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**west virginia department of environmental protection**

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**ENGINEERING EVALUATION / FACT SHEET**

**BACKGROUND INFORMATION**

Registration No.: R13-3259  
Plant ID No.: 061-00220  
Applicant: West Virginia University (WVU)  
Facility Name: Downtown Campus  
Location: Morgantown, Monongalia County  
NAICS Code: 611310  
Application Type: Construction  
Received Date: July 20, 2015  
Engineer Assigned: William T. Rothwell II, P.E.  
Fee Amount: \$2,000.00  
Date Received: July 23, 2015  
Complete Date: August 20, 2015  
Applicant Ad Date: July 16, 2015  
Newspaper: *The Dominion Post*  
UTM's: Easting: 589.775 km Northing: 4387.757 km Zone: 17  
Description: WVU has applied for an after-the-fact permit for seven (7) emergency generators that were installed for the purpose of providing back-up electrical power for critical operating functions of on-campus structures. The operational dates for the generators vary and date back to 1987. The emergency generators will be operated no more than 500 hours per year and the facility will limit testing and maintenance use to 100 hours per engine per calendar year.

**BACKGROUND DISCUSSION**

A total of seven emergency generators have been installed and operated on the WVU campus since 1987. Diesel fueled emergency generators of various size were added over the course of the facilities development to provide backup emergency power for critical facility operations. The last emergency generator was installed in 2014. The following Table outlines the facility/generator configuration:

Table 1: Generator Locations

Generator #	Source Location	Size (kW)	Make/Model	Year
G2-D	Arnold Hall Apartments	150	Kohler / 150 ROZJ	1987
G5-D	Business and Economics Building	275	Onan / DFED-4961568	1990
G6-D	Charles C. Wise Jr. Library	500	Cummins / DFED-4961586	2001
G15-D	Life Sciences Building	1500	Kohler / 1500ROZD4	2001
G18-D	One Waterfront Place	500	Caterpillar / 3412	2001
G19-D	Stalnaker Hall	275	Onan / DFBF-58199F	1997
G24-D	University Place	450	Cummins / DFEJ	2014

### REGULATORY DISCUSSION

Six of the engines were manufactured prior to 2006 (Units G2-D, G-5D, G6-D, G15-D, G18-D and G19-D); thus, these engines would normally be governed under the U.S. EPA's National Emission Standards for Hazardous Pollutants ("NESHAP") as per 40CFR63 Subpart ZZZZ. However, WVU qualifies for Subpart ZZZZ's institutional exemption, therefore, the provisions do not apply to these affected sources. The remaining one engine (Unit G24-D) was manufactured in 2014; thus, this engine operates under EPA's New Source Performance Standard ("NSPS"). Engine G24-D is Tier II certified and will operate under 40CFR60 Subpart IIII.

The NSPS engines meet the requirements of the NESHAP by operating under the NSPS. Engines operating under the NESHAP cannot use the WV DEP's General Permit for Emergency Engines and therefore, must be registered through an individual Rule 13 Permit.

The facility will limit testing and maintenance use to 100 hours per engine per calendar year; thus, the engines will maintain their emergency status as per the NESHAP and NSPS regulations.

The NESHAP engines will comply with the following maintenance requirements:

- Operate/maintain engine & control device per manufacturer's instructions or owner-developed maintenance plan
- Change oil/filter and inspect hoses/belts every 500 hours or annually; inspect air cleaner (CI) or spark plugs (SI) every 1,000 hours or annually
- Emergency engines must have hour meter and record hours of operation
- Keep records of maintenance

Table 3 outlines the proposed equipment and control device information taken from permit application R13-3259:

Table 3: Equipment and Control Device Listing

Emission Unit ID	Emission Unit Description	Detail Make/Model/ Fuel	Year Installed/ Modified	Design Capacity
G2-D	Emergency Generator with integrated sub-base tank	Kohler/ 150 ROZJ / 2FO	1987	150 kW
G5-D	Emergency Generator with integrated sub-base tank	Onan / DFED-4961586 / 2FO	1990	275 kW
G6-D	Emergency Generator with integrated sub-base tank	Cummins / DFED-4961568 / 2FO	2001	500 kW
G15-D	Emergency Generator	Kohler/ 1500ROZJD4 / 2FO	2001	1500 kW
G18-D	Emergency Generator with integrated sub-base tank	Caterpillar / 3412 / 2FO	2001	500 kW
G19-D	Emergency Generator with integrated sub-base tank	Onan / DFBF-58199F / 2FO	1997	275 kW
G24-D	Emergency Generator with integrated sub-base tank	Cummins / DFEJ / 2FO	2014	450 kW
T01	Tank for G15-D	---	2001	2,000 gal.

