



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2866
Plant ID No.: 001-00100
Applicant: Dominion Transmission, Inc.
Facility Name: Pepper Station
Location: Philippi, Barbour County
SIC Code: 4922 Natural Gas Transmission
Application Type: Construction
Received Date: November 8, 2010
Engineer Assigned: David Keatley
Fee Amount: \$2,000
Date Received: November 8, 2010
Complete Date: February 21, 2011
Due Date: May 22, 2011
Applicant Ad Date: November 10, 2010
Newspaper: *The Exponent Telegram*
UTM's: Easting: 574.20 km Northing: 4,337.79 km Zone: 17
Description: The applicant proposes to construct one (1) compressor engine, one (1) auxiliary generator set, a glycol dehydration unit, and installing a flare. Proposed installation is scheduled for August 2011. The existing facility did not have a Rule 13 permit and included two (2) compressor engines, and five tanks.

DESCRIPTION OF PROCESS

Higher water vapor lower pressure natural gas will enter one of three natural gas fired engines that will compress the natural gas to a higher pressure. The new Caterpillar Model G3606LE DM-5433-04 is a four-stroke lean-burn engine that is rated for 1,775 hp and will have an oxidation catalyst to reduce CO emissions. The Generac power systems auxiliary generator set will have a three-way catalyst to reduce VOCs, NO_x, and CO. The compressed natural gas then enters the bottom of the contact tower of the glycol dehydration unit. Lean triethylene glycol (TEG) enters the contact tower at the top and absorbs most of the water vapor from the natural gas. The rich TEG leaves the bottom of the contact tower. The rich TEG stream is then sent to a flash tank where volatiles are piped back to the compressor suction header. From the flash

tank the rich TEG is sent to the regenerator (RSV-1) where stripping gas is added to help evaporate the water and convert the rich TEG back to lean TEG. The gases that come off the still vent are combusted in the flare (F1). Natural gas is also combusted in the reboiler (RBV-1) which raises the temperature of the rich TEG to encourage the evaporation of water in the regenerator.

SITE INSPECTION

Lou Ann Lee of DAQ's Compliance and Enforcement Section out of the North Central Regional Office. Conducted a site visit of Pepper Station on January 25, 2011.

Directions to the facility from Charleston are the following. Take I79 N until exit 115 (Nutterfork) and go east on SR20 E. Take SR 20 E for about 6 miles turning onto SR57 E for about 10 miles. From SR57 turn onto CR18 (Stewarts Run). Take CR18 N until turning onto CR7 (Brushy for Road). Station is about a mile on the right of Brushy Fork.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
EN03	Caterpillar G3606LE Compressor Engine	Total Particulate Matter	0.001	0.0045
		PM-10	0.001	0.0045
		Sulfur Dioxide	0.0079	0.0346
		Nitrogen Oxides	1.96	8.57
		Carbon Monoxide	2.153	9.427
		Volatile Organic Compounds	0.8609	3.771
		Formaldehyde	0.8609	3.7707
EN04	Generac Auxiliary Generator Set	Total Particulate Matter	0.031	0.0033
		PM-10	0.0126	0.0032
		Sulfur Dioxide	0.0008	0.0002
		Nitrogen Oxides	0.0366	0.0092
		Carbon Monoxide	0.6491	0.1623
		Volatile Organic Compounds	0.1531	0.0383
		Formaldehyde	0.0271	0.00677
RSV1	Glycol Dehydrator Regenerator Still Vent	Volatile Organic Compounds	1.284	5.624
		Hexane	0.033	0.1445
		Toluene	0.0948	0.4152
		Xylene	0.1932	0.8462

RBV1	Glycol Dehydrator Reboiler Vent	Total Particulate Matter	0.0089	0.039
		PM-10	0.0030	0.0131
		Sulfur Dioxide	0.0009	0.0039
		Nitrogen Oxides	0.2466	1.080
		Carbon Monoxide	0.1507	0.6601
		Volatile Organic Compounds	0.1164	0.5098
F1	Ground Level Flare	Nitrogen Oxides	0.443	1.94
		Carbon Monoxide	0.358	1.568
		Total Particulate Matter	0.0713	0.3123

REGULATORY APPLICABILITY

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

The Glycol Dehydrator Regenerator (RSV1) at this facility meets the definition for fuel burning unit (section 2.10). This heater is less than 10 mmBTU and is exempt from the following sections: 4,5,6,8, and 9.

The reboiler will have to meet a 10 percent opacity limit. Visible emission monitoring will be required.

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

The facility is subject to the requirements of 45CSR4 and shall not allow the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.

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

From section 2.7 this facilities ground level flare (F1) meets the definition of an incinerator and is therefore subject to applicable Rule 6 requirements. From section 4.1 the maximum allowable total particulate matter emission rate is 1.30 lb/hr. This facilities potential to emit of total particulate matter (0.07 lb/hr) is well below this threshold. The opacity limit for the emergency flare is 20%.

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 facility is subject to 45CSR13 because this source would emit at least 6 lb/hr and 10 tons/year of total particulate matter (any uncontrolled regulated air pollutant).

45CSR16 - *Standards of Performance for New Stationary Sources Pursuant to 40CFR60*

45CSR16 incorporates by reference the standards of performance for new stationary sources (40CFR60). Pepper Station is subject to 40CFR60 Subpart JJJJ, and is therefore subject to 45CSR16.

45CSR22 - *Air Quality Management Fee Program*

The facility is subject to the requirements of 45CSR22 and shall pay fees according to the application fee schedule. The proper application fee (\$1,000 for construction application fee and \$1,000 for additional NSPS fee) \$2,000 was received on November 8, 2010.

45CSR30 - *Requirements for Operating Permits*

Dominion's Pepper Station exceeds the 100 ton/yr threshold for NO_x and is therefore subject to 45CSR30 as a major source. Pepper Station will be required to keep their Certificate to Operate current.

40CFR60 Subpart JJJJ - *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*

40CFR60 Subpart JJJJ sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject spark ignition internal combustion engine. This subpart applies to engine EN03 because it will be manufacturer on or after July 1, 2007 and emergency engine EN04 will be manufactured on or after January 1, 2009 and exceeds 25 hp. Engine EN03 will have to meet the following emission standards: NO_x 1.0 g/hp-hr, CO 2.0 g/hp-hr, and VOC 0.7 g/hp-hr. Engine EN04 will have to meet the following emission standards: NO_x 2.0 g/hp-hr, CO 4.0 g/hp-hr, and VOC 1.0 g/hp-hr. The emissions standards will have to be met over the entire life of the engine. EN03 will have to be tested, however EN04 is certified and has no testing requirements.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Formaldehyde

Formaldehyde is used mainly to produce resins used in particleboard products and as an intermediate in the synthesis of other chemicals. Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute (short-term) and chronic (long-term) inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal

squamous cell cancer. EPA considers formaldehyde a probable human carcinogen (Group B1).

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.

AIR QUALITY IMPACT ANALYSIS

Based on the annual emissions rates this facility will not be a major source as defined by 45CSR14, so no air quality impact analysis was performed.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates Dominion's natural gas compressor station meets all the requirements of applicable rules and regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Barbour County location should be granted a 45CSR13 construction permit for their facility.

David Keatley
Engineer

Date