



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2127F
Plant ID No.: 109-00017
Applicant: Cranberry Pipeline Corporation (Cranberry)
Facility Name: Bradley Compressor Station
Location: Fanrock, Wyoming County
NAICS Code: 211111 (Natural Gas Extraction)
Application Type: Modification
Received Date: March 11, 2013
Engineer Assigned: Jerry Williams, P.E.
Fee Amount: \$1,000.00
Date Received: March 11, 2013
Complete Date: May 20, 2013
Due Date: August 18, 2013
Applicant Ad Date: May 15, 2013
Newspaper: *The Independent Herald*
UTM's: Easting: 443.5 km Northing: 4,155.3 km Zone: 17
Description: Reduction in Carbon Monoxide (CO) emissions to make the facility a minor source, correction of the design capacity of the glycol dehydration unit, addition of one (1) flash tank, and one (1) emergency generator.

DESCRIPTION OF PROCESS

The following process description was taken from Permit Application R13-2127F:

Natural gas enters the facility via pipeline where the wet gas is compressed to a higher pressure. Natural gas fired engines power compressors that compress the gas to a higher pressure. After compression, the compressed gas exits the facility to an underground storage site.

Pipeline quality natural gas has a moisture content of 7 pounds per million standard cubic feet (mmscf). Triethylene glycol (TEG) dehydration units are used to remove water from natural gas streams to prevent the formation of hydrates and corrosion in the pipeline. The natural gas stream is passed through a stream of TEG. At the point of contact, the glycol will absorb water

and water vapor from the natural gas stream. During the absorption process, aromatic hydrocarbons include benzene, toluene, ethylbenzene, xylenes, hexane as well as other volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) present in the gas stream are absorbed along with the water vapor into the glycol stream. When the glycol is saturated with water, it is considered “rich” glycol. The rich glycol is then sent to a glycol still for regeneration to remove water and liquid hydrocarbons. The glycol still vent emits VOCs and HAPs depending on the concentration of those constituents in the processed wet gas. After regeneration, the glycol is considered “lean” glycol and is suitable for reuse.

Natural gas fired boilers provide process heat for processes such as glycol regenerator reboilers. The glycol regenerator reboiler fires natural gas and is also a potential source of criteria and HAP emissions. The reboiler has an exhaust stack where the by-products of natural gas combustion are vented.

PROPOSED CHANGES

This modification permit application addresses the following:

- The Caterpillar G3606TA reciprocating internal combustion engine (RICE) (CE-4) is the largest contributor of CO emissions at this station. A recent performance test of CE-4 demonstrated the actual CO emissions to be less than previous estimations. The combined CO emissions from CE-4 and updated emissions factors modeled via HAPCalc 3.01 reduces the facility wide CO potential to emit (PTE) to less than 100 tons per year. This results in the facility being a minor source.
- Emission factor updates used in modifying the emission rates of the other engines utilizing GRI-HAPCalc 3.01. These engines include Caterpillar G3508TA (CE-1), White Superior 8GT825 (CE-2), and Caterpillar G3516LE (CE-3).
- Correct the dehydration unit maximum design capacity from 40 mmscf/day to 30 mmscf/day.
- Addition of one (1) 100 gallon flash tank to the dehydration unit. All emissions from the flash tank will be directed to the reboiler fuel line. Therefore, no increase of emissions will result with the addition of the flash tank.
- Addition of one (1) 28 hp Generac emergency generator.

Emissions for the facility have been revised, taking into account the items above. With these changes, the facility will become a minor source and no longer subject to 45CSR30 (Title V) permitting requirements.

SITE INSPECTION

A site inspection was conducted on April 6, 2012 by Todd Shrewsbury of the DAQ Enforcement Section. The facility was found to be operating in compliance at that time. The facility is located approximately 400 feet from the closest residence.

Directions as given in the permit application are as follows:

From I-64 Exit 42, take SR16 southwest. After 3.6 miles, bear right onto Lester Highway. Travel 3.3 miles and bear right onto SR54. Travel 6.6 miles and bear left on SR54. Travel 3.9 miles and turn right on SR97. Travel 12 miles and bear left onto SR10. Travel 1.1 miles and turn right onto SR16. Travel 5.1 miles and turn right onto CR12/4 (Indian Creek Road). Travel 5.2 miles and turn left onto CR14 (Brier Creek Road). Travel 1.8 miles and turn right onto local road. Travel 0.2 miles and bear left onto local road. Travel 0.1 miles to Bradley Compressor Station.

