

| | |
|---|--|
| Engineer | Jerry Williams, P.E. |
| Email Address | jerry.williams@wv.gov |
| Company Name | Antero Midstream LLC |
| Company ID | 017-00084 |
| Facility Name | Canton North Compressor Station |
| Permit Number | R13-3167B |
| County | Doddridge |
| Newspaper | <i>The Doddridge Independent</i> |
| Company Email and "Attention To:" | Luz C. Slauter lslauter@anteroresources.com |
| Environmental Contact Email Address | NA |
| Regional Office (if applicable) | NA |
| New or Modified Source? | modified |
| Construction, Modification, or Relocation? | modification |
| Type of Facility | natural gas compressor station |
| "Located" or "To Be Located"? | located |
| Place where I can find electronic versions of your notice, engineering evaluation, and draft permit | Q:\AIR_QUALITY\Willi\Permit Applications Under Review\Antero Resources Appalachian Corporation\R13-3167B Canton North Compressor Station |

publish Fri Nov 18 2016
30 days Mon Dec 19 2016

emails prepped

INTERNAL PERMITTING DOCUMENT TRACKING MANIFEST

Company Name Antero Midstream LLC

Permitting Action Number R13-3167B Total Days 62 DAQ Days 38

Permitting Action:

- | | | |
|---|------------------------------------|---|
| <input type="radio"/> Permit Determination | <input type="radio"/> Temporary | <input checked="" type="radio"/> Modification |
| <input type="radio"/> General Permit | <input type="radio"/> Relocation | <input type="radio"/> PSD (Rule 14) |
| <input type="radio"/> Administrative Update | <input type="radio"/> Construction | <input type="radio"/> NNSR (Rule 19) |

Documents Attached:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Engineering Evaluation/Memo | <input type="checkbox"/> Completed Database Sheet |
| <input checked="" type="checkbox"/> Draft Permit | <input type="checkbox"/> Withdrawal |
| <input checked="" type="checkbox"/> Notice | <input type="checkbox"/> Letter |
| <input type="checkbox"/> Denial | <input type="checkbox"/> Other (specify) _____ |
| <input type="checkbox"/> Final Permit/General Permit Registration | _____ |

| Date | From | To | Action Requested |
|-----------|-------|-------|--------------------------------------|
| 11/3/2016 | Jerry | Bev | Please review and approve for notice |
| 11/14 | Bev | Jerry | Go to Notice |
| 11/14 | Jerry | Jerry | Approved for notice |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

NOTE: Retain a copy of this manifest for your records when transmitting your document(s).



Permit / Application Information Sheet
Division of Environmental Protection
West Virginia Office of Air Quality

| | | | |
|--------------------------|---|--|----------------------|
| Company: | Antero Midstream LLC | Facility: | Canton North Station |
| Region: | 8 | Plant ID: | 017-00084 |
| Engineer: | Williams, Jerry | Application #: | 13-3167B |
| Physical Address: | State Route 23 Center Point WV 26339 | Category: | |
| County: | Doddridge | SIC: [4923] ELECTRIC, GAS AND SANITARY SERVICES - GAS TRANSMISSION AND DISTRIBUTION | |
| Other Parties: | Consultant - Steyskal, Michele 719-632-3593 ENV_MGR - Schatz, Barry 303-357-7276 | | |
| NAICS: | [221210] Natural Gas Distribution | | |

Information Needed for Database and AIRS
 1. Need valid physical West Virginia address with zip

Regulated Pollutants

| Summary from this Permit 13-3167B | | |
|-----------------------------------|------------------------|------------------|
| Air Programs | Applicable Regulations | |
| NSPS | | |
| SIP | | |
| Fee Program | Fee | Application Type |
| 8D | \$4,500.00 | MODIFICATION |

Notes from Database

Permit MM Note: Updated operating conditions of NSCR catalysts, tank emissions, installation of heater, increase in dehydration throughput, modify blowdown and pigging events and elimination of synthetic minor status.

Activity Dates

| | |
|------------------------------|------------|
| APPLICATION RECEIVED | 09/02/2016 |
| APPLICATION FEE PAID | 09/02/2016 |
| ASSIGNED DATE | 09/02/2016 |
| APPLICANT PUBLISHED LEGAL AD | 09/09/2016 |
| APPLICATION DEEMED COMPLETE | 09/27/2016 |
| ADDITIONAL INFO RECEIVED | 09/27/2016 |
| ADDITIONAL INFO RECEIVED | 10/26/2016 |

NON-CONFIDENTIAL

Please note, this information sheet is not a substitute for file research and is limited to data entered into the AIRTRAX database.

Company ID: 017-00084
 Company: Antero Midstream LLC
 Printed: 11/02/2016
 Engineer: Williams, Jerry

| | |
|---|--|
| Engineer | Jerry Williams, P.E. |
| Email Address | jerry.williams@wv.gov |
| Company Name | Antero Midstream LLC |
| Company ID | 017-00084 |
| Facility Name | Canton North Compressor Station |
| Permit Number | R13-3167B |
| County | Doddridge |
| Newspaper | <i>The Doddridge Independent</i> |
| Company Email and "Attention To:" | Luz C. Slauter lslauter@anteroresources.com |
| Environmental Contact Email Address | NA |
| Regional Office (if applicable) | NA |
| New or Modified Source? | modified |
| Construction, Modification, or Relocation? | modification |
| Type of Facility | natural gas compressor station |
| "Located" or "To Be Located"? | located |
| Place where I can find electronic versions of your notice, engineering evaluation, and draft permit | Q:\AIR_QUALITY\Willi\Permit Applications Under Review\Antero Resources Appalachian Corporation\R13-3167B Canton North Compressor Station |

AIR QUALITY PERMIT NOTICE

Notice of Intent to Approve

On September 2, 2016, Antero Midstream LLC applied to the WV Department of Environmental Protection, Division of Air Quality (DAQ) for a permit to modify the Canton North natural gas compressor station located on WV 23, near Center Point, Doddridge County, WV at latitude 39.40425 and longitude -80.68345. A preliminary evaluation has determined that all State and Federal air quality requirements will be met by the proposed facility. The DAQ is providing notice to the public of its preliminary determination to issue the permit as R13-3167B.

The following increase in potential emissions will be authorized by this permit action: Particulate Matter less than 10 microns, 1.97 tons per year (TPY); Sulfur Dioxide, 0.13 TPY; Carbon Dioxide Equivalents, 14,449 TPY.

The following decrease in potential emissions will be authorized by this permit action: Oxides of Nitrogen, 25.05 TPY; Carbon Monoxide, 21.77 TPY; Volatile Organic Compounds, 35.96 TPY; Formaldehyde, 1.00 TPY; Total Hazardous Air Pollutants, 0.94 TPY.

Written comments or requests for a public meeting must be received by the DAQ before 5:00 p.m. on (Day of Week, Month, Day, Year). A public meeting may be held if the Director of the DAQ determines that significant public interest has been expressed, in writing, or when the Director deems it appropriate.

The purpose of the DAQ's permitting process is to make a preliminary determination if the proposed modification will meet all state and federal air quality requirements. The purpose of the public review process is to accept public comments on air quality issues relevant to this determination. Only written comments received at the address noted below within the specified time frame, or comments presented orally at a scheduled public meeting, will be considered prior to final action on the permit. All such comments will become part of the public record.

Jerry Williams, P.E.
WV Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
Telephone: 304/926-0499, ext. 1223
FAX: 304/926-0478

Additional information, including copies of the draft permit, application and all other supporting materials relevant to the permit decision may be obtained by contacting the engineer listed above. The draft permit and engineering evaluation can be downloaded at:

www.dep.wv.gov/daq/Pages/NSRPermitsforReview.aspx



west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone (304) 926-0475 • FAX: (304) 926-0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-3167B
Plant ID No.: 017-00084
Applicant: Antero Midstream LLC (Antero)
Facility Name: Canton North Compressor Station
Location: Center Point, Doddridge County
NAICS Code: 221210 (Natural Gas Distribution)
Application Type: Modification
Received Date: September 2, 2016
Engineer Assigned: Jerry Williams, P.E.
Fee Amount: \$4,500.00
Date Received: September 2, 2016
Complete Date: September 27, 2016
Due Date: December 26, 2016
Applicant Ad Date: September 9, 2016
Newspaper: *The Doddridge Independent*
UTM's: Easting: 527.254 km Northing: 4,361.686 km Zone: 17
Description: Updated operating conditions of NSCR catalysts, tank emissions, installation of heater, increase in dehydration throughput, modify blowdown and pigging events and elimination of synthetic minor status.

DESCRIPTION OF PROCESS

The Canton North Compressor Station is located in Doddridge County, approximately 2.8 miles WNW of Center Point. This facility began operation on August 22, 2014 upon issuance of Permit R13-3167.

This modification application consists of:

- Updating compressor engine emissions to reflect catalyst data based on a new catalyst design from the manufacturer
- Updating storage tank emissions using ProMax 3.2
- New installation of a fuel conditioning heater (0.5 million BTU/hr capacity)
- Removing the generator hours of operation limit
- Eliminating the compressor fuel use limit and synthetic minor status
- Increasing the dehydrator throughput to 110 million standard cubic feet per day (mmscfd) per dehydrator
- Modifying the dehydrator flash tank control efficiency based on new standardized guidance from WVDEP
- Modifying compressor blowdown and pigging events based on expected operations

The following process description was taken from Permit Application R13-3167B:

The Canton North Compressor Station is located in Doddridge County, West Virginia. Gas from surrounding pipelines enters 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 400 barrel settling tank (TK-1502). Gas from the filter separator is sent to one (1) of eleven (11) 1,680 hp Waukesha compressor engines (C-100 – C-1100). The eleven (11) compressor engines are controlled with NSCR catalysts and air-fuel ratio controllers (1C – 11C). Fuel gas for the compressor engines will be treated prior to the engines by a fuel conditioning skid with a 0.5 MMBtu/hr heater (FUEL1) to allow more complete combustion. Produced fluids are routed to the settling tank and gas going to one of the two (2) TEG dehydrators.

Each TEG dehydrator (DEHY1 – DEHY2) contains a flash gas tank and 1.5 MMBtu/hr reboiler. Each dehydrator has a design rate of 110 MMscf/day. Within the dehydrator unit, vent gas from the flash gas tank (DFLSH1 – DFLSH2) is routed to the reboiler (DREB1 – DREB2) and used as fuel. In the case where the flash tank gas cannot be used by the reboiler due to excess gas or the reboiler is offline, the gas will be sent to the vapor recovery units (VRU-100 and VRU-200) via the storage tanks and thus controlled by 98%. Combustion emissions from each reboiler are routed to the atmosphere. The dehydrator still vents (DEHY1 – DEHY2) are controlled by a flare with at least 98% control efficiency (FLARE1). 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 plant discharge.

All produced fluids enter one (1) 400 barrel settling tank (TK-1502) where the fluids settle out as either condensate or produced water. The produced water goes to two (2) 400 barrel produced water tanks (TK-1500 – TK-1501) and the condensate goes to two (2) 400 barrel condensate tanks (TK-200 – TK-201). 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 vapor recovery unit (VRU-100) where tank vapors are collected and recycled back into the gas system right before the initial filter scrubber. There is a second vapor recovery unit (VRU-200) that is used as a back-up control for the storage tanks. The produced fluids are trucked out via tanker trucks as needed (LDOUT1). The production is 150 barrels per day of condensate and 45 barrels per day of produced water.

Two (2) natural gas microturbine generators, each rated at 600 kWe supply power to the facility (GEN1 – GEN2). Each 600 kWe generator is actually comprised of three smaller units, each rated at 200 kWe. Likely, the total generator capacity of 1,200 kWe will not be operating at 8,760 hours per year, however, emissions were calculated as such for maximum flexibility. A small 24,000 Btu/hr catalytic heater (CATHT1) is used to heat the fuel to power the generators. Fugitive emissions from component leaks and emissions from venting or blowdown events also occur.

There will also be six (6) small storage tanks (between 1,000 and 2,000 gallon storage capacity) onsite.

SITE INSPECTION

A site inspection was conducted on October 21, 2015 by Doug Hammell of the DAQ Enforcement Section. According to Mr. Hammell, the facility was operating in compliance.

Latitude: 39.404250
Longitude: -80.683450

Directions to the facility are as follows:

From US-50 near Salem: Travel approximately 15 miles on WV-23W/Jacobs Run Road to site.



ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this application consist of the combustion emissions from eleven (11) natural gas fired compressor engines (C-100 – C-1100), two (2) microturbine generators (GEN1, GEN2), two (2) TEG dehydrator still vents (DEHY1, DEHY2), two (2) TEG dehydrator reboilers (DREB1, DREB2), two (2) dehydrator flash tanks (DFLSH1, DFLSH2), five (5) 400 bbl (16,800 gal) tanks (settling, condensate, produced water) (TK-1502, TK-200, TK-201, TK-1500, TK-1501), six (6) miscellaneous storage tanks (oily water, used oil, TEG, compressor coolant, two (2) lube oil), one (1) product loadout rack (LDOUT1), one (1) flare (FLARE1), two (2) vapor recovery units (VRU-100, VRU-200), one (1) catalytic heater (CATH1), one (1) fuel conditioning heater (FUEL1) and fugitive emissions. Fugitive emissions for the facility are based on calculation methodologies presented in EPA Protocol for Equipment Leak Emission Estimates. The following table indicates which methodology was used in the emissions determination:

| Emission Unit ID# | Process Equipment | Calculation Methodology |
|--------------------------|--|--|
| C-100 – C-1100 | 1,680 hp Waukesha 7044 GSI Reciprocating Internal Combustion Engine (RICE) w/ NSCR | Manufacturer’s Data, EPA AP-42 Emission Factors |
| GEN1, GEN2 | 600 kW Capstone C600 NG Microturbine Generators | Manufacturer’s Data, EPA AP-42 Emission Factors |
| CATH1 | 0.024 MMBTU/hr Catalytic Heater | EPA AP-42 Emission Factors |
| FUEL1 | 0.5 MMBTU/hr Fuel Conditioning Heater | EPA AP-42 Emission Factors |
| DEHY1, DEHY2 | 110 mmscfd TEG Dehydrator Still Vent w/ Condenser/Recycle and Flare | GRI-GlyCalc 4.0 |
| DREB1, DREB2 | 1.5 MMBtu/hr TEG Dehydrator Reboiler | EPA AP-42 Emission Factors |
| TK-1502 | 400 bbl (16,800 gal) Produced Water/Condensate Settling Tank | EPA Tanks 4.09d and ProMax Simulation (Flashing) |
| TK-200, TK-201 | 400 bbl (16,800 gal) Condensate Storage Tanks | EPA Tanks 4.09d |
| TK-1500, TK-1501 | 400 bbl (16,800 gal) Produced Water Storage Tanks | EPA Tanks 4.09d |
| TK-300 | 1,000 gal Compressor Skid Oily Water Storage Tank | Negligible |
| TK-301 | 1,000 gal Used Oil Storage Tank | Negligible |
| TK-104 | 1,000 gal TEG Make-Up Storage Tank | Negligible |
| TL-106 | 2,000 gal Compressor Coolant Storage Tank | Negligible |
| TK-107 | 2,000 gal Engine Lube Oil Storage Tank | Negligible |
| TK-108 | 2,000 gal Compressor Lube Oil Storage Tank | Negligible |
| LDOUT1 | 195 bbl (8,190 gal) / day Product Loadout Rack | EPA AP-42 Emission Factors |
| VRU-100 | Vapor Recovery Unit #1 | Electric Driven |
| VRU-200 | Vapor Recovery Unit #2 | Electric Driven |
| FLARE1 | 4.8 MMBTU/hr Flare Control Device | EPA AP-42 Emission Factors |

The following table indicates the control device efficiencies that are required for this facility:

| Emission Unit | Pollutant | Control Device | Control Efficiency |
|---|----------------------------|--|--------------------|
| 1,680 hp Waukesha 7044 GSI RICE w/ NSCR (C-100 – C-1100) | Nitrogen Oxides | NSCR | 97.5 % |
| | Carbon Monoxide | | 97.5 % |
| | Volatile Organic Compounds | | 84 % |
| | Formaldehyde | | 90 % |
| | Methane | | 70 % |
| 110 mmscfd TEG Dehydrator Still Vents (DEHY1, DEHY2) | Volatile Organic Compounds | Flare | 98 % |
| | Hazardous Air Pollutants | | 98 % |
| 110 mmscfd TEG Dehydrator Flash Tanks (DFLSH1, DFLSH2) | Volatile Organic Compounds | Recycled Reboiler/ Condenser w Backup VRU System | 98 % |
| | Hazardous Air Pollutants | | 98 % |
| Product Tanks (TK-1502, TK-200, TK-201, TK-1500, TK-1501) | Volatile Organic Compounds | Vapor Recovery Units | 98 % |
| | Hazardous Air Pollutants | | 98 % |

The total facility PTE (including fugitives) for the Canton North Compressor Station is shown in the following table:

| Pollutant | R13-3167A PTE (tons/year) | R13-3167B PTE (tons/year) | PTE Change (tons/year) |
|----------------------------|------------------------------|------------------------------|---------------------------|
| Nitrogen Oxides | 90.77 | 65.72 | -25.05 |
| Carbon Monoxide | 93.71 | 71.94 | -21.77 |
| Volatile Organic Compounds | 86.30 | 50.34 | -35.96 |
| Particulate Matter-10/2.5 | 11.97 | 13.94 | 1.97 |
| Sulfur Dioxide | 0.46 | 0.59 | 0.13 |
| Formaldehyde | 1.93 | 0.93 | -1.00 |
| Total HAPs | 11.43 | 10.49 | -0.94 |
| Carbon Dioxide Equivalent | 95,111 | 109,837 | 14,726 |

Maximum detailed controlled point source emissions were calculated by Antero and checked for accuracy by the writer and are summarized in the table on the next page.

Antero Midstream LLC – Canton North Compressor Station (R13-3167B)

| Emission Point ID# | Source | NO _x | | CO | | VOC | | PM-10/2.5 | | SO ₂ | | Formaldehyde | | Total HAPs | | CO _{2e} ton/year |
|---------------------------|------------------------------|-----------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|-----------------|-------------|--------------|-------------|-------------|--------------|------------------------------|
| | | lb/hr | ton/year | lb/hr | ton/year | lb/hr | ton/year | lb/hr | ton/year | lb/hr | ton/year | lb/hr | ton/year | lb/hr | ton/year | |
| 1E | Compressor Engine #1 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 2E | Compressor Engine #2 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 3E | Compressor Engine #3 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 4E | Compressor Engine #4 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 5E | Compressor Engine #5 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 6E | Compressor Engine #6 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 7E | Compressor Engine #7 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 8E | Compressor Engine #8 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 9E | Compressor Engine #9 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 10E | Compressor Engine #10 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 11E | Compressor Engine #11 | 1.26 | 5.52 | 1.19 | 5.19 | 0.25 | 1.09 | 0.27 | 1.18 | <0.01 | 0.04 | 0.02 | 0.08 | 0.18 | 0.81 | 8731 |
| 12E | Microturbine Generator #1 | 0.24 | 1.05 | 0.66 | 2.89 | 0.06 | 0.26 | 0.04 | 0.18 | 0.02 | 0.09 | <0.01 | 0.02 | <0.01 | 0.03 | 3499 |
| 13E | Microturbine Generator #2 | 0.24 | 1.05 | 0.66 | 2.89 | 0.06 | 0.26 | 0.04 | 0.18 | 0.02 | 0.09 | <0.01 | 0.02 | <0.01 | 0.03 | 3499 |
| 14E | Dehydrator Still Vent #1 | 0 | 0 | 0 | 0 | 1.16 | 5.08 | 0 | 0 | 0 | 0 | 0 | 0 | 0.11 | 0.49 | 305 |
| 16E | Dehydrator Reboiler | 0.15 | 0.64 | 0.12 | 0.54 | <0.01 | 0.04 | 0.01 | 0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 771 |
| 17E | Dehydrator Still Vent #2 | 0 | 0 | 0 | 0 | 1.16 | 5.08 | 0 | 0 | 0 | 0 | 0 | 0 | 0.11 | 0.49 | 305 |
| 19E | Dehydrator Reboiler | 0.15 | 0.64 | 0.12 | 0.54 | <0.01 | 0.04 | 0.01 | 0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 771 |
| 20E | Settling Storage Tank | 0 | 0 | 0 | 0 | 0.96 | 4.19 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.11 | 27 |
| 21E, 22E | Condensate Storage Tanks | 0 | 0 | 0 | 0 | 0.02 | 0.10 | 0 | 0 | 0 | 0 | 0 | 0 | <0.01 | <0.01 | 1 |
| 23E, 24E | Produced Water Storage Tanks | 0 | 0 | 0 | 0 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <1 |
| 25E | Product Loadout Rack | 0 | 0 | 0 | 0 | 39.26 | 3.87 | 0 | 0 | 0 | 0 | 0 | 0 | 1.03 | 0.10 | 25 |
| 26E | Flare Combustion | 0.33 | 1.44 | 1.78 | 7.79 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 2475 |
| 27E | Catalytic Heater | <0.01 | 0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 12 |
| 28E | Fuel Conditioning Heater | 0.05 | 0.21 | 0.04 | 0.18 | <0.01 | 0.01 | <0.01 | 0.02 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 257 |
| BD | Compressor Blowdowns | 0 | 0 | 0 | 0 | NA | 8.32 | 0 | 0 | 0 | 0 | 0 | 0 | NA | 0.15 | 903 |
| CSU/PS | Compressor Startup/Shutdown | 0 | 0 | 0 | 0 | NA | 4.62 | 0 | 0 | 0 | 0 | 0 | 0 | NA | 0.02 | 501 |
| LPPV | Low Pressure Pig Venting | 0 | 0 | 0 | 0 | NA | 0.40 | 0 | 0 | 0 | 0 | 0 | 0 | NA | 0.01 | 43 |
| HPPV | High Pressure Pig Venting | 0 | 0 | 0 | 0 | NA | 2.85 | 0 | 0 | 0 | 0 | 0 | 0 | NA | 0.05 | 309 |
| Total Point Source | | 15.01 | 65.72 | 16.42 | 71.94 | 45.41 | 47.11 | 3.08 | 13.50 | 0.13 | 0.59 | 0.21 | 0.93 | 3.25 | 10.41 | 109743 |
| Fugitive | Component Leaks | 0 | 0 | 0 | 0 | 0.74 | 3.23 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0.06 | 94 |
| Fugitive | Dust | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Fugitive | | 0 | 0 | 0 | 0 | 0.74 | 3.23 | 0.10 | 0.44 | 0 | 0 | 0 | 0 | 0.01 | 0.06 | 94 |
| Total Sitewide | | 15.01 | 65.72 | 16.42 | 71.94 | 46.15 | 50.34 | 3.18 | 13.94 | 0.13 | 0.59 | 0.21 | 0.93 | 3.27 | 10.47 | 109837 |

REGULATORY APPLICABILITY

The following rules apply to this modification:

45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers)

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

The individual heat input of the reboilers (DREB1, DREB2) and heaters (CATHT1, FUEL1) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR2.

Antero would also be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

45CSR6 (To Prevent and Control Air Pollution from the Combustion of Refuse)

The purpose of this rule is to prevent and control air pollution from combustion of refuse.

Antero has one (1) flare at the facility. The flare is subject to section 4, emission standards for incinerators. The flare has negligible hourly particulate matter emissions. Therefore, the facility's flare should demonstrate compliance with this section. The facility will demonstrate compliance by maintaining records of the amount of natural gas consumed by the flare and the hours of operation. The facility will also monitor the flame of the flare and record any malfunctions that may cause no flame to be present during operation.

45CSR10 (To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides)

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

The individual heat input of the reboilers (DREB1, DREB2) and heaters (CATHT1, FUEL1) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR10.

45CSR13 (Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation)

A 45CSR13 modification permit applies to this source due to the fact that Antero's modification is subject to a substantive requirement of an emission control rule (40CFR60 Subpart OOOO and 40CFR63 Subpart HH).

Antero paid the appropriate application fee and published the required legal advertisement for a modification permit application.

45CSR16 (Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60)

45CSR16 applies to this source by reference of 40CFR60, Subparts JJJJ and OOOO. These requirements are discussed under those rules below.

45CSR22 (Air Quality Management Fee Program)

Antero is not subject to 45CSR30. The Canton North Compressor Station is subject to 40CFR60 Subparts JJJJ and OOOO, however they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided they are not required to obtain a permit for a reason other than their status as an area source.

Antero is required to pay the appropriate annual fees and keep their Certificate to Operate current.

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

40CFR60 Subpart JJJJ establishes emission standards for applicable SI ICE.

The 1,680 hp Waukesha 7044 GSI RICEs (C-100 – C-1100) were manufactured after the July 1, 2007 date for engines with a maximum rated power capacity greater than or equal to 500 hp.

The 1,680 hp Waukesha 7044 GSI RICEs (C-100 – C-1100) will be subject to the following emission limits: NO_x – 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). Based on the manufacturer's specifications for these engines, the emission standards will be met.

The 1,680 hp Waukesha 7044 GSI RICEs (C-100 – C-1100) are not certified by the manufacturer to meet the emission standards listed in 40CFR60 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 for which Construction, Modification or Reconstruction Commenced after August 23, 2011, and on or before September 18, 2015)

EPA published in the Federal Register new source performance standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. 40CFR60 Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO₂) emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011. The following affected sources which commence construction, modification or reconstruction after August 23, 2011 are subject to the applicable provisions of this subpart: Each gas well affected facility, which is a single natural gas well.

There are no gas wells at this facility. Therefore, all requirements regarding gas well affected facilities under 40 CFR 60 Subpart OOOO would not apply.

- a. 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. For the purposes of this subpart, your centrifugal compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A centrifugal compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

There are no centrifugal compressors at the Canton North Compressor Station. Therefore, all requirements regarding centrifugal compressors under 40 CFR 60 Subpart OOOO would not apply.

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

There are reciprocating internal combustion engines located at the Canton North Compressor Station that were constructed after August 23, 2011. Therefore, the requirements regarding reciprocating compressors under 40 CFR 60 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 or installation of a rod packing emissions collection system..

- 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.

c. Pneumatic Controllers

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

All pneumatic controllers at the facility will be air driven. Therefore, there are no applicable pneumatic controllers which commenced construction after August 23, 2011. Therefore, all requirements regarding pneumatic controllers under 40 CFR 60 Subpart OOOO would not apply.

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

40CFR60 Subpart OOOO defines a storage vessel as a unit that is constructed primarily of 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 day period using good engineering practices. For each storage vessel affected facility that emits more than 6 tpy of VOC, the permittee must reduce VOC emissions by 95% or greater within 60 days of startup. The compliance date for applicable storage vessels is October 15, 2013.

The storage vessels located at the Canton North Compressor Station are controlled by a VRU which will reduce the potential to emit to less than 6 tpy of VOC. Therefore, Antero is not required by this section to further reduce VOC emissions by 95%. Antero is claiming a control efficiency of 98% for the VRU. In able to claim a control efficiency greater than 95%, Antero is required to meet additional design/function requirements. Antero will be required to perform three (3) 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.*

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

- Addition or replacement of equipment for the purpose of process improvement that is accomplished without a capital expenditure shall not by itself be considered a modification under this subpart.
- Equipment associated with a compressor station, dehydration unit, sweetening unit, underground storage vessel, field gas gathering system, or liquefied natural gas unit is covered by §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart if it is located at an onshore natural gas processing plant. Equipment not located at the onshore natural gas processing plant site is exempt from the provisions of §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart.
- The equipment within a process unit of an affected facility located at onshore natural gas processing plants and described in paragraph (f) of

this section are exempt from this subpart if they are subject to and controlled according to subparts VVa, GGG or GGGa of this part.

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

- f. Sweetening units located at onshore natural gas processing plants that process natural gas produced from either onshore or offshore wells.
- Each sweetening unit that processes natural gas is an affected facility; and
 - Each sweetening unit that processes natural gas followed by a sulfur recovery unit is an affected facility.
 - Facilities that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H₂S) in the acid gas (expressed as sulfur) are required to comply with recordkeeping and reporting requirements specified in §60.5423(c) but are not required to comply with §§60.5405 through 60.5407 and paragraphs 60.5410(g) and 60.5415(g) of this subpart.
 - Sweetening facilities producing acid gas that is completely reinjected into oil-or-gas-bearing geologic strata or that is otherwise not released to the atmosphere are not subject to §§60.5405 through 60.5407, 60.5410(g), 60.5415(g), and 60.5423 of this subpart.

There are no sweetening units at the Canton North Compressor Station. Therefore, all requirements regarding sweetening units under 40 CFR 60 Subpart OOOO would not apply.

40CFR63 Subpart HH (National Emission Standards for Hazardous Air Pollutants for Oil and Natural Gas Production Facilities)

Subpart HH establishes national emission limitations and operating limitations for HAPs emitted from oil and natural gas production facilities located at major and area sources of HAP emissions. The glycol dehydration units at the Canton North Compressor Station are subject to the area source requirements for glycol dehydration units. However, because the facility is an area source of HAP emissions and the actual average benzene emissions from the glycol dehydration unit is below 0.90 megagram per year (1.0 tons/year) it is exempt from all requirements of Subpart HH except to maintain records of actual average flowrate of natural gas to demonstrate a continuous exemption status.

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

Subpart ZZZZ establishes national emission limitations and operating limitations for HAPs emitted from stationary RICE located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations. The engines (C-100 – C-1100) at the Canton North Compressor Station are subject to the area source requirements for non-emergency spark ignition engines.

The applicability requirements for new stationary RICEs located at an area source of HAPs, is the requirement to meet the standards of 40CFR60 Subpart JJJJ. These requirements were outlined above. The proposed engine meets these standards.

Because these engines are not certified by the manufacturer, Antero will be required to perform an initial performance test within 180 days from startup, and subsequent testing every 8,760 hours or 3 years, whichever comes first.

The following rules do not apply to the facility:

45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

The Canton North Compressor Station is located in Doddridge County, which is an unclassified county for all criteria pollutants, therefore the Canton North Compressor Station is not applicable to 45CSR19.

As shown in the following table, Antero is not a major source subject to 45CSR14 or 45CSR19 review. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, the fugitive emissions are not included in the PTE below.

| Pollutant | PSD (45CSR14) Threshold (tpy) | NANSR (45CSR19) Threshold (tpy) | Canton North PTE (tpy) | 45CSR14 or 45CSR19 Review Required? |
|------------------------|--------------------------------------|--|-------------------------------|--|
| Carbon Monoxide | 250 | NA | 71.94 | No |
| Nitrogen Oxides | 250 | NA | 65.72 | No |
| Sulfur Dioxide | 250 | NA | 0.59 | No |
| Particulate Matter 2.5 | 250 | NA | 13.50 | No |
| Ozone (VOC) | 250 | NA | 47.11 | No |

45CSR30 (Requirements for Operating Permits)

Antero is not subject to 45CSR30. The Canton North Compressor Station is subject to 40CFR60 Subparts JJJJ and OOOO, however they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided they are not required to obtain a permit for a reason other than their status as an area source.

40CFR60 Subpart Kb (Standards of Performance for VOC Liquid Storage Vessels)

40CFR60 Subpart Kb does not apply to storage vessels with a capacity less than 75 cubic meters. The largest tanks that Antero has installed are 63.60 cubic meters each. Therefore, Antero would not be subject to this rule.

40CFR60 Subpart KKK (Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants)

40CFR60 Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984, and on or Before August 23, 2011. The Canton North Compressor Station is not a natural gas processing facility, therefore, Antero is not subject to this rule.

40CFR60 Subpart KKKK (Standards of Performance for Stationary Combustion Turbines)

40CFR60 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 value of the fuel (§60.4305).

40CFR60 Subpart OOOOa (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification or Reconstruction Commenced after September 18, 2015)

EPA published its New Source Performance Standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. EPA published amendments to the Subpart on September 23, 2013 and June 3, 2016. 40CFR60 Subpart OOOOa establishes emission standards and compliance schedules for the control of the pollutant greenhouse gases (GHG). The greenhouse gas standard in this subpart is in the form of a limitation on emissions of methane from affected facilities in the crude oil and natural gas source category that commence construction, modification or reconstruction after September 18, 2015. This subpart also 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 September 18, 2015. The effective date of this rule is August 2, 2016.

For the purposes of 60.5397a (LDAR), a “modification” to a compressor station occurs when one or more compressors is replaced by one or more compressors of greater total horsepower than the compressor(s) being replaced. No increase in horsepower is being realized, therefore, for the purposes of LDAR, a “modification” has not occurred. No modifications occurred in regards to this rule.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

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 HAPs are common to this industry. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

| HAPs | Type | Known/Suspected Carcinogen | Classification |
|--------------|------|----------------------------|---|
| Formaldehyde | VOC | Yes | Category B1 - Probable Human Carcinogen |
| Benzene | VOC | Yes | Category A - Known Human Carcinogen |
| Ethylbenzene | VOC | No | Inadequate Data |
| Toluene | VOC | No | Inadequate Data |
| Xylenes | VOC | No | Inadequate Data |

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects 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

Modeling was not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) or 45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment) as shown in the table listed in the Regulatory Discussion section under 45CSR14/45CSR19.

SOURCE AGGREGATION

“Building, structure, facility, or installation” is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and will become effective on August 2, 2016. EPA defined the term

“adjacent” and stated that equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.

The Canton North Compressor Station will operate under SIC code 4923 (Natural Gas Distribution). There are other compressor stations operated by Antero that share the same two-digit major SIC code of 49 for natural gas distribution.

“Contiguous or Adjacent” determinations are made on a case by case basis. There are no other equipment and activities in the oil and gas sector that are under common control of Antero that are located on the same site or on sites that share equipment and are within ¼ mile of each other.

Because the Canton North Compressor Station is not located on contiguous or adjacent properties with other facilities under common control, the emissions from this facility shall not be aggregated with other facilities for the purposes of making Title V and PSD determinations.

MONITORING OF OPERATIONS

Antero will be required to perform the following monitoring:

- Monitor and record quantity of natural gas consumed for all engines and combustion sources.
- Monitor all applicable requirements of 40CFR60 Subparts JJJJ and OOOO and 40CFR63 Subparts HH and ZZZZ.
- Monitor the presence of the flare pilot flame with a thermocouple or equivalent.

Antero will be required to perform the following recordkeeping:

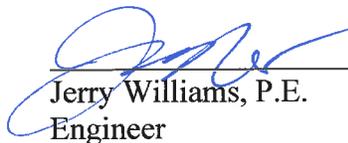
- Maintain records of the amount of natural gas consumed and hours of operation for all engines and combustion sources.
- Maintain records of testing conducted in accordance with the permit. Said records shall be maintained on-site or in a readily accessible off-site location
- Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
- Maintain records of the visible emission opacity tests conducted per the permit.
- Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engines and ancillary equipment.
- Maintain records of all applicable requirements of 40CFR60 Subparts JJJJ and OOOO and 40CFR63 Subparts HH and ZZZZ.
- Maintain records of the flare design evaluation.
- The records shall be maintained on site or in a readily available off-site location maintained by Antero for a period of five (5) years.

