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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2913A
Plant ID No.:	051-00145
Applicant:	Appalachian Midstream Services, L.L.C.
Facility Name:	Sand Hill Compressor Station
Location:	Near Dallas, Marshall County
SIC/NAICS Code:	1382/213112
Application Type:	Modification
Received Date:	September 14, 2015
Engineer Assigned:	Joe Kessler
Fee Amount:	$4,500
Date Received:	September 9, 2015 ($1,000) September 21, 2015 ($2,500) October 21, 2015 ($1,000)
Complete Date:	October 30, 2015
Due Date:	January 28, 2016
Applicant's Ad Date:	September 11, 2015
Newspaper:	*Intelligencer*
UTM's:	Easting: 537.993 km Northing: 4,426.286 km Zone: 17
Latitude/Longitude:	39.98754/-80.55586
Description:	After-the-fact modification to: (1) reduce the CO and VOC control efficiencies claimed for the oxidation catalysts, (2) increase the associated potential-to-emit (PTE) of the compressor engines, and (3) revise the potential emissions from the glycol dehydration units (GDUs), fugitives, and compressor blowdowns using an updated site-specific gas analysis as input into the emissions calculations.

On July 23, 2012, Appalachian Midstream Services, L.L.C. (AMS), a subsidiary of Williams (note that "Williams" is also the parent company of "Williams Ohio Valley Midstream, LLC"), was issued Permit Number R13-2913 for the construction of the Sand Hill Compressor Station located in a rural area of Marshall County approximately 2.50 miles southwest of Dallas, WV.

DESCRIPTION OF PROCESS

Existing Facility

The existing Sand Hill 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. The facility consists of twelve (12) 1,380 horsepower (hp) Caterpillar G3516B 4-stroke lean burn (4SLB) Compressor Engines, three (3) 55 mmscf/day triethylene glycol (TEG) dehydration units (GDU), two (2) 0.50 mmBtu/hr heater treaters, one (1) 600 kW_e Capstone C600 NG Microturbine Generator, and ten (10) storage tanks.

Proposed Modifications

AMS has now submitted a permit application to:

- Reduce the control efficiencies claimed for the oxidation catalysts (see Table 1);

Table 1: Change in Oxidation Catalyst Control Percentages

Pollutant	Old (%)	New (%)
CO	98.00	84.90
NO_x	None	None
VOC[(1)]	80.00	75.00
VOC (True)	84.03	80.27
Formaldehyde	94.87	94.87

(1) Represents NMNEHC emissions not including Formaldehyde.

- Increase the associated PTE of the compressor engines (EUCE-1 through EUCE-12);

- Revise the potential emissions from the GDUs (EUDHY-1 through EUDHY-3), fugitives, and compressor blowdowns using an updated site-specific gas analysis as input into the emissions calculations; and

- Lower the aggregate condensate throughput of the storage tanks (EUTK-1 through EUTK-8) and the truck loading (EULOAD-1) from 9,965,000 to 2,252,000 gallons per year.

Post-Modification Process Description

The natural gas inlet stream from surrounding area wells enters the facility at low pressure through a two phase low pressure inlet separator that will gravity separate the inlet stream into two streams: gas and produced liquids. Low pressure inlet gas will be compressed via twelve (12) 1,380 hp Caterpillar G3516B 4SLB Compressor Engines (EUCE-1 through EUCE-12). The compressor engines are each controlled (CO, VOCs, and formaldehyde) by an EMIT Technologies Model ELH-3550-1416F-4CE0-241 oxidation catalyst. Discharge from the compressors will pass through filter/coalescer separators to remove any condensed or entrained liquids present. After the inlet gas

passes through the compressors, it goes through the glycol dehydration process before exiting the facility via a sales pipeline. A portion of the discharge gas will be removed prior to outlet metering for use as fuel gas.

