



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-3215
Plant ID No.: 085-00039
Applicant: Antero Midstream LLC
Facility Name: West Mountain Station
Location: Pennsboro, Ritchie County
NAICS Code: 221210
Application Type: Construction
Received Date: October 1, 2014
Engineer Assigned: Laura Jennings
Fee Amount: \$4,500
Date Received: October 2, 2014
Complete Date: December 9, 2014
Due Date: March 9, 2015
Applicant Ad Date: October 1, 2014
Newspaper: *The Pennsboro News*
UTM's: Easting: 501.859 km Northing: 4,352.404 km Zone: 17
Coordinates: Longitude: - 80.978431 Latitude: 39.321042
Description: New construction of the West Mountain Compressor Station.

DESCRIPTION OF PROCESS

The proposed West Mountain Compressor Station will be located in Ritchie County, WV. Gas from surrounding pipelines will enter the facility through one (1) receiver and associated slug catcher. From there, the gas is metered and routed through a scrubber and filter separator. Any produced liquids from the scrubber or separator are sent to the 500 barrel settling tank (TK-9000). Gas from the filter separator is sent to one (1) of eleven (11) 1680 hp Waukesha compressor engines (C2100 - C-2200). The eleven (11) compressor engines are controlled with NSCR catalysts and air-fuel ratio controllers (1C-11C). Produced fluids are routed to the settling tank and gas going to one of the two (2) TEG dehydrators.

Each TEG dehydrator (V-3110 & V-3210) contains a flash gas tank and 1.5 MMBtu/hr reboiler. Each dehydrator has a design rate of 60 Mmscf/day. Within the dehydrator unit, vent gas from the flash gas tank (V-3120 & V-3220) is routed to the reboiler (F-

3100 & F-3200) and used as fuel, with an assumed 95% efficiency for combusting the gas. Emissions from each reboiler are routed to the atmosphere. The dehydrator still vents (V-3110 & V-3210) are controlled by a flare with at least 98% control efficiency (FL-8300). Produced fluids from the dehydrator are routed to the settling tank. The dry gas from the dehydration process is either routed to a fuel gas scrubber, metered, and routed to the compressors as fuel gas or metered and sent to facility discharge.

All produced fluids enter one (1) 500 barrel settling tank (TK-9000) where the fluids settle out as either condensate or produced water. The produced water goes to two (2) 400 barrel produced water tanks (TK-9100 - TK-9110) and the condensate goes to two (2) 400 barrel condensate tanks (TK-9200 - TK-9210). Flashing only occurs at the settling tank as the fluids stabilize in the settling tank before going to the other storage tanks. All five (5) tanks are connected to a primary vapor recovery unit (VRU-6000) where tank vapors are collected and recycled back into the gas system right before the initial filter scrubber. A second vapor recovery unit (VRU-6100) is used as back-up to the primary vapor recovery unit. Each vapor recovery unit (VRU-6000 and VRU-6100) is electric-driven with a power rating of 30 horsepower. The produced fluids are trucked out via tanker trucks as needed (LDOUT1). The loading emissions are uncontrolled. The anticipated production is 150 barrels per day of condensate and 45 barrels per day of produced water.

Three (3) natural gas microturbine generators, each rated at 200 kWe, will supply power to the facility (G-8000 - G-8200). The fuel line for the generators will be heated by a small catalytic heater (CATHT1) that burns natural gas as fuel and has a burner rating of 24 Btu/hr.

There will also be small storage tanks (1,000 to 2,000 gallons) located at the facility. Their ID number, description, and exact size are provided in the emission units table.

Fugitive emissions from component leaks and emissions from venting or blowdown events will also occur.

Emission Units Table:

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type and Date of Change	Control Device
C-2100	1E	Compressor Engine #1 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (1C)
C-2110	2E	Compressor Engine #2 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (2C)
C-2120	3E	Compressor Engine #3 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (3C)
C-2130	4E	Compressor Engine #4 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (4C)

C-2140	5E	Compressor Engine #5 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (5C)
C-2150	6E	Compressor Engine #6 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (6C)
C-2160	7E	Compressor Engine #7 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (7C)
C-2170	8E	Compressor Engine #8 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (8C)
C-2180	9E	Compressor Engine #9 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (9C)
C-2190	10E	Compressor Engine 10 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (10C)
C-2200	11E	Compressor Engine 11 Waukesha L7044GSI	2015	1,680 hp	New	NSCR (11C)
G-8000	12E	Microturbine Generator 1 Capstone C200	2015	200 kW _e	New	None
G-8100	13E	Microturbine Generator 2 Capstone C200	2015	200 kW _e	New	None
G-8200	28E	Microturbine Generator 3 Capstone C200	2015	200 kW _e	New	None
V-3110	14E	Dehydrator Still Vent #1 (Valerus)	2015	60 MMscfd	new	12C
V-3120	15E	Dehydrator Flash Tank #1	2015	60 MMscfd	new	F-3100
F-3100	16E	Dehydrator Reboiler #1	2015	1.5 MMBtu/ hr	New	None
V-3210	17E	Dehydrator Still Vent #2 (Valerus)	2015	60 MMscfd	New	12C
V-3220	18E	Dehydrator Flash Tank #2	2015	60 MMscfd	New	F-3200
F-3200	19E	Dehydrator Reboiler #2	2015	1.5 MMBtu/ hr	New	None
TK-9000	20E	Settling Tank 1	2015	500 barrel	New	13C, 14C VRU-6000 & - 6100
TK-9200	21E	Condensate Tank 1	2015	400 barrel	New	13C, 14C VRU-6000 & - 6100
TK-9210	22E	Condensate Tank 2	2015	400 barrel	New	13C, 14C VRU-6000 & - 6100