CHANGES TO PERMIT R13-3167A

- Section 1.0 (Emission Units) – Revised the design capacity of the TEG Dehydration Units (DEHY1, DEHY2) and flash tanks (DFLSH1, DFLSH2)
- Section 1.0 (Emission Units) – Revised the control device status to include a backup VRU for the dehydrator flash tanks (DFLSH1, DFLSH2)
- Section 1.0 (Emission Units) – Addition of a fuel conditioning heater (FUEL1)
- Section 1.1 (Control Devices) – Revised the control efficiencies for engine NSCR
- Section 1.1 (Control Devices) – Included a backup VRU for the dehydrator flash tanks (DFLSH1, DFLSH2)
- Section 5.0 (C-100 – C-1100) – Removed natural gas throughput limitation and CO₂e emission limits as this source is no longer a synthetic minor
- Section 5.0 (C-100 – C-1100) – Revised emission limits based on new NSCR catalyst
- Section 5.0 (GEN1-GEN2) – Removed maximum yearly operation limitation and CO₂e emission limits as this source is no longer a synthetic minor
- Section 6.0 (Glycol Dehydration Units) – Revised the maximum throughput limitation from 60 mmscfd to 110 mmscfd
- Section 6.0 (Glycol Dehydration Units) – Revised the VOC emissions from the flare to account for the increase in throughput and more efficient operation of the glycol pumps
- Section 6.0 (Glycol Dehydration Units) – Addition of language to account for a backup VRU for the glycol dehydration flash tanks
- Section 7.0 – Addition of catalytic heater (CATHT1) and fuel conditioning heater (FUEL1)
- Section 8.0 (Storage Tanks) – Revise VOC emissions from TK-1502 from updated ProMax analysis
- Section 13.0 (Blowdown and Pigging Operations) – Addition of section to require recordkeeping and reporting of these events

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that Antero meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Canton North Compressor Station should be granted a 45CSR13 modification permit for their facility.



Jerry Williams, P.E.
Engineer

NOV 3 2016

Date

West Virginia Department of Environmental Protection
Earl Ray Tomblin
Governor

Division of Air Quality

Randy C. Huffman
Cabinet Secretary

Permit to Modify



R13- 3167B

This permit is issued in accordance with the West Virginia Air Pollution Control Act (West Virginia Code §§22-5-1 et seq.) and 45 C.S.R. 13 – Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits and Procedures for Evaluation. The permittee identified at the above-referenced facility is authorized to construct the stationary sources of air pollutants identified herein in accordance with all terms and conditions of this permit.

Issued to:

Antero Midstream LLC
Canton North Compressor Station
017-00084

William F. Durham
Director

Issued: Draft

This permitting action supersedes and replaces R13-3167A issued on April 13, 2016.

Facility Location: Center Point, Doddridge County, West Virginia
Mailing Address: 1615 Wynkoop Street, Denver, CO 80202
Facility Description: Natural gas compressor station
NAICS Codes: 221210
UTM Coordinates: 527.254 km Easting • 4,361.686 km Northing • Zone 17
Permit Type: Modification
Description of Change: Updated operating conditions of NSCR catalysts, tank emissions, installation of heater, increase in dehydration throughput, modify blowdown and pigging events and elimination of synthetic minor status.

Any person whose interest may be affected, including, but not necessarily limited to, the applicant and any person who participated in the public comment process, by a permit issued, modified or denied by the Secretary may appeal such action of the Secretary to the Air Quality Board pursuant to article one [§§22B-1-1 et seq.], Chapter 22B of the Code of West Virginia. West Virginia Code §§22-5-14.

The source is not subject to 45CSR30.

Table of Contents

| | | |
|-------------|---|-----------|
| 1.0. | Emission Units..... | 5 |
| 1.1. | Control Devices | 6 |
| 2.0. | General Conditions..... | 7 |
| 2.1. | Definitions | 7 |
| 2.2. | Acronyms | 7 |
| 2.3. | Authority | 8 |
| 2.4. | Term and Renewal..... | 8 |
| 2.5. | Duty to Comply | 8 |
| 2.6. | Duty to Provide Information..... | 8 |
| 2.7. | Duty to Supplement and Correct Information | 9 |
| 2.8. | Administrative Update..... | 9 |
| 2.9. | Permit Modification..... | 9 |
| 2.10. | Major Permit Modification..... | 9 |
| 2.11. | Inspection and Entry..... | 9 |
| 2.12. | Emergency..... | 9 |
| 2.13. | Need to Halt or Reduce Activity Not a Defense..... | 10 |
| 2.14. | Suspension of Activities | 10 |
| 2.15. | Property Rights..... | 10 |
| 2.16. | Severability..... | 11 |
| 2.17. | Transferability | 11 |
| 2.18. | Notification Requirements..... | 11 |
| 2.19. | Credible Evidence | 11 |
| 3.0. | Facility-Wide Requirements | 12 |
| 3.1. | Limitations and Standards | 12 |
| 3.2. | Monitoring Requirements..... | 12 |
| 3.3. | Testing Requirements..... | 12 |
| 3.4. | Recordkeeping Requirements..... | 14 |
| 3.5. | Reporting Requirements..... | 14 |
| 4.0. | Source-Specific Requirements..... | 16 |
| 4.1. | Limitations and Standards | 16 |
| 5.0. | Source-Specific Requirements (C-100 – C-1100, GEN1 – GEN2)..... | 18 |
| 5.1. | Limitations and Standards | 18 |
| 5.2. | Monitoring Requirements..... | 19 |
| 5.3. | Testing Requirements..... | 19 |
| 5.4. | Recordkeeping Requirements..... | 19 |
| 5.5. | Reporting Requirements..... | 19 |
| 6.0. | Source-Specific Hazardous Air Pollutant Requirements (Natural Gas Dehydration Units Not Subject to MACT Standards and being controlled by a Flare Control Device).20 | |
| 6.1. | Limitations and Standards | 20 |
| 6.2. | Monitoring Requirements..... | 22 |
| 6.3. | Testing Requirements..... | 22 |
| 6.4. | Recordkeeping Requirements..... | 22 |
| 6.5. | Reporting Requirements..... | 23 |
| 7.0. | Source-Specific Requirements (Reboilers (DREB1, DREB2), Catalytic Heater (CATHT1), Fuel Conditioning Heater (FUEL1))..... | 24 |

| | | |
|--------------|---|-----------|
| 7.1. | Limitations and Standards | 24 |
| 7.2. | Monitoring Requirements..... | 24 |
| 7.3. | Testing Requirements..... | 24 |
| 7.4. | Recordkeeping Requirements..... | 24 |
| 7.5. | Reporting Requirements..... | 24 |
| 8.0. | Source-Specific Requirements (Storage Tanks, TK-1502, TK-200, TK-201, TK-1501, TK-1502)..... | 25 |
| 8.1. | Limitations and Standards | 25 |
| 8.2. | Monitoring Requirements..... | 27 |
| 8.3. | Recordkeeping Requirements..... | 28 |
| 8.4. | Reporting Requirements..... | 29 |
| 9.0. | Source-Specific Requirements (Product Loadout Rack, LDOUT1) | 30 |
| 9.1. | Limitations and Standards | 30 |
| 9.2. | Recordkeeping Requirements..... | 30 |
| 10.0. | Source-Specific Requirements (40CFR60 Subpart JJJJ Requirements, C-100 – C-1100) | 31 |
| 10.1. | Limitations and Standards | 31 |
| 10.2. | Emission Standards for Owners and Operators..... | 31 |
| 10.3. | Other Requirements for Owners and Operators | 32 |
| 10.4. | Compliance Requirements for Owners and Operators | 32 |
| 10.5. | Testing Requirements for Owners and Operators..... | 34 |
| 10.6. | Notification, Reports, and Records for Owners and Operators | 36 |
| 11.0. | Source-Specific Requirements (40CFR60 Subpart OOOO Requirements, Reciprocating Compressor Engines, C-100 – C-1100) | 38 |
| 11.1. | Limitations and Standards | 38 |
| 11.2. | Initial Compliance Demonstration..... | 38 |
| 11.3. | Continuous Compliance Demonstration..... | 39 |
| 11.4. | Notification, Recordkeeping and Reporting Requirements | 39 |
| 12.0. | Source-Specific Requirements (40CFR63 Subpart ZZZZ Requirements, C-100 – C-1100) 41 | 41 |
| 12.1. | Limitations and Standards | 41 |
| 13.0. | Source-Specific Requirements (Blowdown and Pigging Operations)..... | 41 |
| 13.1. | Limitations and Standards | 41 |
| 13.2. | Recordkeeping Requirements..... | 41 |
| 13.3. | Reporting Requirements | 42 |
| | CERTIFICATION OF DATA ACCURACY..... | 43 |

1.0. Emission Units

| Emission Unit ID | Emission Point ID | Emission Unit Description | Year Installed | Design Capacity | Control Device |
|-------------------------|--------------------------|---|-----------------------|-------------------------|-------------------------------|
| C-100 | 1E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| C-200 | 2E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| C-300 | 3E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| C-400 | 4E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| C-500 | 5E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| C-600 | 6E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| C-700 | 7E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| C-800 | 8E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| C-900 | 9E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| C-1000 | 10E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| C-1100 | 11E | Waukesha 7044 GSI Compressor Engine | 2014 | 1,680 HP | NSCR |
| GEN1 | 12E | Capstone C600 NG Microturbine Generator | 2014 | 600 kW | None |
| GEN2 | 13E | Capstone C600 NG Microturbine Generator | 2014 | 600 kW | None |
| DEHY1 | 14E | TEG Dehydration Unit | 2014 | 110 mmscfd | FLARE1 |
| DFLSH1 | 15E | Dehydrator Flash Tank | 2014 | 110 mmscfd | Recycle/ Backup VRU |
| DREB1 | 16E | TEG Dehydration Unit Reboiler | 2014 | 1.5 MMBtu/hr | None |
| DEHY2 | 17E | TEG Dehydration Unit | 2014 | 110 mmscfd | FLARE1 |
| DFLSH2 | 18E | Dehydrator Flash Tank | 2014 | 110 mmscfd | Recycle/ Backup VRU |
| DREB2 | 19E | TEG Dehydration Unit Reboiler | 2014 | 1.5 MMBtu/hr | None |
| TK-1502 | None | Produced Water/Condensate Settling Tank | 2014 | 400 bbl (16,800 gal) | VRU-100 & 200 ¹ |
| TK-200 | None | Condensate Storage Tank | 2014 | 400 bbl (16,800 gal) | VRU-100 & 200 ¹ |
| TK-201 | None | Condensate Storage Tank | 2014 | 400 bbl (16,800 gal) | VRU-100 & 200 ¹ |
| TK-1500 | None | Produced Water Storage Tank | 2014 | 400 bbl (16,800 gal) | VRU-100 & 200 ¹ |
| TK-1501 | None | Produced Water Storage Tank | 2014 | 400 bbl (16,800 gal) | VRU-100 & 200 ¹ |
| TK-300 | TK-300 | Compressor Skid Oily Water Storage Tank | 2014 | 1,000 gal | None |
| TK-301 | TK-301 | Used Oil Storage Tank | 2014 | 1,000 gal | None |

| Emission Unit ID | Emission Point ID | Emission Unit Description | Year Installed | Design Capacity | Control Device |
|------------------|-------------------|----------------------------------|----------------|-----------------|----------------|
| TK-104 | TK-104 | TEG Make-Up Storage Tank | 2014 | 1,000 gal | None |
| TK-106 | TK-106 | Compressor Coolant Storage Tank | 2014 | 2,000 gal | None |
| TK-107 | TK-107 | Engine Lube Oil Storage Tank | 2014 | 2,000 gal | None |
| TK-108 | TK-108 | Compressor Lube Oil Storage Tank | 2014 | 2,000 gal | None |
| LDOUT1 | 25E | Product Loadout Rack | 2014 | 195 bbl/day | None |
| FLARE1 | 26E | Flare Combustion Device | 2014 | 4.8 MMBTU/hr | NA |
| CATHT1 | 27E | Catalytic Heater | 2014 | 0.024 MMBTU/hr | None |
| FUEL1 | 28E | Fuel Conditioning Heater | 2016 | 0.5 MMBTU/hr | None |

1 – Working, Breathing, and Flashing losses routed to Vapor Recovery Unit for recirculation back into the process.

1.1. Control Devices

| Emission Unit | Pollutant | Control Device | Control Efficiency |
|---|----------------------------|--|--------------------|
| 1,680 hp Waukesha 7044 GSI RICE w/ NSCR (C-100 – C-1100) | Nitrogen Oxides | NSCR | 97.5 % |
| | Carbon Monoxide | | 97.5 % |
| | Volatile Organic Compounds | | 84 % |
| | Formaldehyde | | 90 % |
| | Methane | | 70 % |
| 110 mmscfd TEG Dehydrator Still Vents (DEHY1, DEHY2) | Volatile Organic Compounds | Flare | 98 % |
| | Hazardous Air Pollutants | | 98 % |
| 110 mmscfd TEG Dehydrator Flash Tanks (DFLSH1, DFLSH2) | Volatile Organic Compounds | Recycled Reboiler/ Condenser w Backup VRU System | 98 % |
| | Hazardous Air Pollutants | | 98 % |
| Product Tanks (TK-1502, TK-200, TK-201, TK-1500, TK-1501) | Volatile Organic Compounds | Vapor Recovery Units | 98 % |
| | Hazardous Air Pollutants | | 98 % |

2.0. General Conditions

2.1. Definitions

- 2.1.1. All references to the “West Virginia Air Pollution Control Act” or the “Air Pollution Control Act” mean those provisions contained in W.Va. Code §§ 22-5-1 to 22-5-18.
- 2.1.2. The “Clean Air Act” means those provisions contained in 42 U.S.C. §§ 7401 to 7671q, and regulations promulgated thereunder.
- 2.1.3. “Secretary” means the Secretary of the Department of Environmental Protection or such other person to whom the Secretary has delegated authority or duties pursuant to W.Va. Code §§ 22-1-6 or 22-1-8 (45CSR§30-2.12.). The Director of the Division of Air Quality is the Secretary’s designated representative for the purposes of this permit.

2.2. Acronyms

| | | | |
|-----------------------------|---|-------------------------|---|
| CAAA | Clean Air Act Amendments | NO_x | Nitrogen Oxides |
| CBI | Confidential Business Information | NSPS | New Source Performance Standards |
| CEM | Continuous Emission Monitor | PM | Particulate Matter |
| CES | Certified Emission Statement | PM_{2.5} | Particulate Matter less than 2.5 μm in diameter |
| C.F.R. or CFR | Code of Federal Regulations | PM₁₀ | Particulate Matter less than 10μm in diameter |
| CO | Carbon Monoxide | Ppb | Pounds per Batch |
| C.S.R. or CSR | Codes of State Rules | Pph | Pounds per Hour |
| DAQ | Division of Air Quality | Ppm | Parts per Million |
| DEP | Department of Environmental Protection | Ppmv or ppmv | Parts per Million by Volume |
| dscm | Dry Standard Cubic Meter | PSD | Prevention of Significant Deterioration |
| FOIA | Freedom of Information Act | Psi | Pounds per Square Inch |
| HAP | Hazardous Air Pollutant | SIC | Standard Industrial Classification |
| HON | Hazardous Organic NESHAP | SIP | State Implementation Plan |
| HP | Horsepower | SO₂ | Sulfur Dioxide |
| lbs/hr | Pounds per Hour | TAP | Toxic Air Pollutant |
| LDAR | Leak Detection and Repair | TPY | Tons per Year |
| M | Thousand | TRS | Total Reduced Sulfur |
| MACT | Maximum Achievable Control Technology | TSP | Total Suspended Particulate |
| MDHI | Maximum Design Heat Input | USEPA | United States Environmental Protection Agency |
| MM | Million | UTM | Universal Transverse Mercator |
| MMBtu/hr or mmbtu/hr | Million British Thermal Units per Hour | VEE | Visual Emissions Evaluation |
| MMCF/hr or mmcf/hr | Million Cubic Feet per Hour | VOC | Volatile Organic Compounds |
| NA | Not Applicable | VOL | Volatile Organic Liquids |
| NAAQS | National Ambient Air Quality Standards | | |
| NESHAPS | National Emissions Standards for Hazardous Air Pollutants | | |

2.3. Authority

This permit is issued in accordance with West Virginia air pollution control law W.Va. Code §§ 22-5-1. et seq. and the following Legislative Rules promulgated thereunder:

- 2.3.1. 45CSR13 – *Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits and Procedures for Evaluation;*

2.4. Term and Renewal

- 2.4.1. This permit supersedes and replaces previously issued Permit R13-3167A issued on April 13, 2016. This Permit shall remain valid, continuous and in effect unless it is revised, suspended, revoked or otherwise changed under an applicable provision of 45CSR13 or any other applicable legislative rule;

2.5. Duty to Comply

- 2.5.1. The permitted facility shall be constructed and operated in accordance with the plans and specifications filed in Permit Applications R13-3167, R13-3167A, R13-3167B and any modifications, administrative updates, or amendments thereto. The Secretary may suspend or revoke a permit if the plans and specifications upon which the approval was based are not adhered to;
[45CSR§§13-5.11 and -10.3.]
- 2.5.2. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the West Virginia Code and the Clean Air Act and is grounds for enforcement action by the Secretary or USEPA;
- 2.5.3. Violations of any of the conditions contained in this permit, or incorporated herein by reference, may subject the permittee to civil and/or criminal penalties for each violation and further action or remedies as provided by West Virginia Code 22-5-6 and 22-5-7;
- 2.5.4. Approval of this permit does not relieve the permittee herein of the responsibility to apply for and obtain all other permits, licenses, and/or approvals from other agencies; i.e., local, state, and federal, which may have jurisdiction over the construction and/or operation of the source(s) and/or facility herein permitted.

2.6. Duty to Provide Information

The permittee shall furnish to the Secretary within a reasonable time any information the Secretary may request in writing to determine whether cause exists for administratively updating, modifying, revoking, or terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the Secretary copies of records to be kept by the permittee. For information claimed to be confidential, the permittee shall furnish such records to the Secretary along with a claim of confidentiality in accordance with 45CSR31. If confidential information is to be sent to USEPA, the permittee shall directly provide such information to USEPA along with a claim of confidentiality in accordance with 40 C.F.R. Part 2.

2.7. Duty to Supplement and Correct Information

Upon becoming aware of a failure to submit any relevant facts or a submittal of incorrect information in any permit application, the permittee shall promptly submit to the Secretary such supplemental facts or corrected information.

2.8. Administrative Update

The permittee may request an administrative update to this permit as defined in and according to the procedures specified in 45CSR13.

[45CSR§13-4.]

2.9. Permit Modification

The permittee may request a minor modification to this permit as defined in and according to the procedures specified in 45CSR13.

[45CSR§13-5.4.]

2.10 Major Permit Modification

The permittee may request a major modification as defined in and according to the procedures specified in 45CSR14 or 45CSR19, as appropriate.

[45CSR§13-5.1]

2.11. Inspection and Entry

The permittee shall allow any authorized representative of the Secretary, upon the presentation of credentials and other documents as may be required by law, to perform the following:

- a. At all reasonable times (including all times in which the facility is in operation) enter upon the permittee's premises where a source is located or emissions related activity is conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times (including all times in which the facility is in operation) any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit;
- d. Sample or monitor at reasonable times substances or parameters to determine compliance with the permit or applicable requirements or ascertain the amounts and types of air pollutants discharged.

2.12. Emergency

- 2.12.1. An "emergency" means any situation arising from sudden and reasonable unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by

improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

- 2.12.2. Effect of any emergency. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if the conditions of Section 2.12.3 are met.
- 2.12.3. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - a. An emergency occurred and that the permittee can identify the cause(s) of the emergency;
 - b. The permitted facility was at the time being properly operated;
 - c. During the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in the permit; and
 - d. The permittee submitted notice of the emergency to the Secretary within one (1) working day of the time when emission limitations were exceeded due to the emergency and made a request for variance, and as applicable rules provide. This notice must contain a detailed description of the emergency, any steps taken to mitigate emissions, and corrective actions taken.
- 2.12.4. In any enforcement proceeding, the permittee seeking to establish the occurrence of an emergency has the burden of proof.
- 2.12.5. The provisions of this section are in addition to any emergency or upset provision contained in any applicable requirement.

2.13. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it should have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. However, nothing in this paragraph shall be construed as precluding consideration of a need to halt or reduce activity as a mitigating factor in determining penalties for noncompliance if the health, safety, or environmental impacts of halting or reducing operations would be more serious than the impacts of continued operations.

2.14. Suspension of Activities

In the event the permittee should deem it necessary to suspend, for a period in excess of sixty (60) consecutive calendar days, the operations authorized by this permit, the permittee shall notify the Secretary, in writing, within two (2) calendar weeks of the passing of the sixtieth (60) day of the suspension period.

2.15. Property Rights

This permit does not convey any property rights of any sort or any exclusive privilege.

2.16. Severability

The provisions of this permit are severable and should any provision(s) be declared by a court of competent jurisdiction to be invalid or unenforceable, all other provisions shall remain in full force and effect.

2.17. Transferability

This permit is transferable in accordance with the requirements outlined in Section 10.1 of 45CSR13. [45CSR§13-10.1.]

2.18. Notification Requirements

The permittee shall notify the Secretary, in writing, no later than thirty (30) calendar days after the actual startup of the operations authorized under this permit.

2.19. Credible Evidence

Nothing in this permit shall alter or affect the ability of any person to establish compliance with, or a violation of, any applicable requirement through the use of credible evidence to the extent authorized by law. Nothing in this permit shall be construed to waive any defense otherwise available to the permittee including, but not limited to, any challenge to the credible evidence rule in the context of any future proceeding.

3.0. Facility-Wide Requirements

3.1. Limitations and Standards

- 3.1.1. **Open burning.** The open burning of refuse by any person, firm, corporation, association or public agency is prohibited except as noted in 45CSR§6-3.1.
[45CSR§6-3.1.]
- 3.1.2. **Open burning exemptions.** The exemptions listed in 45CSR§6-3.1 are subject to the following stipulation: Upon notification by the Secretary, no person shall cause, suffer, allow or permit any form of open burning during existing or predicted periods of atmospheric stagnation. Notification shall be made by such means as the Secretary may deem necessary and feasible.
[45CSR§6-3.2.]
- 3.1.3. **Asbestos.** The permittee is responsible for thoroughly inspecting the facility, or part of the facility, prior to commencement of demolition or renovation for the presence of asbestos and complying with 40 C.F.R. § 61.145, 40 C.F.R. § 61.148, and 40 C.F.R. § 61.150. The permittee, owner, or operator must notify the Secretary at least ten (10) working days prior to the commencement of any asbestos removal on the forms prescribed by the Secretary if the permittee is subject to the notification requirements of 40 C.F.R. § 61.145(b)(3)(i). The USEPA, the Division of Waste Management, and the Bureau for Public Health - Environmental Health require a copy of this notice to be sent to them.
[40CFR§61.145(b) and 45CSR§34]
- 3.1.4. **Odor.** No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.
[45CSR§4-3.1] *[State Enforceable Only]*
- 3.1.5. **Permanent shutdown.** A source which has not operated at least 500 hours in one 12-month period within the previous five (5) year time period may be considered permanently shutdown, unless such source can provide to the Secretary, with reasonable specificity, information to the contrary. All permits may be modified or revoked and/or reapplication or application for new permits may be required for any source determined to be permanently shutdown.
[45CSR§13-10.5.]
- 3.1.6. **Standby plan for reducing emissions.** When requested by the Secretary, the permittee shall prepare standby plans for reducing the emissions of air pollutants in accordance with the objectives set forth in Tables I, II, and III of 45CSR11.
[45CSR§11-5.2.]

3.2. Monitoring Requirements

[Reserved]

3.3. Testing Requirements

- 3.3.1. **Stack testing.** As per provisions set forth in this permit or as otherwise required by the Secretary, in accordance with the West Virginia Code, underlying regulations, permits and orders, the permittee shall conduct test(s) to determine compliance with the emission limitations set forth in this permit and/or established or set forth in underlying documents. The Secretary, or his duly authorized representative, may at his option witness or conduct such test(s). Should the Secretary exercise his option to conduct such test(s), the operator shall provide all necessary sampling

connections and sampling ports to be located in such manner as the Secretary may require, power for test equipment and the required safety equipment, such as scaffolding, railings and ladders, to comply with generally accepted good safety practices. Such tests shall be conducted in accordance with the methods and procedures set forth in this permit or as otherwise approved or specified by the Secretary in accordance with the following:

- a. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with 40 C.F.R. Parts 60, 61, and 63 in accordance with the Secretary's delegated authority and any established equivalency determination methods which are applicable. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4. or 45CSR§13-5.4 as applicable.
- b. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with applicable requirements which do not involve federal delegation. In specifying or approving such alternative testing to the test methods, the Secretary, to the extent possible, shall utilize the same equivalency criteria as would be used in approving such changes under Section 3.3.1.a. of this permit. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4. or 45CSR§13-5.4 as applicable.
- c. All periodic tests to determine mass emission limits from or air pollutant concentrations in discharge stacks and such other tests as specified in this permit shall be conducted in accordance with an approved test protocol. Unless previously approved, such protocols shall be submitted to the Secretary in writing at least thirty (30) days prior to any testing and shall contain the information set forth by the Secretary. In addition, the permittee shall notify the Secretary at least fifteen (15) days prior to any testing so the Secretary may have the opportunity to observe such tests. This notification shall include the actual date and time during which the test will be conducted and, if appropriate, verification that the tests will fully conform to a referenced protocol previously approved by the Secretary.
- d. The permittee shall submit a report of the results of the stack test within sixty (60) days of completion of the test. The test report shall provide the information necessary to document the objectives of the test and to determine whether proper procedures were used to accomplish these objectives. The report shall include the following: the certification described in paragraph 3.5.1.; a statement of compliance status, also signed by a responsible official; and, a summary of conditions which form the basis for the compliance status evaluation. The summary of conditions shall include the following:
 1. The permit or rule evaluated, with the citation number and language;
 2. The result of the test for each permit or rule condition; and,
 3. A statement of compliance or noncompliance with each permit or rule condition.

[WV Code § 22-5-4(a)(14-15) and 45CSR13]

3.4. Recordkeeping Requirements

- 3.4.1. **Retention of records.** The permittee shall maintain records of all information (including monitoring data, support information, reports, and notifications) required by this permit recorded in a form suitable and readily available for expeditious inspection and review. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation. The files shall be maintained for at least five (5) years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent two (2) years of data shall be maintained on site. The remaining three (3) years of data may be maintained off site, but must remain accessible within a reasonable time. Where appropriate, the permittee may maintain records electronically (on a computer, on computer floppy disks, CDs, DVDs, or magnetic tape disks), on microfilm, or on microfiche.
- 3.4.2. **Odors.** For the purposes of 45CSR4, the permittee shall maintain a record of all odor complaints received, any investigation performed in response to such a complaint, and any responsive action(s) taken.
[45CSR§4. State Enforceable Only.]

3.5. Reporting Requirements

- 3.5.1. **Responsible official.** Any application form, report, or compliance certification required by this permit to be submitted to the DAQ and/or USEPA shall contain a certification by the responsible official that states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.
- 3.5.2. **Confidential information.** A permittee may request confidential treatment for the submission of reporting required by this permit pursuant to the limitations and procedures of W.Va. Code § 22-5-10 and 45CSR31.
- 3.5.3. **Correspondence.** All notices, requests, demands, submissions and other communications required or permitted to be made to the Secretary of DEP and/or USEPA shall be made in writing and shall be deemed to have been duly given when delivered by hand, or mailed first class with postage prepaid to the address(es) set forth below or to such other person or address as the Secretary of the Department of Environmental Protection may designate:

If to the DAQ:

Director
WVDEP
Division of Air Quality
601 57th Street
Charleston, WV 25304-2345

If to the US EPA:

Associate Director
Office of Air Enforcement and Compliance
Assistance
(3AP20)
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

3.5.4. Operating Fee

- 3.5.4.1. In accordance with 45CSR22 – Air Quality Management Fee Program, the permittee shall not operate nor cause to operate the permitted facility or other associated facilities on the same or contiguous sites comprising the plant without first obtaining and having in current effect a

Certificate to Operate (CTO). Such Certificate to Operate (CTO) shall be renewed annually, shall be maintained on the premises for which the certificate has been issued, and shall be made immediately available for inspection by the Secretary or his/her duly authorized representative.

- 3.5.5. **Emission inventory.** At such time(s) as the Secretary may designate, the permittee herein shall prepare and submit an emission inventory for the previous year, addressing the emissions from the facility and/or process(es) authorized herein, in accordance with the emission inventory submittal requirements of the Division of Air Quality. After the initial submittal, the Secretary may, based upon the type and quantity of the pollutants emitted, establish a frequency other than on an annual basis.

DRAFT

4.0. Source-Specific Requirements

4.1. Limitations and Standards

- 4.1.1. **Record of Monitoring.** The permittee shall keep records of monitoring information that include the following:
- The date, place as defined in this permit, and time of sampling or measurements;
 - The date(s) analyses were performed;
 - The company or entity that performed the analyses;
 - The analytical techniques or methods used;
 - The results of the analyses; and
 - The operating conditions existing at the time of sampling or measurement.
- 4.1.2. **Minor Source of Hazardous Air Pollutants (HAP).** HAP emissions from the facility shall be less than 10 tons/year of any single HAP or 25 tons/year of any combination of HAPs. Compliance with this Section shall ensure that the facility is a minor HAP source.
- 4.1.3. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]
- 4.1.4. **Record of Malfunctions of Air Pollution Control Equipment.** For all air pollution control equipment listed in Section 1.0, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:
- The equipment involved.
 - Steps taken to minimize emissions during the event.
 - The duration of the event.
 - The estimated increase in emissions during the event.

For each such case associated with an equipment malfunction, the additional information shall also be recorded:

- The cause of the malfunction.
 - Steps taken to correct the malfunction.
 - Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.
- 4.1.5. The permittee shall monitor and maintain quarterly records (calendar year) for each facility component that was inspected for fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as determined using AVO inspections, USEPA 40 CFR60 Method 21, USEPA alternative work practice to detect leaks from equipment using optical gas imaging (OGI) camera (ex: FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping, loose connections; liquid leaks; or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm in accordance with Method 21. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, then the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak and the final repair must be made within thirty (30) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if it is determined that the emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from a delay of repair. The repair of such equipment must be completed by the end of the next shutdown.

- 4.1.6. The permittee shall install, maintain, and operate all above-ground piping, valves, pumps, etc. that service lines in the transport of potential sources of regulated air pollutants to prevent any substantive fugitive escape of regulated air pollutants. Any above-ground piping, valves, pumps, etc. that shows signs of excess wear and that have a reasonable potential for substantive fugitive emissions of regulated air pollutants shall be replaced.
- 4.1.7. The permittee shall install the following noise abatement equipment prior to operation:
- a. An Emit Technologies ELH-4200-1616F-6CEE-362 hospital grade silencer designed for an insertion loss of 35-40 dBA or equivalent on each Waukesha 7044 GSI reciprocating internal combustion engine (C-100 – C-1100).
 - b. Each engine cooling fan shall include an even number of blades and reduced fan tip speed.
 - c. Each Capstone C600 NG Microturbine Generator (GEN1, GEN2) shall be housed in an enclosure.
 - d. The Waukesha 7044 GSI reciprocating internal combustion engines (C-100 – C-1100) shall be housed in an enclosed building. All operations shall occur with the doors closed as practical.
 - e. A SEMCO Model ST5005 sound silencer or equivalent shall be ducted to the front of each engine cooler intake and shall be operated and maintained in accordance with the manufacturer's specifications.
 - f. Construct a twelve (12) foot high acoustical wall with a Sound Transmission Class (STC) rating of 40 located around the vapor recovery units (VRUs).
 - g. The above noise abatement equipment shall be employed during any and all operation of the noise emitting sources at the facility. Further, the noise abatement equipment shall be operated and maintained in accordance with the manufacturer's specifications.

5.0. Source-Specific Requirements (C-100 – C-1100, GEN1 – GEN2)

5.1. Limitations and Standards

5.1.1. Maximum emissions from each of the 1,680 hp natural gas fired reciprocating engines equipped with NSCR, Waukesha 7044 GSI (C-100 – C-1100) shall not exceed the following limits:

| Pollutant | Maximum Hourly Emissions (lb/hr) | Maximum Annual Emissions (ton/year) |
|----------------------------|----------------------------------|-------------------------------------|
| Nitrogen Oxides | 1.26 | 5.52 |
| Carbon Monoxide | 1.19 | 5.19 |
| Volatile Organic Compounds | 0.25 | 1.09 |
| Formaldehyde | 0.02 | 0.08 |

5.1.2. Maximum emissions from each of the 600 kW natural gas fired microturbine generators, Capstone C600 (GEN1, GEN2) shall not exceed the following limits:

| Pollutant | Maximum Hourly Emissions (lb/hr) | Maximum Annual Emissions (ton/year) |
|----------------------------|----------------------------------|-------------------------------------|
| Nitrogen Oxides | 0.24 | 1.05 |
| Carbon Monoxide | 0.66 | 2.89 |
| Volatile Organic Compounds | 0.06 | 0.26 |

5.1.3. Requirements for Use of Catalytic Reduction Devices (NSCR for C-100 – C-1100)

- a. Rich-burn natural gas compressor engines (C-100 – C-1100) equipped with non-selective catalytic reduction (NSCR) air pollution control device shall be fitted with a closed-loop, automatic air/fuel ratio controller to ensure emissions of regulated pollutants do not exceed the potential to emit for any engine/NSCR combination under varying load. The closed-loop, automatic air/fuel ratio controller shall control a fuel metering valve to deliver additional fuel when required to ensure a fuel-rich mixture and a resultant exhaust oxygen content of less than or equal to 0.5%. The automatic air/fuel ratio controller shall also incorporate dual-point exhaust gas temperature and oxygen sensors which provide temperature and exhaust oxygen content differential feedback. Such controls shall ensure proper and efficient operation of the engine and NSCR air pollution control device;
- b. The automatic air/fuel ratio controller or closed-loop automatic feedback controller shall provide a warning or indication to the operator and/or be interlocked with the engine ignition system to cease engine operation in case of a masking, poisoning or overrich air/fuel ratio situation which results in performance degradation or failure of the catalyst element; and
- c. No person shall knowingly:
 - 1. Remove or render inoperative any air pollution or auxiliary air pollution control device installed subject to the requirements of this permit;
 - 2. Install any part or component when the principal effect of the part or component is to bypass, defeat or render inoperative any air pollution control device or auxiliary air pollution control device installed subject to the requirements of this permit; or
 - 3. Cause or allow engine exhaust gases to bypass any catalytic reduction device.

