UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Four Penn Center – 1600 John F Kennedy Blvd
Philadelphia, Pennsylvania 19103-2852

Report Title: Clean Air Act Inspection of EQT
Inspection Date(s): 03/23/2023
Regulatory Program(s): SIP, NSPS

Company Name: EQT
Facility Name: Sizemore, Knob Fork CS, Opry Water Facility
Facility Location: Multiple Sites – See In Report

Latitude: 39.653011 **Longitude:** -80.536143
County/Parish: Wetzel

AFS Number: WV00010300045 – Knob Fork CS
Permit Number: G30-D181 – Knob Fork CS
NAICS Code: 211111 **SIC:** 1311
Unique Project #: 3E23CA093A

Facility Representatives: **Point of Contact**

Regina Henry, Environmental Manager, EQT ☒
Phone: 412-328-3215 Contact: rhenry@eqt.com
Julianne Baer, Engineer, EQT ☐
Phone: 724-710-2416 Contact: Julianne.baer@eqt.com
Kenny McWhirter, Maintenance, EQT ☐
Phone: 304-904-5077 Contact: kmcwhirter@eqt.com
John Ellender, Supervisor, EQT
Phone: 304-266-3837 Contact: jellender@eqt.com
Todd Varner, Supervisor, EQT
Phone: 724-802-3897 Contact: todd.varner@eqt.com
Ryan Sapp, EHS Supervisor, EQT
Phone: 724-288-5842 Contact: rsapp@eqt.com

EPA Inspectors:

Bruce Augustine, Environmental Scientist, 3ED21
Phone: 215-814-2131 Contact: augustine.bruce@epa.gov
Dean DeLuca, Physical Scientist, 3ED21
Phone: 304-234-0264 Contact: Deluca.dean@epa.gov

State/Local Inspectors:

Doug Hammel, WVDEP Air Quality
Phone: 304-550-4389 Contact: douglas.n.hammell@wv.gov

EPA Lead Inspector	BRUCE AUGUSTINE Digitally signed by BRUCE AUGUSTINE Date: 2023.05.02 07:38:55 -04'00'	05/02/23
Signature	**Bruce Augustine**	**Date**

Four Penn Center – 1600 John F Kennedy Blvd
(3ED21)
Philadelphia, PA 19103-2852

Supervisor	KRISTEN HALL Digitally signed by KRISTEN HALL Date: 2023.05.02 08:01:37 -04'00'	
Signature	**Kristen Hall**	**Date**

Table of Contents

I. Introduction

The United States Environmental Protection Agency (EPA) conducted a Clean Air Act (CAA) inspection at multiple sites owned and operated by EQT to verify compliance with applicable State and Federal regulations. The West Virginia Department of Environmental Protection (WVDEP) was notified of the inspection on February 22, 2023, via email. On March 16, 2023, EPA notified the Facility of the planned inspection via phone and email. EPA emailed a list of records for review to Regina Henry and Todd Varner, prior to the inspection (see Attachment 1).

A. Summary of the Facility

The three facilities inspected are located in Wetzel County, WV. EQT is an oil and gas company that is based in Pittsburgh, PA that is involved in the drilling of natural gas wells in the Utica and Marcellus Shale basins. EQT gathers and compresses natural gas and liquids before transferring them to the midstream segment. Currently, EQT owns and operates natural gas wells in Pennsylvania, West Virginia and Ohio. EQT is a publicly traded company that is the largest natural gas producer in the United States and has a net worth of greater than $10 billion.

Equipment located at wellpads include wells, gas processing units, storage vessels, glycol dehydration units, and combustors. Equipment located at compressor stations includes storage vessels, glycol dehydration units, and compressor engines.

The facilities received the following minor source permits from WVDEP

- Knob Fork CS – Permit #G30-D181 issued 10/10/2012
- Sizemore Wellpad – Permit #G70-D473 issued 09/30/2021
- Opry CWF – R13-3511A issued 06/23/2021

The three facilities inspected are classified as minor sources for all criteria pollutants and HAPs. The facilities are subject to, or potentially subject to the following federal regulations:

- 40 CFR Part 63 Subpart HH: National Emissions Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities (MACT HH)
- 40 CFR Part 63 Subpart ZZZZ: National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (MACT 4Z)
- 40 CFR Part 60 Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (NSPS 4J)
- 40 CFR Part 60 Subpart OOOOa: Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Reconstruction or Modification Commenced after September 18, 2015 (NSPS OOOOa)

B. Inspection Opening Conference

At 8:55AM on March 23, 2023, EPA inspectors arrived at the Knob Fork Compressor Station, located at 39.6528 -80.5359 for a CAA Inspection and conducted a brief opening conference. EQT was represented by Regina Henry, Julianne Baer, Kenny McWhirter, John Ellender, Todd

Varner, and Ryan Sapp. Also, Doug Hammell from WVDEP was present. EPA inspectors, Bruce Augustine and Dean DeLuca, presented their credentials and explained the purpose of the visit was to conduct a CAA inspection to determine compliance with their permit and any applicable regulations. Additionally, EPA informed the facility representatives of their right to claim any confidential business information (CBI). At that time, EQT representatives did not claim any photos or documentation as CBI.