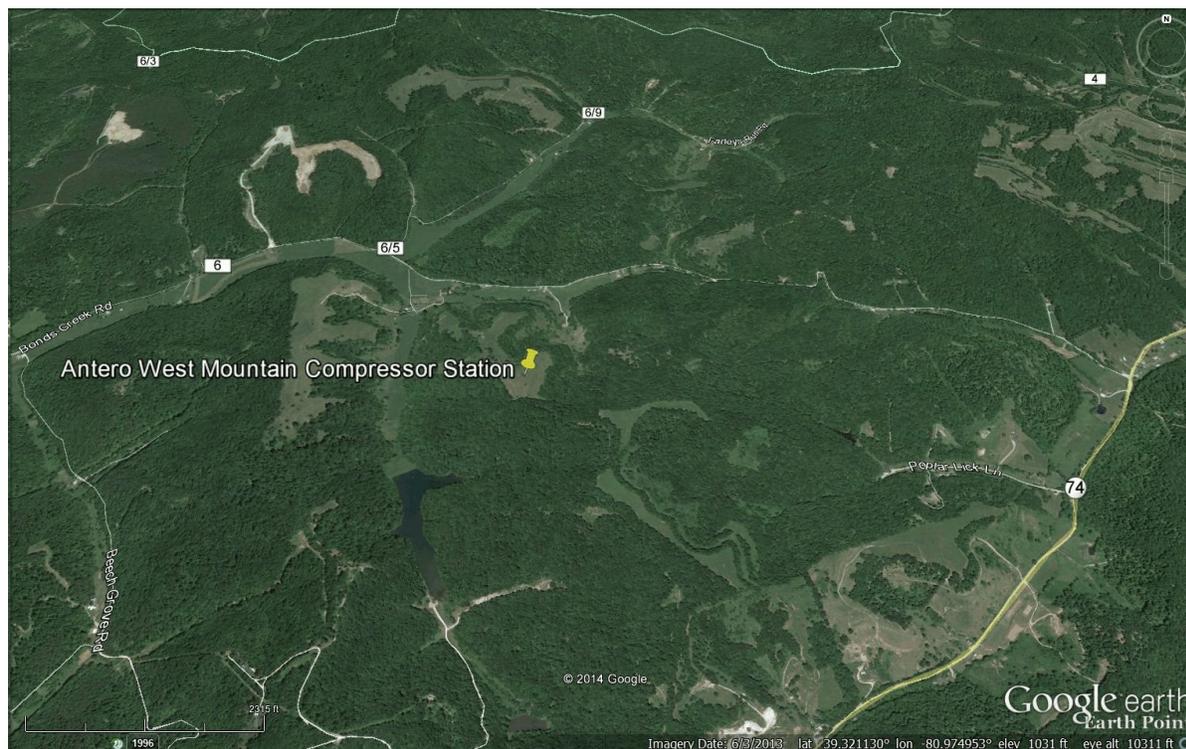
TK-9100	23E	Produced Water Tank 1	2015	400 barrel	New	13C, 14C
TK-9110	24E	Produced Water Tank 2	2015	400 barrel	New	13C, 14C
LDOUT1	25E	Produced Fluids Truck Loadout	2015	2.30 MMgal/yr	New	None
FL-8300	26E	Shielded Flare (Superior Fabrication)	2015	4.8 MMBtu/hr	New	12C
CATHT1	27E	Catalytic Heater for Generator Fuel (Bruest HotCat; Model 8000)	2015	0.024 MMBtu/ hr	New	None
TK-9300	n/a	Compressor Skid Oily Water Tank	2015	500 gallons	New	None
TK-9320	n/a	Compressor Skid Oily Water Tank	2015	500 gallons	New	None
TK-9310	n/a	Used Oil Tank	2015	500 gallons	New	None
TK-9330	n/a	Used Oil Tank	2015	500 gallons	New	None
TK-9400	n/a	Compressor Waste Oil Tank	2015	4,200 gallons	New	None
TK-9410	n/a	TEG Make-Up Tank	2015	1,000 gallons	New	None
TK-9420	n/a	Compressor Coolant Tank	2015	2,000 gallons	New	None
TK-9430	n/a	Engine Oil Tank	2015	2,000 gallons	New	None
TK-9440	n/a	Compressor Lube Oil Tank	2015	2,000 gallons	New	None
Control Devices						
Control Device ID	Control Device Description		Year Installed	Design Capacity	Control Efficiency	
1C - 11C	NSCR Catalyst for Compressors #1-11 (Emit Technologies ELH-4200-1616F-6CEE-362/RT-3615-T)		2015	n/a	NOX - 96% CO - 96% VOC - 50% HCHO - 76%	
12C	Shielded Flare FL-8300 (Superior Fabrication)		2015	4.8 MMBtu/ hr	VOC - 98% Total HAPs - 98%	
13C	Hybon Vapor Recovery Unit 6000		2015	30 hp	VOC - 98% Total HAPs - 98% Methane - 98%	

14C	Hybon Vapor Recovery Unit 6100	2015	30 hp	VOC - 98% Total HAPs - 98% Methane - 98%
F-3100	Dehydrator Reboiler #1	2015	1.5 MMBtu/ hr	VOC - 95% Total HAP - 95%
F-3200	Dehydrator Reboiler #2	2015	1.5 MMBtu/ hr	VOC - 95% Total HAP - 95%

SITE INSPECTION

A site inspection was conducted by James Robertson of DAQ's Compliance and Enforcement Section on November 18, 2014. Using the directions provided in the permit application, he was unable to locate the entrance road to the site off Route 74 and commented that he did not think that the entrance road has been started at this time.