### SITE INSPECTION

This is an application for seven (7) emergency generators installed for the purpose of allowing key systems to continue to operate without interruption during times of utility power outages. A site inspection was deemed unnecessary by the writer at this time, however, the facilities will be placed on the emergency generator list of sources from this permitting action.

Directions: Take the Star City/West Virginia University exit to get off I-79 (Exit 155). Follow US 19 South to the downtown, turn left onto Campus Drive, turn right onto University Drive. Mountainlair will be located on the left side of the road.

**ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER**

Emission estimates for criteria pollutants, hazardous and toxic pollutants were determined using emission factors from AP-42, 5<sup>th</sup> Edition, 1996 and Tier II limits where applicable. Emission estimates were calculated by the applicant and checked for accuracy and completeness by the writer.

WVU's proposed facility emergency generator installations and operations will result in the following estimated potential to discharge controlled emissions:

**Table 4: Emergency Generator Emission Summary - Criteria Pollutants**

Source ID No.	Potential Emissions (lbs/hr)					Potential Emissions (tons/yr) (500 hours)				
	NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	PM <sub>10</sub>	NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	PM <sub>10</sub>
G2-D	6.24	1.34	0.41	0.44	3.02	1.56	0.34	0.10	0.11	0.75
G5-D	7.31	0.75	0.46	0.08	0.15	1.83	0.19	0.12	0.02	0.04
G6-D	13.29	1.34	0.84	0.15	0.28	3.23	0.34	0.21	0.04	0.07
G15-D	48.28	11.06	16.27	1.41	1.42	12.07	2.77	4.07	0.35	0.36
G18-D	14.57	0.55	5.42	0.47	0.06	3.64	0.14	1.36	0.12	0.02
G19-D	8.85	0.49	0.50	0.41	0.15	2.21	0.12	0.13	0.10	0.04
G24-D	6.58	0.60	4.88	0.07	0.09	1.65	0.15	0.01	0.02	0.02
TOTAL	105.12	16.13	28.78	3.03	5.17	26.19	4.05	6	0.76	1.3

**Table 5: Total Facility Criteria Pollutant PTE Summary**

Pollutant	Facility Wide PTE (tons/year)
Nitrogen Oxides	26.19
Carbon Monoxide	4.05
Volatile Organic Compounds	6.00
Particulate Matter-10	13.00
Sulfur Dioxide	0.76
Formaldehyde	0.01

**Table 6: Emergency Generator Emission Summary - Hazardous/Toxic Pollutants**

Source	Potential Emissions (lbs/hr)						Potential Emissions (tons/yr)					
	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formaldehyde	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formaldehyde
G2-D	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01
G5-D	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01
G6-D	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01
G15-D	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01
G18-D	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01
G19-D	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01

Source	Potential Emissions (lbs/hr)						Potential Emissions (tons/yr)					
	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formaldehyde	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formaldehyde
G24-D	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01
TOT	0.010	0.000	0.010	0.010	0.000	0.010	0.010	0.000	0.010	0.010	0.000	0.010

## REGULATORY APPLICABILITY

PSD has no applicability to the proposed facility. The facility is subject to the following state and federal rules:

**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*

The proposed construction is subject to the requirements of 45CSR13 because there will be a potential to discharge controlled emissions in excess of 6 pph and 10 tpy of a regulated air pollutant. In addition, the proposed construction is ineligible for a General Permit and therefore requires a Rule 13 Permit to Construct. The applicant has submitted the \$2,000 application fee and published a Class I legal advertisement in *The Dominion Post* on July 16, 2015.

**45CSR30** *Requirements for Operating Permits*

Certain compression ignition internal combustion engines are subject to 40CFR60, Subpart III. In this case, the one (1) diesel engine (G24-D) is Tier II certified and subject to 40CFR60, Subpart III.

**45CFR60** *Subpart III—Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*

WVU is subject to this subpart because one (1) engine (unit G24-D) was manufactured after April 1, 2006. The engine emissions for this unit are EPA Tier II Certified.

## TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Formaldehyde is emitted from combustion of #2 diesel fuel at very low levels:

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."

AIR QUALITY IMPACT ANALYSIS

The installation and operation of the seven emergency generators at the downtown campus is not classified as a major source as defined by 45CSR14 (PSD). For this reason no air quality modeling was required.

MONITORING OF OPERATIONS

60 CFR 60 Subpart IIII sets specific monitoring and record-keeping requirements for limited use/emergency generator engines:

- Documenting the purpose for operating the engine and
- Performing regular, routine maintenance.

RECOMMENDATION TO DIRECTOR

The information contained in the permit application R13-3259 indicates that compliance with all applicable state rules and federal regulations should be achieved when all proposed control methods are in operation. Therefore, the granting of a permit to WVU for the installation and operation of seven (7) emergency generators at the Downtown Campus, Monongalia County, WV, is hereby recommended.



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William T. Rothwell II, P.E.  
Engineer

02/19/2016

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Date