



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2891
Plant ID No.: 033-00191
Applicant: Enerven Compression Services, LLC (Enerven)
Facility Name: Jarvisville Compressor Station
Location: Jarvisville, Harrison County
NAICS Code: 486210
Application Type: Modification
Received Date: July 27, 2011
Engineer Assigned: Jerry Williams, P.E.
Fee Amount: \$1,000.00
Date Received: July 27, 2011
Complete Date: August 25, 2011
Due Date: November 23, 2011
Applicant Ad Date: July 29, 2011
Newspaper: *The Exponent Telegram*
UTM's: Easting: 545.997 km Northing: 4343.608 km Zone: 17
Description: Modification of a natural gas compressor station consisting of the addition of four (4) natural gas compressor engines and one (1) TEG dehydration unit. This permitting action will supersede and replace G35-A041 issued on January 10, 2011.

DESCRIPTION OF PROCESS

The following process description was taken from Permit Application R13-2891:

Natural gas from the field gathering system enters the station through the slug catcher and gas scrubber. It is directed through the compressors where it is pressurized and then dehydrated in the TEG dehydrator before discharge into the sales pipeline for transport. A portion of the gas is drawn off before the sales outlet and is used to fuel the compressors and other gas-powered equipment.

Gas flows from field gathering and production enters the compressor station through an inlet scrubber at 50 psig. Free liquids that are entrained in the gas stream fall out in this scrubber and are transferred to the liquid storage tanks. Gas then flows to the first stage suction bottle of each compressor, where it is compressed and cooled through three stages of compression. After each stage of compression, gas is cooled. This dynamic will condense free liquid. Condensed liquid is then dropped out in the suction scrubbers before each stage. These suction scrubbers dump to the liquid storage tanks. After compression, gas flows to the dehydration skids at 900 psig where it is dehydrated down to pipeline water content specifications. The dehydration units will collect any free liquid that is not cooked off. The liquid is dumped to the liquid storage tanks. Gas then flows through a sales meter and into the sales pipeline.

The facility will have seven (7) storage tanks. Two (2) 200 bbl tanks to hold water and other system drains from the facility, three (3) 1,000 gallon tanks (one (1) for bulk oil storage, one (1) for bulk glycol (TEG) storage, and one (1) for engine coolant), one (1) 1,000 gallon tanks for oily system drains, and one (1) 500 gallon tank for low pressure system drains. The emissions from these tanks are expected to be negligible.

The nine (9) natural gas compressor engines (CE-1 – CE-9) will be using an air pollution control device that is a fuel additive. This additive is injected into the engines first to saturate the system and create an equilibrium condition. This process takes about two (2) weeks, during which the air/fuel ratio controller is detached to allow the NO_x setting to be lowered below where the engine would normally operate. During this process the engines will be monitored periodically to ensure the NO_x and other pollutant levels are at or below the expected levels. Once the desired condition is achieved, the air/fuel ratio controller is reattached and set using the new condition. Once this occurs, the engine will be unable to function above the NO_x setting (which is the reason this additive becomes a controlling air pollution control device). Enerven has proposed to continue normal operation once the saturated condition exists with standard periodic monitoring using installed instrumentation.

SITE INSPECTION

A site inspection was conducted on September 27, 2011 by Lou Ann Lee of the NCRO.

Directions as given in the permit application are as follows:

From Highway 50, go south on Sycamore Road for approx. 3.5 miles. As Sycamore Road makes a hard left turn, turn right onto C/R 31/3. Travel approx. 1.25 miles, but at the first intersection, bear left, staying on 31/3. At approximately 1.25 miles continue bearing right on the dirt road and continue another approx. 0.5 miles. Site is on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Maximum controlled point source emissions from Enerven's Jarvisville Compressor Station are summarized in the table below.