5.2. Monitoring Requirements

5.2.1. Catalytic Oxidizer Control Devices (NSCR for C-100 – C-1100)

- a. The permittee shall regularly inspect, properly maintain and/or replace catalytic reduction devices and auxiliary air pollution control devices to ensure functional and effective operation of the engine's physical and operational design. The permittee shall ensure proper operation, maintenance and performance of catalytic reduction devices and auxiliary air pollution control devices by:
 1. Maintaining proper operation of the automatic air/fuel ratio controller or automatic feedback controller.
 2. Following operating and maintenance recommendations of the catalyst element manufacturer.

5.3. Testing Requirements

- 5.3.1. See Facility-Wide Testing Requirements Section 3.3 and Testing Requirements of Sections 10.5, 11.2, and 11.3.

5.4. Recordkeeping Requirements

- 5.4.1. To demonstrate compliance with section 5.1.3 the permittee shall maintain records of all catalytic reduction device maintenance. Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

5.5. Reporting Requirements

- 5.5.1. See Facility-Wide Reporting Requirements Section 3.5 and Reporting Requirements of Sections 10.6 and 11.4.

6.0. Source-Specific Hazardous Air Pollutant Requirements (Natural Gas Dehydration Units Not Subject to MACT Standards and being controlled by a Flare Control Device)

6.1. Limitations and Standards

6.1.1. **Maximum Throughput Limitation.** The maximum wet natural gas throughput to the TEG dehydration units/still columns (DEHY1, DEHY2) shall not exceed 110 million standard cubic feet per day (mmscfd) for each unit. Compliance with the Maximum Throughput Limitation shall be determined using a twelve month rolling total. A twelve month rolling total shall mean the sum of the monthly throughput at any given time during the previous twelve consecutive calendar months.

6.1.2. Maximum emissions from the flare shall not exceed the following limits:

| Pollutant | Maximum Hourly Emissions (lb/hr) | Maximum Annual Emissions (ton/year) |
|----------------------------|----------------------------------|-------------------------------------|
| Volatile Organic Compounds | 0.62 | 2.67 |

6.1.3. The flare subject to this section shall be designed and operated in accordance with the following:

- a. Flare shall be non-assisted.
- b. Flare shall be designed for and operated with no visible emissions, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.
- c. Flare shall be operated, with a flame present at all times whenever emissions may be vented to them, except during SSM (Startup, Shutdown, Malfunctions) events.
- d. A flare shall be used only where the net heating value of the gas being combusted is 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam-assisted or air-assisted; or where the net heating value of the gas being combusted is 7.45 MJ/scm (200 Btu/scf) or greater if the flares is non-assisted. The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = K \sum_{i=1}^n C_i H_i$$

Where:

H_T=Net heating value of the sample, MJ/scm; where the net enthalpy per mole of off gas is based on combustion at 25 °C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20 °C.

K=Constant=

$$1.740 \times 10^{-7} \left(\frac{1}{ppmv} \right) \left(\frac{g\text{-mole}}{scm} \right) \left(\frac{MJ}{kcal} \right)$$

where the standard temperature for (g-mole/scm) is 20 °C.

C_i=Concentration of sample component i in ppmv on a wet basis, which may be measured for organics by Test Method 18, but is not required to be measured using Method 18 (unless designated by the Director).

H_i=Net heat of combustion of sample component i, kcal/g-mole at 25 °C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76 or 88 or D4809-95 if published values are not available or cannot be calculated.

n=Number of sample components.

- e. Nonassisted flares shall be designed for and operated with an exit velocity less than 18.3 m/sec (60 ft/sec), except as provided by 6.1.3.f and 6.1.3.g of this section. The actual exit velocity of a flare shall be determined by dividing by the volumetric flow rate of gas being combusted (in units of emission standard temperature and pressure), by the unobstructed (free) cross-sectional area of the flare tip, which may be determined by Test Method 2, 2A, 2C, or 2D in appendix A to 40 CFR part 60, as appropriate, but is not required to be determined using these Methods (unless designated by the Director).
- f. Nonassisted flares designed for and operated with an exit velocity, as determined by the method specified in 6.1.3.e. of this section, equal to or greater than 18.3 m/sec (60 ft/sec) but less than 122 m/sec (400 ft/sec), are allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf).
- g. Nonassisted flares designed for and operated with an exit velocity, as determined by the method specified in 6.1.3.e. of this section, less than the velocity V_{max} , as determined by the calculation specified in this paragraph, but less than 122 m/sec (400 ft/sec) are allowed. The maximum permitted velocity, V_{max} , for flares complying with this paragraph shall be determined by the following equation:

$$\text{Log}_{10}(V_{max})=(H_T+28.8)/31.7$$

Where:

V_{max} =Maximum permitted velocity, m/sec.

28.8=Constant.

31.7=Constant.

H_T =The net heating value as determined in 6.1.3.d of this section

- 6.1.4. The permittee is not required to conduct a flare compliance assessment for concentration of sample (i.e. Method 18) and tip velocity (i.e. Method 2) until such time as the Director requests a flare compliance assessment to be conducted in accordance with section 6.3.2, but the permittee is required to conduct a flare design evaluation in accordance with section 6.4.2. Alternatively, the permittee may elect to demonstrate compliance with the flare design criteria requirements of section 6.1.3 by complying with the compliance assessment testing requirements of section 6.3.2.
- 6.1.5. Recycled reboilers controlling the Dehydrator Flash Tanks (DFLSH1, DFLSH2) shall be designed and operated in accordance with the following:
 - a. The vapors/overheads from the flash tanks shall be routed through a closed vent system to the reboiler at all times when there is a potential that vapors (emissions) can be generated from the flash tank.
 - b. The reboiler shall only be fired with vapors from the flash tank, and natural gas may be used as supplemental fuel.
 - c. The vapors/overheads from the flash tank shall be introduced into the flame zone of the reboiler.
 - d. When the flash tank gas cannot be used by the reboiler due to excess gas or the reboiler is offline, the gas shall be sent to the vapor recovery units (VRU-100 and VRU-200) via the storage tanks to achieve a control efficiency of at least 98%.

6.2. Monitoring Requirements

- 6.2.1. In order to demonstrate compliance with the requirements of 6.1.3.c, the permittee shall monitor the presence or absence of a flare pilot flame using a thermocouple or any other equivalent device, except during SSM events.
- 6.2.2. The permittee shall monitor the throughput of wet natural gas fed to the dehydration system on a monthly basis for each glycol dehydration unit.

6.3. Testing Requirements

- 6.3.1. In order to demonstrate compliance with the flare opacity requirements of 6.1.3.b the permittee shall conduct a Method 22 opacity test for at least two hours. This test shall demonstrate no visible emissions are observed for more than a total of 5 minutes during any 2 consecutive hour period using 40CFR60 Appendix A Method 22. The permittee shall conduct this test within one (1) year of permit issuance or initial startup whichever is later. The visible emission checks shall determine the presence or absence of visible emissions. At a minimum, the observer must be trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor) on the visibility of emissions. This training may be obtained from written materials found in the References 1 and 2 from 40 CFR part 60, appendix A, Method 22 or from the lecture portion of 40 CFR part 60, appendix A, Method 9 certification course.
- 6.3.2. The Director may require the permittee to conduct a flare compliance assessment to demonstrate compliance with section 6.1.3. This compliance assessment testing shall be conducted in accordance with Test Method 18 for organics and Test Method 2, 2A, 2C, or 2D in appendix A to 40 CFR part 60, as appropriate, or other equivalent testing approved in writing by the Director. Also, Test Method 18 may require the permittee to conduct Test Method 4 in conjunction with Test Method 18.
- 6.3.3. In order to demonstrate compliance with 4.1.2, upon request of the Director, the permittee shall demonstrate compliance with the HAP emissions thresholds using GLYCalc Version 3.0 or higher. The permittee shall sample in accordance with GPA Method 2166 and analyze the samples utilizing the extended GPA Method 2286 as specified in the GRI-GLYCalc V4 Technical Reference User Manual and Handbook.

6.4. Recordkeeping Requirements

- 6.4.1. For the purpose of demonstrating compliance with section 6.1.3.c and 6.2.1, the permittee shall maintain records of the times and duration of all periods which the pilot flame was absent.
- 6.4.2. For the purpose of demonstrating compliance with section 6.1.4 and 6.3.2, the permittee shall maintain a record of the flare design evaluation. The flare design evaluation shall include, net heat value calculations, exit (tip) velocity calculations, and all supporting concentration calculations and other related information requested by the Director.
- 6.4.3. For the purpose of demonstrating compliance with the requirements set forth in sections 6.1.3 and 6.3.3., the permittee shall maintain records of testing conducted in accordance with 6.3.3.
- 6.4.4. The permittee shall document and maintain the corresponding records specified by the on-going monitoring requirements of 6.2 and testing requirements of 6.3.

- 6.4.5. For the purpose of demonstrating compliance with section 6.1.3.b, the permittee shall maintain records of the visible emission opacity tests conducted per Section 6.3.1.
- 6.4.6. For the purpose of demonstrating compliance with section 4.1.2, the permittee shall maintain a record of all potential to emit (PTE) HAP calculations for the entire affected facility. These records shall include the natural gas compressor engines and ancillary equipment.
- 6.4.7. The permittee shall maintain a record of the wet natural gas throughput through the dehydration system to demonstrate compliance with section 6.1.1.
- 6.4.8. All records required under Section 6.4 shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

6.5. Reporting Requirements

- 6.5.1. If permittee is required by the Director to demonstrate compliance with section 6.3.3, then the permittee shall submit a testing protocol at least thirty (30) days prior to testing and shall submit a notification of the testing date at least fifteen (15) days prior to testing. The permittee shall submit the testing results within sixty (60) days of testing and provide all supporting calculations and testing data.
- 6.5.2. Any deviation(s) from the allowable visible emission requirement for any emission source discovered during observations using 40CFR Part 60, Appendix A, Method 9 or 22 shall be reported in writing to the Director of the Division of Air Quality as soon as practicable, but in any case within ten (10) calendar days of the occurrence and shall include at least the following information: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any corrective measures taken or planned.
- 6.5.3. Any deviation(s) from the flare design and operation criteria in Section 6.1.3 shall be reported in writing to the Director of the Division of Air Quality as soon as practicable, but in any case within ten (10) calendar days of discovery of such deviation.

7.0. Source-Specific Requirements (Reboilers (DREB1, DREB2), Catalytic Heater (CATHT1), Fuel Conditioning Heater (FUEL1))

7.1. Limitations and Standards

- 7.1.1. Maximum Design Heat Input. The maximum design heat input (MDHI) shall not exceed the following:

| Emission Unit ID# | Emission Unit Description | MDHI (MMBTU/hr) |
|-------------------|-----------------------------|-----------------|
| DREB1 | Glycol Dehydration Reboiler | 1.5 |
| DREB2 | Glycol Dehydration Reboiler | 1.5 |
| CATHT1 | Catalytic Heater | 0.024 |
| FUEL1 | Fuel Conditioning Heater | 0.5 |

- 7.1.2. No person shall cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from any fuel burning unit which is greater than ten (10) percent opacity based on a six minute block average.
[45CSR§2-3.1.]

7.2. Monitoring Requirements

- 7.2.1. At such reasonable times as the Secretary may designate, the permittee shall conduct Method 9 emission observations for the purpose of demonstrating compliance with Section 7.1.2. Method 9 shall be conducted in accordance with 40 CFR 60 Appendix A.

7.3. Testing Requirements

- 7.3.1. Compliance with the visible emission requirements of section 7.1.2 shall be determined in accordance with 40 CFR Part 60, Appendix A, Method 9 or by using measurements from continuous opacity monitoring systems approved by the Director. The Director may require the installation, calibration, maintenance and operation of continuous opacity monitoring systems and may establish policies for the evaluation of continuous opacity monitoring results and the determination of compliance with the visible emission requirements of section 7.1.2. Continuous opacity monitors shall not be required on fuel burning units which employ wet scrubbing systems for emission control.
[45CSR§2-3.2.]

7.4. Recordkeeping Requirements

- 7.4.1. The permittee shall maintain records of all monitoring data required by Section 7.2.1 documenting the date and time of each visible emission check, the emission point or equipment/source identification number, the name or means of identification of the observer, the results of the check(s), whether the visible emissions are normal for the process, and, if applicable, all corrective measures taken or planned. The permittee shall also record the general weather conditions (i.e. sunny, approximately 80°F, 6 - 10 mph NE wind) during the visual emission check(s). Should a visible emission observation be required to be performed per the requirements specified in Method 9, the data records of each observation shall be maintained per the requirements of Method 9.

7.5. Reporting Requirements

- 7.5.1. Any deviation(s) from the allowable visible emission requirement for any emission source discovered during observations using 40CFR Part 60, Appendix A, Method 9 or 22 shall be reported in writing to the Director of the Division of Air Quality as soon as practicable, but in any

case within ten (10) calendar days of the occurrence and shall include at least the following information: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any corrective measures taken or planned.

8.0. Source-Specific Requirements (Storage Tanks, TK-1502, TK-200, TK-201, TK-1500, TK-1501)

8.1. Limitations and Standards

8.1.1. The permittee shall route all VOC and HAP emissions from the Storage Tanks (TK-1502, TK-200, TK-201, TK-1500, TK-1501) to a vapor recovery system (VRU-100, VRU-200), prior to release to the atmosphere. The vapor recovery system shall be designed to achieve a minimum guaranteed control efficiency of 98% for volatile organic compound (VOC) and hazardous air pollutants (HAP) emissions. Emissions from these tanks will be collected and compressed by the vapor recovery units (VRU-100, VRU-200) whereby the vapors are sufficiently compressed to be introduced into the inlet gas line and processed with the inlet gas.

8.1.2. *Operation and Maintenance of Air Pollution Control Equipment.* The permittee shall, to the extent practicable, install, maintain, and operate the vapor recovery units (VRU-100, VRU-200) and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

8.1.3. The maximum annual throughput of product to the 400 bbl storage tanks shall not exceed the following:

| Storage Tank ID | Product Stored | Maximum Annual Throughput (gal/yr) |
|-----------------|---|------------------------------------|
| TK-1502 | Settling Tank (Condensate/Produced Water) | 2,989,350 |
| TK-200 | Condensate | 1,149,750 |
| TK-201 | Condensate | 1,149,750 |
| TK-1500 | Produced Water | 344,925 |
| TK-1501 | Produced Water | 344,925 |

8.1.4. Maximum emissions from the Settling Tank (TK-1502) shall not exceed the following limits:

| Pollutant | Maximum Hourly Emissions (lb/hr) | Maximum Annual Emissions (ton/year) |
|----------------------------|----------------------------------|-------------------------------------|
| Volatile Organic Compounds | 0.96 | 4.19 |

8.1.5. In addition to the vapor recovery units (VRU-100, VRU-200), the permittee shall utilize three (3) of the following requirements:

- a. Install additional sensing equipment to monitor the run status of the vapor recovery units (VRU-100, VRU-200).
- b. Install a by-pass system which operates automatically whereby discharge is re-routed back to the inlet of the vapor recovery units (VRU-100, VRU-200) until the appropriate pressure is built up for the compressor to turn on.

- c. Install a blanket gas and have automatic throttling valves to ensure oxygen does not enter the tanks.
 - d. Install a compressor that has the ability to vary the drive.
- 8.1.6. Emissions from the Storage Tanks (TK-1502, TK-200, TK-201, TK-1500, TK-1501) that are recovered and routed to the vapor recovery units (VRU-100, VRU-200) shall be designed and operated as specified in the paragraphs (a) through (c).
- a. The cover and all openings on the cover (e.g., access hatches, sampling ports, pressure relief valves and gauge wells) shall form a continuous impermeable barrier over the entire surface area of the liquid in the storage vessel.
 - b. Each cover opening shall be secured in a closed, sealed position (e.g., covered by a gasketed lid or cap) whenever material is in the unit on which the cover is installed except during those times when it is necessary to use an opening as follows:
 - (i) To add material to, or remove material from the unit (this includes openings necessary to equalize or balance the internal pressure of the unit following changes in the level of the material in the unit);
 - (ii) To inspect or sample the material in the unit;
 - (iii) To inspect, maintain, repair, or replace equipment located inside the unit; or
 - (iv) To vent liquids, gases, or fumes from the unit through a closed-vent system designed and operated in accordance with the requirements 8.1.7 of this section to a control device.
 - c. Each Storage Tank (TK-1502, TK-200, TK-201, TK-1500, TK-1501) thief hatch shall be weighted and properly seated. You must select gasket material for the hatch based on composition of the fluid in the storage vessel and weather conditions.
[45CSR§13-5.11]
- 8.1.7. The facility shall comply with the closed vent system requirements for the Storage Tanks (TK-1502, TK-200, TK-201, TK-1500, TK-1501) as noted below.
- a. You must design the closed vent system to route all gases, vapors, and fumes emitted from the material in the Storage Tanks (TK-1502, TK-200, TK-201, TK-1500, TK-1501) to the vapor recovery units (VRU-100, VRU-200).
 - b. You must design and operate a closed vent system with no detectable emissions, as determined using olfactory, visual and auditory inspections.
 - c. You must meet the requirements specified in paragraphs (i) and (ii) of this section if the closed vent system contains one or more bypass devices that could be used to divert all or a portion of the gases, vapors, or fumes from entering the control device or to a process.
 - (i) Except as provided in paragraph (ii) of this section, you must comply with either paragraph (A) or (B) of this section for each bypass device.
 - A. You must properly install, calibrate, maintain, and operate a flow indicator at the inlet to the bypass device that could divert the stream away from the control device or process to the atmosphere that sounds an alarm, or initiates notification via remote alarm to the nearest field office, when the bypass device is open such that the stream is being, or could be diverted away from the control device or process to the atmosphere.

- B. You must secure the bypass device valve installed at the inlet to the bypass device in the non-diverting position using a car-seal or a lock-and-key type configuration.
- (ii) Low leg drains, high point bleeds, analyzer vents, open-ended valves or lines, and safety devices are not subject to the requirements of paragraph (i) of this section.
[45CSR§13-5.11]

8.2. Monitoring Requirements

- 8.2.1. The permittee shall monitor the throughput to the storage tanks on a monthly basis.
- 8.2.2. To demonstrate compliance with section 8.1.1, the permittee shall monitor the vapor recovery units (VRU-100, VRU-200) in accordance with the plans and specifications and manufacturer's recommendations.
- 8.2.3. To demonstrate compliance with the closed vent system requirements of Sections 8.1.6 and 8.1.7, the permittee shall:
 - a. Initial requirements. Conduct an initial visual, olfactory, and auditory inspection for defects that could result in air emissions within 180 days of start-up. Defects include, but are not limited to, visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices.
 - i. The annual inspection shall include the bypass inspection, conducted according to paragraph (c) of this section.
 - ii. In the event that a leak or defect is detected, you must repair the leak or defect as soon as practicable. Grease or another applicable substance must be applied to deteriorating or cracked gaskets to improve the seal while awaiting repair.
 - iii. Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emission likely to result from delay of repair. You must complete repair of such equipment by the end of the next shutdown.
 - b. Continuous requirements. Conduct an annual visual, olfactory, and auditory inspection for defects that could result in air emissions. Defect include, but are not limited to, visible cracks, holes, or gaps in piping, loose connections; liquid leaks; or broken or missing caps or other closure devices.
 - i. The annual inspection shall be conducted within 365 calendar days from the date of the previous inspection or earlier.
 - ii. The annual inspection shall include the bypass inspection, conducted according to paragraph (c) of this section.
 - c. Bypass inspection. Visually inspect the bypass valve during the initial and annual inspection for the presence of the car seal or lock-and-key type configuration to verify that the valve is maintained in the non-diverting position to ensure that the vent stream is not diverted through the bypass device. If an alternative method is used, conduct the inspection of the bypass as described in the operating procedures.
 - d. Unsafe to inspect requirements. You may designate any parts of the closed vent system as unsafe to inspect if the requirements in paragraphs (i) and (ii) of this section are met. Unsafe

to inspect parts are exempt from the inspection requirements of paragraphs (a) and (b) of this section.

- i. You determine that the equipment is unsafe to inspect because inspecting personnel would be exposed to an imminent or potential danger as a consequence of complying with the requirements.
 - ii. You have a written plan that requires inspection of the equipment as frequently as practicable during safe-to-inspect times.
- e. Difficult to inspect requirements. You may designate any parts of the closed vent system as difficult to inspect, if the requirements in paragraphs (i) and (ii) of this section are met. Difficult to inspect parts are exempt from the inspection requirements of paragraphs (a) and (b) of this section.
- i. You determine that the equipment cannot be inspected without elevating the inspecting personnel more than 2 meters above a support surface.
 - ii. You have a written plan that requires inspection of the equipment at least once every 5 years.

[45CSR§13-5.11]

8.3. Recordkeeping Requirements

- 8.3.1. All records required under Section 8.3 shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.
- 8.3.2. *Record of Maintenance of VRU.* The permittee shall maintain accurate records of the vapor recovery units (VRU-100, VRU-200) equipment inspection and/or preventative maintenance procedures.
- 8.3.3. *Record of Malfunctions of VRU.* The permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the vapor recovery units (VRU-100, VRU-200) during which excess emissions occur. For each such case, the following information shall be recorded:
 - a. The equipment involved.
 - b. Steps taken to minimize emissions during the event.
 - c. The duration of the event.
 - d. The estimated increase in emissions during the event.

For each such case associated with an equipment malfunction, the additional information shall also be recorded:

- e. The cause of the malfunction.
- f. Steps taken to correct the malfunction.

- g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.
- 8.3.4. To demonstrate compliance with section 8.1.3 and 8.1.4, the permittee shall maintain a record of the aggregate throughput for the storage tanks on a monthly and rolling twelve month total. Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.
- 8.3.5. The permittee shall maintain a copy all design records of the process, maintenance records of equipment and any downtime hours associated with the vapor recovery units (VRU-100, VRU-200).
- 8.3.6. The permittee shall maintain records of the additional monitoring required in Section 8.1.5 to demonstrate compliance with the 98% control efficiency claimed and the Section 8.1.1.
- 8.3.7. To demonstrate compliance with the closed vent monitoring requirements, the following records shall be maintained.
- i. The initial compliance requirements;
 - ii. Each annual visual inspection conducted to demonstrate continuous compliance, including records of any repairs that were made as results of the inspection;
 - iii. Bypass requirements.
 - a. Each inspection or each time the key is checked out or a record each time the alarm is sounded;
 - b. Each occurrence that the control device was bypassed. If the device was bypassed, the records shall include the date, time, and duration of the event and shall provide the reason the event occurred. The record shall also include the estimate of emissions that were released to the environment as a result of the bypass.
 - iv. Any part of the system that has been designated as “unsafe to inspect” in accordance with 8.2.3.d or “difficult to inspect” in accordance with 8.2.3.e.
[45CSR§13-5.11]

8.4. Reporting Requirements

- 8.4.1. Upon request by the Director, the permittee shall report deviations within a requested time from of any occurrences when the control device was operated outside of the parameters defined in the monitoring plan.
- 8.4.2. The permittee shall notify the Director of any downtime of the VRU in excess of 2%, based on the 12 month rolling total, in writing to the Director of the Division of Air Quality as soon as practicable, but within ten (10) calendar days of the discovery and shall include, at a minimum, the following information: the dates and durations of each downtime event, the cause or suspected causes for each downtime event, any corrective measures taken or planned for each downtime event.

9.0. Source-Specific Requirements (Product Loadout Rack, LDOUT1)

9.1. Limitations and Standards

- 9.1.1. The permittee shall install, maintain, and operate all above-ground piping, valves, pumps, etc. that service lines in the transport of potential sources of regulated air pollutants to prevent any substantive fugitive escape of regulated air pollutants. Any above-ground piping, valves, pumps, etc. that shows signs of excess wear and that have a reasonable potential for substantive fugitive emissions of regulated air pollutants shall be replaced.
- 9.1.2. The maximum quantity of condensate that shall be loaded shall not exceed 2,299,500 gallons per year. Compliance with the Maximum Yearly Operation Limitation shall be determined using a twelve month rolling total. A twelve month rolling total shall mean the sum of the hours of operation at any given time during the previous twelve consecutive calendar months.
- 9.1.3. The maximum quantity of produced water that shall be loaded shall not exceed 689,850 gallons per year. Compliance with the Maximum Yearly Operation Limitation shall be determined using a twelve month rolling total. A twelve month rolling total shall mean the sum of the hours of operation at any given time during the previous twelve consecutive calendar months.
- 9.1.4. The Condensate Truck Loading and Produced Water Truck Loading shall be operated in accordance with the plans and specifications filed in Permit Application R13-3167B.

9.2. Recordkeeping Requirements

- 9.2.1. All records required under Section 9.2 shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.
- 9.2.2. To demonstrate compliance with section 9.1.2 and 9.1.3, the permittee shall maintain a record of the aggregate throughput for the product loadout rack (LDOUT1) on a monthly and rolling twelve month total. Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

10.0. Source-Specific Requirements (40CFR60 Subpart JJJJ Requirements, C-100 – C-1100)

10.1. Limitations and Standards

- 10.1.1. The provisions of this subpart are applicable to owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified below. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.
- a. Owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:
 1. On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP);
 2. *Reserved*;
 3. on or after July 1, 2008, for engines with a maximum engine power less than 500 HP; or
 4. *Reserved*.
 - b. Owners and operators of stationary SI ICE that commence modification or reconstruction after June 12, 2006.
[40CFR§60.4230(a)]
- 10.1.2. The provisions of this subpart are not applicable to stationary SI ICE being tested at an engine test cell/stand. **[40CFR§60.4230(b)]**
- 10.1.3. If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable. **[40CFR§60.4230(c)]**
- 10.1.4. Stationary SI ICE may be eligible for exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C (or the exemptions described in 40 CFR parts 90 and 1048, for engines that would need to be certified to standards in those parts), except that owners and operators, as well as manufacturers, may be eligible to request an exemption for national security. **[40CFR§60.4230(e)]**
- 10.1.5. Owners and operators of facilities with internal combustion engines that are acting as temporary replacement units and that are located at a stationary source for less than 1 year and that have been properly certified as meeting the standards that would be applicable to such engine under the appropriate nonroad engine provisions, are not required to meet any other provisions under this subpart with regard to such engines. **[40CFR§60.4230(f)]**

10.2. Emission Standards for Owners and Operators

- 10.2.1. 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. For owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 100 HP (except gasoline and rich burn engines that use LPG) manufactured prior to January 1, 2011 that were certified to the certification emission standards in 40 CFR part 1048 applicable to engines that are not severe duty engines, if such stationary SI ICE was certified to a carbon monoxide (CO) standard above the standard in Table 1 to this subpart, then the owners and operators may meet the

CO certification (not field testing) standard for which the engine was certified.
[40CFR§60.4233(e)]

- 10.2.2. Owners and operators of stationary SI ICE that are required to meet standards that reference 40 CFR 1048.101 must, if testing their engines in use, meet the standards in that section applicable to field testing, except as indicated in paragraph (e) of this section. [40CFR§60.4233(h)]
- 10.2.3. Owners and operators of stationary SI ICE must operate and maintain stationary SI ICE that achieve the emission standards as required in §60.4233 over the entire life of the engine. [40CFR§60.4234]

10.3. Other Requirements for Owners and Operators

- 10.3.1. After July 1, 2010, owners and operators may not install stationary SI ICE with a maximum engine power of less than 500 HP that do not meet the applicable requirements in §60.4233. [40CFR§60.4236(a)]
- 10.3.2. After July 1, 2009, owners and operators may not install stationary SI ICE with a maximum engine power of greater than or equal to 500 HP that do not meet the applicable requirements in §60.4233, except that lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP that do not meet the applicable requirements in §60.4233 may not be installed after January 1, 2010. [40CFR§60.4236(b)]
- 10.3.3. For emergency stationary SI ICE with a maximum engine power of greater than 19 KW (25 HP), owners and operators may not install engines that do not meet the applicable requirements in §60.4233 after January 1, 2011. [40CFR§60.4236(c)]
- 10.3.4. In addition to the requirements specified in §§60.4231 and 60.4233, it is prohibited to import stationary SI ICE less than or equal to 19 KW (25 HP), stationary rich burn LPG SI ICE, and stationary gasoline SI ICE that do not meet the applicable requirements specified in paragraphs (a), (b), and (c) of this section, after the date specified in paragraph (a), (b), and (c) of this section. [40CFR§60.4236(d)]
- 10.3.5. The requirements of this section do not apply to owners and operators of stationary SI ICE that have been modified or reconstructed, and they do not apply to engines that were removed from one existing location and reinstalled at a new location. [40CFR§60.4236(e)]
- 10.3.6. Starting on January 1, 2011, if the emergency stationary SI internal combustion engine that is greater than or equal to 130 HP and less than 500 HP that was built on or after January 1, 2011, does not meet the standards applicable to non-emergency engines, the owner or operator must install a non-resettable hour meter. [40CFR§60.4237(b)]

10.4. Compliance Requirements for Owners and Operators

- 10.4.1. If you are an owner or operator of a stationary SI internal combustion engine and must comply with the emission standards specified in §60.4233(d) or (e), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) and (2) of this section.
 - a. Purchasing an engine certified according to procedures specified in this subpart, for the same model year and demonstrating compliance according to one of the methods specified in paragraph (a) of this section.

- b. Purchasing a non-certified engine and demonstrating compliance with the emission standards specified in §60.4233(d) or (e) and according to the requirements specified in §60.4244, as applicable, and according to paragraphs (b)(2)(i) and (ii) of this section.
 1. If you are an owner or operator of a stationary SI internal combustion engine greater than 25 HP and less than or equal to 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance.
 2. If you are an owner or operator of a stationary SI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance.

[40CFR§60.4243(b)]

- 10.4.2. If you are an owner or operator of a stationary SI internal combustion engine that must comply with the emission standards specified in §60.4233(f), you must demonstrate compliance according paragraph (b)(2)(i) or (ii) of this section, except that if you comply according to paragraph (b)(2)(i) of this section, you demonstrate that your non-certified engine complies with the emission standards specified in §60.4233(f). **[40CFR§60.4243(c)]**
- 10.4.3. Emergency stationary ICE may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State or local government, the manufacturer, the vendor, or the insurance company associated with the engine. Maintenance checks and readiness testing of such units is limited to 100 hours per year. There is no time limit on the use of emergency stationary ICE in emergency situations. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that Federal, State, or local standards require maintenance and testing of emergency ICE beyond 100 hours per year. Emergency stationary ICE may operate up to 50 hours per year in non-emergency situations, but those 50 hours are counted towards the 100 hours per year provided for maintenance and testing. The 50 hours per year for non-emergency situations cannot be used for peak shaving or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity. For owners and operators of emergency engines, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as permitted in this section, is prohibited. **[40CFR§60.4243(d)]**
- 10.4.4. Owners and operators of stationary SI natural gas fired engines may operate their engines using propane for a maximum of 100 hours per year as an alternative fuel solely during emergency operations, but must keep records of such use. If propane is used for more than 100 hours per year in an engine that is not certified to the emission standards when using propane, the owners and operators are required to conduct a performance test to demonstrate compliance with the emission standards of §60.4233. **[40CFR§60.4243(e)]**
- 10.4.5. If you are an owner or operator of a stationary SI internal combustion engine that is less than or equal to 500 HP and you purchase a non-certified engine or you do not operate and maintain your certified stationary SI internal combustion engine and control device according to the manufacturer's written emission-related instructions, you are required to perform initial performance testing as indicated in this section, but you are not required to conduct subsequent performance testing unless the stationary engine is rebuilt or undergoes major repair or maintenance. A rebuilt stationary SI ICE means an engine that has been rebuilt as that term is defined in 40 CFR 94.11(a). **[40CFR§60.4243(f)]**

- 10.4.6. It is expected that air-to-fuel ratio controllers will be used with the operation of three-way catalysts/non-selective catalytic reduction. The AFR controller must be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times. [40CFR§60.4243(g)]
- 10.4.7. If you are an owner/operator of a stationary SI internal combustion engine with maximum engine power greater than or equal to 500 HP that is manufactured after July 1, 2007 and before July 1, 2008, and must comply with the emission standards specified in sections 60.4233(b) or (c), you must comply by one of the methods specified in paragraphs (h)(1) through (h)(4) of this section.
- Purchasing an engine certified according to 40 CFR part 1048. The engine must be installed and configured according to the manufacturer's specifications.
 - Keeping records of performance test results for each pollutant for a test conducted on a similar engine. The test must have been conducted using the same methods specified in this subpart and these methods must have been followed correctly.
 - Keeping records of engine manufacturer data indicating compliance with the standards.
 - Keeping records of control device vendor data indicating compliance with the standards.
- [40CFR§60.4243(h)]

10.5. Testing Requirements for Owners and Operators

- 10.5.1. Owners and operators of stationary SI ICE who conduct performance tests must follow the procedures in paragraphs (a) through (f) of this section.
- Each performance test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and according to the requirements in §60.8 and under the specific conditions that are specified by Table 2 to this subpart. [40CFR§60.4244(a)]
 - You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in §60.8(c). If your stationary SI internal combustion engine is non-operational, you do not need to startup the engine solely to conduct a performance test; however, you must conduct the performance test immediately upon startup of the engine. [40CFR§60.4244(b)]
 - You must conduct three separate test runs for each performance test required in this section, as specified in §60.8(f). Each test run must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and last at least 1 hour. [40CFR§60.4244(c)]
 - To determine compliance with the NO_x mass per unit output emission limitation, convert the concentration of NO_x in the engine exhaust using Equation 1 of this section:

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{HP - hr} \quad (Eq. 1)$$

Where:

ER = Emission rate of NO_x in g/HP-hr.

C_d = Measured NO_x concentration in parts per million by volume (ppmv).

1.912×10⁻³ = Conversion constant for ppm NO_x to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, horsepower-hour (HP-hr).

[40CFR§60.4244(d)]

- e. To determine compliance with the CO mass per unit output emission limitation, convert the concentration of CO in the engine exhaust using Equation 2 of this section:

$$ER = \frac{C_d \times 1.164 \times 10^{-3} \times Q \times T}{HP - hr} \quad (\text{Eq. 2})$$

Where:

ER = Emission rate of CO in g/HP-hr.

C_d = Measured CO concentration in ppmv.

