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Emission Performance Test Report Ozone Season Monitoring

R336.1818(4)(a)(ii)

ANR Pipeline Company

ANR Pipeline – Woolfolk Compressor Station (SRN: B7220)

October 11, 2017

Emissions Test Report

Unit EUWL009, One Ingersoll Rand KVG-123 **Gas Fired Internal Combustion Reciprocating** **Engine**

Permit No.: MI-ROP-B7220-2017

ANR Pipeline Company
Woolfolk Compressor Station
Big Rapids, Michigan

Date:	October 11, 2017
Prepared for:	Michigan Department of Environmental Quality - Air Quality Division
Prepared by:	Roy S. Cannon Air Compliance Team (832) 320-5465

1. Introduction

1.1. The Air Compliance Team of TransCanada's US Pipelines Central conducted monitoring at ANR Woolfolk Compressor Station (SRN: B7220) pursuant to the Compliance Plan ANR submitted to comply with R336.1818(3)(a). The Compliance Plan has been approved by the MDEQ.

1.2. The purpose of the monitoring was to comply with the ozone season monitoring requirement in the ANR Compliance Plan and is in accordance with R336.1818(4)(a)(ii)(A)(2). The monitoring demonstrates compliance with the projected NOx emission rate in the ANR Compliance Plan. As such, the following parameter was determined:

1.2.1. Woolfolk Unit #2009: *20.5 g/bhp-hr of NOx*

1.3. Facilities Information:
ANR Woolfolk Compressor Station
11750 150th Avenue
Big Rapids, MI 49307

Environmental Contact:
Chris Waltman
700 Louisiana Street
Houston, TX 77002
(715) 758-3341

2. Process Description

2.1. Woolfolk compressor station operates nine NOx SIP affected engines; 2001 through 2005 are Ingersoll-Rand KVG-103, 1,000 HP each and 2006 through 2009 are Ingersoll-Rand KVG-123, 1,320 HP each. All engines are natural gas fired, reciprocating internal combustion engine used in Natural Gas Transmission. More specifically, the engine is used in the compression of natural gas from an initial "suction" pressure to a final "discharge" pressure, which creates the pressure gradient necessary to transport natural gas through ANR Pipeline's interstate pipeline system

3. Methodology

3.1. American Society of Testing and Materials test method D6522-00: Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers was employed for determination of compliance with Section 1.2.1.

4. Sample System

4.1. Sample system components, as outlined in Method D6522-00, were utilized for monitoring. These components include, but are not limited to, sample probe, heated sample line, sample transport lines, calibration assembly, moisture removal system, particulate filter, sample pump, sample flow rate control, gas analyzer, data recorder, and external interference gas scrubber.

5. Sample Location

5.1. Sampling location was selected as specified in sections 10.1.1 and 10.1.2 of Method D6522-00 at a location of five duct diameters downstream of any flow disturbance and three duct diameters upstream of the discharge to atmosphere.

5.2. All the stratification sampling for all the units showed a variance in concentration of less of 5%, therefore, as per section 10.1.4 of Method D6522-00, sampling was taken from a single point located in the center of the stack.

6. Sample Time

6.1. Monitoring was conducted during normal engine operation, i.e. not during periods of start-up, shutdown, or malfunction. Each engine was monitored at the maximum load achievable based upon pipeline and ambient conditions.

6.2. Each engine was sampled at three 30-minute test runs. Samples were taken at a frequency of once per minute.

7. Results

7.1. Results of the monitoring demonstrated that the unit tested below the permitted levels of 20.5 g/BHP-hr. Detailed emissions summaries and calibration records can be found in the following pages.

Test Summary

General Information

Company: TransCanada US Pipelines

Station: ANR Woolfolk

Unit Information

Unit No.: 2006 to 2009

Manufacturer: INGERSOLL RAND

Model: KVG-123

Rated BHP: 1,320

Rated RPM: 330

General Data

Unit	2006	2007	2008	2009
Test Date				9/14/17

Operating Data

Horsepower				1,242
Speed				331
% Load				94.1%
% Torque				93.9%
Fuel Use (scfh)				11,749

Emissions Data

NOx Limit	20.5 g/bhp-hr			
NOx (ppm)				1,158.9
NO _x (ppm@ 15% O ₂)				430.5
NO _x (lb/hr)				19.4
NO _x (g/bhp-hr)				7.1
NO _x (TPY)				85.1
O ₂ (%)				5.0