Before R13-2891

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
CE-1	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	4.45	19.48
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-2	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	4.45	19.48
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-3	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	4.45	19.48
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-4	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	4.45	19.48
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-5	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	4.45	19.48
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
RBV-1	Glycol Dehydrator Reboiler	Nitrogen Oxides	0.05	0.20
		Carbon Monoxide	0.04	0.17
		Volatile Organic Compounds	<0.01	0.01
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter-10	<0.01	<0.01
RSV-1	Glycol Dehydrator Regenerator Still Vent	Volatile Organic Compounds	0.05	0.21
		Benzene	<0.01	0.01
		Ethylbenzene	0.01	0.02
		Toluene	0.01	0.05
		Xylenes	0.02	0.11

		n-Hexane	<0.01	<0.01
RBV-2	Glycol Dehydrator Reboiler	Nitrogen Oxides	0.05	0.20
		Carbon Monoxide	0.04	0.17
		Volatile Organic Compounds	<0.01	0.01
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter-10	<0.01	<0.01
RSV-2	Glycol Dehydrator Regenerator Still Vent	Volatile Organic Compounds	0.05	0.21
		Benzene	<0.01	0.01
		Ethylbenzene	0.01	0.02
		Toluene	0.01	0.05
		Xylenes	0.02	0.11
		n-Hexane	<0.01	<0.01

After R13-2891

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
CE-1	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	1.48	6.49
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-2	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	1.48	6.49
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-3	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	1.48	6.49
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-4	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	1.48	6.49
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-5	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	1.49	6.48
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07

CE-6	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	1.49	6.48
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-7	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	1.49	6.48
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-8	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	1.49	6.48
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
CE-9	1,340 bhp Caterpillar G3516LE Compressor Engine	Nitrogen Oxides	1.49	6.48
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	0.11	0.48
		Particulate Matter -10	<0.01	<0.01
		Formaldehyde	0.02	0.07
RBV-1	Glycol Dehydrator Reboiler	Nitrogen Oxides	0.05	0.20
		Carbon Monoxide	0.04	0.17
		Volatile Organic Compounds	<0.01	0.01
		Sulfur Dioxide	0.01	0.04
		Particulate Matter-10	<0.01	<0.01
RSV-1	Glycol Dehydrator Regenerator Still Vent	Volatile Organic Compounds	0.05	0.20
		Benzene	<0.01	<0.01
		Ethylbenzene	<0.01	<0.01
		Toluene	<0.01	<0.01
		Xylenes	<0.01	<0.01
		n-Hexane	<0.01	<0.01
RBV-2	Glycol Dehydrator Reboiler	Nitrogen Oxides	0.05	0.20
		Carbon Monoxide	0.04	0.17
		Volatile Organic Compounds	<0.01	0.01
		Sulfur Dioxide	0.01	0.04
		Particulate Matter-10	<0.01	<0.01
RSV-2	Glycol Dehydrator Regenerator Still Vent	Volatile Organic Compounds	0.05	0.20
		Benzene	<0.01	<0.01
		Ethylbenzene	<0.01	<0.01
		Toluene	<0.01	<0.01
		Xylenes	<0.01	<0.01
		n-Hexane	<0.01	<0.01
RBV-3	Glycol Dehydrator Reboiler	Nitrogen Oxides	0.15	0.66
		Carbon Monoxide	0.13	0.55
		Volatile Organic Compounds	0.01	0.04
		Sulfur Dioxide	<0.01	<0.01

		Particulate Matter-10	<0.01	<0.01
RSV-3	Glycol Dehydrator Regenerator Still Vent	Volatile Organic Compounds	<0.01	0.03
		Benzene	<0.01	<0.01
		Ethylbenzene	<0.01	<0.01
		Toluene	<0.01	<0.01
		Xylenes	<0.01	<0.01
		n-Hexane	<0.01	<0.01
NA	Blowdown Exhaust	Volatile Organic Compounds	NA	23.96
		Hazardous Air Pollutants	NA	0.07
FUG	Fugitive Emissions	Volatile Organic Compounds	NA	0.38

The following table represents the proposed control devices at the Jarvisville Compressor Station:

