

To: File
From: John Legg
Date: 11/10/14



Subj: Class II Administrative Update to R13-2978B
Chesapeake Appalachia, L.L.C (Chesapeake)
Linda Greathouse Pad, Bethany, Brooke County, WV
Plant ID No.: 009-00103; Permit No.: R13-2978C

Chesapeake submitted this class II administrative update on September 5, 2014. On September 11, 2014, the \$1,300.00 application fee was paid and the writer was assigned to the update. On September 22, 2014, the DAQ received the legal advertisement's original affidavit of publication (from the *Intelligencer*, Wheeling, WV). Chesapeake proposes to:

- Replace: The existing permitted 145 hp Caterpillar G3306 NA flash gas compressor engine (EU-ENG1)
- With: A EPA certified 23.6 hp Kubota DG972-E2 flash gas compressor Engine (EU-ENG2).

Chesapeake also re-calculated the following emissions to reflect the lower projected condensate and produced water throughputs:

- Condensate and produced water storage tanks emissions
- Condensate and produced water truck loading emissions
- Vapor combustor emissions
- Fugitive haul road emissions emissions

Process Description

This update replaces the 145 hp flash gas compressor engine with a 23.6 hp engine.

Since the process will/does not change significantly, the following process description is provided for informational purposes only. A less precise version can be found in Attachment G, page 13 of the permit update:

The facility is an oil and natural gas exploration and production facility, responsible for the production of condensate and natural gas. Storage of condensate and produced water occur on-site. A description of the facility process is as follows:

Condensate, gas and water come from the wellhead(s) to the production unit, where the first stage of separation occurs. Fluids (condensate and produced water) will be sent to the heater treater. The flash from the heater treater is captured via natural gas-

fired engine-driven flash gas compressor. Produced water from the heater treater flows into the produced water storage tanks. Condensate flows into the low-pressure tower(s). Flash gases from the low-pressure tower(s) are routed via hard-piping (with 100% capture efficiency) to the inlet of the flash gas compressor to be compressed. Condensate flows to the condensate storage tanks. The natural gas stream will exit the facility for transmission via pipeline. Condensate and produced water are transported offsite via truck. Loading emissions will be controlled via vapor return, which has at least 70% capture efficiency, and will be routed to the vapor combustor for at least 98% destruction efficiency. Working, breathing and flashing vapors from the condensate and produced water storage tanks will be routed to the vapor combustor for at least 98% combustion efficiency. The vapor combustor has two (2) natural gas-fired pilots to ensure a constant flame for combustion.

Table 1: Emission Units Table (Attachment I in Application)
(Changes High-lighted in Red)

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/ Modified	Design Capacity	Control Device
EU-ENG1	EP-ENG1	Caterpillar G3306 NA Engine	2013	145 hp	NSCR
EU-ENG2	EP-ENG2	Kubota DG972-E2 Engine	2014	23.6 hp	N/A
*EU-GPU1	EP-GPU1	GPU Burner	2013	1.0 MMBTU/hr	None
*EU-HT1	EP-HT1	Heater Treater	2013	0.50 MMBTU/hr	None
*EU-LH1	EP-LH1	Line Heater	2013	1.5 MMBTU/hr	None
EU-TANKS-COND	EP-TANKS-COND	Three (3) Condensate Tanks	2013	400 bbl each	Vapor Combustor
EU-TANKS-PW	EP-TANKS-PW	Three (3) Produced Water Tanks	2013	400 bbl each	Vapor Combustor
EU-LOAD-COND	EP-LOAD-COND	Condensate Truck Loading	2013	6,132,000 1,916,250 gal/yr	Vapor Return/ Combustor
EU-LOAD-PW	EP-LOAD-PW	Produced Water Truck Loading	2013	6,132,000 1,533,000 gal/yr	Vapor Return/ Combustor
APC-COMB-TKLD	APC-COMB-TKLD	Vapor Combustor	2013	20.0 MMBTU/hr	NA
*EU-PILOTS	EP-PILOTS	Vapor Combustor Pilots	2013	100 scfh	NA
⁽¹⁾ EU-HR	EP-HR	Fugitive Haul Road Emissions	2013	N/A	NA

* Existing source not changed by this update, i.e., will remain as previously permitted.

(1) There are no emissions limits in the permit for fugitive haul road emissions.

