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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3184A
Plant ID No.:	095-00037
Applicant:	Antero Midstream LLC (Antero)
Facility Name:	Monroe Compressor Station
Location:	Near Alma, Tyler County
NAICS Code:	221210
SIC Code:	4923
Application Type:	Modification
Received Date:	January 7, 2015
Engineer Assigned:	Joe Kessler
Fee Amount:	$2,000
Date Received:	$1,000 (1/13/15), $1,000 (2/23/15)
Complete Date:	February 23, 2015
Due Date:	May 24, 2015
Applicant's Ad Date:	January 21, 2015
Newspaper:	*Tyler Star News*
UTM's:	Easting: 511.720 km Northing: 4,363.467 km Zone: 17
Latitude/Longitude:	39.42065/-80.86384
Description:	Modification to address various as-built changes to the facility.

On July 21, 2014, Antero Midstream LLC (Antero), at the time Antero Resources Corporation, was issued Permit Number R13-3184 for the construction of the Monroe Compressor Station located immediately north of Conway Run Road (WV State Route 48) approximately 1.57 miles west-southwest of Alma, Tyler County, West Virginia.

DESCRIPTION OF PROCESS/MODIFICATION

Existing Facility

The existing Monroe Station receives natural gas from surrounding wells via pipelines and separates, dehydrates, and compresses the gas before sending it via pipeline to other facilities for

further processing or distribution. To effect this, the facility consists of eleven (11) 1,680 horsepower (hp) Waukesha 7044 GSI Compressor Engines, two (2) 60 mmscf/day triethylene glycol (TEG) dehydration units (GDU), a small 0.024 mmBtu/hr catalytic heater, two (2) 600 kW_e Capstone C600 NG Microturbine Generators, and various material storage tanks.

Proposed Modifications

Antero has now submitted a permit application to:

- Update the emissions profile of the compressor engines to reflect site-specific catalyst vendor data;
- Update emissions from the storage tanks to reflect revised production throughputs; and
- Remove the permitted requirement to control emissions from truck loading using the vapor recovery unit.

Post-Modification Process Description

Raw natural gas produced in area wells will enter into the facility and, after passing through an inlet separator to removed produced liquids, will be compressed by the eleven (11) Waukesha 7044 GSI engines. Water and condensate removed from the natural gas by the inlet separator is directed to one of the five (5) 16,880 gallon storage tanks (TK-1500 through TK-1502, and TK-200 and TK-201). Tanks TK-1500 and TK-1501 are used for produced water only, tank TK-1503 is used for as a settling tank for both condensate and produced water, and tanks TK-200 and TK-201 are used for condensate. Six (three (3) 1,000 and three (3) 2,000 gallon) storage tanks are used at the site for miscellaneous storage (waste oil, bulk TEG storage, lube oil storage, and bulk coolant storage). Emissions from the condensate/produced water storage tanks (working/breathing/flashing) are routed to a vapor recovery unit (VRU) for control. Flashing emissions only occur in the settling tank. The VRU captures and recycles the vapors back into the process prior to the inlet separator. Emissions from the other storage tanks are nominal. The VRU has a calculated capture efficiency of 98%.

The engines (C-100 through C-1100) are designed to compress the natural gas produced from the wells and send it through one of the two (2) Exterran 60 mmscf/day TEG GDUs (DEHY1 and DEHY2) for dehydration and then into a gathering pipeline for transport. The engines will use catalytic converters to control CO, NO_x, VOC, and formaldehyde emissions.

Glycol dehydration is a liquid desiccant system used for the removal of water from natural gas. In each GDU, lean, water-free glycol is fed to the top of an absorber (known as a "contactor") where it is contacted with the wet natural gas stream. The glycol removes water from the natural gas by physical absorption and is carried out the bottom of the column. The dry natural gas leaves the top of the absorption column and is fed into a pipeline for transportation. The dehydrator still vent gases are each sent to a 4.8 mmBtu/hr (combustion gases) flare (FLARE1) for destruction (98% combustion efficiency).

