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ENGINEERING EVALUATION/FACT SHEET

B ACKGROUND INFORMATION

Application No.:	R13-3229
Plant ID No.:	055-00136
Applicant:	Bluefield Hospital Company, LLC
Facility Name:	Bluefield Regional Medical Center
Location:	Bluefield
NAICS Code:	622100
Application Type:	Construction
Received Date:	December 16, 2014
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	$2000.00
Date Received:	December 19, 2014
Complete Date:	February 5, 2015
Due Date:	May 6, 2015
Applicant Ad Date:	December 20, 2014
Newspaper:	*Bluefield Daily Telegraph*
UTM's:	Easting: 479.13 km Northing: 4,123.29 km Zone: 17
Description:	The application is for the installation of two natural gas fired boilers rated at 12.6 MMBtu/hr with a burner configuration to use distillate oil as a back-up fuel and two emergency generators, which were installed after the fact.

DESCRIPTION OF PROCESS

The Bluefield Hospital Company, LLC (BHC) owns and operates the Bluefield Regional Medical Center in Bluefield, WV. In 2011, the BHC installed two Hurst Model SE-X-300-150 boilers and a Cummins 900 kW Emergency Generator. The boilers are used to generate steam to support energy intense activities at the Bluefield Hospital. The generator will only be used to provide electric power to the hospital in the event there is a loss of electric service from the local utility provider.

The two 12.6 MMBtu/hr boilers are Hurst Model SE-X-300-150 with duel fuel burners. The burners for these boilers are Power Lame CMAX 9 configured for gas and oil. The maximum firing rate of these burners is 12.6 MMBtu/hr. This model burner has a turndown ratio of 10:1 for gas and 8:1 for oil. The BHC has elected to operate them on natural gas with the ability to switch to fuel oil as a back-up supply source during gas curtailments.

One of the emergency generators is a Cummins QST30-G3 that is able to generate 900 kW of emergency standby power. This generator set is powered by a 4-cycle, V 12 cylinder compression-ignition engine. The engine has a nameplate power output rating of 1,351 horsepower.

The second generator set is an Onan/Cummins generator set that is able to generate 500 kW of standby electric power. The engine for this generator is a Cummins KtA-19 G4, which is a 4-cycle, inline 6 cylinder compression-ignition engine. The nameplate power output of this engine is 755 hp at 1,800 rpm.

Each of these generator sets has its own 2,500 gallon belly diesel fuel storage tank. Both boilers feed from a single storage vessel just outside of the boiler room.

SITE INSPECTION

On August 13, 2014, Mr. John Moneypenny, a Technical Analyst for the Compliance and Enforcement Section, conducted an announced inspection of the facility. During this inspection, Mr. Moneypenny discovered that the facility had installed the two boilers and generator set without obtaining a construction permit. A Notice of Violation was issued on September 16, 2014. The violation was resolved by the agency on receipt of this application, which occurred on January 5, 2015.

The writer conducted a site inspection of the facility to verify the manufacture date of the engines. Mr. Richard Cox, Director of Facilities, accompanied the writer during this visit. The writer was able to obtain an estimated manufacture date for the 900 kW based on the stamped date of the belly tank of 5/2004. Mr. Cox provided some historical information that explained the difference from manufactured date of 2004 and the installation date of 2008. In 2004, BHC began the improvements to provide more standby electric power and purchased the 900 kW generator set. Shortly after commencing the standby power improvement, BMC did not obtain sufficient capital funds to complete the installation of the generator until 2008. The second generator set had an engine manufacture date stamped on the engine tag of 3/98. The site is acceptable for the proposed sources.

ESTIMATE OF EMISSION BY REVIEWING ENGINEER

The applicant supplied emissions estimates from the manufacturer for the burners. Since Bluefield Hospital will only operate the boilers on distillate oil during curtailments and the

generator during power outages, the annual emissions are based on 500 hours of operation per year to account for these emergency situations. The emissions listed in the following tables are manufacturer's estimates:

Table #1 – Potential Emissions from an Individual 12.6 MMBtu/hr Boiler				
Pollutant	**Hourly Rate (lb/hr)**	**Annual Rate (TPY)**	**Hourly Rate on #2 Distillate oil (lb/hr)**	**Annual Rate on #2 Distillate oil (TPY)**
Particulate Matter (PM)	0.06	0.26	0.18	0.05
Particulate Matter Less Than 10 microns (PM_{10})	0.06	0.26	0.18	0.05
Particulate Matter less than 2.5 microns ($PM_{2.5}$)	0.06	0.26	0.18	0.05
Sulfur Dioxide (SO_2)	0.01	0.04	0.02	0.01
Oxides of Nitrogen (NO_x)	0.88	3.85	1.84	0.46
Carbon Monoxide (CO)	0.47	2.06	0.93	0.41
Volatile Organic Compounds (VOCs)	0.32	1.4	0.03	0.011
Total Hazardous Air Pollutants (HAPs)	0.02	0.09	0.0006	0.0002
Carbon Dioxide Equivalent (CO_2e)	1,475.43	6,462.38	2056.61	514.15

