



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

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2715C
Plant ID No.: 071-00008
Applicant: Columbia Gas Transmission, LLC
Facility Name: Seneca Compressor Station
Location: Pendleton County
SIC Code: 4922
Application Type: Modification
Received Date: September 6, 2012; March 7, 2013
Engineer Assigned: Steven R. Pursley, PE
Fee Amount: \$2,000.00
Date Received: September 7, 2012
Complete Date: November 15, 2012; March 7, 2013
Due Date: June 5, 2013
Applicant Ad Date: September 6, 2012
Newspaper: *The Pendleton Times*
UTM's: Easting: 639.5 km Northing: 4,301.1 km Zone: 17
Description: Addition of 2 new turbines, a fuel gas heater and 40 space heaters. Additionally, the replacement of an existing emergency generator.

DESCRIPTION OF PROCESS

Columbia's Seneca Station is located in Pendleton County near the town of Seneca Rocks. The station receives natural gas via pipeline from an upstream compressor station, compresses it using natural gas fired turbines and then transmits it via pipeline to a downstream station. The station currently has three primary natural gas fired turbines including two Solar Taurus 60-7800S turbines rated at 7,700 hp each that were installed in 2008 and one GE 3132R Frame 3 turbine rated at 13,750 hp that was purchased in 1971 and moved to the Seneca Station in 1981. Auxiliary equipment at the station includes natural gas fired emergency generators, heating boilers, and storage tanks for lubricating oils, glycol and other liquids.

Columbia is proposing to add a 1,557 hp turbine/centrifugal compressor to the Seneca Station. This is a Solar Saturn model currently installed at Columbias Adaline Compressor Station. Columbia plans to have that turbine refurbished and then reinstalled at the Seneca Station. In addition, Columbia is proposing to add a new Solar Mars turbine rated at 15,900 hp. Associated with the new Mars unit is a small (0.8 mmbtu/hr) fuel gas heater.

Columbia is also proposing to replace one of the existing emergency generators. The old Waukesha model L59900GU (rated at 420 hp) will be replaced with a new Waukesha model L36GL/GLD (rated at 925 hp).

Finally, Columbia is proposing to add 40 Bruest model 24-72 catalytic space heaters. Each space heater is rated at 72,000 BTU/hr.

SITE INSPECTION

No site inspection was performed by the writer. The facility is an existing well known source to DAQ. Karl Dettinger of DAQs Enforcement section (Eastern Panhandle Regional Office) performed an on site inspection on December 12, 2011. The facility was found to be in compliance.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions from the new/modified equipment at the facility will be as indicated below. Note that since an emergency generator is being replaced and significant limitations are being placed on an existing turbine, the actual increase in PTE will be lower than is reflected below. However, the calculations submitted for existing emissions were not documented sufficiently so they were not considered.

Criteria Pollutants

Criteria PTE for the equipment being modified and new equipment is outlined in the tables below. For the Space Heaters SO₂ is based on a mass balance. All other pollutants are based on AP-42. Annual emissions for the space heater is based on 8,760 hours of operation per year (although this is obviously overly conservative). Additionally, the emissions in the following table are for all 40 space heaters combined. For the Fuel Gas Heater SO₂ is based on a mass balance. All other pollutants are based on AP-42. Annual emissions for the fuel gas heater is based on 8,760 hours of operation per year (although this is obviously overly conservative). For the new emergency generator SO₂ is based on a mass balance while PM is based on AP-42. All other pollutants are based on vendor information. Annual emissions for the emergency generator are based on 500 hours of

operation per year. The permit will make this an enforceable condition. For both of the new turbines SO₂ is based on a mass balance. All other pollutants are based on vendor information. For the turbines, all hourly emissions are based on normal operating mode (>50%load, temp > 0°F). Annual emissions from the turbines are combined and based on the worst case of a variety of scenarios. The permit will require Columbia to track hours of operation under each of these scenarios and calculate rolling totals to ensure compliance with the annual limits.

	NO _x		CO		VOC		SO ₂		PM/PM _{2.5}	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
E07	10.19	36.77	4.15	43.47	0.15	4.67	0.07	1.49	0.45	8.95
E08	7.14		7.14		1.02		0.34		2.04	
G3	4.08	1.02	2.65	0.66	0.53	0.13	0.01	0.01	0.06	0.02
H2	0.08	0.34	0.07	0.29	0.01	0.02	0.01	0.01	0.01	0.03
SH(1-40)	0.28	1.24	0.24	1.04	0.02	0.07	0.01	0.01	0.03	0.09
Total	21.77	39.37	14.25	45.46	1.73	4.89	0.44	1.52	2.59	9.09

Non-criteria Pollutants

The applicant submitted insufficiently documented calculations for GHGs and HAPs. Therefore, the following was performed by the writer based on AP-42. Annual emissions were based on 500 hours per year for the emergency generator and 8,760 hours per year for everything else.