After leaving the absorber, each glycol stream - now referred to as "rich" glycol - is fed to a flash vessel (DFLSH1 and DFLSH2) where flashed hydrocarbon vapors are either sent to one of the two 1.5 mmBtu/hr reboilers (DREB1 and DREB2) as fuel. The reboiler is assumed to have an organic combustion efficiency of 95%. Any liquid hydrocarbons removed in the flash tank are sent to the appropriate storage tanks.

After leaving the flash vessel, the rich glycol is fed to a Glycol Regenerator Column. Each Regenerator Column consists of a column, an overhead condenser, and the reboiler. The glycol is thermally regenerated to remove excess water and regain high purity. The heat for the regeneration is provided by the reboilers. The hot, lean glycol is cooled by a heat-exchanger and is then fed to a pump where it is sent to the glycol absorber for reuse. Liquids produced in the regeneration process are sent to one of the facility storage tanks.

Additionally, the facility will utilize a truck loadout (LDOUT1) to remove condensate and produced water from the site (estimated to be a maximum of 2,300,000 gallons/year of condensate and 690,000 gallons/year of produced water). The Microturbines (GEN-1, GEN-2) will be used to produce power for the facility. The truck loadout and the Microturbines are uncontrolled.

SITE INSPECTION

Due to the nature of the proposed modification, a site inspection by the writer was deemed as not necessary. During the review of R13-3184, on April 22, 2014, a site inspection of the proposed location of the Monroe Compressor Station was conducted by Mr. Doug Hammell of the DAQ Compliance/Enforcement (C/E) Section. According to the R13-3184 evaluation/fact sheet, Mr. Hammell stated that the site location was appropriate for the proposed facility.

AIR EMISSIONS AND CALCULATION METHODOLOGIES

Antero provided an updated and revised facility-wide air emissions estimate for the Monroe Compressor Station. The proposed revisions were noted above. The following will only discuss in detail only those emission units proposed to be modified as part of this permitting process.

Compressor Engines

Potential emissions from each of the eleven (11) Waukesha, 7044 GSI 4-stroke rich burn (4SRB) 1,680 hp compressor engines (1E through 11E) were based on post-control emission factors provided by the catalytic converter vendor, the engine vendor, as given in AP-42, Section 3.2 (AP-42 is a database of emission factors maintained by USEPA), and as given in 40 CFR 98, Subpart C. Hourly emissions were based on the (as calculated using a fuel heat rating of 8,272 Btu/hp-hr) maximum design heat input (MDHI) of the engines of 13.90 mmBtu/hr and the maximum hp rating. Annual emissions were based on a 90% capacity factor. The following table details the potential-to-emit (PTE) of each compressor engine:

Table 1: Per-Compressor Engine PTE

Pollutant	Emission Factor	Source	Hourly (lb/hr)	Annual (ton/yr)
CO[1]	0.51 g/hp-hr (controlled)	Catalyst Vendor	1.89	7.45
NO_X[1]	0.55 g/hp-hr (controlled)	Catalyst Vendor	2.04	8.03
$PM_{2.5}$[2]	19.41 x 10^{-3} lb/mmBtu	AP-42, Table 3.2-3	0.27	1.07
PM_{10}[2]	19.41 x 10^{-3} lb/mmBtu	AP-42, Table 3.2-3	0.27	1.07
PM[2]	19.41 x 10^{-3} lb/mmBtu	AP-42, Table 3.2-3	0.27	1.07
SO_2	5.88 x 10^{-4} lb/mmBtu	AP-42, Table 3.2-3	0.01	0.03
VOCs[1]	0.23 g/hp-hr (controlled)	Catalyst Vendor	0.81	3.21
Total HAPs	Various	AP-42, Table 3.2-3	0.21	0.83
Formaldehyde[1]	0.01 g/hp-hr (controlled)	Catalyst Vendor	0.04	0.14
CH_4	0.40 g/hp-hr	Engine Vendor	1.48	5.84
N_2O	1.00 x 10^{-4} kg/mmBtu	40 CFR Part 98, Subpart C, Table C-2	0.00	0.01
CO_2	528 g/hp-hr	Engine Vendor	1,955.59	7,708.93
CO_2e[3]	n/a	n/a	1,993.54	7,858.55

(1) Based on post-control emission factor provided by the catalytic converter vendor.
(2) Includes condensables.
(3) Based on multiplying the mass amount of emissions for each of the six greenhouse gases by the gas's associated global warming potential published at Table A-1 to Subpart A of 40 CFR Part 98 - Global Warming Potentials. Used to determine major source status of facilities under 45CSR14.

