



REGION 3

PHILADELPHIA, PA 19103

Report Title: Clean Air Act Inspection of Appalachia Midstream Services
Inspection Date(s): 03/26-27/2024
Regulatory Program(s): SIP, NSPS, Title V, NESHAP

Company Name: Williams
Facility Name: Battle Run, Buffalo and Sand Hill Compressor Stations
Facility Location: See Attachment 1

Latitude: See Attachment 1 **Longitude:** See Attachment 1
County/Parish: See Attachment 1

AFS/ICIS-Air Number: See Attachment 1
Permit Number: See Attachment 1
NAICS Code: 211111 **SIC:** 1311
DSB ID #: See Attachment 1

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I. Introduction

The United States Environmental Protection Agency (EPA) conducted a Clean Air Act (CAA) inspection at three Williams Ohio Valley Midstream (Williams or Facility) compressor stations to verify compliance with applicable State and Federal regulations. The West Virginia Department of Environmental Protection (WVDEP) was notified of the inspection on March 5, 2024, via email. On March 22, 2024, EPA notified the Facility of the planned inspection via phone and email. EPA sent an email confirming the inspection to Jeff Steeber, prior to the inspection (see Attachment 3). These records are listed in the Records Review section of the report.

The inspection included an evaluation of the Facility's processes and its compliance with the CAA. All information included in this report is the result of statements by the Facility representatives, materials shown to the inspectors by the Facility representatives, and/or documents provided by the Facility representatives to the inspectors at the time of, or subsequent to, the inspection. In addition, information gathered prior to the inspection from a review of EPA and State records may be included in Section A. Summary of the Facility.

A. Summary of the Facility

The facilities inspected are located at:

Facility	Address	Town	State	Zip	County	Latitude	Longitude
Battle Run	297 Windmill Truckers Rd	Valley Grove	WV	26060	Ohio	40.072236	-80.570525
Buffalo	9628 Bethany Pike	Bethany	WV	26032	Brooke	40.196748	-80.521413
Sand Hill	1594 McCausland Hill Rd	Dallas	WV	26036	Marshall	39.988217	-80.555861

All three stations receive natural gas with entrained natural gas liquids (water and condensate) from natural gas wells in the area surrounding the facility. The gas and liquids enter the facility via pipeline. The facility separates the natural gas from the entrained liquids using a two phase separator and recompresses the gas before sending it downstream via pipeline additional processing. The remaining liquids are further separated into produced water and condensate through additional gravity separation. The produced water and condensate are stored in tanks until being trucked offsite.

Each of the facilities has received a Title V permit from WVDEP. The permits are listed below:

Facility	Permit #	Permit Date
Battle Run	R30-06900107-2024	01/23/2024
Buffalo	R30-00900116-2019	03/19/2024
Sand Hill	R30-05100145-2024	03/11/2024

Each of the three facilities has the potential to emit greater than 100 ton/yr for NO_x, VOC, and CO and is therefore classified as a major source for these pollutants. Each facility is classified as a minor source

for all other criteria pollutants and hazardous air pollutants. The Facility is subject to, or potentially subject to the following federal regulations:

- 40 C.F.R. Part 60 Subpart OOOO – Standards of Performance for Cude Oil and natural Gas Production, Transmission and Distribution for which Construction, Reconstruction or Modification Commenced after August 23, 2011, and on or before September 18, 2015
- 40 C.F.R. Part 60 Subpart OOOOa - Standards of Performance for Cude Oil and natural Gas Production, Transmission and Distribution for which Construction, Reconstruction or Modification Commenced after September 18, 2015
- 40 C.F.R. Part 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines
- 40 C.F.R Part 63 Subpart HH – National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities
- 40 C.F.R. Part 63 Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

B. Inspection Opening Conference

Day 1: March 26, 2024

At 8:35AM EPA inspectors arrived at the Battle Run CF for a CAA Inspection and conducted a brief opening conference. Multiple representatives from Williams Ohio Valley Midstream was represented for the opening conference (Attachment 2). Also, Eric Bland (WVDEP) was present. EPA inspectors, Bruce Augustine, Paul Arnold and Steve Ott 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, Williams' representatives did not claim any photos or documentation as CBI.

