303 West 3rd Street • Elk City, Oklahoma 73644 • 580-225-0403

April 2, 2025

TCEQ Region 7 Office
ClayDesta Plaza
10 Desta Drive
Suite 350E
Midland TX 79705

RE: PDC Permian, Inc.
40 CFR Part 60 Subpart JJJJ –Test Notification

To Whom It May Concern:

We are notifying you of performance testing dates for 40 CFR Part 60, Subpart JJJJ on behalf of PDC Permian, Inc. The testing will take place the week of May 12, 2025. Please see below for the information pertinent to the testing.

Facility	Unit Number	RN Number	Serial Number	Test Type	Location
Buzzard 6972 South	811193	111121455	RBK01488	JJJJ	Reeves County, Texas

For information regarding the performance test, you can contact me by email [redacted] or by phone at (580) 225-0403. For questions regarding the engine or location information you can contact Al Charpentier by email at [redacted] by phone at 575-988-4839.

Regards,

Andrea Carlson

Andrea Carlson
Client Analyst
GAS

Performance Test Protocol
40 CFR Part 60 Subpart JJJJ

Type

Prepared on behalf of
PDC Permian, Inc.

Prepared by

303 West 3rd Street
Elk City, OK 73644

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1.0 Introduction

GAS has been contracted by PDC Permian, Inc. to conduct source testing services at located in County, . The purpose of this test plan is to document the test methods and procedures that will be employed to collect and analyze exhaust gas emissions during performance testing of the internal combustion engines fueled by Natural Gas.

1.1 Contact Information

Table 1.1 Contact Information

Contact	Application	Telephone	Email Address	Physical Address
Andrea Carlson	GAS	580-225-0403	[redacted]	303 W 3rd St. Elk City, OK 73644
Al Charpentier	Chevron	575-988-4839	[redacted]	6301 Deauville Blvd | N3208 Midland, TX 79706

2.0 Test Information

Table 2.0 Test Information and Testing Dates

Source ID	Test Dates	Serial Number	Location/Facility Name	Make and Model	Horsepower	Date of Manufacture	RN#	Engine Classification

2.0 Test Information (continued)

The test will be conducted using a multi component gas analyzer that incorporates a Fourier Transform Infrared (FTIR) spectrometer. FTIR is state of the art technology. It is designed to military specifications and allows simple calibration using only single component calibration gases.

Tests will consist of (3) 60 minute test runs.

Table 2.1 Testing Limits and Parameters (Federal)

Source ID	NOx				CO				VOC (NMNEHC)				CH2O			
	Reference Method ASTM D6348-03				*Reference Method ASTM D6348-03*				*Reference Method ASTM D6348-03*				*Reference Method ASTM D6348-03*			
	g/hp-hr	lb/hr	TPY	ppm @15% O2	g/hp-hr	lb/hr	TPY	ppm @15% O2	g/hp-hr	lb/hr	TPY	ppm @15% O2	g/hp-hr	lb/hr	TPY	ppm @15% O2

Table 2.2 Testing Limits and Parameters (State)

Source ID	NOx				CO				VOC (NMNEHC)				CH2O			
	Reference Method ASTM D6348-03				*Reference Method ASTM D6348-03*				*Reference Method ASTM D6348-03*				*Reference Method ASTM D6348-03*			
	g/hp-hr	lb/hr	TPY	ppm @15% O2	g/hp-hr	lb/hr	TPY	ppm @15% O2	g/hp-hr	lb/hr	TPY	ppm @15% O2	g/hp-hr	lb/hr	TPY	ppm @15% O2

Table 2.3 Additional Parameters

Oxygen (O2)	%vd	3A
Moisture	% H2O	D6348-03
Sample Location	Inches (")	1/1A
Footnote		
CO2, H2O, NOx, CO, VOC, and CH2O will be measured using a Gasmet multigas FTIR analyzer in accordance with ASTM Method D6348 when applicable analytes are being tested for.		

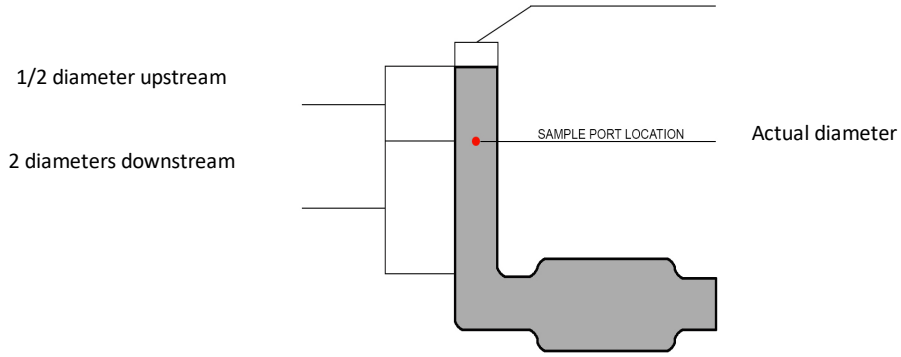
3.0 Method Synopsis

EPA Method 1/1A

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. Method 1 may be modified as allowed in Subpart JJJJ & ZZZZ. Alternatively, for NOx, CO, VOC, O2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3% of the measurement line ('3-point long line'). If the duct is >12 inches in diameter and the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, Appendix A, the duct may be sampled at '3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, Appendix A."

