



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.: R13-2064G
Plant ID No.: 103-00010
Applicant: Columbia Gas Transmission, LLC (Columbia)
Facility Name: Smithfield Compressor Station
Location: Smithfield, Wetzel County
NAICS Code: 486210 (Pipeline Transportation of Natural Gas)
Application Type: Modification
Received Date: June 11, 2015
Engineer Assigned: Jerry Williams, P.E.
Fee Amount: \$2,000.00
Date Received: June 11, 2015
Complete Date: July 6, 2015
Due Date: October 4, 2015
Applicant Ad Date: June 17, 2015
Newspaper: *Wetzel Chronicle*
UTM's: Easting: 539.68 km Northing: 4,370.03 km Zone: 17
Description: Installation of one (1) Solar Centaur turbine

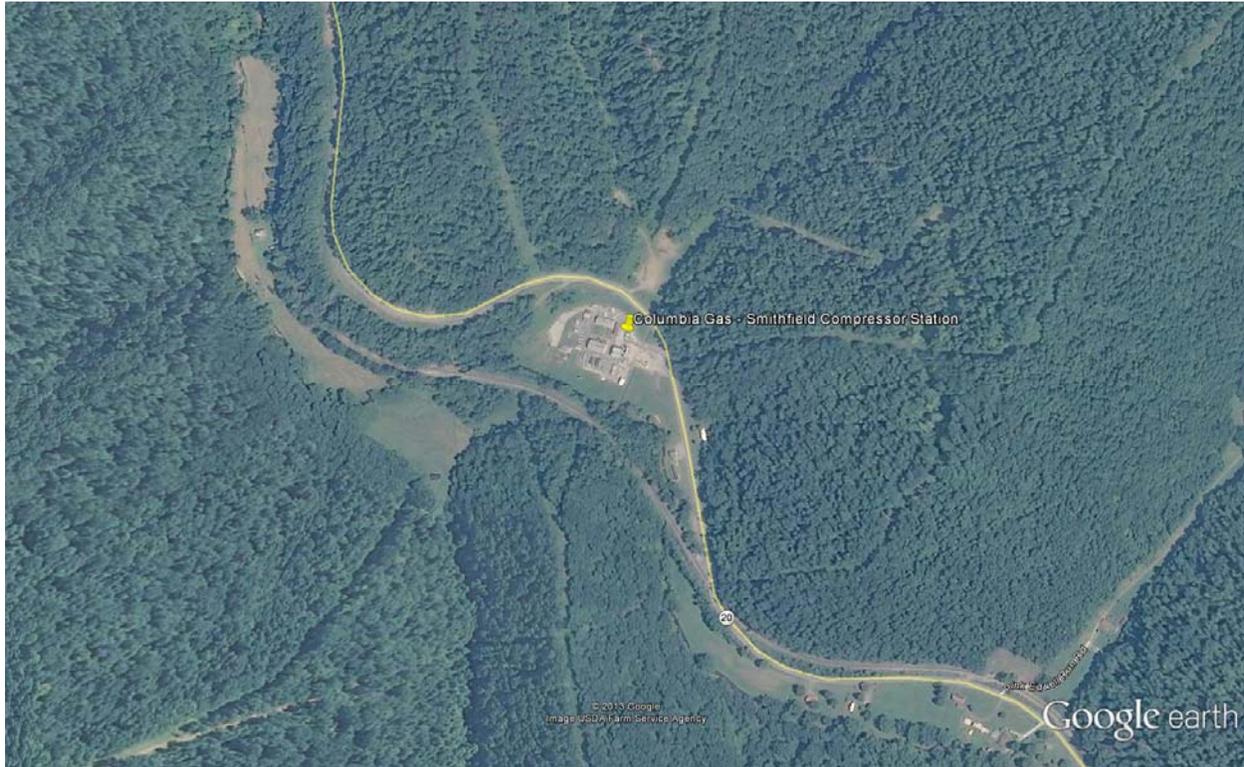
DESCRIPTION OF PROCESS

The following process description was taken from Permit Application R13-2064G:

Pipeline transmission of natural gas requires that the gas be compressed. The Smithfield Compressor Station utilizes two (2) reciprocating internal combustion engines (RICE) and one (1) turbine to drive centrifugal compressors. The facility also has various heaters and tanks. In addition, there is a 530 hp emergency generator which is used to produce power in the event of a power outage. This modification will include the installation of one (1) additional Solar turbine-driven compressor. In addition, two (2) existing RICE will be placed on standby status.

