



**west virginia department of environmental protection**

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**ENGINEERING EVALUATION / FACT SHEET**

BACKGROUND INFORMATION

Registration No.: R13-3228     *After-the-Fact*  
Plant ID No.: 033-00037  
Applicant: Highland/Clarksburg Hospital, Inc.  
Facility Name: Clarksburg  
Location: Clarksburg, Harrison County  
SIC Code: 8062 ; NAICS Code: 622110  
Application Type: Construction  
Received Date: December 18, 2014  
Engineer Assigned: Thornton E. Martin Jr.  
Fee Amount: \$3,500.00  
Date Received: December 19, 2014  
Complete Date: January 22, 2015  
Applicant Ad Date: December 24, 2014  
Newspaper: *The Exponent Telegram*  
UTM's: Easting: 554.23759 km     Northing: 4347.12176 km     Zone: 17  
Description: Highland/Clarksburg Hospital, Inc. has applied for a permit for three (3) emergency generators that were installed for the purpose of providing back-up electrical power for critical operating functions. Three (3) diesel fuel storage tanks are included in the application, one for each diesel generator.

BACKGROUND DISCUSSION

\_\_\_\_\_ The operational dates for two of the generators (350 kW and 450 kW) date back to calendar year 1974. One of the three generators (1,000 kW) was installed in 1990. The engines will be enrolled in the PJM Emergency Load Response Program. The emergency generators will be operated no more than 500 hours per year and the facility will limit testing/maintenance/emergency demand response (“DR”) use to 100 hours per engine per calendar year. The following Table outlines the facility/generator configuration:

Table 1: Generator Location

Source ID	Source Location	Size (kW)	Make/Model	Year
1S	Emergency Backup Generator #1 (West Wing)	350	Cummins/VT12-635-GS	1974
2S	Emergency Backup Generator #2 (OR/CS)	450	Cummins/VT12-800-GS	1974
3S	Emergency Backup Generator #3 (South Wing/North Tower)	1,000	Cummins/KTA50G1	1990

## REGULATORY DISCUSSION

The three engines were manufactured prior to 2006 (Units 1S, 2S and 3S); thus, these engines operate under the U.S. EPA’s National Emission Standards for Hazardous Pollutants (“NESHAP”) as per 40CFR63 Subpart ZZZZ. 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 as a synthetic minor.

In addition to emergency operations, testing and maintenance, the engines will also be enrolled in the PJM Emergency Load Response Program which meets the definition of emergency demand response (“DR”) in the NESHAP as per 63.6640(f)(2)(ii).

*Emergency stationary RICE may be operated for emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP-002-3, Capacity and Energy Emergencies (incorporated by reference, see §63.14), or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2 as defined in the NERC Reliability Standard EOP-002-3.*

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

Ultra low sulfur diesel (“ULSD”) is used as fuel; thus the requirement for sites with NESHAP engines enrolled in emergency DR programs for more than 15 hours per calendar year to start purchasing ULSD starting January 01, 2015 is met. Starting with calendar year 2015, the required emergency DR reporting as per 40CFR63.6650(h) will be made to U.S. EPA.

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
- May use oil analysis program instead of prescribed oil change frequency
- Emergency engines must have hour meter and record hours of operation

- Keep records of maintenance

Table 2 outlines the proposed equipment and control device information taken from permit application R13-3228:

Table 2: Equipment and Control Device Listing

Emission Unit ID	Emission Unit Description	Detail Make/Model Fuel/Throughput	Year Installed/ Modified	Design Capacity	Type <sup>3</sup> and Date of Change	Control Device
1S	Emergency Generator #1	Cummins/VT12-635-GS 2FO / 32.8 gph	1974	350 kW 550 bhp	After-the-Fact	None
2S	Emergency Generator #2	Cummins/VT12-800-GS 2FO / 35.9 gph	1974	450 kW 601 bhp	After-the-Fact	None
3S	Emergency Generator #3	Cummins/KTA50G1 2FO / 88.9 gph	1990	1,000 kW 1,490 bhp	After-the-Fact	None
T01	Located at Main Boiler Plant	Approx. 10,000 gpy Generators 2S, 3S	1974 or later	2,500 gal.	After-the-Fact	None
T02	Located at West Wing	Approx. 1,000 gpy Generator 1S	1974 or later	1,500 gal.	After-the-Fact	None
T03	Located at Main Boiler Plant	Approx. 25,000 gpy Boiler Backup	1974 or later	25,000 gal.	After-the-Fact	None

## SITE INSPECTION

This is an after-the-fact application for three (3) 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: From US Route 19 (Milford Street), take WV Route 98 (Davisson Run Road) to Hospital Drive, turn right onto Hospital Drive.

## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Engine horsepower for generators #1 and #2 (1S and 2S) were derived from internet searches and the nameplate for generator #3 (3S). Diesel fuel input estimated as 0.08 X Engine (kW). Emission estimates for criteria pollutants, hazardous and toxic pollutants were determined using emission factors from AP-42, 5<sup>th</sup> Edition, 1996. Estimated diesel heat input = gal/hr X 135,000 Btu/gal. Emission estimates were calculated by the applicants' consultant and checked for accuracy and completeness by the writer.

Highland-Clarksburg Hospital, Inc.’ proposed facility emergency generator installation and operation (*after-the-fact*) will result in the following estimated potential to discharge controlled emissions:

Table 3: Emergency Generator Emission Summary - Criteria Pollutants

Source ID No.	Potential Emissions (lbs/hr)					Potential Emissions (tons/yr)				
	NOx	CO	VOC	SO <sub>2</sub>	PM <sub>10</sub>	NOx	CO	VOC	SO <sub>2</sub>	PM <sub>10</sub>
1S	17.05	3.67	1.36	1.13	1.21	4.26	0.92	0.34	0.28	0.30
2S	14.42	3.31	0.42	0.07	0.42	3.61	0.83	0.11	0.02	0.11
3S	46.19	8.20	1.05	0.18	1.04	11.55	2.05	0.26	0.05	0.26
TOTAL	77.66	15.18	2.83	1.38	2.67	19.42	3.8	0.71	0.35	0.67

Table 4: 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
1S	0.0041	0	0.0018	0.0013	0	0.0052	0.0010	0	0.0005	0.0003	0	0.0013
2S	0.0037	0	0.0014	0.0009	0	0.0009	0.0009	0	0.0003	0.0002	0	0.00009
3S	0.0093	0	0.0034	0.0023	0	0.0009	0.0023	0	0.0008	0.0006	0	0.00024
TOT	0.017	0.000	0.007	0.005	0.000	0.007	0.004	0.000	0.002	0.001	0.000	0.002

## 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 \$3,500 application fee and published a Class I legal advertisement in *The Exponent Telegram* on December 24, 2014.

*45CSR30 Requirements for Operating Permits*

Certain compression ignition internal combustion engines are subject to 40CFR60, Subpart III, and therefore subject to 45CSR30 as a deferred source. In this case, the three (3) diesel engines (Units 1S, 2S and 3S) are not subject to 40CFR60, Subpart III because they were

manufactured prior to April 1, 2006. The generators will operate under the U.S. EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP) as per 40CFR63, Subpart ZZZZ and will participate in the PJM emergency demand response program which is an allowed use under Subpart ZZZZ for emergency generators. Engines operating under the NESHAP cannot use the WV DEPs' General Permit for Emergency Engines and therefore, must be registered through an individual Rule 13 Permit as a synthetic minor.

*40CFR63 Subpart ZZZZ—National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*

Highland-Clarksburg Hospital, Inc. is subject to 40CFR63 Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, because Units (1S, 2S and 3S) are considered an existing area source of HAP's since they were constructed before June 12, 2006.

The facility will not be subject to the following state and federal rules:

*45CSR14 Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration*

In accordance with 45CSR14 Major Source Determination, the emergency generators and facility is not listed in Table 1. The facility will have the potential to emit 24.96 TPY of regulated air pollutants and HAP's combined, which is less than the 45CSR14 threshold of 250 TPY.