Storage Tanks

Antero provided an estimate of the uncontrolled working/breathing emissions produced from the five (5) 16,880 gallon (20E through 24E) produced water and condensate storage tanks using the TANKS 4.09d program as provided under AP-42, Section 7 and using the Vasquez-Beggs Correlation calculations for estimating flashing losses from the settling tank. Produced water was conservatively estimated to contain 10% by weight of VOCs. However, as noted above, emissions from the tanks shall be routed to a VRU for control. The VRU will capture and recycle all the vapors back into the into inlet separator. Therefore, according to DAQ policy for use of VRUs, the PTE from these tanks shall be based on a 98% capture efficiency (when used in conjunction with the procedures as outlined under 8.1.5 through 8.1.7 of the draft permit). Based on the size of tanks and the material stored, potential emissions from the other bulk material storage tanks will be nominal.

Truck Loadouts

Air emissions from condensate and produced water truck loading operations (LDOUT1) occur as fugitive emissions generated by displacement of vapors when loading trucks. The emission factor used to generate the VOC emissions is based on Equation (1) of AP-42 Section 5.2-4. In this equation, EQT used variables specific to the liquids loaded and to the method of loading - in this

case "submerged filling - dedicated normal service." Additionally, worst-case annual emissions were based on a maximum loading rate of 2,300,000 gal/year of condensate and 690,000 gal/year of produced water. Maximum hourly loadout emissions were based on loading out one (1) 10,920 gallon condensate and one (1) 10,920 produced water truck/hour. Produced water was conservatively estimated to contain 10% by weight of VOCs.

Emissions Summary

Based on the above revised estimation methodologies, which are determined to be reasonable, the post-modification PTE of the Monroe Compressor Station is given in Attachment A to this evaluation.

The change in annual facility-wide PTE as a result of the modifications evaluated herein is given in the following table:

Table 2: Change In Facility-Wide Annual PTE

Pollutant	R13-3184[1]		R13-3184A		Change	
	lbs/hour	tons/year	lbs/hour	tons/year	lbs/hour	tons/year
CO	12.93	52.46	23.55	94.00	10.62	41.54
NO_X	6.64	26.71	23.39	92.60	16.75	65.89
PM[2]	3.04	12.04	3.06	12.04	0.02	0.00
SO_2	0.11	0.46	0.12	0.46	0.01	0.00
VOCs	17.70	76.11	94.13	87.65	76.43	11.54
HAPs	2.77	11.05	2.80	11.12	0.03	0.07
CO_2e	--	99,697	--	95,739	--	(3,958)

(1) Emissions taken from R13-3184 Fact Sheet.
(2) All particulate matter emissions are assumed to be less than 2.5 microns. Includes condensables.

REGULATORY APPLICABILITY

The following will discuss only the regulatory applicability of general rules and specific rules to the emission units that have been proposed to be modified as part of this permitting action.

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

The proposed changes to the Monroe Compressor Station have the potential to increase the PTE of the facility in excess of six (6) lbs/hour and ten (10) TPY of a regulated pollutant (see Table 2 above) and, therefore, pursuant to §45-13-2.17, the changes are defined as a "modification" under 45CSR13. Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the construction, modification, relocation and operation of any stationary source to be commenced without . . .

obtaining a permit to construct." Therefore, Antero is required to obtain a permit under 45CSR13 for the modification of the facility.

