



3/27/15

west virginia department of environmental protection

Division of Air Quality
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GENERAL PERMIT REGISTRATION APPLICATION
ENGINEERING EVALUATION / FACT SHEET

NON-CONFIDENTIAL
ENTIRE DOCUMENT

BACKGROUND INFORMATION

Registration No.: G60-C069
Plant ID No.: 051-000141
Applicant: Williams Ohio Valley Midstream LLC (Williams OVM)
Facility Name: Moundsville Natural Gas Liquids Fractionation Plant
Location: Moundsville, Marshall County
SIC Code: 1321 Natural Gas Liquids
NAICS Code: 211112 - Natural Gas Liquid Extraction
Application Type: Construction
Received Date: December 22, 2014
Engineer Assigned: John Legg
Fee Amount: \$1,500
Date Received: December 22, 2014
Complete Date: December 29, 2014 (Newspaper Affidavit Received)
Applicant Ad Date: December 17, 2014
Newspaper: Moundsville Daily Echo (both times)
Permit Due Date: March 31, 2015
UTM's: Easting: 517.35 km Northing: 4,418.11 km Zone: 17S
Lat/Long: Latitude: 39.91291° Longitude: -80.79704°
Description: Installation of one (1), 49.2 bhp (36.7 kW) Kohler Model 25REZG generator/engine set fueled by propane. The generator will be used to supply power during an emergency and will be operated a maximum of 500 hr/yr.

On December 22, 2014, the Division of Air Quality (DAQ) received Williams OVM's G60-C general permit application for the construction of a 49.2 bhp, 36.7 kW, Kohler Model 25REZG propane-fired engine/generator set to be used to provide temporary power to the Williams OVM Moundsville fractionation plant located near Moundsville, Marshall County, WV facility. Williams OVM paid their \$1,500.00 application fee on December 22, 2014. Their Class I legal advertisement ran in Moundsville Daily Echo on December 17, 2014. The original legal affidavit of publication for the newspaper advertisement was received at the DAQ on December 29, 2014. On February 26, 2015 Williams OVM re-ran their legal advertisement because of a calculation error that caused NOx

and CO emission to be under-estimated. Under this general registration (G60-C069), the generator/engine will be allowed to operation the customary maximum 500 hours per year.

DESCRIPTION OF PROCESS

The following information is provided in Attachment B of the permit application:

Williams OVM owns and operates the Moundsville Fractionation Plant (Frac) located along WV Route 2, West of Moundsville, in Marshall County. The facility fractionates raw Natural Gas Liquids (NGLs) through a series of distillation processes (de-propanizers and de-butanizers) to generate three products: propane, mixed butanes, and heavier organic liquids identified as natural gasoline. Total plant capacity is 42,500 bbl/day of NGL.

An emergency generator will be installed for the purpose of supplying power to allow key systems to continue to operate without interruption during times of utility power outages.

Table 1: Information on Williams OVM's Emergency Propane-fired Generator Engine (EG-1) located near Moundsville, Marshall County, WV.

Emergency Generator Engine (EmGen)	
Source ID No.	6S
Manufacturer	Kohler Power Systems Generator Model Vortex 3.0L Engine Engine Family
Manufacturer's Rated bhp/rpm	49.2/1800
Source Status	New Source
Engine Manufactured	November 2012
Installation Date	To Be Determined/February 15, 2015
Engine Type	Rich Burn Four Stroke (RB4S)
Air Pollution Control Device	---
Fuel Type	Propane
H ₂ S (gr/100 scf)	< 0.25
Operating bhp/rpm	49.2 bhp /1800 rpm
Brake Specific Fuel Consumption (BSFC) (Btu/bhp-hr)	8,660
	0.426 MM Btu/hr
Fuel Type	Propane

Table 1: Information on Williams OVM's Emergency Propane-fired Generator Engine (EG-1) located near Moundsville, Marshall County, WV.