Figure 3.1

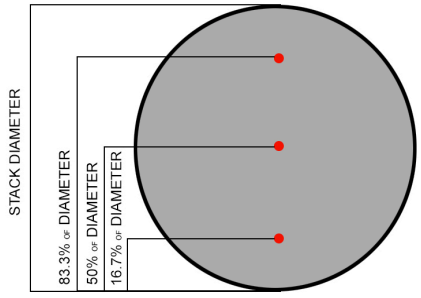
For all stacks greater than 6" in diameter, GAS will use a sampling port that is located at a minimum of 2 stack diameters downstream from any disturbance, and 1/2 stack diameter upstream from any disturbance.



SAMPLE PORT LOCATION DETERMINED
BY DISTANCE FROM DISTURBANCE
Figure 3.1. Sample Port Location

Figure 3.2

For all stacks greater than 6" in diameter, GAS will sample at 3 points within the stack. These points will be located at 83.3%, 50%, and 16.7% of the stack diameter.



TRI-PROBE SAMPLE POINT LOCATIONS
AS PERCENTAGE OF STACK DIAMETER

EPA Method 2/2C

This method is applicable for the determination of the average velocity and the volumetric flow rate of a gas stream. Method 2 will be used for stacks greater than 12 inches. Method 2C will be used for stacks with a diameter 12 inches or less. Section 12.5 of this method will be utilized to determine the molecular weight of the stack on a wet basis. The formula found in Method 3 section 12.3 will be utilized to determine the molecular weight of the stack gas on a dry basis.

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.

ASTM D6348-03

This extractive FTIR based field test method is used to quantify gas phase concentrations of multiple target analytes 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. A heated sample line is used to collect the sample on a wet basis per ASTM D6348. Effluent Moisture content is determined to within a 2% accuracy using the FTIR analytical algorithm.

4.0 Emissions Point Information

4.1 Target Analytes

Exhaust emission testing will be conducted for the following compounds: carbon monoxide (CO), oxides of nitrogen (NOx), volatile organic compounds (VOCs), and oxygen (O2%).

4.2 Test Quality Objectives

Table 4.2 summarizes the test quality objectives specific that will be used to evaluate test data to a known degree of accuracy.

Table 4.2. Test Specific Target Analytes and Data Quality Objectives

Compounds	Infrared Analysis (cm^{-1})	Expected Concentration Range	Measurement System Achievable Minimum Detectable Concentrations	Required Measurement System Accuracy and Precision for Test Application
Target Analytes				
CO	2000-2200	0-1200 ppm	1 ppm	4 ppm
NO	1875-2138	0-1000 ppm	0.20 ppm	2 ppm
NO2	2700-2950	0-100 ppm	0.03 ppm	2 ppm
VOC as defined in 40 CFR Part 60 subpart JJJJ	2600-3200 910-1150 2550-2950	0-100 ppm	0.9 ppm	1 ppm
Interfering Compounds				
CO2	926-1150	0-10%	0%	n/a
Water Vapor	3200-3401	0-22%	0.2%	n/a

*. Measured flue gas conditions at the sampling location including temperature, moisture content, and volumetric flow rate will be included in test results.

5.0 Quality Control Information

The following is a list of the QA/QC procedures performed. It is listed as to the process and method it pertains to. Calibration sheets, calibration gases and any other testing equipment will be made available prior to the start of testing. Upon completion of the assembled sampling system, a leak check will be conducted under pressure or partial vacuum conditions to ensure the integrity of the sample collection system.

