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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-3084
Plant ID No.: 103-00041
Applicant: Williams Ohio Valley Midstream LLC
Facility Name: Nice Station
Location: Wetzel County
NAICS Code: 211111
Application Type: Modification
Received Date: June 4, 2013
Engineer Assigned: David Keatley
Fee Amount: \$2,000
Date Fee Received: June 6, 2013
Complete Date: September 13, 2013
Due Date: December 12, 2013
Applicant Ad Date: December 12, 2012
Newspaper: *Wetzel Chronicle*
UTM's: Easting: 514.870 km Northing: 4,391.039 km Zone: 17
Description: Compared to what is currently installed at this facility the following changes will result. Installation of a new compressor engine, removal of an existing compressor engine, removal of two (2) triethylene glycol (TEG) dehydration units, and installation of a greater capacity TEG dehydration unit.

DESCRIPTION OF PROCESS

This facility compresses natural gas to a higher pressure and reduces the water vapor content of the natural gas stream. The facility has two (2) compressors which raise the pressure of the natural gas stream to approximately 900 psi. The existing compressor engine CE-01 is a 1,340 bhp four-stroke lean-burn Caterpillar 3516 LE. The proposed compressor engine CE-02 is a 1,380 bhp four-stroke lean-burn Caterpillar 3516B. CE-02 has an EMIT oxidation catalyst to reduce the emissions of carbon monoxide, volatile organic compounds (VOCs), and formaldehyde. The compressor engines combusts natural gas and compresses the natural gas stream to 900 psi. After

compression the natural gas stream is sent to the TEG dehydration units contractor. In the contractor the natural gas stream will flow countercurrent to TEG reducing the water vapor of the natural gas stream to 7 lbs H₂O/MMscf. The water latent (rich TEG) TEG is sent to a flash tank to remove volatile hydrocarbons. The vapors from the flash tank will be used as fuel for the reboiler with a 95% destruction efficiency. The liquid from the flash tank then flows to the regenerator to reduce the water content of the TEG. Dry natural gas will be used as a stripping gas in the regenerator. A 1.50 MMBTU/hr Reboiler (RBV-1) will heat the regenerator to liberate water and other hydrocarbons from the TEG. The vapors from the regenerators still vent will first go to a condenser to remove most of the water vapor and then is sent to reboiler RBV-1 to be used as fuel. The lean (dry) TEG can then be sent back to the contractor.

SITE INSPECTION

A site inspection was conducted on April 14, 2011 by Steve Sobotka of DAQ NPRO. The site was deemed appropriate for this kind of facility.

Directions as given in the permit application are as follows:

From the junction of State Route 2 and County Route 3 (North Street) in New Martinsville, proceed east on Route 3 approximately 1 mile. Turn left onto CR 3/1 (Slop Hollow Road). Proceed on this road approximately 2.4 miles to a roadway on the left leading to Lewis Wetzel Park. The site is approximately 0.7 miles towards the park on the left.

ESTIMATE OF EMISSIONS

Emissions for the proposed reboiler are estimated using emission factors from AP-42. The emission factor from AP-42 in lb/1,000,000 scf are: NO_x, 100; CO, 84; VOC, 5.5; and PM, 7.6.

Emissions from the proposed regenerator were estimated using GRI-GLYCalc. The maximum dry gas flow rate is 60 MMCF/day. Vapors from the flash and still vent will be used as fuel in the reboiler.

The following table summarizes the estimated controlled emissions:

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
CE-1	Compressor Engine Caterpillar G3516 LE 1,340 bhp	NO _x	5.91	25.88
		CO	5.49	24.07
		VOC	1.54	6.73
		SO ₂	0.01	0.03
		PM	0.11	0.49
		PM ₁₀	0.11	0.49
		Formaldehyde	0.77	3.36

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Williams Ohio Valley Midstream LLC
Nice Station