1.164×10⁻³ = Conversion constant for ppm CO to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

[40CFR§60.4244(e)]

- f. For purposes of this subpart, when calculating emissions of VOC, emissions of formaldehyde should not be included. To determine compliance with the VOC mass per unit output emission limitation, convert the concentration of VOC in the engine exhaust using Equation 3 of this section:

$$ER = \frac{C_d \times 1.833 \times 10^{-3} \times Q \times T}{HP - hr} \quad (\text{Eq. 3})$$

Where:

ER = Emission rate of VOC in g/HP-hr.

C_d = VOC concentration measured as propane in ppmv.

1.833×10⁻³ = Conversion constant for ppm VOC measured as propane, to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

[40CFR§60.4244(f)]

- g. If the owner/operator chooses to measure VOC emissions using either Method 18 of 40 CFR part 60, appendix A, or Method 320 of 40 CFR part 63, appendix A, then it has the option of correcting the measured VOC emissions to account for the potential differences in measured values between these methods and Method 25A. The results from Method 18 and Method 320 can be corrected for response factor differences using Equations 4 and 5 of this section. The corrected VOC concentration can then be placed on a propane basis using Equation 6 of this section.

$$RF_i = \frac{C_{Mi}}{C_{Ai}} \quad (\text{Eq. 4})$$

Where:

RF_i = Response factor of compound i when measured with EPA Method 25A.

C_{Mi} = Measured concentration of compound i in ppmv as carbon.

C_{Ai} = True concentration of compound i in ppmv as carbon.

$$C_{i\text{corr}} = RF_i \times C_{i\text{meas}} \quad (\text{Eq. 5})$$

Where:

$C_{i\text{corr}}$ = Concentration of compound i corrected to the value that would have been measured by EPA Method 25A, ppmv as carbon.

$C_{i\text{meas}}$ = Concentration of compound i measured by EPA Method 320, ppmv as carbon.

$$C_{P\text{eq}} = 0.6098 \times C_{i\text{corr}} \quad (\text{Eq. 6})$$

Where:

$C_{P\text{eq}}$ = Concentration of compound i in mg of propane equivalent per DSCM.

[40CFR§60.4244(g)]

10.6. Notification, Reports, and Records for Owners and Operators

- 10.6.1. Owners or operators of stationary SI ICE must meet the following notification, reporting and recordkeeping requirements.

- a. Owners and operators of all stationary SI ICE must keep records of the information in paragraphs (a)(1) through (4) of this section.
1. All notifications submitted to comply with this subpart and all documentation supporting any notification.
 2. Maintenance conducted on the engine.
 3. If the stationary SI internal combustion engine is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR parts 90 and 1048.
 4. If the stationary SI internal combustion engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to §60.4243(a)(2), documentation that the engine meets the emission standards.

[40CFR§60.4245(a)]

- b. For all stationary SI emergency ICE greater than or equal to 500 HP manufactured on or after July 1, 2010, that do not meet the standards applicable to non-emergency engines, the owner or operator of must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. For all stationary SI emergency ICE greater than or equal to 130 HP and less than 500 HP manufactured on or after July 1, 2011 that do not meet the standards applicable to non-emergency engines, the owner or operator of must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. For all stationary SI emergency ICE greater than 25 HP and less than 130 HP manufactured on or after July 1, 2008, that do not meet the standards applicable to non-emergency engines, the owner or operator of must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. The owner or operator must document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. **[40CFR§60.4245(b)]**
- c. Owners and operators of stationary SI ICE greater than or equal to 500 HP that have not been certified by an engine manufacturer to meet the emission standards in §60.4231 must submit an initial notification as required in §60.7(a)(1). The notification must include the information in paragraphs (c)(1) through (5) of this section.
1. Name and address of the owner or operator;
 2. The address of the affected source;
 3. Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;
 4. Emission control equipment; and
 5. Fuel used.
- [40CFR§60.4245(c)]**
- d. Owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test as conducted in §60.4244 within 60 days after the test has been completed. **[40CFR§60.4245(d)]**

11.0. Source-Specific Requirements (40CFR60 Subpart OOOO Requirements, Reciprocating Compressor Engines, C-100 – C-1100)

11.1. Limitations and Standards

11.1.1. You must comply with the standards in paragraphs (a) through (d) of this section for each reciprocating compressor affected facility.

- a. You must replace the reciprocating compressor rod packing according to either paragraph (a)(1) or (2) of this section or you must comply with paragraph (a)(3) of this section.
 1. Before the compressor has operated for 26,000 hours. The number of hours of operation must be continuously monitored beginning upon initial startup of your reciprocating compressor affected facility, or October 15, 2012, or the date of the most recent reciprocating compressor rod packing replacement, whichever is later.
 2. Prior to 36 months from the date of the most recent rod packing replacement, or 36 months from the date of startup for a new reciprocating compressor for which the rod packing has not yet been replaced.
 3. Collect the emissions from the rod packing using a rod packing emissions collection system which operates under negative pressure and route the rod packing emissions to a process through a closed vent system that meets the requirements of §60.5411(a).
- b. You must demonstrate initial compliance with standards that apply to reciprocating compressor affected facilities as required by § 60.5410.
- c. You must demonstrate continuous compliance with standards that apply to reciprocating compressor affected facilities as required by § 60.5415.
- d. You must perform the required notification, recordkeeping, and reporting as required by § 60.5420.

[40CFR§60.5385, Reciprocating Compressor Engines]

11.2. Initial Compliance Demonstration

11.2.1. You must determine initial compliance with the standards for each affected facility using the requirements in paragraph (c) of this section. The initial compliance period begins on October 15, 2012 or upon initial startup, whichever is later, and ends no later than one year after the initial startup date for your affected facility or no later than one year after October 15, 2012. The initial compliance period may be less than one full year.

- c. To achieve initial compliance with the standards for each reciprocating compressor affected facility you must comply with paragraphs (c)(1) through (4) of this section.
 1. If complying with §60.5385(a)(1) or (2), during the initial compliance period, you must continuously monitor the number of hours of operation or track the number of months since the last rod packing replacement.
 2. If complying with §60.5385(a)(3), you must operate the rod packing emissions collection system under negative pressure and route emissions to a process through a closed vent system that meets the requirements of §60.5411(a).

3. You must submit the initial annual report for your reciprocating compressor as required in § 60.5420(b).
4. You must maintain the records as specified in § 60.5420(c)(3) for each reciprocating compressor affected facility.

[40CFR§60.5410]

11.3. Continuous Compliance Demonstration

- 11.3.1. For each reciprocating compressor affected facility complying with §60.5385(a)(1) or (2), you must demonstrate continuous compliance according to paragraphs (c)(1) through (3) of this section. For each reciprocating compressor affected facility complying with §60.5385(a)(3), you must demonstrate continuous compliance according to paragraph (c)(4) of this section.
 1. You must continuously monitor the number of hours of operation for each reciprocating compressor affected facility or track the number of months since initial startup, or October 15, 2012, or the date of the most recent reciprocating compressor rod packing replacement, whichever is later.
 2. You must submit the annual report as required in § 60.5420(b) and maintain records as required in § 60.5420(c)(3).
 3. You must replace the reciprocating compressor rod packing before the total number of hours of operation reaches 26,000 hours or the number of months since the most recent rod packing replacement reaches 36 months.
 4. You must operate the rod packing emissions collection system under negative pressure and continuously comply with the closed vent requirements in §60.5411(a).

[40CFR§60.5415]

11.4. Notification, Recordkeeping and Reporting Requirements

- 11.4.1. You must submit the notifications according to paragraphs (a)(1) and (2) of this section if you own or operate one or more of the affected facilities specified in § 60.5365 that was constructed, modified, or reconstructed during the reporting period.

[40CFR§60.5420(a)]

- 11.4.2. Reporting requirements. You must submit annual reports containing the information specified in paragraphs (b)(1) and (4) of this section to the Administrator and performance test reports as specified in paragraph (b)(7) of this section. The initial annual report is due no later than 90 days after the end of the initial compliance period as determined according to § 60.5410. Subsequent annual reports are due no later than same date each year as the initial annual report. If you own or operate more than one affected facility, you may submit one report for multiple affected facilities provided the report contains all of the information required as specified in paragraphs (b)(1) and (4) of this section. Annual reports may coincide with title V reports as long as all the required elements of the annual report are included. You may arrange with the Administrator a common schedule on which reports required by this part may be submitted as long as the schedule does not extend the reporting period.

(1) The general information specified in paragraphs (b)(1)(i) through (iv) of this section.

(i) The company name and address of the affected facility.

(ii) An identification of each affected facility being included in the annual report.

(iii) Beginning and ending dates of the reporting period.

(iv) A certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

(4) For each reciprocating compressor affected facility, the information specified in paragraphs (b)(4)(i) through (ii) of this section.

(i) The cumulative number of hours of operation or the number of months since initial startup, since October 15, 2012, or since the previous reciprocating compressor rod packing replacement, whichever is later.

(ii) Records of deviations specified in paragraph (c)(3)(iii) of this section that occurred during the reporting period.

(7)(i) Within 60 days after the date of completing each performance test (see § 60.8 of this part) as required by this subpart you must submit the results of the performance tests required by this subpart to EPA's WebFIRE database by using the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (www.epa.gov/cdx). Performance test data must be submitted in the file format generated through use of EPA's Electronic Reporting Tool (ERT) (see <http://www.epa.gov/ttn/chief/ert/index.html>). Only data collected using test methods on the ERT Web site are subject to this requirement for submitting reports electronically to WebFIRE. Owners or operators who claim that some of the information being submitted for performance tests is confidential business information (CBI) must submit a complete ERT file including information claimed to be CBI on a compact disk or other commonly used electronic storage media (including, but not limited to, flash drives) to EPA. The electronic media must be clearly marked as CBI and mailed to U.S. EPA/OAPQS/CORE CBI Office, Attention: WebFIRE Administrator, MD C404-02, 4930 Old Page Rd., Durham, NC 27703. The same ERT file with the CBI omitted must be submitted to EPA via CDX as described earlier in this paragraph. At the discretion of the delegated authority, you must also submit these reports, including the confidential business information, to the delegated authority in the format specified by the delegated authority.

(ii) All reports required by this subpart not subject to the requirements in paragraph (a)(2)(i) of this section must be sent to the Administrator at the appropriate address listed in § 63.13 of this part. The Administrator or the delegated authority may request a report in any form suitable for the specific case (e.g., by commonly used electronic media such as Excel spreadsheet, on CD or hard copy). The Administrator retains the right to require submittal of reports subject to paragraph (a)(2)(i) and (ii) of this section in paper format.

[40CFR§60.5420]

11.4.3. Recordkeeping requirements. You must maintain the records identified as specified in § 60.7(f) and in paragraph (c)(1) of this section. All records must be maintained for at least 5 years.

(3) For each reciprocating compressors affected facility, you must maintain the records in paragraphs (c)(3)(i) through (iii) of this section.

(i) Records of the cumulative number of hours of operation or number of months since initial startup or October 15, 2012, or the previous replacement of the reciprocating compressor rod packing, whichever is later.

(ii) Records of the date and time of each reciprocating compressor rod packing replacement, or date of installation of a rod packing emissions collection system and closed vent system as specified in §60.5385(a)(3).

(iii) Records of deviations in cases where the reciprocating compressor was not operated in compliance with the requirements specified in § 60.5385.
[40CFR§60.5420]

12.0. Source-Specific Requirements (40CFR63 Subpart ZZZZ Requirements, C-100 – C-1100)

12.1. Limitations and Standards

12.1.1. The permittee must comply with the applicable operating limitations in this section no later than October 19, 2013.

[40 C.F.R. § 63.6595(a)]

12.1.2. *Stationary RICE subject to Regulation under 40 CFR Part 60.* 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.

The permittee meets the criteria of paragraph (c)(1), which is for a new or reconstructed stationary RICE located at an area source. The permittee must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart JJJJ.

[40 C.F.R. § 63.6590(c)]

13.0. Source-Specific Requirements (Blowdown and Pigging Operations)

13.1. Limitations and Standards

13.1.1. The maximum number of blowdown events per year shall not exceed 936, with an estimated 2,276 scf per event. Compliance shall be determined using a twelve month rolling total. A twelve month rolling total shall mean the sum of the blowdown events at any given time during the previous twelve consecutive calendar months.

13.1.2. The maximum number of low pressure pigging events per year shall not exceed 198, with an estimated 516 scf per event. Compliance shall be determined using a twelve month rolling total. A twelve month rolling total shall mean the sum of the low pressure pigging events at any given time during the previous twelve consecutive calendar months.

13.1.3. The maximum number of high pressure pigging events per year shall not exceed 260, with an estimated 2,801 scf per event. Compliance shall be determined using a twelve month rolling total. A twelve month rolling total shall mean the sum of the high pressure pigging events at any given time during the previous twelve consecutive calendar months.

13.2. Recordkeeping Requirements

13.2.1. All records required under section 13.2 of this permit shall be kept in accordance with permit condition 3.4.1.

13.2.2. To demonstrate compliance with permit conditions 13.1.1 – 13.1.3, the permittee shall maintain a record of the blowdown and pigging events and estimated volume per event (scf) on a monthly and rolling twelve month total.

13.3. Reporting Requirements

- 13.3.1. Any exceedance of permit conditions 13.1.1 – 13.3.3 must be reported in writing to the Director of the DAQ as soon as practicable, but within ten (10) calendar days, of the occurrence and shall include, at a minimum, the following information: the date of the exceedance, the estimate of VOC emissions released to the atmosphere as a result of the exceedance and any corrective measures taken or planned.

DRAFT

CERTIFICATION OF DATA ACCURACY

I, the undersigned, hereby certify that, based on information and belief formed after reasonable inquiry, all information contained in the attached _____, representing the period beginning _____ and ending _____, and any supporting documents appended hereto, is true, accurate, and complete.

Signature¹
(please use blue ink) _____
Responsible Official or Authorized Representative _____ Date _____

Name & Title
(please print or type) _____
Name _____ Title _____

Telephone No. _____ Fax No. _____

- ¹ This form shall be signed by a "Responsible Official." "Responsible Official" means one of the following:
- a. For a corporation: The president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit and either:
 - (i) the facilities employ more than 250 persons or have a gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), or
 - (ii) the delegation of authority to such representative is approved in advance by the Director;
 - b. For a partnership or sole proprietorship: a general partner or the proprietor, respectively;
 - c. For a municipality, State, Federal, or other public entity: either a principal executive officer or ranking elected official. For the purposes of this part, a principal executive officer of a Federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., a Regional Administrator of U.S. EPA); or
 - d. The designated representative delegated with such authority and approved in advance by the Director.



Permit / Application Information Sheet
Division of Environmental Protection
West Virginia Office of Air Quality

| | | | |
|--------------------------|---|-----------------------|--|
| Company: | Antero Resources Corporation | Facility: | Canton North Station |
| Region: | | Plant ID: | 017-00084 |
| Engineer: | Williams, Jerry | Application #: | 13-3167B |
| Physical Address: | State Route 23 Center Point WV 26339 | Category: | SIC: [4923] ELECTRIC, GAS AND SANITARY SERVICES - GAS TRANSMISSION AND DISTRIBUTION NAICS: [221210] Natural Gas Distribution |
| County: | Doddridge | | |
| Other Parties: | Consultant - Steyskal, Michele 719-632-3593 ENV_MGR - Schatz, Barry 303-357-7276 | | |

Information Needed for Database and AIRS
 1. Need valid physical West Virginia address with zip

Regulated Pollutants

| Summary from this Permit 13-3167B | | |
|-----------------------------------|------------------------|------------------|
| Air Programs | Applicable Regulations | |
| Fee Program | Fee | Application Type |
| | \$4,500.00 | MODIFICATION |

Notes from Database

Activity Dates

| | |
|----------------------|------------|
| APPLICATION RECIEVED | 09/02/2016 |
| APPLICATION FEE PAID | 09/02/2016 |
| ASSIGNED DATE | 09/02/2016 |

NON-CONFIDENTIAL

Please note, this information sheet is not a substitute for file research and is limited to data entered into the AIRTRAX database.

Company ID: 017-00084
 Company: Antero Resources Corporation
 Printed: 09/02/2016
 Engineer: Williams, Jerry

Williams, Jerry

From: Kaitlin Meszaros <KMesaros@kleinfelder.com>
Sent: Wednesday, November 2, 2016 5:22 PM
To: Williams, Jerry
Cc: Elizabeth McLaughlin (emcloughlin@anteroresources.com)
Subject: Canton North CS modification - venting emissions update
Attachments: Att N -Canton North Compressor Station Emissions_REV1.pdf; Att J - Emission Point Summary.pdf; Att K-Fugitive Emissions Data Summary Sheet.pdf

Jerry,

Based on your correspondence with Betsy at Antero, please find attached the updated emission calculations, Attachment J, and K for the Canton North CS modification (Permit Application R13-3167B). We have modified the emission calculations by increasing the number of compressor blowdowns. Attachment J is being resubmitted since the venting emissions have been given the emission unit ID of 29E, per your request. Attachment K now only includes emissions from haul road activities, equipment leaks, and liquid loading operations. The form previously submitted in Attachment L regarding venting emissions will remain unchanged since the emissions per event are the same, only the total emissions have been increased.

Should you have any questions or require additional information, please let me know.

Thanks!

Kaitlin Meszaros
Air Quality Professional
4815 List Drive, Unit 115
Colorado Springs, Colorado 80919
o| 719.632.3593
c| 631.245.0308
f| 719.632.2648



ID # 017-00084
Reg R13-3167B
Company ANTERO
Facility CANTON NORTH Initials JL

NON-CONFIDENTIAL

Emissions Summary Total

| | |
|--------------------|---------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Anton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |

UNCONTROLLED POTENTIAL EMISSION SUMMARY

| Source | NOx | | CO | | VOC | | SO ₂ | | PM ₁₀ | | HAPs | | Formaldehyde | | CO ₂ e tpy |
|-------------------------------------|---------------|-----------------|---------------|-----------------|---------------|---------------|-----------------|-------------|------------------|--------------|--------------|--------------|--------------|-------------|-----------------------|
| | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | |
| Engines | | | | | | | | | | | | | | | |
| Compressor Engine 1 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Compressor Engine 2 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Compressor Engine 3 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Compressor Engine 4 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Compressor Engine 5 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Compressor Engine 6 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Compressor Engine 7 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Compressor Engine 8 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Compressor Engine 9 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Compressor Engine 10 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Compressor Engine 11 | 50.37 | 220.62 | 47.41 | 207.64 | 1.56 | 6.81 | 0.0082 | 0.036 | 0.27 | 1.18 | 0.35 | 1.54 | 0.19 | 0.81 | 9,145 |
| Fuel Conditioning Heater | 0.049 | 0.21 | 0.041 | 0.18 | 0.0027 | 0.012 | 0.00029 | 0.0013 | 0.0037 | 0.016 | 0.00092 | 0.0040 | 0.000037 | 0.00016 | 257 |
| Turbines | | | | | | | | | | | | | | | |
| Microturbine Generator 1 | 0.24 | 1.05 | 0.66 | 2.89 | 0.060 | 0.26 | 0.021 | 0.092 | 0.041 | 0.18 | 0.0063 | 0.028 | 0.0044 | 0.019 | 3,499 |
| Microturbine Generator 2 | 0.24 | 1.05 | 0.66 | 2.89 | 0.060 | 0.26 | 0.021 | 0.092 | 0.041 | 0.18 | 0.0063 | 0.028 | 0.0044 | 0.019 | 3,499 |
| Catalytic Heater for Generator Fuel | 0.0024 | 0.010 | 0.0020 | 0.0087 | 0.00013 | 0.00057 | 0.000014 | 0.000062 | 0.00018 | 0.00078 | 0.000044 | 0.00019 | 0.0000018 | 0.0000077 | 12 |
| Dehydrator | | | | | | | | | | | | | | | |
| TEG Dehydrator 1 | | | | | 58.00 | 254.03 | | | | | 5.55 | 24.33 | | | 14,719 |
| TEG Dehydrator 2 | | | | | 58.00 | 254.03 | | | | | 5.55 | 24.33 | | | 14,719 |
| Reboiler 1 | 0.15 | 0.64 | 0.12 | 0.54 | 0.0081 | 0.035 | 0.00088 | 0.0039 | 0.011 | 0.049 | 0.0028 | 0.012 | 0.00011 | 0.00048 | 771 |
| Reboiler 2 | 0.15 | 0.64 | 0.12 | 0.54 | 0.0081 | 0.035 | 0.00088 | 0.0039 | 0.011 | 0.049 | 0.0028 | 0.012 | 0.00011 | 0.00048 | 771 |
| Combustors | | | | | | | | | | | | | | | |
| Flare and Pilot | | | | | | | | | | | | | | | |
| Hydrocarbon Loading | | | | | | | | | | | | | | | |
| Truck Loadout | | | | | 39.26 | 3.87 | | | | | 1.03 | 0.10 | | | 25 |
| Venting Emissions | | | | | | | | | | | | | | | |
| Compressor Blowdown Emissions | | | | | | 8.32 | | | | | | 0.15 | | | 903 |
| Startup and Shutdown Emissions | | | | | | 4.62 | | | | | | 0.082 | | | 501 |
| Pigging Emissions | | | | | | 3.24 | | | | | | 0.057 | | | 352 |
| Fugitive Emissions | | | | | | | | | | | | | | | |
| Component Leak Emissions | | | | | 0.74 | 3.23 | | | | | 0.014 | 0.063 | | | 94 |
| Haul Road Dust Emissions | | | | | | | | | 0.10 | 0.44 | | | | | |
| Storage Tanks | | | | | | | | | | | | | | | |
| Produced Water Tanks | | | | | 0.071 | 0.31 | | | | | 0.0019 | 0.0081 | | | 2.0 |
| Settler Tank | | | | | 47.81 | 209.42 | | | | | 1.26 | 5.52 | | | 1,341 |
| Condensate Tanks | | | | | 1.11 | 4.84 | | | | | 0.029 | 0.13 | | | 31 |
| Total Facility PTE = | 554.90 | 2,430.46 | 523.09 | 2,291.14 | 222.23 | 821.47 | 0.13 | 0.59 | 3.18 | 13.94 | 17.32 | 71.78 | 2.05 | 8.96 | 142,095 |

Emissions Summary Total

| | |
|--------------------|---------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |

CONTROLLED POTENTIAL EMISSION SUMMARY

| Source | NOx | CO | VOC | SO ₂ | PM-10 | HAPs | Formaldehyde | CO ₂ e |
|-------------------------------------|--------------|--------------|--------------|-----------------|-------------|--------------|--------------|-------------------|
| | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy |
| Engines | | | | | | | | |
| Compressor Engine 1 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Compressor Engine 2 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Compressor Engine 3 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Compressor Engine 4 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Compressor Engine 5 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Compressor Engine 6 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Compressor Engine 7 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Compressor Engine 8 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Compressor Engine 9 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Compressor Engine 10 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Compressor Engine 11 | 1.26 | 5.52 | 1.19 | 5.19 | 0.27 | 1.18 | 0.019 | 0.81 |
| Fuel Conditioning Heater | 0.049 | 0.21 | 0.027 | 0.12 | 0.0037 | 0.016 | 0.000037 | 0.00016 |
| Turbines | | | | | | | | |
| Microturbine Generator 1 | 0.24 | 1.05 | 0.60 | 2.89 | 0.041 | 0.18 | 0.0044 | 0.019 |
| Microturbine Generator 2 | 0.24 | 1.05 | 0.60 | 2.89 | 0.041 | 0.18 | 0.0044 | 0.019 |
| Catalytic Heater for Generator Fuel | 0.0024 | 0.010 | 0.0013 | 0.0057 | 0.00018 | 0.00078 | 0.0000018 | 0.000077 |
| Dehydrator | | | | | | | | |
| TEG Dehydrator 1 | 0.15 | 0.64 | 1.16 | 5.08 | 0.011 | 0.049 | 0.0028 | 0.012 |
| TEG Dehydrator 2 | 0.15 | 0.64 | 1.16 | 5.08 | 0.011 | 0.049 | 0.0028 | 0.012 |
| Reboiler 1 | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Reboiler 2 | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Flare and Pilot | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Hydrocarbon Loading | | | | | | | | |
| Truck Loadout | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Venting Emissions | | | | | | | | |
| Compressor Blowdown Emissions | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Startup and Shutdown Emissions | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Pigging Emissions | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Fugitive Emissions | | | | | | | | |
| Component Leak Emissions | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Haul Road Dust Emissions | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Storage Tanks | | | | | | | | |
| Produced Water Tanks | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Sewer Tank | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Condensate Tanks | 0.33 | 1.44 | 0.0011 | 0.0046 | 0.00015 | 0.00064 | 0.000036 | 0.00016 |
| Total Facility PTE = | 15.01 | 65.72 | 46.17 | 71.94 | 3.18 | 13.94 | 0.21 | 10.53 |
| | | | | | | | | 0.93 |
| | | | | | | | | 2,475 |
| | | | | | | | | 3,499 |
| | | | | | | | | 3,499 |
| | | | | | | | | 12 |
| | | | | | | | | 304 |
| | | | | | | | | 304 |
| | | | | | | | | 771 |
| | | | | | | | | 771 |
| | | | | | | | | 25 |
| | | | | | | | | 903 |
| | | | | | | | | 501 |
| | | | | | | | | 352 |
| | | | | | | | | 94 |
| | | | | | | | | 0.040 |
| | | | | | | | | 27 |
| | | | | | | | | 0.62 |
| | | | | | | | | 109,837 |

HAP Emissions Summary Total

| | |
|--------------------|---------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |

CONTROLLED POTENTIAL EMISSION SUMMARY

| Source | Benzene | | Toluene | | Ethylbenzene | | Xylenes | | n-Hexane | |
|-------------------------------------|-------------|-------------|-------------|-------------|--------------|--------------|-------------|-------------|-------------|-------------|
| | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy |
| Engines | | | | | | | | | | |
| Compressor Engine 1 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Compressor Engine 2 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Compressor Engine 3 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Compressor Engine 4 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Compressor Engine 5 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Compressor Engine 6 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Compressor Engine 7 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Compressor Engine 8 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Compressor Engine 9 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Compressor Engine 10 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Compressor Engine 11 | 0.022 | 0.096 | 0.0078 | 0.034 | 0.00035 | 0.0015 | 0.0027 | 0.012 | 0.0027 | 0.012 |
| Fuel Conditioning Heater | *** | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| Turbines | | | | | | | | | | |
| Microturbine Generator 1 | 0.000074 | 0.00032 | 0.00080 | 0.0035 | 0.00020 | 0.00087 | 0.00040 | 0.0017 | 0.00040 | 0.0017 |
| Microturbine Generator 2 | 0.000074 | 0.00032 | 0.00080 | 0.0035 | 0.00020 | 0.00087 | 0.00040 | 0.0017 | 0.00040 | 0.0017 |
| Catalytic Heater for Generator Fuel | *** | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| Dehydrator | | | | | | | | | | |
| TEG Dehydrator 1 | 0.015 | 0.068 | 0.051 | 0.22 | 0.0072 | 0.031 | 0.015 | 0.065 | 0.023 | 0.10 |
| TEG Dehydrator 2 | 0.015 | 0.068 | 0.051 | 0.22 | 0.0072 | 0.031 | 0.015 | 0.065 | 0.023 | 0.10 |
| Reboiler 1 | *** | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| Reboiler 2 | *** | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| Combustors | | | | | | | | | | |
| Flare and Pilot | *** | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| Hydrocarbon Loading | | | | | | | | | | |
| Truck Loadout | 0.027 | 0.0027 | 0.052 | 0.0051 | 0.020 | 0.0019 | 0.040 | 0.0040 | 0.89 | 0.088 |
| Venting Emissions | | | | | | | | | | |
| Compressor Blowdown Emissions | *** | 0.0035 | *** | 0.0093 | *** | 0.0012 | *** | 0.0018 | *** | 0.13 |
| Startup and Shutdown Emissions | *** | 0.0019 | *** | 0.0052 | *** | 0.00066 | *** | 0.0010 | *** | 0.073 |
| Pigging Emissions | *** | 0.0014 | *** | 0.0036 | *** | 0.00046 | *** | 0.00070 | *** | 0.051 |
| Fugitive Emissions | | | | | | | | | | |
| Component Leak Emissions | 0.00036 | 0.0016 | 0.00086 | 0.0038 | 0.00016 | 0.00072 | 0.00029 | 0.0013 | 0.013 | 0.056 |
| Haul Road Dust Emissions | *** | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| Storage Tanks | | | | | | | | | | |
| Produced Water Tanks | 9.86E-07 | 4.32E-06 | 1.87E-06 | 8.18E-06 | 7.08E-07 | 3.10E-06 | 1.44E-06 | 6.32E-06 | 3.21E-05 | 1.41E-04 |
| Settler Tank | 6.68E-04 | 2.93E-03 | 1.27E-03 | 5.55E-03 | 4.80E-04 | 2.10E-03 | 9.78E-04 | 4.28E-03 | 2.18E-02 | 9.55E-02 |
| Condensate Tanks | 1.55E-05 | 6.77E-05 | 2.93E-05 | 1.28E-04 | 1.11E-05 | 4.86E-05 | 2.26E-05 | 9.90E-05 | 5.04E-04 | 2.21E-03 |
| Total Facility PTE = | 0.30 | 1.21 | 0.24 | 0.86 | 0.039 | 0.088 | 0.10 | 0.28 | 0.98 | 0.70 |

Compressor Engine Emission Calculations

| | |
|---------------------|---------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |
| Source Description: | Compressor Engines |

Source Information-Per Engine

| | |
|--------------------------------------|----------------------|
| Emission Unit ID: | C-100 through C-1100 |
| Engine Make/Model: | Waukesha 7044 GSI |
| Service: | Compression |
| Controls - Y or N / Type: | Y NSCR/AFRC |
| Site Horsepower Rating ¹ | 1,680 hp |
| Fuel Consumption (BSFC) ¹ | 8.294 Btu/(hp-hr) |
| Heat Rating ² | 13.93 MMBtu/hr |
| Fuel Consumption ³ | 108.27 MMsct/yr |
| Fuel Consumption ¹ | 12,360 scf/hr |
| Fuel Heating Value | 1,193 Btu/scf |
| Operating Hours | 8,760 hrs/yr |

- Notes:**
1. Values from Waukesha specification sheet
 2. Calculated values
 3. Annual fuel consumption is 100% of maximum fuel consumption at 100% load.

