Chapter 117 Stack Test Report
Technical Review for the MECT Program

Date Reviewed:	06/09/2021	Reviewer:	Zoe Parker
Customer Reference No.:	CN603211277	Company Name:	Enterprise Products Operating LLC
Regulated Entity Reference No.:	RN102323268	Site Name:	Enterprise Mont Belvieu Complex
Portfolio Number:	P3271	County:	Chambers

Are the Test Results Acceptable for MECT Compliance?

☐ Acceptable under §101.354(a)

☒ Acceptable under §101.354(a) with regional office notification

☐ Acceptable under §101.354(b) with potential deviation and quantification penalty

Test Details

Criteria	Details
FIN:	WTF-T4
EPN:	4/5
Unit Type:	Stationary gas turbines < 1 MW
Emission Factor (EF):	0.0399 lb/MMBtu
Maximum Rated Capacity:	46.61 MMBtu/hr
Average Tested Load:	36.2 MMBtu/hr
Test Company:	Element Materials Technology Houston Inc.
Test Date:	07/12/2017

Technical Review

Review	Yes/No	Explanation
For tests conducted at a major source before March 21, 1999, was written approval from the regional office provided?	N/A	
For initial stack tests, was the test completed within 60 days of the start of operation?	N/A	
Does the stack test report include a summary section, raw data, and emission calculations?	Yes	

Review	Yes/No	Explanation
Were the Chapter §117.8000 test methods used?	Yes	EPA Method 3A and 7E
Was the average tested load at least 90% of the units maximum rated capacity?	No	36.2 = 78% of maximum capacity
Was the test load operating rate for each run within ±20% of the average load?	Yes	
Did each unit have three one-hour test runs, at least 180 minutes of test data, or written approval from the region for shorter test runs?	Yes	
Was the average of all the test runs used for compliance as per §117.8000(b)?	Yes	

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AIR EMISSIONS TESTING

Enterprise Products Operating LLC
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Mont Belvieu, Texas 77580

Date:	July, 2017
Author:	Vicente Gonzalez
Report Number:	EHO005366P-A 2017

SOURCE EMISSIONS TEST
40 CFR 60, SUBPART KKKK: ANNUAL TEST
AND TCEQ RULE 117
ONE TURBINE
058CM12051 (WTF-T4)
EPN: 5A
WEST TEXAS FRACTIONATOR UNIT

TCEQ PERMIT 6798
MONT BELVIEU, TEXAS

element™

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August 24, 2017

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Environmental Manager
Enterprise Products Operating LLC
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Phone: 832-501-4078
Cell: 832-398-1849
Email: crbenton@eprod.com

Re: Source Emissions Test
40 CFR 60, Subpart KKKK Annual Test and TCEQ Rule 117
One turbine: 058CM12051
EPN: 5A
TCEQ Permit 6798
West Texas Fractionator Unit
Mont Belvieu, Texas
Element Project No. EHO005366P-A

Gentlemen:

In accordance with your purchase order no. 198691, Element Materials Technology Houston Inc. hereby submits our test report covering the emissions test program of one (1) turbine located at your facility in Mont Belvieu, Texas. Testing was conducted on July 12, 2017.

Except for submittal to the regulatory agencies, our letters and reports are for the exclusive use of the client to whom they are addressed and shall not be reproduced except in full without the approval of Element and the customer. The use of our name must receive our written approval. Our letters and reports apply only to the sample(s) tested and/or inspected, and are not indicative of the quantities of apparently identical or similar samples.

It has been a pleasure working with you and your personnel. Please let us know if you have any questions concerning this report, or we may be of further service.

Sincerely,

ELEMENT MATERIALS TECHNOLOGY HOUSTON INC.

Vicente Gonzalez
Project Manager
Air Emissions Services Division

Russell J. DiRaimo, P.E.
Manager
Air Emissions Services Division

VG:pjm

EXECUTIVE SUMMARY

Element Materials Technology Houston, Inc. performed an annual emissions test program on July 12, 2017 on one (1) natural gas fired turbine located at the Enterprise Products Operating LLC (Enterprise Products) facility in Mont Belvieu, Texas. The test program was performed to satisfy the annual test requirement contained in EPA's New Source Performance Standards (NSPS) in 40 CFR 60, Subpart KKKK for NOx emissions. NOx and CO emissions were also measured to satisfy TCEQ Rule 117 requirements. The test was performed with the unit firing natural gas at maximum achievable load, for the ambient conditions present. The average results of the test program were as follows:

058CM12051 (WTF-T4) Turbine (EPN 5A)

- The average nitrogen oxide (NOx) emissions were 7.98 ppmvd and 10.82 ppmvd @ 15% O_2, which met the EPA NSPS KKKK limit of 42 ppmvd @ 15% O_2. The unit is in the NOx mass cap and trade and therefore has no specific TCEQ Rule 117 limit.
- The average carbon monoxide (CO) emissions were 26.65 ppmvd and 109.61 ppmvd @ 3% O_2, which met the TCEQ Rule 117 limit of 400 ppmvd @ 3% O_2.
- The average oxygen (O_2) content was 16.55% (dry).
- The turbine operated at an average fuel (natural gas) flow of 36.97 mscfh, with a calculated heat input of 36.20 mmBtu/hr, which represents 77.7% of the rated capacity of 46.61 mmBtu/hr. This rate represented the maximum achievable rate given the ambient conditions, and is also the normal operating rate.

General

- Enterprise Products provided the daily fuel (natural gas) sulfur analysis. On the test date the sulfur content was 2.30 ppm by weight.
- Unit 058CM12051 (EPN 5A) exhausts through EPNs 4 and 5 stacks. Compliance NOx and CO testing was performed on the horizontal duct prior to entering the two (2) exhaust stacks.

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INTRODUCTION

An emissions sampling program was conducted on one (1) natural gas fired turbine at the Enterprise Products Operating LLC (Enterprise Products) facility in Mont Belvieu, Texas. The sampling was performed July 12, 2017 by personnel of Element Materials Technology Houston Inc. (Element) Air Emissions Services (AES) Division. Testing consisted of the determination of nitrogen oxides (NOx), carbon monoxide (CO), oxygen (O_2) and fuel sulfur. Present during the sample program were: Mr. Chris Benton and staff of Enterprise Products, and Messrs. Vicente Gonzalez and Gus Gonzalez of Element.

The turbine is located in the West Texas Fractionator Unit. The turbine is equipment number 058CM12051, is emission point number (EPN) 5A which exhausts through EPN 4 and 5 of the Texas Commission on Environmental Quality (TCEQ) Permit No. 6798. The unit is a Solar Centaur 4700 turbine and is rated at 46.61 mmBtu/hr.

The unit is also regulated by the EPA's New Source Performance Standards (NSPS) Subpart KKKK (40 CFR 60 Subpart KKKK) and TCEQ Rule 117. Testing was required to satisfy the annual test requirement for NOx and sulfur dioxide (SO_2) contained in EPA's Subpart KKKK. In addition, the test program included NOx and CO for TCEQ Rule 117 requirements. Also, although Subpart KKKK allows triplicate twenty (20) minute runs, Enterprise Products requested the sample period be extended to sixty (60) minutes per run in order to meet the TCEQ Rule 117 criteria. Element performed the NOx, CO and O_2 measurements. Enterprise Products determined SO_2 compliance using the fuel sulfur option in Subpart KKKK. The tests were performed at maximum achievable load given the ambient conditions encountered.

PROCESS DESCRIPTION

West Texas Fractionator

The West Texas Fractionator at the Mont Belvieu complex consists of two processes, a natural gas liquid fractionator and an associated deisobutanizer. These units are utilized for the separation of combined product into individual gas liquid products. The feed processed by the fractionator is called Y-grade feed which primarily consists of ethane, propane, butane, and other gas liquid constitutes. The commercial C_4 feed into the deisobutanizer is a mixture of butane and isobutane. Prior to the fractionation process, a CO_2 removal system is utilized to treat the incoming Y-grade feed.

Fractionation

The fractionator process consists of three similar trains of fractionation operations. Each of the fractionation operations consists of one Deethanizer Column, one Depropanizer Column, one Debutanizer Column and one DIB column which is used for butane fractionation for all three combustion turbines. Each column operates in a similar manner.

The treated feed (called "sweetened" feed) is fed into the Deethanizer Column which separates the feed into two streams. The overheads from the Deethanizer, ethane product gases, are cooled using a closed loop propylene refrigeration system associated with the Seminole Fractionator Unit and sent to the storage unit. Two reboilers operated in series are used in the Deethanizer. The first reboiler is heated from the debutanizer overhead, the second from a closed loop hot oil system with heat. The hot oil is heated in the fired HRU which recovers heat from the exhaust of the one gas combustion turbine ducted to it. The compressors are driven by three gas combustion turbines.

The Depropanizer Column receives the feed coming off the bottoms of the Deethanizer and separates propane product from the feed stream. The bottoms are reboiled in two heater convection sections with recovered waste heat from the West Texas DIB gas turbines and the hot oil system. The propane is condensed with two cooling water condensers and sent to storage. The cooling water is supplied by the West Texas Fractionator Cooling Tower and the Seminole Cooling Tower.

The next fractionation column, the Debutanizer, separates the bottoms from the Depropanizer into butane and natural (C5+) gasoline. The butane product is cooled in the Deethanizer economizer reboiler and sent to storage. The natural gasoline products are cooled by cross exchange with the Depropanizer feed and then by a fin fan air cooler and sent to gasoline sulfur treaters.

The second train operates in a similar fashion except that the Depropanizer and the Debutanizer occasionally receive a butane/propane mixture and a butane/gasoline mixture as feed from storage, respectively.

RESULTS

Results of the individual runs, calculated in accordance with EPA and TCEQ procedures, are contained in the Tables section of this report. The average emissions are shown as follows.

- **EPA NSPS Subpart KKKK and TCEQ Rule 117**

Parameter	Average Emissions	Allowable Emissions	% of Allowable
058CM12051 (WTF-T4) Turbine (EPN 5A)			
NOx	7.98 ppmvd	---	---
	10.82 ppmvd @ 15% O_2	42 ppmvd @ 15% O_2[1]	25.8%
CO	26.65 ppmvd	---	---
	109.61 ppmvd @ 3% O_2	400 ppmvd @ 3% O_2[2]	27.40%
O_2	16.55% (dry)	---	---

[1] EPA NSPS Subpart KKKK, Table 1-new turbine firing natural gas, electric generating, heat input at peak load ≤50 mmBtu/hr.
[2] TCEQ Rule 117 limit.

The fuel sulfur content of the natural gas during the test day was:

Test Date	Total Sulfur Content
July 12, 2017	2.30 ppm by weight
Note: Data provided by Enterprise Products.	

The turbine operated at the maximum achievable load given the ambient conditions, which was also the normal operating load. Unit operations were monitored and recorded by Enterprise Products. The average fuel flow and calculated heat input were:

Unit	Average Fuel Flow, mscfh[1]	Calculated Heat Input, mmBtu/hr[1]	% of Load[2]
058CM12051	36.97	36.20	77.7
Footnotes: 1 Data provided by Enterprise Products. 2 The turbine is rated at 46.61 mmBtu/hr.			

PROCEDURES

Sampling equipment and procedures were in conformity, except where noted, with EPA Reference Methods 1, 3A, 7E and 10 of the Code of Federal Regulations, Title 40, Part 60 (40 CFR 60) "Standards of Performance for New Stationary Sources", Appendix A - Reference Methods. The methods incorporated the updates which went into effect on August 14, 2006 published in the May 15, 2006 Federal Register "Updated of Continuous Instrumental Test Methods", with further updates on May 22, 2008 and May 29, 2009.

Sample Port Location: EPA Method 1

Prior to the EPN 5A stacks, Turbine 058CM12051 (EPN 5A) exhausts through a horizontal duct measuring 48 inches in diameter and equipped with two (2) two (2) inch flanged ports, 90° apart and in the

same plane. The ports were approximately 10 feet (side port) and 15 feet (top port) above grade, accessible by scaffolding. The turbine is also equipped with a bypass stack (see Figure 2) that was closed during testing. The six (6) traverse points per port (for the stratification check) were selected via EPA Method 1.

Determination of Oxygen, Nitrogen Oxides and Carbon Monoxide - EPA Methods 3A, 7E and 10

Element obtained three (3) sixty (60) minute sample runs on the turbine using EPA Reference Methods 3A, 7E and 10 for O_2, NOx and CO. The following sampling procedure was used:

Analyzer: The instruments used by Element were a Servomex ServoPro 1440 for O_2, a Thermo Scientific Model 42i-HL for NOx, and a Thermo Scientific Model 48i for CO.

Analytical Principle: Paramagnetic for O_2, chemiluminescence for NOx and nondispersive infrared (NDIR) gas filter correlation (GFC) for CO.

Measurement System Performance: The criteria specified in Methods 3A/7E/10 were used as follows:

- The determination of sampling system bias on the NOx, CO and O_2 analyzers.
- Calibration gases were injected at the back of the probe, thereby requiring the gas to pass through the entire sampling system, including sample transport lines, sample conditioning system and metering apparatus. This ensured accurate calibration by more precisely simulating the actual test methodology.

Apparatus/Components: The criteria for Reference Methods 3A/7E/10 were used. The sample system consisted of a stainless steel probe (heated by the flue gas), heat traced Teflon transport line, heated stainless steel and Teflon diaphragm pump, chilled conditioning system (NOx, CO, O_2), metering apparatus, the respective analyzers and a data acquisition system (DAS). The NOx, CO and O_2 analyzer data are dry based (routed through the conditioning system).

Calibration Gases: The gases specified in Methods 3A/7E/10 were used as follows:

- Used zero grade nitrogen for zero NOx, CO, O_2.
- EPA Protocol mid level (40-60% of calibration span) and high level (100% of calibration span) gases for NOx, CO and O_2. The high level gas sets the calibration span of the NOx, CO and O_2 instruments.

Measurement System Performance Test:

- EPA Protocol gases for the test program were used as stated above.
- Performed the Calibration Error (linearity), Response Time and Sample System Bias measurements as required by Methods 3A/7E/10, which met the criteria for acceptance (± 2.0% of calibration span [or ≤0.5 ppmv or 0.5% O_2] for calibration error and ± 5.0% of calibration span [or ≤ 0.5 ppmv or 0.5% O_2] for bias).
- Determined which calibration check (mid or high level) best approximated the actual emissions and used it for the upscale calibration gas.
- Performed the NO_2 to NO converter efficiency check on the test day, at test conclusion, to ensure proper instrument operation. This was done with a Tedlar® bag mixture of NO calibration gas and ambient air. The result met the less than 2% allowance criteria.

Initial Performance Test: Methods 3A/7E/10 techniques were used as follows:

- The compliance NOx/O_2 emissions test on the turbine consisted of the average of three (3) sixty (60) minute runs. The number of sample points was determined based on the stratification check, conducted in accordance with Section 6.5.6.1(a)-(e) of 40 CFR 75, Appendix A [as referenced in 40 CFR 60, Subpart KKKK Section 60.4400(a)(3)(*i*)(B)]. These criteria require a minimum twelve (12) point traverse located in accordance with EPA Method 1. The NOx and O_2 were measured at each point for at least two (2) minutes, with the average NOx and O_2 concentration determined for each point as well as the overall average. The applicable criteria to reduce the number of points is as follows [Section 60.4400(a)(3)(*ii*)(A) and (B)]:

  a) If the individual NOx concentrations are within ± 10% of the mean for all traverse points, or the individual O_2 concentrations differ by no more than ± 0.5% O_2 from the mean of all traverse points, a three (3) point traverse (either 16.7, 50.0 and 83.3% of stack diameter or width or 0.4, 1.2 and 2.0 meters from the wall for stacks greater than 7.8 feet in diameter on circular stacks) is allowed. The points must be located along the measurement line that exhibited the highest average NOx concentration during the stratification test.

  b) For turbines with a NOx standard greater than 15 ppmvd @ 15% O_2 (as in this case), a single point located at least 1 meter from the stack wall or at the stack centroid if each of the individual traverse point NOx concentrations is within ± 5% of the mean of all traverse points or the

individual O_2 concentrations differ by no more than ± 0.3% O_2 from the mean of all traverse points.

c) Element may either reduce the number of points following the above criteria or elect to use the 12 point sampling criteria.

The turbine met the criteria from item b above by the NOx and O_2 criteria although only one (1) need be met to sample at a single point. All three (3) NOx, CO and O_2 compliance test runs were performed at the stack centroid.

- Element operated on the 100 ppmv NOx, 100 ppmv CO and the 25% O_2 instrument scale. The calibration spans (equivalent to the high level calibration gas) were 94.5 ppmv for NOx, 95.7 ppmv for CO and 20.4% O_2.

