PIONEER
NATURAL RESOURCES

Pioneer Natural Resources USA, Inc.
3617 N. Big Spring St.
Midland, Texas 79705
Main: (432) 571-1000

May 27, 2021

Mr. Ryan Slocum
Region 7 Section Manager
Texas Commission on Environmental Quality
9900 West IH-20, Suite 100
Midland, Texas 79706

RE: 40 CFR 60 Subpart JJJJ, Post-test Notification of Compliance Status
Scharbauer Ranch 323-14H Tank Battery ENG 2
GPS Coordinates: 32.273019, -102.143394
Customer Number: CN600130447
Regulated Entity No.: 107031288
PBR No.: 115606

Dear Mr. Slocum:

Pioneer Natural Resources USA, Inc., pursuant to 40 CFR §60.8(a) and 40 CFR §60.4245(d), is submitting this Notification of Compliance Status no later than sixty (60) days after completion of an engine performance test conducted on May 19, 2021 for the engine below located at the Scharbauer Ranch 323-14H Battery in Martin County, Texas.

Unit No.	**Make**	**Model**	**Serial No.**	**Mfg. HP@RPM**
Kodiak Unit #16-0436	Caterpillar	3516B LE	JEF03385	1380 @ 1400
Displacement	**Engine Emissions Control**	**Overhaul Date**	**Fuel Used**	**Engine Family**
69.0 L	Oxidation Catalyst	4-29-2019	Natural Gas (Field Gas)	SI 4SLB

If you have any questions, please contact me at 432-254-1347 o[redacted]

Best Regards,

Efrain Vizcaino
Engine Compliance Tech. III

cc: Shyla Harris, Environmental Compliance Manager, Pioneer Natural Resources USA, Inc.

Enclosure: JJJJ Performance Test Report

40 CFR Part 60 Subpart JJJJ
Performance Test Report

Test Type: Annual
Test Date: 05-19-2021
DOM: 04-29-19
Source:
Caterpillar 3516B LE
Lean Burn 4 Cycle Engine

Unit Number: ENG 2 (K16-0436)
Serial Number: JEF03385
Engine Hours: 17348
CN #: 600130447
RN #: 107031288

Permit #: #PBR 115606

Location:
Scharbauer Ranch 323-14H Tank Battery
Martin County, Texas

Prepared on Behalf of:
Pioneer Natural Resources

	CO			NOx			NMNEHC (VOC)					
	Federal	State		Federal	State		Federal	State				
Results ppmvd	30.435			102.220			21.208					
Results g/hp-hr	0.100			0.554			0.110					
Permit g/hp-hr	2.000	2.000		1.000	1.000		0.700	0.400				
PASS ALL	**Pass**	**Pass**		**Pass**	**Pass**		**Pass**	**Pass**				

Test Started: 6:28 Test Completed: 9:48

GAS

303 W. 3rd St (580) 225-0403 Elk City, OK 73644

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1.0 Key Personnel

Great Plains Analytical Services	Cory Garrison
Pioneer	Efrain Vizcaino

2.0 Sampling System

The sampling system used consisted of a Stainless steel probe, heated Teflon line, gas conditioning system, and a Gasmet model DX4000 FTIR analyzer. The gas conditioning system used was a Gasmet Personal Sampling System with a Zirconium Oxide oxygen sensor.

3.0 Methods Used

ASTM D6348-03

This extractive FTIR based field test method is used to quantify gas phase concentrations of multiple target analytes (CO, NOX, CH2O, & VOC's) from stationary source effluent. Because an FTIR analyzer is potentially capable of analyzing hundreds of compounds, this test method is not analyte or source specific. The analytes, detection levels, and data quality objectives are expected to change for any particular testing situation. It is the responsibility of the tester to define the target analytes, the associated detection limits for those analytes in the particular source effluent, and the required data quality objectives for each specific test program. Provisions are included in this test method that require the tester to determine critical sampling system and instrument operational parameters, and for the conduct of QA/QC procedures. Testers following this test method will generate data that will allow an independent observer to verify the valid collection, identification, and quantification of the subject target analytes.

EPA Method 1

The purpose of the method is to provide guidance for the selection of sampling ports and traverse points at which sampling for air pollutants will be performed pursuant to regulations set forth in this part.

EPA Method 2 & 2C

This method is applicable for the determination of the average velocity and the volumetric flow rate of a gas stream. The average gas velocity in a stack is determined from the gas density and from measurement of the average velocity head with a standard pitot tube. Velocity readings are taken from each stack at 16 separate traverse points (Table 6.1) and used to determine the engines mass emissions rate, calculated utilizing the formulas seen in section 7.0 of this report.

EPA Method 3A

This is a procedure for measuring oxygen (O2) and carbon dioxide (CO2) in stationary source emissions using a continuous instrumental analyzer. Quality assurance and quality control requirements are included to assure that the tester collects data of known quality. Documentation to these specific requirements for equipment, supplies, sample collection and analysis, calculations, and data analysis will be included.

4.0 Test Summary

Unit ENG 2 (K16-0436) with a serial number of JEF03385 which is a Caterpillar 3516B LE engine located at Scharbauer Ranch 323-14H Tank Battery and operated by Pioneer Natural Resources was tested for emissions of: (Oxides of Nitrogen) (Carbon Monoxide) (Volatile Organic Compounds) . The test was conducted on 05-19-2021 by Cory Garrison with Great Plains Analytical Services, Inc. All quality assurance and quality control tests were within acceptable tolerances.

The engine is a natural gas fired Lean Burn (4 Cycle) engine rated at 1380 brake horse power (BHP) at 1400 RPM. The engine was operating at 1328.04 BHP and 1300 RPM which is 96.23% of maximum engine load during the test. The test HP calculation can be found on page 8. The engine was running at the maximum load available at the test site.

This test will satisfy the testing requirements for 40 CFR Part 60 Subpart JJJJ. Unit ENG 2 (K16-0436) is authorized to operate under permit #PBR 115606.

Site Verification Photos

4.0 Test Summary

Engine/Compressor Specs					Test Summary
Location	Scharbauer Ranch 323-14H Tank Battery		*Unit ID*	ENG 2 (K16-0436)	
Make	Caterpillar		*Site Elevation ft.*	2884	
Model	3516B LE		*Atmospheric Pressure psi.*	13.23	
Serial number	JEF03385		*Stack Diameter in.*	15.75	
mfg. rated hp	1380		*Catalyst*	Yes	
mfg. rated rpm	1400		*Date of Manufacture*	4/29/19	
Engine/Compressor Operation		**Run 1**	**Run 2**	**Run 3**	**3 Run Average**
Test Horsepower		1328	1327	1328	1328
Test RPM		1300	1299	1300	1300
Percent Load %		96.26%	96.19%	96.26%	96.23%
Intake Manifold Pressure (hg)		64.68	64.68	64.68	64.68
Intake Manifold Temperature (F)		137.00	137.00	138.00	137.33
Ambient Conditions					
Ambient Temperature Dry (F)		64.00	63.00	62.00	63.00
Exhaust Flow Data					
Q Stack (dscfh)		123028.09	133051.65	142801.65	132960.47
Q Stack (dscm/hr)		3483.73	3767.57	4043.65	3764.99
Moisture Fraction Bws		0.12	0.12	0.12	0.12
			Results		
Method 3A Corrected O2% Dry		9.11%	9.07%	9.12%	9.10%
Moisture %		11.84%	12.49%	12.20%	12.18%

Permitted Standards				***Results***				
Test Start/Completed Times:				***6:28***	***7:35***	***8:41***	***9:48***	***5/19/21***
	JJJJ	**State**		**Run 1**	**Run 2**	**Run 3**	**3 Run Average**	**Pass Permits**
CO (g/hp-hr)	2.000	2.000		0.097	0.097	0.107	0.100	Pass
CO (ppmvd) @15% O2				15.887	14.714	15.063	15.221	
CO (ppbvd) @15% O2				15886.509	14714.452	15063.134	15221.365	
CO (ppmvw)				27.985	25.815	26.395	26.732	
CO (ppmvd)				31.743	29.498	30.063	30.435	
CO (mol wt)				28.01				
NOx (g/hp-hr)	1.000	1.000		0.510	0.567	0.585	0.554	Pass
NOx (ppmvd) @15% O2				50.887	52.098	50.377	51.120	
NOx (ppbvd) @15% O2				50886.784	52097.654	50376.897	51120.445	
NOx (ppmvw)				89.640	91.400	88.275	89.772	
NOx (ppmvd)				101.679	104.439	100.541	102.220	
NOx (mol wt)				46.01				
NMNEHC (g/hp-hr)	0.700	0.400		0.101	0.114	0.116	0.110	Pass
NMNEHC (ppmvd) @15% O2				10.502	10.913	10.404	10.606	
NMNEHC (ppbvd) @15% O2				10502.069	10912.578	10403.521	10606.056	
NMNEHC (ppmvw)				18.500	19.145	18.230	18.625	
NMNEHC (ppmvd)				20.985	21.876	20.763	21.208	
VOC (mol wt)				44.10				

5.0 Run Summaries

Table 5.1 Run Summaries

Summary Source Run 1

PPM Wet	CO	NO	NO2	NOx	NMNEHC		Oxygen %	Moisture %
Baseline	0.00	0.00	0.00	0.00	0.00		0.00%	0.00%
Source	29.61	77.06	11.96	89.02	18.88		7.88%	11.62%
Spike	60.13	89.31	6.52	95.83	37.00		7.38%	10.97%
Source	26.36	74.87	15.39	90.26	18.12		7.74%	12.06%
Baseline	1.22	0.00	0.11	0.11	1.75		0.00%	0.00%
Avg. Wet	27.99	75.97	13.68	89.64	18.50		7.81%	11.84%

