west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone (304) 926-0475 • FAX: (304) 926-0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

GENERAL PERMIT REGISTRATION APPLICATION ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Registration No.:	G35-A064D
Plant ID No.:	049-00138
Applicant:	M3 Appalachia Gathering, LLC
Facility Name:	Daybrook Compressor Station
Location:	Fairview, Marion County
SIC Code:	1311
Application Type:	Modification
Received Date:	September 19, 2014
Engineer Assigned:	John Legg
Fee Amount:	$1,300.00
Date Received:	September 19, 2014
Complete Date:	October 22, 2014 (Date upon which the original Affidavit of Publication was received.)
Applicant Ad Date:	September 18, 2014 and September 25, 2014
Newspaper:	*The Dominion Post*
UTM's:	Easting: 568.433 km Northing: 4381.149 km Zone: 17
Lat/Long Coordinates:	39.620542/-80.254792
Description:	Modification revising the brake horsepower of two permitted compress engines [C-203 (Emission Unit ID: CE-4) and C-207 (Emission Unit ID: CE-5)] upwards to 5,000 hp (from 4,735 hp). This discrepancy in horsepower was discovered on August 25, 2014 by Jamie Jarrett, DAQ Enforcement, during an inspection of the facility. Transparent to this permit: The control equipment manufacturer's specifications differ slightly from what was proposed in the initial general permit registration for compressor engines C-203 and C-207). A copy of the specification sheet for the revised air control equipment was included in the permit modification application under Attachment H.

Modification Description

This modification application proposes to revise general permit registration G35-A064C, issued for the Daybrook Compressor Station on October 30, 2013. It will allow the brake horsepower of two previously permitted natural gas-fueled compressor engines [Emission Unit ID: CE-4 (Source ID No.: 203) and Emission Unit ID: CE-5 (Source ID No.: 207)] to be revised to 5,000 bhp (from 4,735 bhp) as installed. The engines are identical Caterpillar, Model G3616 engines manufactured in 2013. The compressor engines were received on-site in February 2014 and commenced startup in late April 2014.

The site includes the following six (6) compressor engines:

Table 1:
List of Compressor Engines at M3 Appalachia Gathering, LLC's Daybrook Compressor Station.

Emission Unit ID No.	Source ID No.
CE-1	C-201
CE-2	C-202
CE-3	C-206
*CE-4	C-203
*CE-5	C-207
CE-6	C-205

* Brake horsepower changed to 5,000 bhp.

PROCESS DESCRIPTION

The process description has not change since the facility was last permitted. This description is given here for the reader's information:

The station processes both wet and dry gas. Wet, raw natural gas is gathered at approximately 300-350 psig in the field and piped to the station to be compressed and dehydrated. After the gas enters the compressor station, it flows into a bulk separator, and then to slug catchers to separate out free liquids from the gas. The gas is then routed to inlet separators to collect additional liquids before being routed to the compressors to compress gas to approximately 850 psig.

The compressed gas is then routed to a tri-ethylene glycol (TEG) dehydration unit [reboiler (RBV-1) and (RSV-1)] for dehydrating the gas. The dehydrated gas is then piped to the main gathering line for eventual delivery to third party transmission pipelines.

Liquids separated at the inlet and at the various points throughout the process are routed to a flash separator, and then to produced water storage tanks (T-420, 421, 422, and 423). Material from the compressor skid drains are routed to a waste oil/water drain tank (T-450). Liquids from these tanks are collected by truck and sent for disposal.

Previously dehydrated, dry gas from the 20 foot trunk line completely bypasses the dehydration process and is only compressed at the station. This gas is dehydrated, upstream, at another facility.

Table 2: Information on Natural Gas-fueled Compressor Engines CE-4 and CE-5.			
Source Identification Number		C-203 (CE-4) or C-207 (CE-5)	
Engine Manufacture and Model		Caterpillar G3616	
Manufacturer's Rated (bhp/rpm)		5,000/1,000	
Source Status		Modification of Existing Source	
Date Installed/Modified/Removed		2/2014	
Engine Manufactured/Reconstructed Date		2013	
Engine, Fuel & Combustion Data	Engine Type	LB4S	
	APCD Type	A/F & SCR	
	Fuel Type	Pipeline Quality Natural Gas	
	H2S (gr/100 scf)	No Available	
	Operating bhp/rpm	5,000/1,000	
	BSFC (Btu/bhp-hr)	7,511	
	Fuel throughput (ft^3/hr)	12,473	
	Fuel throughput (MM ft^3/yr)	109.26	
	Operation (hr/yr)	8,760	
Reference	**Potential Emissions**	**(lb/hr)**	**(ton/yr)**
Manufacturer's Data	NO_x	5.51	24.14
Manufacturer's Data	CO	1.65	7.24
Manufacturer's Data	VOC	3.52	15.45
EPA AP-42 Emission Factors	SO_2	0.01	0.03
EPA AP-42 Emission Factors	PM_{10}	0.001	0.00
Manufacturer's Data	Formaldehyde	0.66	2.89
EPA AP-42 Emission Factors	CO_2	1,349	5,909
EPA AP-42 Emission Factors	Methane	0.025	0.11
EPA AP-42 Emission Factors	N_2O	0.003	0.01

SITE INSPECTION

A site inspection was deemed to be not necessary because the station is an existing, operating stationary source whose location is well known to the DAQ.