II. Site Activity/Process Description

The three EQT facilities inspected each perform a different function but each assists in the process of extracting natural gas from the Appalachian Basin and transporting it to market. As mentioned earlier, EQT is involved in the process of drilling and operating natural gas wells and operating gathering lines to collect and transport natural gas (and entrained natural gas liquids) for further processing. In West Virginia, EQT operates in Tyler, Ritchie, Wetzel, and Doddridge Counties. Most of the wells drilled by EQT are unconventional wells, however, they do operate some conventional wells.

The Knob Fork station accepts natural gas that has been collected in gathering lines from wells in the surrounding area. Natural gas enters the facility from gathering lines at approximately 200psi. EQT representatives indicated that the Knob Fork station's current throughput is 25 MMscf/day of natural gas. The Knob Fork station removes the water from the gas stream and compresses natural gas to 1000psi before sending the gas into the Williams pipeline for further processing offsite.

In January 2023 EQT began operating the Opry Clean Water Facility (Opry CWF). This facility receives produced water from compressor stations and wellpads in the area and stores it prior to sending it out in a pipeline for use in hydraulic fracturing of new wells. Water is received at the site via truck and can be sent out via pipeline or truck.

The Sizemore Pad is a wellpad that has eight wells, eight gas processing units[1], five storage vessels, a glycol dehydrator with BTEX eliminator, and an enclosed combustion device. The wells extract natural gas and liquids which are sent to a dedicated gas processing unit to separate natural gas from water and natural gas liquids. The gas is sent to a compressor station via pipeline while the liquids are sent to storage vessels before being sent offsite.

The opening conference transitioned directly into the walkthrough at the Knob Fork station.

III. Observations

All EQT representatives present for the opening meeting were present for the walkthrough, as was Doug Hammell from WVDEP. The Knob Fork Station was operating at the time of the inspection. This is one of four compressor stations owned and operated by EQT in West Virginia

[1] The site also has one older well that is not a horizontal well.

that is used to increase the pressure of natural gas collected in gathering lines from nearby wells and send it further downstream for processing. Approximately 25MMscf/day of natural gas and liquids is entering the Knob Fork Station. EQT representatives indicated that the gas passing through this site is put into a Williams Pipeline for additional processing downstream. The custody transfer and natural gas meter are located at the fenceline. Gas entering the facility is sent through a filter separator to remove any impurities in the gas stream and then is sent thorough a compressor scrubber before increasing the pressure of the natural gas. The gas is then sent through an onsite glycol dehydrator to remove water from the gas stream. This glycol dehydrator is owned by Williams but is located on the property owned by EQT. The Williams dehydrator has been issued a separate minor source permit to operate by WVDEP. Water removed from the gas stream at the dehydrator is pumped to one of two 210bbl produced water storage vessels. These vessels are vented directly to the atmosphere. Also, any water which is collected in knockout tanks at the filter separator or compressor scrubber is sent to the produced water tanks. All water from the produced water tanks is sent across the road to the Opry CWF for further use in fracturing operations. The gas stream that exits the glycol dehydrator goes through another discharge filter before being sent to the compressor where the pressure is raised to approximately 1000psi before sending it to the pipeline.

EPA observed the pipeline inlet for natural gas and the inlet filter separator. EPA also observed the glycol dehydrator owned by Williams. The dehydrator contactor tower was operating at a temperature of 100ºF and a pressure of 900psi. The dehydrator is equipped with two Kimray 45020PV glycol recirculation pumps. Only one pump was operating at the time of the inspection and the stroke rate on the pump was 12 strokes/min. This correlates to a glycol recirculation rate of 192.8 gal/hr. The glycol dehydrator is equipped with a BTEX eliminator to control VOC emissions from the still vent column. Any vapors from the reboiler are routed via a closed vent system to the still vent and to the BTEX eliminator where the vapors are condensed and collected. EPA observed the BTEX eliminator using the FLIR GF320 camera and emissions were observed from multiple points on the BTEX eliminator enclosure (MOV_0471.mp4). The permit for this source indicates that the emissions from the BTEX eliminator are to be controlled to a 95% destruction efficiency (Condition 5.1.6 of the R13 permit).

