west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	G35-A027B
Plant ID No.:	083-00123
Applicant:	Dominion Transmission Inc. (Dominion)
Facility Name:	Cassity Mountain
Location:	Randolph County
NAICS Code:	212312
Application Type:	Modification
Received Date:	April 10, 2015
Engineer Assigned:	David Keatley
Fee Amount:	$4,000
Date Fee Received:	April 16, 2015
Complete Date:	September 3, 2015
Due Date:	October 18, 2015
Applicant Ad Date:	April 22, 2015
Newspaper:	*The Inter-Mountain*
UTM's:	Easting: 584.773 km Northing: 4,292.294 km Zone: 17
Description:	Installation and operation of one (1) 97.5-bhp emergency generator engine and one (1) 5-mmBtu/hr enclosed combustor. Removal of a 5 mmBtu/hr flare.

DESCRIPTION OF PROCESS

Cassity Mountain Station is a dehydration facility that services a natural gas pipeline. The primary purpose of the facility is to reduce the water content of the natural stream to meet gas quality specifications. The process to remove the moisture begins with a maximum of 55 mmscf/day of natural gas passing through a contactor flowing countercurrent to triethlyene glycol (TEG). The TEG absorbs moisture and some hydrocarbons. The dehydrated natural gas stream will then exit the facility via pipeline. The rich TEG will then go to a flash tank to reduce volatile hydrocarbons. The liquids from the flash tank will go to the regenerator to remove the water from the TEG. The regenerator is heated by the reboiler (RBV-1). The vapors from the regenerator exit the dehydration unit via the still vent and will be controlled by a proposed 5 mmBtu/hr Questor

QTI Q100 enclosed flare. The facility will also install and operate a 97.5-bhp four-stroke rich-burn Cummins 60 GGHE natural gas fired engine powering an emergency generator.

SITE INSPECTION

A site inspection was conducted by Mike Kolb from DAQ's Compliance and Enforcement section on November 20, 2013. The facility was deemed in compliance.

From Charleston take I79 N to exit 99 (Weston) and take US33 E. Take US33 E until Harding. Turn right (south) onto Route 151 and go 0.5 miles. Turn right and go 0.3 miles to Pumpkintown Road. Turn left onto Pumpkintown Road and go 4 miles. Turn left and go 11 miles (through the towns of Mabie & Cassity) to silver Dominion gate on left side of road. Turn left, station is 4 miles.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The control efficiency of the enclosed combustor F-2 controlling vapors from the still vent will be 95%. Emissions from the TEG dehydration unit were estimated using GRI-GLYCalc version 4.0. Emissions for NOx, CO, and VOCs were estimated with manufacturer emission factors other emissions were estimated with AP-42 four-stroke rich-burn emission factors. The tpy emissions for the emergency generator where based on 500 hrs per year.

Table 1: Estimated Maximum Controlled Modified PTE

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
F-2	Enclosed Combustor (Controlling RSV-1)	Nitrogen Oxides	0.67	2.93
		Carbon Monoxide	0.56	2.46
		Volatile Organic Compounds	0.61	2.68
		Sulfur Dioxide	<0.01	0.01
		Total Particulate Matter	0.05	0.24
		Benzene	0.03	0.15
		Ethylbenzene	0.10	0.43
		Toluene	0.06	0.26
		Xylenes	0.13	0.57
		n-Hexane	0.02	0.09
GE-1	Cummins 60 GGHE Emergency Generator Engine	Nitrogen Oxides	1.31	0.33
		Carbon Monoxide	10.80	2.70
		Volatile Organic Compounds	0.26	0.06
		Formaldehyde	0.02	<0.01
FT-1	Flash Tank	Volatile Organic Compounds	0.42	1.82
		Benzene	<0.01	0.02

		Ethylbenzene	<0.01	0.03
		Toluene	<0.01	0.03
		Xylenes	<0.01	0.03
		n-Hexane	0.02	0.07

Table 2: Maximum Estimated Controlled Facility Wide PTE

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)
Nitrogen Oxides	3.56
Carbon Monoxide	5.42
Volatile Organic Compounds	5.11
Particulate Matter	0.24
PM_{10}	0.24
Sulfur Dioxide	0.01
Benzene	0.15
Ethylbenzene	0.43
Toluene	0.26
Xylenes	0.57
n-Hexane	0.09

REGULATORY APPLICABILITY

The following rules and regulations apply to the facility:

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

This facility shall not cause the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public. 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

45CSR6 *Control of Air Pollution From Combustion of Refuge*

From section 2.7 this facilities enclosed combustor (F-2) meets the definition of incineration and is therefore subject to applicable Rule 6 requirements. The incinerator capacity given is 143 lb/hr. From section 4.1 the maximum allowable total particulate matter emission rate is 0.39 lb/hr. The enclosed combustor's potential to emit of total particulate matter is 0.05 lb/hr which is well below this threshold. The opacity limit for the flare is 20%.