Table 5.0 QA/QC

Process or Element (Method)	QA/QC Element	Acceptance Criteria	Frequency
Calibration Gas	Traceability protocol	2% Certainty	Every Test
Sample Extraction (1/1A)	Probe material	Pass system bias check	Every test run
Sample Extraction (D6348)	Particulate filter	Placed after heated probe	Changed weekly
Sample Extraction (D6348)	Probe Box	Heated to 180°C, introduces calibration into sampling system at the probe outlet	Every test
Sample Extraction (3A/D6348)	Heated line	Sample kept above dew point at all times.	Temp kept to 180°C at all times. Visible digital gauge
Sample Extraction (1/1A)	Manifold material	Stainless Steel	Every Test
Sample Point Selection (1/1A)	Measurement from disturbances	1/2 stack diameter downstream and 2 stack diameters upstream.	Every test
Multiple Sample Points Simultaneously (1/1A)	Distance from stack walls	83.3%, 50%, 16.6% from stack walls	All stacks under 6"
Velocity Flow Measurement (2)	Manometer	System is back purged after last sample. Another sample is taken and must be within 5% of the last sample	Every test
Velocity Flow Measurement (2)	Manometer	Manometer is leveled and visual inspected	Every test run
System Performance (3A)	Calibration	Within 10% of the Sample collected	Every test
System Performance (3A)	System bias check	Within 5%	Before first test and after last
System Performance (3A/D6348)	System response time	Determines minimum sampling time	During bias check
System Performance (3A)	Drift	Within 3%	During bias check
System Performance (D6348)	System Zero	Less than 2 % of permit limit	Pre test
System Performance (D6348)	CTS Check direct to analyzer	Within Tolerance	Pre and post test
System Performance (D6348)	CTS Check entire system	Within Tolerance	Pre Test
System Performance (D6348)	System Recovery (Spike)	Within 30% of effluent concentration	Every test run
System Performance (D6348)	Line position	Verify line positions have not shifted by more than 15% of the resolution, and the resolution has not changed by more than 15% of that determined prior to testing.	Post Test

5.0 Quality Control Information (continued)

Data generated during the bench scale pre-test procedures will be presented in Table 5.1. Please note that Table 5.1 will be presented in the final report with data collected from the actual field-testing source.

Table 5.1. Measurement System Capabilities

Parameter Measured	Gas	Concentration	Path Length	Equilibration Time	Dilution Factor	% Recovery
Path Length	Ethylene	101.2	4.93			
Mechanical Response Time	Ethylene	101.2		42		
System Response Time	Propane	101.9		37		
Analyte Spike Recovery	Propane	101.9		50	10	92
System Zero	Nitrogen			65		

All information required per ASTM D6348, Annexes 1-7 will be provided in the final report. This information shall cover:

A1) Test Plan Requirements
A2) Determination of FTIR Measurement System Minimum Detectable Concentration
A3) FTIR Reference Spectra
A4) Required Pre-Test Procedures
A5) Analyte Spiking Technique
A6) Determination of System Performance Parameters - Noise Equivalent Absorbance, Line Position, Resolution, and
A7) Preparation of Analytical Quantification Algorithm

6.0 Additional Information and Reporting

Additional parameters and atmospheric information will also be provided in the final report and will include:

* Elevation, Barometric pressure ("HG), Ambient temperature °F, Humidity %, Dew Point °F
* Catalyst Inlet Temp °F, Catalyst Outlet Temp °F, Manifold Temp °F
* Exhaust Gas Temp °C
* RPM, Manifold Pressure ("HG)
* Horsepower (BHP) and Fuel Flow Rate (dscfh)
* Stack Diameter (")
* Sample location (" Downstream from Disturbance & " Upstream from Disturbance)
* Catalyst Pressure Drop (Inches H2O)
* Moisture Percentage
* Volumetric Flow Rate
* AFR setpoints and reading
* Catalyst Manufacturer
* Number of elements
* Date of installation
* Date of last reconditioning or cleaning

The final report will contain all field test data including all pre and post calibration information. Final concentrations will be reported in the permitted units of measure.

7.0 Example Calculations

1. Exhaust Volumetric flow Rate Determination by EPA Method 2

$$Qsd = 3600*(1-B(ws))*V(s)*A*(T(std)/T(s))*P(s)/P(std)$$

V(s)= Absolute Stack Gas Velocity
A= Cross Sectional Area of Stack
T(std)= Standard Absolute Temperature
T(s)= Absolute Stack Temperature
P(s)= Absolute Stack Pressure
P(std)= Standard Absolute Pressure

2. Absolute Stack Gas Velocity V(s)
(When Method 2 is used)

$$V(s) = K*C*\sqrt{(\Delta P)}*\sqrt{(T(s(avg))+460)/\sqrt{(M*P)}}$$

K=Pitot tube velocity Constant (85.49)
C=Velocity Pressure Coefficient
√ΔP= Square Root of differential Pressure of stack gas (inH2O)
T(s(avg))= Average Stack temp °R
M=Molecular Weight of stack gas, wet basis
P= Absolute stack gas Pressure

3. Mass Emission Rates (LBS./HR.)

$$lb/hr = \frac{((Mol\ Wgt)*(Q_d\ dscfh)*(concentration}{(385*106)}$$

3. Mass Emission Rates (G./HP.-HR.)

$$g/hp\text{-}hr = \frac{(LB/HR)*454}{Engine\ Horsepower}$$

3. Mass Emission Rates (TPY)

$$TPY = \frac{(LB/HR)*24(HRS/DAY)*365(Days/YR)}{2000(LB/TON)}$$

8.0 Health and Safety Concerns

In accordance with 40 CFR Part 60.8, the client must provide safe access to the unit for testing and observance. Due to the nature of the source and the exposure to high temperatures, extreme caution will be observed in order to avoid contact with the unit which may result in burns and or inhalation of exhaust emissions. GAS personnel will sign in and out at all facilities, as well as undergo site specific safety training.