Summary Source Run 2

PPM Wet	CO	NO	NO2	NOx	NMNEHC		Oxygen %	Moisture %
Baseline	1.22	0.00	0.11	0.11	1.75		0.00%	0.00%
Source	26.09	75.59	17.94	93.53	18.96		7.82%	12.27%
Spike	57.69	87.49	9.80	97.29	37.44		7.25%	11.56%
Source	25.54	73.53	15.74	89.27	19.33		7.62%	12.70%
Baseline	1.17	0.00	0.03	0.03	1.62		0.00%	0.00%
Avg. Wet	25.82	74.56	16.84	91.40	19.15		7.72%	12.49%

Summary Source Run 3

PPM Wet	CO	NO	NO2	NOx	NMNEHC		Oxygen %	Moisture %
Baseline	1.17	0.00	0.03	0.03	1.62		0.00%	0.00%
Source	26.14	75.64	12.42	88.06	19.44		7.83%	12.32%
Spike	58.36	90.24	7.08	97.32	36.92		7.37%	11.34%
Source	26.65	78.35	10.14	88.49	17.02		7.75%	12.08%
Baseline	1.11	0.00	0.28	0.28	1.43		0.00%	0.00%
Avg. Wet	26.40	77.00	11.28	88.28	18.23		7.79%	12.20%

Run Summaries

6.0 Volumetric Flow Rate Data

Table 6.1. Data used for volumetric flow rate (Method 2)

Volumetric flow rate data						
Pitot Tube Coefficient Cp(std)=	0.99					
Stack diameter =	15.75	**inches or:**	1.31	**feet or:**	1.35	**Square Feet**
		Run 1	Run 2	Run 3	Average	
H2O	%d	11.84	12.49	12.20	12.18	
CO2	%d	5.76	5.76	5.73	5.75	
O2	%d	7.81	7.72	7.79	7.77	
CO	ppmd	27.99	25.82	26.40	26.73	
Molecular Weight Stack Gas dry basis (Md)	g/g mole	29.23	29.23	29.23	29.23	
Molecular Weight Stack Gas wet basis (Ms)	g/g mole	27.90	27.83	27.86	27.86	
Stack Static Pressure (Pg)	"H20	0.41	0.49	0.56	0.49	
Stack Static Pressure (Pg)	"Hg	0.03	0.04	0.04	0.04	
Atmospheric Pressure at Location (Pbar)	MBAR	910.72	911.15	912.53	911.46	
Atmospheric Pressure at Location (Pbar)	"Hg	26.90	26.91	26.95	26.92	
Absolute Stack Pressure (Ps)	"Hg	26.93	26.95	26.99	26.96	
Stack Temperature	Deg C	327.85	328.85	332.60	329.77	
Stack Temperature	Deg F	622.13	623.94	630.69	625.58	
Stack Temperature	Deg R	1081.80	1083.61	1090.36	1085.25	
Stack Gas Velocity	ft/sec	65.22	71.13	76.43	71.06	
Stack Flow Rate Q	cfs	88.24	96.23	103.41	96.14	
Stack Gas Wet Volmetric Flow Rate	scf/hr	139550.92	152032.97	162644.25	151717.53	
Stack Gas Dry Volumetric Flow Rate	scf/hr	123028.09	133051.65	142801.65	133245.93	

Emissions Sampling Points - 3 point long line sampling probe	Inches
First Sampling Point Taken @ 16.7% of Stack Diameter	2.63
Second Sampling Point Taken @ 50% of Stack Diameter	7.88
Third Sampling Point Taken @ 83.3% of Stack Diameter	13.12

Volumetric Flow Rates

Table 6.2. Stack gas pressure readings measured with a standard pitot tube used for Volumetric Flow Rate

Δp_{std} = Velocity head measured by the standard pitot tube, cm (in.) H_2O.

	Run 1		Run 2		Run 3	
	Δpstd in H2O	*Exhaust Temp F*	*Δpstd in H2O*	*Exhaust Temp F*	*Δpstd in H2O*	*Exhaust Temp F*
Pitot Tube Sampling Points (Velocity)						
1	0.420	622.00	0.420	624.00	0.410	631.00
2	0.490	621.00	0.420	622.00	0.480	630.00
3	0.470	623.00	0.470	621.00	0.570	628.00
4	0.450	620.00	0.530	622.00	0.580	624.00
5	0.460	624.00	0.570	624.00	0.590	633.00
6	0.370	627.00	0.530	626.00	0.550	630.00
7	0.400	625.00	0.560	625.00	0.600	634.00
8	0.350	622.00	0.510	620.00	0.570	632.00
9	0.300	620.00	0.550	622.00	0.550	633.00
10	0.450	620.00	0.470	627.00	0.560	629.00
11	0.490	619.00	0.430	629.00	0.590	627.00
12	0.490	617.00	0.430	628.00	0.610	628.00
13	0.530	622.00	0.550	627.00	0.520	631.00
14	0.320	624.00	0.490	622.00	0.620	633.00
15	0.300	625.00	0.470	624.00	0.580	635.00
16	0.310	623.00	0.420	620.00	0.620	633.00
Δpstd Average=	0.413	622.13	0.489	623.94	0.563	630.69

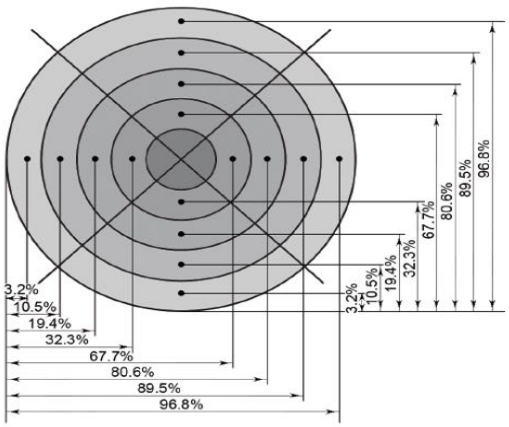
Sample after Back Purge:	0.62
Within 5% of last Δpstd reading:	**Yes**

Stack Diameter (inches)	15.75
Inches upstream from disturbance	8.00
Inches downstream from disturbance	40.00

Pitot readings are taken for Method 2 calculations using measuring points outlined in Method 1

Figure 6.1

16 Traverse Points Were Used



7.0 Calculations

Method 2: Determination of Stack Gas Velocity and Volumetric Flow Rate

**Note- Use of this method negates the need for any fuel related numbers for emissions calculations*

Nomenclature

Δp(avg) = Velocity head of stack gas, mm H2O (in. H20).
3600 = Conversion Factor, sec/hr.
A = Cross-sectional area of stack, m2 (ft2).
Bws = Water vapor in the gas stream (from ASTM D6348)
Cp(std) = Standard pitot tube coefficient; use 0.99
Kp = Velocity equation constant.
Md = Molecular weight of stack gas, dry basis, g/g-mole (lb./lb.-mole).
Ms = Molecular weight of stack gas, wet basis, g/g-mole (lb./lb.-mole).
Ps = Absolute stack pressure (Pbar+ Pg), mm Hg (in Hg)
Pstd = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).
Qsd = Dry volumetric stack gas flow rate corrected to standard conditions, dscm/hr. (dscf/hr.).
Ts(abs) = Absolute stack temperature, °K (°R). = 460 + Ts for English units.
Tstd = Standard absolute temperature, 293°K (528 °R).
Vs = Average stack gas velocity, m/sec (ft./sec).

*(Observed from Method 3 12.3) Dry Molecular Weight. Equation 3-1

Md=.44(%CO2)+.32(%O2)+.28(%N2+%CO)	Md=.44(0.058)+.32(0.091)+.28(0.848+0.003) =29.234LB/LB-MOLE

12.5 Molecular Weight of Stack Gas. Equation 2-6

Ms=Md(1-Bws)+18.0(Bws)	Ms=29.234(1-0.118)+18.0(0.118) =27.904LB/LB-MOLE

12.6 Average Stack Gas Velocity. Equation 2-7

Vs=Kp*Cp(std)*VΔpavg*V(Ts(abs)/(Ps*Ms))	Vs=85.49*0.99*V0.413*V(1081.795/(26.929*27.904)) =65.221FT/SEC

12.7 Average Stack Gas Volumetric Flow Rate. Equation 2-8

Qsd=3600(1-Bws)Vs*A{(Tstd*Ps)/(Ts(abs)*Pstd)}	Qsd=3600(1-0.118)65.221*1.353{(528*26.929)/ (1081.795*29.92)} =123028.093DSCF/HR

*Standard conversion from feet to meters

Q=Qsd/35.315	Q=123028.093/35.315 =3483.735 DSCM/HR

Emission Rates (Examples use CO Run 1)

Nomenclature

453.6= Conversion factor lb. to gram
A = Cross-sectional area of stack, m2 (ft2).
BHP/HR. = Brake work of the engine, horsepower-hour (HP-HR.).
BTU/HP-HR. = Brake Specific Fuel Consumption (HHV)
ER = Emission rate of (CO) in g/HP-hr.
F(d)= Volumes of combustion components per unit of heat content, scm/J (scf/million Btu).
Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis
LB/HR.= Emission rate of (CO) in LB/HR.
Mol wt.= Mol Weight of CO (28.01)
HP= Engines rated Horsepower
Mfg.= Manufacturer Exhaust flow rate at 100% (ft3/min)
O2 = Concentration of oxygen on a dry basis, percent.
ppm= Parts Per Million (CO)
ppm@15% O2= PPM corrected to 15% O2
Qsd = Dry volumetric stack gas flow rate corrected to standard conditions, dscm/hr. (DSCF/HR.).
Run Time = Run Time in Minutes
TPY= Tons per Year
Vs = Average stack gas velocity, m/sec (ft./sec).