- The determination of post-test sample drift and bias (versus the calibration span) for NOx, CO, O_2 was performed after each sample run.

- The post-test drift (zero and span) and sample bias criteria for the NOx, CO and O_2 analyzer are ±3% and ± 5% of calibration span respectively (or alternately ≤ 0.5 ppmv and ≤ 0.5% O_2).

Element Data Acquisition System: Element utilized a custom developed data acquisition system (DAS) incorporating an analog to binary converter box to download the analyzer output signals to the DAS to record parameters. The DAS programming is based on Visual Basic, version 6.0. The data acquisition system downloads the analyzer output to a PRN file in an ASCII format, with data delineated by spaces. The DAS was setup to sample information from the analyzers every second and to save one (1) minute averages of these samples (sixty [60] one [1] second samples are averaged for a one [1] minute average). Element data are presented in a column format with the first column containing the date and the time. Each column is labeled as to which pollutant it is and each file has an initial creation date and time.

Emissions Calculations: Element used the following calculation techniques:

- The Methods 3A/7E/10 requirement to correct the O_2, NOx and CO data for calibration drift and error was applied to each run. Equation 7E-5, as set forth in 40 CFR 60, Appendix A, Method 7E, Section 12.6, was used for the NOx, CO and O_2 analyzers. NOx data were corrected to 15% O_2 for Subpart KKKK requirements, where applicable. CO data were corrected to 3% O_2 for TCEQ Rule 117 comparison. The equations used are shown as follows:

$$Pollutant\ Cd\ lb/dscf = \frac{ppmvd\ x\ molecular\ weight\ x\ 6.242\ x\ 10^{-8}}{24.04}$$

$$NOx\ ppmvd\ @\ 15\%\ O_2 = NOx\ ppmvd\ x\left[\frac{5.9}{20.9 - \%O_{2d}}\right]$$

$$CO\ ppmvd\ @\ 3\%\ O_2 = CO\ ppmvd\ x\left[\frac{17.9}{20.9 - \%O_{2d}}\right]$$

Where:

Molecular Weight=	28 for CO, 46 for NOx (as NO_2)
Cd =	pollutant concentration in lb/dscf
$\%O_2$ =	stack oxygen, dry basis, from Element's test

SAMPLE RECOVERY

Oxygen - EPA Method 3A

Analysis of the oxygen content of the stack gas was performed using a continuous paramagnetic oxygen (O_2) analyzer (Servomex ServoPro 1440). Prior to sampling, the unit was set and calibrated in accordance with manufacturer and EPA instructions using EPA Protocol gases.

To measure O_2, the gas sample is passed through a strong, non-linear magnetic field, which deflects an electromagnetic "dumb-bell" mounted on a torque suspension. This deflection is detected by an optical system and twin photo-cells connected to an amplifier. The "dumb-bell" is wrapped with a coil of wire through which a current is passed to return the "dumb-bell" to its original position. The measured current is proportional to the concentration. Instrument calibration error (linearity), response time and system bias were performed at the field site prior to use. An upscale and zero (N_2) gas were injected after each sample run in order to determine drift and bias.

Copies of field and calculation data are included with this report. The O_2 data were corrected for instrument drift and bias in accordance with calculations presented in Method 7E (NOx instrumental

method). The O_2 data was used in the pollutant corrections to a 3% or 15% O_2 basis (as applicable). O_2 data are shown in Table No. 2.

Nitrogen Oxides – EPA Method 7E

Analysis of nitrogen oxide of the stack gas was performed continuously utilizing a chemiluminescent NO/NOx analyzer (Thermo Scientific Model 42i-HL). Prior to sampling, the unit was set and calibrated in accordance with manufacturer and EPA instructions.

The instrument is capable of measuring NO and NOx (NO plus NO_2). To measure NO, the gas sample is blended with ozone (O_3) in a reaction chamber. Chemiluminescence from the NO/O_3 reaction is monitored through an optical filter by a high-sensitivity photomultiplier positioned at one end of the chamber. The filter/photomultiplier combination responds to light in a narrow-wavelength band unique to the NO/O_3 reaction. The output from the photomultiplier is linearly proportional to the NO concentration. To measure NOx (NO plus NO_2) concentrations, the sample gas flow is diverted through an NO_2 to NO converter. The chemiluminescent response in the reaction chamber to the converter effluent is linearly proportional to the NOx concentration entering the converter. The unit was operated on the NOx mode throughout the emissions test. Calibration error, response time and bias checks were performed in the field prior to the start of the test. An upscale and zero gas were injected after each run to determine drift and bias. Field data were recorded on Element's data acquisition system. An NO_2 to NO converter efficiency was performed on the sample day.

The NOx ppmvd data were corrected to 15% O_2 to satisfy EPA Subpart KKKK. The NOx emissions data are shown in Table No. 2.

Carbon Monoxide – EPA Method 10

Analysis of the stack carbon monoxide levels was performed continuously on-site utilizing a nondispersive infrared (NDIR) gas filter correlation (GFC) analyzer (Thermo Scientific Model 48i). The unit was calibrated in accordance with manufacturer instructions utilizing EPA Protocol span gases (CO in N_2).

To determine CO content, the NDIR-GFC instrument utilizes radiation from an IR source which is chopped and then passed through a gas filter alternating between CO and N_2 due to rotation of the filter wheel. The radiation then passes through a narrow bandpass interference filter and enters a multiple optical pass cell where absorption by the sample gas occurs. The IR radiation then exits the sample cell and falls on an IR detector. The CO gas filter acts to produce a reference beam which cannot be further attenuated by CO in the sample cell. The N_2 side of the filter wheel is transparent to the IR radiation and therefore produces a measure beam which can be absorbed by CO in the cell. The chopped detector signal is modulated by the alternation between the two gas filters with an amplitude related to the concentration of CO in the sample cell. Other gases do not cause modulation of the detector signal since they absorb the reference and measure beams equally. Thus the GFC system responds specifically to CO.

To ensure accurate data, Element determined corrected carbon monoxide results based on zero and calibration drift and bias employing procedures contained in Method 7E (NOx analyzer technique). Calibration error (linearity), response time and system bias checks were performed at the field site prior to use. An upscale gas and zero (N_2) gas were injected after each sample run to determine calibration drift and bias. Field data were recorded on Element's data acquisition system.

The CO ppmvd data were corrected to 3% O_2 to satisfy TCEQ Rule 117. CO emissions data are summarized in Table No. 2.

CUSTODY OF SAMPLES/DATA

After completion of tests, each sample/data was placed in the custody of the technician for analysis. It was his assigned responsibility to insure that each sample/data was recorded and correctly analyzed. Analysis of samples/data was performed at the field site by Element Air Emissions Services personnel. It was the duty of the Program Manager and Project Manager to answer any procedural queries from the Laboratory Technician. Final responsibility rested with the Program Manager and/or Department Manager.

QUALITY ASSURANCE

Element maintains a strict quality assurance program. A summary of this program follows (where applicable):

- Equipment Calibrations
  - Analyzers - calibration with EPA Protocol gases plus calibration error (linearity), response time, bias, converter efficiencies

- Calculation QA
  - hand check of computer programs
  - check print procedure for data entry

- Report QA
  - peer review

DISCUSSION

Element performed NOx, CO and O_2 compliance emissions testing on the WTF-T4 turbine (EPN 5A) to satisfy the requirements of TCEQ Rule 117 and 40 CFR 60, Subpart KKKK. Enterprise Products provided the fuel sulfur to satisfy Subpart KKKK. The test program proceeded as follows:

Day, Date, 2017	Activity
Wednesday, July 12	Element relocated their emissions test trailer to the WTF area, setup on the duct, connected to the generator and turned the generator on. Element allowed the NOx, CO and O_2 analyzers to warm up and performed calibration error, response time and bias checks on the analyzers. Testing began with the 40 CFR 60, Subpart KKKK NOx and O_2 stratification test. The exhaust duct was determined to be unstratified by the NOx criteria. Three (3) sixty (60) minute sample runs were then conducted at the stack centroid between 1340 and 1700. Element performed the NOx converter efficiency test (0.09% which met the 2% criteria). This completed the test program.

All Element's drift and bias for their instruments were acceptable. Enterprise Products provided the fuel flow rate and fuel sulfur data.

SUMMARY

Turbine 058CM12051 (EPN 5A) met the EPA NSPS Subpart KKKK NOx limit of 42 ppmvd @ 15% O_2 (Table 1 to Subpart KKKK) with an average concentration of 10.82 ppmvd @ 15% O_2. The turbine also met the TCEQ Rule 117 CO limit of 400 ppmvd @ 3% O_2 with an average concentration of 109.61 ppmvd @ 3% O_2. The fuel sulfur analysis was 2.30 ppm by weight.

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TABLE NO. 1

SOURCE IDENTIFICATION
Element Project No. EHO005366P-A

Plant Name:	Enterprise Products Operating LLC			**Phone:**	832-501-4078
Address:	10207 FM 1942				
City:	Mont Belvieu	**State:**	Texas	**Zip:**	77580
Plant Representative:	Mr. Christopher Benton				
Process or Function:	West Texas Fractionator Unit				
Source Identification:	Turbine WTF-T4 : 058CM12051 (EPN 5A) Solar Centaur 4700				
	(Note : the unit exhausts thru EPN 4 and 5 stacks- tested on duct prior to the stacks)				
Stack or Duct Description:	Round, horizontal/angled duct prior to the exhaust stacks				
Duct Height:	~10-15 feet to scaffolding				
Duct Diameter:	48 inches				
Stack Temperature:	NA				
Percent Moisture:	NA				
Sampling Facilities:	2 - 2 inch flanged ports with gate valves				
	Scaffold built to access ports.				
Process (Batch or Continuous):	Continuous				
Normal Operating Capacity:	Designed Firing Rate: 46.61 mmBtu/hr				
Operational Status (Sampling Period):	36.20 mmBtu/hr Fired Duty				
	36.97 MSCFH Fuel Gas Flow				
Sampling Parameters:	TCEQ Rule 117 : NOx, CO and O_2				
	EPA NSPS Subpart KKKK : NOx, O_2 and fuel sulfur				
Date Tested:	July 12, 2017				

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TABLE NO. 2

SUMMARY OF SAMPLING RESULTS - NOx, CO and O_2

Enterprise Products Operating LLC
Mont Belvieu, Texas

Element Project No. EHO005366P-A

Run No.	Date	Sample Time	Nitrogen Oxides (NOx) ppmvd	Nitrogen Oxides (NOx) ppmvd @ 15% O_2	Carbon Monoxide (CO) ppmvd	Carbon Monoxide (CO) ppmvd @ 3% O_2	Oxygen (O_2) % (dry)
Source : 058CM12051 (WTF-T4) Turbine (EPN 5A)							
1	12-Jul-17	1340-1440	8.12	11.14	24.14	100.42	16.60
2	12-Jul-17	1450-1550	8.01	10.81	28.21	115.46	16.53
3	12-Jul-17	1600-1700	7.80	10.52	27.61	112.96	16.52
		Average:	**7.98**	**10.82**	**26.65**	**109.61**	**16.55**

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TABLE NO. 3

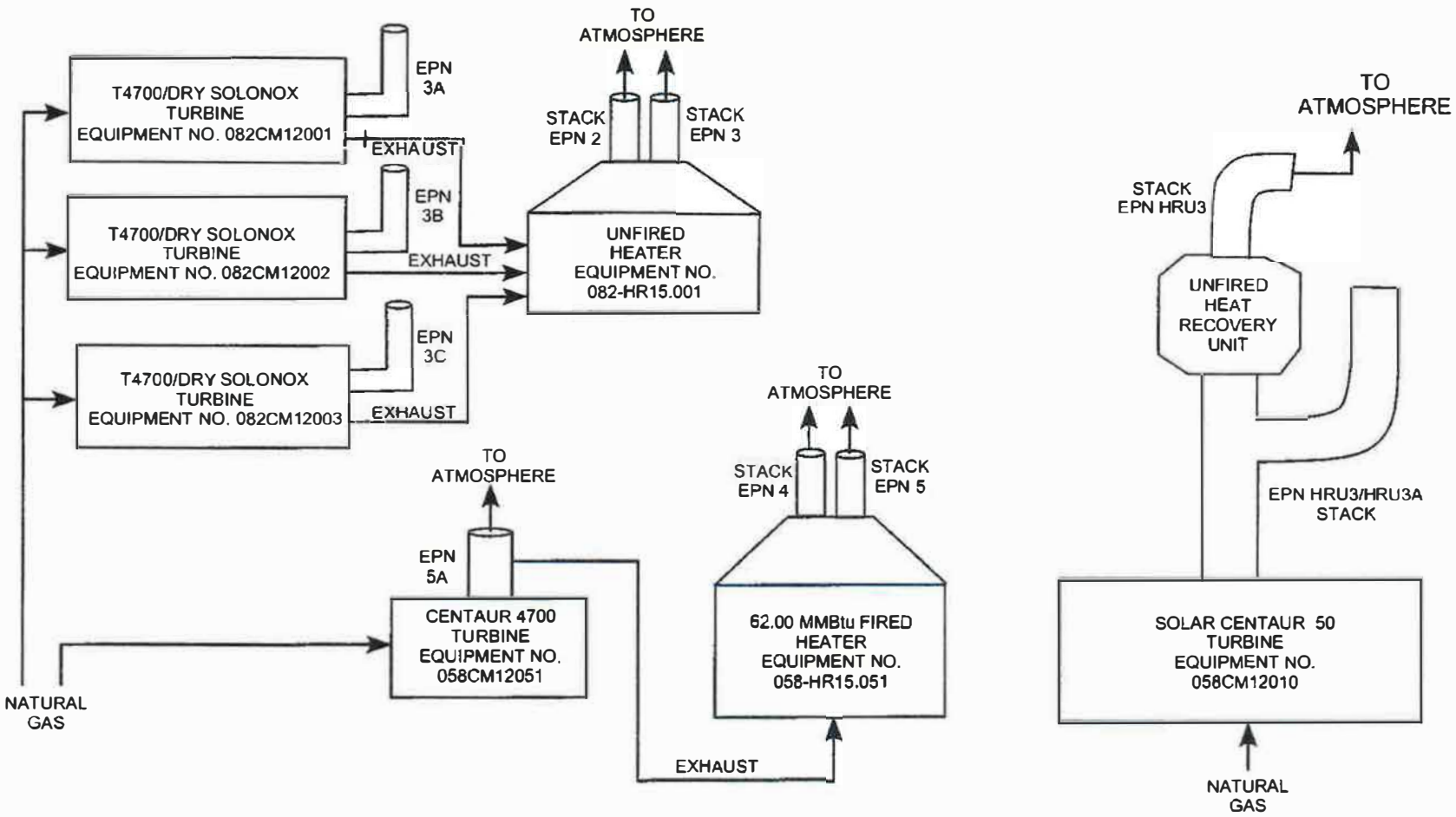
SUMMARY OF SAMPLING RESULTS - Operating Data

Enterprise Products Operating LLC
Mont Belvieu, Texas

Element Project No. EHO005366P-A

Run No.	Date	Sample Time	Fuel Flow (Natural Gas) mscfh	Calculated Heat Input mmBtu/hr	% Load
Source : 058CM12051 (WTF-T4) Turbine (EPN 5A)			***(Rated Capacity = 46.61 mmBtu/hr)***		
1	12-Jul-17	1340-1440	36.99	36.23	77.7%
2	12-Jul-17	1450-1550	36.93	36.17	77.6%
3	12-Jul-17	1600-1700	36.98	36.21	77.7%
		Average:	**36.97**	**36.20**	**77.7%**

Note: Data provided by Enterprise Products.