Potential Emissions per Engine

| Pollutant | Uncontrolled | | | Controlled | | | Source of Emissions Factors |
|-------------------------------------|----------------------------|--|--|----------------------------|--|--|--|
| | Emission Factor (lb/MMBtu) | Estimated Emissions ² (lb/hr) | Estimated Emissions ² (tpy) | Emission Factor (g/bhp-hr) | Estimated Emissions ² (lb/hr) | Estimated Emissions ² (tpy) | |
| NOx ^{1,4} | --- | 13.6 | 220.6 | --- | 1.26 | 5.52 | Manufacturer's Specs - uncontrolled, Catalyst Specs - controlled |
| CO ^{1,4} | --- | 12.8 | 47.41 | --- | 0.32 | 1.19 | Manufacturer's Specs - uncontrolled, Catalyst Specs - controlled |
| VOC ^{1,4} | --- | 0.42 | 1.56 | --- | 0.067 | 0.25 | Manufacturer's Specs - uncontrolled, Catalyst Specs - controlled |
| SO ₂ | 5.88E-04 | --- | 0.082 | --- | 0.0082 | --- | AP-42, Chapter 3.2, Table 3.2-3 |
| PM _{2.5} /PM ₁₀ | 1.94E-02 | --- | 0.27 | --- | 0.27 | --- | AP-42, Chapter 3.2, Table 3.2-3 |
| Total PM | 1.94E-02 | --- | 0.27 | --- | 0.27 | --- | AP-42, Chapter 3.2, Table 3.2-3 |
| 1,1,2,2-Tetrachloroethane | 2.53E-05 | --- | 0.0035 | --- | 0.0035 | 3.09 | AP-42, Chapter 3.2, Table 3.2-3 |
| 1,3-Butadiene | 6.63E-04 | --- | 0.0092 | --- | 0.0092 | 80.93 | AP-42, Chapter 3.2, Table 3.2-3 |
| Acetaldehyde | 2.79E-03 | --- | 0.039 | --- | 0.039 | 340.6 | AP-42, Chapter 3.2, Table 3.2-3 |
| Acrolein | 2.63E-03 | --- | 0.037 | --- | 0.037 | 321.0 | AP-42, Chapter 3.2, Table 3.2-3 |
| Benzene | 1.58E-03 | --- | 0.022 | --- | 0.022 | 192.9 | AP-42, Chapter 3.2, Table 3.2-3 |
| Ethylbenzene | 2.48E-05 | --- | 0.00035 | --- | 0.00035 | 3.03 | AP-42, Chapter 3.2, Table 3.2-3 |
| Formaldehyde ^{1,4} | 0.05 | 0.19 | 1.622 | --- | 0.019 | 162.2 | Manufacturer's Specs - uncontrolled, Catalyst Specs - controlled |
| Methanol | 3.06E-03 | --- | 0.043 | --- | 0.043 | 373.5 | AP-42, Chapter 3.2, Table 3.2-3 |
| Methylene Chloride | 4.12E-05 | --- | 0.0057 | --- | 0.0057 | 5.03 | AP-42, Chapter 3.2, Table 3.2-3 |
| PAH | 1.41E-04 | --- | 0.0020 | --- | 0.0020 | 17.21 | AP-42, Chapter 3.2, Table 3.2-3 |
| Toluene | 5.58E-04 | --- | 0.0078 | --- | 0.0078 | 68.11 | AP-42, Chapter 3.2, Table 3.2-3 |
| Xylenes | 1.95E-04 | --- | 0.0027 | --- | 0.0027 | 23.80 | AP-42, Chapter 3.2, Table 3.2-3 |
| Other HAPs ² | 2.10E-04 | --- | 0.0029 | --- | 0.0029 | 25.61 | AP-42, Chapter 3.2, Table 3.2-3 |
| Total HAPs | | 0.35 | 3.077 | | 0.18 | 1.617 | |
| | | | 1.54 | | | 0.81 | |
| Pollutant | Emission Factor (kg/MMBtu) | Estimated Emissions ² (lb/hr) | Estimated Emissions ² (tpy) | Emission Factor (g/bhp-hr) | Estimated Emissions ² (lb/hr) | Estimated Emissions ² (tpy) | Source of Emissions Factors |
| CO ₂ ¹ | --- | 527 | 6,549 | --- | 1,952 | 8,549 | Manufacturer's Specs |
| CH ₄ ^{1,4} | --- | 1.46 | 5.41 | --- | 1.62 | 7.11 | Manufacturer's Specs - uncontrolled, Catalyst Specs - controlled |
| N ₂ O | 0.0001 | --- | 0.0031 | --- | 0.0031 | 0.013 | 40 CFR Part 98, Subpart C, Table C-2 |
| CO ₂ e ² | --- | --- | 2,088 | --- | 1,993 | 8,731 | 40 CFR Part 98, Subpart A, Table A-1, effective January 2014 |

- Notes:**
4. Due to variable load conditions, the catalyst efficiency may vary. The catalyst efficiencies used in the emissions are typical based on expected operating conditions. The catalyst specification sheet shows typical destruction efficiencies that were used in the calculations. The emission factors shown on the catalyst specification sheet are not site specific, so those will vary; however the efficiencies will be the same.
- Example Calculations**
- lb/hr = (g/bhp-hr) * (tpy) * (1 lb/453.6 g) / (MMBtu/hr) * (MMBtu/hr)
- tpy = (lb/hr) * (8,760 hrs/yr) / (2,000 lb/ton)

Natural Gas Fueled Fuel Conditioning Heater Emissions

| | |
|---------------------|-------------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Location: | Doddridge County, West Virginia |
| Source Description: | Catalytic Heater for Generator Fuel |

Source Information

| Emission Unit ID: | FUEL1 |
|---------------------|--------------------------|
| Source Description: | Fuel Conditioning Heater |
| Hours of Operation | 8,760 hr/yr |
| Design Heat Rate | 0.50 MMBtu/hr |
| Fuel Heat Value | 1,020 Btu/scf |
| Fuel Use | 4.29 MMscf/yr |

Emission Calculations per Heater

| Pollutant | Emission Factor (lb/MMscf) | Emissions (lb/hr) | Emissions (tpy) | Emission Factor Source |
|--|----------------------------|-------------------|-----------------|--------------------------------------|
| NO _x | 100 | 0.049 | 0.21 | AP-42 Ch. 1.4 Table 1.4-1 |
| CO | 84 | 0.041 | 0.18 | AP-42 Ch. 1.4 Table 1.4-1 |
| VOC | 5.5 | 0.0027 | 0.012 | AP-42 Ch. 1.4 Table 1.4-2 |
| PM ₁₀ | 7.6 | 0.0037 | 0.016 | AP-42 Ch. 1.4 Table 1.4-2 |
| SO ₂ | 0.6 | 0.0029 | 0.013 | AP-42 Ch. 1.4 Table 1.4-2 |
| Formaldehyde | 0.075 | 0.000037 | 0.00016 | AP-42 Ch. 1.4 Table 1.4-3 |
| Total HAPs (including HCHO) ¹ | 1.9 | 0.00092 | 0.0040 | AP-42 Ch. 1.4 Table 1.4-3 |
| Pollutant | Emission Factor (kg/MMBtu) | Emissions (lb/hr) | Emissions (tpy) | Emission Factor Source |
| Carbon Dioxide | 53.06 | 58.63 | 256.8 | 40 CFR Part 98, Subpart C, Table C-1 |
| Methane | 0.001 | 0.0011 | 0.0048 | 40 CFR Part 98, Subpart C, Table C-2 |
| Nitrous Oxide | 0.0001 | 0.00011 | 0.00048 | 40 CFR Part 98, Subpart C, Table C-2 |
| CO ₂ e | ----- | 58.69 | 257.1 | 40 CFR Part 98, Subpart A, Table A-1 |

1. Only those HAP pollutants above detection thresholds were included.

Sample Calculations:

$$\text{Fuel Consumption (MMscf/yr)} = \frac{\text{Heater Size (MMBtu/hr)} * \text{Hours of Operation (hrs/yr)}}{\text{Fuel Heat Value (Btu/scf)} * \text{Heater Efficiency}}$$

$$\text{Emissions (tons/yr)} = \frac{\text{Emission Factor (lbs/MMscf)} * \text{Fuel Consumption (MMscf/yr)}}{2,000 \text{ (lbs/ton)}}$$

Microturbine Generator Emission Calculations

| | |
|---------------------|---------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |
| Source Description: | Microturbine Generators |

Source Information

| | |
|--------------------------------------|-------------------------------|
| Emission Unit ID: | GEN1 & GEN2 |
| Make/Model | Capstone C600 Standard |
| Microturbine Rating ² | 600 kW _e |
| Number of Microturbines ² | 2 |
| Net Heat Rate | 10,300 Btu/kW _e hr |
| Heat Input ¹ | 6.18 MMBtu/hr |
| Operating Hours ² | 8,760 hrs/yr |

Notes:

- Calculated
- There will be two (2) generators onsite each rated at 600 kW_e. Only 600 kW_e will be operational at any time while the other 600 kW_e unit will be on standby for the full year. Individual units may switch between primary and standby status depending on their need for maintenance. Emissions were calculated based on both units (1,200 kW_e total) operating at full load for 8,760 hours per year, so as to be conservative.

Potential Emissions per Generator

| Pollutant | Uncontrolled | | | Controlled | | | | |
|-------------------------------------|-------------------------------|---|---|-------------------------------|---|---|---|---------------------------------|
| | Emission Factor (lb/MMBtu) | Estimated Emissions ¹ (lb/hr) | Estimated Emissions ¹ (lb/yr) | Emission Factor (lb/MMBtu) | Estimated Emissions ¹ (lb/hr) | Estimated Emissions ¹ (lb/yr) | Source of Emissions Factors | |
| NOx | --- | 0.24 | 1.05 | --- | 0.24 | 1.05 | Manufacturer Specifications | |
| CO | --- | 0.66 | 2.89 | --- | 0.66 | 2.89 | Manufacturer Specifications | |
| VOC | --- | 0.10 | 0.26 | --- | 0.10 | 0.26 | Manufacturer Specifications | |
| SO ₂ | 3.40E-03 | 0.021 | 0.092 | --- | 0.021 | 0.092 | AP-42, Chapter 3.1, Table 3.1-2a | |
| PM _{2.5} /PM ₁₀ | 6.60E-03 | 0.041 | 0.18 | --- | 0.041 | 0.18 | AP-42, Chapter 3.1, Table 3.1-2a | |
| 1,3-Butadiene | 4.30E-07 | 2.66E-06 | 0.023 | --- | 2.66E-06 | 0.023 | AP-42, Chapter 3.1, Table 3.1-3 | |
| Acetaldehyde | 4.00E-05 | 2.47E-04 | 1.08E-03 | --- | 2.47E-04 | 1.08E-03 | AP-42, Chapter 3.1, Table 3.1-3 | |
| Acrolein | 6.40E-06 | 3.96E-05 | 1.73E-04 | --- | 3.96E-05 | 0.35 | 1.73E-04 | AP-42, Chapter 3.1, Table 3.1-3 |
| Benzene | 1.20E-05 | 7.42E-05 | 0.65 | --- | 7.42E-05 | 0.65 | 3.25E-04 | AP-42, Chapter 3.1, Table 3.1-3 |
| Ethylbenzene | 3.20E-05 | 1.98E-04 | 1.73 | --- | 1.98E-04 | 1.73 | 8.66E-04 | AP-42, Chapter 3.1, Table 3.1-3 |
| Formaldehyde | 7.10E-04 | 4.39E-03 | 38.44 | --- | 4.39E-03 | 38.44 | 1.92E-02 | AP-42, Chapter 3.1, Table 3.1-3 |
| Naphthalene | 1.30E-06 | 8.03E-06 | 0.070 | --- | 8.03E-06 | 0.070 | 3.52E-05 | AP-42, Chapter 3.1, Table 3.1-3 |
| PAH | 2.20E-06 | 1.36E-05 | 0.12 | --- | 1.36E-05 | 0.12 | 5.96E-05 | AP-42, Chapter 3.1, Table 3.1-3 |
| Propylene Oxide | 2.90E-05 | 1.79E-04 | 1.57 | --- | 1.79E-04 | 1.57 | 7.85E-04 | AP-42, Chapter 3.1, Table 3.1-3 |
| Toluene | 1.30E-04 | 8.03E-04 | 7.04 | --- | 8.03E-04 | 7.04 | 3.52E-03 | AP-42, Chapter 3.1, Table 3.1-3 |
| Xylenes | 6.40E-05 | 3.96E-04 | 3.46 | --- | 3.96E-04 | 3.46 | 1.73E-03 | AP-42, Chapter 3.1, Table 3.1-3 |
| Total HAPS | | 0.0063 | 55.62 | | 0.0063 | 55.62 | | |
| Pollutant | Emission Factor (kg/MMBtu) | Estimated Emissions ¹ (lb/hr) | Estimated Emissions ¹ (tpy) | Emission Factor (lb/MMBtu) | Estimated Emissions ¹ (lb/hr) | Estimated Emissions ¹ (tpy) | Source of Emissions Factors | |
| CO ₂ | --- | 798.0 | 3,495 | --- | 798.0 | 3,495 | Manufacturer Specifications | |
| CH ₄ | 0.001 | 0.014 | 0.060 | --- | 0.014 | 0.060 | 40 CFR Part 98, Subpart C, Table C-2 | |
| N ₂ O | 0.0001 | 0.0014 | 0.0060 | --- | 0.0014 | 0.0060 | 40 CFR Part 98, Subpart C, Table C-2 | |
| CO ₂ e | --- | 798.7 | 3,499 | --- | 798.7 | 3,499 | 40 CFR Part 98, Subpart A-1, effective January 2014 | |

Example Calculations

$lb/hr = (lb/MMBtu) * kW_e * (1 MW_e/1000 kW_e) \text{ or } (lb/MMBtu) * (MMBtu/hr) \text{ or } (kg/MMBtu) * (MMBtu/hr) * (2.21 lb/kg)$
 $tpy = (lb/hr) * (hr/yr) * (ton/2000 lb)$

Natural Gas Fueled Catalytic Heater Emissions

| | |
|---------------------|-------------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Location: | Doddridge County, West Virginia |
| Source Description: | Catalytic Heater for Generator Fuel |

Source Information

| | |
|---------------------|-----------------------|
| Emission Unit ID: | CATH1 |
| Source Description: | Generator Fuel Heater |
| Hours of Operation | 8,760 hr/yr |
| Design Heat Rate | 0.024 MMBtu/hr |
| Fuel Heat Value | 1,020 Btu/scf |
| Fuel Use | 0.21 MMscf/yr |

Emission Calculations per Heater

| Pollutant | Emission Factor (lb/MMscf) | Emissions (lb/hr) | Emissions (tpy) | Emission Factor Source |
|--|----------------------------|-------------------|-----------------|--------------------------------------|
| NO _x | 100 | 0.0024 | 0.010 | AP-42 Ch. 1.4 Table 1.4-1 |
| CO | 84 | 0.0020 | 0.0087 | AP-42 Ch. 1.4 Table 1.4-1 |
| VOC | 5.5 | 0.0013 | 0.00057 | AP-42 Ch. 1.4 Table 1.4-2 |
| PM ₁₀ | 7.6 | 0.0018 | 0.00078 | AP-42 Ch. 1.4 Table 1.4-2 |
| SO ₂ | 0.6 | 0.00014 | 0.000062 | AP-42 Ch. 1.4 Table 1.4-2 |
| Formaldehyde | 0.075 | 0.0000018 | 0.0000077 | AP-42 Ch. 1.4 Table 1.4-3 |
| Total HAPs (including HCHO) ¹ | 1.9 | 0.000044 | 0.00019 | AP-42 Ch. 1.4 Table 1.4-3 |
| Pollutant | Emission Factor (kg/MMBtu) | Emissions (lb/hr) | Emissions (tpy) | Emission Factor Source |
| Carbon Dioxide | 53.06 | 2.81 | 12.3 | 40 CFR Part 98, Subpart C, Table C-1 |
| Methane | 0.001 | 0.000053 | 0.00023 | 40 CFR Part 98, Subpart C, Table C-2 |
| Nitrous Oxide | 0.0001 | 0.0000053 | 0.000023 | 40 CFR Part 98, Subpart C, Table C-2 |
| CO ₂ e | ---- | 2.82 | 12.3 | 40 CFR Part 98, Subpart A, Table A-1 |

1. Only those HAP pollutants above detection thresholds were included.

Sample Calculations:

$$\text{Fuel Consumption (MMscf/yr)} = \frac{\text{Heater Size (MMBtu/hr)} * \text{Hours of Operation (hrs/yr)}}{\text{Fuel Heat Value (Btu/scf)} * \text{Heater Efficiency}}$$

$$\text{Emissions (tons/yr)} = \frac{\text{Emission Factor (lbs/MMscf)} * \text{Fuel Consumption (MMscf/yr)}}{2,000 \text{ (lbs/ton)}}$$

Dehydrator Emissions

| | |
|---------------------|---------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |
| Source Description: | Dehydrator Units |

Potential Emissions per Dehydrator

| Pollutant | Emission Unit ID: DEHY1/DEHY2 | | Emission Unit ID: DFLSH/DFLSH2 | |
|---|----------------------------------|-------|--------------------------------|---------|
| | Dehydrator Still Vent (lb/hr) | (tpy) | Flash Tank Gas (lb/hr) | (tpy) |
| Uncontrolled Emissions¹ | | | | |
| VOC | 15.26 | 66.85 | 42.74 | 187.18 |
| Total HAPs | 4.56 | 19.97 | 1.00 | 4.36 |
| Benzene | 0.72 | 3.14 | 0.057 | 0.25 |
| Toluene | 2.43 | 10.62 | 0.11 | 0.48 |
| Ethylbenzene | 0.35 | 1.53 | 0.0080 | 0.035 |
| Xylenes | 0.74 | 3.22 | 0.011 | 0.047 |
| n-Hexane | 0.33 | 1.44 | 0.81 | 3.55 |
| Methane | 18.75 | 82.13 | 115.6 | 506.2 |
| Carbon Dioxide | 0.25 | 1.09 | 2.10 | 9.20 |
| CO ₂ e | 469.0 | 2,054 | 2,891 | 12,664 |
| Controlled Emissions^{2,3} | | | | |
| VOC | 0.31 | 1.34 | 0.85 | 3.74 |
| Total HAPs | 0.091 | 0.40 | 0.020 | 0.087 |
| Benzene | 0.014 | 0.063 | 0.0011 | 0.0050 |
| Toluene | 0.049 | 0.21 | 0.0022 | 0.0096 |
| Ethylbenzene | 0.0070 | 0.031 | 0.00020 | 0.00070 |
| Xylenes | 0.015 | 0.064 | 0.00020 | 0.00090 |
| n-Hexane | 0.0066 | 0.029 | 0.016 | 0.071 |
| Methane | 0.38 | 1.64 | 2.31 | 10.12 |
| Carbon Dioxide | 0.23 | 1.09 | 2.10 | 9.20 |
| CO ₂ e | 9.62 | 42.16 | 59.89 | 262.3 |

| Pollutant | Dehydrator Emission Totals | |
|---|----------------------------|--------|
| | (lb/hr) | (tpy) |
| Uncontrolled Emissions¹ | | |
| VOC | 58.00 | 254.0 |
| Total HAPs | 5.55 | 24.33 |
| Benzene | 0.77 | 3.39 |
| Toluene | 2.53 | 11.10 |
| Ethylbenzene | 0.36 | 1.57 |
| Xylenes | 0.75 | 3.27 |
| n-Hexane | 1.14 | 5.00 |
| Methane | 134.3 | 588.3 |
| Carbon Dioxide | 2.35 | 10.29 |
| CO ₂ e | 3,360 | 14,719 |
| Controlled Emissions^{2,3} | | |
| VOC | 1.16 | 5.08 |
| Total HAPs | 0.11 | 0.49 |
| Benzene | 0.015 | 0.068 |
| Toluene | 0.051 | 0.22 |
| Ethylbenzene | 0.0072 | 0.031 |
| Xylenes | 0.015 | 0.065 |
| n-Hexane | 0.023 | 0.10 |
| Methane | 2.69 | 11.77 |
| Carbon Dioxide | 2.35 | 10.29 |
| CO ₂ e | 69.51 | 304.5 |

¹Output from GRI-GLYCalc 4.0 for both the still vent and flash tank gas emissions
²Controlled emissions assume that the glycol still vent is equipped with a condenser and is controlled by a combustor with 98% control efficiency.
³Flash tank gas is used in the reboiler as the primary fuel source. However, in the case that gas cannot be used in the reboiler, the gas is sent to the primary/backup VRU system via the storage tanks for 98% control.

Natural Gas Fueled Dehydrator Reboiler Emissions

| | |
|---------------------|---------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Location: | Doddridge County, West Virginia |
| Source Description: | Dehydrator Reboilers |

Source Information

| | |
|---------------------|---------------------|
| Emission Unit ID: | DREB1 & DREB2 |
| Source Description: | Dehydrator Reboiler |
| Hours of Operation | 8,760 hr/yr |
| Design Heat Rate | 1.5 MMBtu/hr |
| Fuel Heat Value | 1,020 Btu/scf |
| Fuel Use | 12.9 MMscf/yr |

Emission Calculations per Reboiler

| Pollutant | Emission Factor (lb/MMscf) | Emissions (lb/hr) | Emissions (tpy) | Emission Factor Source |
|-----------------------------|----------------------------|-------------------|-----------------|--------------------------------------|
| NO _x | 100 | 0.15 | 0.64 | AP-42 Ch. 1.4 Table 1.4-1 |
| CO | 84 | 0.12 | 0.54 | AP-42 Ch. 1.4 Table 1.4-1 |
| VOC | 5.5 | 0.0081 | 0.035 | AP-42 Ch. 1.4 Table 1.4-2 |
| PM ₁₀ | 7.6 | 0.011 | 0.049 | AP-42 Ch. 1.4 Table 1.4-2 |
| SO ₂ | 0.6 | 0.00088 | 0.0039 | AP-42 Ch. 1.4 Table 1.4-2 |
| Formaldehyde | 0.075 | 0.00011 | 0.00048 | AP-42 Ch. 1.4 Table 1.4-3 |
| Total HAPs (including HCHO) | 1.9 | 0.0028 | 0.012 | AP-42 Ch. 1.4 Table 1.4-3 |
| Pollutant | Emission Factor (kg/MMBtu) | Emissions (lb/hr) | Emissions (tpy) | Emission Factor Source |
| Carbon Dioxide | 53.06 | 175.9 | 770.4 | 40 CFR Part 98, Subpart C, Table C-1 |
| Methane | 0.001 | 0.0033 | 0.015 | 40 CFR Part 98, Subpart C, Table C-2 |
| Nitrous Oxide | 0.0001 | 0.00033 | 0.0015 | 40 CFR Part 98, Subpart C, Table C-2 |
| CO _{2e} | --- | 176.1 | 771.2 | 40 CFR Part 98, Subpart A, Table A-1 |

Sample Calculations:

$$\text{Fuel Consumption (MMscf/yr)} = \frac{\text{Heater Size (MMBtu/hr)} * \text{Hours of Operation (hrs/yr)}}{\text{Fuel Heat Value (Btu/scf)} * \text{Heater Efficiency}}$$

$$\text{Emissions (tons/yr)} = \frac{\text{Emission Factor (lbs/MMscf)} * \text{Fuel Consumption (MMscf/yr)}}{2,000 \text{ (lbs/ton)}}$$

Flare Emissions

| | |
|---------------------|-------------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |
| Source Description: | Flare for Dehydrator Still Vent Gas |
| Emission Unit ID: | FLARE1 |

Combusted Gas Emissions

Flare Heat Input : 4.80 MMBtu/hr
 Vent Gas to Flare Rate: 4,022 scf/hr
 Gas Heating Value: 1,193 Btu/scf
 Hours of Operation: 8,760 hr/yr

| Pollutant | Emission Factor ¹ (lb/MMBtu) | Emissions (lbs/hr) | Emissions (tons/yr) |
|--|--|-----------------------|------------------------|
| Particulate Matter (PM/PM ₁₀ /PM _{2.5}) | N/A - Smokeless Design | | |
| Nitrogen Oxides (NO _x) | 0.068 | 0.33 | 1.43 |
| Carbon Monoxide (CO) | 0.37 | 1.78 | 7.78 |

¹ Emission Factors from Table 13.5-1 of AP-42 Section 13.5 (Sept 1991)

Pilot Emissions

Pilot Heating Value: 1,193 Btu/scf
 Hours of Operation: 8,760 hr/yr
 Total Pilot Natural Gas Usage: 1.64E-05 MMscf/hr

| Pollutant | Emission Factor (lb/MMscf) | Emissions (lbs/hr) | Emissions (tons/yr) |
|---|-------------------------------|-----------------------|------------------------|
| Particulate Matter (PM/PM ₁₀ /PM _{2.5}) ² | 7.6 | 1.46E-04 | 6.39E-04 |
| Nitrogen Oxides (NO _x) | 100 | 1.92E-03 | 8.40E-03 |
| Sulfur Dioxide (SO ₂) ² | 0.6 | 1.15E-05 | 5.04E-05 |
| Carbon Monoxide (CO) ² | 84 | 1.61E-03 | 7.06E-03 |
| Volatile Organic Compounds (VOC) ² | 5.5 | 1.06E-04 | 4.62E-04 |
| Total HAPs ^{2,3} | 1.88 | 3.61E-05 | 1.58E-04 |

² Emission Factors from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4 (7/98).

³ Sum of Emissions Factors published for pollutants classified as "HAPS" under AP-42 Table 1.4-3.

Total Flare Emissions

| Pollutant | Total Potential Emission Rate (tons/year) |
|--|---|
| Particulate Matter (PM/PM ₁₀ /PM _{2.5}) | 6.39E-04 |
| Nitrogen Oxides (NO _x) | 1.44 |
| Sulfur Dioxide (SO ₂) | 5.04E-05 |
| Carbon Monoxide (CO) | 7.79 |
| Volatile Organic Compounds (VOC) | 4.62E-04 |
| Total HAPs | 1.58E-04 |

Greenhouse Gas Emissions

| Pollutant | Emission Factor (kg/MMBtu) | Emissions (lb/hr) | Emissions (tpy) | Emission Factor Source |
|-------------------|-------------------------------|----------------------|--------------------|--------------------------------------|
| Carbon Dioxide | 53.06 | 565.2 | 2,475 | 40 CFR Part 98, Subpart C, Table C-1 |
| Methane | 0.001 | 0.011 | 0.047 | 40 CFR Part 98, Subpart C, Table C-2 |
| Nitrogen Dioxide | 0.0001 | 0.0011 | 0.0047 | 40 CFR Part 98, Subpart C, Table C-2 |
| CO ₂ e | ---- | 565.1 | 2,475 | 40 CFR Part 98, Subpart A, Table A-1 |

Truck Loading Emissions

| | |
|---------------------|----------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |
| Source Description: | Production Liquids Truck Loadout |
| Emission Unit ID: | LDOUT1 |

AP - 42, Chapter 5.2 $L_L = 12.46 \times S \times P \times M / T$

L_L = Loading Loss Emission Factor (lbs VOC/1000 gal loaded)

S = Saturation Factor

P = True Vapor Pressure of the Loaded Liquid (psia)

M = Vapor Molecular Weight of the Loaded Liquid (lbs/lbmol)

T = Temperature of Loaded Liquid (°R)

VOC Emissions (tpy) = $\frac{L_L (\text{lbs VOC}/1000 \text{ gal}) * 42 \text{ gal}/\text{bbl} * 365 \text{ days}/\text{year} * \text{production (bbl}/\text{day})}{1000 \text{ gal} * 2000 \text{ lbs}/\text{ton}}$

| Source | S ¹ | P (psia) ² | M ³ | T (°F) ⁴ | T (°R) | L _L (lb/1000 gal) | Production (bbl/day) | Uncontrolled | | | | | | |
|-----------------------------|----------------|-----------------------|----------------|---------------------|--------|---------------------------------|-------------------------|--------------|------------------|------------------|--------------------|-----------------|-------------------|---|
| | | | | | | | | VOC (tpy) | Benzene (tpy) | Toluene (tpy) | E-Benzene (tpy) | Xylene (tpy) | n-Hexane (tpy) | CO ₂ e ⁷ (tpy) |
| Condensate | 0.6 | 3.3 | 68 | 52 | 511.81 | 3.27 | 150 | 3.76 | 0.0026 | 0.0050 | 0.0019 | 0.0038 | 0.086 | 24.05 |
| Produced Water ⁵ | 0.6 | 3.3 | 68 | 52 | 511.81 | 0.33 | 45 | 0.11 | 7.88E-05 | 1.49E-04 | 5.66E-05 | 1.15E-04 | 0.0026 | 0.72 |

- Notes:
1. Saturation factor from AP-42, Table 5.2-1 (Submerged loading (bottom loading): dedicated normal service)
 2. True vapor pressure is the average vapor pressure from EPA Tanks 4.09d using an RVP of 7 (representative liquid sample has RVP of 6.09 psi).
 3. Molecular weight of the liquid vapor is retrieved from EPA Tanks 4.09d using an RVP of 7 (representative liquid sample has RVP of 6.09 psi).
 4. Temperature is the liquid bulk temperature from EPA Tanks 4.09d (Elkins, West Virginia).
 5. Produced water assumed to have no more than 10% hydrocarbon liquid.
 6. CO₂e emissions estimated assuming 15% of the vent gas by weight is methane and 58% by weight are VOCs (per ProMax simulation).
 7. HAP emissions estimated assuming 1.6% by weight of the vent gas are HAPs and 58% by weight are VOCs (per ProMax simulation).

Assume 1 truck loaded per hour, 260 bbl truck, for short term emissions

| Source | S ¹ | P (psia) ² | M ³ | T (°F) ⁴ | T (°R) | L _L (lb/1000 gal) | Loading (bbl/hr) | Uncontrolled | | | | | | |
|-----------------------------|----------------|-----------------------|----------------|---------------------|--------|---------------------------------|---------------------|----------------|--------------------|--------------------|----------------------|-------------------|---------------------|---|
| | | | | | | | | VOC (lb/hr) | Benzene (lb/hr) | Toluene (lb/hr) | E-Benzene (lb/hr) | Xylene (lb/hr) | n-Hexane (lb/hr) | CO ₂ e ⁷ (lb/hr) |
| Condensate | 0.6 | 3.3 | 68 | 52 | 511.81 | 3.27 | 260 | 35.69 | 0.025 | 0.047 | 0.018 | 0.037 | 0.81 | 228.5 |
| Produced Water ⁵ | 0.6 | 3.3 | 68 | 52 | 511.81 | 0.33 | 260 | 3.57 | 2.49E-03 | 4.73E-03 | 1.79E-03 | 3.65E-03 | 0.081 | 22.85 |

Component Fugitive Emissions

| | |
|---------------------|--------------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |
| Source Description: | Fugitive Emissions - Component Leaks |

| VOC Fugitive Emissions | | | | | | |
|----------------------------------|------------------------------|-------------------------------|---|----------------------------------|---------------------|---------------------|
| Equipment Type and Service | Number of Units ¹ | Hours of Operation (hours/yr) | THC Emission Factor ² (kg/hr-unit) | VOC Weight Fraction ³ | THC Emissions (tpy) | VOC Emissions (tpy) |
| Flanges - Gas Service | 836 | 8,760 | 3.90E-04 | 0.15 | 3.16 | 0.47 |
| Valves - Gas Service | 250 | 8,760 | 4.50E-03 | 0.15 | 10.89 | 1.62 |
| Compressor Seals Gas Service | 33 | 8,760 | 8.80E-03 | 0.15 | 2.81 | 0.42 |
| Flanges - Liquid Service | 175 | 8,760 | 1.10E-04 | 0.59 | 0.19 | 0.11 |
| Valves - Liquid Service | 42 | 8,760 | 2.50E-03 | 0.59 | 1.02 | 0.60 |
| Total Emissions (tons/yr) | | | | | 18.06 | 3.23 |

| HAPs Fugitive Emissions | | | | | | | | | | |
|----------------------------------|--------------------------------------|-------------------------|--------------------------------------|-------------------------|---|------------------------------|-------------------------------------|------------------------|---------------------------------------|--------------------------|
| Equipment Type and Service | Benzene Weight Fraction ³ | Benzene Emissions (tpy) | Toluene Weight Fraction ² | Toluene Emissions (tpy) | Ethylbenzene Weight Fraction ² | Ethylbenzene Emissions (tpy) | Xylene Weight Fraction ² | Xylene Emissions (tpy) | n-Hexane Weight Fraction ² | n-Hexane Emissions (tpy) |
| Flanges - Gas Service | 6.29E-05 | 0.00020 | 1.67E-04 | 0.00053 | 2.14E-05 | 0.000067 | 3.20E-05 | 0.00010 | 2.35E-03 | 0.0074 |
| Valves - Gas Service | 6.29E-05 | 0.00068 | 1.67E-04 | 0.0018 | 2.14E-05 | 0.00023 | 3.20E-05 | 0.00035 | 2.35E-03 | 0.026 |
| Compressor Seals Gas Service | 6.29E-05 | 0.00018 | 1.67E-04 | 0.00047 | 2.14E-05 | 0.000060 | 3.20E-05 | 0.000090 | 2.35E-03 | 0.0066 |
| Flanges - Liquid Service | 4.14E-04 | 0.000077 | 7.83E-04 | 0.00015 | 2.97E-04 | 0.000055 | 6.05E-04 | 0.00011 | 1.35E-02 | 0.0025 |
| Valves - Liquid Service | 4.14E-04 | 0.00042 | 7.83E-04 | 0.00080 | 2.97E-04 | 0.00030 | 6.05E-04 | 0.00062 | 1.35E-02 | 0.014 |
| Total Emissions (tons/yr) | | 0.0016 | | 0.0038 | | 0.00072 | | 0.0013 | | 0.056 |

1) Component counts from Engineering Lists.

2) API average emission factors are for oil and gas production operations - Table 2.4, EPA Protocol for Equipment Leak Emission Estimates - 1995.

3) Gas weight fractions from a site-specific gas analysis and liquid weight fractions from a site-specific ProMax model run.

| GHG Fugitive Emissions | | | | | | | | |
|----------------------------------|------------------------------|-------------------------------|--|--|--|---------------------------------|---------------------------------|----------------------------------|
| Equipment Type | Number of Units ¹ | Hours of Operation (hours/yr) | Emission Factor ² (scf/hr-unit) | CH ₄ Concentration ³ | CO ₂ Concentration ³ | CH ₄ Emissions (tpy) | CO ₂ Emissions (tpy) | CO _{2e} Emissions (tpy) |
| Flanges | 1,011 | 8,760 | 0.003 | 0.98 | 0.011 | 0.55 | 0.017 | 13.72 |
| Valves | 292 | 8,760 | 0.027 | 0.98 | 0.011 | 1.43 | 0.044 | 35.67 |
| Compressor Seals | 33 | 8,760 | 0.300 | 0.98 | 0.011 | 1.79 | 0.055 | 44.79 |
| Total Emissions (tons/yr) | | | | | | 3.76 | 0.12 | 94.19 |

1) Component counts from Engineering Lists.

2) Emission factors from 40 CFR Part 98 Subpart W, Table W1-A.

3) CH₄ and CO₂ concentrations as defined in 40 CFR Part 98.233(r)

Venting Episodes

| | |
|---------------------|---------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |
| Source Description: | Venting Episodes |

| VOC Venting Emissions | | | | | | |
|--|-----------------------------|-------------------------------------|--|--------------------------|----------------------------------|------------------------|
| Type of Event ¹ | Number Of Events (event/yr) | Amount Vented per Event (scf/event) | Molecular Weight of Vented Gas (lb/lb-mol) | Total Emissions (ton/yr) | VOC Weight Fraction ⁴ | VOC Emissions (ton/yr) |
| Compressor Blowdown ² | 936 | 2,276 | 20.08 | 56.35 | 0.15 | 8.32 |
| Compressor Startup | 936 | 1,050 | 20.08 | 26.00 | 0.15 | 3.84 |
| Plant Shutdown | 2 | 100,000 | 20.08 | 5.29 | 0.15 | 0.78 |
| Low Pressure Pig Venting ³ | 198 | 516 | 20.08 | 2.70 | 0.15 | 0.40 |
| High Pressure Pig Venting ³ | 260 | 2,801 | 20.08 | 19.26 | 0.15 | 2.85 |
| Total Emissions (tons/yr) | | | | | | 16.19 |

| HAPs Venting Emissions | | | | | | | | | | |
|--|--------------------------------------|-------------------------|--------------------------------------|-------------------------|---|------------------------------|-------------------------------------|------------------------|---------------------------------------|--------------------------|
| Type of Event ¹ | Benzene Weight Fraction ⁴ | Benzene Emissions (tpy) | Toluene Weight Fraction ⁴ | Toluene Emissions (tpy) | Ethylbenzene Weight Fraction ⁴ | Ethylbenzene Emissions (tpy) | Xylene Weight Fraction ⁴ | Xylene Emissions (tpy) | n-Hexane Weight Fraction ⁴ | n-Hexane Emissions (tpy) |
| Compressor Blowdown ² | 6.22E-05 | 0.0035 | 1.65E-04 | 0.0093 | 2.12E-05 | 0.0012 | 3.17E-05 | 0.0018 | 2.33E-03 | 0.13 |
| Compressor Startup | 6.22E-05 | 0.0016 | 1.65E-04 | 0.0043 | 2.12E-05 | 0.0055 | 3.17E-05 | 0.0082 | 2.33E-03 | 0.061 |
| Plant Shutdown | 6.22E-05 | 0.00033 | 1.65E-04 | 0.00087 | 2.12E-05 | 0.0011 | 3.17E-05 | 0.0017 | 2.33E-03 | 0.12 |
| Low Pressure Pig Venting ³ | 6.22E-05 | 0.00017 | 1.65E-04 | 0.00045 | 2.12E-05 | 0.00057 | 3.17E-05 | 0.00086 | 2.33E-03 | 0.0063 |
| High Pressure Pig Venting ³ | 6.22E-05 | 0.0012 | 1.65E-04 | 0.0032 | 2.12E-05 | 0.00041 | 3.17E-05 | 0.00061 | 2.33E-03 | 0.045 |
| Total Emissions (tons/yr) | | 0.0068 | | 0.018 | | 0.0023 | | 0.0035 | | 0.26 |

| GHG Venting Emissions | | | | | | |
|--|-----------------------------|-------------------------------------|--|--|--|-----------------------------------|
| Type of Event ¹ | Number Of Events (event/yr) | Amount Vented per Event (scf/event) | Molecular Weight of Vented Gas (lb/lb-mol) | CH ₄ Weight Fraction ⁴ | CO ₂ Weight Fraction ⁴ | CO ₂ e Emissions (tpy) |
| Compressor Blowdown ² | 936 | 2,276 | 20.08 | 0.64 | 0.0038 | 903.10 |
| Compressor Startup | 936 | 1,050 | 20.08 | 0.64 | 0.0038 | 416.69 |
| Plant Shutdown | 2 | 100,000 | 20.08 | 0.64 | 0.0038 | 84.80 |
| Low Pressure Pig Venting ³ | 198 | 516 | 20.08 | 0.64 | 0.0038 | 43.23 |
| High Pressure Pig Venting ³ | 260 | 2,801 | 20.08 | 0.64 | 0.0038 | 308.77 |
| Total Emissions (tons/yr) | | | | | | 1,756.6 |

1) Estimated number of events and venting per event from engineering. Compressor blowdowns are calculated to be 120.4 lb/event.
 2) Total number of compressor blowdowns based on 18 blowdowns per week.
 3) Total number of pigging events based on expected operations.
 4) Weight fractions are from a site-specific gas analysis.