CO corrected @ 15% O2

ppm @ 15% O2=PPM*{(20.9-15%O2)/(20.9-O2)}	ppm @ 15% O2=31.743*{(20.9-15)/(20.9-9.10%)} = 15.887 PPM@ 15% O2

G/HP HR From 40 CFR Part 60 Subpart JJJJ

g/hp-hr= (PPM*(1.164*10^-3)*Q*(Run Time/60))/BHP/HR	(31.743*(1.164*10^-3)*3483.735*(Run Time/60))/1328.382 = 0.097 G/HP-HR

LB/HR from Grams

lb/hr=ER*1/453.6*BHP-HR	LB/HR=0.097*1/453.6*1328.382=0.284

TPY

TPY= LB/HR. *4.38	TPY=0.3*4.38 = 1.243 TPY

Horsepower

BHP/HR = Available HP - ((MFP @100% - Actual MFP inHG) / ((MFP @100% - MFP @75%) / 25%))) * Available HP	1328 = 1281.42857142857 - ((89.1 - 92) / ((89.1 - 71.9) / 25%))) * 1281.42857142857

Wet to Dry PPM

ppm wet * (1/(1-H2O) = ppm dry	31.74 = 27.985 * (1/(1 - 0.1184))

8.0 Oxygen Calibration

8.1 Calibration error test; how do I confirm my analyzer calibration is correct? After the tester has assembled, prepared and calibrated the sampling system and analyzer, they conduct a 3-point analyzer calibration error test before the first run and again after any failed system bias test or failed drift test. They then introduce the low-, mid-, and high-level calibration gases sequentially in direct calibration mode. At each calibration gas level (low, mid, and high) the calibration error must be within ± 2.0 percent of the calibration span.

8.2 Initial system bias and system calibration error checks. Before sampling begins, it is determined whether the high- level or mid-level calibration gas best approximates the emissions and it is used as the upscale gas. The upscale gas is introduced at the probe upstream of all sample-conditioning components in system calibration mode.

(1) Next, zero gas is introduced as described above. The response must be within 0.5 percent of the upscale gas concentration.

(2) Low-level gas reading is observed until it has reached a final, stable value and the results are recorded. The measurement system will be operated at the normal sampling rate during all system bias checks.

(3) If the initial system bias specification is not met, corrective action is taken. The applicable calibration error test from Section 8.2.3 is repeated along with the initial system bias check until acceptable results are achieved, after which sampling will begin. The pre- and post-run system bias must be within ± 5.0 percent of the calibration span for the low-level and upscale calibration gases.

8.3 Post-run system bias check and drift assessment - confirming that each sample collected is valid.
Sampling may be performed for multiple runs before performing the post-run bias or system calibration error check provided this test is passed at the conclusion of the group of runs. A failed final test in this case will invalidate all runs subsequent to the last passed test.

(1) If the post-run system bias check is not passed, then the run is invalid. The problem is then diagnosed and fixed, then another calibration error test and system bias is passed before repeating the run.

(2) After each run, the low-level and upscale drift is calculated, using Equation 7E–4 in Section 12.5 from EPA Method 7E. If the post-run low- and upscale bias checks are passed, but the low-or upscale drift exceeds the specification in Section 13.3, the run data are valid, but a 3-point calibration error test and a system bias check must be performed and passed prior to additional testing.

Table 8.1 Oxygen Calibration

Method 7E 3.4 To the extent practicable, the measured emissions should be between 20 to 100 percent of the selected calibration span. This may not be practicable in some cases of low concentration measurements or testing for compliance with an emission limit when emissions are substantially less than the limit.

EPA Method 3A QA Worksheet

Certified Gas Concentration Low-Level (%)	Certified Gas Concentration Mid-Level (%)	Certified Gas Concentration HIgh-Level (%)
0.00%	9.00%	21.06%

(DIRECT) Analyzer Calibration Error (≤ 2%) Linerarity Check

	Certified Concentration Value (%)	Direct Calibration Response (%)	Absolute Difference (%)	Analyzer Calibration Error (%)
Zero Gas %	0.00%	0.00%	0.00%	0.00%
Mid-Level Gas %	9.00%	8.89%	-0.11%	0.52%
High-Level Gas %	21.06%	20.85%	-0.21%	1.00%

7E 8.5: Note: that you may risk sampling for multiple runs before performing the post-run bias provided you pass this test at the conclusion of the group of runs

(SYSTEM) Calibration Bias Checks (≤ 5%) and Drift Checks (≤ 3%)

Upscale Gas 9.00%

Zero Offset	0.00%
Span	21.06%

	Analyzer Calibration Response (%)	Bias Pre Initial Values: System Calibration Response Pre (%)	Bias Pre Initial Values: System Bias (% of Span) Pre	Bias Post Initial Values: System Calibration Response Post (%)	Bias Post Initial Values: System Bias (% of Span) Post	Drift (% of Span)
Zero Gas	0.00%	0%	0.00%	0%	0.00%	0.00%
Upscale Gas	8.89%	8.74%	-0.71%	8.76%	-0.62%	0.09%

(SYSTEM) Calibration Bias Checks (≤ 5%) and Drift Checks (≤ 3%)

Avg. Gas Concentration (Run 1)	8.86%	Effluent Gas (Cgas) Run 1	9.11%
Avg. Gas Concentration (Run 2)	8.82%	Effluent Gas (Cgas) Run 2	9.07%
Avg. Gas Concentration (Run 3)	8.87%	Effluent Gas (Cgas) Run 3	9.12%

Calibration Bottles	
Zero Gas	100% Nitrogen
Mid-Level O2	9.00%
High-Level O2	21.06%

O2 QA/QC

	Analyzer Direct Calibration Response	Certified bottle value %
Zero Gas %	0.00%	0.00%
Mid-Level Gas %	8.89%	9.00%
High-Level Gas %	20.85%	21.06%

System Calibration Response Pre (%)

Zero Gas	0%	Upscale Used
Upscale Cal	8.74%	9.00%

System Calibration Response Post (%)

Zero Gas	0%	Upscale Used
Upscale Cal	8.76%	9.00%

9.0 Engine Parameter Data Sheet

Company	Pioneer Natural Resources
Facility	Scharbauer Ranch 323-14H Tank Battery
Date	5/19/2021
Site Elevation (ft)	2,884
Unit ID	ENG 2 (K16-0436)
Make	Caterpillar
Model	3516B LE
Serial Number	JEF03385
Technician	Cory Garrison

	Run 1	**Run 2**	**Run 3**	**Completed**
Run Start Times	6:28	7:35	8:41	9:48
Engine Hours	17345	17346	17347	17348

	Engine Parameter Data			
	Run 1	Run 2	Run 3	Average
Engine Speed (RPM)	1300	1299	1300	1300
Intake Manifold Pressure (psi)	45.0	45.0	45.0	45.0
Intake Manifold Temp °F	137.0	137.0	138.0	137.3
Engine Load (BHP)	1328.38	1327.36	1328.38	1328.04
Ambient Temp °F	64	63	62	63
Humidity %	82	92	93	89
Dew Point °F	58	60	60	59
AFR Manufacturer/Type	Caterpillar	Caterpillar	Caterpillar	Caterpillar
Suction Pressure (psi)	39.0	39.0	39.0	39.0
Discharge Pressure (psi)	1225.0	1223.0	1222.0	1223.3
Catalyst (Yes or No)	Yes	Yes	Yes	Yes

<--- Not available on this unit

10.0 QA/QC Results

QA/QC Results

Pre-test Baseline Results		
003 Carbon monoxide CO	Average:	0.6
004 Nitrogen monoxide NO	Average:	0.0
005 Nitrogen dioxide NO2	Average:	1.0
201 NOx	Average:	1.0
202 VOC	Average:	1.2
223 Oxygen	Average:	0.0

CTS Direct to Analyzer		
CTS Bottle Concentration:	Average:	99.0
CTS Compound Concentration Avg:	Average:	97.7
Tolerance:	Average:	4.9
Difference between measured and expected:	Average:	1.3

Pre-test System Zero		
003 Carbon monoxide CO	Average:	1.9
004 Nitrogen monoxide NO	Average:	0.0
005 Nitrogen dioxide NO2	Average:	0.9
201 NOx	Average:	0.9
202 VOC	Average:	4.5
223 Oxygen	Average:	0.0

Pre-test System CTS & Mechanical Response Time		
Mechanical Response Time:	73 seconds	
CTS Bottle Concentration:	Average:	99.0
CTS Compound Concentration Avg:	Average:	97.9
Tolerance:	Average:	4.9
Difference between measured and expected:	Average:	1.1

System (Equilibration) Response Time Target (Spike)		
Equilibration Response Time:	69 seconds	
Spike Reported:	Average:	252.7
Spike Expected:	Average:	252.8

System (Zero) Response Time		
System Zero Response Time:	65 seconds	
System Response Time:	100 seconds	

11.0 D6348 Annexes 1-8

D6348 Annex 1. Test Plan Requirements

Annex 1.2

The test quality objectives completed for the emissions test are demonstrated throughout Annexes 1, 2, 3, 4, 5, 6, 7 & 8 as layed out per ASTM D6348-03. All reference methods, pre-test and post test procedures were within acceptable limits. Data generated during the pre-test and post-test procedures are summarized below in order of the distinctive Annex.

Three 01:00 hour - test runs were performed. The final analyte concentrations are the average of each test run. Data was taken at 20 second intervals. Each 20 second measurement was the average of 200 scans.