Three (3) 55 mmscf/day TEG GDUs (EUDHY-1 through EUDHY-3) are used to remove water from the gas. The units are comprised of both a glycol contactor skid and glycol regeneration skid. In the dehydration process, gas passes through a contactor vessel where water is absorbed by the glycol. The "rich" glycol contacting water goes to the glycol reboiler where heat is used to remove the water and regenerate the glycol. The heat for each GDU is supplied by a 1.0 mmBtu/hr natural gas/waste gas-fired reboiler (EPRBL-1 through EPRBL-3) that exhausts to the atmosphere. Overhead still column emissions from the glycol regeneration skid will be controlled by an air cooled condenser. The non-condensables from the still column overheads will be routed to the reboiler and burned with 98% destruction efficiency. Flash tank off-gases from the glycol regeneration skid will also be routed to the reboiler to be burned as fuel with 98% destruction efficiency. The TEG reboilers are equipped with a burner management system to ensure a constant flame for combustion of the vapors. Any excess vapors not burned as fuel will be recycled/recompressed.

After dehydration, fuel gas is pulled from the discharge side of the process. A fuel gas skid reduces the pressure of a portion of the discharge gas to a pressure suitable for use by fuel burning equipment. Pertaining to the fuel gas skid, there is no hydrocarbon liquid recovery by design.

Inlet liquids will flow from the two phase low pressure inlet separator to one of two (2) 0.5 mmBtu/hr natural gas-fired heater treater feed drums (EUHT-1 and EUHT-2); which is a three phase low pressure separator. Heater Treaters are used to treat emulsions, which are stable mixtures of condensate, solids, and water. These units use thermal, gravitational, mechanical, and sometimes chemical methods to break the emulsions and separate the condensate from water. Elevating the emulsion temperature is particularly effective in lowering condensate viscosity and promoting phase separation. Heavy liquids (water) will be transported off site via truck. Liquid hydrocarbon (condensates) will flow from the feed drum to the heater treater. Any vapors evolved from the liquid to the feed drum will be routed to the electric driven flash gas compressor and recycled to the two phase low pressure inlet separator. After stabilization, condensate will be sent to one of the 16,800 gallon atmospheric condensate storage tanks (EUTK-1 through EUTK-8). Produced condensate will be transported off site via truck. Vapors evolved from truck loading (both produced water and condensate) will be captured and routed to an activated carbon canister (EULOAD-1 and EULOAD-2).

The facility will contain several liquid recycle streams to reduce emissions. All high pressure liquids will be cascaded to lower pressure separators to capture gases evolved as a result of pressure reduction. All liquids formed by gas cooling in the inter-stage coolers of the three stage reciprocating compressors will be cascaded to lower pressure scrubbers on the compressor skid.

The facility will also contain several gas recycle streams. All atmospheric tank emissions will be controlled by vapor recovery compression. The vapor recovery compressors will discharge in the flash gas compressor. The flash gas compressor will compress these gases and discharge into the two phase low pressure inlet separator. Overhead gases from the heater treater feed drum and heater treater will also be routed to the flash gas compressor and recycled to the two phase low pressure inlet separator.

The 600 kW_e Capstone C600 NG Microturbine Generator provides electric power to the vapor recovery and flash gas compressors, electric glycol pumps, and other electrical equipment. Fugitive emissions from component leaks also occur.

SITE INSPECTION

Due to the nature of the proposed modification, a site inspection by the writer was deemed as not necessary. On September 9, 2015, a site inspection of the Sand Hill Compressor Station was conducted by Mr. James Robertson of the DAQ Compliance/Enforcement (C/E) Section. This inspection found the facility be "Status 30 - In Compliance."

AIR EMISSIONS AND CALCULATION METHODOLOGIES

AMS included in Attachment N of the permit application air emissions calculations for the equipment and processes at the Sand Hill Compressor Station. The following will summarize the calculation methodologies used by AMS to calculate the PTE of only those emission units being modified in the permitting action evaluated herein.