Emergency Generator Engine (EmGen)	
LPG Conversion Factor (1.0 gal =? ft ³)	36.39
Fuel Firing Rate @ full load (ft ³ /hr)	184
Fuel Firing Rate @ full load (gal/hr)	5.06
Fuel Use @ 500 hr/yr, (MM ft ³ /yr)	0.092
Fuel Use @ 500 hr/yr, (gal/yr)	2,528
Operating Hours	≤ 500 hr/yr
Fuel Value for Propane (Btu/ft ³) (from literature)	2,516 Btu/ft ³
Design Heat Input to Generator	0.426 MM Btu/hr

The generator set is powered/fueled by propane. Based on the writer's experiences: propane tanks are pressurized tanks and do not have emissions. The application did not contain information on propane storage tank(s).

RE-RUN LEGAL ADVERTISEMENT

On February 10, 2015, the writer discovered that Williams OVM had calculated NO_x and CO emissions incorrectly, resulting in the Company having to re-run their legal advertisement:

Emission Unit	Pollutant	⁽¹⁾ Emission Factor (g/bhp-hr)	Maximum Emissions	
			(lb/hr)	(tpy)
EG-1 (6S) Kohler 25REZG, Rich Burn Four Stroke, Liquid Propane Gas (49.2 HP; 36.7 kW)	Nitrogen Oxides (NO _x)	10	0.66 1.08	0.16 0.27
	Carbon Monoxide (CO)	387	25.53 41.98	6.38 10.49

(1) Emission factors from NSPS Subpart JJJJ, Table 1.

SITE INSPECTION

A site inspection was deemed unnecessary by the writer. The facility is already on the DAQ Enforcement's regular inspection list of sources. Directions as given in the permit application are as follows:

Attachment J

Legal Advertisement: The existing Moundsville Natural Gas Liquids Fractionation Plant located at 200 Caiman Road, approximately 2.0 miles West-Southwest of Moundsville in Marshall County, West Virginia.

Application for
General Permit Registration,
Section 1, 14.A: From Moundsville, take State WV-2/Lafayette Ave South, then West, approximately 2 miles. Site is on the right, at the site of the former Olin Facility in Round Bottom.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Low levels of toxic non-criteria regulated pollutants are emitted from the combustion of propane gas in the generator engine. Formaldehyde is estimated to be the non-criteria pollutant emitted in the greatest quantity. Annual formaldehyde emissions based on emission factors from burning natural gas (propane factors emission not available) and on operating the generator engine 500 hours per year are estimated to equal 5 lb/yr. The following information is given on Formaldehyde.

Formaldehyde, a colorless, pungent-smelling gas, can cause watery eyes, burning sensations in the eyes and throat, nausea, and difficulty in breathing in some humans exposed at elevated levels (above 0.1 parts per million). High concentrations may trigger attacks in people with asthma. There is evidence that some people can develop a sensitivity to formaldehyde. It has also been shown to cause cancer in animals and may cause cancer in humans. Health effects include eye, nose, and throat irritation; wheezing and coughing; fatigue; skin rash; severe allergic reactions. May cause cancer. May also cause other effects listed under "organic gases."

CLASS II GENERAL PERMIT G60-C

Eligibility

The requirements and conditions of the G60-C general permit address the prevention and control of regulated pollutant emissions from emergency generators, including emergency generators installed at Title V (major) facilities and other facilities having additional point sources of emissions. The G60-C Emergency Generator General Permit benefits the regulated community by incorporating all air quality regulations into a single general permit. General Permit G60-C was issued May 21, 2009.

The proposed permitting of the emergency generator is eligible for a G60-C General Permit registration, i.e., it does meet the five (5) conditions given in 2.31 of G60-C and given below:

- a. The emergency generator(s) is not a major source as defined in 45CSR14, 45CSR19 or 45CSR30;
- b. The emergency generator(s) is not subject to 45CSR14, 45CSR15, 45CSR19, 45CSR25, 45CSR 27, or 45CSR34;
- c. Each emergency generator is to be operated 500 hours per year or less;
- d. The emergency generator(s) is not located in, nor will it (they) significantly impact, an area which has been determined to be a nonattainment area;
- e. The emergency generator(s) does not require an individual air quality permit review process and/or individual permit provisions to address the emission of a regulated pollutant or to incorporate regulatory requirements other than those established by General Permit G60-C.

Applicable Sections

All registered facilities under the Class II General Permit G60-C are subject to Sections 1.0, 2.0, 3.0, and 4.0. This is stated at the top of page 3 in the general permit registration for G60-C069.