SITE INSPECTION

A site inspection was conducted on November 20, 2014 by Doug Hammell of the WVDEP DAQ Enforcement Section. The facility was found to be operating in compliance at that time.



ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this modification application consist of the combustion emissions from one (1) Solar Centaur 40 turbine. The following table indicates which methodology was used in the emissions determination:

Emission Point ID#	Process Equipment	Calculation Methodology
E6	Solar Centaur 40 turbine (4,433 HP @ 0 °F 4,213 HP @ 32 °F)	Manufacturer's Data, EPA AP-42 Emission Factors

Maximum detailed controlled point source emissions concerning this modification were calculated by Columbia and checked for accuracy by the writer and are summarized in the table on the following page.

Columbia Gas Transmission, LLC – Smithfield Compressor Station (R13-2064G)

Emission Point ID#	Source	NO _x		CO		VOC		PM-10/2.5		SO ₂		Formaldehyde		Total HAPs		CO ₂ e
		lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	ton/year
BL1	3.4 MMBTU/hr Heating System Boiler	0.33	1.46	0.28	1.23	0.02	0.08	0.03	0.11	0.19	0.01	<0.01	<0.01	<0.01	0.03	1742
H1	0.25 MMBTU/hr Line Heater	0.02	0.11	0.02	0.09	<0.01	0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	128
H2	0.50 MMBTU/hr Line Heater	0.05	0.21	0.04	0.18	<0.01	0.01	<0.01	0.02	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	256
H3	0.30 MMBTU/hr Heater	0.03	0.13	0.02	0.11	<0.01	0.01	<0.01	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	154
E01	1,500 HP NG RICE	63.95	254.65	4.97	19.79	1.85	7.36	0.16	0.62	0.90	0.04	0.83	3.30	1.13	4.51	7303
E02	1,500 HP NG RICE	63.95	254.65	4.97	19.79	1.85	7.36	0.16	0.62	0.90	0.04	0.83	3.30	1.13	4.51	7303
E05	6,736 HP Solar Taurus Turbine	6.04	23.51	7.36	28.66	0.22	0.84	0.40	1.56	3.46	0.17	0.04	0.17	0.06	0.24	27616
G3	530 HP Emergency Generator	2.34	0.58	1.52	0.38	0.30	0.08	0.04	0.01	0.25	<0.01	0.23	0.06	0.32	0.08	129
E06	4,433 Solar Centaur Turbine	4.40	18.30	5.36	32.09	0.31	1.38	0.32	1.33	2.78	0.14	0.03	0.14	0.05	0.21	23609
Total Point Source		141.11	553.60	24.54	102.32	4.55	17.13	1.11	4.29	8.54	0.40	1.96	6.97	2.69	9.58	68240
FUG	Pipeline Fugitive Emissions	-	-	-	-	0.28	1.24	-	-	-	-	-	-	<0.01	<0.01	<0.01
R1	Unpaved Haulroads	-	-	-	-	-	-	0.46	0.21	-	-	-	-	-	-	-
BD	Compressor Engine Blowdowns	-	-	-	-	4.89	0.03	-	-	-	-	-	-	0.12	<0.01	66
SV	Engine Starter Vents	-	-	-	-	2.20	0.08	-	-	-	-	-	-	0.06	<0.01	87
PIG	Pigging Operations	-	-	-	-	24.58	0.04	-	-	-	-	-	-	0.61	0.04	41
TV	Solar Centaur Venting	-	-	-	-	NA	2.16	-	-	-	-	-	-	-	-	1396
TL	Solar Centaur Leaks	-	-	-	-	NA	0.20	-	-	-	-	-	-	-	-	129
Total Fugitive		0.00	0.00	0.00	0.00	31.95	3.75	0.46	0.21	0.00	0.00	0.00	0.00	0.79	0.04	1719
Total Sitewide		141.11	553.60	24.54	102.32	36.50	20.88	1.57	4.50	8.54	0.40	1.96	6.97	3.48	9.62	69959

The following table indicates the existing potential to emit (PTE), emissions increase for the new equipment, and the new facility PTE in tons/year (tpy):

Pollutant	Current Facility PTE (tpy)	Emissions Increase from New Equipment (tpy)	New Facility PTE (tpy)
Carbon Monoxide	70.23	32.09	102.32
Nitrogen Oxides	535.30	18.30	553.60
Particulate Matter-10	2.96	1.33	4.29
Sulfur Dioxide	0.26	0.14	0.40
Volatile Organic Compounds	17.14	3.74	20.88
Greenhouse Gas (CO ₂ e)	44,825	25,134	69,959
Total HAPs	9.41	0.21	9.62

REGULATORY APPLICABILITY

The following rules apply to this modification:

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)

45CSR13 applies to this source due to the fact that Columbia is subject to a substantive requirement of an emission control rule promulgated by the Secretary (40CFR60 Subpart KKKK).

