



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.: R13-3096
Plant ID No.: 051-00170
Applicant: Williams Ohio Valley Midstream LLC
Facility Name: Siburt Station
Location: Marshall County
NAICS Code: 213112
Application Type: Construction
Received Date: June 21, 2013
Engineer Assigned: David Keatley
Fee Amount: \$2,000
Date Received: June 26, 2013
Complete Date: September 11, 2013
Due Date: December 10, 2013
Applicant Ad Date: June 21, 2013
Newspaper: *Moundsville Daily Echo*
UTM's: Easting: 527.44 km Northing: 4,417.595 km Zone: 17
Description: Installation of three (3) compressor engines, one (1) triethylene glycol (TEG) dehydration unit, and one (1) produced water tank.

DESCRIPTION OF PROCESS

Natural gas enters the facility via pipeline. Three (3) compressors will raise the pressure of the natural gas stream to approximately 1,000 psig. The three (3) compressors will be powered by three (3) natural gas fired engines. Engine CE-1 is a 203 bhp four-stroke rich-burn Caterpillar G3306 TA. The emissions from CE-1 will be controlled with a Maxim three-way catalyst reducing the emissions of NO_x by 88% and CO by 76%. Engine CE-2 is a 68 bhp four-stroke rich-burn Arrow VRG-330 A-54. Engine CE-3 is a 95 bhp four-stroke rich-burn Caterpillar G3304 NA. The emissions from CE-3 will be controlled with a Murphy NSCR catalyst reducing NO_x by at least 96.1% and CO by at least 84.7%. After compression the natural gas stream is sent to the TEG dehydration unit to reduce the water vapor content to 5 lb H₂O/MMscf of natural gas. 5 MMscf/day of natural gas and 1.5 gallons/minute of lean TEG flow countercurrent to each other in a contactor.

After dehydration the natural gas stream leaves the facility via pipeline. The rich (water latent) TEG is sent to a flash tank to allow the lighter hydrocarbons to vaporize. At least 50% of the flash tank vapors will be used as fuel in the reboiler. The liquids from the flash tank flow to the regenerator. The regenerator is heated by reboiler RBV-1 and water and hydrocarbons exit the regenerator still vent. The TEG can then be sent back to the contactor.

SITE INSPECTION

Steven Sobotka from DAQ's Compliance and Enforcement Section performed a site visit on July 17, 2013. This site is adjacent to a well pad operated by Chevron Appalachia called Siburt Pad. Siburt Pad has existing equipment compressor(s) and dehydration units. Siburt Station is on relatively remote farm land with the nearest residence more than 500 feet.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions for CE-1, CE-2 and CE-3 were estimated from Caterpillar & Arrow emission factors and AP-42 emission factors.

Emissions for RSV-1 were estimated with GRI-GLYCalc 4.0 with a representative extended gas analysis from Caveney Station which is also in Marshall County. RSV-1 is the combined emissions from the regenerator and flash tank. There was a 20% contingency on the emissions from RSV-1.

Reboiler and truck loadout emissions use AP-42 factors to estimate emissions.

Flash Emissions for the produced water tanks were obtained from ProMax; and the working and breathing losses were estimated with EPA-450/3-85-001a.

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 G3306 TA 203 bhp	NO _x	0.89	3.90
		CO	1.78	7.80
		VOC	0.17	0.73
		SO ₂	<0.01	0.01
		PM	0.04	0.16
		PM ₁₀	0.04	0.16
		Formaldehyde	0.11	0.49
		CO _{2,e}	238	1,044
CE-2	Compressor Engine Arrow VRG-330 A-54 68 bhp	NO _x	2.16	9.46
		CO	2.44	10.70
		VOC	0.01	0.03
		PM	0.01	0.05

		PM ₁₀	0.01	0.05
		Formaldehyde	0.01	0.06
		CO ₂ e	78	342
CE-3	Compressor Engine Caterpillar G3304 NA 95 bhp	NO _x	0.11	0.46
		CO	0.42	1.84
		VOC	0.12	0.51
		PM	0.02	0.07
		PM ₁₀	0.02	0.07
		Formaldehyde	0.06	0.25
		CO ₂ e	114	499
		VOC	13.27	58.13
RSV-1	TEG Dehydrator Still Vent and Flash Tank 5 MMscf/day	Benzene	0.14	0.61
		Ethylbenzene	0.14	0.61
		n-Hexane	0.22	0.95
		Toluene	0.62	2.72
		Xylenes	1.30	5.70
		CO ₂ e	270	1,181
RBV-1	Reboiler 0.2 MMBTU/hr	NO _x	0.02	0.10
		CO	0.02	0.08
		VOC	<0.01	0.01
		PM	<0.01	0.01
		PM ₁₀	<0.01	0.01
		CO ₂ e	26	114
T01	Produced Fluids Tank 8,820 gallons	VOC	0.02	0.21
TLO	Truck Loadout 106,000 gallons/year	VOC	-	0.25
		Benzene	-	0.01
SSM	Startup, Shutdown, and Maintenance	VOC	-	7.73
		Benzene	-	0.02
		Ethylbenzene	-	0.03
		n-Hexane	-	0.23
		Toluene	-	0.02
		CO ₂ e	-	404
FUG	Process Piping Fugitives	VOC	1.09	4.76
		Benzene	<0.01	0.01
		Ethylbenzene	<0.01	0.01
		n-Hexane	0.03	0.13
		Toluene	<0.01	0.01
		CO ₂ e	-	333

The following table represents the estimated total controlled facility wide emissions:

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)
Nitrogen Oxides	13.92
Carbon Monoxide	20.41
Volatile Organic Compounds	72.35
Particulate Matter	0.29
PM ₁₀	0.29
Sulfur Dioxide	0.01
Formaldehyde	0.80
Benzene	0.70
n-Hexane	1.31
Toluene	2.77
Xylenes	5.85
Total HAPs	12.18
Carbon Dioxide Equivalent	3,923

REGULATORY APPLICABILITY

The following rules and regulations apply to this 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 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 (0.2 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)

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 (0.2 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. Therefore, Williams is required to submit a construction application. Williams has published the required Class I legal advertisement notifying the public of their permit application.