The site was last inspected by Jamie Jarrett, DAQ Enforcement Inspector, on August 25, 2014. That inspection prompted the submission of the general permit application under review here.

Directions as given in the permit application are as follows:

From Morgantown, take US19 south to CR 19/1. Turn right onto to CR 19/1 and follow to CR 25/8. Turn left onto CR 25/8 and follow CR 25 to CR17. Bear right onto CR 17 and follow through Grant Town to CR 17/6 (Eight Tooth Hollow Road). Stay on CR 17/6 which becomes Toothman Run Road. Site is on right approximately ¼ mile after road becomes Toothman Run Road.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Table 3, below, gives the change in emissions resulting from increasing the brake horsepower for the two Caterpillar, Model G3616, natural gas-fueled compressor engines (CE-4 and CE-5) located at M3 Appalachia Gathering, LLC's Daybrook Station. Emissions are based on the motor manufacturer's data and AP-42 emission factors.

Table 3: Change in Emissions Resulting from Increasing the Brake Horsepower for Natural Gas-fueled Compressor Engines CE-4 and CE-5.

Source ID	Pollutant	Maximum Emissions							
		Old Registration (G35-A-64C)		New Registration (G35-A-64D)		*Delta (New – Old)			
						One Engine (CE-4 or CE-5)		Two Engines (CE-4 + CE-5)	
		Hourly (lb/hr)	Annual (tpy)	Hourly (lb/hr)	Annual (tpy)	Hourly (lb/hr)	Annual (tpy)	Hourly (lb/hr)	Annual (tpy)
CE-4 (C-203) or CE-5 (C-207)	NO_X	5.22	22.87	5.51	24.14	0.29	1.27	0.58	2.54
	CO	1.98	8.69	1.65	7.24	-0.33	-1.45	0.66	-2.90
	VOC	3.34	14.63	3.52	15.45	0.18	0.79	0.36	1.58
	SO_2	0.007	0.03	0.007	0.03	0.00	0.00	0.00	0.00
	PM_{10}	0.001	0.00	0.001	0.00	0.00	0.00	0.00	0.00
	Formaldehyde	0.63	2.74	0.66	2.90	0.03	0.16	0.06	0.32
*	A positive delta is an increase in emissions; a negative delta is a decrease in emissions.								

The facility's PTE is:

Pollutant	PTE		
	(1)Before (G35-A064C)	(2)After (G35-A064D) (as Advertised)	Delta
NOx	88.9	91.3	2.4
CO	29.9	26.9	3.0
VOC	53.7	55.0	1.3
SO_2	0.08	0.13	0.05
PM_{10}	0.07	0.07	0.00
Formaldehyde	8.2	8.30	0.10

(1) From G35-A064C's Engineering Evaluation.

(2) From the Company's Legal Advertisement in the November 18 and 25, 2014 edition of *The Dominion Post*, published in the City of Morgantown, Monongalia County, WV. Note that the Permit Application, Attachment O, page 6 of 7, has formaldehyde emissions as being equal to 8.45 tpy.

REGULATORY DISCUSSION

The two compressor engines (CE-4 and CE-5) have slightly larger horsepowers than were originally permitted under G35-A064C (5,000 bhp instead 4,735 bhp). Increasing the motor horsepower causes emissions of NOx, VOC and formaldehyde to increase by 2.54, 1.58 and 0.30 ton/yr, respectively.

45CSR13 *Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation*

The difference in permitted (4,735 bhp) versus installed (5,000 bhp) horsepowers for the two compressor engines (CE-4 and CE-5) was discovered during an site inspection conducted on August 25, 2014 by Jamie Jarrett, DAQ Enforcement. On September 19, 2014, the applicant submitted an application to modify G35-A064C. The $1,300.00 application fee was received on September 25, 2014. A Class I legal advertisement was run in *The Dominion Post* on September 18 and 25, 2014.

45CSR16 *"Standards of Performance for New Stationary Sources"*

This rule establishes and adopts standards of performance for new stationary sources promulgated by the United States Environmental Protection Agency pursuant to section 111(b) of the federal Clean Air Act, as amended. This rule codifies general procedures and criteria to implement the standards of performance for new stationary sources set forth in 40 CFR Part 60. The Secretary hereby adopts these standards by reference. The Secretary also adopts associated reference methods, performance specifications and other test methods which are appended to these standards.