Columbia paid the appropriate application fee and published the required legal advertisement for a construction permit application.

45CSR16 (Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60)

45CSR16 applies to this source by reference of 40CFR60 Subpart KKKK. These requirements are discussed under that rule below.

45CSR30 (Requirements for Operating Permits)

Columbia is subject to 45CSR30. The Smithfield Compressor Station has the potential to emit over 100 tons per year of criteria pollutant, Columbia is required to have an operating permit pursuant to Title V of the Federal Clean Air Act as amended and 45CSR30.

Columbia is required to pay the appropriate annual fees and submit an annual Certified Emissions Statement.

40CFR60 Subpart KKKK (Standards of Performance for Stationary Combustion Turbines)

This subpart applies to the new Solar Centaur 40 turbine and establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines with a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour that commenced construction, modification or reconstruction after February 18, 2005. Columbia will be required to operate and maintain the stationary combustion turbine, air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.

The emission limits associated with this rule include a NO_x limit of 25 ppm at 15% O₂, or 1.2 lb/MWh, and a SO₂ limit of 0.90 lb/MWh, or 0.060 lb/MMBTU. According to the specification sheet submitted by Columbia, these limits will be met.

Under 40 CFR 60.4365, Columbia is exempt from monitoring fuel sulfur content because they will burn natural gas that is covered by a purchase or transportation agreement with maximum sulfur content of 20 grains per 100 scf. Annual performance testing must be conducted within 14 calendar months following the previous performance test. Test frequency can be reduced to biennial if measured NO_x emissions are < 75% of limit.

40CFR63 Subpart YYYY (National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines)

Per 40 CFR 63.6095(d), there is a stay of standards for lean premix gas-fired stationary combustion turbines until USEPA takes final action to require compliance with this subpart. The only requirement is to comply with the initial notification requirements of 40 CFR 63.6145.

The following rules do not apply to this modification:

40CFR60 Subpart OOOO (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution)

EPA published in the Federal Register new source performance standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. 40CFR60 Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO₂) emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011.

The following affected sources which commence construction, modification or reconstruction after August 23, 2011 are subject to the applicable provisions of this subpart:

- a. Each gas well affected facility, which is a single natural gas well.

There are no gas wells at this facility. Therefore, all requirements regarding gas well affected facilities under 40 CFR 60 Subpart OOOO would not apply.

- b. Each centrifugal compressor affected facility, which is a single centrifugal compressor using wet seals that is located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. For the purposes of this subpart, your centrifugal compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A centrifugal compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

The Smithfield Compressor Station is not located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. Therefore, all requirements regarding centrifugal compressors under 40 CFR 60 Subpart OOOO would not apply.

- c. Each reciprocating compressor affected facility, which is a single reciprocating compressor located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. For the purposes of this subpart, your reciprocating compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A reciprocating compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

The Smithfield Compressor Station is not located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. Therefore, all requirements regarding reciprocating compressors under 40 CFR 60 Subpart OOOO would not apply.

- d. Pneumatic Controllers

- Each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh which commenced construction after August 23, 2011, and is located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment and not located at a natural gas processing plant.
- Each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller which commenced construction after August 23, 2011, and is located at a natural gas processing plant.

The Smithfield Compressor Station is not located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment.

Therefore, all requirements regarding pneumatic controllers under 40 CFR 60 Subpart OOOO would not apply.

- e. Each storage vessel affected facility, which is a single storage vessel, located in the oil and natural gas production segment, natural gas processing segment or natural gas transmission and storage segment.

40CFR60 Subpart OOOO defines a storage vessel as a unit that is constructed primarily of nonearthen materials (such as wood, concrete, steel, fiberglass, or plastic) which provides structural support and is designed to contain an accumulation of liquids or other materials. The following are not considered storage vessels:

- Vessels that are skid-mounted or permanently attached to something that is mobile (such as trucks, railcars, barges or ships), and are intended to be located at a site for less than 180 consecutive days. If the source does not keep or are not able to produce records, as required by §60.5420(c)(5)(iv), showing that the vessel has been located at a site for less than 180 consecutive days, the vessel described herein is considered to be a storage vessel since the original vessel was first located at the site.
- Process vessels such as surge control vessels, bottoms receivers or knockout vessels.
- Pressure vessels designed to operate in excess of 204.9 kilopascals and without emissions to the atmosphere.