Compressor Engines

Potential emissions from each of the twelve (12) 1,380 hp Caterpillar G3516B 4SLB Compressor Engines (EUCE-1 through EUCE-12) were based on (revised, see Table 1) post-control emission factors provided by the oxidation catalyst vendor, the engine vendor, and as given in AP-42, Section 3.2 (AP-42 is a database of emission factors maintained by USEPA). Hourly emissions were based on the (as calculated using a fuel heat rating of 8,984 Btu/hp-hr) maximum design heat input (MDHI) of the engines of 12.40 mmBtu/hr and the maximum hp rating. Annual emissions were based on 8,760 hours of operation per year. A higher heating value of 1,324 Btu/scf was used in the calculations. The following table details the PTE of each compressor engine:

Table 2: Per-Compressor Engine PTE

Pollutant	Emission Factor	Source	Hourly (lb/hr)	Annual (ton/yr)
CO[(1)]	0.45 g/hp-hr (controlled)	Catalyst Vendor	1.36	5.96
NO_X	0.50 g/hp-hr	Engine Vendor	1.52	6.66
$PM_{2.5}/PM_{10}/PM$[(2)]	9.91×10^{-3} lb/mmBtu	AP-42, Table 3.2-2	0.12	0.54
SO_2	5.88×10^{-4} lb/mmBtu	AP-42, Table 3.2-2	0.01	0.03
VOCs[(1)]	0.29 g/hp-hr (controlled)	Catalyst Vendor	0.88	3.86
Total HAPs	Various	AP-42, Table 3.2-2	0.29	1.25
Formaldehyde[(1)]	0.02 g/hp-hr (controlled)	Catalyst Vendor	0.06	0.27

(1) Based on post-control emission factor provided by the catalytic converter vendor. VOC emission factor is the sum of the both NMNEHC and HCHO emission factors.

(2) Includes condensables.

Glycol Regenerator Column/GDU Flash Tank Emissions

Revised uncontrolled VOC and Hazardous Air Pollutant (HAP) emissions from the glycol regenerator still vent and GDU flash tank are based on the emissions calculation program GRI-GLYCalc Version 4.0. GRI-GLYCalc is a well-known program for estimating air emissions from glycol units using TEG. Included in the application is a copy of the appropriate GLY-Calc analysis sheets. A site specific representative gas analysis taken on February 26, 2015 was used to provide updated inputs to GLY-Calc and was included in the permit application. As noted above, the GDUs are designed and operated so that vapors from both the still vent and the flash tank are sent to the flame zone of the reboiler and used as a fuel. The reboiler is designed with a flame burner management system so that a flame is always present when vapors are being sent to the unit. Additionally, any excess gases from the flash tank not used as a fuel in the reboiler is recycled and sent back to the station inlet for reprocessing. Based on these redundant design features, controlled emissions from the GDU still vent/flash tank were based on a 98% destruction and removal efficiency (DRE) of hydrocarbons in the associated reboilers (with a 10% safety factor applied).

Condensate Storage Tanks

AMS provided a revised estimate (based on lower throughput) of the uncontrolled emissions produced from the eight (8) condensate storage tanks (EPTK-1 through ETK-8) using the TANKS 4.09d program (working/breathing losses) as provided under AP-42, Section 7 and using ProMax Simulation Software (flashing losses). ProMax software is a chemical process simulator for design and modeling of amine gas treating, glycol dehydration units, and other natural gas components. As stated above, the uncontrolled emissions are captured and recycled by the plants VRU system (with a maximum as-monitored 2% downtime (175 hours) as authorized under Permit Number R13-2913. Emissions were based on an aggregate condensate throughput of 2,520,000 gallons per year.

Condensate Truck Loading

Air emissions from revised condensate truck loading operations (based on lower throughput) occur as fugitive emissions generated by displacement of vapors when loading trucks. The uncontrolled emission factor used to generate the VOC emissions is based on Equation (1) of AP-42 Section 5.2-1. In this equation, CNX used variables specific to the condensate loaded and to the method of loading - in this case "submerged filling - dedicated normal service." Based on the use of the VRU compressor, and according to guidance in AP-42, Section 5.2-1, a control efficiency of 70% was applied to the uncontrolled condensate loading emissions. The captured loading vapors are routed to an activated carbon canister for a control of 95%. Therefore, the overall control efficiency of the uncontrolled truck loading emissions is 66.5% as authorized under Permit Number R13-2913. Additionally, worst-case annual emissions were based on a maximum loading of 2,520,000 gallons of condensate. Maximum hourly emission rates were based on loading a maximum of 15,120 gallons of condensate per hour.