The WCM Group, Inc.
P. O. Box 3247
Humble, TX 77347-3247
(281) 446-7070 Fax (281) 446-3348

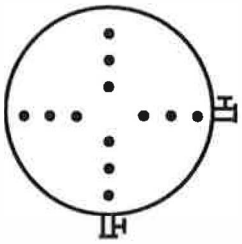
WEST TEXAS FRACTIONATOR UNITS
FLOW CHART DIAGRAM

ENTERPRISE PRODUCTS OPERATING LLC
10207 FM 1942
Mont Belvieu, Chambers County, Texas

FIGURE **3A**

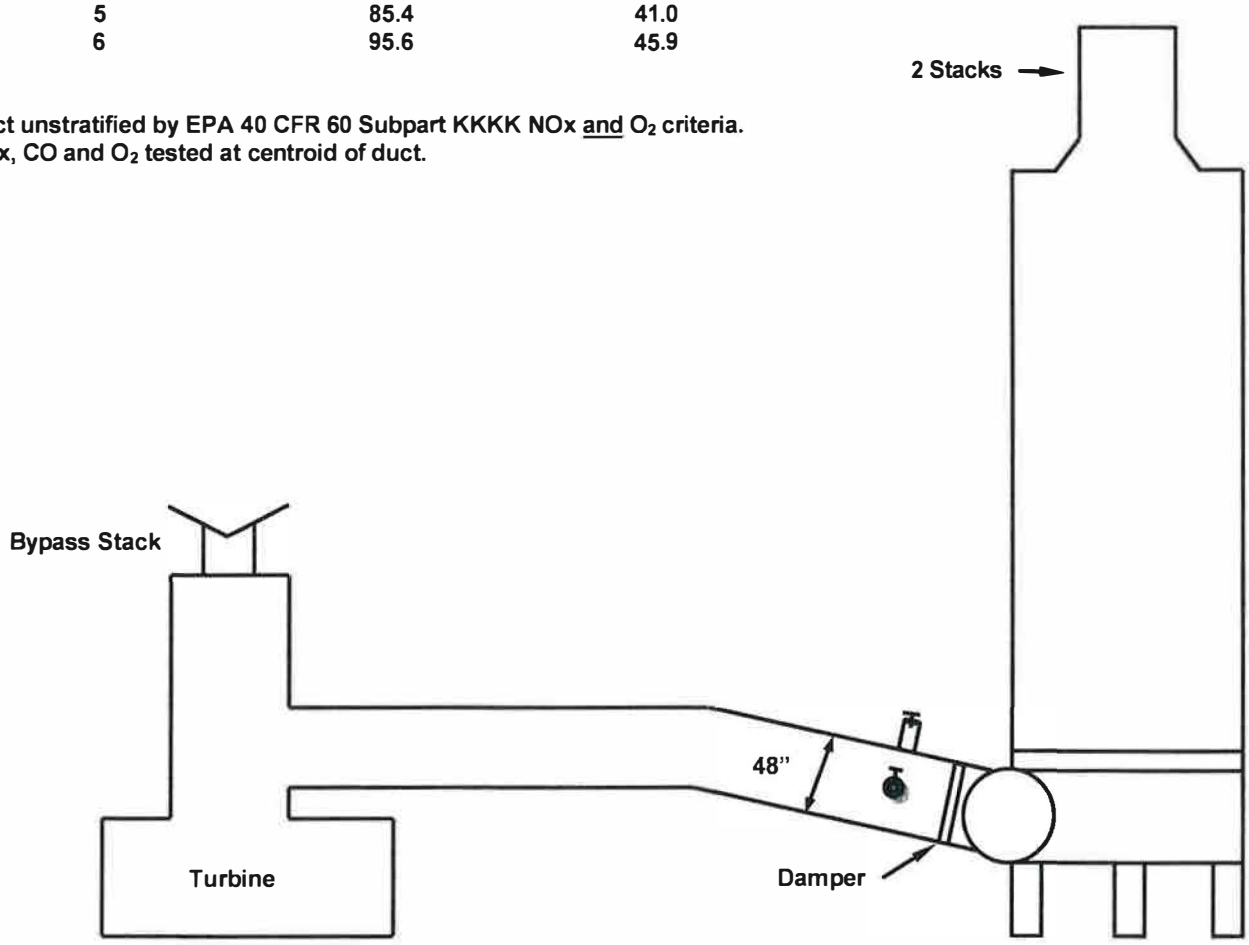
DRAWN BY:	LLB
DATE:	9/1/2011
REV. DATE:	
DRAWING ID:	H:\client\EPO\MTB\West TexasFractionator\Figure 3a Flow_WTX FRAC.cvx

Cross-sectional View



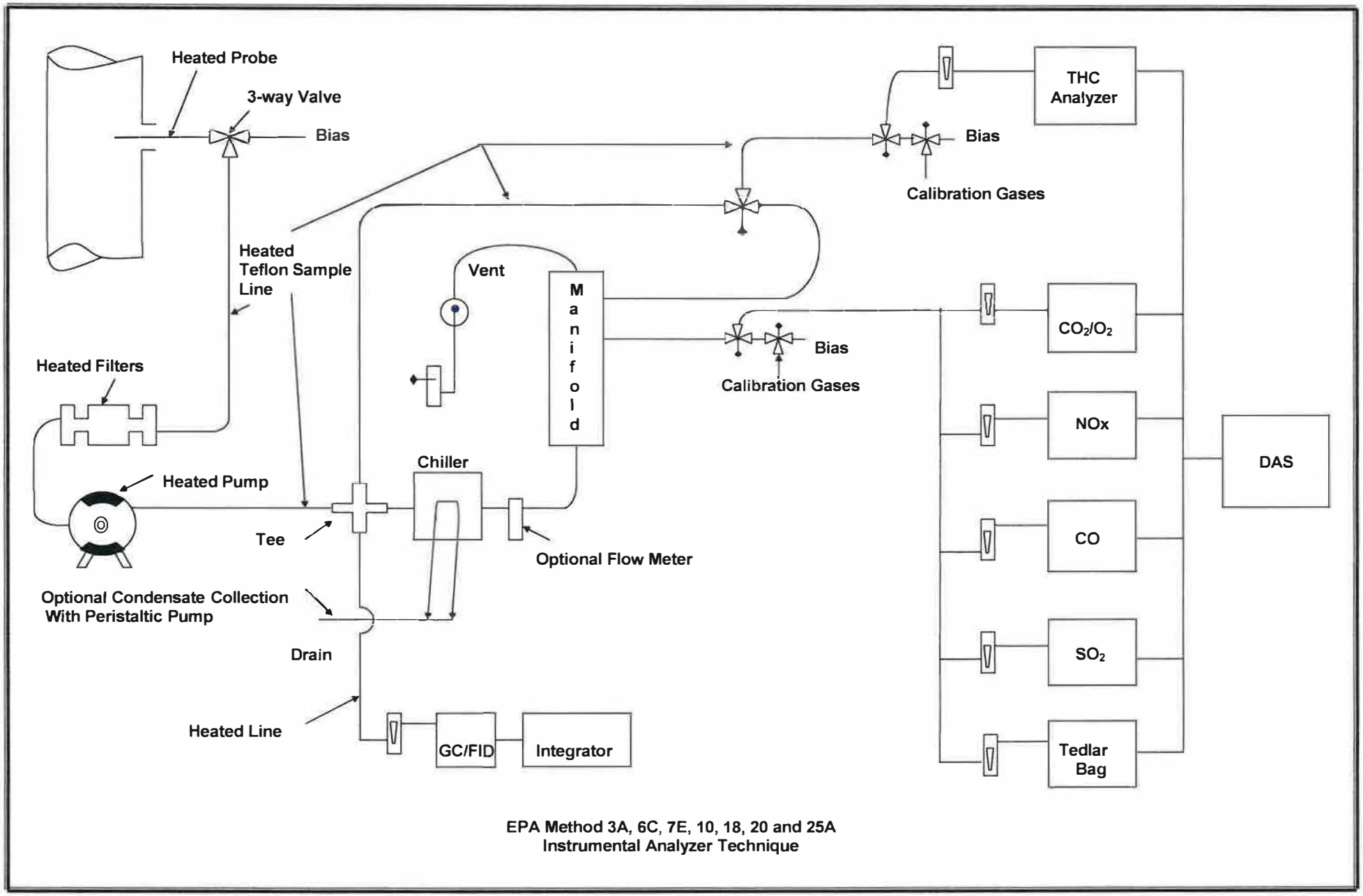
NOx and O_2 Traverse Point No.	Percent of Diameter Distance	Distance from Stack Wall, inches
1	4.4	2.1
2	14.6	7.0
3	29.6	14.2
4	70.4	33.8
5	85.4	41.0
6	95.6	45.9

Duct unstratified by EPA 40 CFR 60 Subpart KKKK NOx and O_2 criteria.
NOx, CO and O_2 tested at centroid of duct.



Enterprise Products Operating LLC
Mont Belvieu, Texas
WTF-T4 Turbine

element



EPA Method 3A, 6C, 7E, 10, 18, 20 and 25A
Instrumental Analyzer Technique

MISC/CAD DRAWINGS/EPA 3A,6C,7E,10,18,20,25A

Element Materials Technology Houston Inc.
Houston, Texas

Source: **Enterprise Products (Mont Belvieu, Tx) - WTF-T4 Turbine** **Analyst:** V Gonzalez
NO_x, CO, O_2 and SO_2 Calibration - Adjusted for Zero and Span Drift and Bias **Proj. No.** EHO005366P-A

Analyzer	Calibration Span of Analyzer ppm, % *	Span Gas Concentration ppm, % *	Span Gas Cylinder Number	Expiration Date	Calibration Error Value Zero	Calibration Error Value Mid Level	Fuel F-Factor HHV dscf/mmBtu	Gross Caloric Value HHV Btu/ft³
CO	95.7	46.0	ALM036415	8/30/2024	0.35	45.13	8,710	na
NO_x	94.5	52.3	ALM005770	12/1/2024	0.23	51.84		
O_2	20.4	11.7	CC483005	12/16/2024	0.00	11.68		
SO_2	na	na	na	na	na	na		

	CO	NOx	O2	SO2
Initial Zero Bias - % of Span	-0.02	0.14	0.15	na
Initial Span Bias - % of Span	0.05	-1.40	-0.29	na

Drift and Bias Limits	
Drift	+/- 3% of Span
Bias	+/- 5% of Span

Run No.	Zero Gas Initial Reading	Zero Gas Final Reading	Zero Gas Difference ppm, % *	Zero Gas % Drift	Zero Gas % Bias	Span Gas Initial Reading	Span Gas Final Reading	Span Gas Difference ppm, % *	Span Gas % Drift	Span Gas % Bias
1 CO	0.33	0.09	-0.24	-0.25	-0.27	45.18	44.40	-0.78	-0.82	-0.76
NO_x	0.36	0.40	0.04	0.04	0.18	50.52	51.18	0.66	0.70	-0.70
O_2	0.03	0.06	0.03	0.15	0.29	11.62	11.73	0.11	0.54	0.25
SO_2	na	na	na	na	na	na	na	na	na	na
2 CO	0.09	0.27	0.18	0.19	-0.08	44.40	44.61	0.21	0.22	-0.54
NO_x	0.40	0.57	0.17	0.18	0.36	51.18	50.63	-0.55	-0.58	-1.28
O_2	0.06	0.05	-0.01	-0.05	0.25	11.73	11.57	-0.16	-0.78	-0.54
SO_2	na	na	na	na	na	na	na	na	na	na
3 CO	0.27	0.05	-0.22	-0.23	-0.31	44.61	44.67	0.06	0.06	-0.48
NO_x	0.57	0.68	0.11	0.12	0.48	50.63	51.11	0.48	0.51	-0.77
O_2	0.05	0.05	0.00	0.00	0.25	11.57	11.66	0.09	0.44	-0.10
SO_2	na	na	na	na	na	na	na	na	na	na

EQUATIONS: % Drift =[(Final Reading - Initial Reading)/Instrument Span] x 100
% Bias =[(Final Reading - Calibration Error Value) /Instrument Span] x 100
(NOTE: Initial Bias uses Initial Reading in place of Final Reading)

Run No.	Uncorrected Stack Gas Concentration ppm, % *	Average of Zero Gas	Average of Span Gas	Corrected Stack Gas Concentration ppm, % *	C Concentration in lb/dscf	C Concentration CO ppmvd@3%O2 NOx ppmvd@15%O2	Date Time
1 CO	23.60	0.21	44.79	24.14	1.755E-06	100.42	
NO_x	8.22	0.38	50.85	8.12	9.704E-07	11.14	7/12/2017
O_2	16.60	0.05	11.68	16.60			1340-1440
SO_2	na	na	na	na	na		
2 CO	27.36	0.18	44.51	28.21	2.051E-06	115.46	
NO_x	8.21	0.49	50.91	8.01	9.571E-07	10.81	7/12/2017
O_2	16.49	0.06	11.65	16.53			1450-1550
SO_2	na	na	na	na	na		
3 CO	26.86	0.16	44.64	27.61	2.007E-06	112.96	
NO_x	8.12	0.63	50.87	7.80	9.318E-07	10.52	7/12/2017
O_2	16.44	0.05	11.62	16.52			1600-1700
SO_2	na	na	na	na	na		
Avg CO				26.65	1.938E-06	109.61	
NO_x				7.98	9.531E-07	10.82	
O_2				16.55			
SO_2				na	na		

Run No.	Method 19 Calculations Emission Rate lb/mmBtu **	Fuel Flow Rate MSCFH	Emission Rate lb/hr	Methods 1-4 Calculation Q_{sd} dscf/hr	Emission Rate lb/hr	Allowable Emission Rate lb/hr	Percent of Allowable Emission Rate
1 CO	0.0742	36.99	na	na	na	na	na
NO_x	0.0411	36.99	na	na	na	na	na
SO_2	na	na	na	na	na	na	na
2 CO	0.0854	36.93	na	na	na	na	na
NO_x	0.0398	36.93	na	na	na	na	na
SO_2	na	na	na	na	na	na	na
3 CO	0.0835	36.98	na	na	na	na	na
NO_x	0.0388	36.98	na	na	na	na	na
SO_2	na	na	na	na	na	na	na
Avg CO	0.0810	36.97	na	na	na	na	na
NO_x	0.0399	36.97	na	na	na	na	na
SO_2	na	na	na	na	na	na	na

Note * O_2 is expressed in percent ** lb/mmBtu is calculated using 0% O_2 and the HHV F-Factor

EQUATIONS: lb/mmBtu = C x F x [20.9/(20.9-%O2)]
Method 19 lb/hr = lb/mmBtu x Fuel Flow Rate x Gross Calorific Value 1x10-6
Method 1-4 lb/hr = C x Qsd

JVh

Enterprise
WTF-4
Mont Belvieu , Texas
EHO005366P-A
File Name: 07-12-17_12-34

Date & Time	CO	NOx	O2
M/D/Y H:M	ppm	ppm	%
7/12/2017 13:41	26.16	8.73	16.62
7/12/2017 13:42	25.88	8.74	16.62
7/12/2017 13:43	27.89	8.67	16.63
7/12/2017 13:44	27.26	8.55	16.64
7/12/2017 13:45	26.2	8.48	16.64
7/12/2017 13:46	25.91	8.53	16.64
7/12/2017 13:47	26.19	8.51	16.63
7/12/2017 13:48	27.12	8.46	16.63
7/12/2017 13:49	27.01	8.45	16.64
7/12/2017 13:50	27.7	8.44	16.63
7/12/2017 13:51	27.67	8.43	16.64
7/12/2017 13:52	27.75	8.36	16.63
7/12/2017 13:53	25.92	8.37	16.63
7/12/2017 13:54	25.69	8.35	16.63
7/12/2017 13:55	27.83	8.22	16.62
7/12/2017 13:56	27.58	8.26	16.62
7/12/2017 13:57	27.41	8.32	16.63
7/12/2017 13:58	28.92	8.24	16.62
7/12/2017 13:59	15.02	8.29	16.63
7/12/2017 14:00	5.61	8.15	16.63
7/12/2017 14:01	5.43	8.16	16.63
7/12/2017 14:02	5.52	8.06	16.63
7/12/2017 14:03	5.51	8.06	16.63
7/12/2017 14:04	5.56	8.05	16.63
7/12/2017 14:05	5.54	8.07	16.63
7/12/2017 14:06	5.69	8.02	16.62
7/12/2017 14:07	5.57	8.06	16.62
7/12/2017 14:08	5.43	8.04	16.63
7/12/2017 14:09	5.5	8.03	16.63
7/12/2017 14:10	9.55	8.02	16.62
7/12/2017 14:11	27.91	8.06	16.61
7/12/2017 14:12	29.06	8.09	16.61
7/12/2017 14:13	28.4	8.13	16.61
7/12/2017 14:14	27.26	8.21	16.61
7/12/2017 14:15	27.07	8.26	16.6
7/12/2017 14:16	28.16	8.2	16.61
7/12/2017 14:17	28.68	8.19	16.6
7/12/2017 14:18	28.99	8.14	16.61
7/12/2017 14:19	29.17	8.15	16.61
7/12/2017 14:20	29.12	8.16	16.61
7/12/2017 14:21	28.26	8	16.33
7/12/2017 14:22	29.07	8.12	16.61
7/12/2017 14:23	29.22	8.1	16.61
7/12/2017 14:24	28.81	8.19	16.61
7/12/2017 14:25	28.61	8.15	16.61
7/12/2017 14:26	27.45	8.24	16.6
7/12/2017 14:27	28.41	8.13	16.6
7/12/2017 14:28	29.17	8.01	16.6
7/12/2017 14:29	28.85	8.13	16.61
7/12/2017 14:30	28.7	8.12	16.61
7/12/2017 14:31	28.71	8.12	16.61
7/12/2017 14:32	27.03	8.2	16.61
7/12/2017 14:33	26.62	8.1	16.33
7/12/2017 14:34	27.7	8.2	16.62
7/12/2017 14:35	27.56	8.02	16.34
7/12/2017 14:36	27.38	8.24	16.61
7/12/2017 14:37	28.29	8.14	16.6
7/12/2017 14:38	29.29	8.05	16.6
7/12/2017 14:39	28.55	8.03	16.6
7/12/2017 14:40	28.3	8.05	16.61
Avg =	**23.60**	**8.22**	**16.60**

