Chesapeake Appalachia, LLC

Brian Dytko Pad, R13-2923A




West Virginia Division of Air Quality

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Air Quality Permits are Required If:

- Subject to any substantive requirement
- Criteria pollutants: 6 lb/hr and 10 tons/yr
- HAPs: 2 lb/hr or 5 tons/yr of all HAPs added together

The Permitting Process

- Applicant submits the necessary application forms to the DAQ and publishes a legal ad for public comment.
- Application is reviewed for completeness and applicant is notified of any deficiencies.
- Application undergoes a technical review to determine which air quality rules apply, and if the proposal meets those rules. An engineering evaluation is written and a draft permit is developed.

The Permitting Process *(cont'd.)*

- If the application meets all applicable air quality rules, the DAQ publishes a notice of intent to approve the draft permit which provides for a second, 30-day public comment period. At this time, a copy of the engineering evaluation and draft permit is made available for public review.
- All received comments are reviewed and addressed by the DAQ.
- Final decision is made.

What is a natural gas production site?

- Located at an existing well pad already permitted by the DEP's Office of Oil & Gas.
- Gathers gas from all of the well heads on the site and prepares the gas for use by removing unwanted liquids and other impurities.
- Equipment generally found at these sites include compressors, gas production units, heater-treaters, low-pressure towers, vapor combustors, condensate and water storage tanks.

Process Description

- Condensate, gas, and water come from the wellhead(s) to the gas production units, where the first stage of separation occurs. Fluids (condensate and produced water) will be sent to the heater treaters, gas will be sent downstream.

- Heater treaters are used to treat stable mixtures of condensate, solids, and water. These units break the mixtures and separate the condensate from water. The process causes hydrocarbons, including methane, to vaporize and escape.

Process Description *(cont'd.)*

- The vaporized hydrocarbons from the heater treaters is captured via a flash gas compressor driven by a natural gas-fired engine and sent downstream.

- Produced water from the heater treaters flows into produced water tanks. Condensate flows into a low pressure tower.

Process Description *(cont'd.)*

- Gases from the low pressure towers are routed directly to the vapor combustor inlet with 100% capture efficiency. Condensate flows into condensate storage tanks.

- The natural gas stream will exit the facility via pipeline. Condensate and produced water are transported off-site via truck.