		CO ₂ e	1,531	6,706
CE-2	Compressor Engine Caterpillar G3516B 1,380	NO _x	1.52	6.66
		CO	0.52	2.27
		VOC	0.56	2.45
		SO ₂	0.01	0.03
		PM	0.11	0.50
		PM ₁₀	0.11	0.50
		Formaldehyde	0.27	1.17
		CO ₂ e	1,675	7,424
RSV-1	TEG Dehydrator Still Vent and Flash Tank 60 MMscf/day	VOC	5.88	25.77
		Benzene	0.04	0.19
		Ethylbenzene	0.03	0.13
		n-Hexane	0.11	0.49
		Toluene	0.11	0.50
		Xylenes	0.14	0.61
		CO ₂ e	256	1,122
RBV-1	Reboiler 1.5 MMBTU/hr	NO _x	0.16	0.72
		CO	0.14	0.60
		VOC	0.01	0.04
		PM	0.02	0.06
		PM ₁₀	0.02	0.06
		CO ₂ e	195	854
SSM	Startup, Shutdown, Maintenance	VOC	-	28.56
		n-Hexane	-	0.95
		Benzene	-	0.10
		Toluene	-	0.10
		Ethylbenzene	-	0.10
		Xylenes	0.01	0.06
		CO ₂ e	-	1,690
FUG	Process Fugitive Emissions	VOC	0.91	3.97
		n-Hexane	0.04	0.16
		Benzene	<0.01	0.02
		Toluene	<0.01	0.02
		Ethylbenzene	<0.01	0.02
		Xylenes	0.01	0.06
CO ₂ e	-	334		

The following table represents the facility wide total emissions and the change in emissions:

Pollutant	Emissions (Before) tons/year	Emissions (After) tons/year	Change in Emissions tons/year
Nitrogen Oxides	46.13	33.26	12.87
Carbon Monoxide	45.26	26.94	18.31
Volatile Organic Compounds	10.51	67.52	56.16
Particulate Matter-10	0.83	1.05	0.19
Sulfur Dioxide	0.05	0.06	0.01
Formaldehyde	4.21	4.54	0.33
Benzene	0.08	0.32	0.27
Ethylbenzene	0.09	0.24	0.15
Toluene	0.07	0.63	0.56
n-Hexane	0.06	1.68	1.62
Xylenes	0.17	1.06	0.89
Carbon Dioxide Equivalent	11,734	18,130	6,396

REGULATORY APPLICABILITY

45CSR2 - To Prevent and Control 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 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 4 (weight emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The heat input of all of the proposed fuel burning unit RBV-1 (1.5 MMBTU/hr) is below 10 MMBTU/hr. Therefore, this unit are exempt from the aforementioned sections of 45CSR2. However, RBV-1 is 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*

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.

45CSR10 - *To Prevent and Control Air Pollution From the Emissions of Sulfur Oxides The Reboilers*

45CSR10 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 3 (weight emission standard), 6 (registration), 7 (permits), and 8 (testing, monitoring, recordkeeping, reporting). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The heat input of all of the proposed fuel burning unit RBV-1 (1.5 MMBTU/hr) are below 10 MMBTU/hr. Therefore, this unit are exempt from the aforementioned sections of 45CSR10.

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 changes proposed under this permitting action results in an emissions increase above permitting thresholds (6 lb/hr and 10 tons/year). Therefore, Williams is required to submit a modification application. Williams has published the required Class I legal advertisement notifying the public of their permit application.

45CSR22 - *Air Quality Management Fee Program*

This facility is a minor source, not subject to 45CSR30, and the NSPS are Title V exempt. This facility is required to keep their Certificate to Operate current. Williams paid a \$1,000 construction application fee and \$1,000 NSPS fee. Since this facility has a total reciprocating engine capacity of less than 1,000 hp (2,720 hp) this facility is subject to 8D with an annual fee of \$500.

40 CFR 63 Subpart HH (*National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities*)

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart HH. Nice Station is a natural gas production facility that processes, upgrades, or stores natural gas prior to transmission. Nice Station is an area source of HAPs refer to the previous facility wide emissions table.

Pursuant to §63.760(b)(2), each glycol dehydration unit (GDU) located at an area source that meets the requirements under §63.760(a)(3) is defined as an affected facility under Subpart HH. The requirements for affected sources at area sources are given under §63.764(d). However, for a GDU, exemptions to these requirements are given under §63.764(e)(2) “actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram [1 TPY] per year.”

As shown above, the maximum PTE of benzene emissions from the GDU process vent is 0.19 TPY. Therefore, the GDU is exempt from the Subpart HH requirements given under §63.764(d).