The generator engine is a Reciprocating Internal Combustion Engine (R.I.C.E.) and therefore is subject to Section 5 of the Class II General Permit C60-C. The Section 5 box located at the top of page 3 in the general permit registration is "Xed."

The generator engine will burn propane gas. Based on the writer's experience: Propane storage tank(s) store propane as a liquid under pressure and are not considered emission sources. The Section 6 box located at the top of page 3 in the general permit registration is not "Xed."

The generator engine is not subject to 40CFR60 Subpart IIII entitled "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." For For that Reason the Section 7 box at the top of page 3 in the general permit registration is not "Xed."

The generator engine is subject to 40 CFR 60, Subpart JJJJ entitled "Standards of Performance for Stationary Spark Ignition Internal Combustion Engines." For that Reason, the Section 8 box at the top of page 3 in the general permit registration is "Xed."

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Maximum controlled emissions from Williams's emergency generator engine are summarized below. The G60-C069 registration limits the facility to 500 hours per year of operation.

Emission Unit ID	Pollutant	Emission Factor		Maximum Emissions	
		(lb/MM Btu)	(g/bhp-hr)	(lb/hr)	(tpy) ⁽³⁾
EmGen (6S)	Nitrogen Oxide (NOx)	---	10 ⁽¹⁾	1.08	0.27
	Carbon Monoxide (CO)	---	387 ⁽¹⁾	41.98	10.49
	Volatile Organic Compounds (VOC)	0.0778 ⁽²⁾⁽⁵⁾	0.33	0.04	0.01
	Sulfur Dioxide (SO ₂)	0.000588 ⁽²⁾	0.0025	0.00027	0.000068
	PM ₁₀ / PM _{2.5}	0.01941 ⁽²⁾⁽⁴⁾	0.08	0.01	0.0022
	Total HAP	0.0330 ⁽²⁾⁽⁶⁾	0.14	0.01	0.0037

(1) Emission factor from NSPS JJJJ, Table 1.
(2) No available LPG Factors; Emission factors from U.S. EPA AP-42 Chapter 3.2 (07/2000) Natural Gas-fired 4-stroke Reciprocating Engines, Table 3.2-3 entitled "Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines". To convert emission factors in Table 3.2-3 from lb/MM Btu to lb/hr multiply by 0.426 MM Btu/hr.
(3) Based on operating the generator/engine a maximum of 500 hr/yr.
(4) PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5
(5) As per NSPS JJJJ: NMNEHC (non-methane/non-ethane hydrocarbon) does not include HCHO. VOC is the sum of NMNEHC and formaldehyde (HCHO).
(6) Total HAP includes, but not limited to HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acroienin, and MeOH (methanol).

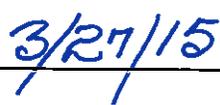
Only nitrogen oxide (NOx) and carbon monoxide (CO) limits were established in the permit registration. All other pollutants were less than 0.01 ton/yr.

RECOMMENDATION TO DIRECTOR

Williams OVM's request to construct and operate an emergency generator at their Moundsville, Marshall County, WV site meets the requirements of General Permit G60-C and all applicable rules and therefore Williams OVM should be granted said General Permit Registration G60-C069.



John Legg, Permit Writer

March 27, 2015 

Date

Table 3.2-3. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE RICH-BURN
 ENGINES^a
 (SCC 2-02-002-53)

Pollutant	Emission Factor (lb/MMBtu) ^b (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO _x ^c 90 - 105% Load	2.21 E+00	A
NO _x ^c <90% Load	2.27 E+00	C
CO ^c 90 - 105% Load	3.72 E+00	A
CO ^c <90% Load	3.51 E+00	C
CO ₂ ^d	1.10 E+02	A
SO ₂ ^e	5.88 E-04	A
TOC ^f	3.58 E-01	C
Methane ^g	2.30 E-01	C
VOC ^h	2.96 E-02	C
PM10 (filterable) ^{ij}	9.50 E-03	E
PM2.5 (filterable) ^j	9.50 E-03	E
PM Condensable ^k	9.91 E-03	E
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane ^l	2.53 E-05	C
1,1,2-Trichloroethane ^l	<1.53 E-05	E
1,1-Dichloroethane	<1.13 E-05	E
1,2-Dichloroethane	<1.13 E-05	E
1,2-Dichloropropane	<1.30 E-05	E
1,3-Butadiene ^l	6.63 E-04	D
1,3-Dichloropropene ^l	<1.27 E-05	E
Acetaldehyde ^{l,m}	2.79 E-03	C
Acrolein ^{l,m}	2.63 E-03	C
Benzene ^l	1.58 E-03	B
Butyr/isobutyraldehyde	4.86 E-05	D
Carbon Tetrachloride ^l	<1.77 E-05	E