The Knob Fork Station is equipped with two Caterpillar G3606 compressor engines that are leased from USA Compression. EQT performs the general maintenance on the engines, however, USA Compressions performs all other work on the engines. Compressor Unit 3 (#11615) was operating with a suction pressure of 220psi and a discharge pressure of 900psi. Compressor Unit 2 (#11614) was operating with a suction pressure of 220psi and a discharge 900psi. EQT stated during the inspection that they were not sure if the engines were equipped with any emission controls (i.e., SNCR or SCR). These engines are subject to the requirements of NSPS 4J and

MACT 4Z[2]. Specifically, the engines are subject to the emission limits in Table 1 of NSPS 4J and the testing requirements of 40 C.F.R. § 60.4243(a).

All water at the facility that is produced in the process is routed to the two produced water tanks. As mentioned earlier, the tanks are uncontrolled for emissions and all water is trucked across the road to the Opry CWF for further use. EPA observed the two produced water tanks both from ground level and the catwalk using the FLIR GF320 camera and emissions were observed from the open header pipe on the tanks and an Enardo valve on Tank EPC5445531 (MOV_0472.mp4 and MOV_0473.mp4). This concluded the walkthrough at the Knob Fork Station and EPA exited the site at 10:25AM.

After inspecting the Knob Fork Station, the EPA inspection team, Doug Hammell from WVDEP, and EQT representatives proceeded to the Opry CWF. Eric Kramer, Operations Manager for Opry CWF, met us at the facility. This is a centralized water facility that receives and stores water for further use by EQT. Water is trucked into the site from surrounding wellpads and compressor stations where it can be stored in one of four 50,000 barrel capacity tanks. The facility commenced operation in early 2023 and is currently receiving approximately 12,000-13,000bbl/day of water via eight receiving bays. EPA observed multiple trucks entering the facility and unloading water.

The facility is equipped with three 530HP Waukesha engines to pump water between the tanks and out of the facility[3]. The engines are equipped with NSCR for NOx control and are subject to NSPS 4J and MACT 4Z. The emission limits in the existing permit are more stringent than NSPS 4J requirements in Table 1. Only one of the engines was operating at the time of the inspection and was currently pumping water at a rate of 44bbl/min. Mr. Kramer indicated that the day before, the facility had pumped 16,344bbl of water offsite. The water is pumped through a pipeline or trucked to various EQT sites that require water for fracking of wells. He also indicated that the site could potentially pump up to 93,000bbl/day of water offsite, if necessary.

During the inspection, the four tanks were full to the following capacities:

Tank	% Full
A	81
B	87
C	20.4
D	18.7

[2] §63.6590(c) states that any source must meet the requirements of MACT 4Z by meeting the requirements of either NSPS 4I or NSPS 4J and no other requirements for MACT 4Z exist.
[3] The current permit for the site lists six engines, however, only three are installed.

Each of the 50,000bbl tanks is open to the atmosphere and does not have a roof. EPA observed the four tanks using the FLIR GF320 camera and no emissions were observed at the time of the inspection. The inspection of the Opry CWF concluded at 11:10AM and EPA exited the facility and proceeded to the Sizemore Wellpad.

The EPA inspection team, Doug Hammell from WVDEP, and EQT representatives proceeded to the Sizemore Wellpad. EPA arrived at the site at 11:19AM. The site is equipped with eight wells and eight gas processing units (GPU). The GPU's are two phase separators that separate the natural gas and water. EQT stated that there is no oil in the liquids and it's just gas and water. The water that is separated from the natural gas is pumped to a tank battery and one of the five produced water tanks. These tanks are open to the atmosphere and are not controlled. Natural gas that is separated in the GPU is sent to the glycol dehydrator to further remove water from the gas stream. EPA was unable to acquire the operating pressure and temperature of the gylcol contactor tower during the inspection. The glycol dehydrator is equipped with two Kimray 450 gal recirculation pumps, however, these pumps were not operating during the inspection. The dehydrator also has two electric glycol recirculation pumps that were operating during the inspection. Vapors from the dehydrator still vent column are routed to a BTEX eliminator tank. These vapors are condensed and any remaining vapors are routed to a vapor destruction unit (VDU). EQT stated that there is a pressure control valve on the line from the BTEX tank to the VDU that is set to open when the pressure reaches 0.2 ounces. EPA observed the BTEX tank with the FLIR GF320 camera and emissions were observed from the suction side of the relief valve (MOV_0474.mp4). EQT was notified of the leaking valve and indicated that they would repair it.

