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GENERAL PERMIT REGISTRATION APPLICATION
ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Registration No.:	G35-A010C
Plant ID No.:	109-00104
Applicant:	Cranberry Pipeline Corporation (Cranberry)
Facility Name:	Key Rock Compressor Station
Location:	near Rock View, Wyoming County
SIC Code:	1311
Application Type:	Modification
Received Date:	September 23, 2015
Engineer Assigned:	Thornton E. Martin Jr.
Fee Amount:	$3,000
Date Fee Received:	September 24, 2015
Complete Date:	October 26, 2015
Applicant Ad Date:	September 30, 2015
Newspaper:	*Independent Herald*
UTM's:	Easting: 451.178 km Northing: 4162.856 km Zone: 17
Description:	Applicant proposes to update emission limits based on recent (April 22, 2015) wet gas analyses. The updated emission limits will reflect storage vessel and tank truck loading emissions for the first time.

PROCESS DESCRIPTION

Natural gas enters the compressor station via pipelines at relatively low pressure. A natural gas fired engine powers a compressor which compresses the gas to higher pressure. Engine CE-1 is a 269-bhp two-stroke lean-burn Ajax DPC-280. The products of combustion from engine CE-1 are vented through exhaust stacks to the atmosphere. After compression, the wet gas is transferred to the Exterran triethylene glycol (TEG) dehydration unit, at a maximum flow rate of 10 mmscf/day. Pipeline quality natural gas has a moisture content of 7 lb/mmscf. Excess liquids are removed before the gas is dehydrated. This may be done by various techniques. The result is a small amount of pipeline fluids collected in a storage tank. The material is predominantly water, but it may contain small amounts of oils and other petroleum based compounds. Before leaving the facility, the gas is transferred to a dehydration unit where excess water is removed from the gas stream. In the contactor of the dehydration unit TEG flows countercurrent to the natural gas stream, the TEG absorbs water vapor, reducing the amount of water from the natural gas stream. The rich TEG stream is then heated in the reboiler where the entrained water is boiled out of the TEG through the still vent. After the water is removed from the rich TEG, the lean TEG is sent back to the contactor by a gas-driven Kimray TEG pump, model 5015SC. The pump

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has a maximum pump rate of 0.83 GPM. The Exterran's 0.2 mmBtu/hr reboiler has a stack RBV-1 where by-products of combustion are emitted and the dehydrator has a still vent RSV-1, which contains the pollutants listed in Table 1.

DESCRIPTION OF FUGITIVE EMISSIONS

Fugitive emissions consist of those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Fugitive leaks are leaks from sealed surfaces associated with process equipment.

Equipment specific to the gas production and processing operation, which result in fugitive emissions includes equipment such as separators, pipelines and pumps. Pneumatic devices such as gas actuated pumps and pressure/level controllers also result in fugitive emissions. Fugitive emissions may also result from process upsets such as pressure relief device releases due to over-pressure. Other process-related sources of emissions include fugitive emissions from flanges, valves, connectors, fittings and emissions from routine maintenance activities involving equipment depressurization (blowdown) or complete purging and filter replacement.

The amount of gas vented by pressure and level controllers is dependent on the manufacturer, application, age and orifice size. In general, controllers in liquid service have larger orifices than those in pressure service. Valves in liquid service are designed to quickly open or close to avoid throttling which can erode the valve seat and reduce the life of the valve. Emissions from gas actuated pumps will be impacted by the gas composition, fuel supply pressure, discharge head (pressure) and the flow rate of the liquid pumped. Factors affecting blowdown emissions include maintenance schedules, line pressures and the volume of gas relieved. More frequent maintenance results in more frequent gas relief.

Fugitive emissions typically may emanate from some or all of the following:

1) Storage tanks
2) Emergency and process vents
3) Gas actuated pumps
4) Loading losses (storage tank to tanker truck)
5) Pneumatic devices
6) Blowdown and blowout
7) Equipment leaks (connectors, flanges, open ended lines and valves)

SITE INSPECTION

A site inspection was conducted by John Moneypenny of DAQ Enforcement on June 5, 2014. The facility was deemed in compliance.

Directions to the facility. From Pineville on SR-97/SR-10 North for approximately 2.9 miles. Turn left onto CR-9/5 (Skin Fork Road) for approximately 1.2 miles. Turn right onto the local road for approximately 100 yards to station.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions from still vent RSV-1 was estimated using GRI-GLYCalc 4.0. Emissions for Engine CE-1 were estimated with engine manufacturer emission factors and AP-42 emission factors. Air emissions for RBV-1 were estimated with AP-42 emission factors. Storage vessel and tank truck loading emissions have been included for the first time with this modification.