Fugitive Dust Emissions

| | |
|---------------------|---------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |
| Source Description: | Fugitive Dust Emissions |

| Gravel Access Road | Loaded Truck Weight ¹ | Trips per year ² | Trips per round trip (truck in and out) ³ | Distance per round trip | | VMT per year ⁴ |
|---------------------------|----------------------------------|-----------------------------|--|-------------------------|-------|---------------------------|
| | | | | feet | miles | |
| Condensate Tank Truck | 40,000 | 365 | 1.0 | 5,366 | 1.02 | 371 |
| Produced Water Tank Truck | 40,000 | 365 | 1.0 | 5,366 | 1.02 | 371 |

| Equation Parameter | PM-10/PM2.5 | PM-Total |
|---|-----------------|-----------------|
| E, annual size-specific emission factor for PM ₁₀ & PM _{2.5} (upaved industrial roads) extrapolated for natural mitigation ⁶ | see table below | see table below |
| k, Particle size multiplier for particle size range (PM ₁₀), (lb/VMT) (Source: AP-42 Table 13.2.2-2) | 1.5 | 4.9 |
| k, Particle size multiplier for particle size range (PM _{2.5}), (lb/VMT) (Source: AP-42 Table 13.2.2-2) | 0.15 | |
| s, surface material silt content, (%) (Source: AP-42 Table 13.2.2-1) | 4.8 | 4.8 |
| W, mean weight (tons) of the vehicles travelling the road | 40.00 | 40.00 |
| a, constant for PM ₁₀ and PM _{2.5} on industrial roads (Source: AP-42 Table 13.2.2-2) | 0.9 | 0.7 |
| b, constant for PM ₁₀ and PM _{2.5} on industrial roads (Source: AP-42 Table 13.2.2-2) | 0.45 | 0.45 |
| P, number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period, based on AP-42 Figure 13.2.2-1. | 160 | 160 |

$$E = \left[\left(\frac{s}{12} \right)^a \times \left(\frac{W}{3} \right)^b \right] \times (365 - P / 365)$$

Source of Equation: AP-42 Section 13.2.2

| PM ₁₀ Emissions | Annual Uncontrolled PM ₁₀ Emissions (tpy) |
|--|--|
| Emission Factor (lb/VMT) | 0.44 |
| Vehicle miles traveled (VMT/yr) ⁴ | 741.89 |

| PM _{2.5} Emissions (tons/yr) | Annual Uncontrolled PM _{2.5} Emissions (tpy) |
|--|---|
| Emission Factor (lb/VMT) | 0.044 |
| Vehicle miles traveled (VMT/yr) ⁴ | 741.89 |

| PM- Total Emissions (tons/yr) | Annual Uncontrolled PM-Total Emissions (tpy) |
|--|--|
| Emission Factor (lb/VMT) | 1.72 |
| Vehicle miles traveled (VMT/yr) ⁴ | 741.89 |

Table Notes:

1. Loaded truck weight is based on typical weight limit for highway vehicles.
2. Based on production, it's assumed a maximum of one condensate truck (260 bbl truck) and one produced water truck (260 bbl truck) will be onsite per day.
3. Distance per round trip is based on the site layout. The one way distance is measured as 2,683 feet for the gravel access road.
4. VMT/yr = Trips/yr x Roundtrip Distance
5. Hourly emissions determined from tons per year calculation using 2,000 lb/ton and 8,760 hours per year.

Storage Tank Flashing Emissions Calculated by ProMax Simulation

| | |
|---------------------|---------------------------------|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |
| Source Description: | Settling Tank |
| Emission Unit ID: | TK-1502 |

Settling Tank Flashing Emissions

| Component | Uncontrolled Flashing Emissions ¹ (lb/hr) | Uncontrolled Flashing Emissions (tons/yr) | Controlled Flashing Emissions ^{2,3} (lb/hr) | Controlled Flashing Emissions (tons/yr) |
|---------------------------------|--|---|--|---|
| Methane | 12.05 | 52.79 | 0.24 | 1.06 |
| Ethane | 20.44 | 89.53 | 0.41 | 1.79 |
| Propane | 20.36 | 89.20 | 0.41 | 1.78 |
| i-Butane | 5.01 | 21.96 | 0.10 | 0.44 |
| n-Butane | 9.48 | 41.54 | 0.19 | 0.83 |
| i-Pentane | 3.85 | 16.88 | 0.077 | 0.34 |
| n-Pentane | 3.30 | 14.46 | 0.066 | 0.29 |
| 2-Methylpentane | 1.92 | 8.43 | 0.038 | 0.17 |
| n-Heptane | 1.22 | 5.35 | 0.024 | 0.11 |
| n-Octane | 0.57 | 2.51 | 0.011 | 0.050 |
| n-Nonane | 0.093 | 0.41 | 0.0019 | 0.0082 |
| Decanes+ | 0.0070 | 0.030 | 0.0014 | 0.0061 |
| Benzene | 0.033 | 0.14 | 0.00066 | 0.0029 |
| Toluene | 0.062 | 0.27 | 0.0012 | 0.0055 |
| Ethylbenzene | 0.024 | 0.10 | 0.00047 | 0.0021 |
| o-Xylene | 0.048 | 0.21 | 0.0010 | 0.0042 |
| n-Hexane | 1.07 | 4.70 | 0.021 | 0.094 |
| 2,2,4-Trimethylpentane | 0.00 | 0.00 | 0.00 | 0.00 |
| Water | 0.74 | 3.23 | 0.74 | 3.23 |
| Nitrogen | 0.095 | 0.42 | 0.095 | 0.42 |
| Carbon Dioxide | 0.087 | 0.38 | 0.087 | 0.38 |
| VOC Subtotal | 47.07 | 206.18 | 0.94 | 4.12 |
| HAP Subtotal | 1.24 | 5.43 | 0.025 | 0.11 |
| CO₂e Subtotal | 301.42 | 1,320.2 | 6.11 | 26.78 |
| Total | 80.49 | 352.53 | 2.51 | 11.00 |

Notes:

1. Flashing emissions calculated by ProMax 3.2. Flash gas is "Uncontrolled Flash Gas" of the associated ProMax simulation. Flashing only occurs in the settling tank as all pressurized fluids flow into the settling tank and then separate out at atmospheric conditions to the condensate and produced water tanks.
2. Tanks are controlled by a VRU with assumed 98% capture efficiency; but will likely be higher as vapors are recycled back into the system.
3. VRU-100 is the primary VRU to collect storage tank vapors and VRU-200 is the backup VRU in times when the primary VRU is undergoing maintenance or shutdown.

Storage Tank Working and Breathing Emissions

| | |
|---------------------|--|
| Company: | Antero Midstream LLC |
| Facility Name: | Canton North Compressor Station |
| Facility Location: | Doddridge County, West Virginia |
| Source Description: | Condensate, Settling, and Produced Water Tanks |
| Emission Unit ID: | TK-200, TK-201, TK-1500, TK-1501, TK-1501 |

| TANK DESCRIPTION | Uncontrolled VOC Emissions ¹ (tons/yr) | Uncontrolled Benzene Emissions ¹ (tons/yr) | Uncontrolled Toluene Emissions ¹ (tons/yr) | Uncontrolled Ethylbenzene Emissions ¹ (tons/yr) | Uncontrolled Xylene Emissions ¹ (tons/yr) | Uncontrolled n-Hexane Emissions ¹ (tons/yr) | Uncontrolled CH ₄ Emissions ³ (tons/yr) | Uncontrolled CO ₂ e Emissions (tons/yr) |
|--|---|---|---|--|--|--|---|--|
| 400 bbl Hydrocarbon Storage Tank (TK-200) | 2.42 | 0.0017 | 0.0032 | 0.0012 | 0.0025 | 0.055 | 0.62 | 15.50 |
| 400 bbl Hydrocarbon Storage Tank (TK-201) | 2.42 | 0.0017 | 0.0032 | 0.0012 | 0.0025 | 0.055 | 0.62 | 15.50 |
| 400 bbl Settling Tank (TK-1502) | 3.24 | 0.0023 | 0.0043 | 0.0016 | 0.0033 | 0.074 | 0.83 | 20.72 |
| 400 bbl Produced Water Storage Tank ² (TK-1500) | 0.15 | 0.00011 | 0.00020 | 0.000078 | 0.00016 | 0.0035 | 0.040 | 0.99 |
| 400 bbl Produced Water Storage Tank ² (TK-1501) | 0.15 | 0.00011 | 0.00020 | 0.000078 | 0.00016 | 0.0035 | 0.040 | 0.99 |
| TOTAL | 8.39 | 0.0059 | 0.011 | 0.0042 | 0.0086 | 0.19 | 2.15 | 53.69 |

| TANK DESCRIPTION | Controlled VOC Emissions ⁵ (tons/yr) | Controlled Benzene Emissions ^{1,3} (tons/yr) | Controlled Toluene Emissions ^{1,3} (tons/yr) | Controlled Ethylbenzene Emissions ^{1,3} (tons/yr) | Controlled Xylene Emissions ^{1,3} (tons/yr) | Controlled n-Hexane Emissions ^{1,3} (tons/yr) | Controlled CH ₄ Emissions ⁵ (tons/yr) | Controlled CO ₂ e Emissions (tons/yr) |
|--|---|---|---|--|--|--|---|--|
| 400 bbl Hydrocarbon Storage Tank (TK-200) | 0.048 | 3.38E-05 | 6.41E-05 | 2.43E-05 | 4.95E-05 | 1.10E-03 | 0.012 | 0.31 |
| 400 bbl Hydrocarbon Storage Tank (TK-201) | 0.048 | 3.38E-05 | 6.41E-05 | 2.43E-05 | 4.95E-05 | 1.10E-03 | 0.012 | 0.31 |
| 400 bbl Settling Tank (TK-1502) | 0.065 | 4.53E-05 | 8.57E-05 | 3.25E-05 | 6.62E-05 | 1.48E-03 | 0.017 | 0.41 |
| 400 bbl Produced Water Storage Tank ² (TK-1500) | 0.0031 | 2.16E-06 | 4.09E-06 | 1.55E-06 | 3.16E-06 | 7.04E-05 | 0.00079 | 0.020 |
| 400 bbl Produced Water Storage Tank ² (TK-1501) | 0.0031 | 2.16E-06 | 4.09E-06 | 1.55E-06 | 3.16E-06 | 7.04E-05 | 0.00079 | 0.020 |
| TOTAL | 0.17 | 1.17E-04 | 2.22E-04 | 8.42E-05 | 1.72E-04 | 3.82E-03 | 0.043 | 1.07 |

Notes:

1. Tanks 4.0.9d used to calculate standing, working, and breathing (S,W,B) emissions.
2. Produced water assumed to have no more than 10% hydrocarbon liquid.
3. CO₂e emissions estimated assuming 15% of the vent gas by weight is methane and 58% by weight are VOCs (per ProMax simulation).
4. HAP emissions estimated assuming 1.6% by weight of the vent gas are HAPs and 58% by weight are VOCs (per ProMax simulation).
5. Tanks are controlled by a VRU with assumed 98% capture efficiency; but will likely be higher as vapors are recycled back into the system.
6. VRU-100 is the primary VRU to collect storage tank vapors and VRU-200 is the backup VRU in times when the primary VRU is undergoing maintenance or shutdown.

Facility Gas Analysis

| | MOL % | MW | Component Weight lb/lb-mol | Wt. Fraction |
|----------------|---------|--------|----------------------------|--------------|
| Methane | 80.23 | 16.04 | 12.87 | 0.64 |
| Ethane | 13.44 | 30.07 | 4.04 | 0.20 |
| Propane | 3.77 | 44.10 | 1.66 | 0.083 |
| i-Butane | 0.46 | 58.12 | 0.27 | 0.013 |
| n-Butane | 0.80 | 58.12 | 0.46 | 0.023 |
| i-Pentane | 0.23 | 72.15 | 0.16 | 0.0081 |
| n-Pentane | 0.18 | 72.15 | 0.13 | 0.0064 |
| Hexanes | 0.10 | 106.72 | 0.11 | 0.0056 |
| Heptanes | 0.080 | 100.20 | 0.080 | 0.0040 |
| Octanes | 0.018 | 114.23 | 0.021 | 0.0010 |
| Nonanes | 0.0090 | 128.26 | 0.012 | 0.00057 |
| Decanes | 0.00070 | 142.29 | 0.0010 | 0.000050 |
| n-Hexane | 0.054 | 86.18 | 0.047 | 0.0023 |
| Benzene | 0.0016 | 78.11 | 0.0012 | 0.000062 |
| Toluene | 0.0036 | 92.14 | 0.0033 | 0.00017 |
| Ethylbenzene | 0.00040 | 106.17 | 0.00042 | 0.000021 |
| Xylenes | 0.00060 | 106.16 | 0.00064 | 0.000032 |
| Nitrogen | 0.44 | 28.01 | 0.12 | 0.0061 |
| Carbon Dioxide | 0.17 | 44.01 | 0.076 | 0.0038 |
| Oxygen | 0.015 | 32.01 | 0.0049 | 0.00024 |
| Totals | 100.0 | | 20.08 | 1.00 |

Heating Value (Btu/scf) 1,193.5
Molecular weight 20.08

VOC weight fraction 0.15
Methane weight fraction 0.64
THC weight fraction 0.99
VOC of THC wt fraction 0.15
Methane of THC wt fraction 0.65
Benzene of THC wt fraction 0.000063
Toluene of THC wt fraction 0.00017
E-benzene of THC wt fraction 0.000021
Xylene of THC wt fraction 0.000032
n-Hexane of THC wt fraction 0.0024

1. Gas analysis is site-specific.

Facility Tank Vent Gas Analysis

| | MOL % | MW | Component Weight lb/lb-mol | Wt. Fraction |
|----------------|--------|--------|----------------------------|--------------|
| Methane | 32.08 | 16.04 | 5.15 | 0.15 |
| Ethane | 29.02 | 30.07 | 8.73 | 0.25 |
| Propane | 19.72 | 44.10 | 8.69 | 0.25 |
| i-Butane | 3.68 | 58.12 | 2.14 | 0.062 |
| n-Butane | 6.97 | 58.12 | 4.05 | 0.12 |
| i-Pentane | 2.28 | 72.15 | 1.65 | 0.048 |
| n-Pentane | 1.95 | 72.15 | 1.41 | 0.041 |
| Hexanes | 0.95 | 86.18 | 0.82 | 0.024 |
| Heptanes | 0.52 | 100.20 | 0.52 | 0.015 |
| Octanes | 0.21 | 114.23 | 0.24 | 0.0071 |
| Nonanes | 0.031 | 128.26 | 0.040 | 0.0012 |
| Decanes+ | 0.0017 | 179.10 | 0.0030 | 0.000086 |
| n-Hexane | 0.53 | 86.18 | 0.46 | 0.013 |
| Benzene | 0.018 | 78.11 | 0.014 | 0.00041 |
| Toluene | 0.029 | 92.14 | 0.027 | 0.00077 |
| Ethylbenzene | 0.0095 | 106.17 | 0.010 | 0.00029 |
| Xylenes | 0.019 | 106.17 | 0.021 | 0.00060 |
| Nitrogen | 0.14 | 28.01 | 0.040 | 0.0012 |
| Carbon Dioxide | 0.085 | 44.01 | 0.037 | 0.0011 |
| Water | 1.75 | 18.02 | 0.31 | 0.0092 |
| Totals | 100.00 | | 34.36 | 1.00 |

| | |
|------------------------------|---------|
| Molecular weight | 34.36 |
| VOC weight fraction | 0.58 |
| CH4 weight fraction | 0.15 |
| THC weight fraction | 0.99 |
| VOC of THC wt fraction | 0.59 |
| CH4 of THC wt fraction | 0.15 |
| Benzene of THC wt fraction | 0.00041 |
| Toluene of THC wt fraction | 0.00078 |
| E-benzene of THC wt fraction | 0.00030 |
| Xylene of THC wt fraction | 0.00061 |
| n-Hexane of THC wt fraction | 0.013 |

1. Tank vent gas analysis retrieved from "Uncontrolled Flash Gas" stream from ProMax 3.2 simulation.

**Attachment J
EMISSION POINTS DATA SUMMARY SHEET**

Table 1: Emissions Data

| Emission Point ID No. (Must match Emission Units Table & Plot Plan) | Emission Point Type ¹ | Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan) | | Air Pollution Control Device (Must match Emission Units Table & Plot Plan) | | Vent Time for Emission Unit (chemical processes only) | | All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS) | Maximum Potential Uncontrolled Emissions ⁴ | | Maximum Potential Controlled Emissions ⁵ | | Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor) | Est. Method Used ⁶ | Emission Concentration ⁷ (ppmv or mg/m ⁴) |
|--|----------------------------------|--|----------------------|---|---------------|--|-------------|---|---|--------|---|--------|--|-------------------------------|---|
| | | ID No. | Source | ID No. | Device Type | Short Term ² | Max (hr/yr) | | lb/hr | ton/yr | lb/hr | ton/yr | | | |
| 1E | Upward Vertical Stack | C-100 | Com-pressor engine 1 | 1C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 | 220.62 | 1.26 | 5.52 | Gas/Vapor | EE | |
| | | | | | | | | | 47.41 | 207.64 | 1.19 | 5.19 | | | |
| | | | | | | | | | 1.56 | 6.81 | 0.25 | 1.09 | | | |
| | | | | | | | | | 0.27 | 1.18 | 0.27 | 1.18 | | | |
| | | | | | | | | | 0.0082 | 0.036 | 0.0082 | 0.036 | | | |
| | | | | | | | | | 0.35 | 1.54 | 0.18 | 0.81 | | | |
| 0.19 | 0.81 | 0.019 | 0.081 | | | | | | | | | | | | |
| 2088 | 9145 | 1993 | 8731 | | | | | | | | | | | | |
| 2E | Upward Vertical Stack | C-200 | Com-pressor engine 2 | 2C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 | 220.62 | 1.26 | 5.52 | Gas/Vapor | EE | |
| | | | | | | | | | 47.41 | 207.64 | 1.19 | 5.19 | | | |
| | | | | | | | | | 1.56 | 6.81 | 0.25 | 1.09 | | | |
| | | | | | | | | | 0.27 | 1.18 | 0.27 | 1.18 | | | |
| | | | | | | | | | 0.0082 | 0.036 | 0.0082 | 0.036 | | | |
| | | | | | | | | | 0.35 | 1.54 | 0.18 | 0.81 | | | |
| 0.19 | 0.81 | 0.019 | 0.081 | | | | | | | | | | | | |
| 2088 | 9145 | 1993 | 8731 | | | | | | | | | | | | |
| 3E | Upward Vertical Stack | C-300 | Com-pressor engine 3 | 3C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 | 220.62 | 1.26 | 5.52 | Gas/Vapor | EE | |
| | | | | | | | | | 47.41 | 207.64 | 1.19 | 5.19 | | | |
| | | | | | | | | | 1.56 | 6.81 | 0.25 | 1.09 | | | |
| | | | | | | | | | 0.27 | 1.18 | 0.27 | 1.18 | | | |
| | | | | | | | | | 0.0082 | 0.036 | 0.0082 | 0.036 | | | |
| | | | | | | | | | 0.35 | 1.54 | 0.18 | 0.81 | | | |
| 0.19 | 0.81 | 0.019 | 0.081 | | | | | | | | | | | | |
| 2088 | 9145 | 1993 | 8731 | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | |
|----|-----------------------|-------|----------------------|----|---------------|---|------|---|--|---|---|--|-----------|----|--|
| 4E | Upward Vertical Stack | C-400 | Com-pressor engine 4 | 4C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 47.41 1.56 0.27 0.0082 0.35 0.19 2088 | 220.62 207.64 6.81 1.18 0.036 1.54 0.81 9145 | 1.26 1.19 0.25 0.27 0.0082 0.18 0.019 1993 | 5.52 5.19 1.09 1.18 0.036 0.81 0.081 8731 | Gas/Vapor | EE | |
| 5E | Upward Vertical Stack | C-500 | Com-pressor engine 5 | 5C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 47.41 1.56 0.27 0.0082 0.35 0.19 2088 | 220.62 207.64 6.81 1.18 0.036 1.54 0.81 9145 | 1.26 1.19 0.25 0.27 0.0082 0.18 0.019 1993 | 5.52 5.19 1.09 1.18 0.036 0.81 0.081 8731 | Gas/Vapor | EE | |
| 6E | Upward Vertical Stack | C-600 | Com-pressor engine 6 | 6C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 47.41 1.56 0.27 0.0082 0.35 0.19 2088 | 220.62 207.64 6.81 1.18 0.036 1.54 0.81 9145 | 1.26 1.19 0.25 0.27 0.0082 0.18 0.019 1993 | 5.52 5.19 1.09 1.18 0.036 0.81 0.081 8731 | Gas/Vapor | EE | |
| 7E | Upward Vertical Stack | C-700 | Com-pressor engine 7 | 7C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 47.41 1.56 0.27 0.0082 0.35 0.19 2088 | 220.62 207.64 6.81 1.18 0.036 1.54 0.81 9145 | 1.26 1.19 0.25 0.27 0.0082 0.18 0.019 1993 | 5.52 5.19 1.09 1.18 0.036 0.81 0.081 8731 | Gas/Vapor | EE | |

| | | | | | | | | | | | | | | | |
|-----|-----------------------|--------|-----------------------|-----|---------------|---|------|---|--|---|---|--|-----------|----|--|
| 8E | Upward Vertical Stack | C-800 | Com-pressor engine 8 | 8C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 47.41 1.56 0.27 0.0082 0.35 0.19 2088 | 220.62 207.64 6.81 1.18 0.036 1.54 0.81 9145 | 1.26 1.19 0.25 0.27 0.0082 0.18 0.019 1993 | 5.52 5.19 1.09 1.18 0.036 0.81 0.081 8731 | Gas/Vapor | EE | |
| 9E | Upward Vertical Stack | C-900 | Com-pressor engine 9 | 9C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 47.41 1.56 0.27 0.0082 0.35 0.19 2088 | 220.62 207.64 6.81 1.18 0.036 1.54 0.81 9145 | 1.26 1.19 0.25 0.27 0.0082 0.18 0.019 1993 | 5.52 5.19 1.09 1.18 0.036 0.81 0.081 8731 | Gas/Vapor | EE | |
| 10E | Upward Vertical Stack | C-1000 | Com-pressor engine 10 | 10C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 47.41 1.56 0.27 0.0082 0.35 0.19 2088 | 220.62 207.64 6.81 1.18 0.036 1.54 0.81 9145 | 1.26 1.19 0.25 0.27 0.0082 0.18 0.019 1993 | 5.52 5.19 1.09 1.18 0.036 0.81 0.081 8731 | Gas/Vapor | EE | |
| 11E | Upward Vertical Stack | C-1100 | Com-pressor engine 11 | 11C | NSCR catalyst | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 50.37 47.41 1.56 0.27 0.0082 0.35 0.19 2088 | 220.62 207.64 6.81 1.18 0.036 1.54 0.81 9145 | 1.26 1.19 0.25 0.27 0.0082 0.18 0.019 1993 | 5.52 5.19 1.09 1.18 0.036 0.81 0.081 8731 | Gas/Vapor | EE | |

| | | | | | | | | | | | | | | | |
|-----|-----------------------|--------|--------------------------|----------------------|---------------------|---|------|--|--|---|---|---|-----------|----|--|
| 12E | Upward Vertical Stack | GEN1 | Microturbine Generator 1 | ---- | ---- | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 0.24 0.66 0.060 0.041 0.021 0.0063 4.4E-3 799 | 1.05 2.89 0.26 0.18 0.092 0.028 0.019 3499 | 0.24 0.66 0.060 0.041 0.021 0.0063 4.4E-3 799 | 1.05 2.89 0.26 0.18 0.092 0.028 0.019 3499 | Gas/Vapor | EE | |
| 13E | Upward Vertical Stack | GEN2 | Microturbine Generator 2 | ---- | ---- | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 0.24 0.66 0.060 0.041 0.021 0.0063 4.4E-3 799 | 1.05 2.89 0.26 0.18 0.092 0.028 0.019 3499 | 0.24 0.66 0.060 0.041 0.021 0.0063 4.4E-3 799 | 1.05 2.89 0.26 0.18 0.092 0.028 0.019 3499 | Gas/Vapor | EE | |
| 14E | Upward Vertical Stack | DEHY1 | Dehydrator Still Vent 1 | 12C | Flare - 98% Control | C | 8760 | VOC Total HAPs Benzene Toluene E-benzene Xylene n-Hexane CO2e | 15.26 4.56 0.72 2.43 0.35 0.74 0.33 469 | 66.85 19.97 3.14 10.62 1.53 3.22 1.44 2054 | 0.31 0.091 0.014 0.049 0.0070 0.015 0.0066 9.62 | 1.34 0.40 0.063 0.21 0.031 0.064 0.029 42.16 | Gas/Vapor | EE | |
| 15E | Used for fuel in 16E | DFLSH1 | Dehydrator Flash Gas 1 | Used for Fuel in 16E | 98% Control | C | 8760 | VOC Total HAPs Benzene Toluene E-benzene Xylene n-Hexane CO2e | 42.74 1.00 0.057 0.11 0.0080 0.011 0.81 2897 | 187.18 4.36 0.25 0.48 0.035 0.047 3.55 12664 | 0.85 0.020 0.0011 0.0022 2.0E-4 2.0E-4 0.016 59.89 | 3.74 0.087 0.0050 0.0096 0.00070 0.00090 0.071 262.3 | Gas/Vapor | EE | |

| | | | | | | | | | | | | | | | |
|-----|-----------------------|--------|-------------------------|----------------------|---------------------|---|------|--|--|--|---|---|-----------|----|--|
| 16E | Upward Vertical Stack | DREB1 | Dehydrator Reboiler r1 | --- | --- | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 0.15 0.12 0.0081 0.011 8.8E-4 0.0028 1.1E-4 176 | 0.64 0.54 0.035 0.049 0.0039 0.012 4.8E-4 771 | 0.15 0.12 0.0081 0.011 8.8E-4 0.0028 1.1E-4 176 | 0.64 0.54 0.035 0.049 0.0039 0.012 4.8E-4 771 | Gas/Vapor | EE | |
| 17E | Upward Vertical Stack | DEHY2 | Dehydrator Still Vent 2 | 12C | Flare - 98% Control | C | 8760 | VOC Total HAPs Benzene Toluene E-benzene Xylene n-Hexane CO2e | 15.26 4.56 0.72 2.43 0.35 0.74 0.33 469 | 66.85 19.97 3.14 10.62 1.53 3.22 1.44 2054 | 0.31 0.091 0.014 0.049 0.0070 0.015 0.0066 9.62 | 1.34 0.40 0.063 0.21 0.031 0.064 0.029 42.16 | Gas/Vapor | EE | |
| 18E | Used for fuel in 19E | DFLSH2 | Dehydrator Flash Gas 2 | Used for Fuel in 19E | 98% Control | C | 8760 | VOC Total HAPs Benzene Toluene E-benzene Xylene n-Hexane CO2e | 42.74 1.00 0.057 0.11 0.0080 0.011 0.81 2897 | 187.18 4.36 0.25 0.48 0.035 0.047 3.55 12664 | 0.85 0.020 0.0011 0.0022 2.0E-4 2.0E-4 0.016 59.89 | 3.74 0.087 0.0050 0.0096 0.00070 0.00090 0.071 262.3 | Gas/Vapor | EE | |
| 19E | Upward Vertical Stack | DREB2 | Dehydrator Reboiler r2 | --- | --- | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 0.15 0.12 0.0081 0.011 8.8E-4 0.0028 1.1E-4 176 | 0.64 0.54 0.035 0.049 0.0039 0.012 4.8E-4 771 | 0.15 0.12 0.0081 0.011 8.8E-4 0.0028 1.1E-4 176 | 0.64 0.54 0.035 0.049 0.0039 0.012 4.8E-4 771 | Gas/Vapor | EE | |

| | | | | | | | | | | | | | | | |
|-----|-----------------------|---------|-----------------------|----------|-----------------|---|------|--|---|--|--|---|-----------|----|--|
| 20E | Upward Vertical Stack | TK-1502 | Settling Tank | 13C, 14C | VRU-98% Capture | C | 8760 | VOC Total HAPs Benzene Toluene E-benzene Xylene n-Hexane CO2e | 47.81 1.26 0.033 0.063 0.024 0.049 1.09 306.2 | 209.42 5.52 0.15 0.28 0.11 0.21 4.77 1341 | 0.96 0.025 6.7E-4 1.3E-3 4.8E-4 9.8E-4 2.2E-2 6.21 | 4.19 0.11 2.9E-3 5.5E-3 2.1E-3 4.3E-3 9.5E-2 27 | Gas/Vapor | EE | |
| 21E | Upward Vertical Stack | TK-200 | Condensate Tank 1 | 13C, 14C | VRU-98% Capture | C | 8760 | VOC Total HAPs Benzene Toluene E-benzene Xylene n-Hexane CO2e | 0.55 0.015 3.9E-4 7.3E-4 2.8E-4 5.7E-4 0.013 3.54 | 2.42 0.064 0.0017 0.0032 0.0012 0.0025 0.055 15.50 | 0.011 2.9E-4 7.7E-6 1.5E-5 5.5E-6 1.1E-5 2.5E-4 0.071 | 0.048 1.3E-3 3.4E-5 6.4E-5 2.4E-5 5.0E-5 1.1E-3 0.31 | Gas/Vapor | EE | |
| 22E | Upward Vertical Stack | TK-201 | Condensate Tank 2 | 13C, 14C | VRU-98% Capture | C | 8760 | VOC Total HAPs Benzene Toluene E-benzene Xylene n-Hexane CO2e | 0.55 0.015 3.9E-4 7.3E-4 2.8E-4 5.7E-4 0.013 3.54 | 2.42 0.064 0.0017 0.0032 0.0012 0.0025 0.055 15.50 | 0.011 2.9E-4 7.7E-6 1.5E-5 5.5E-6 1.1E-5 2.5E-4 0.071 | 0.048 1.3E-3 3.4E-5 6.4E-5 2.4E-5 5.0E-5 1.1E-3 0.31 | Gas/Vapor | EE | |
| 23E | Upward Vertical Stack | TK-1500 | Produced Water Tank 1 | 13C, 14C | VRU-98% Capture | C | 8760 | VOC Total HAPs Benzene Toluene E-benzene Xylene n-Hexane CO2e | 0.035 9.3E-4 2.5E-5 4.7E-5 1.8E-5 3.6E-5 8.0E-4 0.23 | 0.15 0.0041 1.1E-4 2.0E-4 7.8E-5 1.6E-4 0.0035 0.99 | 7.1E-4 1.9E-5 4.9E-7 9.3E-7 3.5E-7 7.2E-7 1.6E-5 0.0045 | 0.0031 8.1E-5 2.2E-6 4.1E-6 1.6E-6 3.2E-6 7.0E-5 0.020 | Gas/Vapor | EE | |

| | | | | | | | | | | | | | | |
|-----|-----------------------|---------|---------------------------|----------|-----------------|---|------|--|--|---|--|---|-----------|----|
| 24E | Upward Vertical Stack | TK-1501 | Produced Water Tank 2 | 13C, 14C | VRU-98% Capture | C | 8760 | VOC Total HAPs Benzene Toluene E-benzene Xylene n-Hexane CO2e | 0.035 9.3E-4 2.5E-5 4.7E-5 1.8E-5 3.6E-5 8.0E-4 0.23 | 0.15 0.0041 1.1E-4 2.0E-4 7.8E-5 1.6E-4 0.0035 0.99 | 7.1E-4 1.9E-5 4.9E-7 9.3E-7 3.5E-7 7.2E-7 1.6E-5 0.0045 | 0.0031 8.1E-5 2.2E-6 4.1E-6 1.6E-6 3.2E-6 7.0E-5 0.020 | Gas/Vapor | EE |
| 26E | Upward Vertical Stack | FLARE 1 | Flare combustion device 1 | --- | --- | C | 8760 | NOx CO VOC PM10 Total HAPs CO2e | --- --- --- --- --- --- | --- --- --- --- --- --- | 0.33 1.78 1.1E-4 1.5E-4 3.6E-5 565 | 1.44 7.79 0.00046 6.4E-4 1.6E-4 2475 | Gas/Vapor | EE |
| 27E | Upward Vertical Stack | CATH 1 | Catalytic Heater | --- | --- | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 0.0024 0.0020 1.3E-4 1.8E-4 1.4E-5 4.4E-5 1.8E-6 2.82 | 0.010 0.0087 5.7E-4 7.8E-4 6.2E-5 1.9E-4 7.7E-6 12.3 | 0.0024 0.0020 1.3E-4 1.8E-4 1.4E-5 4.4E-5 1.8E-6 2.82 | 0.010 0.0087 5.7E-4 7.8E-4 6.2E-5 1.9E-4 7.7E-6 12.3 | Gas/Vapor | EE |
| 28E | Upward Vertical Stack | FUEL1 | Fuel Conditioning Heater | --- | --- | C | 8760 | NOx CO VOC PM10 SO2 Total HAPs Formaldehyde CO2e | 0.049 0.041 0.0027 0.0037 2.9E-4 9.2E-4 3.7E-5 58.7 | 0.21 0.18 0.012 0.016 0.0013 0.0040 1.6E-4 257 | 0.049 0.041 0.0027 0.0037 2.9E-4 9.2E-4 3.7E-5 58.7 | 0.21 0.18 0.012 0.016 0.0013 0.0040 1.6E-4 257 | Gas/Vapor | EE |

| | | | | | | | | | | | | | | |
|-----|-------------|------------------|--|-----|------|---|--------------|---|------|--|------|--|-----------|----|
| 29E | Relief Vent | Venting Episodes | Venting Episodes - compressor blowdowns, startup & shutdown, and pigging | --- | ---- | C | Intermittent | VOC Total HAPs Benzene Toluene E-benzene Xylene n-Hexane CO ₂ e | ---- | 16.19 0.29 0.0068 0.018 0.0023 0.0035 0.26 1757 | ---- | 16.19 0.29 0.0068 0.018 0.0023 0.0035 0.26 1757 | Gas/Vapor | EE |
|-----|-------------|------------------|--|-----|------|---|--------------|---|------|--|------|--|-----------|----|

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

- 1 Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.
- 2 Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).
- 3 List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. **DO NOT LIST** H₂, H₂O, N₂, O₂, and Noble Gases.
- 4 Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
- 5 Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
- 6 Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).
- 7 Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m³) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO₂, use units of ppmv (See 45CSR10).