Fugitives

Equipment Leaks

AMS based their revised VOC fugitive equipment leak calculations on emission factors taken from the document EPA-453/R-95-017 - "Protocol for Equipment Leak Emission Estimates" Table

2-4 (VOCs). No control efficiencies, as based on a Leak Detection and Repair (LDAR) protocol, were applied. Component counts were based on as-built numbers at the facility. VOC by-weight percentages (gas ~ 23%, light oil ~ 79%) of the natural gas/condensate were also used in the calculations and is based on a site-specific gas/oil analysis taken on February 26, 2015.

Compressor Blowdowns

AMS also included in their fugitive emission estimate a number of compressor blowdowns where natural gas is released for emergency or maintenance purposes. The calculations were based on a release of 1,793,500 scf of natural gas per year (based on 10 blowdowns per engine during the first month of operation and 8 blowdowns/engine-month after). The VOC by-weight percentage (23%) of the natural gas was also used in the calculations and is based on a site-specific gas analysis taken on February 26, 2015.

Emissions Summary

Based on the above revised estimation methodologies, the post-modification PTE of the Sand Hill Compressor Station is given in Tables 1a through 1d in Attachment N of the permit application. The change in annual facility-wide PTE (only pollutants that changed are listed) as a result of the after-the-fact modifications evaluated herein is given in the following table:

Table 3: Change In Facility-Wide Annual PTE

Pollutant	R13-2913[(1)]		R13-2913A		Change	
	lbs/hour	tons/year	lbs/hour	tons/year	lbs/hour	tons/year
CO	3.13	13.74	17.19	75.30	14.06	61.56
VOCs	12.52	81.93	15.66	94.46	3.14	12.53
HAPs	3.81	16.69	3.87	16.41	0.06	-0.28

(1) Emissions taken from R13-2913 Fact Sheet.
(2) All particulate matter emissions are assumed to be less than 2.5 microns. Includes condensables.

REGULATORY APPLICABILITY

The Sand Hill Compressor Station is subject to the following substantive state and federal air quality rules and regulations: 45CSR2, 45CSR6, 45CSR13, 40 CFR 60 Subparts JJJJ and OOOO, and 40 CFR 63, Subparts HH and ZZZZ. The following will discuss only the potential or actual regulatory applicability of rules to the emission units that have been proposed to be substantively 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 modification of the Sand Hill Compressor Station has a potential to emit in excess of six (6) lbs/hour and ten (10) TPY of a regulated pollutant (see Table 3) and, therefore, pursuant to §45-13-2.17, the proposed changes are defined as a "modification" under 45CSR13.

Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the . . . modification . . . and operation of any stationary source to be commenced without . . . obtaining a permit to . . . modify." Therefore, AMS is required to obtain a permit under 45CSR13 for the proposed changes.

As required under §45-13-8.3 ("Notice Level A"), AMS placed a Class I legal advertisement in a "newspaper of *general circulation* in the area where the source is . . . located." The ad ran on September 11, 2015 in the *Intelligencer* and the affidavit of publication for this legal advertisement was submitted on October 9, 2015.

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

The Sand Hill Compressor Station is located in Marshall County, WV. Marshall County is classified as "in attainment" with all National Ambient Air Quality Standards except for, in certain tax districts, SO_2. The Franklin Tax District, where the Sand Hill facility is *not* located, is classified as "non-attainment" for SO_2. 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 Table 3, the facility-wide PTE of the proposed Sand Hill Compressor Station is less than 250 TPY for all criteria pollutants. Therefore, the facility is not defined as a "major stationary source" under 45CSR14 and the rule does not apply.

45CSR27: To Prevent and Control the Emissions of Toxic Air Pollutants - (NON APPLICABILITY)

Pursuant to §45-27-3.1, the "owner or operator of a plant that discharges or may discharge a toxic air pollutant into the open air in excess of the amount shown in the Table A [of 45CSR27] shall employ [Best Available Technology] at all chemical processing units emitting the toxic air pollutant." As calculated from Table 2 above, the aggregate PTE of formaldehyde generated by the compressor engines is greater than 0.5 TPY - greater than the 1,000 pound per year threshold given in Table A of 45CSR27. However, internal combustion engines do no meet the definition of "chemical processing units" under §45-27-2.4 and, therefore, they are not subject to BAT under 45CSR27.