Latitude: 37.545489

Longitude: -81.639058



ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this modification application consist of the combustion emissions from four (4) natural gas fired compressor engines, one (1) TEG dehydrator still vent, one TEG dehydrator reboiler, one (1) flash tank, one (1) emergency generator and fugitive emissions. Fugitive emissions for the facility are based on calculation methodologies presented in EPA Protocol for Equipment Leak Emission Estimates. The following table indicates which methodology was used in the emissions determination:

Emission Point ID#	Process Equipment	Calculation Methodology
006	515 horsepower (hp) Caterpillar G3508TA RICE	Manufacturer's Data, EPA AP-42 Emission Factors
009	1,100 hp White Superior 8GT825 RICE	Manufacturer's Data, EPA AP-42 Emission Factors
012	1,150 hp Caterpillar G3516LE RICE	Manufacturer's Data, EPA AP-42 Emission Factors
013	1,775 hp Caterpillar G3606TA RICE	Performance Test, EPA AP-42 Emission Factors, Stack Test
011	30 mmscfd TEG Dehydrator Still Vent	GRI-GlyCalc 4.0
010	2.04 million British Thermal Units per hour (MMBtu/hr) TEG Dehydrator Reboiler	EPA AP-42 Emission Factors
010	100 gallon Flash Tank	Vasquez-Beggs Method, EPA TANKS 4.09
014	28 hp Generac Emergency Generator	Manufacturer's Data, EPA AP-42 Emission Factors

The total facility PTE for the Bradley Compressor Station is shown in the following table:

Pollutant	Facility Wide PTE (tons/year)
Nitrogen Oxides	64.08
Carbon Monoxide	99.14
Volatile Organic Compounds	33.34
Particulate Matter	1.51
Sulfur Dioxide	0.10
Formaldehyde	7.63
Total HAPs	16.73
Carbon Dioxide Equivalent	17,913

Maximum detailed controlled point source emissions were calculated by Cranberry and checked for accuracy by the writer and are summarized in the table on the next page.

Cranberry Pipeline Corporation – Bradley Compressor Station (R13-2127F)

Emission Point ID#	Source	NO _x		CO		VOC		PM		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	lb/hr	ton/year
006	515 hp CAT G3508TA	2.27	9.94	1.70	7.45	0.44	1.93	0.04	0.16	<0.01	0.01	0.20	0.87	0.21	0.90	470	2059
009	1,100 hp White 8GT825	4.85	21.22	7.27	31.84	0.94	4.13	0.08	0.35	<0.01	0.02	0.42	1.85	0.44	1.93	936	4098
012	1,150 hp CAT G3516LE	4.56	19.97	3.80	16.64	0.99	4.32	0.08	0.37	<0.01	0.02	0.44	1.93	0.46	2.01	998	4369
013	1,775hp CAT G3606TA	2.74	11.99	9.62	42.13	1.52	6.67	0.13	0.56	<0.01	0.03	0.68	2.98	0.71	3.11	1375	6022
010	2.04 MMBTU/hr Reboiler	0.20	0.88	0.17	0.74	0.01	0.05	0.02	0.07	<0.01	0.05	<0.01	<0.01	<0.01	0.02	239	1045
011	30 mmscf/d TEG Still Vent	0.00	0.00	0.00	0.00	3.47	15.20	0.00	0.00	0.00	0.00	0.00	0.00	2.00	8.75	0	0
010	100 gal Flash Tank	0.00	0.00	0.00	0.00	0.11	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
014	28 hp Emergency Gen.	0.31	0.08	1.38	0.35	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	24	6
Fugitive	Fugitive Emissions	0.00	0.00	0.00	0.00	0.13	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	72	314
Total	Total Facility PTE	14.92	64.08	23.94	99.14	7.61	33.34	0.34	1.51	0.03	0.10	1.74	7.63	3.82	16.73	4113	17913

REGULATORY APPLICABILITY

Unless otherwise stated WVDEP DAQ did not 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, Subparts HH and ZZZZ.

The following rules apply to the facility:

45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers)

The purpose of 45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers) is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units.

45CSR2 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 4 (weight emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The heat input of the proposed fuel burning unit (010) is below 10 MMBTU/hr. Therefore, this unit is exempt from the aforementioned sections of 45CSR2. However, Cranberry would be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

45CSR10 (To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides)

45CSR10 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 3 (weight emission standard), 6 (registration), 7 (permits), and 8 (testing, monitoring, recordkeeping, reporting). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The heat input of the proposed fuel burning unit (010) is below 10 MMBTU/hr. Therefore, this unit is exempt from the aforementioned sections of 45CSR10.