Enterprise
WTF-4
Mont Belvieu , Texas
EHO005366P-A
File Name: 07-12-17_12-34

Date & Time M/D/Y H:M	CO ppm	NOx ppm	O2 %
7/12/2017 14:51	28.2	7.55	16.17
7/12/2017 14:52	27.64	8.13	16.5
7/12/2017 14:53	27.94	8.15	16.5
7/12/2017 14:54	27.36	8.27	16.5
7/12/2017 14:55	28.22	8.15	16.5
7/12/2017 14:56	27.87	8.24	16.5
7/12/2017 14:57	26.82	8.24	16.5
7/12/2017 14:58	27.32	8.24	16.49
7/12/2017 14:59	27.53	8.21	16.5
7/12/2017 15:00	27.54	8.11	16.5
7/12/2017 15:01	27.9	8.18	16.5
7/12/2017 15:02	28.43	8.14	16.51
7/12/2017 15:03	28.17	8.16	16.51
7/12/2017 15:04	27.86	8.16	16.5
7/12/2017 15:05	27.14	8.18	16.5
7/12/2017 15:06	27.57	8.15	16.5
7/12/2017 15:07	27.54	8.19	16.51
7/12/2017 15:08	26.4	8.27	16.5
7/12/2017 15:09	27.15	8.21	16.51
7/12/2017 15:10	26.73	8.21	16.51
7/12/2017 15:11	26.16	8.26	16.51
7/12/2017 15:12	26.89	8.24	16.51
7/12/2017 15:13	28.53	8.13	16.51
7/12/2017 15:14	28.4	8.1	16.51
7/12/2017 15:15	26.52	8.25	16.51
7/12/2017 15:16	25.27	8.36	16.51
7/12/2017 15:17	26.97	8.19	16.51
7/12/2017 15:18	27.2	8.19	16.5
7/12/2017 15:19	26.83	8.19	16.5
7/12/2017 15:20	27.04	8.19	16.5
7/12/2017 15:21	26.2	8.24	16.51
7/12/2017 15:22	26.53	8.23	16.5
7/12/2017 15:23	26.54	8.27	16.5
7/12/2017 15:24	26.98	8.27	16.5
7/12/2017 15:25	26.57	8.24	16.5
7/12/2017 15:26	27.26	8.06	16.23
7/12/2017 15:27	27.63	8.18	16.5
7/12/2017 15:28	28.71	8.19	16.51
7/12/2017 15:29	28.16	8.07	16.23
7/12/2017 15:30	27.78	8.29	16.5
7/12/2017 15:31	28.11	8.23	16.51
7/12/2017 15:32	27.77	8.22	16.51
7/12/2017 15:33	28.45	8.17	16.51
7/12/2017 15:34	26.86	8.33	16.52
7/12/2017 15:35	26.97	8.39	16.52
7/12/2017 15:36	28.12	8.27	16.53
7/12/2017 15:37	27.78	8.23	16.53
7/12/2017 15:38	27.84	8.24	16.53
7/12/2017 15:39	28.27	8.15	16.53
7/12/2017 15:40	28.32	8.17	16.53
7/12/2017 15:41	27.56	8.21	16.53
7/12/2017 15:42	27.18	8.2	16.53
7/12/2017 15:43	27.98	8.27	16.53
7/12/2017 15:44	27.9	8.17	16.53
7/12/2017 15:45	27.52	8.13	16.25
7/12/2017 15:46	26.05	8.33	16.52
7/12/2017 15:47	26.17	8.37	16.53
7/12/2017 15:48	25.95	8.35	16.53
7/12/2017 15:49	26.2	8.4	16.52
7/12/2017 15:50	26.87	8.33	16.52
Avg =	**27.36**	**8.21**	**16.49**

Enterprise
WTF-4
Mont Belvieu , Texas
EHO005366P-A
File Name: 07-12-17_12-34

Date & Time	CO	NOx	O2
M/D/Y H:M	ppm	ppm	%
7/12/2017 16:01	25.67	8.46	16.47
7/12/2017 16:02	26.26	8.22	16.5
7/12/2017 16:03	11.58	8.18	16.51
7/12/2017 16:04	22.62	7.71	15.68
7/12/2017 16:05	26.86	8.14	16.5
7/12/2017 16:06	26.78	8.12	16.5
7/12/2017 16:07	27.26	8.11	16.5
7/12/2017 16:08	27.88	8.12	16.5
7/12/2017 16:09	27.65	8.07	16.5
7/12/2017 16:10	27.45	8.16	16.5
7/12/2017 16:11	27.52	8.13	16.5
7/12/2017 16:12	27.54	7.9	16.22
7/12/2017 16:13	27.16	8.06	16.49
7/12/2017 16:14	26.59	8.13	16.5
7/12/2017 16:15	27.09	8.08	16.49
7/12/2017 16:16	27.94	8.08	16.5
7/12/2017 16:17	26.9	7.92	16.22
7/12/2017 16:18	27.24	8.08	16.49
7/12/2017 16:19	27.37	8.02	16.49
7/12/2017 16:20	26.56	8.12	16.49
7/12/2017 16:21	27.9	8.04	16.49
7/12/2017 16:22	27.65	8.05	16.49
7/12/2017 16:23	28.85	8	16.49
7/12/2017 16:24	27.73	8.09	16.49
7/12/2017 16:25	28.03	8.12	16.49
7/12/2017 16:26	28.64	8.06	16.49
7/12/2017 16:27	27.85	8.11	16.49
7/12/2017 16:28	26.86	8.17	16.49
7/12/2017 16:29	27.07	8.12	16.49
7/12/2017 16:30	27.92	8.1	16.5
7/12/2017 16:31	27.14	8.12	16.49
7/12/2017 16:32	25.94	8.04	16.22
7/12/2017 16:33	26.18	8.19	16.49
7/12/2017 16:34	27.6	8.15	16.49
7/12/2017 16:35	27.13	8.17	16.49
7/12/2017 16:36	26.22	8.02	16.22
7/12/2017 16:37	25.93	8.02	16.22
7/12/2017 16:38	27.53	8.14	16.49
7/12/2017 16:39	27.45	8.16	16.49
7/12/2017 16:40	26.81	8.16	16.49
7/12/2017 16:41	26.14	8.24	16.49
7/12/2017 16:42	25.16	8.27	16.49
7/12/2017 16:43	25.86	8.24	16.49
7/12/2017 16:44	26.66	8.18	16.49
7/12/2017 16:45	26.62	8.18	16.49
7/12/2017 16:46	27.44	8.12	16.49
7/12/2017 16:47	26.86	8.12	16.49
7/12/2017 16:48	26.89	8.17	16.49
7/12/2017 16:49	27.23	8.15	16.49
7/12/2017 16:50	27.46	8.01	16.21
7/12/2017 16:51	27.47	7.96	16.21
7/12/2017 16:52	28.03	7.98	16.21
7/12/2017 16:53	28.01	8.13	16.49
7/12/2017 16:54	27.59	8.15	16.49
7/12/2017 16:55	27.55	8.22	16.5
7/12/2017 16:56	27.75	8.22	16.5
7/12/2017 16:57	27.8	8.19	16.5
7/12/2017 16:58	27.58	8.26	16.49
7/12/2017 16:59	27.33	8.27	16.49
7/12/2017 17:00	27.74	8.28	16.49
Avg =	**26.86**	**8.12**	**16.44**

Enterprise
WTF-4
Mont Belvieu , Texas
EH0005366P — A
File Name: 07-12-17 12-34

Date and Time	CO	NOx	O2	THC	CO2	SO2	Flow
MM/DD/YY HH:MM	ppm	ppm	%	ppm	%	ppm	lpm
7/12/2017 12:34	0.12	-0.37	14.80				
7/12/2017 12:35	2.68	-0.31	9.33				
7/12/2017 12:36	4.81	-0.50	0.01				
7/12/2017 12:37	4.57	-0.51	0.00				
7/12/2017 12:38	3.09	0.03	0.00				
7/12/2017 12:39	0.35	0.23	-0.01				
7/12/2017 12:40	4.93	0.21	5.44				
7/12/2017 12:41	85.21	79.93	20.49				
7/12/2017 12:42	97.02	49.92	20.45				
7/12/2017 12:43	96.13	90.69	20.44				
7/12/2017 12:44	95.04	93.83	16.02				
7/12/2017 12:45	95.06	94.18	10.23				
7/12/2017 12:46	94.93	94.21	11.16				
7/12/2017 12:47	62.93	76.51	11.70				
7/12/2017 12:48	45.12	55.94	11.68				
7/12/2017 12:49	45.13	33.73	5.86				
7/12/2017 12:50	42.80	35.28	0.06				
7/12/2017 12:51	7.11	51.34	0.05				
7/12/2017 12:52	0.32	52.12	0.04				
7/12/2017 12:53	0.32	51.33	0.04				
7/12/2017 12:54	0.33	31.51	0.03				
7/12/2017 12:55	0.32	0.59	0.03				
7/12/2017 12:56	0.24	0.44	1.81				
7/12/2017 12:57	-0.01	0.36	2.76				
7/12/2017 12:58	0.82	0.36	0.01				
7/12/2017 12:59	35.24	0.34	0.00				
7/12/2017 13:00	44.29	0.33	0.00				
7/12/2017 13:01	45.18	0.32	0.00				
7/12/2017 13:02	34.91	0.32	6.01				

RT - ↑ 27 sec
↓ 30 sec

7/12/2017 13:04	-0.29	0.32	11.62
7/12/2017 13:05	-0.34	0.31	11.78
7/12/2017 13:06	-0.23	17.49	4.00
7/12/2017 13:07	0.12	50.52	0.04
7/12/2017 13:08	0.16	51.60	0.03
7/12/2017 13:09	0.17	42.22	11.21
7/12/2017 13:10	0.16	0.90	20.82
7/12/2017 13:11	0.19	0.49	20.85
7/12/2017 13:12	0.21	0.49	20.86
7/12/2017 13:13	0.19	0.39	20.88
7/12/2017 13:14	0.19	0.35	20.89
7/12/2017 13:15	0.16	0.35	20.85
7/12/2017 13:16	0.27	0.45	20.87
7/12/2017 13:17	3.24	1.24	20.35
7/12/2017 13:18	12.95	2.59	18.05
7/12/2017 13:19	39.21	6.87	16.64
7/12/2017 13:20	32.38	8.34	16.63
7/12/2017 13:21	29.94	8.31	16.63
7/12/2017 13:22	28.93	8.36	16.62
7/12/2017 13:23	27.82	8.44	16.62
7/12/2017 13:24	27.34	8.40	16.62
7/12/2017 13:25	28.27	8.41	16.61
7/12/2017 13:26	29.00	8.44	16.60
7/12/2017 13:27	30.06	8.43	16.60
7/12/2017 13:28	30.13	8.38	16.60
7/12/2017 13:29	29.19	8.55	16.59
7/12/2017 13:30	28.54	8.69	16.59
7/12/2017 13:31	28.61	8.76	16.59
7/12/2017 13:32	28.83	8.84	16.59
7/12/2017 13:33	28.38	8.84	16.58
7/12/2017 13:34	23.44	8.16	18.13
7/12/2017 13:35	1.40	1.10	20.28
7/12/2017 13:36	0.23	0.49	20.40
7/12/2017 13:37	0.20	0.43	20.41
7/12/2017 13:38	1.54	0.42	19.57
7/12/2017 13:39	23.78	7.45	16.65
7/12/2017 13:40	26.78	8.79	16.62
7/12/2017 13:41	26.16	8.75	16.62
7/12/2017 13:42	25.88	8.74	16.62
7/12/2017 13:43	27.89	8.67	16.63
7/12/2017 13:44	27.26	8.55	16.64
7/12/2017 13:45	26.20	8.48	16.64
7/12/2017 13:46	25.91	8.53	16.64
7/12/2017 13:47	26.19	8.51	16.63
7/12/2017 13:48	27.12	8.46	16.63
7/12/2017 13:49	27.01	8.45	16.64
7/12/2017 13:50	27.70	8.44	16.63
7/12/2017 13:51	27.67	8.43	16.64
7/12/2017 13:52	27.75	8.36	16.63
7/12/2017 13:53	25.92	8.37	16.63
7/12/2017 13:54	25.69	8.35	16.63
7/12/2017 13:55	27.83	8.22	16.62
7/12/2017 13:56	27.58	8.26	16.62
7/12/2017 13:57	27.41	8.32	16.63
7/12/2017 13:58	28.92	8.24	16.62
7/12/2017 13:59	15.02	8.29	16.63
7/12/2017 14:00	5.61	8.15	16.63
7/12/2017 14:01	5.43	8.16	16.63
7/12/2017 14:02	5.52	8.06	16.63
7/12/2017 14:03	5.51	8.06	16.63
7/12/2017 14:04	5.56	8.05	16.63
7/12/2017 14:05	5.54	8.07	16.63
7/12/2017 14:06	5.69	8.02	16.62
7/12/2017 14:07	5.57	8.06	16.62

Run #1

7/12/2017 14:10	9.55	8.02	16.62
7/12/2017 14:11	27.91	8.06	16.61
7/12/2017 14:12	29.06	8.09	16.61
7/12/2017 14:13	28.40	8.13	16.61
7/12/2017 14:14	27.26	8.21	16.61
7/12/2017 14:15	27.07	8.26	16.60
7/12/2017 14:16	28.16	8.20	16.61
7/12/2017 14:17	28.68	8.19	16.60
7/12/2017 14:18	28.99	8.14	16.61
7/12/2017 14:19	29.17	8.15	16.61
7/12/2017 14:20	29.12	8.16	16.61
7/12/2017 14:21	28.26	8.00	16.33
7/12/2017 14:22	29.07	8.12	16.61
7/12/2017 14:23	29.22	8.10	16.61
7/12/2017 14:24	28.81	8.19	16.61
7/12/2017 14:25	28.61	8.15	16.61
7/12/2017 14:26	27.45	8.24	16.60
7/12/2017 14:27	28.41	8.13	16.60
7/12/2017 14:28	29.17	8.01	16.60
7/12/2017 14:29	28.85	8.13	16.61
7/12/2017 14:30	28.70	8.12	16.61
7/12/2017 14:31	28.71	8.12	16.61
7/12/2017 14:32	27.03	8.20	16.61
7/12/2017 14:33	26.62	8.10	16.33
7/12/2017 14:34	27.70	8.20	16.62
7/12/2017 14:35	27.56	8.02	16.34
7/12/2017 14:36	27.38	8.24	16.61
7/12/2017 14:37	28.29	8.14	16.60
7/12/2017 14:38	29.29	8.05	16.60
7/12/2017 14:39	28.55	8.03	16.60
7/12/2017 14:40	28.30	8.05	16.61
7/12/2017 14:41	10.73	33.99	1.03
7/12/2017 14:42	0.10	49.29	0.06
7/12/2017 14:43	5.09	51.18	0.04
7/12/2017 14:44	0.10	39.08	6.79
7/12/2017 14:45	0.15	0.98	11.78
7/12/2017 14:46	0.11	0.69	11.73
7/12/2017 14:47	16.36	0.51	3.63
7/12/2017 14:48	11.50	0.40	0.05
7/12/2017 14:49	14.40	0.38	0.03
7/12/2017 14:50	43.15	0.43	4.85
7/12/2017 14:51	28.20	7.55	16.17
7/12/2017 14:52	27.64	8.13	16.50
7/12/2017 14:53	27.94	8.15	16.50
7/12/2017 14:54	27.36	8.27	16.50
7/12/2017 14:55	28.22	8.15	16.50
7/12/2017 14:56	27.87	8.24	16.50
7/12/2017 14:57	26.82	8.24	16.50
7/12/2017 14:58	27.32	8.24	16.49
7/12/2017 14:59	27.53	8.21	16.50
7/12/2017 15:00	27.54	8.11	16.50
7/12/2017 15:01	27.90	8.18	16.50
7/12/2017 15:02	28.43	8.14	16.51
7/12/2017 15:03	28.17	8.16	16.51
7/12/2017 15:04	27.86	8.16	16.50
7/12/2017 15:05	27.14	8.18	16.50
7/12/2017 15:06	27.57	8.15	16.50
7/12/2017 15:07	27.54	8.19	16.51
7/12/2017 15:08	26.40	8.27	16.50
7/12/2017 15:09	27.15	8.21	16.51
7/12/2017 15:10	26.73	8.21	16.51
7/12/2017 15:11	26.16	8.26	16.51
7/12/2017 15:12	26.89	8.24	16.51
7/12/2017 15:13	28.53	8.13	16.51