40CFR60 Subpart OOOO (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution)

EPA issued its new source performance standards (NSPS) and air toxics rules for the oil and gas sector on April 17, 2012. 40CFR60 Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO₂) emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011. The following affected sources which commence construction, modification or reconstruction after August 23, 2011 are subject to the applicable provisions of this subpart:

- a. Each reciprocating compressor affected facility, which is a single reciprocating compressor located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. For the purposes of this subpart, your reciprocating compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A reciprocating compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

There will be two (2) reciprocating compressor associated with CE-1 and CE-2 at this facility. The compressor associated with CE-1 was constructed before the effective date of this regulation and therefore is not subject. The compressor associated with CE-2 was constructed after the effective date of this regulation and is therefore subject. Requirements will include replacing rod packing systems, recordkeeping, and reporting.

- b.
 1. Each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh which commenced construction after August 23, 2011, and is located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment and not located at a natural gas processing plant.
 2. Each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller which commenced construction after August 23, 2011, and is located at a natural gas processing plant.

The pneumatic controllers at this facility will be intermittent or will vent less than 6 scf/hr and therefore this facility is not subject to this section of this regulation.

40CFR63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines)

Subpart ZZZZ establishes national emission limitations and operating limitations for HAPs emitted from stationary RICE located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations. The Nice Station is subject to the area source requirements and has non-emergency spark ignition engines.

Engine CE-1 and CE-2 are "New Stationary RICE" sources at an area source of HAPs and are affected source because construction will commence after June 12, 2006 [63.6590(a)(2)(iii)] due to the manufacture's dates of the engines.

This regulation states engine CE-1 and CE-2 must meet the requirements of 40CFR60 subpart JJJJ, but has no additional requirements due to this regulation.

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

Both engines (CE-1 and CE-2) are subject to 40CFR60 Subpart JJJJ because construction was after June 12, 2006; and engine CE-1 was manufactured after January 1, 2008 (lean-burn greater than 500 bhp and less than 1,350 bhp) and CE-2 was manufactured after July 1, 2007 (above 1,350 bhp).

[40CFR60.4230(4)]

40CFR60.4248 Table 1 provides the allowable emission standards for stationary spark ignition internal combustion engines. Engine CE-1 is a non-emergency, with $1,350 < \text{hp} \leq 500$, and manufactured after January 1, 2008 the allowable emission standards in g/hp-hr are: 2.0 for NO_x , 4.0 for CO, and 1.0 for VOC. Engine CE-2 is a non-emergency $\text{hp} \geq 500$ manufacturer date after July 1, 2010 the allowable emission standards in g/hp-hr are: 1.0 for NO_x , 2.0 for CO, and 0.7 for VOC. The engines will also have

operating limits, performance tests, notification requirements, and recordkeeping requirements.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The following information was obtained from USEPA's Air Toxic Website.

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.

Toluene

Toluene is added to gasoline, used to produce benzene, and used as a solvent. Exposed to toluene may occur from breathing ambient or indoor air. The central nervous system (CNS) is the primary target organ for toluene toxicity in both humans and animals for acute (short-term) and chronic (long-term) exposures. CNS dysfunction and narcosis have been frequently observed in humans acutely exposed to toluene by inhalation; symptoms include fatigue, sleepiness, headaches, and nausea. CNS depression has been reported to occur in chronic abusers exposed to high levels of toluene. Chronic inhalation exposure of humans to toluene also causes irritation of the upper respiratory tract and eyes, sore throat, dizziness, and headache. Human studies have reported developmental effects, such as CNS dysfunction, attention deficits, and minor craniofacial and limb anomalies, in the children of pregnant women exposed to toluene or mixed solvents by inhalation. Reproductive effects, including an association between exposure to toluene and an increased incidence of spontaneous abortions, have also been noted. However,

these studies are not conclusive due to many confounding variables. EPA has classified toluene 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.

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.

CHANGES TO PERMIT G35-A052B

R13-3084 will supercede and replace G35-A052B. Compared to what is currently installed at this facility the following changes will result. Installation of a new compressor engine (1,380 bhp), removal of an existing compressor engine, removal of two (2) triethylene glycol (TEG) dehydration units (one (1) 10 MMscf/day and one (1) 20 MMscf/day), and installation of a greater capacity TEG (60 MMscf/day) dehydration unit.

RECOMMENDATION TO DIRECTOR

Williams's request for a Modification to Nice Station near New Martinsville, Wetzel County, WV site should meet all applicable requirements and therefore should be granted.

David Keatley
Permit Writer

Date