Annex Table 1.2.1 Certified Calibration Bottle Concentrations

Bottle	Expiration	NO2	Ethylene			O2 (%)
CC511378	10/9/23	101.30				9.00%
CC420697	11/6/23		98.96			
CC317205	12/16/27					21.06%

Cylinder # CC48394 Expiration: 10-12-28				
	Propane	CO	NO	SF6
Bottle Value	252.80	495.60	254.20	10.15
Analyzer System Response	252.70	499.50	253.60	10.13
Percent Difference	0.04%	0.79%	0.24%	0.20%

Annex Table 1.2.2 Measurement System Capabilities

Parameter Measured	Gas	Concentration (ppm)	Path Length	Equilibration Time	Dilution Factor	% Recovery
Path Length	Ethylene	97.670	4.935			
Spike Direct	Propane	248.100				
	SF6	9.960				
	CO	491.100				
	NO	251.800				
	NO2	100.500				
Mechanical Response Time	Ethylene	97.850		73 seconds		
Analyzer Response	Propane	252.700		69 seconds		
	SF6	10.130				
	CO	499.500				
	NO	253.600				
	NO2	99.800				
Analyte Spike Recovery	Propane & SF6				6.73%	96.12%
					6.53%	106.35%
					6.53%	101.74%
System Zero	Nitrogen			65 seconds		
Post Spike System	Propane	246.800				
	CO	485.600				
	NO	247.900				
	NO2	103.590				

Annex 1.3

Annex Table 1.3.1 Test Specific Target Analytes and Data Quality Objectives

Compounds	Infrared Analysis Region (cm-1)	Expected Concentration Range	Measurement System Achievable Minimum Detectable Concentrations	Required Measurement System Accuracy and Precision for Test Application
CO	2000-2200	0-1200 ppm	0.16267 ppm	4 ppm
NO	1875-2138	0-1000 ppm	0.4007 ppm	2 ppm
NO2	2700-2950	0-100 ppm	0.4899 ppm	2 ppm
VOC	2600-3200 910-1150 2550-2950	0-100 ppm	1.8520 ppm Total VOC's	1 ppm per VOC
CH2O	2550-2850	0-100 ppm	0.7878 ppm	1 ppm
Interfering Compounds	* CO is analyzed in a separate analysis region than CO2 and H2O			
CO_2	926-1150	0-10%		n/a
Water Vapor	3200-3401	0-22%	0.20%	n/a

* VOCs compiled of Acetaldehyde, Ethylene, Hexane, and Propane

Annex 1.4

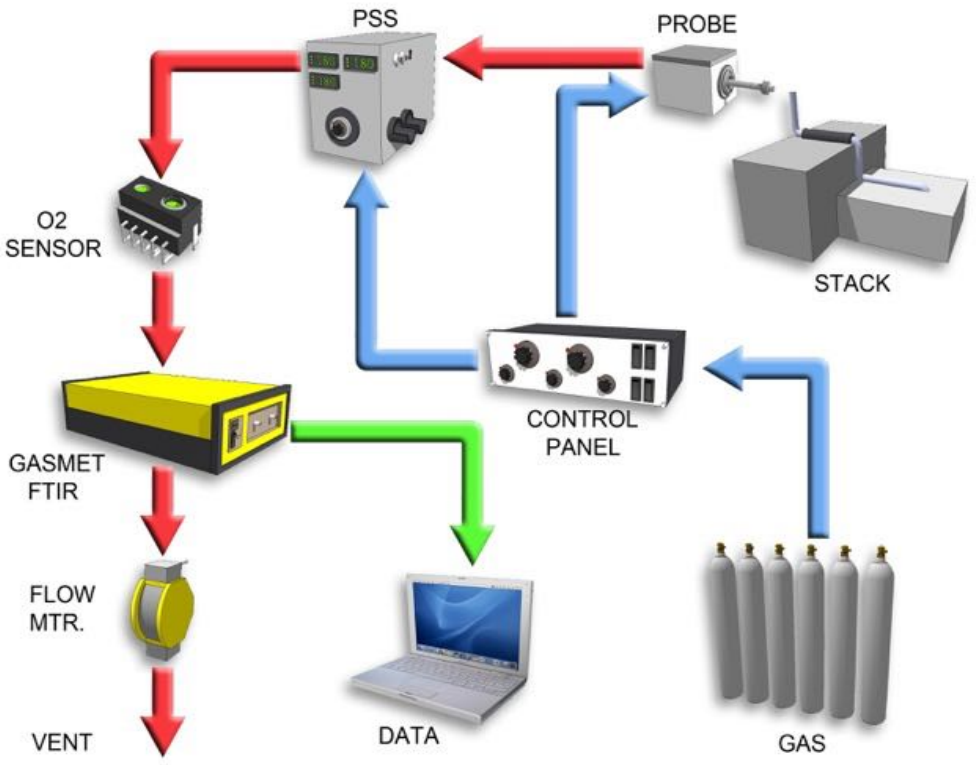
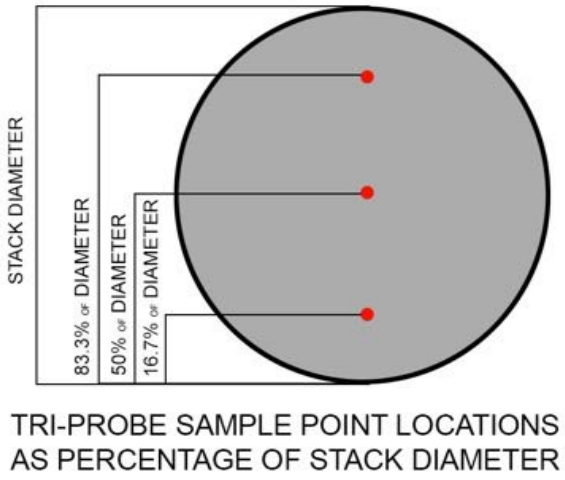


Figure Annex 1.4.1 Sampling Train

The testing instrumentation is housed in an enclosed vehicle which is located approximately 45 feet from the source. A heated sample line (sixty feet in length) is attached to the inlet of analyzer system and the source effluent discharges through the analyzer outlet .



Sampling Point Locations in Inches	
16.7%:	2.630
50%:	7.875
83.3%:	13.120

Figure Annex 1.4.2 Sampling Points

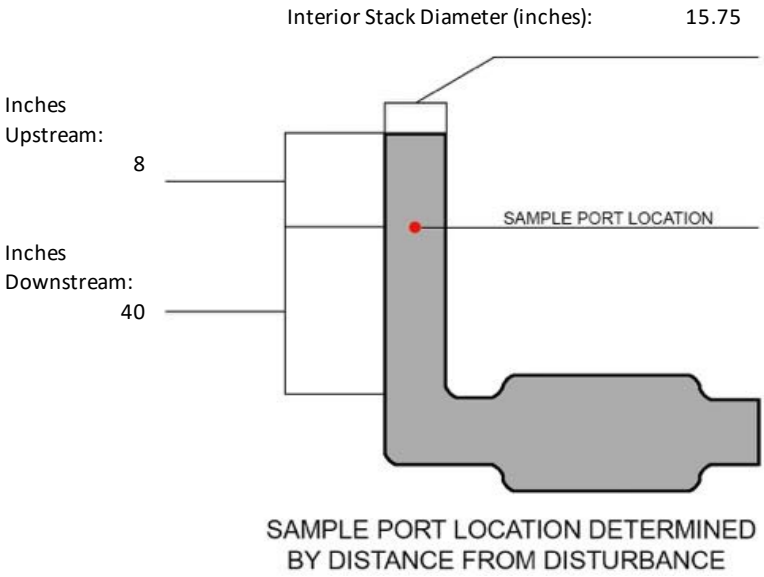


Figure Annex 1.4.3 Sample Port Location

Pressure @ Sampling Point (Pg "H2O):	0.49
Temperature @ Sampling Point (Deg F):	625.58
Stack Gas Dry Volumetric Flow Rate (scf/hr):	133245.93
H2O%d @ Sampling Point:	12.18
CO2%d @ Sampling Point:	5.75

D6348 Annex 2. Determination of FTIR Measurement System Minimum Detectable Concentrations (MDC#1

Target Analyte	Results (ppm)
CO	0.2603
NO	0.6410
NO2	1.3387
Total VOC's	2.3011
Ethylene	0.3011
Propane	0.5906
Hexane	0.3030
Acetaldehyde	1.1064
Formaldehyde	1.0691

$$NEA_{rms}^{m} = \sqrt{\frac{1}{n}\sum_{j=1}^{N_m}\left(NEA_i^m\right)^2}$$

$$REF_{rms}^{m} = \sqrt{\frac{1}{n}\sum_{j=1}^{N_m}\left(REF_i^m\right)^2}$$

$$MDC\#1 = \frac{NEA_{rms}^{m}}{REF_{rms}^{m}} * \frac{C_{ref}L_{ref}}{L_{cell}}$$

D6348 Annex 3. FTIR Reference Spectra

Calibration Transfer Standard	Expected	Measured	Path Length	Validated
Ethylene	98.96	97.67	4.935	Passed

Within 5% of certified bottle value demonstrating Linearity and Pathlength

D6348 Annex 4. Required Pre-Test Procedures

Annex Table 4.1 Measurement System Capabilities

Parameter Measured	Gas	Concentration (ppm)	Path Length	Equilibration Time	Dilution Factor	% Recovery
Path Length	Ethylene	97.670	4.935			
Spike Direct	Propane	248.100				
	SF6	9.960				
	CO	491.100				
	NO	251.800				
	NO2	100.500				
Mechanical Response Time	Ethylene	97.850		73 seconds		
System Response Time	Propane	252.700		69 seconds		
	SF6	10.130				
	CO	499.500				
	NO	253.600				
	NO2	99.800				
Analyte Spike Recovery	Propane & SF6				6.73%	96.12%
					6.53%	106.35%
					6.53%	101.74%
System Zero	Nitrogen			65 seconds		
Post Spike System	Propane	246.800				
	CO	485.600				
	NO	247.900				
	NO2	103.590				

D6348 Annex 5. Analyte Spiking Technique

Parameter	Gas	Concentration	Measured	% Difference	Specification	Validated
Spike Direct	Propane	252.800	248.100	1.86%	+/- 2%	Pass
	SF6	10.150	9.960	1.87%	+/- 2%	Pass
	CO	495.600	491.100	0.91%	+/- 2%	Pass
	NO	254.200	251.800	0.94%	+/- 2%	Pass
	NO2	101.300	100.500	0.79%	+/- 2%	Pass

Spike Run 1 via the System

	Source Output	Spike Average	Dilution Factor	Expected	% Recovery	Specification
Propane	1.220	17.440		18.144	96.12%	70-130%
SF6	0.050	0.670	6.73%			<10%

Spike Run 2 via the System

	Source Output	Spike Average	Dilution Factor	Expected	% Recovery	Specification
Propane	0.960	18.500		17.395	106.35%	70-130%
SF6		0.650	6.53%			<10%