Lot 2

7/12/2017 15:16	25.27	8.36	16.51
7/12/2017 15:17	26.97	8.19	16.51
7/12/2017 15:18	27.20	8.19	16.50
7/12/2017 15:19	26.83	8.19	16.50
7/12/2017 15:20	27.04	8.19	16.50
7/12/2017 15:21	26.20	8.24	16.51
7/12/2017 15:22	26.53	8.23	16.50
7/12/2017 15:23	26.54	8.27	16.50
7/12/2017 15:24	26.98	8.27	16.50
7/12/2017 15:25	26.57	8.24	16.50
7/12/2017 15:26	27.26	8.06	16.23
7/12/2017 15:27	27.63	8.18	16.50
7/12/2017 15:28	28.71	8.19	16.51
7/12/2017 15:29	28.16	8.07	16.23
7/12/2017 15:30	27.78	8.29	16.50
7/12/2017 15:31	28.11	8.23	16.51
7/12/2017 15:32	27.77	8.22	16.51
7/12/2017 15:33	28.45	8.17	16.51
7/12/2017 15:34	26.86	8.33	16.52
7/12/2017 15:35	26.97	8.39	16.52
7/12/2017 15:36	28.12	8.27	16.53
7/12/2017 15:37	27.78	8.23	16.53
7/12/2017 15:38	27.84	8.24	16.53
7/12/2017 15:39	28.27	8.15	16.53
7/12/2017 15:40	28.32	8.17	16.53
7/12/2017 15:41	27.56	8.21	16.53
7/12/2017 15:42	27.18	8.20	16.53
7/12/2017 15:43	27.98	8.27	16.53
7/12/2017 15:44	27.90	8.17	16.53
7/12/2017 15:45	27.52	8.13	16.25
7/12/2017 15:46	26.05	8.33	16.52
7/12/2017 15:47	26.17	8.37	16.53
7/12/2017 15:48	25.95	8.35	16.53
7/12/2017 15:49	26.20	8.40	16.52
7/12/2017 15:50	26.87	8.33	16.52
7/12/2017 15:51	34.14	5.38	4.53
7/12/2017 15:52	[illegible]	0.52	[illegible]
7/12/2017 15:53	44.6	0.41	0.05
7/12/2017 15:54	26.12	0.62	10.31
7/12/2017 15:55	0.27	0.57	11.36

7/12/2017 15:56	0.21	0.58	11.57
7/12/2017 15:57	0.30	16.55	3.79
7/12/2017 15:58	-0.02	30.29	0.06
7/12/2017 15:59	-0.02	50.63	0.04
7/12/2017 16:00	6.86	39.76	9.20
7/12/2017 16:01	25.67	8.46	16.47
7/12/2017 16:02	26.26	8.22	16.50
7/12/2017 16:03	11.58	8.18	16.51

RUN #3

7/12/2017 16:05	26.86	8.14	16.50
7/12/2017 16:06	26.78	8.12	16.50
7/12/2017 16:07	27.26	8.11	16.50
7/12/2017 16:08	27.88	8.12	16.50
7/12/2017 16:09	27.65	8.07	16.50
7/12/2017 16:10	27.45	8.16	16.50
7/12/2017 16:11	27.52	8.13	16.50
7/12/2017 16:12	27.54	7.90	16.22
7/12/2017 16:13	27.16	8.06	16.49
7/12/2017 16:14	26.59	8.13	16.50
7/12/2017 16:15	27.09	8.08	16.49
7/12/2017 16:16	27.94	8.08	16.50
7/12/2017 16:17	26.90	7.92	16.22
7/12/2017 16:18	27.24	8.08	16.49
7/12/2017 16:19	27.37	8.02	16.49
7/12/2017 16:20	26.56	8.12	16.49
7/12/2017 16:21	27.90	8.04	16.49
7/12/2017 16:22	27.65	8.05	16.49
7/12/2017 16:23	28.85	8.00	16.49
7/12/2017 16:24	27.73	8.09	16.49
7/12/2017 16:25	28.03	8.12	16.49
7/12/2017 16:26	28.64	8.06	16.49
7/12/2017 16:27	27.85	8.11	16.49
7/12/2017 16:28	26.86	8.17	16.49
7/12/2017 16:29	27.07	8.12	16.49
7/12/2017 16:30	27.92	8.10	16.50
7/12/2017 16:31	27.14	8.12	16.49
7/12/2017 16:32	25.94	8.04	16.22
7/12/2017 16:33	26.18	8.19	16.49
7/12/2017 16:34	27.60	8.15	16.49
7/12/2017 16:35	27.13	8.17	16.49
7/12/2017 16:36	26.22	8.02	16.22
7/12/2017 16:37	25.93	8.02	16.22
7/12/2017 16:38	27.53	8.14	16.49
7/12/2017 16:39	27.45	8.16	16.49
7/12/2017 16:40	26.81	8.16	16.49
7/12/2017 16:41	26.14	8.24	16.49
7/12/2017 16:42	25.16	8.27	16.49
7/12/2017 16:43	25.86	8.24	16.49
7/12/2017 16:44	26.66	8.18	16.49
7/12/2017 16:45	26.62	8.18	16.49
7/12/2017 16:46	27.44	8.12	16.49
7/12/2017 16:47	26.86	8.12	16.49
7/12/2017 16:48	26.89	8.17	16.49
7/12/2017 16:49	27.23	8.15	16.49
7/12/2017 16:50	27.46	8.01	16.21
7/12/2017 16:51	27.47	7.96	16.21
7/12/2017 16:52	28.03	7.98	16.21
7/12/2017 16:53	28.01	8.13	16.49
7/12/2017 16:54	27.59	8.15	16.49
7/12/2017 16:55	27.55	8.22	16.50
7/12/2017 16:56	27.75	8.22	16.50
7/12/2017 16:57	27.80	8.19	16.50
7/12/2017 16:58	27.58	8.26	16.49
7/12/2017 16:59	27.33	8.27	16.49
7/12/2017 17:00	27.74	8.28	16.49
7/12/2017 17:01	25.03	8.32	12.77
7/12/2017 17:02	3.33	45.65	0.11
7/12/2017 17:03	0.05	50.49	0.06
7/12/2017 17:04	0.03	51.11	0.05
7/12/2017 17:05	-0.03	47.10	4.81
7/12/2017 17:06	-0.16	1.30	11.66
7/12/2017 17:07	-0.09	0.62	11.31

7/12/2017 17:10	44.19	0.40	0.06
7/12/2017 17:11	44.67	30.75	

Enterprise Products Operating LLC
Mont Belvieu Facility
Wes Texas Frac Turbine EPN 5A (058CM12.051)

Run 1: 1340 - 1440	W. Texas Frac Turbine 12.051 Fuel	
Date	MSCFH	MMBtu/hr
12-Jul-17 13:40:00	37.25	36.48
12-Jul-17 13:41:00	37.25	36.48
12-Jul-17 13:42:00	37.21	36.44
12-Jul-17 13:43:00	37.02	36.25
12-Jul-17 13:44:00	36.91	36.15
12-Jul-17 13:45:00	37.11	36.34
12-Jul-17 13:46:00	37.26	36.49
12-Jul-17 13:47:00	37.26	36.49
12-Jul-17 13:48:00	37.24	36.47
12-Jul-17 13:49:00	37.22	36.45
12-Jul-17 13:50:00	37.20	36.43
12-Jul-17 13:51:00	37.18	36.41
12-Jul-17 13:52:00	37.16	36.40
12-Jul-17 13:53:00	37.15	36.38
12-Jul-17 13:54:00	37.13	36.36
12-Jul-17 13:55:00	37.11	36.34
12-Jul-17 13:56:00	37.09	36.32
12-Jul-17 13:57:00	37.07	36.30
12-Jul-17 13:58:00	37.05	36.29
12-Jul-17 13:59:00	37.03	36.27
12-Jul-17 14:00:00	37.01	36.25
12-Jul-17 14:01:00	37.00	36.23
12-Jul-17 14:02:00	36.98	36.21
12-Jul-17 14:03:00	36.96	36.19
12-Jul-17 14:04:00	36.94	36.17
12-Jul-17 14:05:00	36.90	36.13
12-Jul-17 14:06:00	36.86	36.09
12-Jul-17 14:07:00	36.82	36.06
12-Jul-17 14:08:00	36.78	36.02
12-Jul-17 14:09:00	36.74	35.98
12-Jul-17 14:10:00	36.74	35.98
12-Jul-17 14:11:00	36.88	36.12
12-Jul-17 14:12:00	37.03	36.27
12-Jul-17 14:13:00	37.18	36.41
12-Jul-17 14:14:00	37.27	36.50
12-Jul-17 14:15:00	37.17	36.40
12-Jul-17 14:16:00	37.06	36.30
12-Jul-17 14:17:00	36.95	36.19
12-Jul-17 14:18:00	36.84	36.08
12-Jul-17 14:19:00	36.73	35.98
12-Jul-17 14:20:00	36.67	35.91
12-Jul-17 14:21:00	36.75	35.99
12-Jul-17 14:22:00	36.83	36.07
12-Jul-17 14:23:00	36.92	36.16
12-Jul-17 14:24:00	37.01	36.24
12-Jul-17 14:25:00	37.09	36.33
12-Jul-17 14:26:00	37.13	36.36
12-Jul-17 14:27:00	37.01	36.25
12-Jul-17 14:28:00	36.91	36.15
12-Jul-17 14:29:00	36.90	36.14
12-Jul-17 14:30:00	36.89	36.13
12-Jul-17 14:31:00	36.89	36.13
12-Jul-17 14:32:00	36.88	36.12
12-Jul-17 14:33:00	36.88	36.11
12-Jul-17 14:34:00	36.87	36.11
12-Jul-17 14:35:00	36.86	36.10
12-Jul-17 14:36:00	36.86	36.09
12-Jul-17 14:37:00	36.85	36.09
12-Jul-17 14:38:00	36.84	36.08
12-Jul-17 14:39:00	36.83	36.07
12-Jul-17 14:40:00	36.81	36.05
Average	**36.99**	**36.23**

Run 2: 1450 - 1550	W. Texas Frac Turbine 12.051 Fuel	
Date	MSCFH	MMBtu/hr
12-Jul-17 14:50:00	36.90	36.14
12-Jul-17 14:51:00	36.92	36.15
12-Jul-17 14:52:00	36.93	36.16
12-Jul-17 14:53:00	36.94	36.18
12-Jul-17 14:54:00	36.95	36.19
12-Jul-17 14:55:00	36.97	36.20
12-Jul-17 14:56:00	36.98	36.21
12-Jul-17 14:57:00	36.99	36.23
12-Jul-17 14:58:00	37.00	36.24
12-Jul-17 14:59:00	37.01	36.25
12-Jul-17 15:00:00	37.02	36.26
12-Jul-17 15:01:00	37.02	36.25
12-Jul-17 15:02:00	37.01	36.24
12-Jul-17 15:03:00	37.00	36.24
12-Jul-17 15:04:00	36.99	36.23
12-Jul-17 15:05:00	36.99	36.22
12-Jul-17 15:06:00	36.98	36.21
12-Jul-17 15:07:00	36.97	36.21
12-Jul-17 15:08:00	36.97	36.20
12-Jul-17 15:09:00	36.98	36.21
12-Jul-17 15:10:00	36.98	36.22
12-Jul-17 15:11:00	36.99	36.23
12-Jul-17 15:12:00	37.00	36.24
12-Jul-17 15:13:00	37.01	36.24
12-Jul-17 15:14:00	37.02	36.25
12-Jul-17 15:15:00	37.03	36.26
12-Jul-17 15:16:00	37.04	36.27
12-Jul-17 15:17:00	37.04	36.28
12-Jul-17 15:18:00	37.05	36.29
12-Jul-17 15:19:00	37.06	36.29
12-Jul-17 15:20:00	37.07	36.30
12-Jul-17 15:21:00	37.08	36.31
12-Jul-17 15:22:00	37.09	36.32
12-Jul-17 15:23:00	37.09	36.33
12-Jul-17 15:24:00	37.08	36.32
12-Jul-17 15:25:00	37.01	36.25
12-Jul-17 15:26:00	36.94	36.17
12-Jul-17 15:27:00	36.86	36.10
12-Jul-17 15:28:00	36.81	36.05
12-Jul-17 15:29:00	36.81	36.04
12-Jul-17 15:30:00	36.81	36.05
12-Jul-17 15:31:00	36.81	36.05
12-Jul-17 15:32:00	36.81	36.05
12-Jul-17 15:33:00	36.81	36.05
12-Jul-17 15:34:00	36.81	36.05
12-Jul-17 15:35:00	36.81	36.05
12-Jul-17 15:36:00	36.82	36.06
12-Jul-17 15:37:00	36.82	36.06
12-Jul-17 15:38:00	36.82	36.06
12-Jul-17 15:39:00	36.82	36.06
12-Jul-17 15:40:00	36.82	36.06
12-Jul-17 15:41:00	36.82	36.06
12-Jul-17 15:42:00	36.83	36.06
12-Jul-17 15:43:00	36.83	36.07
12-Jul-17 15:44:00	36.83	36.07
12-Jul-17 15:45:00	36.83	36.07
12-Jul-17 15:46:00	36.83	36.07
12-Jul-17 15:47:00	36.83	36.06
12-Jul-17 15:48:00	36.82	36.06
12-Jul-17 15:49:00	36.82	36.06
12-Jul-17 15:50:00	36.82	36.06
Average	**36.93**	**36.17**

Run 3: 1600 - 1700	W. Texas Frac Turbine 12.051 Fuel	
Date	MSCFH	MMBtu/hr
12-Jul-17 16:00:00	37.00	36.23
12-Jul-17 16:01:00	36.96	36.20
12-Jul-17 16:02:00	36.92	36.16
12-Jul-17 16:03:00	36.89	36.12
12-Jul-17 16:04:00	36.86	36.09
12-Jul-17 16:05:00	36.86	36.10
12-Jul-17 16:06:00	36.87	36.10
12-Jul-17 16:07:00	36.87	36.11
12-Jul-17 16:08:00	36.88	36.11
12-Jul-17 16:09:00	36.88	36.12
12-Jul-17 16:10:00	36.89	36.12
12-Jul-17 16:11:00	36.89	36.13
12-Jul-17 16:12:00	36.90	36.13
12-Jul-17 16:13:00	36.90	36.14
12-Jul-17 16:14:00	36.91	36.14
12-Jul-17 16:15:00	36.91	36.15
12-Jul-17 16:16:00	36.92	36.15
12-Jul-17 16:17:00	36.92	36.16
12-Jul-17 16:18:00	36.93	36.16
12-Jul-17 16:19:00	36.93	36.17
12-Jul-17 16:20:00	36.94	36.17
12-Jul-17 16:21:00	36.94	36.18
12-Jul-17 16:22:00	36.95	36.19
12-Jul-17 16:23:00	36.95	36.19
12-Jul-17 16:24:00	36.96	36.20
12-Jul-17 16:25:00	36.96	36.20
12-Jul-17 16:26:00	36.97	36.21
12-Jul-17 16:27:00	36.98	36.21
12-Jul-17 16:28:00	36.98	36.22
12-Jul-17 16:29:00	36.99	36.22
12-Jul-17 16:30:00	36.99	36.23
12-Jul-17 16:31:00	37.00	36.23
12-Jul-17 16:32:00	37.00	36.24
12-Jul-17 16:33:00	37.01	36.24
12-Jul-17 16:34:00	37.01	36.25
12-Jul-17 16:35:00	37.02	36.25
12-Jul-17 16:36:00	37.02	36.26
12-Jul-17 16:37:00	37.03	36.26
12-Jul-17 16:38:00	37.03	36.27
12-Jul-17 16:39:00	37.04	36.27
12-Jul-17 16:40:00	37.04	36.28
12-Jul-17 16:41:00	37.05	36.28
12-Jul-17 16:42:00	37.05	36.29
12-Jul-17 16:43:00	37.06	36.29
12-Jul-17 16:44:00	37.06	36.30
12-Jul-17 16:45:00	37.07	36.30
12-Jul-17 16:46:00	37.07	36.31
12-Jul-17 16:47:00	37.06	36.30
12-Jul-17 16:48:00	37.06	36.29
12-Jul-17 16:49:00	37.05	36.28
12-Jul-17 16:50:00	37.04	36.28
12-Jul-17 16:51:00	37.03	36.27
12-Jul-17 16:52:00	37.03	36.26
12-Jul-17 16:53:00	37.02	36.25
12-Jul-17 16:54:00	37.01	36.24
12-Jul-17 16:55:00	37.00	36.24
12-Jul-17 16:56:00	36.99	36.23
12-Jul-17 16:57:00	36.99	36.22
12-Jul-17 16:58:00	36.98	36.22
12-Jul-17 16:59:00	37.00	36.23
12-Jul-17 17:00:00	37.01	36.25
Average	**36.98**	**36.21**

EPO L.P. - Mont Belvieu LAB Report - Multi-Component

From: 7/12/2017 07:00:00 to: 7/13/2017 07:00:00

Plant/Unit Area/ Sample Point	Results/Units		7/13/2017	Meter	Comments
COMP [991-0025]					
NATURAL GAS COMPOSITE		**DA29093**	**7/13/17**	**25**	
TOTAL SULFUR (WT PPM)	2.30	wt. ppm	7/13/17 2:00	GRAB SAMPLE.	