Table 1: Modified Maximum Summarized Estimated Controlled Point Source Air Emissions

Proposed – Criteria PTE									
Source	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NOx**	**CO**	**VOC**	**HAPs**	**CO2e**
Engine – CE-1 (ton/yr)	0.838	0.838	0.838	0.006	29.612	3.377	3.117	1.014	1130.480
Reboiler – RBV-1 (ton/yr)	0.007	0.007	0.007	0.001	0.086	0.072	0.005	0.002	102.501
Dehys – RSV-1 (ton/yr)	--	--	--	--	--	--	14.441	4.505	385.313
Storage Tank – T03 (ton/yr)							0.319		
Truck Loading (ton/yr)							0.140		
Fugitives (ton/yr)	--	--	--	--	--	--	0.940	--	22.718
Total Emission (ton/yr)	**0.844**	**0.844**	**0.844**	**0.006**	**29.698**	**3.449**	**18.962**	**5.520**	**1641.011**
Total Emissions (lb/day)	4.626	4.626	4.626	0.034	162.727	18.898	103.902	30.245	8991.843
Total Emissions (lb/hr)	0.193	0.193	0.193	0.001	6.780	0.787	4.329	1.260	374.660

Table 2: Previous Summarized Estimated Controlled Point Source Air Emissions

Previous Emissions Summary (G35-A010B) – Criteria PTE									
Source	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NOx**	**CO**	**VOC**	**HAPs**	**CO2e**
Engine – CE-1 (ton/yr)	0.838	0.838	0.838	0.006	29.61	3.38	3.117	1.01	1130.480
Reboiler – RBV-1 (ton/yr)	0.007	0.007	0.007	0.001	0.09	0.07	0.005	0.00	102.501
Dehys – RSV-1 (ton/yr)	--	--	--	--	--	--	2.267	1.38	385.313
Storage Tank – T03 (ton/yr)									
Truck Loading (ton/yr)									
Fugitives (ton/yr)	--	--	--	--	--	--	0.940	--	22.718
Total Emission (ton/yr)	**0.844**	**0.844**	**0.844**	**0.006**	**29.698**	**3.449**	**6.328**	**2.391**	**1641.011**
Total Emissions (lb/day)	4.626	4.626	4.626	0.034	162.727	18.898	34.676	13.102	8991.843
Total Emissions (lb/hr)	0.193	0.193	0.193	0.001	6.780	0.787	1.445	0.546	374.660

Table 3: Proposed Difference of Emissions

Proposed Difference of Emissions									
Source	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NOx**	**CO**	**VOC**	**HAPs**	**CO2e**
Total Emission (ton/yr)	0.000	0.000	0.000	0.000	0.000	0.000	12.634	3.129	0.000

Table 4: Summary of Estimated Emissions Increase

Pollutant	Increased Potential (ton/yr)
VOC	12.63
Benzene	0.21
Ethylbenzene	1.00
Toluene	0.47
Xylene	1.37
n-Hexane	0.07

REGULATORY APPLICABILITY AND GENERAL PERMIT ELIGIBILITY

Based on the modification outlined this facility is subject to the following rules and regulations:

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

45CSR2 establishes emission limitations for smoke and particulate matter which are discharged from fuel burning units. All fuel burning units will be subject to the weight emission standard for particulate matter set forth in 45CSR2. Each registrant is also subject to all applicable opacity requirements set forth in 45CSR2 Section 3.2.

Each substantive 45CSR2 requirement for the reboiler is discussed below.

45CSR2 *Opacity Standard - Section 3.1*

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

45CSR2 *Weight Emission Standard - Section 4.1.b*

The allowable particulate matter (PM) emission rate for the reboiler, identified as Type "b" fuel burning unit, per 45CSR2, Section 4.1.a, is the product of 0.09 and the total design heat input of the reboiler in million Btu per hour. The maximum design heat input of the reboiler will be 0.2 mmBtu/Hr. Using the above equation, the 45CSR2 facility-wide PM emission limit of the reboiler will be 0.018 lb/hr. The maximum potential hourly PM emissions during normal operations (firing natural gas) from the reboiler is estimated to be 0.007 lb/hr. This emission rate is 39% of the 45CSR2 limit.

45CSR4 *To Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors*

45CSR4 states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable. All facilities are inspected by the DAQ Enforcement Section.

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 Applicant has applied for a permit to modify based on increased emission levels for the facility as determined by the most recent wet gas analysis according to the requirements defined under §45-13-5.13

The applicant published a Class I legal advertisement in the *Independent Herald* on September 30, 2015.

45CSR22 *Air Quality Management Fee Program*

45CSR22 applies to all registrants which are minor sources and no NSPS applies. The affected registrants will be subject to the fee schedule set forth in 45CSR22. They are also required to keep their Certificate to Operate status current.