Using the facility coordinates listed in the application and visited the general area of the site. Given the relatively remote location of the proposed site and its distance to the nearest dwelling, it is his opinion that this site would be suitable for a compressor facility.



Directions from the application:

From Pennsboro, WV, head southeast on Collins Avenue. Turn left onto Main street and then the first right onto Wells Avenue. Make a slight right onto WV-74N and continue for 1.7 miles. Turn left onto facility entrance

Lattitude and Longitude from legal ad are: 39.321042N,- 80.978431W

AGGREGATION ANALYSIS

New Source Review for major source determinations includes consideration of the aggregation of related sources. A three-pronged test is used to evaluate whether related sources should be aggregated. The three prongs are SIC code, contiguous and adjacent, and common control.

The closest Antero Midstream LLC operated facilities are a compressor station located approximately 2.60 miles northeast of the proposed facility.

SIC CODE: The West Mountain Compressor Station will operate under SIC code 4922 (pipeline transportation of natural gas). The closest facility owned by Antero Midstream LLC with this SIC code is a compressor station 2.6 miles north east of the facility. All Antero Resources Corporation production facilities operate under the SIC code of 1311 (crude petroleum of natural gas).

CONTIGUOUS OR ADJACENT: The land between the West Mountain Compressor Station and its nearest facility operating under the same SIC code is not owned or managed by Antero Midstream LLC. Therefore, the facilities are not considered to be adjacent or continuous.

COMMON CONTROL: Only those facilities that are owned and managed by Antero are included in the aggregation discussion. This includes Antero Resources Corporation production facilities in addition to the Antero Midstream LLC midstream facilities.

Based on this three-pronged evaluation, DAQ concludes that there are no existing or proposed compressor stations that meet all three aggregation criteria relative to the subject facility. Therefore, DAQ concludes that no other facilities should be aggregated with this facility for purposes of air permitting.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emission calculations were calculated by the applicant and reviewed for accuracy by the writer. A discussion of the emission calculations and the potential emissions table follows.

The compressors of the vapor recovery units are electric and have no associated emissions.

Compressor Engines [C-2100 thru C-2200]. Manufacturer's emission factors were used to calculate the NO_x, CO, VOC, and Formaldehyde emissions. EPA's AP-42 emission factors for RB4S engines were used to calculate SO₂, PM₁₀, and total HAP emissions. Calculations were based on an engine rating of 1680 bhp. The non selective catalyst control efficiencies used in the calculations are: > 96% NO_x, > 96% CO, > 50% VOC, and > 76% HCHO (formaldehyde). The hazardous air pollutants other than formaldehyde are also VOC's and are therefore reduced by 50%. Annual emissions for the compressor engines are based on 90% of the operating hours (NO_x, CO, VOC, and Formaldehyde) or 90% of the fuel usage for SO₂, PM₁₀, and total HAP.

Microturbines [GEN-1 and GEN-2]. Manufacturer's emission factors were used to calculate NO_x, CO, VOC, and CO₂ emissions. Emission factors are based on natural gas @ 1,000 BTU/scf (HHV).

Catalytic Heater for Generator Fuel [CATHT1]. Emissions were calculated using emission factors from AP-42, Chapter 1.4.

TEG Dehydration Unit Still Vents and Flash Tank Gas [V-3110/ V-3210, V-3120/V-3220]. Emissions were calculated using GRI-GLYCalc 4.0 and a dry gas flow rate of 60.0 Mmscf/day. Flash tank gas is used in the reboiler as the primary fuel source. A destruction efficiency of 95% was used for the flash tank gas emissions that will be routed to the reboiler. Emissions from the still vent are controlled with a condenser and routed to a shielded flare [12C] with a minimum destruction efficiency of 98%. The applicant provided the manufacturer's certification performance test for the enclosed flare demonstrating the minimum destruction efficiency used in the calculations.

Glycol Dehydration Unit Reboilers [F-3100 and F-3200]. AP-42, Section 1.4 emission factors were used to calculate the emissions. The burner rating for each reboiler is 1.5 MMBTU/hr and the fuel consumption used in the calculations was 16.1 MMscf/yr with a fuel heat value of 1,020 BTU/scf.

Storage Tanks. Working and Breathing losses were calculated using EPA's TANKS 4.09 simulation. Flashing losses from the settling tank were calculated with the ProMax simulation. The combined annual throughput of the produced water tanks [Tanks 9100 and 9110] used in the calculations was 689,850gal/yr. The combined annual throughput of the condensate tanks [Tanks 9200 and 9210] used in the calculations was 2.30 MMgal/yr. The annual combined throughput of the settling tank [Tank 9000] used in the calculations is the total throughput from the produced water and the condensate tanks. The miscellaneous storage tanks for oils, TEG, etc. have negligible emissions.

Vapors from storage tanks [9000, 9100, 9110, 9200, and 9210] are routed to a vapor recovery unit. The primary VRU is VRU-6000 (13C) and the back-up VRU is VRU-6100 (14C). The applicant has claimed 98% capture with the VRU system. DAQ follows the guidance provided by TCEQ regarding VRU capture/control. The additional requirements that have been designed into the system for the applicant to claim over 95% capture/control efficiency are discussed below. An additional 1% efficiency is

allowed for each of the design elements.