DEFINITIONS

Standard Conditions: 68° and 29.92 inches of mercury

Stack Conditions: Stack temperature, pressure and moisture

NOMENCLATURE

ACFM	Volumetric stack gas flow in cubic feet per minute at stack conditions
AMT	Average temperature at meter in degrees Rankin
An	Area of nozzle in square feet
As	Area of stack in square feet
C	Total pollutant concentration in grains per dry standard cubic feet
CEMS	Continuous emission monitoring system
CFM	Cubic feet per minute
CGA	Cylinder gas audit
CO_2	Carbon dioxide
CO	Carbon monoxide
Cp	Pitot tube correction factor (PTCF)
Cs	Partial pollutant concentration in grains or grams per dry standard cubic foot (total less impinger catch)
De	Equivalent stack diameter of rectangular stack

$$De = \left[\frac{2LW}{L+W} \right]$$

DGMCF	Dry gas meter correction factor
DI	Deionized water
dscf	dry standard cubic feet

Page 2

NOMENCLATURE (Continued)

EA	Excess Air (expressed as percent)
FPD	Flame photometric detector
FID	Flame ionization detector
°F	Temperature in degrees Fahrenheit
GC	Gas chromatograph
GPC	Grams of particulate caught (total)
g	Grams
gr	Grains
Hg	Mercury
H_2O	Water
H_2SO_4	Sulfuric Acid
I	Isokinetics as percent
IMPI	Grams of particulate caught in impinger
IMPP	Grams of particulate caught before impinger (total less impinger catch)
MWSG	Molecular weight of stack gas in grams/gram-mole (g/g-mole) or pounds/pound-mole (lb/lb-mole)
N_2	Nitrogen
NOx	Total oxides of nitrogen
O_2	Oxygen
Pb	Barometric pressure in inches of mercury
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 microns

Page 3

NOMENCLATURE (Continued)

Pm	Meter pressure in inches of mercury
ppm	Parts per million (Volume/Volume or mass/mass)
P_r	Barometric pressure of reference barometer
Ps	Absolute pressure in stack in inches of mercury
PMR	True pollutant mass rate in pounds per hour
PMRs	Pollutant mass rate for the "front half" in pounds per hour (total less impinger catch)
Qsd	Dry volumetric stack gas flow rate corrected to standard conditions in dscf/hr
°R	Temperature in degrees Rankin (equivalent to °F + 460°)
RA	Relative accuracy
RATA	Relative accuracy test audit
Std.P	Pressure at standard conditions (29.92 inches of mercury)
SO_2	Sulfur dioxide
SO_3	Sulfur trioxide
Std.T	Temperature at standard conditions (528°R)
THC	Total Hydrocarbons
TG	Total weight of water collected in silica gel, in grams
TRS	Total Reduced Sulfur Compounds
T_r	Temperature of reference thermometer
Ts	Stack gas temperature in degrees Rankin
T_t	Temperature of test thermometer

Page 4

NOMENCLATURE (Continued)

TWW	Total water wash volume collected in impingers and silica gel, in milliliters (ml) NOTE: Density of H_2O equals 1 g/ml
VOC	Total Volatile Organic Compounds
Vm(Std)	Total gas sampled converted to standard conditions, dry basis, in cubic feet
Vs	Stack gas velocity in feet per second
ΔH	Pressure differential across the orifice meter in inches of water
ΔP	Stack gas velocity head in inches of water
Θ	Sample time in minutes

element

DERIVATIONS OF EQUATIONS

Fuel and Operations Data

$$\text{Fuel F Factor (dscf/MMBtu)} = \frac{10^6[3.64(\%H) + 1.53(\%C) + 0.57(\%S) + 0.14(\%N) - 0.46(\%O_2)]}{\text{Gross Calorific Value (BTU/lb)}}$$

Density (lb/ft^3) = Gas Mixture Molecular Weight/385

Gross Calorific Value - GCV (BTU/lb) = High Heat of Combustion (BTU/ft^3) x (1/mixture density (lb/ft^3))

Fuel Flow Rate (FFR) = Fuel Flow Rate in ft^3/hr, lb/hr or gal/hr

FFR (lb/hr) = FFR (ft^3/hr) x Gas Mixture Density (lb/ft^3)

FFR (lb/hr) = FFR (gal/hr) x Liquid Density (lb/gal)

Operating Rate (MMBtu/hr) = FFR (ft^3/hr) x Gross Calorific Value (BTU/ft^3) x 1×10^{-6}

Operating Rate (MMBtu/hr) = FFR (lb/hr) x Gross Calorific Value (Btu/lb) x 1×10^{-6}

Pollutant Emissions Equations

lb/dscf = (ppm x MW x 6.242×10^{-8})/24.04 (Note: MW for NOx = 46, MW for CO = 28)

lb/MMBtu @ 0% O_2 = lb/dscf x Fuel F Factor (dscf/MMBtu) x [20.9/20.9 - %O_2 (dry)]

Emission Rate (lb/hr) = lb/MMBtu x GCV x FFR x 1×10^{-6}
Note: if FFR is ft^3/hr, GCV is Btu/ft^3
if FFR is lb/hr, GCV is Btu/lb

CO, ppm (dry) @ 3% O_2 = CO ppm (dry) x [17.9/20.9-%O_2(dry)]

CO, ppm (dry) @ 0% O_2 = CO ppm (dry) x [20.9/20.9-%O_2(dry)]

Grams/Horsepower - Hour (g/hp-hr) = (Emission Rate lb/hr x 454)/Horsepower

Element Analyzer QA

Project Name:	Enterprise Products - WTF-T4 Turbine	Date	7/12/2017
Project No.:	EHO005366P-A	Initials	VG

EPA Protocol Gases

Cylinder Pollutant	Cylinder Value	Cylinder Number	Expiration Date
NOx - Mid	52.3	ALM005770	12/1/2024
NOx - High	94.5	ALM048117	5/28/2022
CO - Mid	46.00	ALM036415	8/30/2024
CO - High	95.7	ALM026436	5/25/2019
O2 - Mid	11.66	CC483005	12/16/2024
O2 - High	20.4	ALM066349	8/20/2022

Parameter:	NOx	Calibration Error Test			
Analyzer:	Thermo Scientific			Span:	94.5
Model:	42i-HL Chemiluminescent			Serial:	1134350816
GASES	Cylinder Value	Analyzer Response	Difference	% Difference	Is Linearity Within +or- 2%
Zero	0.0	0.23	0.2	0.24%	Yes
EPA Protocol					
Mid-Level	52.3	51.84	-0.46	-0.49%	Yes
High-Level	94.5	94.23	-0.27	-0.29%	Yes

Parameter:	CO	Calibration Error Test			
Analyzer:	Thermo Scientific			Span:	95.7
Model:	48i Gas Filter Correlation			Serial:	JC1227000393
GASES	Cylinder Value	Analyzer Response	Difference	% Difference	Is Linearity Within +or- 2%
Zero	0.0	0.35	0.4	0.37%	Yes
EPA Protocol					
Mid-Level	46.0	45.13	-0.87	-0.91%	Yes
High-Level	95.7	95.04	-0.66	-0.69%	Yes

Parameter:	O2	Calibration Error Test			
Analyzer:	Servomex			Span:	20.4
Model:	ServoPro 1440 Paramagnetic			Serial:	01440D1-4962
GASES	Cylinder Value	Analyzer Response	Difference	% Difference	Is Linearity Within +or- 2%
Zero	0.0	0.00	0.0	0.00%	Yes
EPA Protocol					
Mid-Level	11.7	11.68	0.02	0.10%	Yes
High-Level	20.4	20.49	0.09	0.44%	Yes

* % Difference = Difference/Span Value x 100

A16
Revision 0
4/6/15

Element Analyzer QA

NOx - SYSTEM BIAS

Bias = (System Response - Analyzer Response) / Span

Span Value 94.5

	Zero	Span
Analyzer Cal. Response	0.23	51.84
System Cal. Response	0.36	50.52

The Zero Bias (0.14%) is within +/- 5%
The Span Bias (-1.40%) is within +/- 5%

Manifold Pressure	
Sampling	5 psi
Calibration	5 psi
Temperatures	
Sample Line	275 F
Knockout	39 F

CONVERSION EFFICIENCY

Span Value	94.5	Highest Peak Value	31.88	% Difference
Analyzer Mode	NOx	Ending Value	31.85	0.09%
				must be <= 2%

CO - SYSTEM BIAS

Bias = (System Response - Analyzer Response) / Span

Span Value 95.7

	Zero	Span
Analyzer Cal. Response	0.35	45.13
System Cal. Response	0.33	45.18

The Zero Bias (-0.02%) is within +/- 5%
The Span Bias (0.05%) is within +/- 5%

O2 - SYSTEM BIAS

Bias = (System Response - Analyzer Response) / Span

Span Value 20.4

	Zero	Span
Analyzer Cal. Response	0.00	11.68
System Cal. Response	0.03	11.62

The Zero Bias (0.15%) is within +/- 5%
The Span Bias (-0.29%) is within +/- 5%

12 Point Stratification Test - 40CFR60 Subpart KKKK

[utilizes procedure contained in 40CFR75, Appendix A, Section 6.5.6.1 (a) thru (e)]

Plant: Enterprise Products Operating LLC
Source: WTF-T4 Turbine
Element Project No.: EHO005366P-A

Port	Pollutant: Point No.	NOx	NOx Emissions ppmvd	NOx Difference from Average ppmvd	NOx Difference from Average - % %
	1		8.34		
	1		8.31		
1	**Pt. 1 Avg.**		**8.33**	**-0.19**	**-2.20**
	2		8.36		
	2		8.44		
1	**Pt. 2 Avg.**		**8.40**	**-0.11**	**-1.32**
	3		8.40		
	3		8.41		
1	**Pt. 3 Avg.**		**8.41**	**-0.11**	**-1.26**
	4		8.44		
	4		8.43		
1	**Pt. 4 Avg.**		**8.44**	**-0.08**	**-0.91**
	5		8.38		
	5		8.55		
1	**Pt. 5 Avg.**		**8.47**	**-0.05**	**-0.55**
	6		8.69		
	6		8.76		
1	**Pt. 6 Avg.**		**8.73**	**0.21**	**2.50**
	7		8.79		
	7		8.73		
2	**Pt. 7 Avg.**		**8.76**	**0.25**	**2.91**
	8		8.74		
	8		8.67		
2	**Pt. 8 Avg.**		**8.71**	**0.19**	**2.27**
	9		8.55		
	9		8.48		
2	**Pt. 9 Avg.**		**8.52**	**0.00**	**0.03**
	10		8.53		
	10		8.51		
2	**Pt. 10 Avg.**		**8.52**	**0.01**	**0.09**
	11		8.46		
	11		8.45		
2	**Pt. 11 Avg.**		**8.46**	**-0.06**	**-0.67**
	12		8.44		
	12		8.43		
2	**Pt. 12 Avg.**		**8.44**	**-0.08**	**-0.91**
	12 Point Average:		**8.51**		
		5% =	**0.43**		
		10% =	**0.85**		

Criteria 1:
1) Each traverse point less than 10% of Average?
(If Yes- can use 3 point traverse along highest NOx port)

Criteria 2 : For sources with a NOx limit > 15 ppmvd @ 15% O2 :
2) Each traverse point less than 5% of Average?
(If yes - can do a single point sample at least 1 meter in or at centroid)

Criteria 3:
3.) If 1 and 2 are both No, do Method 1 Traverse (12 points)

Enterprise
WTF-4
Mont Belvieu , Texas
EH0005366P — A
File Name: 07-12-17 12-34

Date and Time	CO	NOx	O2	THC	CO2	SO2	Flow
MM/DD/YY HH:MM	ppm	ppm	%	ppm	%	ppm	lpm
7/12/2017 12:34	0.12	-0.37	14.80				
7/12/2017 12:35	2.68	-0.31	9.33				
7/12/2017 12:36	4.81	-0.50	5.01				
7/12/2017 12:37	4.57	-0.51	3.90				
7/12/2017 12:38	3.69	0.00	0.00				
7/12/2017 12:39	8.35	0.23	-0.01				
7/12/2017 12:40	4.97	0.27	3.41				
7/12/2017 12:41	85.21	79.93	20.49				
7/12/2017 12:42	97.02	49.92	20.45				
7/12/2017 12:43	96.13	90.69	20.44				
7/12/2017 12:44	95.04	93.83	16.02				
7/12/2017 12:45	93.06	94.18	10.91				
7/12/2017 12:46	94.93	94.27	11.76				
7/12/2017 12:47	62.93	76.51	15.70				
7/12/2017 12:48	45.12	55.94	11.68				
7/12/2017 12:49	45.13	33.73	5.96				
7/12/2017 12:50	13.30	35.28	0.06				
7/12/2017 12:51	7.11	51.89	0.05				
7/12/2017 12:52	0.32	52.12	0.04				
7/12/2017 12:53	0.32	51.33	0.04				
7/12/2017 12:54	0.33	31.51	0.03				
7/12/2017 12:55	0.32	0.59	3.03				
7/12/2017 12:56	0.24	0.44	1.81				
7/12/2017 12:57	-0.01	0.36	2.76				
7/12/2017 12:58	0.82	0.36	0.01				
7/12/2017 12:59	35.24	0.34	0.09				
7/12/2017 13:00	44.39	0.33	0.00				
7/12/2017 13:01	45.13	0.32	0.90				
7/12/2017 13:02	34.91	0.32	5.01				