Spike Run 3 via the System

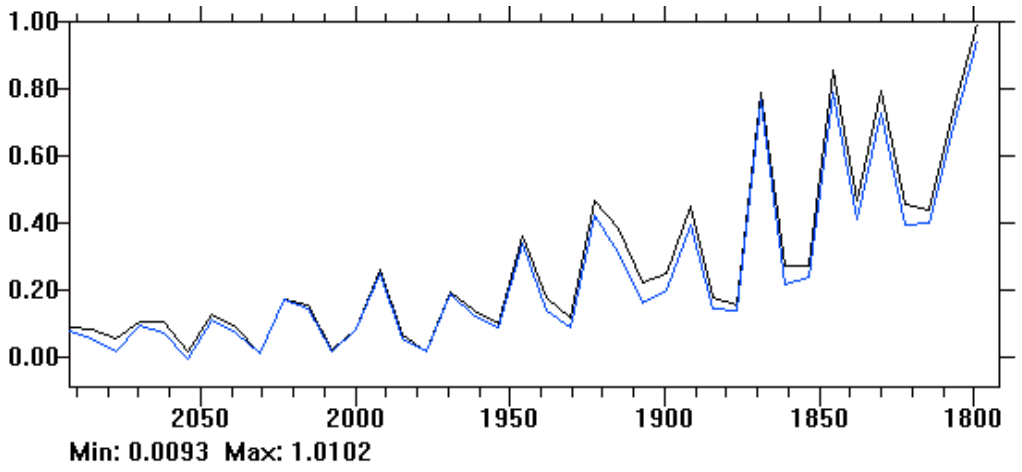
	Source Output	Spike Average	Dilution Factor	Expected	% Recovery	Specification
Propane	1.530	18.240		17.928	101.74%	70-130%
SF6		0.650	6.53%			<10%

D6348 Annex 6. Determination of System Performance Parameters

Noise Equivalent Absorbance (NEA)

RMS High	0.000312
RMS Mid	0.000096
RMS Low	0.000119

Line Position: Demonstrating the peak positions align correctly (Manual Comparison +/- 20%)

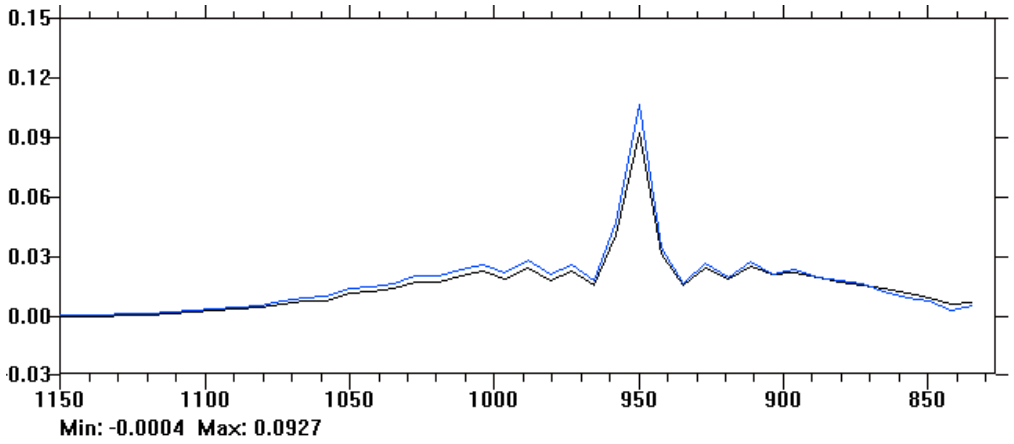


Resolution

The Gasmet GICCOR (Genzel Interferometer with Cube Corner Retroreflectors) interferometer is specially designed for maximum optical throughput and maximum signal to noise ratio of 7.72 (cm-1) remaining stable with any vibration and temperature changes.

Detector Linearity

The Gasmet DX4000 is a low resolution spectrometer where the aperture is fixed to a maximum angle setting and the detector linearity was tested with an alternate approach. A three point linearity of the CTS gas was performed and validated.



D6348 Annex 7. Preparation of Analytical Quantification Algorithm

The analytical accuracy of the quantification algorithm is satisfied via the results from Annex 5 per Annex 7.6

D6348 Annex 8. Post Test Quality Assurance/Quality Control Procedures

POST CTS System Check:	
CTS Bottle Concentration:	98.96
CTS Sample Concentration Average:	96.50
Difference between measured and expected:	2.46
Tolerance:	4.95

12.0 RMGuide Report for:
Pioneer Natural Resources Scharbauer Ranch 323-14H Tank Battery JJJJ

CTS Bottle Concentration:	98.96
Spike Bottle Concentration:	252.80
SF6 Bottle Concentration:	10.15
System Response Time:	100 seconds
Minimum Response Time:	100 seconds

Step: 06 PRE-TEST Baseline Results:				
Water Vapor H2O	Average:	-0.18	Residual:	0.0007
Carbon monoxide CO	Average:	0.57	Residual:	0.0006
Nitrogen monoxide NO	Average:	0.00	Residual:	0.0012
Nitrogen dioxide NO2	Average:	1.02	Residual:	0.0002
Propane C3H8	Average:	0.07	Residual:	0.0003
Sulfur hexafluoride SF6	Average:	0.00	Residual:	0.0015
Ethylene C2H4	Average:	0.41	Residual:	0.0011
Methane CH4	Average:	1.42	Residual:	0.0005
Nitrous oxide N2O	Average:	0.02	Residual:	0.0006
Carbon dioxide CO2	Average:	0.02	Residual:	0.0010
Ammonia NH3	Average:	0.00	Residual:	0.0011
Ethane C2H6	Average:	0.00	Residual:	0.0009
Hexane C6H14	Average:	0.01	Residual:	0.0003
Acetaldehyde C2H4O	Average:	0.68	Residual:	0.0003
NOx	Average:	1.02	Residual:	0.0012
VOC	Average:	1.17	Residual:	0.0011
Ambient pressure	Average:	912.00	Residual:	0.0000
Oxygen	Average:	0.00	Residual:	0.0000
Cell temperature	Average:	180.00	Residual:	0.0000
Interferometer temperature	Average:	34.60	Residual:	0.0000
Detector temperature	Average:	37.12	Residual:	0.0000
IFG Center	Average:	2409.00	Residual:	0.0000
Source intensity	Average:	92.00	Residual:	0.0000
Electronics temperature	Average:		Residual:	
External temperature	Average:	25.26	Residual:	0.0000

Step:07 CTS Direct to Analyzer:	
CTS Bottle Concentration:	98.96
CTS Concentration Average:	97.67
Tolerance:	4.948
Difference between measured and expected	1.29

Step: 08 PRE-TEST System Zero:				
Water vapor H2O	Average:	-0.01	Residual:	0.0022
Carbon monoxide CO	Average:	1.91	Residual:	0.0006
Nitrogen monoxide NO	Average:	0.00	Residual:	0.0012
Nitrogen dioxide NO2	Average:	0.87	Residual:	0.0002
Propane C3H8	Average:	0.00	Residual:	0.0014
Sulfur hexafluoride SF6	Average:	0.00	Residual:	0.0060
Ethylene C2H4	Average:	1.42	Residual:	0.0035
Methane CH4	Average:	2.75	Residual:	0.0003
Nitrous oxide N2O	Average:	0.09	Residual:	0.0006
Carbon dioxide CO2	Average:	0.23	Residual:	0.0034
Ammonia NH3	Average:	0.00	Residual:	0.0035
Ethane C2H6	Average:	0.00	Residual:	0.0020
Hexane C6H14	Average:	0.12	Residual:	0.0005
Acetaldehyde C2H4O	Average:	3.00	Residual:	0.0007
NOx	Average:	0.87	Residual:	0.0012
VOC	Average:	4.54	Residual:	0.0035
Ambient pressure	Average:	910.67	Residual:	0.0000
Oxygen	Average:	0.00	Residual:	0.0000
Cell temperature	Average:	180.00	Residual:	0.0000
Interferometer temperature	Average:	37.34	Residual:	0.0000
Detector temperature	Average:	37.14	Residual:	0.0000
IFG Center	Average:	2415.33	Residual:	0.0000
Source intensity	Average:	92.67	Residual:	0.0000
External temperature	Average:	25.31	Residual:	0.0000

Step: 09 PRE-TEST System CTS & Mechanical Response Time	
Mechanical Response Time:	73 seconds
CTS Bottle Concentration:	98.96
CTS Concentration Average:	97.85
Tolerance:	4.948
Difference bettween measured and expected	1.11

Step: 10 System(Equilibration) Response Time Target (Spike)	
Equilibration Response Time:	69 seconds
Spike Reported:	252.7
Spike Expected:	252.80

Step: 11 System(Zero) Response Time				
System Zero Response Time:	65 seconds			
System Response Time:	100 seconds			
Water vapor H2O	Average:	0.00	Residual:	0.0022
Carbon monoxide CO	Average:	0.00	Residual:	0.0006
Nitrogen monoxide NO	Average:	0.00	Residual:	0.0011
Nitrogen dioxide NO2	Average:	0.00	Residual:	0.0002
Propane C3H8	Average:	0.00	Residual:	0.0008
Sulfur hexafluoride SF6	Average:	0.01	Residual:	0.0064
Ethylene C2H4	Average:	0.00	Residual:	0.0038
Methane CH4	Average:	3.52	Residual:	0.0006
Nitrous oxide N2O	Average:	0.10	Residual:	0.0006
Carbon dioxide CO2	Average:	0.27	Residual:	0.0035
Ammonia NH3	Average:	0.00	Residual:	0.0038
Ethane C2H6	Average:	0.00	Residual:	0.0020
Hexane C6H14	Average:	0.00	Residual:	0.0006
Acetaldehyde C2H4O	Average:	0.00	Residual:	0.0007
NOx	Average:	0.00	Residual:	0.0011
VOC	Average:	0.00	Residual:	0.0038
Ambient pressure	Average:	911.00	Residual:	0.0000
Oxygen	Average:	0.00	Residual:	0.0000
Cell temperature	Average:	180.00	Residual:	0.0000
Interferometer temperature	Average:	38.39	Residual:	0.0000
Detector temperature	Average:	37.14	Residual:	0.0000
IFG Center	Average:	2390.33	Residual:	0.0000
Source intensity	Average:	93.00	Residual:	0.0000
External temperature	Average:	25.68	Residual:	0.0000