- Both VRUs have automatic monitoring, shutdown, and alert systems. These systems are fitted with sensors that detect temperature, pressure, liquid levels, suction pressure, and motor overload.
- VRU-6000 is the primary VRU to collect storage tank vapors and VRU-6100 is the backup VRU in times when the primary VRU is undergoing maintenance or is shutdown. This ensures that the facility's storage tank vapors are continuously captured and controlled. In the unlikely event that both VRU-6000 and VRU-6100 are under maintenance or are shutdown, a bypass system is in place to route tank vapors to the facility inlet.
- The compressor of the VRU is equipped to recover both wet and dry gas from the storage tanks and has a variable frequency drive (VFD) to adapt the VRU compressor's operating speed as needed for varying environmental pressures and temperatures.

Tank Truck Loading [LDOUT1]. Condensate and Produced Water loading emissions are based on EPA, AP-42, Section 5.2 (Emissions from loading petroleum liquid), Equation 1. HAP emissions are based on the weight percent HAP from the gas analysis for proportion of VOC estimated emissions. The annual throughput used in the calculations was 2.30 MMgal/yr (150 bbl/day production) of condensate and 690,000 gal/yr (45 bbl/day production) of produced water. The tank truck loading emissions are not routed to a control device; therefore, the controlled and uncontrolled potential emissions are the same.

Fugitive Emissions.

The estimated number of events and venting per event from engineering based on other facilities. Compressor blowdown are based on 12 blowdowns per year per compressor engine. The total number of compressor startups based on 12 starts per compressor. Plant shutdown and pigging venting emissions are also included.

Component counts are from engineering lists. Emission factors for leaks are taken from EPA 1995 Protocol for Equipment Leak Emission Estimates, Table 2-4, Oil and Gas Production Operations Average Emission Factors. Gas and liquid weight fractions are from representative analysis from a nearby facility. The component count used in the calculations are: 836 flanges in gas service; 250 valves in gas service; 33 compressor seals in gas service; 175 flanges in liquid service; and 42 valves in liquid service.

Greenhouse Gases. Global Warming Potentials were obtained from 40 CFR 98, Subpart A, Table A-1. Combustion emission factors are from 40 CFR 98, Subpart C, Tables C-1 and C-2. The CO₂ and CH₄ emissions from engines C-2100 thru C-2200 were provided in the manufacturer data sheets. The microturbine CO₂ emission factor was provided by the manufacturer.

Emissions Summary Table:

Emission Point ID	Emission Unit ID	Control Device ID	Regulated Pollutant	Maximum Potential Uncontrolled Emissions		Maximum Potential Controlled Emissions	
				lb/hr	tpy	lb/hr	tpy
1E thru 11E	C-2100 thru C-2200 (Total)	1C thru 11C	NO _x	554.07	2,427	22.11	87.23
			CO	521.51	2,284	20.90	82.06
			VOC	16.72	73.23	8.36	32.89
			SO ₂	0.09	0.33	0.09	0.33
			PM ₁₀ / PM _{2.5}	2.97	11.66	2.97	11.66
			Acetaldehyde	0.44	1.65	0.44	1.65
			Acrolein	0.44	1.54	0.44	1.54
			Benzene	0.22	0.99	0.22	0.99
			Methanol	0.44	1.87	0.44	1.87
			Formaldehyde	2.09	9.15	0.44	1.87
			Total HAPs	3.85	16.86	2.31	9.13
CO _{2e}	22,913	100,359	22,484	88,484			
12E, 13E, 28E	G-8000 thru G-8200 (Total)	None	NO _x	0.24	1.05	0.24	1.05
			CO	0.66	2.88	0.66	2.88
			VOC	0.06	0.27	0.06	0.27
			SO ₂	0.03	0.09	0.03	0.09
			PM ₁₀ / PM _{2.5}	0.03	0.18	0.03	0.18
			Total HAPs	0.01	0.03	0.01	0.03
			CO _{2e}	798	3,498	798	3,498
14E, 17E	V-3110/ V-3210 (Total)	12C	VOC	40.66	178.06	0.82	3.56
			Benzene	1.56	6.82	0.04	0.14
			Toluene	3.48	15.26	0.06	0.30
			n-Hexane	1.52	6.64	.04	0.14
			Total HAP	7.48	32.80	.14	0.66
			CO _{2e}	904	3,960	18.60	81

15E, 18E	V-3120/ V-3220 (Total)	F-3100 F-3200	VOC	77.48	339.34	3.88	16.96
			n-Hexane	3.20	14.04	0.16	0.70
			Benzene	0.12	0.50	0.01	0.02
			Total HAP	3.48	15.20	0.18	0.76
			CO ₂ e	3,890	17,038	198	866
16E, 19E	F-3100 F-3200 (Total)		NO _x	0.36	1.62	0.36	1.62
			CO	0.30	1.36	0.30	1.36
			VOC	0.02	0.08	0.02	0.08
			SO ₂	<0.01	0.01	<0.01	0.01
			PM ₁₀ / PM _{2.5}	0.02	0.12	0.02	0.12
			Formaldehyde	<0.01	<0.01	<0.01	<0.01
			Total HAPs	0.01	0.04	0.01	0.04
			CO ₂ e	352	1,542	352	1,542
20E	TK-9000	13C/ 14C	VOC	90.83	397.83	1.82	7.96
			Total HAP	7.25	31.74	0.14	0.63
			CO ₂ e	250	1,096	5.20	23
21E, 22E	TK-9200/ TK-9210 (Total)	13C/ 14C	VOC	1.30	5.72	0.03	0.12
			HAP	0.10	0.46	<0.01	0.01
			CO ₂ e	3.66	16.04	0.08	0.32
23E, 24E	TK-9100/ TK-9110 (Total)	13C/ 14C	VOC	0.08	0.36	<0.01	0.01
			HAP	0.01	0.03	<0.01	<0.01
			CO ₂ e	0.22	1.00	<0.01	0.01
26E	FL-8300	12C	NO _x	0.33	1.44	0.33	1.44
			CO	1.78	7.79	1.78	7.79
			CO ₂ e	563	2,465	563	2,465
27E	CATHT1	None	NO _x	<0.01	0.01	<0.01	0.01
			CO	<0.01	0.01	<0.01	0.01
			CO ₂ e	2.82	12	2.82	12
29E	LDOUT1	None	VOC	46.22	4.56	46.22	4.56
			HAP	3.76	0.37	3.76	0.37
			CO ₂ e	130	12.79	130	12.79

