



**west virginia** department of environmental protection

Division of Air Quality  
601 57<sup>th</sup> 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](http://www.dep.wv.gov)

**GENERAL PERMIT REGISTRATION APPLICATION  
ENGINEERING EVALUATION / FACT SHEET**

BACKGROUND INFORMATION

Registration No.: G35-A107B  
Plant ID No.: 033-00187  
Applicant: MK Midstream Holdings, LLC  
Facility Name: PDC West Compressor  
Location: Clarksburg, Harrison County  
SIC Code: 1311  
Application Type: Modification  
Received Date: September 29, 2015  
Engineer Assigned: Roy F. Kees, P.E.  
Fee Amount: \$1,500  
Date Received: October 1, 2015  
Complete Date: November 2, 2015  
Due Date: December 17, 2015  
Applicant Ad Date: September 26, 2015  
Newspaper: *The Exponent Telegram*  
UTM's: Easting: 551.408 km      Northing: 4347.731 km      Zone: 17  
Description: Addition of two (2) new compressor engines and removal of two (2) compressor engines that were not installed with the previous modification.

TYPE OF PROCESS

The following process description was taken from Registration Application G35-A107B:

Pipeline quality natural gas is supplied to four (4) Caterpillar G3516ULB internal combustion engines (1380 hp @ 1400 rpm each) all with Model DC-65 Oxidation Catalysts, one (1) Caterpillar G3608TALE (2370 hp @ 1000 rpm) with EMIT oxidation catalyst, and one (1) Caterpillar G3606TALE (1775 hp @ 1000 rpm) with DCL Model DC-64 oxidation catalyst, all for emission reductions. The engines drive compressors to move the natural gas through a pipeline into two (2) 45.0 mmscfd TEG dehydrators for drying gas below 7.0 lbs/mmscfd of water content and eventually sell the dried clean natural gas into a sales line that has a higher pressure than the wells can produce on their own.

The engine burns the dried hot natural gas from the discharge of the dehydrator and products of combustion are exhausted through an exhaust line and into a Hospital Grade muffler/silencer through a tailpipe and into the atmosphere.

The TEG dehydrators are used to remove water which is entrained in the gas stream. The reboiler heats the glycol to a certain temperature and a pump pushes the glycol up through a tower that also has natural gas flowing through it and absorption tray vessel (tower) strips out the water and it is dropped out of gas stream and piped to a waste tank. The reboiler has a stack on it and the only real pollutant that is measurable is VOC or non-methane hydrocarbons from the still column. NOx and CO are the product of combustion of natural gas through the burner and are vented to the atmosphere through the fire tube.

Most of the lube oils from the compressor are entrained in the gas stream, but what is caught in a coalescent filter is piped to a waste tank and hauled away and disposed properly. The engine oil and filters that must be used to keep the engines running and in good condition is piped to the same take that has a containment dike around it for accidental spills. This is drained periodically and disposed of properly.

#### SITE INSPECTION

A site inspection was not deemed necessary by the writer at this time due to this being an existing compressor station.

Directions as given in the permit application are as follows:

*I-79 to Route 50 West out of Clarksburg, WV. Follow Route 50W for approximately 3.5 miles to Old Route 50, left or south onto Davisson Run Road. Compressor site is 1/4 mile on the right of Davisson Run Road.*

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Maximum controlled point source emissions from PDC's natural gas compressor station are summarized in the table below. The calculations were derived from manufacturer data as well as AP-42 and were found to be accurate by the writer