Step: 12 SOURCE GAS 1A				
Water vapor H2O	Average:	11.62	Residual:	0.0091
Carbon monoxide CO	Average:	29.61	Residual:	0.0070
Nitrogen monoxide NO	Average:	77.06	Residual:	0.0138
Nitrogen dioxide NO2	Average:	11.96	Residual:	0.0023
Propane C3H8	Average:	1.22	Residual:	0.0031
Sulfur hexafluoride SF6	Average:	0.05	Residual:	0.0036
Ethylene C2H4	Average:	11.30	Residual:	0.0031
Methane CH4	Average:	1061.25	Residual:	0.0185
Nitrous oxide N2O	Average:	0.00	Residual:	0.0071
Carbon dioxide CO2	Average:	5.79	Residual:	0.0026
Ammonia NH3	Average:	0.00	Residual:	0.0031
Ethane C2H6	Average:	57.53	Residual:	0.0026
Hexane C6H14	Average:	1.00	Residual:	0.0026
Acetaldehyde C2H4O	Average:	5.36	Residual:	0.0030
NOx	Average:	89.02	Residual:	0.0138
VOC	Average:	18.88	Residual:	0.0032
Ambient pressure	Average:	910.89	Residual:	0.0000
Oxygen	Average:	7.88	Residual:	0.0000
Cell temperature	Average:	180.01	Residual:	0.0000
Interferometer temperature	Average:	40.78	Residual:	0.0000
Detector temperature	Average:	37.08	Residual:	0.0000
IFG Center	Average:	2386.59	Residual:	0.0000
Source intensity	Average:	93.00	Residual:	0.0000
External temperature	Average:	28.95	Residual:	0.0000

Step: 13 SPIKE GAS- A				
Water vapor H2O	Average:	10.97	Residual:	0.0092
Carbon monoxide CO	Average:	60.13	Residual:	0.0067
Nitrogen monoxide NO	Average:	89.31	Residual:	0.0134
Nitrogen dioxide NO2	Average:	6.52	Residual:	0.0024
Propane C3H8	Average:	17.44	Residual:	0.0025
Sulfur hexafluoride SF6	Average:	0.67	Residual:	0.0033
Ethylene C2H4	Average:	12.39	Residual:	0.0027
Methane CH4	Average:	998.06	Residual:	0.0178
Nitrous oxide N2O	Average:	0.00	Residual:	0.0068
Carbon dioxide CO2	Average:	5.76	Residual:	0.0026
Ammonia NH3	Average:	0.00	Residual:	0.0027
Ethane C2H6	Average:	48.66	Residual:	0.0025
Hexane C6H14	Average:	1.77	Residual:	0.0025
Acetaldehyde C2H4O	Average:	5.40	Residual:	0.0026
NOx	Average:	95.84	Residual:	0.0134
VOC	Average:	37.00	Residual:	0.0027
Ambient pressure	Average:	910.00	Residual:	0.0000
Oxygen	Average:	7.38	Residual:	0.0000
Cell temperature	Average:	180.00	Residual:	0.0000
Interferometer temperature	Average:	41.33	Residual:	0.0000
Detector temperature	Average:	37.07	Residual:	0.0000
IFG Center	Average:	2371.67	Residual:	0.0000
Source intensity	Average:	93.00	Residual:	0.0000
External temperature	Average:	29.49	Residual:	0.0000

Step: 14 SOURCE GAS 02-A				
Water vapor H2O	Average:	12.06	Residual:	0.0097
Carbon monoxide CO	Average:	26.36	Residual:	0.0067
Nitrogen monoxide NO	Average:	74.87	Residual:	0.0135
Nitrogen dioxide NO2	Average:	15.39	Residual:	0.0025
Propane C3H8	Average:	0.43	Residual:	0.0028
Sulfur hexafluoride SF6	Average:	0.01	Residual:	0.0029
Ethylene C2H4	Average:	11.70	Residual:	0.0027
Methane CH4	Average:	1051.30	Residual:	0.0187
Nitrous oxide N2O	Average:	0.00	Residual:	0.0068
Carbon dioxide CO2	Average:	5.72	Residual:	0.0019
Ammonia NH3	Average:	0.00	Residual:	0.0027
Ethane C2H6	Average:	57.81	Residual:	0.0028
Hexane C6H14	Average:	0.78	Residual:	0.0028
Acetaldehyde C2H4O	Average:	5.21	Residual:	0.0028
NOx	Average:	90.26	Residual:	0.0135
VOC	Average:	18.12	Residual:	0.0030
Ambient pressure	Average:	910.54	Residual:	0.0000
Oxygen	Average:	7.74	Residual:	0.0000
Cell temperature	Average:	180.03	Residual:	0.0000
Interferometer temperature	Average:	42.34	Residual:	0.0000
Detector temperature	Average:	37.05	Residual:	0.0000
IFG Center	Average:	2367.06	Residual:	0.0000
Source intensity	Average:	93.00	Residual:	0.0000
External temperature	Average:	30.46	Residual:	0.0000

Step: 15 BASELINE GAS 01-B				
Water vapor H2O	Average:	0.00	Residual:	0.0013
Carbon monoxide CO	Average:	1.22	Residual:	0.0004
Nitrogen monoxide NO	Average:	0.00	Residual:	0.0011
Nitrogen dioxide NO2	Average:	0.11	Residual:	0.0002
Propane C3H8	Average:	0.00	Residual:	0.0006
Sulfur hexafluoride SF6	Average:	0.00	Residual:	0.0039
Ethylene C2H4	Average:	0.57	Residual:	0.0029
Methane CH4	Average:	2.46	Residual:	0.0003
Nitrous oxide N2O	Average:	0.06	Residual:	0.0004
Carbon dioxide CO2	Average:	0.38	Residual:	0.0027
Ammonia NH3	Average:	0.00	Residual:	0.0028
Ethane C2H6	Average:	0.00	Residual:	0.0004
Hexane C6H14	Average:	0.12	Residual:	0.0003
Acetaldehyde C2H4O	Average:	1.06	Residual:	0.0004
NOx	Average:	0.11	Residual:	0.0011
VOC	Average:	1.75	Residual:	0.0029
Ambient pressure	Average:	911.00	Residual:	0.0000
Oxygen	Average:	0.00	Residual:	0.0000
Cell temperature	Average:	180.00	Residual:	0.0000
Interferometer temperature	Average:	43.15	Residual:	0.0000
Detector temperature	Average:	37.04	Residual:	0.0000
IFG Center	Average:	2395.67	Residual:	0.0000
Source intensity	Average:	93.00	Residual:	0.0000
External temperature	Average:	31.22	Residual:	0.0000

Step: 16 SOURCE GAS 01-B				
Water vapor H2O	Average:	12.27	Residual:	0.0099
Carbon monoxide CO	Average:	26.09	Residual:	0.0064
Nitrogen monoxide NO	Average:	75.59	Residual:	0.0133
Nitrogen dioxide NO2	Average:	17.94	Residual:	0.0025
Propane C3H8	Average:	0.96	Residual:	0.0028
Sulfur hexafluoride SF6	Average:	0.00	Residual:	0.0029
Ethylene C2H4	Average:	11.83	Residual:	0.0027
Methane CH4	Average:	1070.03	Residual:	0.0192
Nitrous oxide N2O	Average:	0.00	Residual:	0.0064
Carbon dioxide CO2	Average:	5.80	Residual:	0.0020
Ammonia NH3	Average:	0.00	Residual:	0.0028
Ethane C2H6	Average:	58.60	Residual:	0.0028
Hexane C6H14	Average:	0.65	Residual:	0.0028
Acetaldehyde C2H4O	Average:	5.52	Residual:	0.0027
NOx	Average:	93.53	Residual:	0.0133
VOC	Average:	18.96	Residual:	0.0028
Ambient pressure	Average:	911.00	Residual:	0.0000
Oxygen	Average:	7.82	Residual:	0.0000
Cell temperature	Average:	180.05	Residual:	0.0000
Interferometer temperature	Average:	43.66	Residual:	0.0000
Detector temperature	Average:	37.03	Residual:	0.0000
IFG Center	Average:	2380.07	Residual:	0.0000
Source intensity	Average:	93.01	Residual:	0.0000
External temperature	Average:	31.70	Residual:	0.0000

Step: 17 SPIKE GAS- B				
Water vapor H2O	Average:	11.56	Residual:	0.0093
Carbon monoxide CO	Average:	57.69	Residual:	0.0061
Nitrogen monoxide NO	Average:	87.49	Residual:	0.0128
Nitrogen dioxide NO2	Average:	9.80	Residual:	0.0024
Propane C3H8	Average:	18.50	Residual:	0.0023
Sulfur hexafluoride SF6	Average:	0.65	Residual:	0.0027
Ethylene C2H4	Average:	12.19	Residual:	0.0025
Methane CH4	Average:	1000.58	Residual:	0.0184
Nitrous oxide N2O	Average:	0.00	Residual:	0.0061
Carbon dioxide CO2	Average:	5.76	Residual:	0.0023
Ammonia NH3	Average:	0.00	Residual:	0.0025
Ethane C2H6	Average:	50.33	Residual:	0.0023
Hexane C6H14	Average:	1.22	Residual:	0.0023
Acetaldehyde C2H4O	Average:	5.53	Residual:	0.0027
NOx	Average:	97.30	Residual:	0.0128
VOC	Average:	37.44	Residual:	0.0027
Ambient pressure	Average:	911.00	Residual:	0.0000
Oxygen	Average:	7.25	Residual:	0.0000
Cell temperature	Average:	180.00	Residual:	0.0000
Interferometer temperature	Average:	44.10	Residual:	0.0000
Detector temperature	Average:	37.02	Residual:	0.0000
IFG Center	Average:	2368.33	Residual:	0.0000
Source intensity	Average:	93.00	Residual:	0.0000
External temperature	Average:	32.12	Residual:	0.0000

