

DEPARTMENT OF ENVIRONMENTAL QUALITY
 AIR QUALITY DIVISION
 ACTIVITY REPORT: Scheduled Inspection

D631527919

FACILITY: MICHIGAN MASONIC HOME		SRN / ID: D6315
LOCATION: 1200 WRIGHT ROAD, ALMA		DISTRICT: Lansing
CITY: ALMA		COUNTY: GRATIOT
CONTACT: Kevin McCormack, Maintenance Manager		ACTIVITY DATE: 11/17/2014
STAFF: Michelle Luplow	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MINOR
SUBJECT: Scheduled, unannounced compliance inspection. Facility may not have been inspected in the past.		
RESOLVED COMPLAINTS:		

Inspected by: Michelle Luplow

Personnel Present: Kevin McCormack, Maintenance Manager (kmccormack@masonicpathways.com)

Purpose: Conduct an unannounced, scheduled compliance inspection by determining compliance with Michigan Masonic Home's (Masonic Pathways) Permit to Install (PTI) No. 8-79 for 2 Cleaver-Brooks boilers. There are no records on file that the Air Quality Division (AQD) has ever inspected this source in the past.

Facility Background/Regulatory Overview: Masonic Pathways (Masonic) is a home for the elderly. The permitted boilers are used to make steam, which is sent to a heat exchanger and used to heat water for hydronic heating. The steam is also diverted to a heat a drum used for ironing the home's laundry. Masonic also has 2 emergency generators that are used solely for the purpose of backup power in case the power goes out.

The two boilers are exempt from the Boiler MACT JJJJJ because they meet the exemption definition of a "gas-fired boiler."

The two emergency generators are subject to the area source RICE MACT ZZZZ for CI emergency engines rated at greater than 500 HP constructed prior to June 12, 2006.

Equipment located onsite

Table 1. Emergency Generators

Engine	Serial #	HP	MMBTU/hr	Fuel	PTI No.	Installation Date	Federal Regulation
Kohler 400R0271	TB3355554	536	3	Deisel only	NA	1991	NESHAP ZZZZ – area source
Kohler (Detroit Diesel) 400ROZB71	28162B	536	3	Diesel only	NA	1997	NESHAP ZZZZ – area source

Table 2. Cleaver-Brooks boilers

Boiler	Serial #	BTU/hr	Fuel	PTI No.	Federal Regulation
Cleaver-Brooks 200X-500	L89144	20,922,000	Sweet Natural Gas & Fuel Oil #2	Not permitted; no exemptions apply	Exempt from Boiler MACT Subpart JJJJJ (classified as "gas-fired boiler")
Cleaver-Brooks 400-350	L61815	14,645,000	Sweet Natural Gas & Fuel Oil #2	8-79	Exempt from Boiler MACT Subpart JJJJJ (classified as "gas-fired boiler")

Inspection: This was an unannounced scheduled compliance inspection. At approximately 12:30 p.m. on November 17, 2014 I met with Kevin McCormack, Masonic Pathways Maintenance Manager, at the maintenance building near the back of the complex (see map). I provided K. McCormack with a DEQ "Environmental Inspections: Rights and Responsibilities" brochure and a May 2012 Permit to Install Exemption Handbook, as well as a copy of

PTI No. 8-79 for the 2 boilers.

PTI No. 8-79 – CB 400-350 and CB 200 Cleaver-Brooks Boilers

The permit was written for two Cleaver-Brooks boilers: a CB 400-350 and a CB 200. K. McCormack said that the CB 200 was removed in 1990 because it wasn't large enough to handle the extra heating required for the expansion of the Michigan Masonic Home. In its place they installed a CB 200x-500 boiler, rated at 20,922,000 BTU/hr. This equipment was installed without a permit. Exemption Rule 282(b)(ii) is for fuel-burning equipment used for space heating, that can fire both fuel #2 and sweet natural gas, with the caveat that the fuel oil contain no more than 0.4% sulfur by weight and a rated heat input capacity not more than 20,000,000 Btu/hr. The CB200x-500 boiler is rated at greater than the exemption's Btu/hr; therefore, Masonic Pathways is required to apply for a permit to install for the unpermitted installation of the boiler. I will work with K. McCormack to ensure that Masonic Pathways applies for a permit to install for the boiler.

Condition 12 requires that no more than 20% opacity be seen from the stack for CM 400-350. During the inspection the boiler was operating and there were no signs of opacity coming from the stack. Masonic Pathways is in compliance with condition 12.

