

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

D631548156

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: 03/20/2019
STAFF: Michelle Luplow	COMPLIANCE STATUS: Compliance
SUBJECT: Unannounced, scheduled inspection to determine compliance with PTI 63-15 and 8-79.	
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 Masonic Pathways' Permit to Install (PTI) No. 8-79 for 1 Cleaver-Brooks boiler and PTI 63-15 for 1 500 hp Cleaver Brooks Boiler (CB 200-500), installed in 1991.

Facility Background/Regulatory Overview

Masonic Pathways (Masonic) is an assisted living facility. 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 there is a power interruption. This facility is an area source of HAP emissions.

The two boilers are subject to the NSPS Subpart Dc for small industrial, commercial and institutional steam generating units. The NSPS Subpart Dc requirements have been incorporated into PTI 63-15.

The 2 emergency generators are exempt from a permit to install and are not subject to the RICE NESHAP Subpart ZZZZ at this time for the following reason: the existing engines are classified as institutional emergency stationary RICE located at an area source of HAP that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year and keep operating hours at or below 100 hours for the purposes of maintenance and readiness testing, emergency demand response required by NERC, and non-emergency situations not exceeding 50 hours per calendar year which are hours included in the 100 hours.

Steam sterilization is used onsite; there is no ethylene oxide used at this facility.

The facility was last inspected in November 2014.

K. McCormack said that they plan to install 2 new engines and 2 500-hp boilers near the end of 2019/beginning of 2020, but he is uncertain if these new units will replace the existing engines and boilers or will be installed in addition to the existing units. I made him aware that it is possible these new units would require a permit and/or other applicable federal regulations could apply. I made him aware that we should have discussions regarding these new installations to determine if they will need permits or not, and to discuss the possibility of other federal regulations applying. I also explained that if these units do need permits, not even the footings are allowed to be installed until a permit is obtained from AQD. To install the units without a permit would be a violation of Air Pollution Control Rules. He acknowledged that he understood and will pursue future discussions with AQD.

Equipment located onsite

Table 1. Emergency Generators

Engine	Serial #	HP	MMBTU/hr	Fuel	PTI No./ Exemption	Installation Date
Kohler Cummins KTA19-G2	37113872	536	3	Diesel only	Rule 285(2)(g)	1991
Kohler Detroit Diesel 8083-7416	8VF146466	536	3	Diesel only	Rule 285(2)(g)	1997

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	63-15	NSPS Subpart Dc
Cleaver-Brooks 400-350	L61845	14,645,000	Sweet Natural Gas & Fuel Oil #2	8-79	NSPS Subpart Dc

Inspection

This was an unannounced scheduled compliance inspection. At approximately 9:00 a.m. on March 20, 2019 I met with Kevin McCormack, Masonic Pathways Maintenance Manager. I provided K. McCormack with a January 2017 Permit to Install Exemption Handbook, as well as an electronic copy of PTI No. 63-15.

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 the 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. Masonic received PTI 63-15 for the unpermitted boiler on May 6, 2015.

This boiler has the capability to burn diesel fuel as a backup fuel source in the event natural gas fuel flow is interrupted. Natural gas is its primary fuel.

K. McCormack said Dean Boiler conducts annual CSD1 inspections on this unit.

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.

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:

$$\frac{142 \text{ lb SO}_2}{1000 \text{ gal}} \times 0.0015 \text{ S} \times \frac{1 \text{ gal}}{132,000 \text{ BTU}} = \frac{2 \times 10^{-9} \text{ lb SO}_2}{\text{BTU}} \times 10^6 = \frac{0.002 \text{ lb SO}_2}{\text{MMBTU}}$$

According to this calculation Masonic 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 is in compliance with both the stack height and diameter for the Cleaver-Brooks 400-350 boiler.

PTI No. 63-15 – CB 200x-500 Boiler

The Cleaver Brooks 200x-500, 500 hp dual-fuel fired boiler is used in conjunction with the CB 400-350 boiler to provide steam for hot water and building heat.

Emission Limits and Testing/Sampling

Testing to determine compliance with NOx and CO limits when burning natural gas and diesel fuel is required based on AQD's discretion. At this time it is my professional judgment that testing for NOx and CO to determine compliance with the established emission limits is not necessary and will not be requested by the AQD.

Material Limits, Process/Operational Restrictions and Monitoring/Recordkeeping

The sulfur content of all No. 2 fuel oil is required to be equal to or less than 15 ppm by weight and records of the sulfur

content or maximum sulfur content of the name of the fuel oil supplier, a statement from the fuel oil supplier that the oil complies with the specifications found in 40 CFR 60.41c and the sulfur content or maximum sulfur content of the fuel oil must be kept.