	Formaldehyde		Toluene		Xylene		Acetaldehyde		Benzene		Ethylbenzene		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
E07	0.02	0.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.07	0.11
E08	0.09	0.37	0.02	0.07	0.01	0.04	0.01	0.03	0.01	0.01	0.01	0.02	0.15	0.54
G3	0.34	0.09	0.01	0.01	0.01	0.01	0.06	0.02	0.01	0.01	0.01	0.01	0.44	0.15
H2	0.01	0.01	0.01	0.01	--	--	--	--	0.01	0.01	--	--	0.03	0.03
SH	0.01	0.01	0.01	0.01	--	--	--	--	0.01	0.01	--	--	0.03	0.03
Total	0.47	0.54	0.06	0.11	0.03	0.06	0.08	0.06	0.05	0.05	0.03	0.04	0.72	0.86

	Methane	CO ₂	N ₂ O	CO ₂ e
	tpy	tpy	tpy	tpy
E07	0.64	8177	0.23	8261.74
E08	4.45	56872	1.56	57449.05
G3	1.98	174.08	--	215.63
H2	0.01	412.08	0.01	415.35
SH	0.03	1484.30	0.03	1494.23
Total	7.11	67,119.46	1.83	67,836.00

REGULATORY APPLICABILITY

The following state and federal rules apply to the modified portion of the facility:

45CSR2: *To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers*

The Fuel Gas Heater (H2) has been determined to meet the definition of a “fuel burning unit” under 45CSR2 and is, therefore, subject to the applicable requirements therein. However, pursuant to the exemption given under §45-2-11, as the MDHI of the unit is less than 10 mmBtu/hr (800,000 Btu/hr), it is not subject to sections 4, 5, 6, 8 and 9 of 45CSR2. The only remaining substantive requirement is under Section 3.1 - Visible Emissions Standards.

Pursuant to 45CSR2, Section 3.1, the line heater is subject to an opacity limit of 10%. Proper maintenance and operation of the unit (and the use of natural gas as fuel) should keep the opacity of the unit well below 10% during normal operations.

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 proposed modification of the Seneca Compressor Station has a potential to emit in excess of six (6) lbs/hour and ten (10) TPY of a regulated pollutant and, therefore, is subject to 45CSR13.

As required under §45-13-8.3, Columbia placed a Class I legal advertisement in a “newspaper of general circulation in the area where the source is . . . located.” The ad ran on September 6, 2012 in *Pendleton Times* and the affidavit of publication for this legal advertisement was submitted on September 17, 2012.

45CSR30: Requirements for Operating Permits

The facility is an existing major Title V source with an issued Title V permit. This modification does not change that status.

40 CFR 60 Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.

The proposed 925 hp emergency generator G5 is defined under 40 CFR 60, Subpart JJJJ as stationary spark-ignition internal combustion engines (SI ICE) and is, pursuant to §60.4230(a)(4)(ii), subject to the applicable provisions of the rule. Pursuant to §60.4233(e): “Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 to this subpart for their stationary SI ICE.” Therefore, as the proposed generator engine is an emergency engine greater than 100 HP, the engine must comply with the following emission standards:

	NO _x	CO	VOC
Standard (g/HP-hr)	2.0	4.0	1.0

Since the applicant submitted nothing indicating that the engine is a “certified engine” (and I can find nothing online indicating that it is a certified engine) under the rule, it will have to demonstrate compliance by performing testing in accordance with §60.4244 of the rule. Additionally, per §60.4243(b)(2)(i) the permittee will have to “keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.”

40 CFR 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines.

Per §60.4305, Subpart KKKK applies to combustion turbines with a peak heat input of 10 MMBTU/hr or greater. Since the new Solar Mars turbine is rated at 121 MMBTU/hr and the Solar Saturn turbine is rated at 25 MMBTU/hr they will be subject to the rule.