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
CE-1R	Caterpillar G3516B 1,380 bhp (Existing)	Nitrogen Oxides	1.52	6.66
		Carbon Monoxide	0.52	2.26
		Volatile Organic Compounds	0.73	3.20
		Sulfur Dioxide	<0.01	0.03
		Particulate Matter-10	0.09	0.40
		Formaldehyde	0.32	1.41
CE-2R	Caterpillar G3516B 1,380 bhp (Existing)	Nitrogen Oxides	1.52	6.66
		Carbon Monoxide	0.52	2.26
		Volatile Organic Compounds	0.73	3.20
		Sulfur Dioxide	<0.01	0.03
		Particulate Matter-10	0.09	0.40
		Formaldehyde	0.32	1.41
CE-3R	Caterpillar G3516B 1,380 bhp (Existing)	Nitrogen Oxides	1.52	6.66
		Carbon Monoxide	0.52	2.26
		Volatile Organic Compounds	0.73	3.20
		Sulfur Dioxide	<0.01	0.03
		Particulate Matter-10	0.09	0.40
		Formaldehyde	0.32	1.41
CE-4R	Caterpillar G3516B 1,380 bhp (Existing)	Nitrogen Oxides	1.52	6.66
		Carbon Monoxide	0.52	2.26
		Volatile Organic Compounds	0.73	3.20
		Sulfur Dioxide	<0.01	0.03
		Particulate Matter-10	0.09	0.40
		Formaldehyde	0.32	1.41
CE-5R	Caterpillar G3608TALE 2,370 bhp (New)	Nitrogen Oxides	2.61	6.66
		Carbon Monoxide	1.00	4.39
		Volatile Organic Compounds	1.65	7.21
		Sulfur Dioxide	0.01	0.05
		Particulate Matter-10	0.18	0.78
		Formaldehyde	0.68	2.98
CE-6R	Caterpillar G3606TALE 1,775 bhp (New)	Nitrogen Oxides	1.96	8.57
		Carbon Monoxide	0.75	3.29
		Volatile Organic Compounds	1.23	5.40
		Sulfur Dioxide	0.01	0.04
		Particulate Matter-10	0.13	0.58
		Formaldehyde	0.51	2.23

RSV-1	Dehy Still Vent 31 mmscf/day	Volatile Organic Compounds	0.21	0.89
		Benzene	<0.01	<0.01
		Ethylbenzene	<0.01	<0.01
		Toluene	<0.01	<0.01
		Xylenes	<0.01	<0.01
		n-Hexane	<0.01	<0.01
RBV-1	Reboiler 1.0 mmBtu/hr	Nitrogen Oxides	0.10	0.43
		Carbon Monoxide	0.08	0.36
		Volatile Organic Compounds	<0.01	0.02
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter-10	0.01	0.03
RSV-2	Dehy Still Vent 45 mmscf/day	Volatile Organic Compounds	0.21	0.89
		Benzene	<0.01	<0.01
		Ethylbenzene	<0.01	<0.01
		Toluene	<0.01	<0.01
		Xylenes	<0.01	<0.01
		n-Hexane	<0.01	<0.01
RBV-2	Reboiler 1.0 mmBtu/hr	Nitrogen Oxides	0.10	0.43
		Carbon Monoxide	0.08	0.36
		Volatile Organic Compounds	<0.01	0.02
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter-10	0.01	0.03
TK-1	Storage Tank	Volatile Organic Compounds	0.02	0.10
		Total HAPs	<0.01	0.01
TK-2	Catch Tank	Volatile Organic Compounds	0.01	0.02
		Total HAPs	<0.01	<0.01

The total facility PTE for the PDC West Compressor Station is shown in the following table:

Pollutant	Proposed Facility Wide PTE (tons/year)
Nitrogen Oxides	47.51
Carbon Monoxide	17.48
Volatile Organic Compounds	27.34
Particulate Matter-10/2.5	3.18
Sulfur Dioxide	0.21
Total HAPs	10.85

## REGULATORY APPLICABILITY

The following rules apply to the facility:

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

The permittee is subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

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

45CSR4 states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable. No odors have been deemed objectionable.

### **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)**

45CSR13 applies to this source due to the fact that MK Midstream is defined as a “stationary source” under 45CSR13 Section 2.24.b, which states that an owner or operator discharges or has the potential to discharge more than six (6) pounds per hour and ten (10) tons per year, or has the potential to discharge more than 144 pounds per calendar day of any regulated air pollutant. MK Midstream’s uncontrolled NO<sub>x</sub> emissions exceed 45CSR13 permit thresholds. MK Midstream has published the required Class I legal advertisement notifying the public of their permit application, and paid the appropriate application fee (Class II General Permit) and NSPS Fee. The Class I legal advertisement was published on September 26, 2015 in *The Exponent Telegram*.

### **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 that rule below.

### **45CSR22 (Air Quality Management Fee Program)**

MK Miidstream is not subject to 45CSR30. The PDC West 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.