As required under §45-13-8.3 ("Notice Level A"), Antero placed a Class I legal advertisement in a "newspaper of *general circulation* in the area where the source is . . . located." The ad ran on October 2, 2013 in *The Tyler Star News* and the affidavit of publication for this legal advertisement was submitted on January 28, 2015.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration - (NON APPLICABILITY)

The Monroe Compressor Station is located in Tyler County, WV. Tyler County is classified as "in attainment" with all National Ambient Air Quality Standards. Therefore, as the facility is not a "listed source" under §45-14-2.43, the individual major source applicability threshold for all pollutants is 250 TPY. As given in Attachment A, the post-modification facility-wide PTE of the Monroe Compressor Station remains less than 250 TPY for all criteria pollutants. Therefore, the facility is not defined as a "major stationary source" under either 45CSR14 and is not subject to review requirements therein.

45CSR30: Requirements for Operating Permits - (NON APPLICABILITY)

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The Monroe Compressor Station does not meet the definition of a "major source under §112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. The proposed facility-wide PTE (see Attachment A) of any regulated pollutant does not exceed 100 TPY. Additionally, the facility-wide PTE does not exceed 10 TPY of any individual HAP or 25 TPY of aggregate HAPs.

However, as the facility is subject to two New Source Performance Standard (NSPS) - 40 CFR 60, Subpart JJJJ and Subpart OOOO - and two Maximum Achievable Control Technology (MACT) rules - 40 CFR 63, Subpart ZZZZ and 40 CFR 63, Subpart HH, the facility would, in most cases, be subject to Title V as a "deferred source." However, pursuant to §60.4230(c), §60.5370(c), §63.6585(d), and §63.760(h) as a non-major "area source," Antero is not required to obtain a Title V permit for the proposed facility. Therefore, the Monroe Compressor Station is not subject to 45CSR30.

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 - (NON APPLICABILITY)

Pursuant to §60.110b, 40 CFR 60, Subpart Kb applies to "each storage vessel with a capacity greater than or equal to 75 cubic meters (m^3) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984." The largest storage tanks proposed for the Monroe Compressor Station are each 16,800 gallons, or 64 m^3. Therefore, Subpart Kb does not apply to any storage tanks at the proposed facility.

40 CFR 60 Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.

Antero's eleven (11) Waukesha, 7044 GSI 4SRB 1,680 hp compressor engines proposed for the Monroe Compressor Station are defined under 40 CFR 60, Subpart JJJJ as stationary spark-ignition internal combustion engines (SI ICE) and are each, pursuant to §60.4230(a)(4)(i), subject to the applicable provisions of the rule. Pursuant to §60.4233(e): "Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 to this subpart for their stationary SI ICE." Therefore, as the proposed Antero's compressor engines are greater than 100 hp, each engine must comply with the emission standards under Table 1 for "Non-Emergency SI ICE ≥ 500 hp manufactured after July 1, 2010:" NO_x - 1.0 g/HP-hr, CO - 2.0 g/HP-hr, and VOC - 0.7 g/HP-hr. The emission standards and the proposed compliance therewith of the engines are given in the following table:

Table 3: Waukesha, 7044 GSI Subpart JJJJ Compliance

Pollutant	Standard (g/HP-hr)	Uncontrolled Emissions (g/bhp)(1)	Control Percentage	Controlled Emissions (g/bhp)(1)	JJJJ Compliant?
NO_x	1.0	13.70	95.99%	0.55	Yes
CO	2.0	12.70	95.98%	0.51	Yes
VOC	0.7	0.46	50.00%	0.23	Yes

(1) Based on the EMIT Technologies, Inc. Model ELH-4200-1616F-65CEE-361 catalytic converter specification sheet included in the permit application.

The Waukesha, 7044 GSI is not a "certified" engine under Subpart JJJJ so Antero will have to show compliance with the emission standards pursuant to §60.4243(b)(2)(ii): conducting an initial performance test and thereafter conducting subsequent performance testing every 8,760 hours or 3 years, whichever comes first, to demonstrate compliance. Performance testing requirements are given under §60.4244 of Subpart JJJJ. Antero will additionally have to meet all applicable monitoring, recording, and record-keeping requirements under Subpart JJJJ.

40 CFR 60, Subpart OOOO: Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

On April 27, 2012, the USEPA issued a final rule (with amendments finalized on August 16, 2012) that consists of federal air standards for natural gas wells that are hydraulically fractured, along with requirements for several other sources of pollution in the oil and gas industry that currently are not regulated at the federal level. Each potentially applicable section of Subpart OOOO to a modified unit is discussed below.

