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ENGINEERING EVALUATION/FACT SHEET

B ACKGROUND INFORMATION

Application No.:	R13-2170A
Plant ID No.:	081-00148
Applicant:	Department of Justice - Bureau of Prisons
Facility Name:	Federal Correctional Institute (FCI) Beckley
Location:	Beaver
NAICS Code:	922140
Application Type:	Modification
Received Date:	December 9, 2014
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	$2000.00
Date Received:	Modification
Complete Date:	January 8, 2015
Due Date:	April 8, 2015
Applicant Ad Date:	December 12, 2014
Newspaper:	*The Register-Herald*
UTM's:	Easting: 488.65 km Northing: 4,185.47 km Zone: 17
Description:	The application is for the installation of three natural gas fired boilers rated at 12.0 MMBtu/hr with a burner configuration to use distillate oil as a back-up fuel and three 2.0 MMBtu/hr boilers, which will replace the existing units.

DESCRIPTION OF PROCESS

The Bureau of Prisons (BOP) of the Department of Justice (DOJ) operates the Beckley Federal Correctional Institute in Beaver, WV. As part of an energy improvement project for the facility, the BOP had replaced the existing three 12.6 MMBtu/hr boilers with 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.

The three existing 2.1 MMBtu/hr boilers are being replaced with 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.

The energy improvement project includes removal of five gas fired water heater with fuel oil backup. Steam generated from the boilers is now used in lieu of these water heaters. These water heaters are removed from the facility and not replaced. These changes were made August of 2013.

SITE INSPECTION

On September 23, 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 replaced the existing boilers without obtaining a modification permit. A Notice of Violation was issued on November 20, 2014. The violation was resolved by the agency upon receipt of this application, which occurred on December 9, 2014.

ESTIMATE OF EMISSION BY REVIEWING ENGINEER

The applicant supplied emissions estimates from the manufacturer for the boilers of 100 ppm for CO and 70 ppm for NO_x. The boiler manufacturer noted that the oxides of nitrogen (NO_x) and carbon monoxide (CO) emissions were corrected to 3% oxygen. The writer corrected these emission rates for these two pollutants using procedures outlined in U.S. EPA Method 19 to 0% oxygen. Since 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 listed in the following tables are manufacturer's estimates:

Table #1 – Potential Emissions from the one 12.0 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)	0.09	0.39	0.27	0.07
Particulate Matter Less Than 10 microns (PM_{10})	0.09	0.39	0.19	0.05
Particulate Matter less than 2.5 microns ($PM_{2.5}$)	0.09	0.39	0.13	0.03
Sulfur Dioxide (SO_2)	0.006	0.026	5.80	0.58
Oxides of Nitrogen (NO_x)	1.02	1.66	1.63	0.38
Carbon Monoxide (CO)	0.89	3.37	0.93	0.41

Volatile Organic Compounds (VOCs)	0.06	0.26	0.03	0.011
Total Hazardous Air Pollutants (HAPs)	0.02	0.009	0.0037	0.001
Carbon Dioxide Equivalent (CO_2e)	1,405.18	6,154.69	1958.676	489.67

Table #2 – Potential Emissions from the one 2.0 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)	0.01	0.04	0.04	0.01
Particulate Matter Less Than 10 microns (PM_{10})	0.01	0.04	0.03	0.01
Particulate Matter less than 2.5 microns ($PM_{2.5}$)	0.01	0.04	0.02	0.01
Sulfur Dioxide (SO_2)	0.001	0.026	0.96	0.24
Oxides of Nitrogen (NO_x)	0.17	0.74	0.27	0.07
Carbon Monoxide (CO)	0.15	0.66	0.16	0.04
Volatile Organic Compounds (VOCs)	0.01	0.04	0.005	0.001
Total Hazardous Air Pollutants (HAPs)	0.004	0.018	0.001	0.0003
Carbon Dioxide Equivalent (CO_2e)	234.20	1,025.80	326.446	81.61

Table #3 – Changes to the Facility Potential Emissions

Pollutant	Permitting Potential (tpy)	Emissions from the New Boilers (tpy)	Facility Potential After the Changes* (tpy)	Net Change in Emissions (tpy)
Particulate Matter (PM)	3.14	1.48	1.99	-1.15
Particulate Matter Less Than 10 microns (PM_{10})	3.14	1.42	1.93	-1.21
Particulate Matter less than 2.5 microns ($PM_{2.5}$)	3.14	1.36	1.87	-1.27
Sulfur Dioxide (SO_2)	8.5	2.55	5.4	-3.10
Oxides of Nitrogen (NO_x)	40.67	16.09	28.65	-12.02
Carbon Monoxide (CO)	9.60	14.33	18.75	9.15
Volatile Organic Compounds (VOCs)	1.09	0.26	0.62	-0.47

*Includes the removal of the five water heaters.

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 from 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. The applicable SO_2 standard for the 12.0 MMBtu/hr and 2.0 MMBtu/hr boilers is 38.4 pounds per hour and 6.4 pounds per hour respectively under Rule 10 and 5.25 pounds per hour under Subpart Dc of 40 CFR 60. Even under this situation, the units 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 nearly 93%.

Department of Justice - Bureau of Prisons prepared and submitted a complete application, paid the filing fee, paid the NSPS fee, and published a Class I Legal ad in *The Register Herald* on December 12, 2014. This proposed modification does not trigger any additional rule or regulations.

The Beckley Correctional Institution 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). These new boilers do not have the potential to emit of any one of the New Source Review Pollutants above the major source levels as defined in Rule 14. 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 institution will be 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.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The potential release of hazardous air pollutants from these sources is 0.072 pounds per hour and 0.32 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.

CHANGES TO PERMIT R13-2170

This permit focused compliance on fuel restrictions and limited the boilers to use natural gas as the primary fuel and limited fuel oil use to 500 hours per year. The permit limits the sulfur content to 0.5% for fuel oil. In addition, the permit included the requirements of sulfur dioxide of Subpart Dc but did not specify which units are subject and means of demonstrating compliance. Then the permit state that the permittee shall comply with the agency's policy on Rules 2 & 10. These conditions are either redundant and/or outdated.

The recommendation from the writer streamlines the applicable requirements of Subpart Dc, Rules 2 & 10, and the definition of the natural gas fired boiler from the Area Source Boiler GACT into a set of specific requirements for each type of boiler based on heat input (i.e. 4.1.1. is for the 12.0 MMBtu/hr, 4.1.2. is for the 2.0 MMBtu/hr).

The emergency generator set has fuel and annual emissions limits based on 500 hours of operation per year. The writer recommends setting just annual emission limits for the generators and stipulating compliance is satisfied by limiting operation of engine/generator to 500 hours per year through the use of a non-resettable hour meter.

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 FCI Beckley located in Beaver, WV.

Edward S. Andrews, P.E.
Engineer

April 27, 2015
Revised Date