The proposed modification and operation of this facility should meet the eligibility, siting, limitations, and emissions controls as specified in General Permit G35-A.

The following rules and regulations do not apply to the facility:

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

40CFR60.4230 states that a source that commenced construction after June 12, 2006 whose SI ICE was less than 500 hp and was manufactured on or after July 1, 2008 is subject to this regulation. Engine CE-1 based on engine manufacture date (1981) is not subject to this regulation.

40 CFR 63 Subpart HH *National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities*

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart HH. This facility is a natural gas production facility that processes, upgrades, or stores natural gas prior to transmission. This facility is an area source of HAPs refer to the previous facility wide emissions table.

Pursuant to §63.760(b)(2), each glycol dehydration unit (GDU) located at an area source that meets the requirements under §63.760(a)(3) is defined as an affected facility under Subpart HH. The requirements for affected sources at area sources are given under §63.764(d). However, for a GDU, exemptions to these requirements are given under

§63.764(e)(2) "actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram [1 TPY] per year."

The maximum PTE of benzene emissions from the GDU process vent (RSV-1) is 0.33 TPY. Therefore, the GDU is exempt from the Subpart HH requirements given under §63.764(d).

40CFR63 Subpart HHH *National Emission Standards for Hazardous Air Pollutants: Natural Gas Transmission and Storage*

These promulgated national emission standards for hazardous air pollutants (NESHAP) limit emissions of hazardous air pollutants (HAP) from oil and natural gas production and natural gas transmission and storage facilities.

The Key Rock Compressor Station is exempt from the requirements of this Subpart because of the annual average flow of gas exemption of 10 mmscf/day.

40CFR63 Subpart ZZZZ *National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion 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. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations. This facility is subject to the area source requirements and has non-emergency spark ignition engines.

Engine CE-1 is an "Existing Stationary RICE" source at an area source of HAPs and is an affected source because construction commenced before June 12, 2006 [63.6590(a)(1)(iii)] due to the manufacturer's date of the engine (1981).

Engine CE-1 due to the manufacturer's date of the engine must comply with the applicable emission limitations, operating limitations, and other requirements no later than October 19, 2013. Engine CE-1 is a non-emergency, non-black start two-stoke lean-burn stationary RICE≤500 HP that is not remote and operates more than 24 hours per calendar year (Table 2d.6). Engine CE-1 has oil, oil filter, spark plug, hose, and belt maintenance requirements.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Small amounts of non-criteria regulated hazardous or toxic air pollutants such as benzene, ethylbenzene, toluene, xylenes and formaldehyde may be emitted when natural gas is combusted in reciprocating engines. Total non-criteria regulated hazardous/toxic air pollutant emissions are tabulated for each registered natural gas compressor station in the Class II General Permit Registration Application. A toxicity analysis will be performed when the Director finds existing circumstances and/or submitted data provide cause for an assessment to be made concerning whether a specific natural gas compressor station may interfere with attainment or maintenance of an applicable ambient air quality standard or cause or contribute to degradation of public health and welfare. Any natural gas compressor station granted Class II General Permit registration by the Director shall not have a potential to emit of 10 tons per year of any hazardous/toxic pollutant or 25 tons per year of any combination of hazardous/toxic pollutants.

AIR QUALITY IMPACT ANALYSIS

Air dispersion modeling will be performed when the Director finds existing circumstances and/or submitted data provide cause for an assessment to be made concerning whether a specific natural gas compressor station may interfere with attainment or maintenance of an applicable ambient air quality standard or cause or contribute to a violation of an applicable air quality increment from any proposed Class II General Permit registration action. Factors to be considered when determining whether an ambient air assessment would be made include:

a. Existing air quality of the area
b. Topographic or meteorological factors
c. Maximum emissions
d. Siting criteria

Air dispersion modeling was not performed due to the size and location of this facility. This facility will be located in Wyoming County, WV, which is currently in attainment for PM (particulate matter), PM_{10}

(particulate matter less than 10 microns in diameter) and $PM_{2.5}$ (particulate matter less than 2.5 microns in diameter).

RECOMMENDATION TO DIRECTOR

The information contained in this General Permit Registration Application indicates that compliance with all applicable regulations should be achieved when all of the proposed particulate matter control methods are in operation. Due to the location, nature of the process, and control methods proposed, adverse impacts on the surrounding area should be minimized. Therefore, the granting of a permit to Cranberry Pipeline for the modification of the Key Rock Compressor Station located near Rock View, Wyoming County, WV, is hereby recommended.

Thornton E. Martin Jr.
Permit Engineer

October 14, 2015
Date