Table 2: Control Devices (Changes High-lighted in Red)

Emission Unit	Pollutant	Control Device	Control Efficiency
EU-ENG1 Compressor Engine	Nitrogen Oxides	Non-Selective Catalytic Reduction (NSCR)	92.58 %
	Carbon Monoxide		85.15 %
EU-TANKS-COND, EU-TANKS-PW Storage Tanks	Volatile Organic Compounds	Vapor Combustor (APC-COMB-TKLD)	98.00 %
	Total HAPs		98.00 %
EU-LOAD-COND, EU-LOAD-PW Loadout Racks	Volatile Organic Compounds	Vapor Return/ Vapor Combustor	69.00 %

Table 3: Information on New, Natural Gas-fueled Flash Gas Compressor Engine (EU-ENG2)

Unit ID		EU-ENG2	
Manufacturer		Kubota Corporation	
Model		DG972-E2	
EPA Emission Regulation	Certification	Tier 2	Complies with EPA Tier 2 Emissions Regulations.
	Engine Family	EKBXS.9622HP	
	Certificate Number	EKBXS.9622HP-005	
	Emission Standards (g/kW-hr)	610 (CO) 8 (NMHC+NO _x)	
Type		Vertical 4-cycle Liquid Cooled Natural Gas	
Cylinders	Number of	3	
	Bore (in)	2.93	
	Stroke (in)	2.9	
	Displacement (cu. in)	58.7	
Fuel		Natural Gas	
Design Class		4S-RB	4 stroke rich burn

Table 3: Information on New, Natural Gas-fueled Flash Gas Compressor Engine (EU-ENG2)

Output: Net Intermittent	kW	17.6	@ Maximum Speed of 3,600 rpm
	hp	23.6	
	ps	23.9	
Fuel Use (Btu/kW-hr)		11,771	
Fuel Use (scfh)		229	
Annual Fuel Use (mmscf)		2.01	
Fuel Use (mm Btu/hr)		0.21	
Fuel Heating Value (Btu/scf)		905	
Serial Number		4EB 1558	
Manufacture Date		Model Year 2014	
Operating Hours		8,760	
Emissions Control Device		None	

Material Safety Data Sheets (MSDS)

No new chemicals were used because of this update. Therefore, no new MSDS were included in Chesapeake's application.

Aggregation Analysis

This facility is an existing facility with a permit that has been modified two times prior to this update. The changes made under this update do not impact/affect the facility's aggregation analysis. Chesapeake did not included an aggregation analysis in the application.

Regulatory Discussion

The replacement of the flash gas compressor engine with a smaller horsepower engine required that section 5.0 (Engine, EP-ENG1) and section 10.0 (40CFR60 Subpart JJJJ Requirements, EP-ENG1) be revised.

Also, since the last time this facility was permitted (May 8, 2013), West Virginia took delegation (June 1, 2013) for area sources subject to 40CFR63, Subpart ZZZZ. Section 12.0 (40CFR63 Subpart ZZZZ Requirements, EP-ENG2) was added.

Only the rules related to the changes made under this update are discussed below. Please see previous engineering evaluations for a complete discussion of the rules applicable to this facility.

45 CSR 13 “Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission to Commence Construction, and Procedures for Evaluation”

Chesapeake’s Linda Greathouse Pad facility is a stationary source under Rule 13, Section 2.24.a. The facility, before this update, operated under R13-2978B. This update meets the requirements for a Class II Administrative Update. Chesapeake submitted an application, published a Class I legal advertisement to notify the public, and paid the appropriate application fee.

The changes made the permit (sections 1, 2, 5, 9, 10 and 12) are detailed in the compare file which is attached at the end of this evaluation.

45CSR16 “Standards of Performance for New Stationary Sources”

This rule establishes and adopts standards of performance for new stationary sources promulgated by the United States Environmental Protection Agency pursuant to section 111(b) of the federal Clean Air Act, as amended. This rule codifies general procedures and criteria to implement the standards of performance for new stationary sources set forth in 40 CFR Part 60. The Secretary hereby adopts these standards by reference. The Secretary also adopts associated reference methods, performance specifications and other test methods which are appended to these standards.

40CFR60

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

The replacement flash gas compressor engine (EP-ENG2) was manufactured in 2014, and like the engine that was replaced, is subject to this rule. The changes made the permit (section 10) are detailed in the compare file which is attached at the end of this evaluation.

45 CSR 34 “Emission Standards for Hazardous Air Pollutants for Source Categories Pursuant to 40 CFR, Part 63”

This rule establishes and adopts a program of national emission standards for hazardous air pollutants (NESHAPS) and other regulatory requirements promulgated by the United States Environmental Protection Agency pursuant to 40 CFR Parts 61, 63 and section 112 of the federal Clean Air Act, as amended (CAA). This rule codifies general procedures and criteria to implement emission standards for stationary sources that emit (or have the potential to emit) one or more of the eight substances listed as hazardous air pollutants in 40 CFR §61.01(a), or one or more of the substances listed as hazardous air pollutants in section 112(b) of the CAA. The Secretary hereby adopts these standards by reference. The Secretary also adopts associated reference methods, performance specifications and other test methods which are appended to these standards.

40CFR63
Subpart ZZZZ

“Nation Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combust 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. The subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

The replacement engine (EP-ENG2) is subject to the area source requirements for non-emergency spark ignition engines.

For a new stationary RICE located at an area source of HAPs, the applicability requirement is to meet the standards of 40CFR60, Subpart JJJJ.

The changes made the permit (section 12) are detailed in the compare file which is attached at the end of this evaluation.