**Attachment J
EMISSION POINTS DATA SUMMARY SHEET**

Table 2: Release Parameter Data

| Emission Point ID No. | Inner Diameter (ft.) | Exit Gas | | | Emission Point Elevation (ft) | | UTM Coordinates (km) | |
|-----------------------|---|------------|-------------------------------------|----------------|-------------------------------|---------------------------|----------------------|----------|
| | | Temp. (°F) | Volumetric Flow ¹ (acfm) | Velocity (fps) | Ground Level | Stack Height ² | Northing | Easting |
| 1E/1C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.667 | 527.2435 |
| 2E/2C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.661 | 527.2348 |
| 3E/3C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.654 | 527.2261 |
| 4E/4C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.647 | 527.2174 |
| 5E/5C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.641 | 527.2087 |
| 6E/6C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.634 | 527.2 |
| 7E/7C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.627 | 527.1913 |
| 8E/8C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.621 | 527.1826 |
| 9E/9C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.614 | 527.1739 |
| 10E/10C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.607 | 527.1652 |
| 11E/11C | 1.1 | 1226 | 8820 | 112 | 804 | 25 | 4361.601 | 527.1566 |
| 12E | NA | 535 | 3.99 kg/s mass flow | NA | 804 | 10 | 4361.586 | 527.1122 |
| 13E | NA | 535 | 3.99 kg/s mass flow | NA | 804 | 10 | 4361.589 | 527.1095 |
| 14E/12C/26E | 5 | 1400 | 67.0 | 0.06 | 804 | 15 | 4361.736 | 527.2371 |
| 15E | Combusted in 16E | | N/A | N/A | 804 | N/A | 4361.72 | 527.2492 |
| 16E | 0.75 | 350 | 530 | 20 | 804 | ~18 | 4361.72 | 527.2492 |
| 17E/12C/26E | 5 | 1400 | 67.0 | 0.06 | 804 | 15 | 4361.736 | 527.2371 |
| 18E | Combusted in 19E | | N/A | N/A | N/A | N/A | 4361.727 | 527.2436 |
| 19E | 0.75 | 350 | 530 | 20 | 804 | ~18 | 4361.727 | 527.2436 |
| 20E-25E/13C-14C | Emissions captured in closed loop system with VRU | | | | | | | |
| 27E | 0.5 | 350 | 530 | 20 | 804 | ~18 | 4361.761 | 527.3002 |
| 28E | 0.5 | 350 | 530 | 20 | 804 | ~18 | 4361.587 | 527.1105 |
| 29E | Venting episodes will occur from various locations around the facility. | | | | | | | |

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

| APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS |
|--|
| <p>1.) Will there be haul road activities?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.</p> |
| <p>2.) Will there be Storage Piles?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.</p> |
| <p>3.) Will there be Liquid Loading/Unloading Operations?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.</p> |
| <p>4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.</p> |
| <p>5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.</p> |
| <p>6.) Will there be General Clean-up VOC Operations?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.</p> |
| <p>7.) Will there be any other activities that generate fugitive emissions?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.</p> |
| <p>If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."</p> |

| FUGITIVE EMISSIONS SUMMARY | | All Regulated Pollutants - Chemical Name/CAS ¹ | Maximum Potential Uncontrolled Emissions ² | | Maximum Potential Controlled Emissions ³ | | Est. Method Used ⁴ |
|---|--|--|--|------------------------|--|------------------------|-------------------------------------|
| | | | lb/hr | ton/yr | lb/hr | ton/yr | |
| Haul Road/Road Dust Emissions Paved Haul Roads | | | | | | | |
| Unpaved Haul Roads | | PM-10 PM-2.5 | 0.10 0.010 | 0.44 0.044 | 0.10 0.010 | 0.44 0.044 | EE |
| Storage Pile Emissions | | | | | | | |
| Loading/Unloading Operations | | VOCs Total HAPs CO2e | 39.26 1.03 251.3 | 3.87 0.10 24.78 | 39.26 1.03 251.3 | 3.87 0.10 24.78 | EE |
| Wastewater Treatment Evaporation & Operations | | | | | | | |
| Equipment Leaks | | VOCs Total HAPs CO2e | 0.74 0.014 21.50 | 3.23 0.063 94.19 | 0.74 0.014 21.50 | 3.23 0.063 94.19 | EE |
| General Clean-up VOC Emissions | | | | | | | |
| Other | | | | | | | |

¹ List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases.

² Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

³ Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

⁴ Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

Williams, Jerry

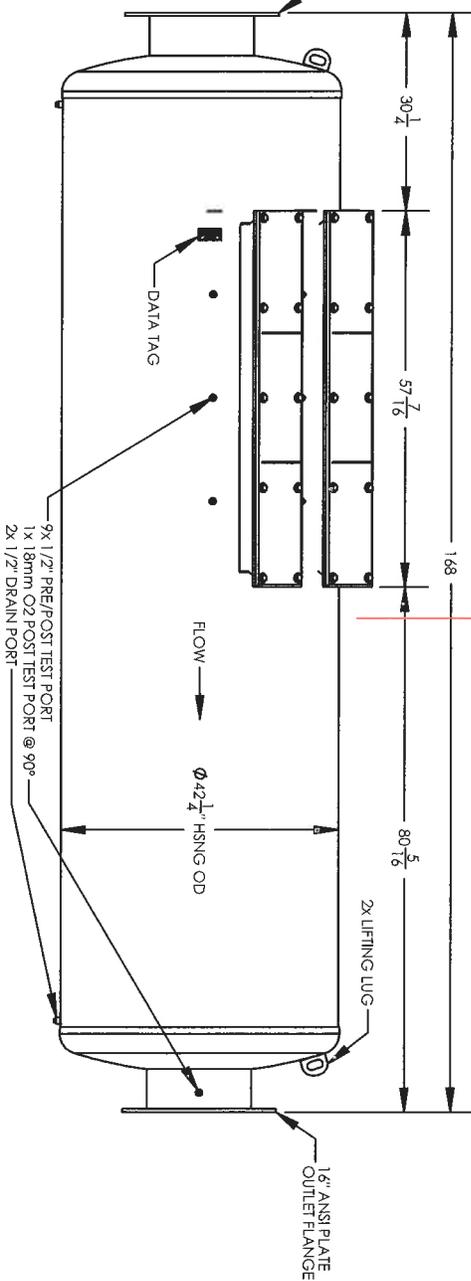
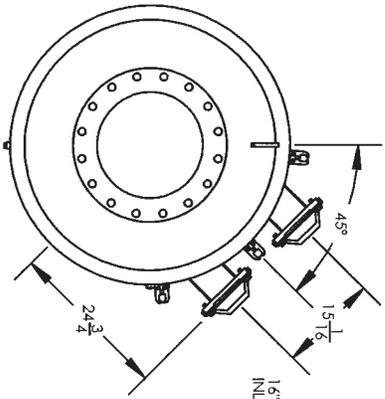
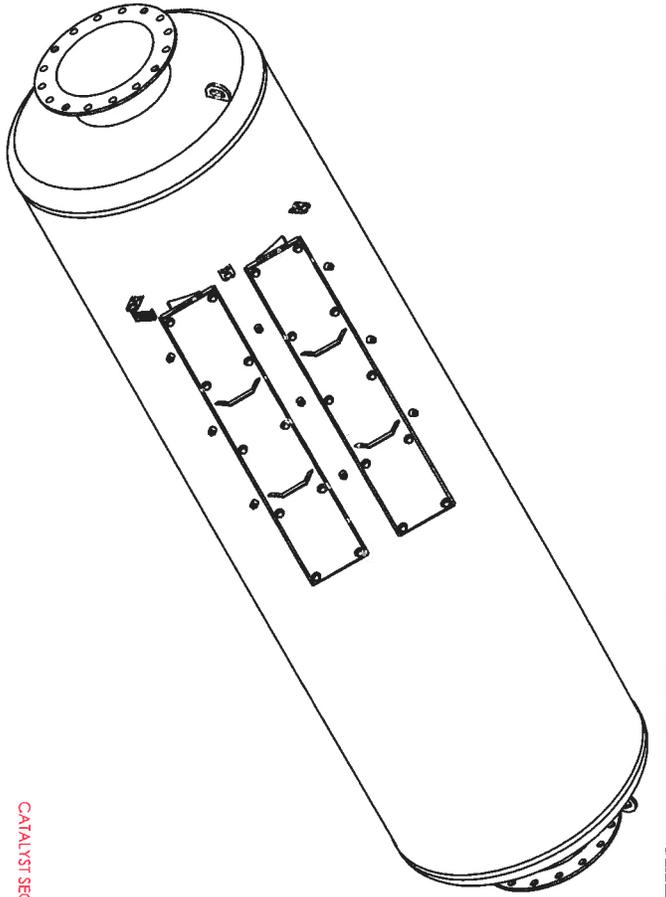
From: Barry Schatz <bschatz@anteroresources.com>
Sent: Tuesday, September 27, 2016 3:30 PM
To: Williams, Jerry
Cc: Luz Slauter
Subject: North Canton Silencer Spec Sheets- 35-40 dBA reduction
Attachments: ELH-4200-1616F-6CEE-361_notes_revBC.PDF; North Canton Silencer Spec Sheets.pdf

Jerry here are the spec sheets on the silencer. It shows that the silencer section meets the 35-40 dBA sound reduction for EMIT catalysts.

Barry Schatz
Senior Environmental and Regulatory Manager
Antero Resources
1615 Wynkoop Street
Denver, CO 80202
bschatz@anteroresources.com
(303) 357-7276 (O)
(719) 351-4198 (C)

ID # 017-0008F
Reg K13-3167B
Company ANTERO
Facility ANTERO NORTH Initials JS

NON-CONFIDENTIAL



CATALYST SECTION →

→ SILENCER SECTION
35-40 DBA SOUND REDUCTION
WORKS INDEPENDENTLY OF CATALYST SECTION

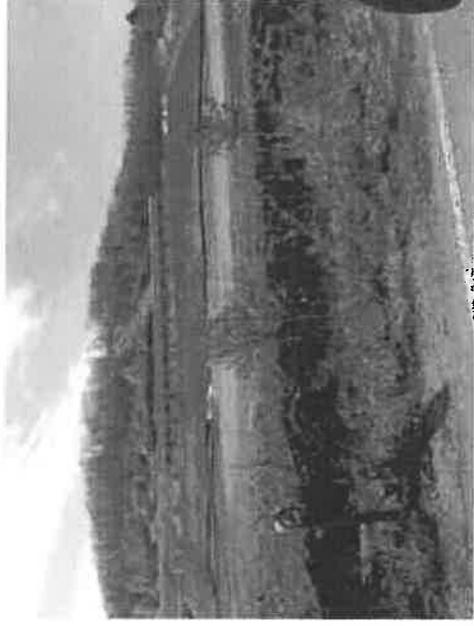
NOTES
42 IN. CATALYST HOUSING, HOSPITAL
GRADE SILENCER, 16 & 18 IN.
FLANGES.

| | | | | |
|------------------|-------------|-----|-------------|--------------------------|
| PROJECT REV: CHM | CASE NUMBER | EIN | CUSTOMER | DO NOT SCALE DRAWING |
| | | | ENGINE | DIMENSIONS ARE IN INCHES |
| | | | COOLER | TWO DECIMAL ± |
| | | | LOCATION | THREE DECIMAL ± |
| | | | SITE NAME | MATERIAL |
| | | | UNIT NUMBER | CARBON STEEL |
| | | | | DRAWN BY |
| | | | | TJS |
| | | | | CHECKED BY |
| | | | | DATE |
| | | | | 6/2/2015 |

EMIT
TECHNOLOGIES
P.O. Box 6785
Sheridan, WY 82801
Ph. 307-673-0883
Fax 307-675-5977

DESCRIPTION: ELH-4200-1616F-60CE-361
SIZE/ITEM NO: A 77951-0009
SCALE: 1:28 WEIGHT: 1637 lbs.
REV: BC
SHEET 1 OF 3

North Canton CS



Noise Abatement Requirements

Emit Technologies Hospital Grade Silencer



- 4.1.7 a. An Emit technologies DLH-@\$00-161F-6CEE-362 hospital grade silencer designed for an insertion loss of 35-40 dBA or equivalent on each Waukesha 7044 GSI reciprocating internal combustion engine. (**Manufactures Specifications Attached**)



10497 Town & Country Way, Ste. 940
Houston, TX 77024
Office: 307.673.0883 | Direct: 307.675.5073
cpartist@emittechnologies.com

Prepared For:

Michelle Steyskal
KLEINFELDER

QUOTE: QUO-11068-B2M5

INFORMATION PROVIDED BY WAUKESHA

Engine: L7044GSI
Horsepower: 1680
RPM: 1200
Compression Ratio: 8.0
Exhaust Flow Rate: 8886 CFM
Exhaust Temperature: 1225 °F
Reference: N/A
Fuel: Natural Gas
Annual Operating Hours: 8760

Uncontrolled Emissions

| | g/bhp-hr |
|---------|----------|
| NOx: | 13.60 |
| CO: | 12.80 |
| THC: | 2.30 |
| NMHC | 0.86 |
| NMNEHC: | 0.42 |
| HCHO: | 0.05 |
| O2: | 0.30 % |

POST CATALYST EMISSIONS

| | % Reduction | g/bhp-hr |
|-------|-------------|----------|
| NOx: | >99 % | <0.14 |
| CO: | >98 % | <0.26 |
| VOC: | >50 % | <0.21 |
| HCHO: | >76 % | <0.01 |

CONTROL EQUIPMENT

Catalyst Housing

Model: ELH-4200-1616F-6CEE-362
Manufacturer: EMIT Technologies, Inc
Element Size: Rectangle 36" x 15" x 3.5"
Housing Type: 6 Element Capacity
Catalyst Installation: Accessible Housing
Construction: 10 gauge Carbon Steel
Sample Ports: 9 (0.5" NPT)
Inlet Connections: 16" Flat Face Flange
Outlet Connections: 16" Flat Face Flange
Configuration: End In / End Out
Silencer: Integrated
Silencer Grade: Hospital
Insertion Loss: 35-40 dBA

Catalyst Element

Model: RT-3615-T
Catalyst Type: NSCR, Standard Precious Group Metals
Substrate Type: BRAZED
Manufacturer: EMIT Technologies, Inc
Element Quantity: 5
Element Size: Rectangle 36" x 15" x 3.5"

The information in this quotation, and any files transmitted with it, is confidential and may be legally privileged. It is intended only for the use of individual(s) within the company named above. If you are the intended recipient, be aware that your use of any confidential or personal information may be restricted by state and federal privacy laws

Canton North Compressor Station - Doddridge County, WV

VHP - L7044GSI

Kleinfelder Michele Steyskal 719-832-3593 msteyskal@kleinfelder.com

Gas Compression - Continuous

| | | | |
|--------------------------|-------------------------|---------------------------------------|-------------|
| ENGINE SPEED (rpm): | 1200 | COOLING SYSTEM: | JW, IC + OC |
| DISPLACEMENT (in3): | 7040 | INTERCOOLER WATER INLET (°F): | 130 |
| COMPRESSION RATIO: | 8:1 | JACKET WATER OUTLET (°F): | 180 |
| IGNITION SYSTEM: | ESM | JACKET WATER CAPACITY (gal): | 100 |
| EXHAUST MANIFOLD: | Water Cooled | AUXILIARY WATER CAPACITY (gal): | 11 |
| COMBUSTION: | Rich Burn, Turbocharged | LUBE OIL CAPACITY (gal): | 180 |
| ENGINE DRY WEIGHT (lbs): | 21000 | MAX. EXHAUST BACKPRESSURE (in. H2O): | 18 |
| AIR/FUEL RATIO SETTING: | 0.38% CO | MAX. AIR INLET RESTRICTION (in. H2O): | 15 |
| ENGINE SOUND LEVEL (dBA) | 104 | EXHAUST SOUND LEVEL (dBA) | 111 |

SITE CONDITIONS:

| | | | |
|-----------------------------|---------|-------------------------------------|------|
| FUEL: | | ALTITUDE (ft): | 805 |
| FUEL PRESSURE RANGE (psig): | 30 - 80 | MAXIMUM INLET AIR TEMPERATURE (°F): | 100 |
| FUEL HHV (BTU/lb): | 1,249.9 | FUEL WVI: | 62.5 |
| FUEL LHV (BTU/lb): | 1,130.0 | | |

SITE SPECIFIC TECHNICAL DATA

| POWER RATING | UNITS | MAX RATING AT 100 °F AIR TEMP | SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 100 °F | | |
|------------------------------|-----------|-------------------------------|--|------|------|
| | | | 100% | 75% | 50% |
| CONTINUOUS ENGINE POWER | BHP | 1680 | 1680 | 1260 | 843 |
| OVERLOAD | % 2/24 hr | 10 | 10 | - | - |
| MECHANICAL EFFICIENCY (LHV) | % | 30.7 | 30.7 | 29.8 | 28.8 |
| CONTINUOUS POWER AT FLYWHEEL | BHP | 1680 | 1680 | 1260 | 843 |

based on no auxiliary engine driven equipment

FUEL CONSUMPTION

| | BTU/BHP-hr | 8294 | 8294 | 8612 | 8914 |
|------------------------|------------|------|------|------|------|
| FUEL CONSUMPTION (LHV) | | 8294 | 8294 | 8612 | 8914 |
| FUEL CONSUMPTION (HHV) | | 9175 | 9175 | 9526 | 9961 |
| FUEL FLOW | SCFM | 206 | 206 | 160 | 111 |

based on fuel analysis LHV

HEAT REJECTION

| | BTU/hr x 1000 | 4171 | 4171 | 3398 | 2525 |
|-------------------|---------------|------|------|------|------|
| JACKET WATER (JW) | | 4171 | 4171 | 3398 | 2525 |
| LUBE OIL (OC) | | 572 | 572 | 519 | 435 |
| INTERCOOLER (IC) | | 268 | 268 | 183 | 92 |
| EXHAUST | | 4211 | 4210 | 3110 | 1922 |
| RADIATION | | 707 | 707 | 646 | 538 |

EMISSIONS

| | g/bhp-hr | 13.6 | 13.8 | 14.8 | 16.5 |
|----------------|----------|------|------|------|------|
| NOx (NO + NO2) | | 13.6 | 13.8 | 14.8 | 16.5 |
| CO | | 12.8 | 12.8 | 12.5 | 11.4 |
| THC | | 2.3 | 2.3 | 2.2 | 1.8 |
| NMHC | | 0.88 | 0.88 | 0.81 | 0.67 |
| NM, NEHC | | 0.42 | 0.42 | 0.39 | 0.32 |
| CH4 | | 1.46 | 1.46 | 1.36 | 1.12 |
| CO2 | | 527 | 527 | 547 | 566 |
| CO2a | | 557 | 557 | 575 | 590 |
| CH2O | | 0.05 | 0.05 | 0.05 | 0.05 |

AIR INTAKE / EXHAUST GAS

| | SCFM | 2552 | 2552 | 1967 | 1376 |
|-----------------------|-------|-------|-------|------|------|
| INDUCTION AIR FLOW | | 2552 | 2552 | 1967 | 1376 |
| EXHAUST GAS MASS FLOW | lb/hr | 11866 | 11866 | 9240 | 6397 |
| EXHAUST GAS FLOW | ACFM | 8886 | 8886 | 6706 | 4353 |
| EXHAUST TEMPERATURE | °F | 1225 | 1225 | 1173 | 1071 |

at exhaust temp, 14.5 psia

HEAT EXCHANGER SIZING

| | BTU/hr x 1000 | 4730 |
|---|---------------|------|
| TOTAL JACKET WATER CIRCUIT (JW) | | 4730 |
| TOTAL AUXILIARY WATER CIRCUIT (IC + OC) | | 953 |

COOLING SYSTEM WITH ENGINE MOUNTED WATER PUMPS

| | GPM | 450 |
|---|------|-----|
| JACKET WATER PUMP MIN. DESIGN FLOW | | 450 |
| JACKET WATER PUMP MAX. EXTERNAL RESTRICTION | psig | 16 |
| AUX WATER PUMP MIN. DESIGN FLOW | GPM | 79 |
| AUX WATER PUMP MAX. EXTERNAL RESTRICTION | psig | 44 |



A G Equipment Co.

3401 W. Albany • Broken Arrow, OK 74012
918/250-7386 • Fax 918/250-7393

A G EQUIPMENT COMPANY
3401 W ALBANY
BROKEN ARROW, OK 74012-1174
United States of America

Ph: 918-250-7386
Fax: 918-250-7393

| | |
|-----------------------|-----------------|
| Purchase Order | |
| Number: 222557 | Date: 18-Aug-14 |

To

| |
|--|
| EMIT TECHNOLOGIES 772 AIRFIELD LANE SHERIDAN, WY 82801 United States of America |
|--|

Ship To

| |
|---|
| A G EQUIPMENT COMPANY 3401 W ALBANY BROKEN ARROW, OK 74012-1174 United States of America |
|---|

Ph: 307-673-0883

Fax: 307-673-0886

Ph: 918/250-7386

Fax: 918/250-7393

| Terms | | Ship Via | | FOB | Issued By |
|--|--|-----------------|--------|-----|-----------|
| Net 10 | | Patterson - COL | | | VPV |
| Quantity | Description | Unit Price | Amount | | |
| | Qty: 1 Job: 14140-B Due: 05-Jan-15 1153 Description: [EMIT CATALYST/SILENCER, ELH-4200-1616F-6CEE-361, 16" INLET/OUTLET, 6 ELEMENT CAPACITY] Service: [SILENCER] | | | | |
| Line: 005 | 1 ea ELH-4200T-1616F-65CEE-361 EMIT CATALYST Qty: 1 Job: 14141-B Due: 05-Jan-15 1153 Description: [EMIT CATALYST/SILENCER, ELH-4200-1616F-6CEE-361, 16" INLET/OUTLET, 6 ELEMENT CAPACITY] Service: [SILENCER] | | | | |
| Line: 006 | 1 ea ELH-4200T-1616F-65CEE-361 EMIT CATALYST Qty: 1 Job: 14142-B Due: 05-Jan-15 1153 Description: [EMIT CATALYST/SILENCER, ELH-4200-1616F-6CEE-361, 16" INLET/OUTLET, 6 ELEMENT CAPACITY] Service: [SILENCER] | | | | |
| THERE WILL BE NO COST ADJUSTMENTS ON UNCONFIRMED ORDERS! PLEASE ADVISE IF UNABLE TO SHIP BY DUE DATE. | | | | | |
| | | | | | |



A G Equipment Co.

3401 W. Albany • Broken Arrow, OK 74012
918/250-7386 • Fax 918/250-7393

A G EQUIPMENT COMPANY
3401 W ALBANY
BROKEN ARROW, OK 74012-1174
United States of America

Ph: 918-250-7386
Fax: 918-250-7393

Purchase Order

Number 222557

Date 18-Aug-14

To

EMIT TECHNOLOGIES
772 AIRFIELD LANE
SHERIDAN, WY 82801
United States of America

Ship To

A G EQUIPMENT COMPANY
3401 W ALBANY
BROKEN ARROW, OK 74012-1174
United States of America

Ph: 307-673-0883

Fax: 307-673-0886

Ph: 918/250-7386

Fax: 918/250-7393

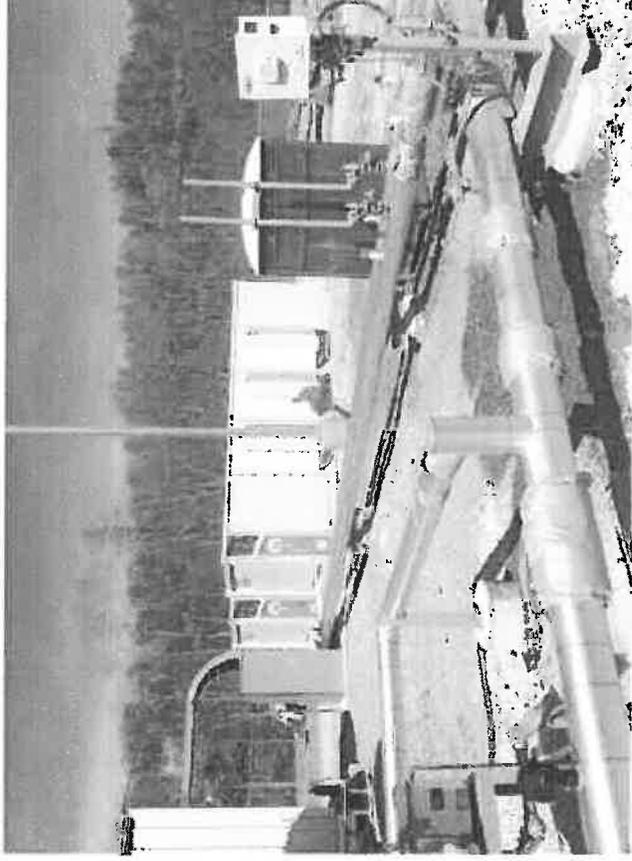
| Terms | | Ship Via | FOB | Issued By |
|----------------------|--|-----------------|--------|-----------|
| Net 10 | | Patterson - COL | | VPV |
| Quantity | Description | Unit Price | Amount | |
| | ATTENTION: PLEASE SEND INVOICES (ONLY) VIA EMAIL TO: | | | |
| Line: 001 5 ea | CATALYST ELEMENT EMIT ELEMENT Qty: 5 Job: 14140-B Due: 05-Jan-15 1153 Description: [EMIT CATALYST ELEMENTS RT-3615-T, SHIPPED LOOSE FROM HOUSING] Service: [ENGINE EXHAUST] | | | |
| Line: 002 5 ea | CATALYST ELEMENT EMIT ELEMENT Qty: 5 Job: 14141-B Due: 05-Jan-15 1153 Description: [EMIT CATALYST ELEMENTS RT-3615-T, SHIPPED LOOSE FROM HOUSING] Service: [ENGINE EXHAUST] | | | |
| Line: 003 5 ea | CATALYST ELEMENT EMIT ELEMENT Qty: 5 Job: 14142-B Due: 05-Jan-15 1153 Description: [EMIT CATALYST ELEMENTS RT-3615-T, SHIPPED LOOSE FROM HOUSING] Service: [ENGINE EXHAUST] | | | |
| Line: 004 1 ea | ELH-4200T-1616F-65CEE-361 EMIT CATALYST | | | |

Fan Blades



4.1.7 b. Each engine cooling fan shall include an even number of blades and reduced fan tip speed. (**Eight Fan Blades**)

Enclosed Capstone Generators



4.1.7 c. Each capstone C600 NG Microturbine Generator shall be housed in an enclosure. (**Manufacturers Specification attached**)

C600 600kW Power Package High-pressure Natural Gas



World's largest air-bearing microturbine produces 600kW of clean, green and reliable power.

- High electrical efficiency over a very wide operating range
- Low maintenance air bearings require no lube oil or coolant
- Ultra-low emissions
- High availability – part load redundancy
- Proven technology with tens of millions of operating hours
- Integrated utility synchronization and protection with a modular design
- 5 and 9 year Factory Protection Plans available
- Remote monitoring and diagnostic capabilities
- Upgradable to 800kW or 1MW with field installed Capstone 200kW power modules
- Internal fuel gas compressor available for low fuel pressure Natural Gas applications



C600 600kW Power Package

Electrical Performance⁽¹⁾

| | |
|---------------------------|--|
| Electrical Power Output | 600kW |
| Voltage | 400–480 VAC |
| Electrical Service | 3-Phase, 4 wire |
| Frequency | 50/60 Hz, grid connect operation 10–60 Hz, stand alone operation |
| Maximum Output Current | 870A RMS @ 400V, grid connect operation 720A RMS @ 480V, grid connect operation 930A RMS, stand alone operation ⁽²⁾ |
| Electrical Efficiency LHV | 33% |

Fuel/Engine Characteristics⁽¹⁾

| | |
|-------------------------------|---|
| Natural Gas HHV | 30.7–47.5 MJ/m ³ (825–1,275 BTU/scf) |
| Inlet Pressure ⁽³⁾ | 517–552 kPa gauge (75–80 psig) |
| Fuel Flow HHV | 7,200 MJ/hr (6,840,000 BTU/hr) |
| Net Heat Rate LHV | 10.9 MJ/kWh (10,300 BTU/kWh) |

Exhaust Characteristics⁽¹⁾

| | Standard | CARB Version |
|---|-----------------------------------|----------------------------------|
| NO _x Emissions @ 15% O ₂ ⁽⁴⁾ | < 9 ppmvd (18 mg/m ³) | < 4 ppmvd (8 mg/m ³) |
| NO _x / Electrical Output ⁽⁴⁾ | 0.14 g/bhp-hr (0.4 lb/MWhe) | 0.05 g/bhp-hr (0.14 lb/MWhe) |
| Exhaust Gas Flow | 4.0 kg/s (8.8 lbm/s) | 4.0 kg/s (8.8 lbm/s) |
| Exhaust Gas Temperature | 280°C (535°F) | 280°C (535°F) |
| Exhaust Energy | 4,260 MJ/hr (4,050,000 BTU/hr) | 4,260 MJ/hr (4,050,000 BTU/hr) |

Reliable power when and where you need it. Clean and simple.

Dimensions & Weight⁽¹⁾

| | |
|-----------------------------|--|
| Width x Depth x Height | 2.4 x 9.1 x 2.9 m (96 x 360 x 114 in) |
| Weight - Grid Connect Model | 12565 kg (27,700 lbs) |
| Weight - Dual Mode Model | 15014 kg (33,100 lbs) |

Minimum Clearance Requirements⁽²⁾

| | |
|----------------------|---------------|
| Vertical Clearance | 0.6 m (24 in) |
| Horizontal Clearance | |
| Left & Right | 1.5 m (60 in) |
| Front | 1.5 m (60 in) |
| Rear | 1.8 m (72 in) |

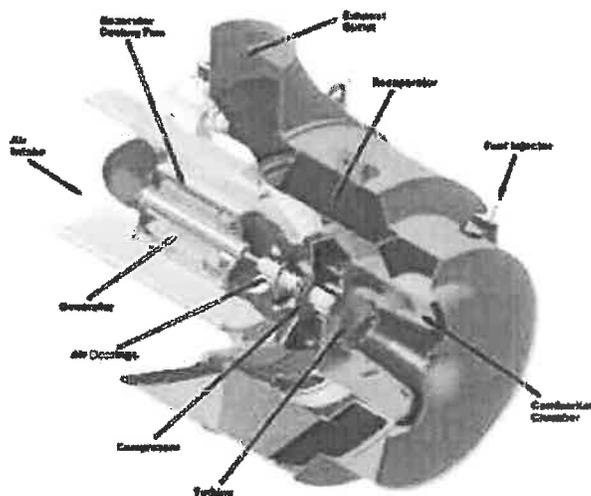
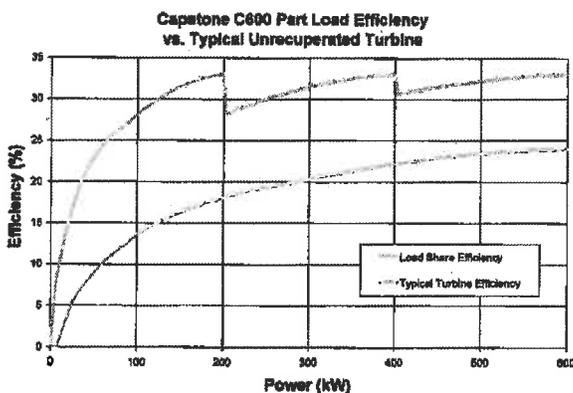
Sound Levels

Acoustic Emissions at Full Load Power

| | |
|-------------------------|--------|
| Nominal at 10 m (33 ft) | 65 dBA |
|-------------------------|--------|

Planned Certification⁽⁷⁾

- UL 2200 and UL 1741 for natural gas operation under existing UL files⁽⁷⁾
- Will comply with IEEE 1547 and will meet statewide utility interconnection requirements for California Rule 21 and the New York State Public Service Commission
- Models will be available with optional equipment for CE marking



C200 Engine

- (1) Nominal full power performance at ISO conditions: 59°F, 14.696 psia, 60% RH
- (2) With linear load
- (3) Inlet pressure for standard natural gas at 39.4 MJ/Nm³ (1,000 BTU/scf) (HHV)
- (4) Emissions for standard natural gas at 39.4 MJ/Nm³ (1,000 BTU/scf) (HHV)
- (5) Approximate dimensions and weights
- (6) Clearance requirements may increase due to local code considerations
- (7) All models are planned to be UL Listed or available with optional equipment for CE marking. Specifications are not warranted and are subject to change without notice.



Engine Housing



- 4.1.7 d. The Waukesha 7044 GSI reciprocating internal combustion engines shall be housed in an enclosed building.

Engine Silencer



4.1.7 e. A SEMCO Model ST5005 sound silencer or equivalent shall be ducted to the front of each engine cooler intake and shall be operated and maintained in accordance With manufacturer's specifications. (**Manufacturer Specifications Attached**)

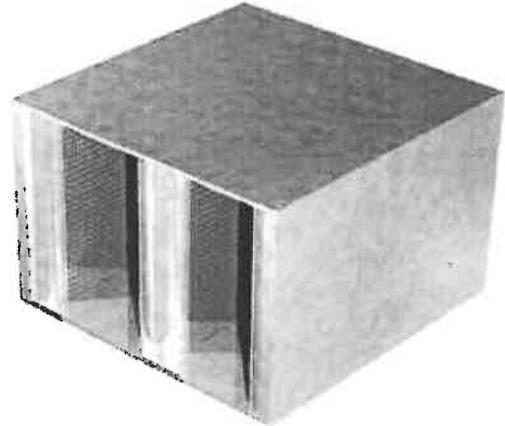
Attachment 1

**ENVIRONMENTAL
NOISE CONTROL**



**Model ST5000
Standard
Sound Silencer**

The Environmental Noise Control Model ST5000 sound silencers provide good attenuation across all bands and are designed to be used in low to medium pressure ranges where low to medium velocities are present.