EPA inspected the VDU and could not determine the manufacturer or model of the unit. The VDU was operating with a combustion temperature of 120ºF during the inspection. EPA also observed the VDU using the FLIR GF320 camera and uncombusted hydrocarbon may be present in the emission plume (MOV_0475.mp4).

Finally, EPA observed the five produced water tanks. EPA climbed onto the catwalk at the top of the tank battery and could hear dumping of liquids consistently into Tank 1. The tanks are combined with a common vapor header that is open to the atmosphere. Each of the tanks is equipped with an Enardo ES660 thief hatch and a weighted relief hatch. EPA observed the tanks with the FLIR GF320 camera and emissions were observed from the open header pipe on the top of Tank 1 (MOV_0476.mp4 and MPV_0477.mp4). Tank 1 was the storage vessel that was receiving consistent liquid dumps from the GPU's during the inspection. EQT stated that the Enardo valves are rated at 16oz/in^2 of pressure. EQT representatives stated that the Sizemore Pad is currently averaging 80MMscf/day of natural gas and 400-500bbl of water per day. This completed the onsite inspection of the Sizemore Pad.

IV. Records Review

Because the inspected sites are completely outside and there is no area to convene, no records were reviewed during the inspection. EPA and EQT discussed the list of records that were requested in EPA's March 16, 2023, email. EQT agreed to provide the records requested by mid-April 2023.

V. Closing Conference

After the inspection of the Sizemore Pad, EPA inspectors, each of the EQT representatives present for the opening and Doug Hammell from WVDEP had a brief closing conference to ask additional questions and discuss observations. The EPA inspectors noted that the investigation is on-going, and any areas of concern identified in the final reports do not necessarily reflect a violation or deviation, rather, they are areas that will require further investigation. EPA also noted that they would issue an inspection report within 60 days, with a copy to the State. Simultaneously, EPA will perform a detailed review of records and may have additional questions. EQT agreed to provide the make and model for the VDU and the pressure settings for the Enardo thief hatches on the produced water tanks. EPA also requested a copy of the permit for the equipment that is owned by Williams at the Knob Fork Station. EPA also reiterated EQT's ability to claim any material, including photographs and FLIR videos, as CBI. EQT did not claim any material CBI during the inspection. The inspection concluded at 12:44PM.

The following have been identified as *potential* issues during the inspection. They are issues that require either further investigation by EPA or additional information or explanation by EQT.

- Emissions were observed using the FLIR camera from the BTEX eliminator at the Knob Fork Station. This equipment is not owned by EQT, however, it is located on their property. The permit requires that the BTEX eliminator control emissions from the glycol dehydrator to a minimum of 95%. The operation of this unit and potential additional control should be evaluated.
- There are six compression engines listed in the existing permit for the Knob Fork Station while there are only two onsite during the inspection. EQT should identify if the engines onsite are two of the engines listed in the October 10, 2012, permit and, if so, which engines. Also, EQT should identify if these engines are certified by the manufacturer or have been performance tested to determine compliance with the emission limits in NSPS 4J and any additional limits in the existing permit.
- The produced water from the glycol dehydrator and other sources at the Knob Fork Station is collected in two produced water tanks that vent directly to the atmosphere. It is not clear how much natural gas liquids are entrained in the natural gas that enters the station. FLIR videos taken of the tanks during the inspection indicate the presence of hydrocarbons. EQT should provide a detailed gas analysis of the gas stream entering the Knob Fork Station and the engineering results using a process modeling software to demonstrate the potential emissions from the tanks. EPA has already requested the volume of water and condensate/oil for these tanks on a monthly basis.

- EPA observed emissions from the BTEX eliminator at the Sizemore Pad using the FLIR camera. This device is designed to control VOC and HAP emissions from the glycol dehydrator. Under normal operation emissions should not be visible from this unit. It is unclear what the typical monitoring or periodic maintenance procedures are for this control device.
- The VDU was operating at 120ºF during the inspection. This is well below the typical combustor operating temperature observed at wellpads. The make and model were not clearly labeled on the VDU and EPA requested this information. EQT should also provide a copy of the manufacturer operating procedures including typical operating temperature range and flow to ensure the unit operates within the design destruction efficiency.
- EPA also observed potential hydrocarbons from the VDU using the FLIR camera. This indicates potential incomplete combustion from the control unit.

VI. List of Attachments

Attachment 1:	Email correspondence to Regina Henry of EQT of records requested to review during inspection
Attachment 2:	Photo Log
Attachment 3:	FLIR Video log