Site Inspection

No site inspection was conducted for this update. Chesapeake’s Linda Greathouse Pad facility is know to the WVDAQ. The last targeted full onsite inspection was conducted by Michael Wade, Compliance and Enforcement Inspector, Northern Panhandle Regional Office, on October 30, 2013. That inspection found the facility in compliance (Code 30).

UTM coordinates (per application, page 5, entry 12.E, F, and G):

Northing	4,450.48389	KM
Easting	533.43015	KM
Zone	17T	

Latitude & Longitude Coordinates (per Chesapeake’s September 11, 2014 legal advertisement):

Latitude:	40.204092
Longitude	-80.60719

Directions (per application, entry 12A, page 5):

From the intersection of Route 2 and CR 1 (Short Creek Road/Airport Road) above the village of Clearview, WV, along the Ohio River, proceed east 0.60 mile to CR 2/2 (Girty’s Point Road) and turn left. Travel 2.55 miles to CR 28 (Huffs Run-Apple Pie Ridge) and turn left. Drive 0.65 mile to the stop sign and turn left to continue on CR 28 (Apple Pie Ridge Road). Drive 1.13 miles to CR 30 (Hukill Run Road) and turn right. The well pad access road will be 0.77 miles on right.

Facility Emissions

Summarized below are hourly, annual and net/delta changes in facility emissions resulting from changes proposed under Permit Update R13-2978C to Chesapeake’s Linda Greathouse Pad facility, Bethany, Brooke County, WV:

Table 4: Hourly, Annual and Delta Change in Emissions Resulting from Permit Update R13-2978C.						
Pollutant	Hourly Emissions (lb/hr)			Annual Emissions (TPY)		
	Before Update (R13-2978B)	After Update (R13-2978C)	Delta*	Before Update (R13-2978B)	After Update (R13-2978C)	⁽¹⁾ Advertised Delta*
NOx	3.43	3.42	-0.01	15.01	14.97	-0.04
CO	6.44	11.35	+4.91	28.19	49.70	+21.51
Total VOC	4.55	2.61	-1.94	19.89	11.41	-8.47
Total HAPs	0.38	0.19	-0.19	1.66	0.81	-0.85
SO2	<0.01	<0.01	0.00	0.01	0.01	0.00
PM Total	2.58	0.92	-1.66	8.57	3.16	-5.41
CO ₂ e	2,864.31	2,741.18	-123.13	12,546.17	12,006.82	-539.35
* + Delta = Emission Increase; - Delta = Emission Decrease.						
(1) Legal Advertisement Run by Chesapeake in the Intelligencer on September 11, 2014.						

Note that Table 4 includes fugitive VOC emission decreases from Truck Loading of Condensate and Produced Water amounting to approximately 1.71 lb/hr and 7.47 TPY.

Engine Emissions

Summarized below are hourly, annual and net/delta changes in emissions resulting from the engine changeout proposed under Permit Update R13-2978C to Chesapeake's Linda Greathouse Pad facility, Bethany, Brooke County, WV:

Table 5: Hourly, Annual and Delta Change in Emissions Resulting from Flash Gas Compressor Engine Replacement (Section 5.1.2 in R13-2978B and R13-2978C).						
Pollutant	Hourly Emissions (lb/hr)			Annual Emissions (TPY)		
	Old Engine (145 HP) (R13-2978B)	New Engine (23.5 HP) (R13-2978C)	Delta*	Old Engine (145 HP) (R13-2978B)	New Engine (23.5 HP) (R13-2978C)	Delta*
NOx	0.32	0.31	- 0.01	1.40	1.36	- 0.04
CO	0.64	5.55	4.91	2.80	24.31	22.51
VOC (includes Formaldehyde)	0.24	0.31	0.07	1.05	1.36	0.31
Formaldehyde	0.02	< 0.01	-0.02	0.09	0.02	-0.07
* + Delta = Emission Increase; - Delta = Emission Decrease.						

Vapor Combustor Emissions

Summarized below are hourly, annual and net/delta changes in Vapor Combustor (APC-COMB-TKLD) emissions resulting from lower projected condensate and produced water throughputs proposed under Permit Update R13-2978C to Chesapeake's Linda Greathouse Pad facility, Bethany, Brooke County, WV:

Table: Hourly, Annual and Delta Change in Vapor Combustor Emissions Resulting from Lower Projected Condensate and Produced Water Throughputs (Section 9.1.12 in R13-2978B and R13-2978C).						
Pollutant	Hourly Emissions (lb/hr)			Annual Emissions (TPY)		
	Old Engine (145 HP) (R13-2978B)	New Engine (23.5 HP) (R13-2978C)	Delta*	Old Engine (145 HP) (R13-2978B)	New Engine (23.5 HP) (R13-2978C)	Delta*
VOC	1.35	0.59	- 0.76	5.91	2.58	- 3.33
NOx	2.76	2.76	0.00	12.09	12.09	0.00
CO	5.51	5.51	0.00	24.13	24.13	0.00
PM ₁₀	0.06	0.06	0.00	0.26	0.26	0.00
* + Delta = Emission Increase; - Delta = Emission Decrease.						