west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone 304/926-0475

Jim Justice, Governor
Austin Caperton, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Registration No.:	R13-3342
Plant ID No.:	061-00041
Applicant:	WVU Hospitals Inc.
Facility Name:	Ruby Memorial Hospital
Location:	Morgantown, Monongalia County
NAICS Code:	622110
Application Type:	Construction
Received Date:	September 26, 2016
Engineer Assigned:	William T. Rothwell II, P.E.
Fee Amount:	$2,000.00
Date Received:	September 28, 2016
Complete Date:	October 26, 2016
Applicant Ad Date:	September 27, 2016
Newspaper:	*The Dominion Post*
UTM's:	Easting: 589.560 km Northing: 4389.894 km Zone: 17
Description:	WVU Hospitals Inc. has applied for a permit for two (2) diesel fired emergency generators that were installed for the purpose of providing emergency power during loss of normal electric utility service for priority 1 (life support and critical branches) and priority 2 (equipment branch loads).

BACKGROUND DISCUSSION

This is an after-the-fact application for two (2) emergency generators installed for the purpose of allowing key systems to continue to operate without interruption during times of utility power outages. Both (5E & 6E) 1,500 kW generators were installed in 2016. 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. The following Table outlines the facility/generator configuration:

Table 1: Generator Location

Emission Unit ID	Emission Unit Location	Detail Make/Model	Year Installed/ Modified	Design Capacity	Type and Date of Change	Control Device[1]
5E	Mechanical Building	2016 Caterpillar / 3512C	2016	1,500 kW 2,000 bhp	After-the-Fact	None
6E	Mechanical Building	2016 Caterpillar / 3512C	2016	1,500 kW 2,000 bhp	After-the-Fact	None

SITE INSPECTION

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 I-79, take exit 155 (Star City/WVU exit). Turn right onto CR-19/24N, bear right onto US-19 / WV-7, turn left onto WV-705, bear right onto Elmer Prince Drive, at the roundabout take 2nd exit, hospital is located on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emission estimates for criteria pollutants were derived from the Manufacturer's supplied data. Hazardous and toxic pollutants were determined using emission factors from AP-42, 5th Edition, 1996. Emission estimates were calculated by the applicant and checked for accuracy and completeness by the writer.

WVU Hospitals Inc.'s proposed emergency generator installation and operation will result in the following estimated potential to discharge controlled emissions:

Table 2: Emergency Generator Emission Summary - Criteria Pollutants

Source ID No.	Potential Emissions (lbs/hr)				Potential Emissions (tons/yr)			
	NOx	CO	VOC	PM_{10}	NOx	CO	VOC	PM_{10}
5E	17.97	1.94	0.48	0.13	4.49	0.49	0.12	0.03
6E	17.97	1.94	0.48	0.13	4.49	0.49	0.12	0.03
TOTAL	35.94	3.88	0.96	0.26	8.98	0.98	0.24	0.06

Table 3: Emergency Generator Emission Summary - Hazardous/Toxic Pollutants

Source	Potential Emissions (lbs/hr)						Potential Emissions (tons/yr)					
	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formal-dehyde	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formal-dehyde
5E	0.00159	0	0.00069	0.00049	0	0.00201	0.00040	0	0.00017	0.00012	0	0.0005
6E	0.00079	0	0.00035	0.00024	0	0.00101	0.00020	0	0.00009	0.00006	0	0.00023
TOTAL	0.002	0.000	0.001	0.001	0.000	0.003	0.001	0.000	0.000	0.000	0.000	0.001

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 (NOx). 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 September 27, 2016.

45CSR22 *Air Quality Management Fee Program*

This rule establishes a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources of air pollution. Funds collected from these fees will be used to supplement the Director's budget for the purpose of maintaining an effective air quality management program.

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

WVU Hospitals Inc. is subject to this subpart because both engines (5E & 6E) were manufactured after April 1, 2006. Both engines are EPA Tier 2 certified. Manufacturer's supplied data indicate this engines will meet its respective certification standard.

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 as the source is not a 'major source' as defined under Rule 14 and Monongalia County is designated as 'in attainment' for all Regulated Pollutants.

RECOMMENDATION TO DIRECTOR

The information contained in the permit application R13-3342 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 Hospitals Inc. for the installation and operation of two (2) emergency generators at the Ruby Memorial Hospital Facility, Morgantown, Monongalia County, WV, is hereby recommended.

William T. Rothwell II, P.E.
Engineer

May 4, 2017
Date