This rule requires that the permittee determine the VOC emission rate for each storage vessel affected facility utilizing a generally accepted model or calculation methodology within 30 days of startup, and minimize emissions to the extent practicable during the 30 day period using good engineering practices. For each storage vessel affected facility that emits more than 6 tpy of VOC, the permittee must reduce VOC emissions by 95% or greater within 60 days of startup. The compliance date for applicable storage vessels is October 15, 2013.

The storage vessels located at the Smithfield Compressor Station commenced construction, modification, or reconstruction before August 23, 2011. Therefore, Columbia is not required by this section to reduce VOC emissions by 95%.

- f. The group of all equipment, except compressors, within a process unit is an affected facility.
- Addition or replacement of equipment for the purpose of process improvement that is accomplished without a capital expenditure shall not by itself be considered a modification under this subpart.
 - Equipment associated with a compressor station, dehydration unit, sweetening unit, underground storage vessel, field gas gathering system,

or liquefied natural gas unit is covered by §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart if it is located at an onshore natural gas processing plant. Equipment not located at the onshore natural gas processing plant site is exempt from the provisions of §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart.

- The equipment within a process unit of an affected facility located at onshore natural gas processing plants and described in paragraph (f) of this section are exempt from this subpart if they are subject to and controlled according to subparts VVa, GGG or GGGa of this part.

The Smithfield Compressor Station is not a natural gas processing plant. Therefore, Leak Detection and Repair (LDAR) requirements for onshore natural gas processing plants would not apply.

- g. Sweetening units located at onshore natural gas processing plants that process natural gas produced from either onshore or offshore wells.
- Each sweetening unit that processes natural gas is an affected facility; and
 - Each sweetening unit that processes natural gas followed by a sulfur recovery unit is an affected facility.
 - Facilities that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H₂S) in the acid gas (expressed as sulfur) are required to comply with recordkeeping and reporting requirements specified in §60.5423(c) but are not required to comply with §§60.5405 through 60.5407 and paragraphs 60.5410(g) and 60.5415(g) of this subpart.
 - Sweetening facilities producing acid gas that is completely reinjected into oil-or-gas-bearing geologic strata or that is otherwise not released to the atmosphere are not subject to §§60.5405 through 60.5407, 60.5410(g), 60.5415(g), and 60.5423 of this subpart.

There are no sweetening units at the Smithfield Compressor Station. Therefore, all requirements regarding sweetening units under 40 CFR 60 Subpart OOOO would not apply.

45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

The Smithfield Compressor Station is located in Wetzel County, which is an unclassified county for all criteria pollutants, therefore the Smithfield Compressor Station is not applicable to 45CSR19. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, the fugitive emissions are not included in the PTE below.

As shown in the table below, Columbia is not subject to 45CSR14 or 45CSR19 review.

Pollutant	PSD (45CSR14) Threshold (tpy)	NANSR (45CSR19) Threshold (tpy)	Smithfield PTE (tpy)	45CSR14 or 45CSR19 Review Required?
Carbon Monoxide	250	NA	102.32	No
Nitrogen Oxides	250	NA	553.60	No, See Explanation Below
Sulfur Dioxide	250	NA	0.40	No
Particulate Matter 2.5	250	NA	4.29	No
Ozone (VOC)	250	NA	17.13	No
Greenhouse Gas (CO ₂ e)	100,000	NA	68,240	No

The Smithfield Compressor Station is an existing Major Stationary Source with respect to PSD because they have actual emissions of nitrogen oxides in excess of 250 tons per year. The Smithfield Compressor Station is not one of the listed 28 major stationary sources whose emissions threshold is 100 tpy as defined in 40CFR52.21(b)(1)(i) and 45CSR14 Section 2.43. In order for a project to become subject to PSD review, the major stationary source must have a significant emissions increase from the project **and** a significant net emissions increase as calculated over the 5 year contemporaneous period. The first step is to determine if the proposed project results in a significant emissions increase utilizing the calculation procedures in 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources for the Prevention of Significant Deterioration of Air Quality) Section 3.4. The procedure for calculating whether a significant emissions increase will occur depends on the type of emissions units being modified. The procedure for calculating whether a significant net emissions increase will occur at the major stationary source, which is the second step in the process, is contained in 45CSR14 Section 2.46. Regardless of any such preconstruction projections, a major modification results if the project causes a significant emissions increase and a significant net emissions increase.

In determining whether a significant emissions increase occurs, 45CSR14 provides two (2) ways to make that determination. These calculations are based on whether or not it is an existing emissions unit or a new emissions unit.