Fugitive Emissions:

Fugitive Emissions Description	Regulated Pollutant	Maximum Potential Uncontrolled Emissions
		tpy
Equipment Leaks	VOC	3.91
	BTEX HAPs	<0.01
	CO ₂ e	85.45
Other - Vented	VOC	8.15
	BTEX HAPs	<0.01
	CO ₂ e	691

Total Facility Emissions Table:

Regulated Pollutant	Maximum Potential Controlled Emissions Without Fugitives		45CSR30 Major Source Threshold	45CSR14 Major Source Threshold	Maximum Potential Controlled Emissions With Fugitives	
	lb/hr	tpy	tpy	tpy	lb/hr	tpy
NO _x	23.10	91.32	100 tpy	250 tpy	23.10	91.32
CO	23.61	94.12	100 tpy	250 tpy	23.61	94.12
SO ₂	0.11	0.46	100 tpy	250 tpy	0.11	0.46
PM _{2.5}	3.25	12.90	100 tpy	250 tpy	3.25	12.90
VOC	61.18	66.41	100 tpy	250 tpy	n/a	78.47
Formaldehyde	0.44	1.87	10 tpy	n/a	0.44	1.87
Acetaldehyde	0.44	1.65	10 tpy	n/a	0.44	1.65
Acrolein	0.44	1.54	10 tpy	n/a	0.44	1.54
Benzene	0.27	1.15	10 tpy	n/a	0.27	1.15
Methanol	0.44	1.87	10 tpy	n/a	0.44	1.87
Total HAPs	6.55	11.64	25 tpy	n/a	6.55	11.64
CO ₂ e	24,552	96,984	100,000 tpy*	100,000 tpy*	n/a	97,761

*Subject to regulation threshold

REGULATORY APPLICABILITY

Applicable State Regulations. The following regulations apply to this facility.

Fact Sheet R13-3215
Antero Midstream LLC
West Mountain Station

45CSR2 TO PREVENT AND CONTROL PARTICULATE AIR POLLUTION FROM COMBUSTION OF FUEL IN INDIRECT HEAT EXCHANGERS

The applicant is not subject to the weight emission standard for particulate matter set forth in 45 CSR2-4.1 because the dehydrator reboilers [F-3100 and F-3200] and the catalytic heater [CATHT1] are all less than 10 MMBtu/hr; however, they are subject to the 10% opacity based on a six minute block average. Compliance will be demonstrated by complying with permit requirements. The applicant is using natural gas as fuel; therefore, meeting the 10% opacity requirements should not be a problem.

45CSR6 TO PREVENT AND CONTROL AIR POLLUTION FROM THE COMBUSTION OF REFUSE

The applicant has one flare [FL-8300] and two dehydrator reboilers [F-3100 and F-3200] at the facility that are subject to this rule. The flare will use natural gas as its fuel and therefore will have negligible particulate matter emissions and is expected to be in compliance by being in compliance with the permit requirements. The reboiler will use the emissions stream from the natural gas dehydration flash tank and will be supplemented with natural gas as the fuel and will have negligible particulate matter emissions.

45CSR10 TO PREVENT AND CONTROL AIR POLLUTION FROM THE EMISSION OF SULFUR OXIDES

The glycol dehydration reboilers and the catalytic heater each have a maximum design heat input of less than 10 MMBtu/hr and are therefore exempt from sections 3, 6, and 8.

45CSR13 PERMITS FOR CONSTRUCTION, MODIFICATION, RELOCATION AND OPERATION OF STATIONARY SOURCES OF AIR POLLUTANTS, NOTIFICATION REQUIREMENTS, ADMINISTRATIVE UPDATES, TEMPORARY PERMITS, GENERAL PERMITS, PERMISSION TO COMMENCE CONSTRUCTION, AND PROCEDURES FOR EVALUATION

The applicant is subject to this rule because they meet the definition of a stationary source. They have submitted a complete permit application and placed a legal advertisement in *The Pennsboro News* on October 1, 2014.

The applicant is subject to catalytic converter requirement of § 45-13-2.19a. Compliance will be demonstrated by compliance with permit requirements.

This application is considered a synthetic minor application because the applicant is taking an operational limit on the compressor engines to remain a minor source for Title V purposes. The applicant; therefore, is subject to Notice Level C for public review as required by § 45-13-8.5. The applicant is required to place a commercial display advertisement as set forth in subdivision 8.4.a and a sign as set forth in

subdivision 8.5.a. They will demonstrate compliance with the Notice Level C requirements by sending verification of the additional requirements to WVDAQ prior to permit issuance.