II. Site Activity/Process Description

Battle Run CF:

Appalachia Midstream Services was formed in 2008 and acquired by Chesapeake Energy in 2011. The Battle Run CF was constructed in 2012 by Chesapeake Energy and was acquired in an asset purchase by Williams in 2015. The site operates 24 hour/day, 7 day/week, however, the site is typically manned during normal business hours. Williams has the ability to monitor Facility operating conditions from offsite.

Battle Run CF receives natural gas and liquids via three 16" inlet pipelines. The inlet pressure in the pipelines is approximately 100-150psi and the Facility receives 95-105MMscf/day of gas. During 2020-2021 the amount of natural gas received at the site increased before decreasing in 2022. Williams

indicated that additional wells were drilled in 2023 which will increase the flow of natural gas to the Facility.

Gas and liquids entering the facility first go to the inlet separator which serves to drop liquids out of the gas stream. All of the gas and liquids comes to the Facility from wellpads owned by Southwest Energy (SWN). Gas leaving the inlet separator is sent to the compressors to be compressed to pipeline pressure (1000psi). Battle Run CF has 12 Caterpillar 3516 gas fired compressors rated at 1380HP each. The Facility also has a Caterpillar 3616LE compressor rated at 5,000HP. Units 2-11 were installed in 2012 while units 1 and 12 were installed in 2013. The Caterpillar 3616LE engine was permitted in 2019 and installed in May 2023. Each of the engines is a “non-certified” engine and was not certified by the manufacturer to meet NSPS applicable emission limits. In addition, each of the compressor engines is equipped with oxidation catalyst to control emissions of CO, VOC and formaldehyde to the atmosphere.

The gas is then sent to one of three triethylene glycol dehydrators rated at 55MMscf/day each to remove excess water in the gas stream. Gas enters the contactor tower of the dehydrator where it comes in contact with lean glycol to remove water. The gas is then sent into the sales pipeline while the rich glycol is sent to the reboiler to separate the glycol from hydrocarbons. The flash gas is used to fire the reboiler burner while the bottom liquids from the still vent are sent to condensate storage. The current throughput at the dehydrators is approximately 35MMscf/day.

Liquids which drop out at the inlet separator are sent to a three phase separator to separate the produced water from condensate. Produced water is then sent to one of two 400 bbl produced water tanks. The condensate is sent to a stabilizing unit where it is heated to remove lighter ends and recover heavier ends. The light end material is used for fuel gas while the heavy ends are sent to one of four 400 bbl condensate storage tanks. Williams indicated that in 2023 the site produced 15,000 bbl of produced water and 58,000 bbl of condensate. The vapors from the six storage tanks are controlled by two vapor recovery units (VRU). Vapors which accumulate in the vapor header are routed to the VRU's, which operate in series. The first VRU turns on when the pressure in the header reaches a setpoint and the second VRU turns on if the pressure reaches a higher setpoint. Vapors recovered in the VRUs are sent to a flash gas compressor and then back to the inlet for re-processing. Also, there are two carbon canisters used to control vapors from produced water and condensate truck loading.

Williams stated that there is a 605HP Baldor emergency generator onsite to provide backup power to certain systems in the event of a utility power failure. The generator cannot power the entire site nor can the facility keep operating in the event of a power loss. There is also a smaller 49HP emergency generator that was permitted but never installed.

Williams indicated that the site is subject to NSPS OOOOa and has subject compressor engines and storage vessels. They stated that they conduct quarterly LDAR surveys of the site. They also, as part of their internal procedures, conduct monthly FLIR monitoring at the compressor engines. They also

conduct annual audio, visual, olfactory monitoring at the site. Williams indicated that pigging occurs at the inlet and discharge at the site – weekly at the discharge and approximately quarterly at the inlet.