45CSR14 Section 2.27 defines an ‘emissions unit’ as any part of a stationary source that emits or would have the potential to emit any regulated NSR pollutant and includes an electric utility steam generating unit as defined in subsection 2.25. For the purposes of this rule, there are two types of emissions units as described in subdivisions 2.27.a and 2.27.b.

2.27.a. A new emissions unit is any emissions unit that is (or will be) newly constructed and that has existed for less than 2 years from the date such emissions unit first operated.

2.27.b. An existing emissions unit is any emissions unit that does not meet the requirements in subdivision 2.27.a. A replacement unit, as defined in subsection 2.68, is an existing emissions unit.

Because the turbine proposed at the Smithfield Compressor Station would be a new emissions unit, it would fall under 2.27.a.

Therefore, since emissions units at Smithfield Compressor Station would be considered new units, 45CSR14 Section 3.4.d states that an Actual-to-Potential test would be utilized. A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the potential to emit (as defined in subsection 2.58) and the baseline actual emissions (as defined in subdivisions 2.8.a and 2.8.b), for each existing emissions unit, equals or exceeds the significant amount of that pollutant (as defined in subsection 2.74).

The first step is to determine whether or not the proposed project results in a significant emissions increase utilizing the Actual-to-Potential test. The result of that test will be compared to PSD Significant Emission Rates (SER) to determine PSD applicability. If the resultant emissions are below the PSD SER then the project is not subject to PSD review. If the project’s emissions are greater than the PSD SER then all contemporaneous increases and decreases must be examined to determine if the project is subject to PSD Review. The potential to emit from the emissions units associated with this project were based on the proposed turbine.

The following table indicates what Smithfield Compressor Station's potential emissions increase would be with the installation of the turbines, line heater, emergency generator and catalytic heaters:

Pollutant	Emissions increase associated with this modification (tpy)	PSD SER (tpy)
NO _x	18.30	40
CO	32.09	100
SO ₂	0.14	40
PM _{2.5}	1.33	10
VOC	3.74	100
CO ₂ e	25,134	100,000

Final Conclusion

Because there was not an emissions increase above the PSD SER, PSD review is not required.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There will be small amounts of various non-criteria regulated pollutants emitted from the combustion of natural gas. However, due to the concentrations emitted, detailed toxicological information is not included in this evaluation.

AIR QUALITY IMPACT ANALYSIS

Modeling was not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) or 45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment) as seen in the table listed in the Regulatory Discussion section under 45CSR14/45CSR19.

SOURCE AGGREGATION

“Building, structure, facility, or installation” is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

The Smithfield Compressor Station is located in Wetzel County and will be operated by Columbia.

1. The Smithfield Compressor Station will operate under SIC code 4922 (Pipeline Transportation of Natural Gas). There are other compressor stations operated by Columbia that share the same two-digit major SIC code of 49 for natural gas transmission. Therefore, the Smithfield Compressor Station does share the same SIC code as other Columbia compressor stations.
2. “Contiguous or Adjacent” determinations are made on a case by case basis. These determinations are proximity based, and it is important to focus on this and whether or not it meets the common sense notion of a plant. The terms “contiguous” or “adjacent” are not defined by USEPA. Contiguous has a dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; having a common endpoint or border.

There are no Columbia properties in question that are considered to be on contiguous or adjacent property with the Smithfield Compressor Station.
3. The proposed Smithfield Compressor Station is not under common control with any facilities in question.

Because the facilities are not considered to be on contiguous or adjacent properties and not under common control, the emissions from the Smithfield Compressor Station should not be aggregated with other facilities in determining major source or PSD status.

MONITORING OF OPERATIONS FOR PROPOSED MODIFICATION

Columbia will be required to perform the following monitoring:

1. Monitor and record quantity of natural gas consumed for all fuel combustion sources.
2. Monitor all applicable requirements of 40CFR60 Subparts JJJJ and KKKK.

Columbia will be required to perform the following recordkeeping:

1. Maintain records of the amount of natural gas consumed and hours of operation for all fuel combustion sources.
2. Maintain records of testing conducted in accordance with the permit. Said records shall be maintained on-site or in a readily accessible off-site location
3. Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
4. Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engines and ancillary equipment.
5. Maintain records of all applicable requirements of 40CFR60 Subparts JJJJ and KKKK.
6. The records shall be maintained on site or in a readily available off-site location maintained by Columbia for a period of five (5) years.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that Columbia meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Smithfield Compressor Station should be granted a 45CSR13 modification permit for their facility.

Jerry Williams, P.E.
Engineer

Date