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

The proposed changes requires a modification permit because the proposed enclosed combustor is subject to 45CSR6 which is a substantive requirement.

45CSR22 *Air Quality Management Fee Program*

This source is subject to this rule due to the required construction application fee and the annual operating fee.

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

40CFR60 Subpart JJJJ sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the date of construction, date of manufacture, and horsepower (hp) of the spark ignition internal combustion engine. All proposed engines will commence construction after June 12, 2006.

Engine G-1 is subject to this subpart due to the manufacturers date of the engine. G-1 is a certified engine and the Certificate on Conformity will be available in the file. To keep the designation of certified this engine must be operated and maintained to the manufacturer's emission-related written instructions and must keep records of conducted maintenance to demonstrate compliance.

40CFR63 Subpart ZZZZ NESHAP for Stationary Reciprocating Internal Combustion Engines

This facility is an area source of Hazardous Air Pollutants. The proposed emergency generator engine is considered a new area source RICE and will comply with Subpart ZZZZ by complying with 40 CFR 60 Subpart JJJJ.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Benzene

Benzene is found in the air from emissions from burning coal and oil, gasoline service stations, and motor vehicle exhaust. Acute (short-term) inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic (long-term) inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for

women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidence of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. EPA has classified benzene as a Group A, human carcinogen.

Ethyl Benzene

Ethyl benzene is mainly used in the manufacturing of styrene. Acute (short-term) exposure to ethyl benzene in humans results in respiratory effects, such as throat irritation and chest constriction, irritation of the eyes, and neurological effects, such as dizziness. Chronic (long-term) exposure to ethyl benzene by inhalation in humans has shown conflicting results regarding its effects on the blood. Animal studies have reported effects on the blood, liver, and kidneys from chronic inhalation exposure to ethyl benzene. Limited information is available on the carcinogenic effects of ethyl benzene in humans. In a study by the National Toxicology Program (NTP), exposure to ethyl benzene by inhalation resulted in an increased incidence of kidney and testicular tumors in rats, and lung and liver tumors in mice. EPA has classified ethyl benzene as a Group D, not classifiable as to human carcinogenicity.

Hexane

Hexane is used to extract edible oils from seeds and vegetables, as a special-use solvent, and as a cleaning agent. Acute (short-term) inhalation exposure of humans to high levels of hexane causes mild central nervous system (CNS) effects, including dizziness, giddiness, slight nausea, and headache. Chronic (long-term) exposure to hexane in air is associated with polyneuropathy in humans, with numbness in the extremities, muscular weakness, blurred vision, headache, and fatigue observed. Neurotoxic effects have also been exhibited in rats. No information is available on the carcinogenic effects of hexane in humans or animals. EPA has classified hexane as a Group D, not classifiable as to human carcinogenicity.

Toluene

The acute toxicity of toluene is low. Toluene may cause eye, skin, and respiratory tract irritation. Short-term exposure to high concentrations of toluene (e.g., 600 ppm) may produce fatigue, dizziness, headaches, loss of coordination, nausea, and stupor; 10,000 ppm may cause death from respiratory failure. Ingestion of toluene may cause nausea and vomiting and central nervous system depression. Contact of liquid toluene with the eyes causes temporary irritation. Toluene is a skin irritant and may cause redness and pain when trapped beneath clothing or shoes; prolonged or repeated contact with toluene may result in dry and cracked skin. Because of its odor and irritant effects, toluene is regarded as having good warning properties. The chronic effects of exposure to toluene are much less severe than those of benzene. No carcinogenic effects were reported in animal studies. Equivocal results were obtained in studies to determine developmental effects in animals. Toluene was not observed to be mutagenic in

standard studies. The major use of toluene is as a mixture added to gasoline to improve octane ratings. Toluene is also used to produce benzene and as a solvent in paints, coatings, synthetic fragrances, adhesives, inks, and cleaning agents. Toluene is also used in the production of polymers used to make nylon, plastic soda bottles, and polyurethanes and for pharmaceuticals, dyes, cosmetic nail products, and the synthesis of organic chemicals.

Xylene

Commercial or mixed xylene usually contains about 40-65% *m*-xylene and up to 20% each of *o*-xylene and *p*-xylene and ethyl benzene. Xylenes are released into the atmosphere as fugitive emissions from industrial sources, from auto exhaust, and through volatilization from their use as solvents. Acute (short-term) inhalation exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, eye irritation, and neurological effects. Chronic (long-term) inhalation exposure of humans to mixed xylenes results primarily in central nervous system (CNS) effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported. EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity. Mixed xylenes are used in the production of ethylbenzene, as solvents in products such as paints and coatings, and are blended into gasoline.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates compliance with all state and federal air quality requirements will be satisfied and this facility is expected to meet the requirements of General Permit G35-A. Therefore Dominion's request to for a modification to their G35-A registration and operate Cassity Mountain natural gas compressor facility is recommended to the Director of Air Quality.

David Keatley
Permit Writer - NSR Permitting

September 4, 2015

Date