Table #2 – Potential Emissions from the Generators				
	S3 – 900 kW Generator		**S4 – 500 kW Generator**	
Power Output	**1,351**	**bhp**	**755**	**bhp**
Pollutant	**Hourly Rate (lb/hr)**	**Annual Rate (TPY)**	**Hourly Rate (lb/hr)**	**Annual Rate (TPY)**
Particulate Matter (PM)	0.24	0.06	0.53	0.13
Sulfur Dioxide (SO_2)	0.01	0.003	0.01	0.003
Oxides of Nitrogen (NO_x)	22.56	5.64	18.12	4.53
Carbon Monoxide (CO)	0.62	0.16	4.15	1.04
Volatile Organic Compounds (VOCs)	0.57	0.14	0.53	0.13
Total Hazardous Air Pollutants (HAPs)	0.03	0.018	0.03	0.0000
Carbon Dioxide Equivalent (CO_2e)	1,375.62	343.91	820.36	205.09

The emissions from the 900 kW generator set was based on manufacturer's engine model specific emission data and the 500 kW generator set was based on emission factors from Chapter 3.4 of AP-42. Annual emissions were based on an operating schedule of 500 hours per year.

Table #3 – Facility Potential to Emit	
Pollutant	**Permitting Potential (tpy)**
Particulate Matter (PM)	0.74
Particulate Matter Less Than 10 microns (PM_{10})	0.74
Particulate Matter less than 2.5 microns ($PM_{2.5}$)	0.74
Sulfur Dioxide (SO_2)	0.10
Oxides of Nitrogen (NO_x)	17.90
Carbon Monoxide (CO)	5.49
Volatile Organic Compounds (VOCs)	2.92
Total HAPs	0.20
CO_2e	13,250.12

REGULATORY APPLICABLILITY

It is understood that these sources burning natural gas are significantly below the applicable allowable limitations in Rule 2 and Rule 10, which are the State of West Virginia's rules addressing particulate matter (PM) and sulfur dioxide (SO_2) from boilers, regardless of the size of the unit. This understanding is confirmed with the provisions in Rules 2A and 10A, which exempts such sources for conducting periodic testing and monitoring for the purpose of demonstrating compliance with the limitations under these rules.

The applicant proposes to use distillate oil #2 (diesel) as a back-up fuel source when there is an interruption of the facility's natural gas supply or a natural gas curtailment. This back-up fuel makes the source subject to the sulfur dioxide standard of Subpart Dc, since these are new boilers with a heat input greater than 10 MMBtu/hr. Under Subpart Dc, the applicable SO_2 standard for these boilers is 0.50 lb/MMBtu which equates to 6.3 pounds of sulfur dioxide per hour. This standard is more stringent than the allowable under Rule 10 of 3.2 lb of SO_2 per MMBtu. Even under this situation, the boilers are burning 15 ppm sulfur diesel which meets the applicable alternative SO_2 standard under Subpart Dc of 0.5% by wt. and the Rule 10 allowable by over 99%.

Bluefield Hospital Company prepared and submitted a complete application, paid the filing fee, paid the NSPS fee, and published a Class I Legal ad in *The Bluefield Daily Telegraph*

on December 20, 2014. This proposed modification does not trigger any additional rule or regulations.

The Bluefield Regional Medical Center is a non-major source as defined in 45 CSR 14 and 45 CSR 30 (i.e. Potential to emit of less than 100 tons per year of CO, PM_{10}, PM, and SO_2). Therefore, no New Source Review is required to be conducted for this project. In addition, this construction will not increase the facility potential to emit to major source level as defined in Rule 30. Thus, the facility is a non-major source subject to 45 CSR 30 as a "deferred source", which means the facility, will be required to submit "Certified Emission Statements" (CES) and pay annual fees in accordance with the Rule 30.

The Bluefield Regional Medical Center is "institutional" based on NAICS Code under EPA commercial and institutional source policy for the Reciprocating Internal Combustion Engine (RICE) MACT and BHC does not have an agreement to operate the emergency generators for emergency demand response. Therefore, the two engines for the emergency generators sets are excluded from the RICE MACT as affected sources (40 CFR §63.6585(f))

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The potential release of hazardous air pollutants from these sources is 0.1 pounds per hour and 0.2 tons per year, which is significantly below the Rule 13 trigger threshold of 2 pounds per hour or 5 tons per year. Therefore, no information about the toxicity of the HAPs is presented in this evaluation.

AIR QUALITY IMPACT ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed modification does not meet the definition of a major source as defined in 45CSR14.

MONITORING OF OPERATIONS

The writer recommends the following monitoring requirements:

- Facility total fuel usage (natural gas & diesel) for each month. This is required by Rules 2, 10, and Subpart Dc.
- Maintain records from the "certified fuel supplier" that each shipment of diesel meets the definition of distillate oil and the maximum sulfur content for the diesel used in the boilers not exceeds 0.5 % sulfur by weight.

- Hour of operation of the boilers using/firing diesel fuel and reason for usage. Natural gas boilers with distillate oil back-up that do not operate more than 48 hours per year for maintenance or readiness checks using distillate oil are not affected sources to the 40 CFR 63, Subpart JJJJJ.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates the proposed modification of the emission sources will meet all the requirements of the applicable rules and regulations when operated in accordance with the permit application. Therefore, the writer recommends granting Bluefield Hospital Company, LLC a Rule 13 construction permit for the Bluefield Regional Medical Center located in Bluefield, WV.

Edward S. Andrews, P.E.
Engineer

March 31, 2015
Date