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 Cranberry seeks federally enforceable requirements to establish this facility as a minor source of CO emissions.

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

45CSR22 (Air Quality Management Fee Program)

As a result of the granting of this permit, Cranberry is not subject to 45CSR30.

Emissions for the facility have been revised, taking into account the items above. With these changes, the facility will become a minor source and no longer subject to 45CSR30 (Title V) permitting requirements.

Cranberry is required to pay the appropriate annual fees and keep their Certificate to Operate current. Cranberry must submit the appropriate documentation to the Title V Section to make their Title V Permit inactive.

40CFR60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE))

40CFR60 Subpart JJJJ is applicable to owners and operators of new stationary spark ignition internal combustion engines manufactured:

On or after July 1, 2007, for engines with a maximum rated power capacity greater than or equal to 500 hp. **(013)**

On or after January 1, 2008, for lean burn engines with a maximum rated power capacity greater than or equal to 500 hp and less than 1,350 hp. **(006, 009, 012)**

On or after January 1, 2009 for emergency engines with a maximum engine power greater than 25 hp. **(014)**

Engines 006, 009, 012, 013 were manufactured before the applicability dates and have not been modified in any way. Therefore, these engines are not subject to this rule.

However, Engine 014 was manufactured after the applicability date. The Generac emergency generator is a certified spark ignition internal combustion engine. Therefore, Cranberry is required to keep records of conducted maintenance, but is not required to conduct a performance test.

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.

There are no centrifugal compressors at the Bradley Compressor Station. 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.

There is one (1) reciprocating internal combustion engines located at the Bradley Compressor Station that were constructed after August 23, 2011. Therefore, the requirements regarding reciprocating compressors under 40 CFR 60 Subpart OOOO would apply to Engine 014. Also, none of the engines have underwent any modifications.

- 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.

There are no applicable pneumatic controllers which commenced construction after August 23, 2011. 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 Bradley Compressor Station were installed prior to August 23, 2011 and have the potential to emit to less than 6 tpy of VOC. Therefore, Cranberry 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 Bradley 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 Bradley Compressor Station. Therefore, all requirements regarding sweetening units under 40 CFR 60 Subpart OOOO would not apply.

The following rules do not apply to the facility:

45CSR30 (Requirements for Operating Permits)

As a result of the granting of this permit, Cranberry is not subject to 45CSR30.

40CFR60 Subpart KKK (Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants)

40CFR60 Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984, and on or Before August 23, 2011. The Bradley Compressor Station is not a natural gas processing facility, therefore Cranberry is not subject to this rule.

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 Bradley Compressor Station is located in Wyoming County, which is an attainment county for all pollutants. Because Wyoming County is an attainment county, 45CSR19 does not apply to this facility.

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

Pollutant	PSD (45CSR14) Threshold (tpy)	NANSR (45CSR19) Threshold (tpy)	Bradley PTE (tpy)	45CSR14 or 45CSR19 Review Required?
Carbon Monoxide	250	NA	99.14	No
Nitrogen Oxides	250	NA	64.08	No
Sulfur Dioxide	250	NA	0.10	No
Particulate Matter 2.5	250	NA	1.51	No
Ozone (VOC)	250	NA	33.34	No
Greenhouse Gas (CO _{2e})	100,000	NA	17,913	No

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) as seen in the table listed in the Regulatory Discussion Section.

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 Bradley Compressor Station is located in Wyoming County and will be operated by Cranberry.

“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 other Cranberry properties in question that are considered to be on contiguous or adjacent property with the Bradley Compressor Station.

Because there are no other facilities that are considered to be on contiguous or adjacent properties, the emissions from the Bradley Compressor Station should not be aggregated with other facilities in determining major source or PSD status.

MONITORING OF OPERATIONS

Cranberry will be required to perform the following monitoring and recordkeeping:

1. Monitor and record quantity of natural gas consumed for all combustion devices.
2. Monitor and record quantity of wet gas throughput for the glycol dehydration unit.
3. Monitor and record quantity of condensate loaded into storage tanks.
4. 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
5. Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
6. 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.
7. The records shall be maintained on site or in a readily available off-site location maintained by Cranberry for a period of five (5) years.

RECOMMENDATION TO DIRECTOR

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

Jerry Williams, P.E.
Engineer

Date