45CSR30: Requirements for Operating Permits

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 modified Sand Hill 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 Table 3) 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 Sand Hill Compressor Station is not subject to 45CSR30.

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

AMS's twelve (12) Caterpillar G3516 4SLB 1,380 hp compressor engines 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 AMS'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 4: Caterpillar G3616 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	0.50	0.00%	0.50	Yes
CO	2.0	2.98	84.90%	0.45	Yes
VOC	0.7	1.08	75.00%	0.27	Yes

(1) Based on the EMIT Technologies, Inc. Model ELH-3550-1416F-4CE0-241 oxidation catalyst specification sheet included in the permit application. Pursuant to Subpart JJJJ, compliance with VOC emissions do not include CH_2O emission factors.

The Caterpillar G3516B is not a "certified" engine under Subpart JJJJ so AMS 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. AMS 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 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 Sand Hill 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).

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. Pursuant to §63.760(a)(3), as the Sand Hill Compressor Station - an area source of HAPs (see Table 3) - "process[es], upgrade[s], or store[s] natural gas prior to the point at which natural gas enters the natural gas transmission and storage source category or is delivered to a final end user," it is defined as an area source subject to the applicable provisions under Subpart HH.

Pursuant to §63.760(b)(2), each TEG 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): if (1) "actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters [3 mmscf/day] per day" or (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."

Information in the permit application indicates the the maximum aggregate PTE of benzene emissions from each GDU is less than 1 TPY. Therefore, the GDUs are exempt from the Subpart HH requirements given under §63.764(d).

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 Sand Hill Compressor Station is defined as an area source of HAPs (see Table 3), 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 Sand Hill Compressor Station are each defined as a new stationary RICE 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 existing Sand Hill 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_{10} and $PM_{2.5}$), 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 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 following table lists each HAP identified by AMS as emitted in substantive amounts at Sand Hill and the associated carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 5: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
Acetaldehyde	VOC	Yes	B2 - Probable Human Carcinogen
Acrolein	VOC	No	Inadequate Data
Formaldehyde	VOC	Yes	B1 - Probable Human Carcinogen
Methanol	VOC	No	No Assessment Available
n-Hexane	VOC	No	Inadequate Data
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Toluene	VOC	No	Inadequate Data

HAPs	Type	Known/Suspected Carcinogen	Classification
Ethylbenzene	VOC	No	Category D - Not Classifiable
Xylenes	VOC	No	Inadequate Data

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 emissions of the proposed facility are less than applicability thresholds that would define the proposed facility as "major" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature and location of the proposed source, an air quality impacts modeling analysis was not required under §45-13-7.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

Due to the nature of the modification, no changes in the monitoring, compliance demonstration, and reporting, record-keeping requirements (MRR) were made.

PERFORMANCE TESTING OF OPERATIONS

Due to the nature of the modification, no changes in the performance testing requirements were made.

CHANGES TO PERMIT R13-2913

The substantive changes made changes to R13-2913 were limited to:

- The CO and VOC emission limits of the compressor engines in Section 5.1.2 of the draft permit were revised;
- The emission limits of the GDU still vent in Section 5.1.2 of the draft permit were revised;

- Additional language was added under 7.1.8. of the draft permit to require a burner management system on the reboilers;

- A requirement limiting VRU downtime in controlling the emissions from the storage tanks was added to Section 9.1.2. of the draft permit;

- Truck loading throughput limits under Sections 10.1.1. and 10.1.2. were revised lower;

- Language from 40 CFR 63, Subpart ZZZZ was added to Section 12.0 of the draft permit; and

- Language from 40 CFR 60, Subpart OOOO was added to Section 13.0 of 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 R13-2913A to Appalachian Midstream Services, L.L.C. for the proposed modification of the Sand Hill Compressor Station located near near Dallas, Marshall County, WV.

_____
Joe Kessler, PE
Engineer

_____
Date