



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.: R13-2866A
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: April 18, 2012
Engineer Assigned: David Keatley
Fee Amount: \$2,000
Date Fee Received: April 18, 2012
Complete Date: June 12, 2013
Due Date: September 12, 2013
Applicant Ad Date: April 21, 2012
Newspaper: *The Exponent Telegram*
UTM's: Easting: 574.20 km Northing: 4,337.79 km Zone: 17
Description: The applicant proposes to remove an emergency generator engine EN04 from the permit. The applicant proposes to install a different 530 bhp generator engine.

DESCRIPTION OF PROCESS

Higher water vapor lower pressure natural gas will enter one of three (3) compressors that will compress the natural gas to a higher pressure. The compressors are powered by three (3) compressor engines. EN03 an existing Caterpillar Model G3606LE DM-5433-04 is a four-stroke lean-burn engine is rated for 1,775 hp and will have an oxidation catalyst to reduce CO emissions. The proposed Cummins KTA19G generator set is a certified four-stroke lean-burn natural gas fired 530 bhp engine and a date of manufacture of May 2, 2012. The emergency generator set will be used for back up power when electric power from the local utility is interrupted. 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 of the contactor and absorbs water vapor from the natural gas stream. 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 flashed 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 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. This facility will also have six (6) tanks.

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

The emissions from TK09 include working, breathing, and flash losses. The flash losses were estimated using the Vasquez-Beggs Solution and totaled 0.11 tons/year. The working and breathing losses were estimated using TANKS 4.0.9d and totaled 0.07 tons/year.

The emissions factors for EN05 from the engine manufacture are in g/hp-hr are: VOC, 0.18; NOx, 1.45; CO, 1.50; and CO₂, 462.3. EN05 is considered an emergency engine and will be limited to 500 hours of operation per calendar year.

The emissions from the other tanks were considered negligible due to the combination of small tank size and low vapor pressure of tank contents.

The following table lists the additional proposed controlled estimated air emissions:

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
EN05	Cummins Generator Set KTA19G	Total Particulate Matter	0.05	0.02
		PM-10	0.05	0.02
		Nitrogen Oxides	1.69	0.42
		Carbon Monoxide	1.75	0.44
		Volatile Organic Compounds	0.21	0.05
		Formaldehyde	0.26	0.07
		CO ₂ e	540	135
TK09	Hydrocarbon Tank	Volatile Organic Compounds	0.04	0.18

This represents an overall facility increase in tons per year of: VOC, 0.19; CO, 0.27; NOx, 0.41; PM, 0.02; PM10, 0.02; and formaldehyde 0.06.

REGULATORY APPLICABILITY

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.

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 has an engine 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 April 20, 2012.

45CSR30 - *Requirements for Operating Permits*

With this application Dominion's Pepper Station will be less than the 100 ton/yr threshold for NOx and is therefore not subject to 45CSR30 as a major source. In addition subpart JJJJ does not make this facility Title V deferred. 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. 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. EN05 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. EN05 is a certified engine. The emissions standards for both engines will have to be met over the entire life of the engine. Since the emission standards from Cummins are above the non-emergency emission standards (NO_x 1.0 g/hp-hr, CO 2.0 g/hp-hr, and VOC 0.7 g/hp-hr) for NO_x and CO a non-resettable hour meter must be installed.

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.

Xylenes

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 Pepper 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 modification permit for their facility.

David Keatley
Engineer

Date