Compressor Engines

Pursuant to §60.5365(c), "[e]ach 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" that is constructed after August 23, 2011 is subject to the applicable provisions of Subpart OOOO. As the Monroe Compressor Station is located before the point of custody transfer, the compressor engines are applicable to Subpart OOOO. The substantive requirements for the engines are given under §60.5385(a): the engines' "rod packing" must replaced according to the given schedule and the engine must meet applicable MRR given under §60.5410(c), §60.5415(c), and §60.5420(b)(1).

Storage Tanks - (CONDITIONAL NON APPLICABILITY)

Pursuant to §60.5365(e), for "[e]ach 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" that is constructed after August 23, 2011 and, pursuant to §60.5395 has "VOC emissions equal to or greater than 6 tpy" must meet the control requirements under §60.5395 as of October 15, 2013. The substantive requirement is to "reduce VOC emissions by 95.0 percent or greater." Antero has proposed the use of a closed-loop VRU to control all potential emissions from the proposed storage tanks to a level of 98%. Pursuant to §60.5365(e), "[a]ny vapor from the storage vessel that is recovered and routed to a process through a VRU designed and operated as specified in [§60.5365] is not required to be included in the determination of VOC potential to emit for purposes of determining affected facility status, provided you comply with the requirements in paragraphs (e)(1) through (4) of [§60.5365]." Therefore, if the proposed VRU complies with §60.5365(e)(1) through (e)(4), storage tanks are not subject to Subpart OOOO.

40 CFR 63 Subpart ZZZZ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart ZZZZ. As the Monroe Compressor Station is defined as an area source of HAPs (see Attachment A), the facility is subject to applicable requirements of Subpart ZZZZ. Pursuant to §63.6590(c):

> An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

§63.6590(c)(1) specifies that "[a] new or reconstructed stationary RICE located at an area source" is defined as a RICE that shows compliance with the requirements of Subpart ZZZZ by "meeting the requirements of . . . 40 CFR part 60 subpart JJJJ, for spark ignition engines." Pursuant to §63.6590(a)(2)(iii), a "stationary RICE located at an area source of HAP emissions is new if [the applicant] commenced construction of the stationary RICE on or after June 12, 2006." The engines proposed for the Monroe Compressor Station are each defined as a new stationary RICE (application states manufacture date of engines is July 2013) and, therefore, will show compliance with Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart JJJJ. Compliance with Subpart JJJJ is discussed above.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the modified Monroe Compressor Station and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM), Particulate Matter less than 10 microns (PM_{10}), Particulate Matter less than 2.5 microns ($PM_{2.5}$), and Sulfur Dioxide (SO_2). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal and programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) limits promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs for the modified sources were discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The Monroe Compressor Station has the potential to emit the following HAPs in substantive amoutns: Hexane, Benzene, Toluene, Ethyl-benzene, Xylene, and Formaldehyde. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 4: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
Hexane	VOC	No	Inadequate Data
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Toluene	VOC	No	Inadequate Data
Ethyl-benzene	VOC	No	Category D - Not Classifiable
Xylene	VOC	No	Inadequate Data
Formaldehyde	VOC	Yes	B1 - Probable Human Carcinogen

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health affects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals.* For a complete discussion of the known health effects of each compound refer to the IRIS database located at *www.epa.gov/iris*.

AIR QUALITY IMPACT ANALYSIS

The estimated maximum increase in emissions are less than applicability thresholds that would define the proposed modification as "major" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature of the modification and the location of the source, an air quality impacts modeling analysis was not required under 45CSR13, Section 7.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

The only substantive change to the monitoring, compliance demonstrations, reporting, and recording of operations in the draft permit was the removal of the MRR requirements relating to the use of the VRU on the truck loadout.

PERFORMANCE TESTING OF OPERATIONS

There was no change in the performance testing requirements.