Control Device ID	Control Device	Emission Unit	Pollutant	Control Efficiency
1C	Selective Catalytic Reduction (SCR)	CE-1 – CE-9	Carbon Monoxide	98 %
			Volatile Organic Compounds	87 %
			Formaldehyde	98 %
2C	BTEX Condenser	RSV-1, RSV-2, RSV-3	Volatile Organic Compounds	98 %
			Hazardous Air Pollutants	98 %
3C	Fuel Borne Catalyst	CE-1 – CE-9	Nitrogen Oxides	0.5 g/hp-hr

The emission changes associated with this application are shown in the following table:

Pollutant	Annual Emissions Before R13-2891 (tons/year)	Annual Emissions After R13-2891 (tons/year)	Emissions Change (tons/year)
Nitrogen Oxides	97.80	59.50	-38.30
Carbon Monoxide	3.04	5.19	2.15
Volatile Organic Compounds	16.54	28.76	12.22
Particulate Matter-10	0.02	0.15	0.13
Sulfur Dioxide	0.01	0.01	0
Formaldehyde	0.35	0.60	0.25

REGULATORY APPLICABILITY

The following rules apply to the facility:

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

Enerven would be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

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. No odors have been deemed 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)

45CSR13 applies to this source due to the fact that the modification that Enerven has proposed is not covered under General Permit G35-A. Therefore, in order to permit the use of a chemical fuel treatment to control NO_x emissions from the compressor engines, Enerven is required to obtain a 45CSR13 modification permit.

45CSR22 (Air Quality Management Fee Program)

Enerven is not subject to 45CSR30. They are required to keep their Certificate to Operate (CTO) current on an annual basis.

The following regulations do not apply to the facility:

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

All of Enerven's reciprocating internal combustion engines (CE-1 – CE-9) are lean burn engines that were manufactured before January 1, 2008. Therefore, these engines are not subject to 40CFR60 Subpart JJJJ.

40CFR63 Subpart ZZZZ (National Emission Standards for Reciprocating Ignition Internal Combustion Engines)

40CFR63 Subpart HH (National Emission Standards for Hazardous Air Pollutants: Oil and Natural Gas Production and National Emission Standards for Hazardous Air Pollutants: Natural Gas Transmission and Storage)

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

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, Subpart HH and 40 CFR 63, Subpart ZZZZ.

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. These final rules implement section 112 of the Clean Air Act (Act) and are based on the Administrator's determination that oil and natural gas production and natural gas transmission and storage facilities emit HAP identified on the EPA's list of 188 HAPs.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Various non-criteria regulated pollutants are emitted from the incomplete combustion of natural gas. However, these emissions should not adversely impact the quality of the surrounding ambient air at the concentrations, discharge rates, and point of introduction into the atmosphere as described in the permit application.

The gas wells that feed this processing facility are not owned by Enerven. This facility is not contiguous or adjacent with any other facility that would be associated with it. Therefore, the emissions from any other facility would not be aggregated with this facility.

AIR QUALITY IMPACT ANALYSIS

The changes to this facility do not constitute a major modification under 45CSR14. Based on the nature of the emissions and the annual emission rate, no air quality analysis was performed. However, air dispersion modeling will be required if the Director finds existing circumstances and/or submitted data that provide cause for an assessment to be made concerning whether this facility 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.

MONITORING OF OPERATIONS

Enerven will be required to perform the following monitoring:

1. Monitor and record quantity of natural gas consumed for all combustion sources.

Enerven will be required to perform the following recordkeeping:

1. Maintain records of the amount of natural gas consumed in each combustion source.
2. 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
3. Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
4. Maintain records of the visible emission opacity tests conducted per the permit.
5. 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.
6. The records shall be maintained on site or in a readily available off-site location maintained by Enerven for a period of five (5) years.

Enerven will be required to perform the following testing:

1. Perform an initial operational test prior to fuel additive admission to provide a baseline level.
2. Perform quarterly testing following the first (3) month testing period to ensure continued compliance.

RECOMMENDATION TO DIRECTOR

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

Jerry Williams, P.E.
Engineer

Date