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

Highland-Clarksburg Hospital, Inc. is not subject to this subpart because the three (3) engines (units 1S, 2S and 3S) were manufactured prior to April 1, 2006.

## TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

### *Acetaldehyde:*

Acetaldehyde is mainly used as an intermediate in the synthesis of other chemicals. It is ubiquitous in the environment and may be formed in the body from the breakdown of ethanol. Acute (short-term) exposure to acetaldehyde results in effects including irritation of the eyes, skin, and respiratory tract. Symptoms of chronic (long-term) intoxication of acetaldehyde resemble those of alcoholism. Acetaldehyde is considered a probable human carcinogen (Group B2) based on inadequate human cancer studies and animal studies that have shown nasal tumors in rats and laryngeal tumors in hamsters.

### *Benzene:*

Benzene is found in the air from emissions from burning coal and oil, gasoline service stations, and motor vehicle exhaust. Acute (short-term) inhalation exposure of humans to benzene may

cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic (long-term) inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidence of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. EPA has classified benzene as a Group A, human carcinogen.

#### *Ethyl Benzene:*

Ethyl benzene is mainly used in the manufacturing of styrene. Acute (short-term) exposure to ethyl benzene in humans results in respiratory effects, such as throat irritation and chest constriction, irritation of the eyes, and neurological effects, such as dizziness. Chronic (long-term) exposure to ethyl benzene by inhalation in humans has shown conflicting results regarding its effects on the blood. Animal studies have reported effects on the blood, liver, and kidneys from chronic inhalation exposure to ethyl benzene. Limited information is available on the carcinogenic effects of ethyl benzene in humans. In a study by the National Toxicology Program (NTP), exposure to ethyl benzene by inhalation resulted in an increased incidence of kidney and testicular tumors in rats, and lung and liver tumors in mice. EPA has classified ethyl benzene as a Group D, not classifiable as to human carcinogenicity.

#### *Formaldehyde:*

Formaldehyde is used mainly to produce resins used in particle board products and as an intermediate in the synthesis of other chemicals. Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute (short-term) and chronic (long-term) inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. EPA considers formaldehyde a probable human carcinogen (Group B1).

#### *Toluene:*

The acute toxicity of toluene is low. Toluene may cause eye, skin, and respiratory tract irritation. Short-term exposure to high concentrations of toluene (e.g., 600 ppm) may produce fatigue, dizziness, headaches, loss of coordination, nausea, and stupor; 10,000 ppm may cause death from respiratory failure. Ingestion of toluene may cause nausea and vomiting and central nervous system depression. Contact of liquid toluene with the eyes causes temporary irritation. Toluene is a skin irritant and may cause redness and pain when trapped beneath clothing or shoes; prolonged or repeated contact with toluene may result in dry and cracked skin. Because of its odor and irritant effects, toluene is regarded as having good warning properties. The chronic effects of exposure to toluene are much less severe than those of benzene. No carcinogenic effects were reported in animal studies. Equivocal results were obtained in studies to determine developmental effects in animals. Toluene was not observed to be mutagenic in standard studies.

*Xylene:*

Commercial or mixed xylene usually contains about 40-65% m-xylene and up to 20% each of o-xylene and p-xylene and ethyl benzene. Xylenes are released into the atmosphere as fugitive emissions from industrial sources, from auto exhaust, and through volatilization from their use as solvents. Acute (short-term) inhalation exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, eye irritation, and neurological effects. Chronic (long-term) inhalation exposure of humans to mixed xylenes results primarily in central nervous system (CNS) effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported. EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity.

AIR QUALITY IMPACT ANALYSIS

Air dispersion modeling was not performed due to the scope of the application for this facility. This facility is located in Harrison County, WV, which is currently designated as attainment for PM<sub>2.5</sub> (particulate matter less than 2.5 microns in diameter).

RECOMMENDATION TO DIRECTOR

The information contained in the permit application R13-3228 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 Highland-Clarksburg Hospital, Inc. for the installation and operation of three (3) emergency generators at the Highland-Clarksburg Hospital, Harrison County, WV, is hereby recommended.

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Thornton E. Martin Jr.  
Permit Engineer

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January 22, 2015  
Date