CHANGES TO PERMIT R13-3184

The substantive changes made changes to R13-3184 were limited to:

- Emission Units Table 1.0 of the draft permit was updated with the use of VRU-200 as a backup control device;
- The VRU use on the product loadout racks was removed from Table 1.1 of the draft permit;
- Control efficiency of catalytic converters was revised in Table 1.1 of the draft permit to reflect the new emission rates;
- The emission limits of the compressor engines under 5.1.2. of the draft permit were revised;
- Storage tank throughputs were revised under Table 8.1.3. of the draft permit;
- Emission limits from the settling tank were revised under Table 8.1.4. of the draft permit; and
- Requirements relating tot he use of the VRU to control emissions from the product loading racks under Section 9.0 were removed from the draft permit.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that compliance with all applicable state and federal air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of a Permit Number R13-3184A to Antero Midstream LLC for the proposed modification of the Monroe Compressor Station located near Alma, Tyler County, WV.

Joe Kessler, PE
Engineer

2/27/15
Date

Attachment A: Facility-Wide PTE

Antero Midstream, LLC: Monroe Compressor Station
Permit Number R13-3184A: Facility ID 095-00037

Emission Unit	EP ID	CO		NO_x		PM[1]		SO_x		VOC		CO_2e		HAPs	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Compressor Engine	1E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Compressor Engine	2E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Compressor Engine	3E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Compressor Engine	4E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Compressor Engine	5E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Compressor Engine	6E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Compressor Engine	7E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Compressor Engine	8E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Compressor Engine	9E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Compressor Engine	10E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Compressor Engine	11E	1.89	7.45	2.04	8.04	0.27	1.06	0.01	0.03	0.85	3.35	1,994	7,860	0.21	0.83
Microturbines[2]	12E, 13E	0.66	2.89	0.24	1.07	0.04	0.19	0.02	0.10	0.06	0.26	844	3,697	0.01	0.03
Dehydrator #1 Still Vent[3]	14E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	1.23	9	41	0.11	0.48
Dehydrator #1 Flash Tank[4]	15E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.86	8.15	77	338	0.10	0.44
Dehydrator #1 Reboiler[5]	16E	0.15	0.68	0.18	0.81	0.01	0.06	~0.00	~0.00	0.01	0.04	176	771	~0.00	~0.00
Dehydrator #2 Still Vent[3]	17E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	1.23	9	41	0.11	0.48
Dehydrator #2 Flash Tank[4]	18E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.86	8.15	77	338	0.10	0.44
Dehydrator #2 Reboiler[5]	19E	0.15	0.68	0.18	0.81	0.01	0.06	~0.00	~0.00	0.01	0.04	176	771	~0.00	~0.00
Storage Tanks	20E-24E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.49	6.54	0	0	0.02	0.09
Truck Loadout	25E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	77.14	8.11	0	1	0.02	<0.01
Flare Combustion[5]	26E	1.78	7.80	0.33	1.45	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	563	2,465	<0.01	<0.01
Catalytic Heater	27E	<0.01	0.01	<0.01	0.01	<0.01	<0.01	~0.00	~0.00	<0.01	<0.01	3	12	~0.00	~0.00

Emission Unit	EP ID	CO		NO_x		PM[1]		SO_x		VOC		CO_2e		HAPs	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Component Leaks	Fugitive	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.77	7.75	30	133	<0.01	0.02
Venting	Fugitive	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a	9.27	n/a	668	n/a	0.02
Facility-Wide Total →		***23.55***	***94.00***	***23.39***	***92.60***	***3.06***	***12.04***	***0.12***	***0.46***	***94.13***	***87.65***	***23,899***	***95,739***	***2.80***	***11.12[6]***

(1) All particular matter emissions are assumed to be 2.5 microns or less.
(2) Aggregate emissions of both units.
(3) As emitted at the flare after pass-through.
(4) As emitted at the reboiler stack after pass-through.
(5) Combustion exhaust only.
(6) No individual HAP has a PTE over 10 TPY. As the PTE of all individual HAPs are less than 10 TPY and the PTE of total HAPs is less than 25 TPY, the Monroe Compressor Station is defined as a minor (area) source of HAPs for purposes of 40 CFR 61, 40CFR63, and Title V.