The opening conference concluded at 9:30AM. *The walkthrough for the Battle Run CF commenced immediately after the opening conference. See The walkthrough beginning on Page 9 of this report.*

Sand Hill CF:

EPA resumed the inspection at the Sand Hill CF at 1:25PM on March 26, 2024. The list of attendees included most of the Williams staff from the Battle Run inspection and additional Williams employees: Aaron Poling, Operations Supervisor; Jimmy Jackson, Operations; and Brad Henderson, Operations. Eric Blend, from WVDEP, was also present.

The Sand Hill CF has two inlet lines to receive natural gas from the surrounding wellpads: Grandstaff and Sand Hill lines. The Facility receives natural gas at field pressure, approximately 130-140psi. Similar to Battle Run, the pads supplying gas to the site are owned and operated by SWN. The general operation at the Sand Hil CF is the same as the Battle Run CF. Natural gas enters the Facility via pipeline and goes through the two phase inlet separator to remove liquids from the gas stream. The natural gas that is separated goes to one of twelve Caterpillar 3516 compressors rated at 1380HP each. Each of the compressor engines is equipped with an oxidation catalyst for CO, VOC, and formaldehyde controls. Williams personnel indicated that this site began operations in about 2010 or 2011 and six engines were installed at that time. An additional three engines were installed in a year or two later and then the final three engines in 2016. All of the engines are subject to NSPS JJJ and MACT ZZZZ. The engines are tested annually for NO_x, CO, and VOC to determine compliance with the permit and federal NSPS emission limits. After the gas is compressed to pipeline pressure, it is sent to one of three 55MMscf/day glycol dehydrators to remove excess water. The dehydrators run in parallel and use electric glycol recirculation pumps. Emissions from the dehydrators are controlled using BTEX eliminators to condense vapors from the still vent. Vapors which aren't condensed go to the reboiler burner to be combusted as fuel. Condensate recovered is sent to the storage tanks. After leaving the dehydrators, the natural gas is sent to a central delivery point and then for further processing.

Liquids which are removed at the inlet separator are sent to a three phase separator to separate additional gas, produced water, and condensate. Gas separated at this point is sent to the flash gas compressor, produced water is sent to one of two 400 bbl produced water storage tanks, and condensate is sent to a heater treater/condensate stabilizer and then to one of four 400 bbl storage tanks. Vapors from all of the storage vessels are controlled by two VRUs. The first VRU is set to operate when vapor header pressure reaches 4"WC and the second VRU will turn on when line pressure reaches 5"WC. Williams monitors tank pressure with a monitor located in the vapor header.

The Sand Hill CF has a 805HP Capstone microturbine generator used to generate power for the site. This Facility does not use utility power to operate the site. Williams indicated that this unit is not subject to NSPS JJJJ.

The opening meeting for the Sand Hill CF ended at 1:49PM. *The walkthrough for the Sand Hill CF commenced immediately after the opening conference. See The walkthrough beginning on Page 10 of this report.*

Buffalo CF:

On March 27, 2024, at 12:14PM, EPA arrived at the Buffalo CF to continue the inspection. EPA commenced the opening meeting and circulated a sign-in sheet (Attachment 2). The opening meeting began after a safety orientation for the site. The Buffalo CF was originally permitted by Access Midstream in 2013 and initially commenced operation in late 2015. Access and Appalachia Midstream Services was a joint venture and the transition to Williams happened shortly after operations commenced.