§60.4320 requires the turbines to meet the NO_x requirement in Table 1 of the rule. Since the Mars turbine is a new, natural gas fired turbine between 50 and 850 MMBTU/hr, Table 1 requires it to meet a NO_x limit of 25 ppm at 15% O₂ or 150 ng/J of useful output. Since the Saturn turbine is a reconstructed turbine less than 50 MMBTU/hr it has to meet a NO_x limit of 150 ppm at 15% O₂ or 1,100 ng/J of useful output. To demonstrate compliance with the limit, §60.4400(a) requires both an initial (within 180 days of startup or 60 days of achieving full load operation) and annual (not to exceed 14 months from previous test) performance test. However, §60.4340 allows the permittee to be exempted from the annual testing if continuous emission monitors or continuous parameter monitoring systems are installed that meet the requirements of the section. Additionally, if the NO_x testing results show emissions less than 75% of the limit, testing frequency can be reduced to once every 2 years (with no more than 26 months after the previous test.)

The rule also limits SO₂ emissions from the turbines. §60.4330(a)(2) allows the facility to meet this limit by burning fuel with a total potential SO₂ emissions of less than 0.06 lb/MMBTU. Additionally, §60.4365(a) exempts the permittee from monitoring fuel sulfur content if a source burns only natural gas that is covered by a purchase or transportation contract that limits sulfur to no more than 20 grains per 100 scf. Columbia qualifies for this exemption.

40 CFR 63 Subpart ZZZZ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines - (NON-DELEGATION)

The proposed emergency generator appear to be subject to the area source requirements of 40 CFR 63, Subpart ZZZZ. However, the DAQ has not been delegated authority from USEPA to enforce the area source requirements of this rule. Therefore, unless otherwise stated, DAQ did not formally determine whether the permittee is subject to an area source air toxics standard requiring Generally Achievable Control Technology (GACT) promulgated after January 1, 2007 pursuant to 40 CFR 63, including the area source air toxics provisions of 40 CFR 63, Subpart ZZZZ.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. Columbia Gas included the following HAPs as emitted in substantive amounts in their emissions estimate: Benzene, Ethylbenzene, Acetaldehyde, Formaldehyde, Toluene, and Xylene. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

HAPs	Type	Known/Suspected Carcinogen	Classification
Formaldehyde	VOC	Yes	Category B1 - Probable Human Carcinogen
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Ethylbenzene	VOC	No	Inadequate Data
Acetaldehyde	VOC	Yes	Category B2 - Probable Human Carcinogen
Toluene	VOC	No	Inadequate Data
Xylenes	VOC	No	Inadequate Data

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. For a complete discussion of the known health effects of each compound refer to the IRIS database located at www.epa.gov/iris.

AIR QUALITY IMPACT ANALYSIS

Since this is a minor modification (as defined in 45CSR14) to a major stationary source, no modeling was performed.

MONITORING OF OPERATIONS

In addition to the monitoring already required by R13-2715V=B, the permittee shall monitor and record the following:

- * Monthly operating hours of the new compressor turbines (E07 and E08) and the Emergency Generator (G3).
- * Monthly operating hours of the compressor turbines (E07 and E08) at less than 50% load.
- * Monthly operating hours of the compressor turbines (E07 and E08) at less than 0°F.
- * Monthly number of compressor turbine (E04) startup and shutdown hours.
- * Per §60.4243(b)(2)(i) for the emergency generator, the permittee will have to “keep a maintenance plan and records of conducted maintenance and must...”

Fact Sheet R13-2715C
Columbia Gas Transmission, LLC
Seneca Compressor Station

The permittee shall perform the following tests:

- * Testing to determine the emission rates of NO_x, CO and VOCs from the emergency generator per §60.4244.
- * Testing to determine the NO_x emissions from the new turbines (E07 and E08) per §60.4400(a).

CHANGES TO PERMIT R13-2715B

The following changes were made to R13-2715B:

- * The permit was put into the most recent boilerplate.
- * Table 1.0 was updated to include the new equipment.
- * New conditions 4.1.5 through 4.1.16 were added.
- * Old conditions 4.2.1 and 4.2.2 were modified to include the new turbines.
- * New condition 4.2.3 was added.
- * New condition 4.3.7 was added.
- * New conditions 4.4.2 though 4.4.5 were added.

RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that permit R13-2715C for the modification of a compressor station in Seneca Rocks, Pendleton County, be granted to Columbia Gas Transmission, LLC.

Steven R. Pursley, PE
Engineer

April 9, 2013

Fact Sheet R13-2715C
Columbia Gas Transmission, LLC
Seneca Compressor Station