Condition 13 requires that sulfur dioxide emissions not exceed 1.4 lb/ MMBTU. The EPA AP-42 emission factor for SO₂ from firing fuel oil #2 in boilers is 142 lb/1000 gallons of fuel oil. This number is multiplied by the wt% sulfur of the oil. K. McCormack said that the fuel oil has a sulfur content of 15 ppm or 0.0015% and a 132,000 BTU rating. The following calculation was used to determine compliance with condition 13 emission limits:

$$\frac{142 \text{ lb SO}_2}{1000 \text{ gal}} \times 0.0015 \text{ Sulfur} \times \frac{1 \text{ gal}}{132,000 \text{ BTU}} \times \frac{2 \times 10^{-9} \text{ lb SO}_2}{\text{BTU}} \times 10^6 = \frac{0.00216 \text{ SO}_2}{\text{MMBTU}}$$

According to this calculation Masonic Pathways is in compliance with condition 13's SO₂ emission limit.

Condition 14 is not applicable because it refers to the boiler that was removed in 1990.

Condition 15 requires that the stack height be at least 37 feet above ground level and have a maximum exit diameter of 1.67 feet (20 inches). K. McCormack called Dean Boiler in Grand Rapids, who services the two boilers. Dean Boiler verified that the exit internal stack diameter is 20 inches. K. McCormack said that the height of the boiler building is approximately 40 feet. The stack is at least 10 feet higher than the building and therefore Masonic Pathways is in compliance with both the stack height and diameter for the Cleaver-Brooks 400-350 boiler.

Boiler MACT NESHAP JJJJJ for area sources of HAPs

The two boilers are exempt from the Boiler MACT NESHAP Subpart JJJJJ because they are classified as "gas-fired boilers" as defined in 40 CFR 63.11237. To be considered a gas-fired boiler, the boiler must burn gaseous fuels not combined with any solid fuels and burn liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or periodic testing on liquid fuel. The periodic testing of liquid fuel should not exceed a combined total of 48 hours during any calendar year. K. McCormack said that they burn #2 fuel oil and only burn the fuel oil for training purposes so that when the gas supply is interrupted employees know how to switch the boilers over to fuel oil combustion. The last time they operated the boilers using fuel oil was during the 1977 ice storm. He said that for the past calendar year, each boiler has only burned fuel oil for approximately 12 hours. Masonic Pathways therefore meets the Boiler MACT JJJJJ gas-fired boiler exemption criteria.

RICE MACT ZZZZ Emergency Engines

Masonic Pathways has 2 emergency generators located adjacent to the boiler room. The MMBTU/hr per engine is 3. Ed Briand of W. W. Williams (engine servicer for Masonic) explained that a 536 HP engine is approximately 200 kW. He said that 100 kW is approximately 1.3 – 1.5 MMBTU/hr; therefore, both engines are exempt from a permit to install per Rule 285(g) because they have less than 10,000,000 BTU/hr maximum heat input. Both engines are 400 KVA, which is equivalent to 536 HP (the conversion from 400 KVA to HP was done by Masonic Pathways servicer Fuel Tank Services (FTS)). FTS explained that you multiply the 400 KVA by a power factor of 1.34 to determine the horsepower.

K. McCormack said that the engines are load-tested once per month and maintenance-tested once per week. Each engine has its own non-resettable hours meter. The Cummins engine had a total of 51.8 hours meter-recorded and the Kohler engine had 677.3 hours meter-recorded.

In order to meet the RICE MACT ZZZZ definition of an "emergency engine" the engines, in Masonic Pathway's case, must only be used to provide electrical power or mechanical work during an emergency situation, for example when electric power from the local utility is interrupted. Additionally, emergency engines should not be operated for more than 100 hours per calendar year for readiness testing and maintenance checks, and may be operated up to 50 hours per calendar year for non-emergency situations (the 50 hours is included in the aforementioned 100 hours per calendar year). Based on the information provided by K. McCormack, the engines are not operated for more than 5 hours per calendar month for maintenance checks and readiness testing. This operating schedule results in 60 hours per calendar year. Masonic Pathways' engines are therefore emergency engines.

Using the EPA's Stationary Reciprocating Internal Combustion Engines (RICE) regulatory navigation quiz (<http://www.epa.gov/ttn/atw/rice/output/quiz.html>), Masonic Pathways engines are determined to be existing emergency compression ignition engines greater than 500 HP at an area source of HAP, constructed before June 12, 2006.

According to the output of the quiz, the compliance date for this regulation is May 3, 2013. Michigan currently does not have the delegated authority to enforce the area source RICE MACT ZZZZ at this time.

Masonic Pathways is in compliance with their air permits and federal regulations at this time.

NAME Mitchell M. Lyden

DATE 12-11-14

SUPERVISOR B.M.