Williams indicated that natural gas is supplied to the Facility by 10-15 wellpads in the surrounding area owned and operated by SWN. At the time of the inspection, the Buffalo CF was receiving 63MMscf/day of natural gas through two inlet pipelines. The two lines feed an inlet separator where liquids and gas are separated. After the two phase separator, natural gas is sent to one of twelve Caterpillar 3516 engines rated at 1380HP each. All of the engines are subject to NSPS Subpart JJJJ and are equipped with oxidation catalyst to limit the emissions of VOC, CO and formaldehyde. Furthermore, the engines are subject to NSPS OOOO and Williams changes the rod packing every three years or 26,000 hours of operation. The engines are stack tested annually and were last tested in February 2024. Williams stated that Engine 7 was out of service during the inspection for preventative maintenance and that Engine 6 had just gone out of service.

After leaving the compressor engines, natural gas is sent to the glycol dehydrators to remove excess water. The Buffalo CF site has a 55MMscf/day and 110 MMscf/day dehydrator. Both dehydrators are equipped with a BTEX control to recover vapors from the reboiler skid and prevent the emissions to the atmosphere. In addition, both dehydrators use electric glycol circulation pumps with Kimray gas pumps as backup.

The liquids which leave the initial two phase separator are sent to a three phase separator to separate any additional gas, produced water, and condensate. Produced water removed at this point is sent to the two 400 bbl produced water tanks while the condensate is sent to a heater treater for further processing. The Buffalo CF has six 400 bbl condensate tanks for storage. Vapors from the tanks are routed through a common header system that is connected to each tank. The vapors are routed one of two VRUs.

Williams stated that all pneumatic controllers at the site are on instrument air and none are gas driven. Also, Williams will be commencing optical gas imaging surveys of the Facility, as required by the

Williams Consent Decree that was entered in December 2023. Finally, Williams utilizes a Capstone microturbine generator for site power. Only the administration building at the site is powered using utility power.

The opening meeting concluded at 12:46PM. *The walkthrough for the Buffalo CF commenced immediately after the opening conference. See The walkthrough beginning on Page 11 of this report.*

III. Observations

Battle Run CF:

EPA inspectors were led on a walkthrough of the Facility at 9:45AM on March 26, 2024, by Williams representatives and Eric Blend of WVDEP was also present for the walkthrough. EPA inspectors noted photos would be taken during the Facility walkthrough and a GF320 FLIR camera would be used to observe sources for potential emissions. All photos and videos obtained during the inspection are included in Attachments 4 and 5. Weather was in the 40s with slight rain and overcast conditions.

The EPA inspection team began the walkthrough at the inlet pipelines and pigging area. EPA observed these sources, including the inlet separator, with the FLIR camera.

The EPA inspection team then proceeded to the compressor building. EPA observed the following conditions at each engine:

Engine	Pre CatOx Inlet Temp °F	Engine RPM	1 st Stage Suction Pressure (psi)
1	941	1350	95
2	928	1372	130
3	935	1392	145
4	813	1364	130
5	926	1374	118
6	955	1372	140
7	949	1385	128
8	953	1368	117
9	935	1375	114
10	942	1387	115
11	<i>Unit</i>	<i>Down</i>	<i>For SVC</i>
12	944	1381	98
13	890	994	108

During the walkthrough, EPA observed with the FLIR camera potential leaking insulation at the elbow the oxidation catalyst at Engine 1 (MOV_0466)¹. A FLIR video was obtained with an overview of Engine 4 (MOV_0467) and a leak was observed at a fitting on a valve compressor from on Engine 5 (MOV_0468).

The EPA inspection team observed the stabilization unit and then proceeded to the three glycol dehydrators. The contactor tower on the three towers was observed to be: A 90°F; B 96°F; C 98°F. The reboiler skids were also observed. The facility utilizes electric glycol recirculation pumps with a gas powered backup pump. The reboiler and still vent were also observed with the FLIR camera. The inspection team proceeded to the tank battery and observed the top of each tank with the FLIR camera. A leak was observed at the Enardo thief hatch of Tank 104 (MOV_0469).

The walkthrough concluded at 12:16PM and EPA exited the facility. A break for lunch was taken and the inspection continued in the afternoon at the Sand Hill CF. The process description for this station is included above while observations are included below.