45CSR16 STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES PURSUANT TO 40 CFR PART 60

The facility is subject to 45CSR16 because they are subject to NSPS, Subparts JJJJ and OOOO that are further described in the federal regulations section of this evaluation.

45CSR22 AIR QUALITY MANAGEMENT FEE PROGRAM

The applicant has paid the \$1,000 application fee, the \$1,000 NSPS fee and the \$2,500 NESHAP fee as required by section 3.4.b of this rule because they are subject to both NSPS and NESHAP requirements as described in this regulatory review section.

Additionally, the source will be added to the fee database when the registration is issued and the facility will be required to maintain their certificate to operate.

45CSR34 EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

The facility is subject to 45CSR34 because they are subject to 40 CFR 63, Subparts HH and ZZZZ that are further described in the federal regulations section of this evaluation.

Applicable Federal Regulations. The following regulations apply to this facility.

40CFR60, SUBPART, JJJJ STANDARDS OF PERFORMANCE FOR NEW STATIONARY SPARK IGNITION INTERNAL COMBUSTION ENGINES

Subpart JJJJ establishes emission standards for applicable SI ICE.

The 1,680 hp Waukesha L7044GSI compressor engines [C-2100 -C-2200] will be manufactured after the July 1, 2007 date for engines with a maximum rated power capacity greater than or equal to 500 hp.

The proposed 1,680 hp Waukesha L7044GSI compressor engines [C-2100 -C-2200] will be subject to the following emission limits: NOX - 1.0 g/hp-hr (3.70 lb/hr); CO - 2.0 g/hp-hr (7.41 lb/hr); and VOC - 0.7 g/hp-hr (2.59 lb/hr). The emission limits will be met by way of EMIT non-selective catalysts (NSCR) that were purchased separately from the engines. Based on the manufacturer's specifications for these engines, the emission standards will be met.

The proposed 1,680 hp Waukesha L7044GSI compressor engines [C-2100 -C-

2200] will not be certified according to NSPS, Subpart JJJJ. Therefore, Antero will be required to conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or three (3) years, whichever comes first, to demonstrate compliance.

40CFR60, SUBPART OOOO STANDARDS OF PERFORMANCE FOR CRUDE OIL AND NATURAL GAS PRODUCTION, TRANSMISSION AND DISTRIBUTION

EPA published its new source performance standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. EPA published final amendments to the subpart on September 23, 2013.

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 affected sources which commence construction, modification or reconstruction after August 23, 2011 are subject to the applicable provisions of this subpart as described below:

- a. Each gas well affected facility, which is a single natural gas well.

There will not be any gas wells at this facility. Therefore, all requirements regarding gas well affected facilities under 40 CFR 60, Subpart OOOO would not apply.

- b. Each centrifugal compressor affected facility, which is a single centrifugal compressor using wet seals that is located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment.

There will not be any centrifugal compressors at this facility. Therefore, all requirements regarding centrifugal compressors affected facilities under 40 CFR 60, Subpart OOOO would not apply.

- c. 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.

There are reciprocating internal combustion engines located at this facility that will be constructed after August 23, 2011. Therefore, the requirements regarding reciprocating compressors under Subpart OOOO will apply.

Antero will be required to perform the following:

- *Replace the reciprocating compressor rod packing at least every 26,000 hours of operation or 36 months;*
- *Demonstrate initial compliance by continuously monitoring the number of hours of operation or track the number of months since the last rod*

- *packing replacement;*
 - *Submit the appropriate start up notifications;*
 - *Submit the initial annual report for the reciprocating compressors;*
 - *Maintain records of hours of operation since last rod packing replacement, records of the date and time of each rod packing replacement, and records of deviations in cases where the reciprocating compressor was not operated in compliance.*
- d. For the natural gas production segment (between the wellhead and the point of custody transfer to the natural gas transmission and storage segment and not including natural gas processing plants), 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.

The pneumatic controllers that will be installed at West Mountain Compressor Station will be air-actuated. Therefore, there will be no applicable pneumatic controllers which constructed construction after August 23, 2011 and the requirements for pneumatic controllers under Subpart OOOO do not apply.

- e. 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.

Subpart OOOO defines a storage vessel as a unit that is constructed primarily of non-earthen 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:

- 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.
- Process vessels such as surge control vessels, bottoms receivers or knockout vessels.
- 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 days 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. The compliance date for applicable storage vessels is October 15, 2013.

The storage vessels located at the West Mountain Compressor Station will be controlled by a Vapor Recovery Unit (VRU) designed with a capture/control efficiency of 98%. In order to claim an efficiency greater than 95%, Antero is required to meet additional design/function requirements. Antero will be required to perform three of the following additional requirements:

- *Additional sensing equipment*
- *Properly designed bypass system*
- *Appropriate gas blanket*
- *A compressor that is suitable and has the ability to vary the drive speed*

The potential to emit for the condensate and produced water tanks [TK-9200, TK-9210, TK-9110, and TK-9110] are less than 6 tpy of VOC and therefore are not subject to the control requirements of Subpart OOOO. The controlled potential to emit for the settling tank [TK-9000] is 7.96 tpy which is greater than 6 tpy of VOC ;and therefore, may be considered a storage vessel affected facility under this subpart.

Each storage vessel must determine storage vessel affected facility status as determined within 30 days after startup. The potential for VOC emissions must be calculated using a generally accepted model or calculation methodology, based on the maximum average daily throughput determined for a 30-day period of production prior to the emission determination deadline. The determination may take into account requirements under permit R13-3215.