40CFR60 *Subpart JJJJ— "Standards of Performance for Stationary Spark Ignition Internal Combustion Engines"*

Subpart JJJJ sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine.

The increase in brake horsepower for the two compressor engines does not change the findings from the previous review (G35-A064C) as related to Subpart JJJJ.

Engines CE-4 and C-5 are still subject to the requirements of this subpart per section §60.4230(a)(4)(i)., which states that owners and operators of stationary SI ICE that commence construction after June 12, 2006, that were manufactured on or after July 1, 2007, and for engine power greater than or equal to 500 HP are subject to the subpart.

Engines CE-4 and CE-5 still must comply with the emission limitations set forth in Table 1 of this subpart per section §60.4233(e). Controlled emission factors will meet the emission limits set forth in the standard.

Table 1 to Subpart JJJ of Part 60 – NOx, CO, and VOC Emission Standards for Stationary Non-Emergency SI Engines ≥ 100 HP (Except Gasoline and Rich Burn LPG), Stationary SI Landfill/Digester Gas Engines, and Stationary Emergency Engines > 25 HP

Engine type and fuel	Maximum engine power	Manufacture Date	Emission Standards g/HP-hr		
			NOx	CO	VOC[d]
Non-Emergency SI Natural Gas	HP ≥ 500	7/1/2010	1.0	2.0	0.7

d For purposes of this subpart, when calculating emissions of volatile organic compounds, emissions of formaldehyde should not be included.

Engines C-203 and C-207 are still required to comply with the following subparts.

Standards	§60.4243(b)(2), (b)(2)(ii) §60.4243(e)
Monitoring/Testing	§60.4243(b)(2), (b)(2)(ii) §60.4244(a), (b), (c), (d)
Recordkeeping	§60.4243(b)(2), (b)(2)(ii) §60.4245(a)
Reporting	§60.4245(c) §60.4245(d)

40CFR60 *Subpart OOOO—Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution (evaluated only for modification)*

Nothing has changed: The facility is subject to the requirements of this subpart. The engines are subject to the requirements listed in §60.5385. Although the requirements are not listed in the general permit, the permitte must still meet those requirements.

45 CSR 34 *"Emission Standards for Hazardous Air Pollutants for Source Categories Pursuant to 40 CFR, Part 63"*

This rule establishes and adopts a program of national emission standards for hazardous air pollutants (NESHAPS) and other regulatory requirements promulgated by the United States Environmental Protection Agency pursuant to 40 CFR Parts 61, 63 and section 112 of the federal Clean Air Act, as amended (CAA). This rule codifies general procedures and criteria to implement emission standards for stationary sources that emit (or have the potential to emit) one or more of the eight substances listed as hazardous air pollutants in 40 CFR §61.01(a), or one or more of the substances listed as hazardous air pollutants in

section 112(b) of the CAA. The Secretary hereby adopts these standards by reference. The Secretary also adopts associated reference methods, performance specifications and other test methods which are appended to these standards.

40CFR63,
Subpart ZZZZ - "Nation Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combust Engines"

Subpart ZZZZ establishes national emission limitations and operating limitations for HAPs emitted from stationary RICE located at major and area sources of HAP emissions. The subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

Nothing has changed. Because the engines commenced construction on or after June 12, 2006, they were correctly considered to be new stationary RICE per section §63.6590(a)(2)(iii).

Because the engines are subject to 40 CFR Part 60, Subpart JJJJ, they are required to meet those requirements and no further requirements of this subpart, i.e., compliance with 40CFR63, Subpart ZZZZ is demonstrated by compliance with 40CFR60, Subpart JJJJ.

40CFR63
Subpart HH –" National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities"

Nothing has changed: The facility is an area source of HAPs and meet the 1 tons/yr benzene exemption. The source will be subject to the following requirements under the rule.

§63.764(e)(1) – exemption from control requirements for either throughput (§63.764(e)(1)(i)) or benzene concentration (§63.772(e)(1)(ii)).

§63.722(b) – determination of natural gas flowrate and/or determination of benzene emissions.

§63.774(d)(1) – maintenance of records to support the determination of exemption.

§63.774(d)(1)(i), for the throughput exemption, and §63.774(d)(1)(ii), for the actual average benzene emissions exemption.

RECOMMENDATION TO DIRECTOR

M3Appalachia's request to modify a natural gas compressor station at the Fairview, Marion County, WV site meets the requirements of General Permit G35-A and all applicable rules and regulations and therefore should be granted a General Permit Registration to modify and operate the said facility.

John Legg
Permit Writer

November 18, 2014
Date