



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2891A
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: October 17, 2011
Engineer Assigned: Jerry Williams, P.E.
Fee Amount: \$2,000.00
Date Received: October 17, 2011, October 27, 2011
Complete Date: November 7, 2011
Due Date: January 5, 2012
Applicant Ad Date: October 17, 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 three (3) natural gas compressor engines and one (1) TEG dehydration unit. This permitting action will supersede and replace R13-2891.

DESCRIPTION OF PROCESS

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

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.

This application includes an additional inlet header. This gives the operators the option of which source of gas they line up to the different compression equipment. The different expansion phases run in a common header out of the scrubbers, but header split valves provide the option of splitting the header for operational flexibility. Three (3) additional compressor engines have been added, along with one (1) TEG dehydration unit, BTEX unit and associated production equipment. No additional tanks have been added.

The twelve (12) natural gas compressor engines (CE-1 – CE-12) 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. The facility was operating in compliance at that time.

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.

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
	1,340 bhp	Nitrogen Oxides	1.49	6.48

CE-8	Caterpillar G3516LE Compressor Engine	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
CE-10	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
CE-11	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
CE-12	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
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
RSV-1	Glycol Dehydrator Regenerator Still Vent	Particulate Matter-10	<0.01	<0.01
		Volatile Organic Compounds	0.05	0.20
		Benzene	<0.01	<0.01
		Ethylbenzene	<0.01	<0.01
		Toluene	<0.01	<0.01
RBV-2	Glycol Dehydrator Reboiler	Xylenes	<0.01	<0.01
		n-Hexane	<0.01	<0.01
		Nitrogen Oxides	0.05	0.20
		Carbon Monoxide	0.04	0.17
		Volatile Organic Compounds	<0.01	0.01
RSV-2	Glycol Dehydrator Regenerator Still Vent	Sulfur Dioxide	0.01	0.04
		Particulate Matter-10	<0.01	<0.01
		Volatile Organic Compounds	0.05	0.20
		Benzene	<0.01	<0.01
		Ethylbenzene	<0.01	<0.01
RSV-2	Glycol Dehydrator Regenerator Still Vent	Toluene	<0.01	<0.01
		Xylenes	<0.01	<0.01
		n-Hexane	<0.01	<0.01
		Volatile Organic Compounds	0.05	0.20
		Benzene	<0.01	<0.01

RBV-3	Glycol Dehydrator Reboiler	Nitrogen Oxides	0.14	0.60
		Carbon Monoxide	0.12	0.50
		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
RBV-4	Glycol Dehydrator Reboiler	Nitrogen Oxides	0.10	0.40
		Carbon Monoxide	0.08	0.34
		Volatile Organic Compounds	0.01	0.03
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter-10	<0.01	<0.01
RSV-4	Glycol Dehydrator Regenerator Still Vent	Volatile Organic Compounds	0.02	0.07
		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	31.94
		Hazardous Air Pollutants	NA	0.07
FUG	Fugitive Emissions	Volatile Organic Compounds	NA	0.55

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-12	Carbon Monoxide	98 %
			Volatile Organic Compounds	87 %
			Formaldehyde	98 %
2C	BTEX Condenser	RSV-1, RSV-2, RSV-3, RSV-4	Volatile Organic Compounds	98 %
			Hazardous Air Pollutants	98 %
3C	Fuel Borne Catalyst	CE-1 – CE-12	Nitrogen Oxides	0.5 g/hp-hr

The emission changes associated with this application include the addition of three (3) natural gas compressor engines (CE-10 – CE-12) and one (1) TEG dehydration unit (RBV-4, RSV-4) shown in the above table. The new facility wide emissions are shown in the following table:

Pollutant	Annual Emissions Before R13-2891A (tons/year)	Annual Emissions After R13-2891A (tons/year)	Emissions Change (tons/year)
Nitrogen Oxides	59.50	79.32	19.82
Carbon Monoxide	5.19	7.64	2.45
Volatile Organic Compounds	28.76	38.52	9.76
Particulate Matter-10	0.15	0.15	0
Sulfur Dioxide	0.01	0.32	0.31
Formaldehyde	0.60	0.80	0.20

REGULATORY APPLICABILITY

The following rules apply to the facility:

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

The purpose of 45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers) is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units.