Storage vessel NSPS, Subpart OOOO language will be added to permit R13-3215 for the settling tank [TK-9000] because the actual determination of status does not occur until after startup. The applicant will demonstrate compliance by demonstrating compliance with the requirements of the permit.

- f. The group of all equipment, except compressors, within a process unit is an affected facility.

The West Mountain Compressor Station is not a natural gas processing plant. Therefore, Leak Detection and Repair (LDAR) requirements for onshore natural gas processing plants does not apply.

- g. Sweetening units located at onshore natural gas processing plants that process natural gas produced from either onshore or offshore wells.

There are no sweetening units at West Mountain Compressor Station. Therefore, none of the requirements regarding sweetening units under Subpart OOOO apply.

40 CFR63, SUBPART HH NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS FROM OIL AND NATURAL GAS PRODUCTION FACILITIES

Subpart HH establishes national emission limitations and operating limitations of HAPs emitted from oil and natural gas production facilities located at major and area sources of HAP emissions. For area source applicability, the affected source includes each triethylene glycol (TEG) dehydration unit located at a facility that meets the criteria specified in §63.760(a).

The two glycol dehydration units are TEG dehydration units located at an area source of HAPs and thus are subject to this subpart. Because the potential benzene emissions are less than 1 tpy, the units are only subject to the recordkeeping requirements that demonstrate exemption from the control requirements of this rule.

Based on the PTE emissions, the applicant will be in compliance with the benzene exception from § 63.764(d) and further compliance will be demonstrated by demonstrating compliance with the recordkeeping requirements provided in the permit.

40 CFR63, SUBPART ZZZZ NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (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 engines [C-2100 - C-2200] at the West Mountain Compressor Station are subject to the area source requirements for non-emergency spark ignition engines. Compliance will be demonstrated by complying with NSPS, Subpart JJJJ. These requirements were outlined above along with the compliance discussion.

Non-applicability determinations. It has been determined that the applicant is not subject to the following rules:

45CSR14 PERMITS FOR CONSTRUCTION AND MAJOR MODIFICATION OF MAJOR STATIONARY SOURCES OF AIR POLLUTANTS

The West Mountain Compressor Station is located in Ritchie County, which is in an attainment county for all criteria pollutants. The applicant is not subject to this rule because they do not meet the definition of a major stationary source because the facility PTE (as shown in the emissions section of this evaluation) for the criteria pollutants are all below the PSD threshold of 250 tpy.

On June 23, 2014, the United States Supreme Court issued a decision addressing the application of stationary source permitting requirements to greenhouse gases. In very brief summary, the Supreme Court said that EPA may not treat greenhouse gases as an air pollutant for the purposes of determining whether a source is a major source required to obtain a Prevention of Significant Deterioration (PSD) or title V permit.

45CSR30 REQUIREMENTS FOR OPERATING PERMITS

The applicant is not subject to this rule because they took an operating limit on the compressor engines to limit the potential emissions; and therefore, do not meet the definition of a major source of regulated air pollutants as shown in the facility PTE table in the emissions section of this evaluation. The West Mountain Station is a synthetic minor (NOX and CO) because the annual emissions on the compressor engines are based on 90% operating hours per engine.

The applicant is subject to 40 CFR 60, Subpart JJJJ and OOOO and 40 CFR 63, Subpart HH and ZZZZ, however they are exempt from the obligation to obtain a permit under 40 CFR, Part 70 or 71 provided that they are not required to obtain a permit for a reason other than their status as an area source.

On June 23, 2014, the United States Supreme Court issued a decision addressing the application of stationary source permitting requirements to greenhouse gases. In very brief summary, the Supreme Court said that EPA may not treat greenhouse gases as an air pollutant for the purposes of determining whether a source is a major source required to obtain a Prevention of Significant Deterioration (PSD) or title V permit.

40CFR60, SUBPART Kb STANDARDS OF PERFORMANCE FOR VOLATILE ORGANIC LIQUID STORAGE VESSELS (INCLUDING PETROLEUM LIQUID STORAGE VESSELS) FOR WHICH CONSTRUCTION, RECONSTRUCTION, OR MODIFICATION COMMENCED AFTER JULY 23, 1984

Subpart Kb establishes control requirements, testing requirements, monitoring requirements, and recordkeeping and reporting requirements. Subpart Kb applies to any storage vessel with a capacity greater than 19,313 gallons that is used to store volatile organic liquids except that it does not apply to storage vessels with a capacity greater than 39,890 gallons storing a liquid with a maximum true vapor pressure less than 3.5 kPa or with a capacity greater than 19,813 gallons but less than 39,890 gallons storing a liquid with a maximum true vapor pressure less than 15.0 kPa.

This subpart does not apply to vessels with a design capacity less than or equal to 419,204 gallons used for petroleum or condensate stored, processed, or treated prior to custody transfer.

The settling tank [TK-9000] at the West Mountain Compressor Station has a capacity of 21,000 gal; however it stores condensate prior to custody transfer and therefore is

not subject to this subpart.

40 CFR 60, SUBPART GG STANDARDS OF PERFORMANCE FOR STATIONARY GAS TURBINES

Subpart GG applies to stationary gas turbines with a heat input at peak load equal to or greater than 10 MMBtu/hr, based on the lower heating value of the fuel fired per § 60.330(a). The three Capstone C200 micro turbines [G-8000, G-8100, and G-8200] will have a heat input rating less than 10 MMBtu/hr; therefore this subpart does not apply.