Sand Hill CF:

The walkthrough for the Sand Hill CF commenced immediately after the opening meeting. The same personnel present at the opening meeting were present for the walkthrough. The temperature was in the 40s with overcast conditions and steady rain. EPA informed Williams that photographs would be obtained during the walkthrough and EPA would use a FLIR GF320 infrared camera to observe emission sources (Attachments 4 & 5). The walkthrough commenced in the compressor building. The following conditions were observed at the compressor engines during the inspection:

Engine	Pre CatOx Inlet Temp °F	Engine RPM	1st Stage Suction Pressure (psi)
1	976	1379	160
2	916	1400	135
3	940 ²	1372	140
4 ³	964	1374	150
5	873	1375	160
6	972	1378	180
7	952	1381	150
8	927	1373	160
9	941	1374	125
10	892	1375	130

¹ Williams personnel also had a GF320 FLIR camera during the walkthrough and confirmed all leaks observed by EPA with their own FLIR camera.

² The oxidation catalyst outlet was reading 140°F indicating a possible thermocouple malfunction.

³ Gas from the heater treater is sent to the inlet of Engines 4 & 5 for combustion.

11	899	1350	115
12	980	1377	130

All of the engines were operating during the inspection. Williams stated that 16 wellpads in the surrounding area supply natural gas and liquids this site. There can be multiple wells on a single pad. During the inspection, the Sand Hill CF was receiving approximately 97MMscf/day of gas. In 2023, the Facility produced 15,000 bbl of produced water and 55,000 bbl of condensate.

The EPA inspection team walked past the inlet separator and heater treater. The inspection team then proceeded to the Capstone 600C microturbine generator. This unit is used to produce the power for the site. There is no backup utility power to operate the Facility. The unit combusts natural gas and does not have any inherent emission controls⁴.

The EPA inspection team then observed the contactor towers for the three glycol dehydrators. All three towers were observed to be 100°F and were operating during the inspection. The following conditions were observed at the glycol dehydrator reboiler skids:

Dehydrator	Glycol Recirculation Rate (gpm)	Dehydrator Throughput (MMscf/day)
A	3.8	33
B	4.45	32
C	3.6	33

EPA observed that the glycol dehydrators use electric pumps to circulate glycol with Kimray gas pumps as backups. The Kimray pumps were not operating during the inspection.

The inspection team then proceeded to the tank battery to observe the produced water and condensate storage tanks. There are six total tanks at the site (two produced water and four condensate). The tanks are manifolded together to collect vapors which are routed to the VRU for control. While in the field, Williams stated the VRUs turn on at 4"WC and 7"WC respectively. The VRUs were cycling on and off during the inspection. At one point, the pressure at both VRUs was observed to be 1"WC. EPA climbed on top of the tank battery to observe the pressure relief devices and thief hatches with the FLIR camera. The steady rain prevented a thorough inspection of the tanks. EPA observed the two carbon canisters used to control emissions during truck loading. Both produced water and condensate are loaded into tanker trucks and removed from the site.

The walkthrough at the Sand Hill CF ended and EPA indicated that the inspection would continue the next day. EPA exited the Facility at 3:35PM.

⁴ The manufacturer lists NOx emissions from this unit as <9ppmvd.

Buffalo CF:

The walkthrough commenced immediately after the opening meeting. The list of attendees is included in Attachment 2. EPA also utilized a digital camera for photographs and a GF320 FLIR infrared camera to observe emission sources (Attachments 4 & 5). The walkthrough commenced at the tank battery. EPA climbed the top of the battery to observe the top of the tanks. Using the FLIR camera, EPA observed emissions from the following sources:

Tank	Emission	Video File
105	Enardo Thief Hatch	MOV_0473
101	PW Tank bolt on Enardo Hatch	MOV_0474
106	Enardo Valve	MOV_0475
102	Enardo valve	MOV_0476
103	Enardo Valve	MOV_0477
104	Enardo Valve	MOV_0478
108	Thief Hatch and Enardo valve	MOV_0479

The EPA inspection team then observed the two VRU's used to capture vapors from the storage tanks. VRU A turned on at 0.149psi and off at 0.090psi. The tank pressure observed on the meter was 0.131psi.