Natural Gas Well Heads

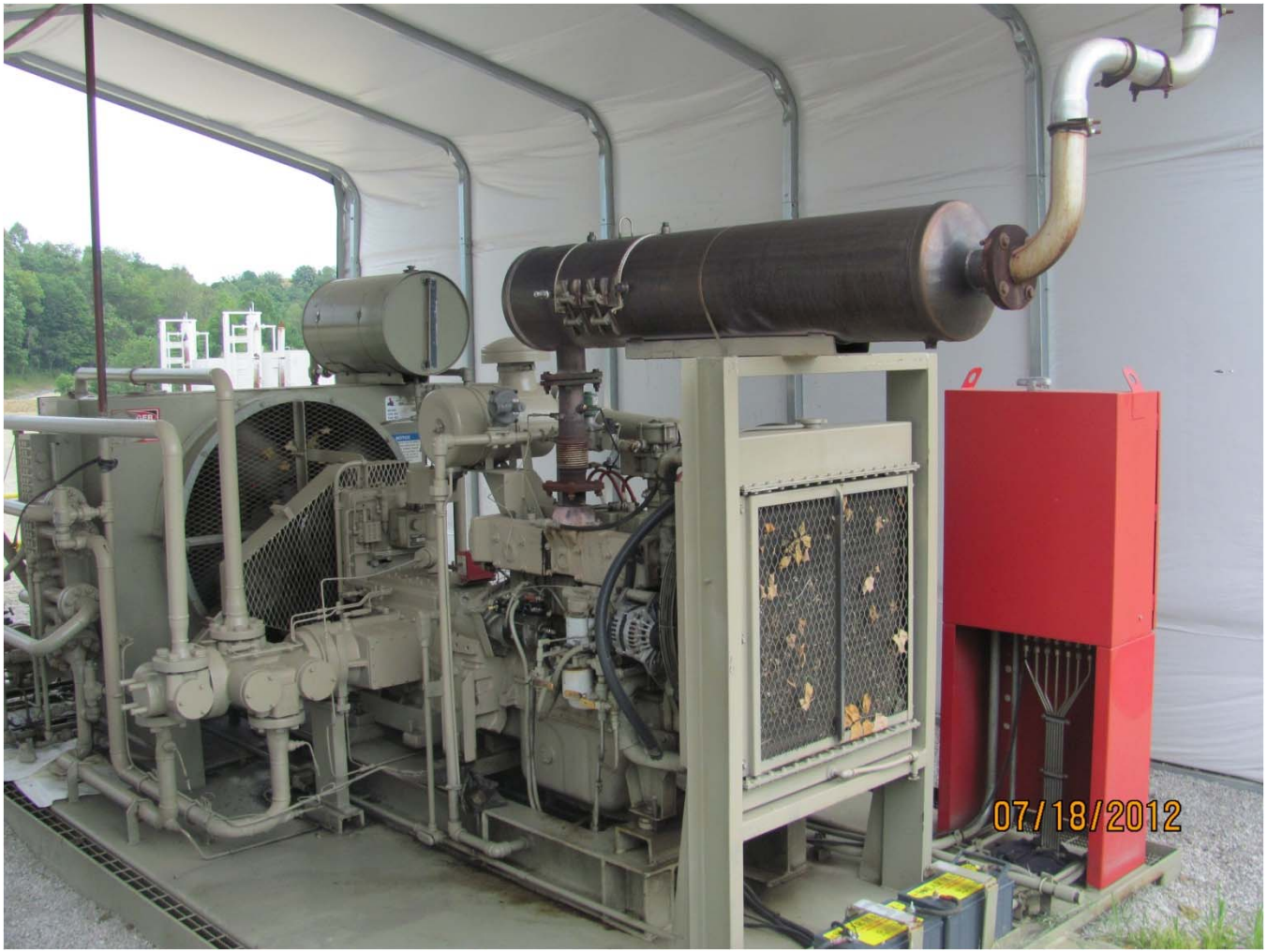
Natural Gas Production Site

Types of Pollutants

Combustion Sources – Nitrogen Oxides (NO_X), Carbon Monoxide (CO), Volatile Organic Compounds (VOCs), Sulfur Dioxide (SO_2), Particulate Matter (PM).

- These pollutants are commonly found in sources where combustion occurs. Sources of combustion include compressor engines, gas production units, heater treaters.

Natural Gas Compressor



Gas Production Unit (GPU)

Heater Treater

Types of Pollutants *(cont'd.)*

Natural Gas Liquids Storage and Transfer – Volatile Organic Compounds (VOCs), Benzene, Toluene, Ethylbenzene, Xylene, trace amounts of other constituents.

- In the transfer and storage of the natural gas liquids as the pressure is suddenly decreased such as filling a tank, vapors are "flashed" off. These vapors containing VOCs and HAPs will be controlled by a vapor combustor with 98% destruction efficiency.

Produced Water and Condensate Tanks

Types of Pollutants *(cont'd.)*

Natural Gas Liquids Loadout – VOCs, HAPs.

- Produced water and condensate are stored in storage tanks and transported off-site via truck.

- Emissions during loading are controlled using a vapor return line with is also routed to the vapor combustor with 98% destruction efficiency.

Condensate Tank Loadout

Equipment Control Devices

- **Compressor Engine** – Non-Selective Catalytic Reduction
  - Nitrogen Oxides – 92% Control Efficiency
  - Carbon Monoxide – 85% Control Efficiency
- **Condensate and Produced Water Storage Tanks** – Vapor Combustors – 100% Capture
  - VOCs: 98% Control Efficiency
  - Total HAPs: 98% Control Efficiency
- **Condensate and Water Loadout Racks** – Vapor Return / Combustion – 70% Capture
  - VOCs: 98% Control Efficiency

What Kind of Rules May Apply?

- West Virginia State Air Quality Rules
- National Emission Standards for Hazardous Air Pollutants (NESHAPs) – Maximum Achievable Control Technology (MACT) Standards
- New Source Performance Standards (NSPS)

What Rules May Apply?

Rule	Sources	Pollutants	Requirement
45CSR13	Criteria pollutants emitted above 6 pph and 10 tpy. HAPs emitted above 2 pph or 5 tpy.	Criteria Pollutants (Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Volatile Organic Compounds (VOC), Sulfur Dioxide (SO_2), Particulate Matter (PM)), Hazardous Air Pollutants (HAPs)	Required to obtain air quality permit.
45CSR2	Hot Oil Heater, Reboiler	PM	Visible emission readings, particulate matter emission limits.
45CSR4	Facility Wide	Non-Specific	Objectionable odors are prohibited.
45CSR6	Flare	PM	Particulate matter emission limits. Temporary flares meeting specific requirements are exempt from this rule.
40CFR60.18	Flare	VOC	98% destruction efficiency of VOC emissions.
40CFR60 Subparts K, Ka, Kb	Storage Tanks	VOC	Prescribed control devices on storage tanks to reduce VOC emissions.
40CFR60 Subpart GG	Gas Turbines	NO_x, SO_2	Must meet the emission control limits for NO_x and SO_2. Must conduct performance testing.
40CFR60 Subpart KKK	Natural Gas Processing Plants	VOC	Must conduct Leak Detection and Repair (LDAR) on all processing equipment to reduce VOC emissions.
40CFR60 Subpart LLL	Natural Gas Sweetening Plants	SO_2	Must conduct appropriate testing and monitoring to show compliance of SO_2 limit for the gas sweetening facility.