45CSR2 classifies the glycol dehydration reboilers (RSV1-4) as a ‘type b’ unit. The allowable PM emission rate for the glycol dehydration reboilers (RSV1-4) would be the product of 0.09 and the total design heat input of the reboilers (0.5 MMBTU/hr). This equates to a maximum allowable PM emission rate of 0.05 lb/hr. According to Enerven’s permit application, the proposed PM emission rate is <0.01 lb/hr. Therefore, Enerven would meet this rule.

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.

45CSR10 (To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides)

The purpose of this rule is to establish standards for emissions of sulfur oxides from fuel burning units, manufacturing operations and gas streams.

45CSR10 classifies the glycol dehydration reboilers (RSV1-4) as a 'type b' unit. The allowable SO₂ emission rate for the glycol dehydration reboilers (RSV1-4) would be the product of 3.1 and the total design heat input of the reboilers (0.5 MMBTU/hr). This equates to a maximum allowable SO₂ emission rate of 1.55 lb/hr. According to Enerven's permit application, the proposed SO₂ emission rate is <0.01 lb/hr. Therefore, Enerven would meet this rule. Furthermore, 45CSR10A exempts fuel burning units that combust natural gas from testing and monitoring requirements.

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 Enerven currently has draft permit R13-2891 currently at public notice. Draft Permit R13-2891 was publicly noticed on October 14, 2011. The changes requested in Permit application R13-2891A in conjunction with draft permit R13-2891 results in an emissions increase above 45CSR13 modification thresholds. Therefore, they are required to obtain a 45CSR13 modification permit. In addition, two (2) of the three (3) engines that Enerven has proposed are subject to 40CFR60 Subpart JJJJ, which would also make them subject to a substantive requirement of an emission control rule.

45CSR16 (Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60)

45CSR16 applies to this source by reference of 40CFR60, Subpart JJJJ. Enerven is subject to the recordkeeping, monitoring, and testing required by 40CFR60 Subpart JJJJ.

45CSR30 (Requirements for Operating Permits)

This permitting action does not affect 45CSR30 applicability, the source is a non-major source subject to 45CSR30. The facility is not subject to the permitting requirements of 45CSR30 and is classified as a deferred source.

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

Enerven has twelve (12) reciprocating internal combustion engines at the Jarvisville facility. Engines (CE-1 – CE-10) are lean burn engines that were manufactured before January 1, 2008. Therefore, these engines are not subject to 40CFR60 Subpart JJJJ. However, two (2) of the proposed engines (CE-11, CE-12) were manufactured on June 2, 2008 and June 16, 2008. Therefore, these engines are subject to 40CFR60 Subpart JJJJ, which sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine.

The two (2) proposed 1,340 hp engines (CE-11 – CE-12) will be subject to this rule. The emission limits for these engines are the following: NO_x – 2.0 g/hp-hr (5.91 lb/hr); CO – 4.0 g/hp-hr (11.82 lb/hr); and VOC – 1.0 g/hp-hr (2.96 lb/hr). Based on the manufacturer’s specifications for these engines, the emission standards will be met.

Because these engines will not be certified by the manufacturer, Enerven will be required to perform an initial performance test within 180 days from startup, and subsequent testing every 8,760 hours or 3 years, whichever comes first.

The following regulations do not apply to the facility:

45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

Pollutant	PSD (45CSR14) Threshold (tpy)	NANSR (45CSR19) Threshold (tpy)	NPP PTE (tpy)	45CSR14 or 45CSR19 Review Required?
Carbon Monoxide	250	NA	7.64	No
Nitrogen Oxides	250	NA	79.32	No
Sulfur Dioxide	250	NA	0.32	No
Particulate Matter 10	250	NA	0.15	No
Ozone (VOC)	250	NA	38.52	No

40CFR63 Subpart JJJJJ (National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources)

This rule applies to all existing and new industrial boilers, institutional boilers, and commercial boilers located at area sources. There are no requirements for natural gas fired units.

The following regulations may apply to the facility:

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.

AIR QUALITY IMPACT ANALYSIS

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.

SOURCE AGGREGATION DETERMINATION

“Building, structure, facility, or installation” is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

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.

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