Step: 18 SOURCE GAS 02-B				
Water vapor H2O	Average:	12.70	Residual:	0.0102
Carbon monoxide CO	Average:	25.54	Residual:	0.0062
Nitrogen monoxide NO	Average:	73.53	Residual:	0.0131
Nitrogen dioxide NO2	Average:	15.74	Residual:	0.0026
Propane C3H8	Average:	1.50	Residual:	0.0028
Sulfur hexafluoride SF6	Average:	0.01	Residual:	0.0028
Ethylene C2H4	Average:	11.77	Residual:	0.0026
Methane CH4	Average:	1052.69	Residual:	0.0197
Nitrous oxide N2O	Average:	0.00	Residual:	0.0062
Carbon dioxide CO2	Average:	5.71	Residual:	0.0019
Ammonia NH3	Average:	0.00	Residual:	0.0026
Ethane C2H6	Average:	57.96	Residual:	0.0028
Hexane C6H14	Average:	0.56	Residual:	0.0028
Acetaldehyde C2H4O	Average:	5.50	Residual:	0.0027
NOx	Average:	89.27	Residual:	0.0131
VOC	Average:	19.33	Residual:	0.0028
Ambient pressure	Average:	911.29	Residual:	0.0000
Oxygen	Average:	7.62	Residual:	0.0000
Cell temperature	Average:	180.01	Residual:	0.0000
Interferometer temperature	Average:	44.61	Residual:	0.0000
Detector temperature	Average:	37.01	Residual:	0.0000
IFG Center	Average:	2359.41	Residual:	0.0000
Source intensity	Average:	93.61	Residual:	0.0000
External temperature	Average:	32.69	Residual:	0.0000

Step: 19 BASELINE GAS 01-C				
Water vapor H2O	Average:	0.00	Residual:	0.0011
Carbon monoxide CO	Average:	1.17	Residual:	0.0004
Nitrogen monoxide NO	Average:	0.00	Residual:	0.0011
Nitrogen dioxide NO2	Average:	0.03	Residual:	0.0004
Propane C3H8	Average:	0.00	Residual:	0.0005
Sulfur hexafluoride SF6	Average:	0.00	Residual:	0.0036
Ethylene C2H4	Average:	0.40	Residual:	0.0028
Methane CH4	Average:	2.65	Residual:	0.0004
Nitrous oxide N2O	Average:	0.06	Residual:	0.0004
Carbon dioxide CO2	Average:	0.40	Residual:	0.0025
Ammonia NH3	Average:	0.00	Residual:	0.0027
Ethane C2H6	Average:	0.12	Residual:	0.0003
Hexane C6H14	Average:	0.18	Residual:	0.0003
Acetaldehyde C2H4O	Average:	1.04	Residual:	0.0004
NOx	Average:	0.03	Residual:	0.0011
VOC	Average:	1.62	Residual:	0.0028
Ambient pressure	Average:	912.00	Residual:	0.0000
Oxygen	Average:	0.00	Residual:	0.0000
Cell temperature	Average:	180.00	Residual:	0.0000
Interferometer temperature	Average:	45.14	Residual:	0.0000
Detector temperature	Average:	37.00	Residual:	0.0000
IFG Center	Average:	2347.67	Residual:	0.0000
Source intensity	Average:	94.00	Residual:	0.0000
External temperature	Average:	33.21	Residual:	0.0000

Step: 20 SOURCE GAS 01-C				
Water vapor H2O	Average:	12.32	Residual:	0.0096
Carbon monoxide CO	Average:	26.14	Residual:	0.0058
Nitrogen monoxide NO	Average:	75.64	Residual:	0.0125
Nitrogen dioxide NO2	Average:	12.42	Residual:	0.0024
Propane C3H8	Average:	1.53	Residual:	0.0024
Sulfur hexafluoride SF6	Average:	0.00	Residual:	0.0028
Ethylene C2H4	Average:	11.85	Residual:	0.0027
Methane CH4	Average:	1068.36	Residual:	0.0194
Nitrous oxide N2O	Average:	0.00	Residual:	0.0058
Carbon dioxide CO2	Average:	5.77	Residual:	0.0019
Ammonia NH3	Average:	0.00	Residual:	0.0027
Ethane C2H6	Average:	58.76	Residual:	0.0024
Hexane C6H14	Average:	0.66	Residual:	0.0024
Acetaldehyde C2H4O	Average:	5.40	Residual:	0.0026
NOx	Average:	88.06	Residual:	0.0125
VOC	Average:	19.44	Residual:	0.0027
Ambient pressure	Average:	912.67	Residual:	0.0000
Oxygen	Average:	7.83	Residual:	0.0000
Cell temperature	Average:	179.99	Residual:	0.0000
Interferometer temperature	Average:	45.01	Residual:	0.0000
Detector temperature	Average:	37.00	Residual:	0.0000
IFG Center	Average:	2346.61	Residual:	0.0000
Source intensity	Average:	94.00	Residual:	0.0000
External temperature	Average:	33.02	Residual:	0.0000

Step: 21 SPIKE GAS- C				
Water vapor H2O	Average:	11.34	Residual:	0.0089
Carbon monoxide CO	Average:	58.36	Residual:	0.0057
Nitrogen monoxide NO	Average:	90.24	Residual:	0.0121
Nitrogen dioxide NO2	Average:	7.08	Residual:	0.0022
Propane C3H8	Average:	18.24	Residual:	0.0020
Sulfur hexafluoride SF6	Average:	0.65	Residual:	0.0027
Ethylene C2H4	Average:	11.85	Residual:	0.0023
Methane CH4	Average:	1003.56	Residual:	0.0181
Nitrous oxide N2O	Average:	0.00	Residual:	0.0057
Carbon dioxide CO2	Average:	5.73	Residual:	0.0018
Ammonia NH3	Average:	0.00	Residual:	0.0022
Ethane C2H6	Average:	50.67	Residual:	0.0020
Hexane C6H14	Average:	1.40	Residual:	0.0020
Acetaldehyde C2H4O	Average:	5.44	Residual:	0.0024
NOx	Average:	97.32	Residual:	0.0121
VOC	Average:	36.92	Residual:	0.0025
Ambient pressure	Average:	913.00	Residual:	0.0000
Oxygen	Average:	7.37	Residual:	0.0000
Cell temperature	Average:	180.00	Residual:	0.0000
Interferometer temperature	Average:	43.91	Residual:	0.0000
Detector temperature	Average:	37.02	Residual:	0.0000
IFG Center	Average:	2364.33	Residual:	0.0000
Source intensity	Average:	94.00	Residual:	0.0000
External temperature	Average:	31.76	Residual:	0.0000

Step: 22 SOURCE GAS 02-C				
Water vapor H2O	Average:	12.08	Residual:	0.0093
Carbon monoxide CO	Average:	26.65	Residual:	0.0059
Nitrogen monoxide NO	Average:	78.35	Residual:	0.0124
Nitrogen dioxide NO2	Average:	10.14	Residual:	0.0025
Propane C3H8	Average:	0.53	Residual:	0.0026
Sulfur hexafluoride SF6	Average:	0.01	Residual:	0.0027
Ethylene C2H4	Average:	11.03	Residual:	0.0023
Methane CH4	Average:	1062.74	Residual:	0.0186
Nitrous oxide N2O	Average:	0.00	Residual:	0.0060
Carbon dioxide CO2	Average:	5.69	Residual:	0.0019
Ammonia NH3	Average:	0.00	Residual:	0.0020
Ethane C2H6	Average:	58.55	Residual:	0.0025
Hexane C6H14	Average:	0.82	Residual:	0.0025
Acetaldehyde C2H4O	Average:	4.64	Residual:	0.0028
NOx	Average:	88.49	Residual:	0.0124
VOC	Average:	17.02	Residual:	0.0028
Ambient pressure	Average:	912.39	Residual:	0.0000
Oxygen	Average:	7.75	Residual:	0.0000
Cell temperature	Average:	180.03	Residual:	0.0000
Interferometer temperature	Average:	42.49	Residual:	0.0000
Detector temperature	Average:	37.05	Residual:	0.0000
IFG Center	Average:	2383.53	Residual:	0.0000
Source intensity	Average:	93.21	Residual:	0.0000
External temperature	Average:	30.39	Residual:	0.0000

Step: 23 BASELINE GAS 02-C				
Water vapor H2O	Average:	0.00	Residual:	0.0011
Carbon monoxide CO	Average:	1.11	Residual:	0.0004
Nitrogen monoxide NO	Average:	0.00	Residual:	0.0010
Nitrogen dioxide NO2	Average:	0.28	Residual:	0.0003
Propane C3H8	Average:	0.06	Residual:	0.0003
Sulfur hexafluoride SF6	Average:	0.00	Residual:	0.0036
Ethylene C2H4	Average:	0.38	Residual:	0.0026
Methane CH4	Average:	1.83	Residual:	0.0004
Nitrous oxide N2O	Average:	0.03	Residual:	0.0004
Carbon dioxide CO2	Average:	0.37	Residual:	0.0025
Ammonia NH3	Average:	0.00	Residual:	0.0026
Ethane C2H6	Average:	0.00	Residual:	0.0005
Hexane C6H14	Average:	0.14	Residual:	0.0003
Acetaldehyde C2H4O	Average:	0.85	Residual:	0.0003
NOx	Average:	0.28	Residual:	0.0010
VOC	Average:	1.43	Residual:	0.0026
Ambient pressure	Average:	912.00	Residual:	0.0000
Oxygen	Average:	0.00	Residual:	0.0000
Cell temperature	Average:	180.00	Residual:	0.0000
Interferometer temperature	Average:	41.46	Residual:	0.0000
Detector temperature	Average:	37.07	Residual:	0.0000
IFG Center	Average:	2398.33	Residual:	0.0000
Source intensity	Average:	93.00	Residual:	0.0000
External temperature	Average:	29.53	Residual:	0.0000

Step:24 POST CTS Direct to Analyzer:	
CTS Bottle Concentration:	98.96
CTS Concentration Average:	96.5
Tolerance:	4.948
Difference between measured and expected:	2.46

13.0 Signature Page

R0

Job/File Name: Pioneer Natural Resources; Scharbauer Ranch 323-14H Tank Battery; ENG 2 (K16-0436); JJJJ;

We certify that based on review of test data, knowledge of those individuals directly responsible for conducting this test, we believe the submitted information to be accurate and complete.