INDEPENDENTLY CERTIFIED TEST DATA

Published data is derived from Independent Certified Testing conducted in accordance with ASTM E477. For testing purposes, specified lengths of straight duct are used both upstream and downstream of the silencer. Static pressure losses must therefore be adjusted when the unit is installed, at or near transitions, elbows, or at the intake or discharge of the system. Consult ENC for adjustment values. All data published herein was obtained from a 24" x 24" production run unit.

| | | | | Dynamic Insertion Loss (dB) | | | | | | | | | | | | | | | | |
|--------|--------|---------------|------|-----------------------------|----|----|----|----|----|----|----|-----------------------------|----|----|----|----|----|----|----|----|
| | | | | Forward Airflow Performance | | | | | | | | Reverse Airflow Performance | | | | | | | | |
| | | | | Octave Band/Frequency (hz) | | | | | | | | Octave Band/Frequency (hz) | | | | | | | | |
| Model | Length | Face Velocity | Cv | Press. Drop | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | | | 63- 125 250 500 1K 2K 4K 8K | | | | | | | | 63 125 250 500 1K 2K 4K 8K | | | | | | | | |
| ST5003 | 36" | 0 | 1.93 | 0 | 2 | 3 | 11 | 24 | 33 | 29 | 17 | 10 | 4 | 4 | 12 | 24 | 33 | 29 | 18 | 12 |
| | | 500 | | .03 | 1 | 2 | 10 | 22 | 32 | 29 | 16 | 9 | 3 | 5 | 13 | 24 | 34 | 29 | 18 | 12 |
| | | 1000 | | .12 | 1 | 2 | 10 | 21 | 32 | 29 | 16 | 9 | 3 | 3 | 11 | 21 | 31 | 27 | 15 | 10 |
| | | 1500 | | .27 | 0 | 2 | 9 | 20 | 31 | 29 | 16 | 9 | 2 | 4 | 11 | 22 | 30 | 22 | 14 | 7 |
| | | 2000 | .48 | 0 | 2 | 9 | 20 | 29 | 29 | 16 | 9 | 0 | 4 | 12 | 22 | 30 | 20 | 10 | 5 | |
| ST5005 | 60" | 0 | 2.47 | 0 | 4 | 8 | 19 | 35 | 41 | 40 | 26 | 15 | 6 | 8 | 19 | 33 | 37 | 36 | 26 | 16 |
| | | 500 | | .04 | 3 | 7 | 18 | 34 | 41 | 40 | 26 | 14 | 6 | 10 | 21 | 33 | 38 | 36 | 25 | 15 |
| | | 1000 | | .16 | 3 | 6 | 17 | 33 | 40 | 39 | 26 | 14 | 6 | 9 | 20 | 31 | 36 | 34 | 24 | 14 |
| | | 1500 | | .35 | 2 | 6 | 17 | 32 | 39 | 37 | 25 | 14 | 4 | 10 | 20 | 31 | 33 | 24 | 17 | 11 |
| | | 2000 | .62 | 2 | 6 | 16 | 32 | 36 | 33 | 23 | 14 | 2 | 10 | 21 | 31 | 33 | 22 | 12 | 8 | |
| ST5007 | 84" | 0 | 3.01 | 0 | 6 | 12 | 27 | 45 | 49 | 50 | 35 | 19 | 8 | 12 | 26 | 41 | 41 | 42 | 34 | 19 |
| | | 500 | | .05 | 5 | 11 | 26 | 45 | 49 | 50 | 35 | 19 | 8 | 14 | 28 | 41 | 41 | 43 | 32 | 17 |
| | | 1000 | | .19 | 4 | 10 | 24 | 44 | 48 | 49 | 35 | 19 | 8 | 14 | 29 | 41 | 40 | 41 | 32 | 17 |
| | | 1500 | | .42 | 4 | 10 | 24 | 44 | 46 | 44 | 34 | 19 | 5 | 15 | 29 | 40 | 36 | 25 | 19 | 15 |
| | | 2000 | .75 | 4 | 9 | 22 | 43 | 43 | 37 | 29 | 18 | 4 | 15 | 29 | 39 | 35 | 24 | 13 | 10 | |
| ST5010 | 120" | 0 | 3.85 | 0 | 9 | 19 | 39 | 61 | 61 | 66 | 49 | 26 | 11 | 18 | 37 | 54 | 47 | 52 | 46 | 24 |
| | | 500 | | .07 | 8 | 18 | 38 | 62 | 62 | 66 | 49 | 27 | 12 | 21 | 39 | 54 | 46 | 54 | 43 | 21 |
| | | 1000 | | .24 | 6 | 16 | 35 | 61 | 60 | 64 | 49 | 27 | 12 | 22 | 43 | 56 | 47 | 52 | 45 | 22 |
| | | 1500 | | .53 | 7 | 16 | 35 | 62 | 57 | 55 | 48 | 27 | 7 | 23 | 43 | 54 | 41 | 27 | 23 | 21 |
| | | 2000 | .95 | 7 | 14 | 32 | 60 | 54 | 43 | 39 | 25 | 7 | 23 | 42 | 52 | 39 | 27 | 15 | 14 | |

Forward Airflow Performance applies when both noise and airflow are traveling in the same direction.

Reverse Airflow Performance applies when noise and airflow are traveling in opposite directions.

Pressure Drops for velocities not shown above can be calculated using the following formula:

$$P.D. = C_v \times H_v$$

Where: P.D. = Pressure Drop

C_v = Silencer Flow Coefficient

$$H_v = (V/4005)^2$$

H_v = Velocity Pressure in Inches wg.

V = Face velocity in Ft./Min.

Standard Sound Silencer

Model ST5000

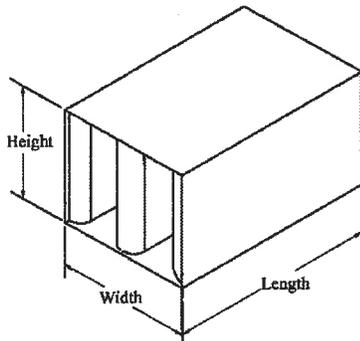
STANDARD CONSTRUCTION:

Shell and Nose: 22 Gauge Galvanized
 Steel Perforated Metal: 24 Gauge Galvanized Steel
 Fill Material: Fiberglass

FIRE RATINGS:

Fire Hazard Classification Ratings in accordance with ASTM-E84 is FHC 25/20.

Additional materials, gauges, and configurations are available, such as stainless or aluminum, with Mylar or polyethylene liners or bagging. Please contact your ENC representative for details.



| Standard Sizes & Weights | | | | | | | | | | | | | | |
|--------------------------|-----------------------------|-----|-----|-----|-----------------------------|-----|-----|-----|-----------------------------|-----|-----|------------------------------|-----|-----|
| Std. Height | 3'-0" Length Standard Width | | | | 5'-0" Length Standard Width | | | | 7'-0" Length Standard Width | | | 10'-0" Length Standard Width | | |
| | 12" | 24" | 36" | 48" | 12" | 24" | 36" | 48" | 12" | 24" | 36" | 12" | 24" | 36" |
| 12" | 30 | 49 | 64 | 77 | 49 | 82 | 105 | 126 | 69 | 115 | 148 | 98 | 163 | 210 |
| 24" | 47 | 75 | 93 | 111 | 76 | 120 | 147 | 176 | 105 | 166 | 204 | 136 | 206 | 244 |
| 36" | 64 | 101 | 122 | 145 | 102 | 159 | 189 | 226 | 141 | 219 | 259 | 185 | 278 | 314 |
| 48" | 82 | 126 | 150 | 179 | 129 | 197 | 230 | 276 | - | - | - | - | - | - |

Non-standard sizes are available.

Non-standard height dimensions are available within the following restrictions:
 48" heights are not available in 7' through 10' lengths.

| Self-Generated Noise (dB) | | | | | | | | | | | | | | | | | | |
|---------------------------|--------|---------------|--|-------|-------|-------|------|------|------|------|--|-------|-------|-------|------|------|------|------|
| Model | Length | Face Velocity | Forward Airflow Performance Octave Band/Frequency (Hz) | | | | | | | | Reverse Airflow Performance Octave Band/Frequency (Hz) | | | | | | | |
| | | | 1 63 | 2 125 | 3 250 | 4 500 | 5 1K | 6 2K | 7 4K | 8 8K | 1 63 | 2 125 | 3 250 | 4 500 | 5 1K | 6 2K | 7 4K | 8 8K |
| ST5003 | 36" | 500 | 49 | 45 | 39 | 37 | 30 | 22 | 19 | 19 | 50 | 41 | 37 | 43 | 48 | 38 | 28 | 21 |
| | | 1000 | 55 | 49 | 43 | 43 | 43 | 42 | 37 | 29 | 52 | 44 | 42 | 48 | 56 | 52 | 41 | 30 |
| | | 1500 | 62 | 59 | 51 | 48 | 50 | 52 | 51 | 44 | 62 | 56 | 53 | 56 | 61 | 71 | 65 | 55 |
| | | 2000 | 64 | 64 | 66 | 56 | 54 | 59 | 61 | 57 | 68 | 62 | 59 | 60 | 62 | 74 | 75 | 66 |
| ST5005 | 60" | 500 | 47 | 46 | 39 | 35 | 28 | 21 | 19 | 19 | 48 | 41 | 38 | 43 | 48 | 38 | 28 | 20 |
| | | 1000 | 53 | 49 | 42 | 41 | 42 | 41 | 35 | 28 | 53 | 47 | 41 | 46 | 54 | 51 | 40 | 29 |
| | | 1500 | 59 | 57 | 49 | 46 | 49 | 51 | 49 | 43 | 64 | 56 | 53 | 55 | 60 | 70 | 66 | 56 |
| | | 2000 | 64 | 62 | 62 | 54 | 53 | 57 | 59 | 55 | 68 | 61 | 59 | 59 | 62 | 72 | 74 | 65 |
| ST5007 | 84" | 500 | 45 | 46 | 38 | 33 | 25 | 19 | 19 | 19 | 45 | 41 | 38 | 43 | 47 | 38 | 28 | 19 |
| | | 1000 | 51 | 48 | 40 | 39 | 41 | 39 | 33 | 27 | 54 | 49 | 40 | 44 | 52 | 49 | 38 | 28 |
| | | 1500 | 56 | 55 | 47 | 44 | 47 | 49 | 47 | 41 | 65 | 56 | 53 | 54 | 59 | 69 | 67 | 57 |
| | | 2000 | 63 | 59 | 57 | 51 | 51 | 55 | 57 | 53 | 67 | 59 | 58 | 58 | 61 | 70 | 73 | 64 |
| ST5010 | 120" | 500 | 42 | 47 | 37 | 30 | 21 | 17 | 19 | 19 | 41 | 41 | 39 | 43 | 46 | 38 | 28 | 18 |
| | | 1000 | 48 | 47 | 38 | 36 | 40 | 37 | 30 | 26 | 56 | 53 | 39 | 41 | 49 | 47 | 36 | 27 |
| | | 1500 | 52 | 52 | 44 | 41 | 45 | 47 | 44 | 39 | 67 | 56 | 53 | 53 | 58 | 68 | 69 | 59 |
| | | 2000 | 62 | 55 | 50 | 47 | 49 | 52 | 54 | 50 | 66 | 57 | 57 | 57 | 60 | 67 | 72 | 63 |

| Face Area Adjustment for Self Noise | | | | | | | | | |
|---|-----|----|----|---|----|----|----|-----|-----|
| Attenuator Face Area (sq. ft.) | 0.5 | 1 | 2 | 4 | 8 | 16 | 32 | 64 | 128 |
| PWL Adjustment Factor dB re 10 ⁻¹² Watts | -9 | -6 | -3 | 0 | +3 | +6 | +9 | +12 | +15 |

Add or Deduct From Power Level Above.

For intermediate face areas, interpolate to nearest whole number.

Hawthorne, California ~ Aledo, Texas ~ Napa, California ~ Shreveport, Louisiana ~ Denver, Colorado ~ Pittsburg, Pennsylvania
 800-679-8633

www.environmental-noise-control.com ~ www.drillingnoisecontrol.com



Rock Wool Manufacturing Company
P. O. Box 506

Loeds, Al. 35094-0506
(205)-699-6121

BILL TO: General Insulation (Hayward)
278 Mystic Ave
Suite 209
Medford, MA 02155

| ORDER NO | CURRENT DATE | PAGE NO |
|----------|--------------|---------|
| 84369 | 1/23/2015 | 1 |

| CUSTOMER PURCHASE ORDER |
|-------------------------|
| P1429381 |

SHIP TO: CANTON LAND LINE
5577 RIGGINS RUN RD
WEST UNION, WV 26456

Dear Customer,

This document acknowledges receipt of your order. Please review the information presented here and advise us of any errors you notice or disagreements you have at your earliest convenience. For fastest service, write or call us at the address and phone number printed above. Please refer to our Order Number and your P.O. Number in all correspondence. Note: Due to new Federal Regulations, any detention charges incurred on delivery will be the responsibility of the consignee.

| CUSTOMER ENTRY ID | PAYMENT TERMS | SHIP DATE | SHIPPING INSTRUCTIONS |
|-------------------|------------------------|------------------------|--|
| CAGEN1 KM | 1%-10/N-30 BEST WAY | 1/27/2015 PPD & ADD | ATTN: JALEN 304-782-4339 OR 304-782-4454 FAX: 514-670-2850 |

| ITEM NO DESCRIPTION | QUANTITY | UOM MFG RATIO | UNIT PRICE | DISC % | EXTENDED PRICE |
|------------------------|----------|------------------|------------|--------|----------------|
|------------------------|----------|------------------|------------|--------|----------------|

SITE LOCATED IN DODDRIDGE CO. WV & CAN BE REACHED BY TRAVELING HWY US50 WEST FROM CLARKSBURG FOR 17 MILES. TURN NORTH ONTO HWY 23. FOLLOW HWY 23 THRU CENTER POINT. APPROX. 14.5 MILES NORTH FROM HWY 50 TO RIGGINS RUN/COUNTY ROAD E. TURN SOUTH ON RIGGINS RUN. CROSSING THE BRIDGE. STATION ENTRANCE WILL BE APPROX. 900FT FROM HWY 23 ON THE EAST.

4DB 4
DELTA-4 Board
4 x 24 x 48

26,400.0000 BF
275.0000 PK

Req Ship Date: 01/27/2015

PAL
Pellet Charges

17.0000 EA

Req 01/27/2015

TOTAL

Ready - 1-27 @ 11:AM
Deliver - 1-28 @ 8:AM

D.S. 9540

For Chemical Emergency
 Spill, Leak, Fire, Exposure, or Accident
 Call CHEMTREC Day or Night CCN: 832203
 Within USA and Canada: 1-800-424-9300
 Outside USA and Canada: +1 703-827-3887 (collect calls accepted)

STRAIGHT BILL OF LADING
 ORIGINAL - SHORT FORM - NOT NEGOTIABLE

Printed On :03-FEB-15
 Name of carrier :CPU
 Bill of Lading No. :17920431

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of the Bill of Lading. **7797**

FROM: Metal Building Components
 ENNIS
 972-876-6586

F.O.B.: ENNIS, TX
 (ELLIS CNTY)

The property described below, in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination. If on its route otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in official, Southern, Western and Illinois Freight Classifications in effect on the date hereof. If this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff, if this is a motor shipment. Shipper certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of the shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his agents.

Delivering Carrier: CPU
 Consigned 149713 - BEHRENS AND ASSOCIATES INC
 To And CPU-ENNIS
 Destination 1804 JACK MCKAY BLVD
 ENNIS, TX 75119
 JEREMY

Car or Vehicle Initials **ENC Schmitz**
8577 Riggins Row Rd
West Houston 46.6
 PREPARED BY: CSEBER

FREIGHT CHARGES
 COLLECT PREPAID

| # OF PKGS | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | * WEIGHT SUBJ TO CORRECTION | CLASS OR RATE |
|--------------------|---|--------------------------------|------------------|
| | Load of Steel As Per List ORDER NUMBER 45985B2 <i>loading times</i> <i>Arrival BCF 8AM</i> <i>sch 8AM</i> <i>Loaded 2PM</i> <i>Carla Linder</i> | 4711.581 | |
| Approximate Weight | | 4711.58 | |

Subject to section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
 The carrier shall not make delivery of this shipment without payment of freight and other lawful charges.
 (Signature of Consignor)

SPECIAL INSTRUCTIONS

Received \$ _____
 to apply in prepayment of the charges on the property described hereon.
 (Agent or Carrier)

Per _____
 (The signature here acknowledges only the amount prepaid.)

Charges Advanced
 \$ _____

Shipper's imprint in lieu of stamp, not a part of Bill of Lading approved by the Interstate Commerce Commission.

If the shipper moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight. NOTE-Where the rate is dependent on value, shipper's are required to state specifically in writing the agreed or declared value of the property.
 The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per

The fibre boxes used for this shipment conform to the specifications set forth in the box maker's certificate there on and all other requirements of consolidated freight.

LOAD MUST BE TARPED.
 The driver of the vehicle being used to transport the materials represented on the Bill of Lading is responsible for securing said materials to the vehicle.
NOTICE: This material must be delivered by _____ DATE _____

UNITS:
 I HAVE INSPECTED THIS DELIVERY AND HAVE VERIFIED RECEIPT OF QUANTITIES AS LISTED IN ACCEPTABLE CONDITION OR AS NOTED.
 I HAVE READ AND UNDERSTAND AND CONSENT TO THE TERMS AND CONDITIONS OF SALE INCLUDED ON THE REVERSE HEREOF.
 CUSTOMER NAME: _____

CUSTOMER SIGNATURE *Michael* DATE *2-6-15*
 THIS IS TO CERTIFY THAT THE ABOVE NAMED ARTICLES ARE PROPERLY CLASSIFIED, DESCRIBED, PACKAGED, MARKED, AND LABELED, AND IN PROPER CONDITION FOR TRANSPORTATION ACCORDING TO THE APPLICABLE REGULATIONS OF THE DEPARTMENT OF TRANSPORTATION.

PAYMENTS REMIT TO:
 MBCI LOCKBOX
 PO BOX 840326
 DALLAS, TX 75284-0326



Driver Signature *Brewer* Date *2-3-15-7797*
 BOL Creation Date: 03-FEB-2015 13:01 Bill of Lading #: 17920431 Ship Confirm Date: 03-FEB-2015 13:36

26617-2

Date 1/23/2015

ORIGINAL

BILL OF LADING

BOL# Canton-North

| | | |
|---|--|--|
| SHIP FROM Environmental Noise Control 10111 E Bankhead Hwy Aledo, TX 76008 Phone: 817-441-5556 | | Bill of Lading Location: Environmental Noise Control |
| SHIP TO 5577 Riggins Run Rd. West Union, WV 26456 Special Instructions: Call 1 hour before arrival to set meeting time Jalen: (304-782-4339)(304-782-4454) | | Carrier Name: M&A Express Trucking LLC. Track#: 23 Trailer#: 04 Driver #: Eldar: 937-829-2553 |
| | | DIRECTIONS GIVEN SEPERATELY |

| SHIPPING INFORMATION | | |
|-------------------------|----------|----------------|
| Description of Articles | Quantity | Remarks |
| Sheet Bundles | 6 | Panic Hardware |
| Trim Box | 1 | Dist. Jambos |
| Hardware Box | 1 | |
| Chain Stops | 11 | |
| Doors | 11 | |

APX. TOTAL WEIGHT 20,000LBS

11
11

Note: Liability limitation for loss or damage in this shipment may be applicable. See 49 USC § 14706(c)(1)(A) and (B).

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications, and rules that have been established by the carrier and are available to the shipper, on request, and to all applicable state and federal regulations.

The carrier shall not make delivery of this shipment without payment of charges and all other lawful fees.

Shipper Signature/Date

[Signature]

This is to certify that the above named materials are properly classified, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the DOT.

Trailer Loaded:

- By shipper
- By driver

Freight Counted:

- By shipper
- By driver/pallets said to contain
- By driver/pieces

Shipper Signature

[Signature]

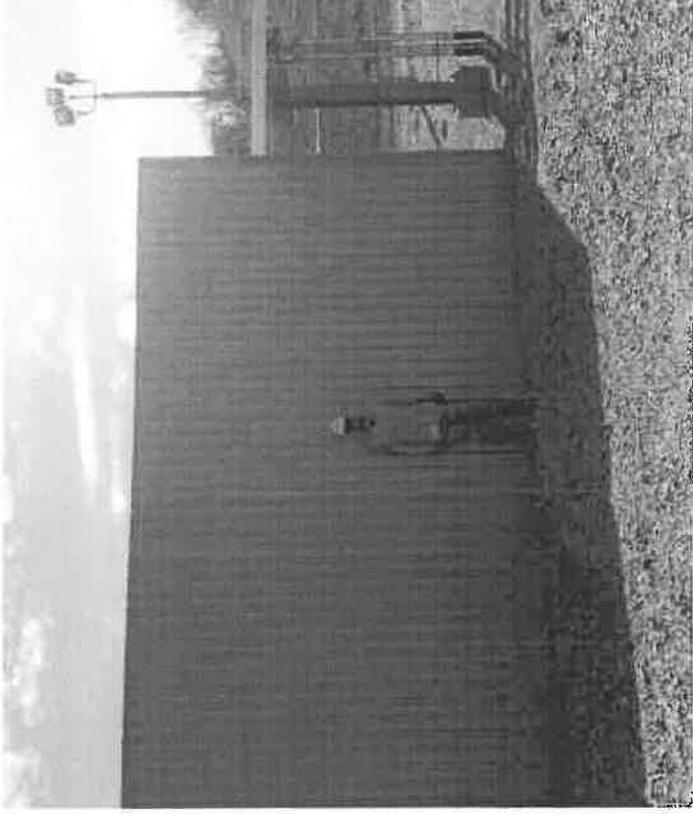
Carrier Signature/ Pickup Date

Carrier acknowledges receipt of packages and required placards. Carrier certifies emergency response information was made available and/or carrier has the DOT emergency response guidebook or equivalent documentation in the vehicle. Property described above is received in good order, except as noted.

[Handwritten Signature]

1-27-2015

VRU Sound Wall



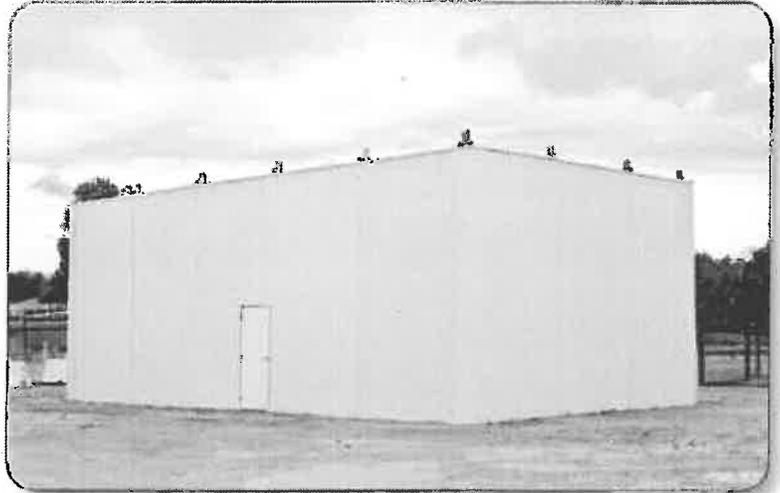
4.1.7 f. Construct a twelve (12) foot high acoustical wall with Sound Transmission Class (STC) Rating of 40 located around the vapor recovery units (**Manufacturer Specifications Attached**)

Behrens and Associates, Inc.
Environmental Noise Control
PRODUCT SPECIFICATIONS SHEET

ENC MMA SOUND CONTROL PANEL SYSTEM

The ENC Movable Modular Acoustical (MMA) Sound Control Panel system is manufactured using state of the art acoustical composite materials and is designed for quick and simple field installation where an immediate noise control solution is required. Fabricated with a pre-painted steel U-panel outer skin and a specially developed 3.2 #/ft² composite construction barrier/absorber acoustical insulation system, ENC MMA Sound Control Panels are designed to provide optimum performance for both blocking and absorbing unwanted sound for permanent and semi-permanent equipment installations and yet be easily disassembled to facilitate major equipment maintenance.

The ENC MMA Sound Control Panel System utilizes a vertical 4" pipe support structure and is available in heights from 8' to 16', with our most popular heights of 12' and 16' stocked at most locations. The modular panels are 8'-4" wide and can be equipped with a conventional 3070 walk door with emergency egress hardware. Special closed corner panels allow the system to be configured as an acoustical enclosure, in which case an optional acoustically rated ventilation system is offered to provide fresh air for equipment cooling. Additionally, because the system uses standard U-panel sheeting, colors to match most surrounding construction are readily available.



PRODUCT SPECIFICATIONS

Support Structure:

4" Schedule 40 Galvanized Steel pipe in augured holes

Panel Skin:

26 Gauge U-panel Sheeting

Panel Size:

8'-4" wide by 8' to 16' High

Insulation System:

3.2 #/ft² Custom Composite Barrier and Absorber

Sound Transmission Class:

STC-40

Noise Reduction Coefficient:

NRC = 1.10

Panel Size:

8'-4" wide by 8' to 16' High

APPLICATIONS:

Compressor Enclosure • Generator Enclosure • Traffic Sound Barrier • Construction Site Sound Wall • Directional Drilling • Excavation/Demolition

For more information on applications for ENC MMA Sound Control panels or any of the other quality products and services that we offer, please see our web site or contact your local ENC representative.

TEXAS
 10111 East Barkhead Road
 Aledo, TX 76008
 Phone: 817 441-5556
 Fax: 817 441-5561

PENNSYLVANIA
 1215 Henderson Ave.
 Washington, PA 15301
 Phone: 724 206-9145

**CORPORATE OFFICE
 CALIFORNIA**
 13808 Inglewood Avenue
 Hawthorne, CA 90250
 Phone: 310 879-8533
 Fax: 310 331-1538

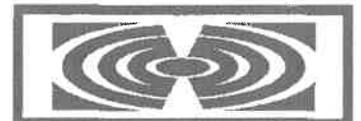
COLORADO
 14122 Mead St.
 Longmont, CO 80504
 (970) 535-9000

LOUISIANA
 1442 Hawn Avenue, Suite 1B
 Shreveport, LA 71107
 Phone: 817 441-5556
 Fax: 817 441-5561

Field Office:
NAPA CALIFORNIA
 (707) 252-9019

Please visit our web sites: www.drillingnoisecontrol.com www.environmental-noise-control.com

**ENVIRONMENTAL
 NOISE CONTROL, INC.**



Williams, Jerry

From: Williams, Jerry
Sent: Tuesday, September 27, 2016 9:29 AM
To: Barry Schatz; Kaitlin Meszaros
Cc: McKeone, Beverly D
Subject: WV DAQ NSR Permit Application Complete for Antero Midstream LLC - Canton North Compressor Station

**RE: Application Status: Complete
Antero Midstream LLC - Canton North Compressor Station
Permit Application R13-3167B
Plant ID No. 017-00084**

Mr. Schatz,

Your application for a modification permit for a natural gas compressor station was received by this Division on September 2, 2016 and assigned to the writer for review. Upon review of said application, it has been determined that the application is complete and, therefore, the statutory review period commenced on September 27, 2016.

In the case of this application, the agency believes it will take approximately 90 days to make a final permit determination.

This determination of completeness shall not relieve the permit applicant of the requirement to subsequently submit, in a timely manner, any additional or corrected information deemed necessary for a final permit determination.

Should you have any questions, please contact Jerry Williams at (304) 926-0499 ext. 1223 or reply to this email.

Jerry Williams, P.E.
Engineer
WVDEP – Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
(304) 926-0499 ext. 1223
jerry.williams@wv.gov

NON-CONFIDENTIAL



 Please consider the environment before printing this email.

September 19, 2016



Mr. Jerry Williams
Division of Air Quality
WV Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

Dear Mr. Williams:

Re: **Original Affidavit of Publication**
North Canton Compressor Station – Permit No. R13-3167B

Antero Midstream would like to submit the Original Affidavit of Publication from *The Doddridge Independent*. This is being submitted in accordance with a permit application requirement for an oil and gas facility.

Sincerely,


Luz Slauter
Midstream Environmental and Regulatory Manager



Encl.

ID # 017-00084
Reg R13-3167B
Company ANTERO MIDSTREAM
Facility ANTERO NORTH Initials LS

NON-CONFIDENTIAL

The Doddridge Independent

The Doddridge Independent PUBLISHER'S CERTIFICATE

I, Michael D. Zorn, Publisher of The Doddridge Independent, A newspaper of general circulation published in the town of West Union, Doddridge County, West Virginia, do hereby certify that:

Attachment U / Air Quality Permit Notice / Notice of Application / Canton North Compressor Station
Notice is given that Antero Midstream LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a modification to the existing 45CSR13 Construction Permit R13-3167A for a Natural Gas Compressor Station located south of US-23 near Center Point, and north of US-50, in Doddridge County, West Virginia. The latitude and longitude coordinates are: 39.4042N, 80.6834W.

was published in The Doddridge Independent
1 time commencing on Friday, September 9, 2016 and
Ending on Friday, September 9, 2016 at the request of:

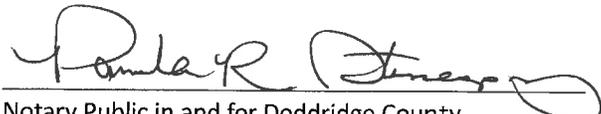
Antero Resources Corporation

Given under my hand this Monday, September 12, 2016

The publisher's fee for said publication is:
\$ 46.93 1st Run/\$ 0 Subsequent Runs
This Legal Ad Total: \$ 46.93


Michael D. Zorn
Publisher of The Doddridge Independent

Subscribed to and sworn to before me on
this date: 9/12/16


Notary Public in and for Doddridge County

My Commission expires on
The 17th day of May 2019



LEGAL ADVERTISEMENT

Air Quality Permit Notice

Notice of Application

Canton North Compressor Station

Notice is given that Antero Midstream LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a modification to the existing 45CSR13 Construction Permit R13-3167A for a Natural Gas Compressor Station located south of US-23 near Center Point, and north of US-50, in Doddridge County, West Virginia. The latitude and longitude coordinates are: 39.4042N, 80.6834W.

The applicant estimates the change in potential to discharge of the following Regulated Air Pollutants will be:

| Pollutants | Totals (tons/yr) |
|---|------------------|
| Nitrogen Oxides (NOx) | -25.05 |
| Carbon Monoxide (CO) | -21.77 |
| Volatile Organic Compounds (VOC) | -44.82 |
| Particulate Matter less than 2.5 µm (PM2.5) | 1.56 |
| Particulate Matter less than 10 µm (PM10) | 1.56 |
| Sulfur Dioxide (SO2) | 0.13 |
| Formaldehyde (HCHO) | -1.00 |
| Benzene | -0.13 |
| Toluene | -0.04 |
| Ethylbenzene | 0.07 |
| Xylenes | -0.20 |
| n-Hexane | -0.10 |
| Total HAPs | -0.88 |
| Carbon Dioxide equivalent (CO2e) | 13,835 |

Note that a negative change reflects a decrease in potential emissions.

Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated the 31st day of August 2016.

By: Antero Resources Corporation
Barry Schatz
Senior Environmental & Regulatory Manager
1615 Wynkoop Street
Denver, CO 80202

09/09

Williams, Jerry

From: Ward, Beth A
Sent: Tuesday, September 06, 2016 12:10 PM
To: Williams, Jerry
Subject: ANTERO RESOURCES CORP PERMIT APPLICATION FEE

This is the receipt for payment received from:

ANTERO RESOURCES CORP, CANTON NORTH STATION, CHECK NUMBER 1489, CHECK DATE 08/17/2016, \$4,500.00
R13-3167B ID# 017-00084

OASIS Deposit CR 1700024832

Thank You!

Beth Ward

**WV DEPARTMENT OF ENVIRONMENTAL PROTECTION
BTO FISCAL
601 57TH STREET SE
CHARLESTON, WV 25304
(304) 926-0499 EXT 1846
beth.a.ward@wv.gov**

NON-CONFIDENTIAL

Adkins, Sandra K

From: Adkins, Sandra K
Sent: Friday, September 2, 2016 4:43 PM
To: 'bschatz@anteroresources.com'; 'kmeszaros@kleinfelder.com'
Cc: McKeone, Beverly D; Williams, Jerry
Subject: WV DAQ Permit Application Status for Antero Resources Corporation; Canton North Station

**RE: Application Status
Antero Resources Corporation
Canton North Station
Facility ID No. 017-00084
Application No. R13-3167B**

Mr. Schatz,

Your application for a modification permit for the Canton North Compressor Station was received by this Division on September 2, 2016, and was assigned to Jerry Williams. The following item was not included in the initial application submittal:

Original affidavit for Class I legal advertisement not submitted.

This item is necessary for the assigned permit writer to continue the 30-day completeness review.

Within 30 days, you should receive a letter from Jerry stating the status of the permit application and, if complete, given an estimated time frame for the agency's final action on the permit.

Any determination of completeness shall not relieve the permit applicant of the requirement to subsequently submit, in a timely manner, any additional or corrected information deemed necessary for a final permit decision.

Should you have any questions, please contact the assigned engineer, Jerry Williams, at 304-926-0499, extension 1223.

NON-CONFIDENTIAL

R13-3167B

Jung

017-60084

modification

**45CSR13 Administrative Update, Construction, Modification, Relocation,
Temporary Permit or General Permit Registration Incomplete Application**

A complete application is demonstrated when all of the information required below is properly prepared, completed and attached. The items listed below are required information which must be submitted with a 45CSR13 permit application. Any submittal will be considered incomplete if the required information is not included. The applicant must submit a complete application in order to receive a 45CSR13 permit.

- Class I legal advertisement not published in a newspaper certified to accept legal advertisements and original affidavit submitted.
- Application fee AND/OR additional application fees not included:
 - \$250 Class I General Permit
 - \$300 Class II Administrative Update
 - \$1,000 Construction, Modification, Relocation or Temporary Permit
 - \$500 Class II General Permit
 - \$1,000 NSPS
 - \$2,500 NESHAP
 - \$2,500 45CSR27 Pollutant
 - \$5,000 Major Modification
 - \$10,000 Major Construction
- Original and two (2) copies of the application not submitted.
- File organization – application pages are not numbered or in correct order, application is not bound in some way, etc.
- Confidential Business Information is not properly identified.
- General application forms not completed and signed by a responsible official.
- Authority of Corporation form not included – required if application is signed by someone other than a responsible official.
- Applicant is not registered with the West Virginia Secretary of State's Office.
- Copy of current Business Registration Certificate not included.
- Process description, including equipment and emission point identification numbers, not submitted.
- Process flow diagram, including equipment and emission point identification numbers, not submitted.
- Plot plan, including equipment and emission point identification numbers, not submitted.
- Applicable technical forms not completed and submitted:
 - Emission Point Data Summary Sheets
 - Emission Unit Data Sheets
 - Air Pollution Control Device Sheets
 - Equipment List Form
- Emission calculations not included – emission factors, references, source identification numbers, etc.
- Electronic submittal diskette not included.