K. McCormack provided me with a Marathon TECHNEWS Ultra low sulfur No 2 Diesel product specifications sheet for the most recent delivery of oil (attached). The document states "This product, [ultra low sulfur no 2 diesel], meets the ASTM Specifications for D975 (Diesel Fuel), which complies with 60.41c. The sulfur content is 15 ppm by weight.

Additional required recordkeeping includes identification of the type and amount (in gallons or cubic feet) of all fuels combusted and the hours of operation run on each fuel type. K. McCormack said that they only use fuel oil for the boilers in the event that natural gas flow is interrupted but is also used for training purposes to ensure that Masonic's staff are trained on converting the fuel line from natural gas to fuel oil. In lieu of records, K. McCormack said that they conduct the natural gas-to-fuel oil training once per year for a period of 3 – 4 days, 24 hours per day. Natural gas is used for the remainder of the calendar year. The boilers are operated 24 hours per day, 365 days per year. The 2019 training was conducted starting February 13, 2019 and a total of 3,835 gallons of diesel was used during this 96-hour period. This information satisfies the requirement, but I did instruct K. McCormack that Masonic should begin keeping records for the hours operated on each fuel and the quantity of each fuel used.

Reporting

As required under the NSPS Subpart Dc, notification of the date of construction and actual startup of the CB 200x-500 boiler, in addition to the design heat input capacity and identification of the fuels to be combusted in the boiler are required to be submitted to the AQD. I am working with Masonic to ensure that an official notification is submitted in a timely manner.

Boiler MACT NESHAP JJJJJJ for area sources of HAPs

The AQD does not have delegated authority to enforce this area source MACT. The two boilers would be exempt from the Boiler MACT NESHAP Subpart JJJJJJ because they have the potential to be considered "gas-fired boilers" as defined in 40 CFR 63.11237; however, 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, maintenance or operator training on liquid fuel. Periodic testing, maintenance or operator training on a liquid fuel shall not exceed a combined total of 48 hours during any calendar year. As discussed previously in this report, K. McCormack said that they burn #2 fuel oil for training purposes, which lasts 3-4 days, at 24 hours per day, which would exceed the 48-hour caveat and therefore these boilers would not be classified "gas-fired boilers" and therefore subject to Boiler MACT Subpart JJJJJJ. K. McCormack will be informed of this finding to allow Masonic the opportunity to come into compliance with the MACT Subpart JJJJJJ or to reduce their fuel oil training to 48 hours or less per calendar year.

RICE MACT ZZZZ for area sources of HAPs (Emergency Engines)

Masonic has 2 emergency generators located adjacent to the boiler room that are used as "life safety" units, according to K. McCormack. Each is rated at 3 MMBTU/hr (536 HP); therefore, both engines are exempt from a permit to install per Rule 285(2)(g) because they are rated at less than 10,000,000 BTU/hr maximum heat input.

Using the EPA's Stationary Reciprocating Internal Combustion Engines (RICE) regulatory navigation quiz (<http://www.epa.gov/ttn/atw/rice/output/quiz.html>), Masonic 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; however, because Masonic is considered an institution, the engines are not subject to the RICE MACT Subpart ZZZ, as long as the engines meet the definition of "emergency engine."

In order to meet the RICE MACT ZZZZ definition of an "emergency engine" the engines 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). The most recent "emergency" Masonic had was January 1, 2019. Power was out for 2-3 hours while Consumer's Energy shut off electricity for maintenance/repair.

K. McCormack said that the engines are load-tested once per month (1 hour each) for fire safety requirements and maintenance-tested once per week (15- 20 mins each). An annual inspection is also conducted by W.W. Williams, which includes load testing (1 hour each) and maintenance (see attached for copies of the most recent testing by Masonic and W.W. Williams). Based on this information, Masonic's engines would meet the definition of "emergency engine" and therefore are not subject to the Rice MACT ZZZZ.

Each engine has its own non-resettable hours meter. In November 2014, the Cummins engine had a total of 51.8 hours meter-recorded and the Detroit Diesel engine had 677.3 hours meter-recorded. During this inspection I recorded 211.2 hours and 837.4 hours, respectively for the engines.

Compliance Statement: Masonic Pathways is in compliance with PTI's 63-15 and 8-79 at this time.

NAME _____

DATE _____

SUPERVISOR _____