Company:	G.A.S. Inc.	Date:	5/26/21
Print Name:	Mike Chapel		
Title:	Director of Stack Testing		
Signature:	Mike Chapel		
Phone Number:	580-225-0403		

Company:	G.A.S. Inc.	Date:	5/26/21
Print Name:	Cory Garrison		
Title:	Emissions Specialist		

Company:	**Pioneer Natural Resources**		
Print Name:	**Efrain Vizcaino**	Date:	**5/26/21**
Signature:			
Title:	**Engine Compliance Tech III**		
Phone Number:	**432-254-1347**		

Appendices

Spike (5 Gas)

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
12722 S. Wentworth Ave.
Chicago, IL 60628
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E05NI94E15AC014	Reference Number:	54-401922301-1
Cylinder Number:	CC48394	Cylinder Volume:	147.0 CF
Laboratory:	124 - Chicago (SAP) - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12020	Valve Outlet:	660
Gas Code:	CO,CO2,NO,NOX,PPN,BALN	Certification Date:	Oct 12, 2020

Expiration Date: Oct 12, 2028

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 mole/mole 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
NOX	250.0 PPM	254.8 PPM	G1	+/- 0.9% NIST Traceable	10/05/2020, 10/12/2020
NITRIC OXIDE	250.0 PPM	254.2 PPM	G1	+/- 0.5% NIST Traceable	10/05/2020, 10/12/2020
PROPANE	250.0 PPM	252.8 PPM	G1	+/- 0.8% NIST Traceable	10/06/2020
CARBON MONOXIDE	500.0 PPM	495.6 PPM	G1	+/- 0.6% NIST Traceable	10/07/2020
CARBON DIOXIDE	5.000 %	4.843 %	G1	+/- 1.0% NIST Traceable	10/05/2020
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	18060112	KAL004093	249.9 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Nov 08, 2023
PRM	12386	D685025	9.91 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Feb 20, 2020
GMIS	401438583103	EB0120479	3.882 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.1%	Feb 18, 2023
NTRM	10060515	CC281302	495.3 PPM PROPANE/AIR	+/- 0.5%	Jan 06, 2022
NTRM	13010109	KAL003925	495.4 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jul 03, 2024
NTRM	13060720	CC413719	16.939 % CARBON DIOXIDE/NITROGEN	+/- 0.6	May 14, 2025

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AMP0900100	FTIR	Sep 10, 2020
CO-1 SIEMENS ULTRAMAT 6E N1J5700	NDIR	Sep 23, 2020
Nicolet 6700 AMP0900100	FTIR	Oct 09, 2020
Nicolet 6700 AMP0900100	FTIR	Oct 09, 2020
Nicolet 6700 AHR0801332	FTIR	Sep 10, 2020

Triad Data Available Upon Request

PERMANENT NOTES: Mixture contains nominal 10ppm Sulfur Hexafluoride as a tracer component. Actual tested value included within the original Certificate of Analysis. Contact the Airgas laboratory if a reprint is required

NOTES:SF6 @ 10.15 PPM

Signature on file
Approved for Release

9% O2/NO2

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
12722 S. Wentworth Ave.
Chicago, IL 60628
Airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI90E15W0003	Reference Number:	54-401922300-1
Cylinder Number:	CC511378	Cylinder Volume:	145.1 Cubic Feet
Laboratory:	124 - Chicago (SAP) - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12020	Valve Outlet:	660
Gas Code:	NO2,O2,BALN	Certification Date:	Oct 09, 2020

Expiration Date: Oct 09, 2023

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 mole/mole 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
NITROGEN DIOXIDE	100.0 PPM	101.3 PPM	G1	+/- 1.2% NIST Traceable	10/02/2020, 10/09/2020
OXYGEN	9.000 %	8.999 %	G1	+/- 0.7% NIST Traceable	10/02/2020
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	401424911103	CC506133	195.2 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.1%	Feb 10, 2023
PRM	12382	D685052	197.6 PPM NITROGEN DIOXIDE/AIR	+/- 1.0%	Sep 17, 2020
NTRM	98051116	SG9159580BAL	9.507 % OXYGEN/NITROGEN	+/- 0.7%	Oct 06, 2021

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
MKS FTIR NO2 017707558	FTIR	Sep 17, 2020
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Sep 10, 2020

Triad Data Available Upon Request

Signature on file
Approved for Release

Ethylene Only

Airgas

CERTIFICATE OF ANALYSIS

Grade of Product: PRIMARY STANDARD

Part Number:	X02NI99P15ACVH8	Reference Number:	54-401954197-1
Cylinder Number:	CC420697	Cylinder Volume:	144.4 CF
Laboratory:	124 - Chicago (SAP) - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Nov 06, 2020	Valve Outlet:	350
Lot Number:	54-401954197-1		

Expiration Date: Nov 06, 2023

Primary Standard Gas Mixtures are traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration (Mole %)	Analytical Uncertainty
ETHYLENE	100.0 PPM	98.96 PPM	+/- 1%
NITROGEN	Balance		

Signature on file

Approved for Release

Zero Gas/Nitrogen Bottle Certification

Airgas

CERTIFICATE OF BATCH ANALYSIS

Grade of Product: BIP-BUILT IN PURIFIER

Part Number:	NI BIP300	Reference Number:	29-400672389-1
Cylinder Analyzed:	TW05-867349	Cylinder Volume:	304.0 CF
Laboratory:	MSO - Tulsa Fast Fill (SAP) - OK	Cylinder Pressure:	2640 PSIG
Analysis Date:	Feb 10, 2016	Valve Outlet:	580
Lot Number:	29-400672389-1		

ANALYTICAL RESULTS

Component	Requested Purity	Certified Concentration
NITROGEN	99.999 %	99.999 %
OXYGEN	< 1 PPM	0.94 PPM
WATER	< 1 PPM	0.058 PPM
TOTAL HYDROCARBONS	< 0.1 PPM	0.1 PPM
CARBON DIOXIDE	< 0.5 PPM	0.235 PPM
CARBON MONOXIDE	< 0.5 PPM	0.235 PPM

Permanent Notes: This cert includes values from the "fill" side and is not representative of the "use" side purity. Contact an Airgas Sales Representative for this information.

Cylinders in Batch:

4263617Y, TW04671107, TW05-831574, TW05-865966, TW05-867349, TW05-867538, TW05-867578, TW05-881687, TW05-881820, TW05-920689, TW05-920760, TW05848694, TW05867441, TW05897265, TW05897512, TW05920678, TW05920686, TW05920695, TW05920781, TW05920874

Impurities verified against analytical standards traceable to NIST by weight and/or analysis.

Signature on file

Approved for Release

Page 1 of 29-400672389-1

21% O2

Airgas

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02NI79E15A00B1	Reference Number:	163-401680474-1
Cylinder Number:	CC317205	Cylinder Volume:	146.2 CF
Laboratory:	124 - Pasadena (SG06) - TX	Cylinder Pressure:	2015 PSIG
PGVP Number:	A32019	Valve Outlet:	590
Gas Code:	O2,BALN	Certification Date:	Dec 16, 2019

Expiration Date: Dec 16, 2027

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 mole/mole 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
OXYGEN	21.00 %	21.06 %	G1	+/- 0.7% NIST Traceable	12/16/2019
NITROGEN	Balance			-	

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08010502	K010502	23.20 % OXYGEN/NITROGEN	+/-0.4%	Jun 01, 2024

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
O2-SIEMENS OXYMAT 6 DD550	PARAMAGNETIC	Dec 09, 2019

Triad Data Available Upon Request

Signature on file

Approved for Release

Tri Probe Certification

Great Plains Analytical Services
303 W 3rd St
Elk City, OK, 73644
(580)225-0403 Fax: (580)225-2612

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-PROBE

Part Number:	16	Reference Number:	A-0016
Laboratory:	GREATPLAINS	Stack Diameter:	16”
Analysis Date:	Jan. 18, 2018	Flow Rate:	3L/min
LOT Number:	0001	Number of Points:	3
Cylinder Number:	Air Liquide ALM060675		

Product performance verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

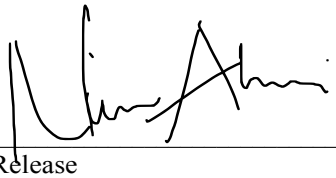
*The probe listed on this form meets the multipoint traverse requirement of EPA Method 7e, section 8.4 as shown in the accompanying data. Method 7e, section 8.4 states that the multipoint traverse requirement can be satisfied by sampling via “a multi-hole probe designed to sample at the prescribed points with a flow within 10 percent of mean flow rate".

ANALYTICAL RESULTS

Component	Cylinder Concentration	Concentration Port A (Difference from Mean)	Concentration Port B (Difference from Mean)	Concentration Port C (Difference from Mean)	Mean Probe Port Sampled Concentration	Maximum Error
SF6 – SULFUR HEXAFLUORIDE	10.31 PPM	3.42 (0.09%)	3.37 (1.2%)	3.45 (1.12%)	3.41	1.2%
C2H40 – ACETALDEHYDE	103.84 PPM	34.02 (0.4%)	33.65 (0.71%)	33.99 (0.32%)	33.89	0.71%

*Concentration error in this certification is defined as the percent difference between the concentration of gas sampled at a particular port and the mean concentration sampled at all ports on probe.

Notes:



Approved for Release

Jan 18, 2018

Date