MK 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 four (4) 1380 hp Caterpillar G3516B RICE (CE-1R – CE-4R), one (1) 2,370 hp Caterpillar G3608 TALE (CE-5R) and one (1) 1,775 hp Caterpillar G3606 TALE (CE-6R) were all manufactured after the July 1, 2010 date for engines with a maximum rated power capacity greater than 500 hp.

The proposed engines will be subject to the following emission limits: NO<sub>x</sub> – 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 and catalysts, the emission standards will be met.

The proposed engines are not certified by the manufacturer to meet the emission standards listed in 40CFR60 Subpart JJJJ. Therefore, MK 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)

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 (SO<sub>2</sub>) 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 drilled after August 23, 2011. 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 PDC West 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 six reciprocating internal combustion engine located at the PDC West Compressor Station that were constructed after August 23, 2011. Therefore, the requirements regarding reciprocating compressors under 40 CFR 60 Subpart OOOO will apply.*

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 were constructed after the applicability date of August 23, 2011. Therefore, there are applicable pneumatic controllers which commenced construction after August 23, 2011. Therefore, all requirements regarding pneumatic controllers under 40 CFR 60 Subpart OOOO would 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 vessel located at the PDC West Compressor Station will not have the potential to emit more than 6.0 tpy of VOC uncontrolled, therefore, MK will not be required to install a control device.*

- 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 PDC West 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 (H<sub>2</sub>S) 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 PDC West Compressor Station. Therefore, all requirements regarding sweetening units under 40 CFR 60 Subpart OOOO would not apply.*

**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 engine (5S) at the Lumberport Compressor Station is 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 engines meet these standards.

Because this engines will not be certified by the manufacturer, MK 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 PDC West Compressor Station is located in Harrison County, which is an attainment county for all criteria pollutants, therefore the PDC West Compressor Station is not applicable to 45CSR19.

As shown in the table below, MK is not subject to 45CSR14 or 45CSR19 review.

<b>Pollutant</b>	<b>PSD (45CSR14) Threshold (tpy)</b>	<b>NANSR (45CSR19) Threshold (tpy)</b>	<b>PDC West PTE (tpy)</b>	<b>45CSR14 or 45CSR19 Review Required?</b>
Carbon Monoxide	250	NA	17.48	No
Nitrogen Oxides	250	NA	47.51	No
Sulfur Dioxide	250	NA	0.21	No
Particulate Matter 2.5	250	NA	3.18	No
Ozone (VOC)	250	NA	27.34	No

**45CSR30** (Requirements for Operating Permits)

MK is not subject to 45CSR30. The PDC West 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 tank that MK has proposed to install 15.90 cubic meters. Therefore, MK 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 PDC West Compressor Station is not a natural gas processing facility, therefore, MK 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).

**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 PDC West Facility 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.

**TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS**

There will be small amounts of various non-criteria regulated pollutants emitted from the combustion of natural gas. However, due to the concentrations emitted, detailed toxicological information is not included in this evaluation.

**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) as seen in the table listed in the Regulatory Discussion Section.

## MONITORING OF OPERATIONS

1. Monitor and record quantity of natural gas consumed in each reboiler and compressor.
2. Monitor opacity from all fuel burning units.
3. Monitor the quantity of wet natural gas processed through the dehydration units.
4. Monitor the quantity of liquids produced and sent to the tank.

MK will be required to perform the following recordkeeping associated with this modification application:

1. Maintain records of the amount of natural gas consumed in each compressor and reboiler.
2. 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
3. Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
4. Maintain records of the visible emission opacity tests conducted per the permit.
5. Maintain records of liquids produced, stored and loaded into trucks.
5. 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.
6. The records shall be maintained on site or in a readily available off-site location maintained by MK for a period of five (5) years.

## RECOMMENDATION TO DIRECTOR

PDC's request to modify a natural gas compressor station at the Clarksburg, Harrison County, WV site meets the requirements of General Permit G35-A and all applicable rules and regulations and therefore should be granted a General Permit Registration to construct and operate the said facility.

  
\_\_\_\_\_  
Roy F. Kees, P.E.  
Engineer – NSR Permitting

11/17/15  
\_\_\_\_\_  
Date