Prior to entering the compressor building, EPA observed the compressor engine ESD stacks for each engine with the FLIR camera. The ESD stack for Engine 9 was observed with the FLIR venting to the atmosphere (MOV_0480). Williams indicated that this valve should not vent unless there is an ESD and it is not seated properly. The ESD stacks for Engines 1 and 3 were also observed venting using the FLIR camera. EPA entered the compressor building and observed the following conditions at each engine:

Engine	Pre CatOx Inlet Temp °F	Engine RPM	1 st Stage Suction Pressure (psi)
1	877	1376	100
2	919	1352	110
3	933	1378	120
4	741	1352	110
5 ⁵	946	1376	120
6	881	1382	100
7	Not	Operating	
8	983	1379	100

⁵ EPA observed a leak with the FLIR camera at a compressor valve on the discharge side of the compressor (MOV_0481)

9	690	1375	110
10	948	1357	119
11	979	1373	100
12	950	1377	100

The EPA inspection team observed the natural gas inlet lines, two and three phase separators. These components are similar to the ones observed at the previous facilities. The flash gas compressors were also observed. Williams indicated that the flash gas compressors send gas to Engines 4, 5, 6, and 7. The Buffalo CF utilizes a microturbine to generate power for the site. The Buffalo CF not powered using utility power. The two glycol contactor towers were also observed. Tower V514 was operating at 92°F and Tower 511 was operating at 100°F. Both reboilers were observed operating during the inspection. Both glycol dehydrators use electric glycol circulation pumps with Kimray gas pumps as backups. The glycol recirculation rate on the two dehydrators was 5.98 gal/min and 6.35 gal/min.

The walkthrough at the Buffalo CF ended at 2:53PM on March 27, 2024.

IV. Records Review

Due to lack of meeting space at the sites, records review was not conducted onsite. A records request was sent to Jeff Steeber on March 22, 2024, and is included as Attachment 6. The records requested were provided by Williams on April 19, 2024, via a secure file sharing site. The records are currently being reviewed for completeness.

V. Closing Conference

After the walkthrough at the Buffalo CF, EPA inspectors, Williams representatives and 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 report 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 in 60 days, with a copy to the State. Simultaneously, EPA will perform a detailed review of records and may have additional questions. The inspection concluded at 3:07PM.

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 Williams.

- EPA observed multiple leaks at storage tanks using the FLIR camera. The settings on the Enardo valves appear to be 16 psi and vapors from the tanks are routed to VRUs at all three sites. Proper design and operation of the vapor control system (piping from tanks and VRUs) should result in no emissions from the storage vessels. The design at all three sites is almost identical,

with the exception of the number of vessels in the tank battery, and the lack of emission observations at the Battle Run and Sand Hill CFs is most likely due to rain that was present on that day of the inspection.

- EPA observed emissions from three ESD stacks for compressor engines at the Buffalo CF using the FLIR camera. These stacks should not leak during normal operation. Williams also observed the emissions with their FLIR camera and indicated that they would contact their contractor to make necessary repairs.
- EPA will review the date of construction for each of the sites to determine the applicability of NSPS OOOO versus NSPS OOOOa. Williams has claimed that some of the sites are subject to NSPS OOOO and other NSPS OOOOa. The date of the LDAR monitoring is also dependent on the startup date of the facility.

VI. List of Attachments

- Attachment 1: List of Facilities Inspected
- Attachment 2: List of Attendees for 3/26-27/2024
- Attachment 3: Email to Jeff Steeber confirming the Inspection
- Attachment 4: Photographs taken during the Inspection
- Attachment 5: FLIR Video Log
- Attachment 6: Records Requested