What Rules May Apply? *(cont'd.)*

40CFR60 Subpart IIII	Diesel Fired Engines	VOC, NO_x, CO, PM	Emission limits that may require the use of air pollution control devices. Must conduct performance testing.
40CFR60 Subpart JJJJ	Natural Gas Fired Engines	VOC, NO_x, CO	Emission limits that may require the use of air pollution control devices. Must conduct performance testing.
40CFR60 Subpart KKKK	Gas Turbines	NO_x, SO_2	Must meet the emission control limits for NO_x and SO_2. Must conduct performance testing.
40CFR63 Subpart H	Equipment Leaks	HAPs	Varies depending upon source category.
40CFR63 Subpart HH	Tanks, Equipment Leaks, Glycol Dehydration Units at Production Facilities	HAPs	Must control HAP emissions from tanks, equipment leaks, and glycol dehydration units. Must conduct appropriate testing, monitoring and recordkeeping.
40CFR63 Subpart VV	Oil-Water Separators	HAPs	Varies depending upon source category. Must conduct appropriate testing, monitoring and recordkeeping.
40CFR63 Subpart HHH	Glycol Dehydration Unit	HAPs	Must control HAP emissions from glycol dehydration units. Must conduct appropriate testing, monitoring and recordkeeping.
40CFR63 Subpart YYYY	Gas Turbines	HAPs	Must control HAP emissions from stationary gas turbines. Must conduct appropriate testing, monitoring and recordkeeping.
40CFR63 Subpart ZZZZ	Reciprocating Internal Combustion Engines	HAPs	Emission limits that may require the use of air pollution control devices. Must conduct appropriate testing, monitoring and recordkeeping.

What Rules Apply?

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

- Requires Chesapeake to conduct visible emissions readings of the combustion sources. The opacity requirements (visible emissions) in 45CSR2 is 10% opacity based on a six minute block average.

What Rules Apply? *(cont'd.)*

45CSR4 - To Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors

- States that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly-authorized representative of the Division of Air Quality, based upon their investigations and complaints, such odor is objectionable.

What Rules Apply? *(cont'd.)*

45CSR6 - To Prevent and Control Air Pollution From Combustion of Refuse

- Defines incineration as the destruction of combustible refuse by burning in a furnace designed for that purpose. The purpose of this vapor combustor is to destroy VOC emissions through incineration. Therefore, it meets this definition. The vapor combustor is also subject to the 20% opacity limitation (visible emissions) in this rule. Typically, the incineration of gases produces minimal visible emissions.

What Rules Apply? *(cont'd.)*

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

- Applies due to the fact that Chesapeake exceeds the regulatory emission threshold for criteria pollutants of 6 lbs/hr and 10 tons/year, and is subject to a substantive requirement of an emission control rule promulgated by the Secretary.

What Rules Apply? *(cont'd.)*

40CFR60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

- Chesapeake's compressor engines are subject to 40CFR60 Subpart JJJJ, which sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine. 40CFR60 Subpart JJJJ is applicable to owners and operators of new stationary spark ignition internal combustion engines manufactured after July 1, 2008, for engines with a maximum rated power capacity less than 500 hp.

What Rules Apply? *(cont'd.)*

40CFR60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

- The emission limits for these engines are the following: NOx – 1.0 g/hp-hr; CO – 2.0 g/hp-hr; and VOC – 0.7 g/hp-hr. Based on the manufacturer's specifications for these engines, the emission standards for all of the proposed engines will be met.

Required Performance Testing

- The natural gas compressor engines are required to conduct an initial performance test within 1 year of engine startup and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter, to demonstrate compliance.

- In addition, Chesapeake must keep a maintenance plan and records of conducted maintenance and to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practices for minimizing emissions.

Required Monitoring

- Monitor and record the quantity of natural gas consumed in all combustion sources.
- Monitor the presence of the vapor combustor pilot flame with a thermocouple or equivalent.
- Monitor opacity from all fuel-burning units.
- Monitor tanks to ensure all vapors are sent to the vapor combustors.
- Monitor truck loading to ensure that vapor return / combustion is used.

Required Recordkeeping

- Maintain records of the amount of natural gas consumed in each combustion source.
- Maintain records of testing conducted in accordance with the permit.
- Maintain the corresponding records specified by the on-going monitoring 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.

Contact Information

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