40 CFR 60, SUBPART KKK STANDARDS OF PERFORMANCE FOR EQUIPMENT LEAKS OF VOC FROM ONSHORE NATURAL GAS PROCESSING PLANTS

Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984, and on or before August 23, 2011. The West Mountain Compressor Station is not a natural gas processing facility and therefore is not subject to this rule.

40 CFR 60, SUBPART KKKK STANDARDS OF PERFORMANCE FOR STATIONARY COMBUSTION TURBINES

This subpart establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that commenced construction, modification or reconstruction after February 18, 2005.

Subpart KKKK does not apply because there are no stationary combustion turbines at the facility with a heat input at peak load equal to or greater than 10 MMBTU/hr, based on the higher heating values of the fuel per § 60.4305.

40 CFR63, SUBPART EEEE NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS: ORGANIC LIQUIDS DISTRIBUTION (NON-GASOLINE)

This subpart establishes national emission limitations, operating limits, and work practice standards for organic hazardous air pollutants (HAP) emitted from organic liquids distribution (OLD) (non-gasoline) operations at major sources of HAP emissions. The West Mountain Compressor station is not a major source of HAP emissions and therefore this subpart is not applicable.

40 CFR63, SUBPART YYYY NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR STATIONARY COMBUSTION TURBINES

Subpart YYYY establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emissions from stationary combustion turbines located at major sources of HAP emissions. The West Mountain Compressor station is not a major source of HAP emissions and therefore this subpart is not applicable.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The West Mountain Compressor Station is classified as an area source of hazardous air pollutants. Listed below is a description of the primary hazardous air pollutants for this facility.

Acetaldehyde:

Acetaldehyde is mainly used as an intermediate in the synthesis of other chemicals. It is common in the environment and may be formed in the body from the breakdown of ethanol. Acute (short-term) exposure to acetaldehyde results in effects including irritation of the eyes, skin, and respiratory tract. Symptoms of chronic (long-term) intoxication of acetaldehyde resemble those of alcoholism. Acetaldehyde is considered a probable human carcinogen (Group B2) based on human cancer studies and animal studies that have shown nasal tumors in rats and laryngeal tumors in hamsters.

Acrolein:

Acrolein is primarily used as an intermediate in the synthesis of acrylic acid and as a biocide. It may be formed from the breakdown of certain pollutants in outdoor air or from the burning of organic matter including tobacco, or fuels such as gasoline or oil. It is toxic to humans following inhalation, oral or dermal exposures. Acute (short-term) inhalation exposure may result in upper respiratory tract irritation and congestion. No information is available on its reproductive, developmental, or carcinogenic effects in humans, and the existing animal cancer data are considered inadequate to make a determination that acrolein is carcinogenic to humans.

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

Formaldehyde:

Formaldehyde is used mainly to produce resins used in particle board 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).

Methanol:

Methanol is released to the environment during industrial uses and naturally from volcanic gases, vegetation, and microbes. Exposure may occur from ambient air and during the use of solvents. Acute (short-term) or chronic (long-term) exposure of humans to methanol by inhalation or ingestion may result in blurred vision, headache, dizziness, and nausea. No information is available on the reproductive, developmental, or carcinogenic effects of methanol in humans. Birth defects have been observed in the offspring of rats and mice exposed to methanol by inhalation. EPA has not classified methanol with respect to carcinogenicity.

Methanol is primarily used as an industrial solvent for inks, resins, adhesives, and dyes. It is also used as a solvent in the manufacture of cholesterol, streptomycin, vitamins, hormones, and other pharmaceuticals. Methanol is also used as an antifreeze for automotive radiators, an ingredient of gasoline (as an antifreezing agent and octane booster), and as fuel for picnic stoves. Methanol is also an ingredient in paint and varnish removers. Methanol is also used as an alternative motor fuel.

AIR QUALITY IMPACT ANALYSIS

Modeling was not required for this source due to the fact that the facility is not considered a “major source” according to 45CSR 14 or 45CSR19.

MONITORING OF OPERATIONS

The applicant will be subject to the following monitoring requirements:

- There is a synthetic minor operating hour restriction of 86,724 hours for the combined 11 compressor engines on a 12-month rolling total annual basis. The annual PTE emissions for the compressor engines were calculated using 7,884 operating hours/engine which is 90% of the total possible annual operating hours (8,760 hours).
- Records of catalyst replacement for compressor engines
- Records of fuel usage and operating hours for engines and generators
- Monitor catalyst inlet temperature (per application)
- Engine monitoring requirements per NSPS, Subparts JJJJ and OOOO
- Throughput limitation for each TEG dehydration unit
- Monitor operating parameters for the dehydration unit
- Monitor presence of pilot flame for the flare
- Visible emission monitoring
- Actual average benzene emissions from the dehydration unit <1 tpy
- Minor HAP source monitoring

- Monitor throughput to the VRUs
- Inspections of closed vent system and cover requirements
- Monitor product loading throughput
- Monitoring requirements of 40CFR60, Subparts JJJJ and OOOO
- Monitoring requirements of 40CFR63, Subpart HH

RECOMMENDATION TO DIRECTOR

It is recommended that permit R13-3215 be granted to Antero Midstream LLC, West Mountain Compressor Station (085-00039) that will be located in Pennsboro, Ritchie County, WV. Based on the information provided in the application, including all supplemental information received, Antero should meet all applicable state and federal requirements. The notice level "C" requirements for this synthetic minor permit will be verified prior to permit issuance.

Laura M. Jennings
Permit Engineer

Date