Table 3.2-3. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE RICH-BURN ENGINES
(Concluded)

Pollutant	Emission Factor (lb/MMBtu) ^b (fuel input)	Emission Factor Rating
Chlorobenzene ¹	<1.29 E-05	E
Chloroform ¹	<1.37 E-05	E
Ethane ⁿ	7.04 E-02	C
Ethylbenzene ¹	<2.48 E-05	E
Ethylene Dibromide ¹	<2.13 E-05	E
Formaldehyde ^{1,m}	2.05 E-02	A
Methanol ¹	3.06 E-03	D
Methylene Chloride ¹	4.12 E-05	C
Naphthalene ¹	<9.71 E-05	E
PAH ¹	1.41 E-04	D
Styrene ¹	<1.19 E-05	E
Toluene ¹	5.58 E-04	A
Vinyl Chloride ¹	<7.18 E-06	E
Xylene ¹	1.95 E-04	A

^a Reference 7. Factors represent uncontrolled levels. For NO_x, CO, and PM-10, "uncontrolled" means no combustion or add-on controls; however, the factor may include turbocharged units. For all other pollutants, "uncontrolled" means no oxidation control; the data set may include units with control techniques used for NO_x control, such as PCC and SCR for lean burn engines, and PSC for rich burn engines. Factors are based on large population of engines. Factors are for engines at all loads, except as indicated. SCC = Source Classification Code. TOC = Total Organic Compounds. PM10 = Particulate Matter ≤ 10 microns (μm) aerodynamic diameter. A "<" sign in front of a factor means that the corresponding emission factor is based on one-half of the method detection limit.

^b Emission factors were calculated in units of (lb/MMBtu) based on procedures in EPA Method 19. To convert from (lb/MMBtu) to (lb/10⁶ scf), multiply by the heat content of the fuel. If the heat content is not available, use 1020 Btu/scf. To convert from (lb/MMBtu) to (lb/hp-hr) use the following equation:

$$\text{lb/hp-hr} = \text{lb/MMBtu} \cdot \text{heat input, MMBtu/hr} \cdot \text{1/operating HP, 1/hp}$$

^c Emission tests with unreported load conditions were not included in the data set.

^d Based on 99.5% conversion of the fuel carbon to CO₂. CO₂ [lb/MMBtu] = (3.67)(%CON)(C)(D)(1/h), where %CON = percent conversion of fuel carbon to CO₂,

- C = carbon content of fuel by weight (0.75), D = density of fuel, $4.1 \text{ E}+04 \text{ lb}/10^6 \text{ scf}$, and h = heating value of natural gas (assume 1020 Btu/scf at 60°F).
- ^e Based on 100% conversion of fuel sulfur to SO_2 . Assumes sulfur content in natural gas of $2,000 \text{ gr}/10^6 \text{ scf}$.
 - ^f Emission factor for TOC is based on measured emission levels from 6 source tests.
 - ^g Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor.
 - ^h VOC emission factor is based on the sum of the emission factors for all speciated organic compounds. Methane and ethane emissions were not measured for this engine category.
 - ⁱ No data were available for uncontrolled engines. PM10 emissions are for engines equipped with a PCC.
 - ^j Considered $\leq 1 \mu\text{m}$ in aerodynamic diameter. Therefore, for filterable PM emissions, $\text{PM}_{10}(\text{filterable}) = \text{PM}_{2.5}(\text{filterable})$.
 - ^k No data were available for condensable emissions. The presented emission factor reflects emissions from 4SLB engines.
 - ^l Hazardous Air Pollutant as defined by Section 112(b) of the Clean Air Act.
 - ^m For rich-burn engines, no interference is suspected in quantifying aldehyde emissions. The presented emission factors are based on FTIR and CARB 430 emissions data measurements.
 - ⁿ Ethane emission factor is determined by subtracting the VOC emission factor from the NMHC emission factor.