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ENGINEERING EVALUATION/FACT SHEET

B ACKGROUND INFORMATION

Application No.:	R13-2170B ***After-The-Fact***
Plant ID No.:	081-00148
Applicant:	Department of Justice – Federal Bureau of Prisons
Facility Name:	Federal Correctional Institute (FCI) Beckley
Location:	Beaver
NAICS Code:	922140
Application Type:	Modification
Received Date:	September 09, 2016
Engineer Assigned:	Thornton E. Martin Jr.
Fee Amount:	$2,000.00
Date Received:	Modification
Complete Date:	November 07, 2016
Applicant Ad Date:	September 13, 2016
Newspaper:	*The Register-Herald*
UTM's:	Easting: 488.65 km Northing: 4,185.47 km Zone: 17
Description:	The application is for the removal of two existing generators in May 2016 and the addition of one (1) new generator in May 2016.

DESCRIPTION OF PROCESS

The Federal Bureau of Prisons (FBOP) of the Department of Justice (DOJ) operates the Beckley Federal Correctional Institute in Beaver, WV. The facility has three 12.0 MMBtu/hr boilers, which are Clever-Brooks Flexible Watertube Boilers Model FLX-12000. These units are equipped with burners that can be fired with natural gas or fuel oil. The BOP has elected to fire with natural gas as the primary fuel and fuel oil as a back-up supply source.

Additionally, there are three 2.0 MMBtu/hr boilers, which are Clever-Brooks Flexible Watertube Boilers Model FLX-200. Department of Justice - Bureau of Prisons 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.

This application is for the removal of two (2) existing emergency generators (G-001 and G-002) and the addition of one (1) new emergency generator (G-003).

PREVIOUS EQUIPMENT LIST

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
BLR1	1E	Boiler	2013	12.0 MMBtu/hr	N
BLR2	2E	Boiler	2013	12.0 MMBtu/hr	N
BLR3	3E	Boiler	2013	12.0 MMBtu/hr	N
BLR4	4E	Boiler	2013	2.0 MMBtu/hr	N
BLR5	5E	Boiler	2013	2.0 MMBtu/hr	N
BLR6	5E	Boiler	2013	2.0 MMBtu/hr	N
G-001	E-G-001	Emergency Generator	1999	0.9 MMBtu/hr	N
G-002	E-G-002	Emergency Generator	1999	0.9 MMBtu/hr	N

PROPOSED EQUIPMENT LIST

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
BLR1	1E	Boiler	2013	12.0 MMBtu/hr	N
BLR2	2E	Boiler	2013	12.0 MMBtu/hr	N
BLR3	3E	Boiler	2013	12.0 MMBtu/hr	N
BLR4	4E	Boiler	2013	2.0 MMBtu/hr	N
BLR5	5E	Boiler	2013	2.0 MMBtu/hr	N
BLR6	5E	Boiler	2013	2.0 MMBtu/hr	N
G-003	E-G-003	Emergency Generator	2016	2,990 bhp	N

SITE INSPECTION

On September 23, 2014, Mr. John Moneypenny, of the Compliance and Enforcement Section, conducted an announced inspection of the facility. During this inspection, Mr. Moneypenny discovered that the facility replaced the existing boilers in the Spring of 2014 with

more efficient units of nearly the same BTU rating (12.6MM vs 12.0MM and 2.1MM vs 2.0MM). The new units are natural gas/oil fired. A permit modification was not submitted prior to the construction. A Notice of Violation was issued on November 20, 2014. The violation was resolved by the agency upon receipt of application for modification, which occurred on December 9, 2014.

ESTIMATE OF EMISSION BY REVIEWING ENGINEER

The new emergency generator utilizes a 2016 Caterpillar, Model 3516C, diesel engine, 2,990 bhp (2,230 kW) @ 1,800 RPM, Serial No: DD600841. The engine is EPA Certified (Certificate Number: GCPXL78.1NSF-021).

Engine emissions for generator G-003 were derived from the manufacturers supplied test data. Emission estimates for sulfur dioxide, hazardous and toxic pollutants were determined using emission factors from AP-42 3.4-3. Estimated diesel heat input = 141.5 gal/hr X 140,000 Btu/gal = 19.81 MMBtu/hr. Emission estimates were calculated by the applicants' consultant and checked for accuracy and completeness by the writer.