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

45CSR16 incorporates by reference the standards of performance for new stationary sources (40CFR60). This facility has one (1) storage vessel subject to 40CFR60 Subpart OOOO, and is therefore this facility is subject to 45CSR16.

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 (366 hp) this facility is subject to 9M with an annual fee of \$200.

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. Siburt Station is a natural gas production facility that processes, upgrades, or stores natural gas prior to transmission. Siburt 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 0.61 TPY. Therefore, the GDU is exempt from the Subpart HH requirements given under §63.764(d).

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 Siburt Station is subject to the area source requirements for non-emergency spark ignition engines.

Engine CE-1 is a "New Stationary RICE" source at an area source of HAPs and is an affected source because construction will commenced after June 12, 2006 [63.6590(a)(2)(iii)] due to the manufacturer's date (DOM April 27, 2008) of the engine. This regulation states engine CE-1 must meet the requirements of 40CFR60 subpart JJJJ, but this engine will have no requirements due to the manufacture date of the engine being before July 1, 2008 causing it to not be subject to 40CFR60 subpart JJJJ.

Engine CE-2 is a "New Stationary RICE" source at an area source of HAPs and is an affected source because construction will commenced after June 12, 2006 [63.6590(a)(2)(iii)] due to the manufacture's date (DOM May 2011) of the engine. This regulation states engine CE-2 must meet the requirements of 40CFR60 subpart JJJJ.

Engine CE-3 is a "New Stationary RICE" source at an area source of HAPs and is an affected source because construction will commenced after June 12, 2006 [63.6590(a)(2)(iii)] due to the manufacture's date (DOM May 12, 2007) of the engine.

This regulation states engine CE-3 must meet the requirements of 40CFR60 subpart JJJJ, but this engine will have no requirements due to the manufacture date of the engine being before July 1, 2008 causing it to not be subject to 40CFR60 subpart JJJJ.

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 three (3) reciprocating compressor associated with CE-1, CE-2 and CE-3 at this facility. These compressors will be delivered after to the effective date of this regulation. However these compressors were installed at a different facility prior to August 23, 2011 and this therefore this section of the regulation does not apply.

- 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.

- c. Each storage vessel affected facility, which is a single storage vessel, located in the oil and natural gas production segment, natural gas processing segment or natural gas transmission and storage segment.

40CFR60 Subpart OOOO defines a storage vessel as a unit that is constructed primarily of nonearthen materials (such as wood, concrete, steel, fiberglass, or plastic) which provides structural support and is designed to contain an accumulation of liquids or other materials. The following are not considered storage vessels:

1. Vessels that are skid-mounted or permanently attached to something that is mobile (such as trucks, railcars, barges or ships), and are intended to be located at a site for less than 180 consecutive days. If the source does not keep or are not able to produce records, as required by §60.5420(c)(5)(iv), showing that the vessel has been located at a site for less than 180 consecutive days, the vessel described herein is considered to be a storage vessel since the original vessel was first located at the site.
2. Process vessels such as surge control vessels, bottoms receivers or knockout vessels.
3. Pressure vessels designed to operate in excess of 204.9 kilopascals and without emissions to the atmosphere.

This rule requires that the permittee determine the VOC emission rate for each storage vessel affected facility utilizing a generally accepted model or calculation methodology within 30 days of startup, and minimize emissions to the extent practicable during the 30 day period using good engineering practices. For each storage vessel affected facility that emits more than 6 tpy of VOC, the permittee must reduce VOC emissions by 95% or greater within 60 days of startup.

Tank T01 will be constructed after August 23, 2011 and is an affected facility based on 40CFR60.5365(e). Tank T01 located at this facility will emit less than 6 tpy of VOC (40CFR60.5395) without controls (0.25 tons/year) and therefore this section of this regulation is applicable. Recordkeeping requirements will be kept [40CFR60.5420(b)(6)(ii) and 40CFR60.5420(c)(5)(ii)].

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

Engine CE-2 is subject to 40CFR60 Subpart JJJJ because construction was after June 12, 2006 and engine CE-2 was manufactured after July 1, 2008 (DOM May 2011).

[40CFR60.4230(4)]

40CFR60.4233(d) states that the emission standards for engines greater than 25 bhp and less than 100 hp are listed in §1048.101(c). Engine CE-2 will also have operating limits, performance tests, notification requirements, and recordkeeping requirements.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Fact Sheet R13-3096
Williams Ohio Valley Midstream LLC
Siburt Station

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.

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).

AIR QUALITY IMPACT ANALYSIS

Based on the annual emission rates this facility will not be a major source as defined by 45CSR14, so air quality modeling was not performed.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates this natural gas site should meet the applicable requirements. It is recommended that Williams's proposed Siburt Station should be granted a 45CSR13 construction permit for their facility.

David Keatley
Permit Writer

Date