In addition, GAS will use the following safety equipment:

* Hardhat
* Steel-Toed Boots
* Safety Glasses
* Hearing Protection
* Fire-Retardant Clothing
* 4 - Safety Gloves
* 4 Gas Monitor

Due to the remote location of the source unit, additional health & safety precautions will be observed such as avoidance of slips, trips, falls, and heat exhaustion.

Figure 9.0 Schematic Diagram

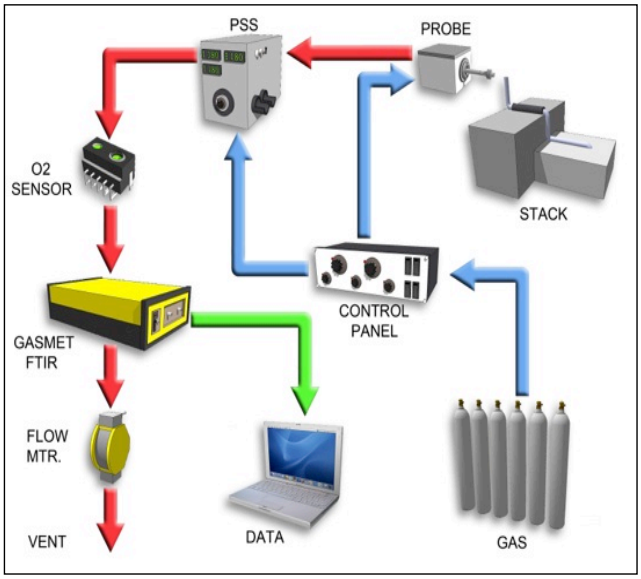


Figure 9.0 Sampling Schematic Diagram

Breakdown Of Schematic Diagram:

* Gas: Required calibration gases per ASTM D6348 and Method 3A.
* Control Panel: Allows the control of flow throughout the system as required by ASTM D6348 and Method 3A. Allows for introduction of calibration standards into the sampling system at the probe outlet, upstream of the primary particulate filter.
* Probe: Heated probe assembly required by ASTM D6348.
* Heated Line: Used for "Hot/Wet" sample to keep line above any dew point that would cause moisture to drop out.
* PSS: Allows precise heating of the sampling system.
* O2 Sensor: Zirconium Dioxide sensor to measure Oxygen per method 3A.
* Gasmet FTIR: FTIR Analyzer for use with ASTM D6348
* Flow Meter: Allows proper measurement of flow.
* Data: Data acquisition system that allows for the acquisition of the infrared data, Oxygen data and analysis of the resulting spectra.

Attachment 10.0 Engine Parameter Data Sheet Diagram

Company	
Facility	
Date	
Elevation (ft)	
Unit ID	
Make	
Model	
Serial Number	
Technician	

	Run 1	Run 2	Run 3	Average
Time:				
Engine Speed (RPM)				
Engine Hours				
Catalyst (Yes or No)				
Catalyst Manufacturer				
# of Catalyst installed				
Catalyst Element Installation date				
Catalyst Inlet Temp °F				
Catalyst Outlet Temp °F				
Catalyst Pressure Drop H2O				
Catalyst reconditioning or cleaning date				
AFR Manufacturer/Type				
AFR Setting (Targets Right Bank)				
AFR Readings				
Intake Manifold Pressure (psi)				
Ambient Temp °F				
Exhaust Gas Temp °F (From Probe)				
Intake Manifold Temp °F				
Barometric Press ("HG)				
Fuel Flow Rate (dscf)				
Engine Load (BHP)				

**Note: Actual note parameters may differ due to the availability of such parameters at specific locations.

Attachment 11.0 Velocity Field Data

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

Δp_{std} = Velocity head measured by the standard pitot tube, cm (in.) H_2O.	Run 1 Δpstd in H2O	Run 2 Δpstd in H2O	Run 3 Δpstd in H2O
Traverse Point			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
Δpstd Average=			

Sample after Back Purge:	
Within 5% of last Δpstd reading:	
Stack Diameter (inches)	
Inches upstream from disturbance	
Inches downstream from disturbance	