RT - ↑ 27 sec
↓ 30 sec

7/12/2017 13:04	-0.29	0.32	11.62
7/12/2017 13:05	-0.34	0.31	11.78
7/12/2017 13:06	-0.23	17.49	4.00
7/12/2017 13:07	0.12	50.52	0.04
7/12/2017 13:08	0.16	51.60	0.03
7/12/2017 13:09	0.17	42.22	11.21
7/12/2017 13:10	0.16	0.90	20.82
7/12/2017 13:11	0.19	0.49	20.85
7/12/2017 13:12	0.21	0.49	20.86
7/12/2017 13:13	0.19	0.39	20.88
7/12/2017 13:14	0.19	0.35	20.89
7/12/2017 13:15	0.16	0.35	20.85
7/12/2017 13:16	0.27	0.45	20.87
7/12/2017 13:17	3.24	1.24	20.35
7/12/2017 13:18	12.95	2.59	18.05
7/12/2017 13:19	39.21	6.87	16.64
7/12/2017 13:20	32.38	8.34	16.63
7/12/2017 13:21	29.94	8.31	16.63
7/12/2017 13:22	28.93	8.36	16.62
7/12/2017 13:23	27.82	8.44	16.62
7/12/2017 13:24	27.34	8.40	16.62
7/12/2017 13:25	28.27	8.41	16.61
7/12/2017 13:26	29.00	8.44	16.60
7/12/2017 13:27	30.06	8.43	16.60
7/12/2017 13:28	30.13	8.38	16.60
7/12/2017 13:29	29.19	8.55	16.59
7/12/2017 13:30	28.54	8.69	16.59
7/12/2017 13:31	28.61	8.76	16.59
7/12/2017 13:32	28.83	8.84	16.59
7/12/2017 13:33	28.38	8.84	16.58
7/12/2017 13:34	23.44	8.16	18.13
7/12/2017 13:35	1.40	1.10	20.28
7/12/2017 13:36	0.23	0.49	20.40
7/12/2017 13:37	0.20	0.43	20.41
7/12/2017 13:38	1.54	0.42	19.57
7/12/2017 13:39	23.78	7.45	16.65
7/12/2017 13:40	26.78	8.79	16.62
7/12/2017 13:41	26.16	8.73	16.62
7/12/2017 13:42	25.88	8.74	16.62
7/12/2017 13:43	27.89	8.67	16.63
7/12/2017 13:44	27.26	8.55	16.64
7/12/2017 13:45	26.20	8.48	16.64
7/12/2017 13:46	25.91	8.53	16.64
7/12/2017 13:47	26.19	8.51	16.63
7/12/2017 13:48	27.12	8.46	16.63
7/12/2017 13:49	27.01	8.45	16.64
7/12/2017 13:50	27.70	8.44	16.63
7/12/2017 13:51	27.67	8.43	16.64
7/12/2017 13:52	27.75	8.36	16.63
7/12/2017 13:53	25.92	8.37	16.63
7/12/2017 13:54	25.69	8.35	16.63
7/12/2017 13:55	27.83	8.22	16.62
7/12/2017 13:56	27.58	8.26	16.62
7/12/2017 13:57	27.41	8.32	16.63
7/12/2017 13:58	28.92	8.24	16.62
7/12/2017 13:59	15.02	8.29	16.63
7/12/2017 14:00	5.61	8.15	16.63
7/12/2017 14:01	5.43	8.16	16.63
7/12/2017 14:02	5.52	8.06	16.63
7/12/2017 14:03	5.51	8.06	16.63
7/12/2017 14:04	5.56	8.05	16.63
7/12/2017 14:05	5.54	8.07	16.63
7/12/2017 14:06	5.69	8.02	16.62
7/12/2017 14:07	5.57	8.06	16.62

Pond 1

Run # 1

NOx Conv

7/12/2017 17:12	31.63
7/12/2017 17:13	31.73
7/12/2017 17:14	31.76
7/12/2017 17:15	31.21
7/12/2017 17:16	31.79
7/12/2017 17:17	31.77
7/12/2017 17:18	31.24
7/12/2017 17:19	31.81
7/12/2017 17:20	31.77
7/12/2017 17:21	31.81
7/12/2017 17:22	31.80
7/12/2017 17:23	31.80
7/12/2017 17:24	31.82
7/12/2017 17:25	31.29
7/12/2017 17:26	31.82
7/12/2017 17:27	31.82
7/12/2017 17:28	31.31
7/12/2017 17:29	31.84
7/12/2017 17:30	31.85
7/12/2017 17:31	31.34
7/12/2017 17:32	31.86
7/12/2017 17:33	31.83
7/12/2017 17:34	31.85
7/12/2017 17:35	31.89
7/12/2017 17:36	31.86
7/12/2017 17:37	31.88 Avg
7/12/2017 17:38	31.36
7/12/2017 17:39	31.85
7/12/2017 17:40	31.86
7/12/2017 17:41	31.85 End
7/12/2017 17:42	31.82

Airgas
an Air Liquide company

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

		PGVP Vendor ID:	A32016
Part Number:	E02NI99E15A1657	Reference Number:	163-400800200-1
Cylinder Number:	ALM005770	Cylinder Volume:	144 Cu.Ft.
Laboratory:	124 - Pasadena(SG06) - TX	Cylinder Pressure:	1964
Analysis Date:	December 1, 2016	Valve Outlet:	660

Expiration Date: December 1, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical methodology does not require correction for analytical interference. 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 bases unless otherwise noted.
Do Not Use This Cylinder below 100psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
Nitric Oxide	53.0 PPM	52.24 PPM	G1	+/-0.9% NIST Traceable
Nitrogen	Balance			
Oxides of Nitrogen		52.3 PPM		Reference Value only

CALIBRATION STANDARDS

Type	LOT ID	Cylinder No	Concentration	Expiration Date
NTRM	051711	KAL003305	49.46PPM NO/NITROGEN	March 15, 2018

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	COMP	Last Multipoint Calibration
MKS 2030 000929060	FTIR	NO	November 28, 2016

Triad Data Available Upon Request

Notes:

QA APPROVAL

AIR LIQUIDE Air Liquide America Specialty Gases LLC

Intertek

RATA CLASS

Guaranteed +/- 1% Accuracy

8832 DICE ROAD, SANTA FE SPRINGS, CA 90670-2516 Phone: 800-323-2212 Fax: 562-464-5262

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A52014
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
8832 DICE ROAD
SANTA FE SPRINGS, CA 90670-2516

P.O. No.: EHO015383PO
Document # : 55339189-003
Folio #:93.5 ppm NO / N2

Customer
ELEMENT MATERIALS TECHNOLOGY HOUSTO
222 CAVALCADE ST
HOUSTON TX 77009
US

ANALYTICAL INFORMATION Gas Type : NO,BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards, Procedure G-1. EPA/600/R-12/531; May 2012. Do not use this standard if pressure is less than 100 psig.

Cylinder Number: ALM048117 **Certification Date:** 27May2014 **Exp. Date:** 28May2022
Cylinder Pressure: 2000 PSIG **Batch No:** SB00093126

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY (ABSOLUTE / RELATIVE)
NITRIC OXIDE	94.5	PPM	0.9 PPM / 1.0 %
NITROGEN - OXYGEN FREE		BALANCE	
TOTAL OXIDES OF NITROGEN	94.5	PPM	Reference Value Only

TRACEABILITY

REFERENCE STANDARD

COMPONENT	CONCENTRATION	UNCERTAINTY	CYLINDER	TYPE/SRM SAMPLE	EXP. DATE
NITRIC OXIDE	97.6000 PPM	0.8000 PPM	KAL004804	NTRM 1684/02-1309	22Jul2017

ANALYTICAL METHOD

1st Analysis: 20May2014

COMPONENT	INSTRUMENT	ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
NITRIC OXIDE	MKS-FTIR/2030/001785245	FTIR	16May2014	94.48 PPM

2nd Analysis: 27May2014

COMPONENT	INSTRUMENT	ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
NITRIC OXIDE	MKS-FTIR/2030/001785245	FTIR	16May2014	94.48 PPM

Special Notes: NO RANGE: 92-95 PPM REPORT MOL% AND EXP DATE REPORT TOTAL NOX

APPROVED BY: THUAN TRAN

Scott™

RATA CLASS

Guaranteed +/- 1% Accuracy

9810 Bay Area Blvd. Pasadena, TX 77507 Phone: 281-474-5800 Fax: 281-474-5950

CERTIFICATE OF ACCURACY : EPA Protocol Gas

Customer:
ELEMENT MATERIALS TECHNOLOGY
ELEMENT MATERIALS TECHNOLOGY HOUST-2
14805 Yorktown Plaza Dr
Houston, TX 77040-1486
US

Assay Laboratory - PGVP Vendor ID: A32016
Air Liquide America Specialty Gases LLC
9810 Bay Area Blvd.
Pasadena, TX 77507

Lot No: 551832
P.O. No.: EHO025397PO
Folio #: 46.25 PPM CO / N2
Sales Order #: 5150492

ANALYTICAL INFORMATION

Gas Type : CO,BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1 EPA/600/R-12/531, May 2012 Do not use this standard if pressure is less than 100 psig.

Cylinder Number: ALM036415 **Certification Date:** 29Aug2016 **Expiration Date:** 30Aug2024
Cylinder Pressure: 2000 PSIG **Lot No:** 551832

Component Name	Concentration (Mole)	Accuracy (Absolute / Relative)
CARBON MONOXIDE	46.0 PPM	0.3 PPM / 0.7 %
NITROGEN	BALANCE	

TRACEABILITY

Analytical Traceability

Reference Standard

Component	Concentration	Uncertainty	Cylinder	Type	Exp. Date
CARBON MONOXIDE	98.4800 PPM	0.49 PPM	KAL004886	NTRM 1679	14Jan2019

ANALYTICAL METHOD

1st Analysis: 08/29/2016

COMPONENT	INSTRUMENT	ANALYTICAL PRINCIPLE	CALIBRATED	CONCENTRATION
CARBON MONOXIDE	MKS FTIR SN 000929060	Fourier Transform Infrared	08/25/2016	46.0 PPM

APPROVED BY: Gary L Wright DATE: 29Aug2016

AIR LIQUIDE

AIR LIQUIDE Air Liquide America Specialty Gases LLC

Scott

RATA CLASS

Dual-Analyzed Calibration Standard

11426 FAIRMONT PKWY, LA PORTE, TX 77571 Phone: 800-248-1427 Fax: 281-474-8419

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A32011

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
11426 FAIRMONT PKWY
LA PORTE, TX 77571

P.O. No.: HOU003803PO
Document # : 41801160-003

Customer
STORK TESTING & METALLURGICAL CONSU

222 CAVALCADE ST
HOUSTON TX 77009
US

ANALYTICAL INFORMATION Gas Type : CO,BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number:	ALM026436	**Certification Date:**	24May2011	**Exp. Date:**	25May2019
Cylinder Pressure*:**	1876 PSIG			**Batch No:**	LAP0041473

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
CARBON MONOXIDE	95.7	PPM	+/- 1%	Direct NIST and VSL
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1679 1	10Apr2013	KAL004882	98.48 PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//MG-09-149	28Apr2011	FTIR

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

CARBON MONOXIDE

Date: 17May2011 Response Unit: PPM

Z1 = -0.02479	R1 = 97.63584	T1 = 94.89728
R2 = 97.81549	Z2 = -0.00362	T2 = 95.12872
Z3 = -0.00127	T3 = 95.18319	R3 = 97.86236

Avg. Concentration: 95.75 PPM

Second Triad Analysis

Date: 24May2011 Response Unit: PPM

Z1 = 0.01853	R1 = 98.56466	T1 = 95.68719
R2 = 98.57676	Z2 = 0.05745	T2 = 95.72080
Z3 = 0.05828	T3 = 95.76549	R3 = 98.61813

Avg. Concentration: 95.62 PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4

r = 9.99996E-1

Constants:	A = 0.00000E+0
B = 9.80443E-1	C = 8.77000E-4
D = 1.00000E-6	E = 0.00000E+0

Special Notes: The expiration date has been extended without re-assay per EPA 600/R-12/531
CO = .00957% N2= 99.99043% CGA 350 DEW POINT 40 F

APPROVED BY: RON STITT

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
9810 BAY AREA BLVD
Pasadena, TX 77507
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI77E15A0043	Reference Number:	163-400818112-1
Cylinder Number:	CC483005	Cylinder Volume:	152.1 CF
Laboratory:	124 - Pasadena (SG06) - TX	Cylinder Pressure:	2015 PSIG
PGVP Number:	A32016	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Dec 16, 2016

Expiration Date: Dec 16, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. 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 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	11.50 %	11.66 %	G1	+/- 0.8% NIST Traceable	12/14/2016
OXYGEN	11.50 %	11.66 %	G1	+/- 0.5% NIST Traceable	12/16/2016
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	102505	1D007075	7.016 % CARBON DIOXIDE/NITROGEN	+/-0.50%	Jan 13, 2022
NTRM	103009	K014168	20.89 % OXYGEN/NITROGEN	+/-0.53%	Jun 27, 2022

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-H - NICOLET 6700 AHR0600411	FTIR	Dec 05, 2016
O2 - SIEMENS OXYMAT 6 DD550	PARAMAGNETIC	Dec 12, 2016

Triad Data Available Upon Request

Signature on file
Approved for Release

AIR LIQUIDE Air Liquide America Specialty Gases LLC

Intertek

RATA CLASS

Guaranteed +/- 1% Accuracy

8832 DICE ROAD, SANTA FE SPRINGS, CA 90670-2516 Phone: 800-323-2212 Fax: 562-464-5262

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A52014
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
8832 DICE ROAD
SANTA FE SPRINGS, CA 90670-2516

P.O. No.: EH0016520PO
Document # : 56463839-004
Folio #:20.5% CO + 20.5% O2

Customer
ELEMENT MATERIALS TECHNOLOGY HOUSTO
14805 YORKTOWN PLAZA DR.
HOUSTON TX 77040
US

ANALYTICAL INFORMATION Gas Type : CO2,O2,BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1, EPA/600/R-12/531; May 2012. Do not use this standard if pressure is less than 100 psig.

Cylinder Number: ALM066349 **Certification Date:** 19Aug2014 **Exp. Date:** 20Aug2022
Cylinder Pressure: 2000 PSIG **Batch No:** SB00097509

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY (ABSOLUTE / RELATIVE)
CARBON DIOXIDE	20.5 %	0.1 % / 0.5 %
OXYGEN	20.4 %	0.1 % / 0.5 %
NITROGEN	BALANCE	

TRACEABILITY

REFERENCE STANDARD

COMPONENT	CONCENTRATION	UNCERTAINTY	CYLINDER	TYPE/SRM SAMPLE	EXP. DATE
CARBON DIOXIDE	23.0100 %	0.0900 %	K021330	NTRM 2300/080403	05Jan2018
OXYGEN	20.8500 %	0.1300 %	K000461	NTRM 2659/020500	14May2018

ANALYTICAL METHOD

1st Analysis: 18Aug2014

COMPONENT	INSTRUMENT	ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
CARBON DIOXIDE	VARIAN B/3400/2806	FID & TCD	18Aug2014	20.52 %
OXYGEN	VARIAN B/3400/2806	FID & TCD	18Aug2014	20.41 %

Special Notes: REPORT MOL % AND EXP DATE

APPROVED BY: _____
JMU

ThermoFisher
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The world leader
in serving science

To Whom It May Concern:

In an effort to assist our customers with meeting the requirements of the Instrumental Methods for testing, 3A, 6C, 7E, 10, and 20, we are providing a summary of interferences for certain Thermo Scientific analyzers.

The requirement for conducting analyzer interference checks for potential interfering gases is the responsibility of the testing organizations. The Methods do, however, allow the manufacturer of instruments to provide this data. Test are required to be conducted on the same "make and model" as those being used for method testing.

The information contained in the accompanying tables pertains to the "make" of analyzers under the names of; Thermo Electron Corporation, Thermo Environmental Instruments and Thermo Scientific. The "model" are models; Model 42 for NO, NO_2, NO_x, Model 43 for SO_2, and Model 410i for CO_2. The specific pollutant detection and analytical technology for each of the above listed specific models have remained the same for the various series of analyzers manufactured over the past years. Therefore, the interference test results shown for iSeries analyzers would produce essentially the same results for C Series and earlier Series of these models.

The potential interference gases test results shown in the tables to follow indicate that none of the Thermo Scientific analyzers tested have a collective analytical detection interference that would sum more than 0.06% of analyzer span value. The acceptance criterion is; the sum of the interference responses must not be greater than 2.5% of analyzer span value.

If you have any questions regarding the information contained herein please do no hesitate to contact us.

Thermo Fisher Scientific

Frank Duckett
Product Manager, Continuous Gas Analyzers
Air Quality Instruments

Air Quality Instruments
Environmental Instruments
27 Forge Parkway
Franklin, MA
02038
(508) 520-0430
(508) 520-1460 fax
www.thermofisher.com

ThermoFisher
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Thermo Scientific Model 42 NO-NO_2-NO_x Analyzer
Potential Interference Gas Responses

Potential Interferent		*Model 42iLS*			*Model 42iHL*		
Test Gas	*Concentration*	*NO*	*NO_2*	*NO_x*	*NO*	*NO_2*	*NO_x*
CO_2	5.20%	0.001	0.004	0.004	0.001	0.003	0.004
CO_2	15.60%	0	0.003	0.003	0.001	0.004	0.005
H_2O	1.00%	0	0	0	0.003	0.001	0.004
NO	15 ppm	14.9	0.1	15	15	-0.06	14.99
NO_2	15 ppm	1.1	14	15	0.4	14.6	15
N_2O	10 ppm	0	0	0	0	0	0
CO	50 ppm	0	0	0	0	0	0
SO_2	21 ppm	-0.01	0	-0.01	0.007	0	0.007
CH_4	50 ppm	0	0	0	0	0	0
HCl	10 ppm	0	0.006	0.006	0	0.004	0.004
NH_3[1]	10 ppm	0	0	0	0.17	8.9	9.1
Sum of Responses		**0.011**	**0.01**	**0.02**	**0.011**	**0.009**	**0.02**
Span Value		**160**	**152**	**160**	**160**	**152**	**160**
% of Calibration Span		**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.01%**

Acceptance Criteria found in Section 13.4 of Method 7E is the sum of responses must not be greater than 2.5% of the analyzer calibration span value.