The emission factors from the engine manufacturer's data (Caterpillar) in g/bhp-hr are: 0.10, HC; 5.50, NO_x; 0.30, CO and 0.10, $PM/PM_{10}/PM_{2.5}$. Since the Department of Justice - Bureau of Prisons 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 from the emergency generator engine and change in emissions are listed in the following Tables:

Table #1 – Emergency Generator Potential Emissions

Pollutant	Potential Emissions	
	lb/hr	TPY
Particulate Matter $PM / PM_{10} / PM_{2.5}$	0.66	0.17
Sulfur Dioxide (SO_2)	0.03	0.008
Oxides of Nitrogen (NO_x)	36.26	9.07
Carbon Monoxide (CO)	1.98	0.50
Volatile Organic Compounds (VOCs)	0.66	0.17
Benzene	0.0154	0.0039
Formaldehyde	0.0016	0.0004
Hexane	--	--
Ethylbenzene	--	--
Naphthalene	0.0026	0.0007
Toluene	0.0056	0.0014
Lead	--	--
Xylene	0.0038	0.001
Acetaldehyde	0.0005	0.0001
Acrolein	0.0002	0.0001
Total Hazardous Air Pollutants (HAPs)	0.0297	0.0076

Table #2 – Total Facility Emissions			
Pollutant	**Existing Potential**	**Proposed Potential***	**Net Change in Emissions**
	TPY	**TPY**	**TPY**
Particulate Matter PM / PM_{10} / $PM_{2.5}$	1.93	1.85	-0.08
Sulfur Dioxide (SO_2)	7.26	5.198	-2.062
Oxides of Nitrogen (NO_x)	24.5	21.49	-3.01
Carbon Monoxide (CO)	18.62	16.52	-2.1
Volatile Organic Compounds (VOCs)	1.47	1.28	-0.19
Benzene	0.001	0.004254	0.003254
Formaldehyde	0.0157	0.01336	-0.00234
Hexane	0.324	0.324	0
Ethylbenzene	0.0006	0.0006	0
Naphthalene	0.0007	0.000805	0.000105
Toluene	0.0015	0.002	0.0005
Lead	0.0006	0.0006	0
Xylene	0.0006	0.001	0.0004
Acetaldehyde	0	0.0001	0.0001
Acrolein	0	0.0001	0.0001
Total Hazardous Air Pollutants (HAPs)	0.3465	0.3541	0.0076

*Includes the removal of the two previous emergency generators.

REGULATORY APPLICABLILITY

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

45CSR4 *To Prevent an Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to the Objectionable Odor or Odors*

The Federal Correctional Institute, Beckley Facility (FCI) shall not cause the discharge of Air pollutants which cause or contribute to an objectionable odor at any location occupied by The public.

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 modification 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. The applicant has submitted the $2,000 application fee and published a Class I legal advertisement in *The Register-Herald* on September 13, 2016.

45CSR30 *Requirements for Operating Permits*

Certain compression ignition internal combustion engines are subject to 40CFR60, Subpart IIII, and therefore subject to 45CSR30 as a deferred source. In this case, the one (1) diesel engine (Unit G-003) is EPA certified and subject to 40CFR60, Subpart IIII.

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

The Federal Correctional Institute, Beckley Facility (FCI) is subject to this subpart because engine (G-003) was manufactured after April 1, 2006. The engine emissions for this unit is EPA Tier 4 Final Certified (Certificate Number: GCPXL78.1NSF-021).

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

The Federal Correctional Institute, Beckley Facility (FCI) is considered a new area source of HAPs, since this source has been constructed after June 12, 2006.

The facility will <u>not</u> 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*

The facility will have the potential to emit 21.49 TPY of a regulated air pollutant (NOx), not including fugitive emissions, which is less than the 45CSR14 threshold of 250 TPY. This facility is not listed in Table 2, and so fugitive emissions are not included when determining source applicability. Therefore, the proposed Modification is not subject to the requirements set forth within 45CSR14.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Various VOC/non-criteria regulated pollutants are emitted from the incomplete combustion of diesel fuel. These emissions, however, are generally small and do not adversely impact the quality of the surrounding ambient air.

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:

- Change oil and filter every 500 hours of operation or annually, whichever comes first;
- Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary;
- Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary;
- Emergency engines must have hour meter and record hours of operation;
- Keep records of maintenance.

CHANGES TO PERMIT R13-2170A

This permit has been updated to reflect the removal of emergency generators (G-001 and G-002) and the addition of emergency generator (G-003).

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 Department of Justice - Bureau of Prisons a Rule 13 modification permit for the Federal Correctional Institute, Beckley Facility (FCI) located in Beaver, WV.

Thornton E. Martin Jr.

Thornton E. Martin Jr.
Permit Engineer

November 07, 2016
Date