[1]NH_3 interferent results shown for the Model 42iHL was not used in calculation of interference response check because it is a known interferent with an approximate 1 ppm to 1 ppm positive bias in analyzers using stainless steel NO_2 to NO converters. Thermo recommends that NO_x analyzers with stainless steel NO_2 to NO converters must use a NH_3 scrubber when testing sources with potential NH_3 in the flue gas.

This document is subject to change without notice.

Element Materials Technology Houston, Inc. Analyzer Drift and Calculation QA

Hand Check Calculations

FACILITY: Enterprise	ANALYST: V. Gonzalez	DATE: 7-26-17
SOURCE NAME: West Texas FRAC	CITY, STATE: Mount Belvieu	ELEMENT PROJ. NO.: EH0005366F

	CO	NOx	O_2	CO_2	THC	SO_2
Span gas - C_{ma}	46.0	52.3	11.66			
Scale (ppm,%) *	95.7	94.5	20.4			

Difference = Final Reading - Initial Reading %Zero = (Zero difference / Scale)*100 %Span = (Span difference / Scale)*100

Run No. and Pollutant	ZERO				SPAN			
	Initial Reading	Final Reading	Difference (ppm, %) *	% Zero Drift	Initial Reading	Final Reading	Difference (ppm, %) *	% Span Drift
1 CO	0.33	0.09	-0.24	-0.25	45.18	44.40	-0.78	-0.82
1 NOx	0.36	0.40	+0.04	0.04	50.52	51.18	0.66	0.70
1 O_2	0.03	0.06	0.03	0.15	11.62	11.73	0.11	0.54
CO_2								
THC								
SO_2								

F-Factor dscf/mmBtu	**GCV**	**Fuel Flow Rate**	**Conversion Factor**	**Qsd** dscf/hr
8710				

C_o = (Initial Zero Reading + Final Zero Reading)/2
C_m = (Initial Span Reading + Final Span Reading)/2
C_{gas} = (C_{avg} - C_o) * (C_{ma} / (C_m-C_o))
ppmvd @" x"% O2 = ppmvd * [(20.9-"x")/(20.9-%O2)]

C = (C_{gas} * M.W. * 6.242e-8) / 24.04
lb/mmBtu = C * F-Factor * (20.9 / (20.9 - %O2 dry))
lb/hr = lb/mmBtu * GCV * Fuel Flow Rate * Conversion Factor
lb/hr = lb/dscf x Qsd in dscf/hr

CO ppmvd @ 3% O_2 = 100.4 NOx ppmvd @ @ 15% O_2 = 11.14

Run No. and Pollutant	**C_{avg}.** Uncorrected Stack Gas Concentration (ppm, %) *	**C_o** Average of Zero Air	**C_m** Average of Span Gas	**C_{gas}** Corrected Stack Gas Concentration (ppm, %) *	**M.W.** Molecular Weight	**C** Concentration in lb/dscf	**lb/mmBtu** Emission Rate lb/mmBtu	**lb/hr** Emission Rate lb/hr
1 CO	23.60	0.21	44.79	24.135	28	1.7546^{E-6}	0.074	NA
1 NOx	8.22	0.38	50.85	8.124	46	9.7035^{E-7}	0.041	NA
1 O_2	16.60	0.045	11.675	16.60	32	NA	NA	NA
CO_2					44.01			
THC					44.09 (as C_3H_8)			
SO_2					64			

Note * O_2 and CO_2 are expressed in percent.

CHECK PRINTS: Vicente Gonzalez 7/27

ELECTRONIC CODE OF FEDERAL REGULATIONS

e-CFR data is current as of August 5, 2015

Title 40 → Chapter I → Subchapter C → Part 60 → Subpart KKKK → Appendix

Title 40: Protection of Environment
PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES
Subpart KKKK—Standards of Performance for Stationary Combustion Turbines

TABLE 1 TO SUBPART KKKK OF PART 60—NITROGEN OXIDE EMISSION LIMITS FOR NEW STATIONARY COMBUSTION TURBINES

Combustion turbine type	Combustion turbine heat input at peak load (HHV)	NO_X emission standard
New turbine firing natural gas, electric generating	50 MMBtu/h	42 ppm at 15 percent O_2 or 290 ng/J of useful output (2.3 lb/MWh).
New turbine firing natural gas, mechanical drive	50 MMBtu/h	100 ppm at 15 percent O_2 or 690 ng/J of useful output (5.5 lb/MWh).
New turbine firing natural gas	50 MMBtu/h and 850 MMBtu/h	25 ppm at 15 percent O_2 or 150 ng/J of useful output (1.2 lb/MWh).
New, modified, or reconstructed turbine firing natural gas	850 MMBtu/h	15 ppm at 15 percent O_2 or 54 ng/J of useful output (0.43 lb/MWh)
New turbine firing fuels other than natural gas, electric generating	50 MMBtu/h	96 ppm at 15 percent O_2 or 700 ng/J of useful output (5.5 lb/MWh).
New turbine firing fuels other than natural gas, mechanical drive	50 MMBtu/h	150 ppm at 15 percent O_2 or 1,100 ng/J of useful output (8.7 lb/MWh).
New turbine firing fuels other than natural gas	50 MMBtu/h and 850 MMBtu/h	74 ppm at 15 percent O_2 or 460 ng/J of useful output (3.6 lb/MWh).
New, modified, or reconstructed turbine firing fuels other than natural gas	850 MMBtu/h	42 ppm at 15 percent O_2 or 160 ng/J of useful output (1.3 lb/MWh).
Modified or reconstructed turbine	50 MMBtu/h	150 ppm at 15 percent O_2 or 1,100 ng/J of useful output (8.7 lb/MWh).
Modified or reconstructed turbine firing natural gas	50 MMBtu/h and 850 MMBtu/h	42 ppm at 15 percent O_2 or 250 ng/J of useful output (2.0 lb/MWh).
Modified or reconstructed turbine firing fuels other than natural gas	50 MMBtu/h and 850 MMBtu/h	96 ppm at 15 percent O_2 or 590 ng/J of useful output (4.7 lb/MWh).
Turbines located north of the Arctic Circle (latitude 66.5 degrees north), turbines operating at less than 75 percent of peak load, modified and reconstructed offshore turbines, and turbine operating at temperatures less than 0 °F	30 MW output	150 ppm at 15 percent O_2 or 1,100 ng/J of useful output (8.7 lb/MWh).
Turbines located north of the Arctic Circle (latitude 66.5 degrees north), turbines operating at less than 75 percent of peak load, modified and reconstructed offshore turbines, and turbine operating at temperatures less than 0 °F	30 MW output	96 ppm at 15 percent O_2 or 590 ng/J of useful output (4.7 lb/MWh).
Heat recovery units operating independent of the combustion turbine	All sizes	54 ppm at 15 percent O_2 or 110 ng/J of useful output (0.86 lb/MWh).

Need assistance?

Enterprise Products

ENTERPRISE PRODUCTS PARTNERS L.P.
ENTERPRISE PRODUCTS GP, LLC (General Partner)

ENTERPRISE PRODUCTS OPERATING LLC

June 9, 2017

7015 0920 0001 7003 0742
CERTIFIED MAIL – RETURN RECEIPT REQUIRED

Executive Director
c/o Andy Goodridge
Air Section Manager, Region 12
Texas Commission on Environmental Quality
5425 Polk Street, Suite H
Houston, TX 77023-1452

RE: 40 CFR §60.7 Notification of Testing
30 TAC 117 Notification of Testing
Enterprise Products Operating LLC
Mont Belvieu Complex
Mont Belvieu, Chambers County, Texas
CN603211277; RN102323268

Dear Mr. Goodridge:

Enterprise Products Operating LLC, (Enterprise), is providing this 30-day notification of the periodic stack testing of a natural gas fired turbine located at the Mont Belvieu Complex. This testing is required for affected sources under 40 CFR 60 Subpart KKKK (§60.4400(a)). The results of this testing effort will also be used for compliance with the MECT program. Therefore, the testing will also incorporate the applicable requirements of 30 TAC §117.8000.

The following sources will be tested:

1. **Cogen II Turbine 016GE14002 (EPN 21)**
2. **Cogen II Turbine 016GE14003 (EPN 22)**
3. **West Texas Frac Turbine 058CM12051 (EPN 5A)**

Enterprise has tentatively scheduled the testing for the week of July 10, 2017. Element Materials Technology has been selected to conduct the testing.

If you have any questions regarding this notification, please contact Field Environmental Representative Kyle Richardson at 832-501-4193 or me directly at 832-501-4078.

Sincerely,

for: Christopher Benton
Manager, Field Environmental
Houston Region

KLR/rkw

P.O. Box 573
Mont Belvieu, TX 77580-0573
832-501-4000

10910 Eagle Drive
Mont Belvieu, TX 77523
www.enterpriseproducts.com

RUSSELL J. DIRAIMO, P.E.

Manager
Air Emissions Division
Element Materials Technology Houston, Inc.

EDUCATION

B.S. Civil and Environmental Engineering - University of Rhode Island, 1977

CONTINUING EDUCATION

- Cause and Prevention of Grain Elevator Fires and Explosions, Texas A&M University, 1978.
- International Symposium on Grain Dust, Kansas State University, 1979
- "Controlling Exposure to Asbestos in the Office Environment", Houston Building Owners and Managers Association, Inc., 1985
- "Practices and Procedures for Asbestos Control", The National Asbestos Training Center, 1986
- "Hazardous Waste Site Operations and Emergency Response", 29 CFR 1910.120 40-hour training course, Industrial Hygiene & Safety Technology, Inc., 1987
- "Asbestos Hazardous Emergency Response Act", 40 CFR 763 Subpart D, Certified Inspector, Certified Management Planner, Texas A&M Extension Course, 1988
- OSHA 1910.119(h) Process Safety Management Training

AWARDS AND HONORS:

Graduated High Distinction
Tau Beta Pi Honor Society
Phi Kappa Phi Honor Society

PROFESSIONAL ENGINEERING REGISTRATION

Texas No. 53580

PROFESSIONAL AFFILIATIONS

National Society of Professional Engineers (NSPE)
Texas Society of Professional Engineers (TSPE)
Air and Waste Management Association (AWMA)
Source Evaluation Society

RUSSELL J. DIRAIMO, P.E.

QUALIFICATIONS SUMMARY

Throughout his career with Element (formerly Southwestern Laboratories, Huntingdon Engineering and Environmental, Maxim Technologies, Inc. and Stork Testing & Metallurgical Consulting, Inc.), Mr. DiRaimo has been involved with stationary source air pollution emissions testing first as a project engineer performing field work, followed by project management, and currently as manager in charge of the Air Emissions Services Division.

Mr. DiRaimo's experience includes projects located in Texas, Louisiana, New Mexico, Oklahoma, Alabama, Georgia, Mississippi, Arkansas and Puerto Rico, with the great majority of the projects centered in Texas.

Mr. DiRaimo has participated in over a thousand air pollution projects, including several hundred involving the determination of compliance with Texas Commission on Environmental Quality (TCEQ) and EPA permits and regulations.

Mr. DiRaimo's experience includes field experience performing air emissions tests of stationary sources including particulate matter, NOx, CO, VOCs, speciated VOCs, NH_3, HCl, Cl_2, SOx and H_2SO_4. In addition, he has project and department management experience involving source testing projects for the above listed pollutants plus speciated volatile organics, semivolatile organics, aldehydes, ketones, metals, dioxins and furans. Also included are several projects involving Continuous Emission Monitor System (CEMS) certifications and BIF related testing.

As manager of the Air Emissions Division, Mr. DiRaimo prepares Compliance Sampling Plans, performs Quality Assurance review of field, laboratory and calculation data, prepares compliance emissions test reports, and performs peer review of test reports prepared by others. In addition, he managed Element's Analytical Chemistry laboratories which provided him with experience in the review of analytical data and the associated QA/QC requirements.

Mr. DiRaimo served as Element's Project Manager of the BIF Trial Burn performed at the Ascend (formerly Solutia and Monsanto) Chocolate Bayou, Texas facility. His responsibilities included assisting in the planning and scheduling, coordination of Element's field crews and review and compilation of the field and QA/QC equipment data.

PHILLIP YOKLEY

Air Emissions Program Manager - Air Emissions Services Division
Element Materials Technology Houston, Inc.

EDUCATION

B.S. - Environmental Health, East Tennessee State University - 1981

CONTINUING EDUCATION

- Asbestos Abatement Training Program, the University of Texas, Arlington, Texas - May, 1987.
- Asbestos Technique Workshop, American Industrial Hygiene Association, Houston, Texas - April, 1987.
- Identification of Asbestos Utilizing Polarized Light Microscopy, McCrone Research Institute, Chicago, Illinois - 1986.
- In-Stack Opacity Monitor Audit Procedures, Environmental Protection Agency Regional Office, Annapolis, Maryland.
- Texas A & M Extension Course - "Asbestos Hazardous Emergency Response Act", 40 CFR 763 Subpart D, April, 1988. Certified Inspector; Certified Management Planner.
- Workshop on Sampling and Analysis Methods for Compliance with the "BIF" Regulation, USEPA, Durham, N.C., April, 1991.
- Attended 40 hour Occupational and Environmental Training Program on Hazardous Materials (CFR 1910.120) Houston, Texas, September, 1992 (including annual refresher courses).

PROFESSIONAL AFFILIATIONS

Source Evaluation Society

QUALIFICATIONS SUMMARY

Mr. Yokley began his career as an Air Pollution Analyst for the Allegheny County Air Pollution Control Bureau in Pittsburgh, Pennsylvania. He has performed stationary source air emissions testing services with Element (formerly Southwestern Laboratories, Huntingdon Engineering and Environmental, Maxim Technologies, Inc. and Stork Testing & Metallurgical Consulting, Inc.) since 1985 and currently holds the position of Air Emissions Program Manager. He also currently serves as the Quality Coordinator for the Air Emissions Services Division and the 5S Coordinator for Element's Houston facility. He has performed testing in Mexico, Puerto Rico and numerous states, with the great majority of sources being in Texas.

Mr. Yokley's direct field experience includes routine procedures such as particulates, NOx, CO, VOCs, as well as the specialized trial burn procedures including VOST, modified method 5, HCl/Cl_2, multiple metals, aldehydes/ketones, dioxins and furans, ammonia, and hydrogen cyanide. In addition, Mr. Yokley has performed particle size distribution, PM_{10}, $PM_{2.5}$, and Method 202 condensable particulate matter sampling and analysis on numerous sources.

PHILLIP YOKLEY

Mr. Yokley has performed project management, field supervision and on site testing for numerous types of sources including boilers, furnaces, scrubbers, incinerators, dryers, baghouses, turbines, compressor engines, sulfur recovery units and fluid catalytic cracking units. His experience includes involvement on several BIF interim status and recertification emissions test projects and team lead of numerous EPA Section 114 ICR and MACT comprehensive performance test programs.

Overall, Mr. Yokley has over 30 years experience in stationary source sampling and analysis for air emissions encompassing direct field sampling project management, compliance sampling plan preparation and presentation, departmental scheduling, field work, laboratory analysis, data reduction/emission calculations, QA/QC of field instrumentation and laboratory data, report preparation, and peer review of air emissions reports prepared by others.

VICENTE GONZALEZ

Project Manager - Air Emissions Services Division
Element Materials Technology Houston, Inc.

QUALIFICATIONS SUMMARY

Mr. Gonzalez has been involved in source sampling and analysis with Element since 2004, and currently holds the position of Project Manager. He has participated in source emission test projects involving measurements for flow, particulate, sulfur oxides, fluorides and various other pollutants. Mr. Gonzalez has progressed from an Environmental Technician to a Field Supervisor to a Project Manager, where he is responsible for the operation of a mobile emissions test trailer, the coordination of the field crew, data reduction, and the preparation of the emission test report.

Mr. Gonzalez's other responsibilities include equipment calibration and maintenance and related QA/QC procedures.

GUSTAVO GONZALEZ

Senior Environmental Technician - Air Emissions Services Division
Element Materials Technology Houston, Inc.

QUALIFICATIONS SUMMARY

Mr. Gonzalez has been involved in source sampling and analysis with Element since 2008, and currently holds the position of Senior Environmental Technician. He has participated in source emission test projects involving measurements for flow, particulate matter, sulfur oxides, dioxins/furans, PM-10, Method 202 condensable particulate matter, hydrogen cyanide, fluorides, hydrogen chloride, chlorine, ammonia and various other pollutants. Mr. Gonzalez has been a TCEQ-certified visible emissions evaluator since 2010.

Mr. Gonzalez's other responsibilities include particulate analysis, equipment calibration and maintenance and related QA/QC procedures.

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