

M1967

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

FY2018 Sched. Insp.
SM CMS

M196742485

FACILITY: ST. JOHN PROVIDENCE HOSPITAL		SRN / ID: M1967
LOCATION: 16001 WEST NINE MILE RD, SOUTHFIELD		DISTRICT: Southeast Michigan
CITY: SOUTHFIELD		COUNTY: OAKLAND
CONTACT:		ACTIVITY DATE: 11/16/2017
STAFF: Iranna Konanahalli	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: FY 2018 SM CMS scheduled inspection of Providence Hospital ("Providence")		
RESOLVED COMPLAINTS:		

Providence Hospital (M1967)
16001 West Nine Mile Road
Southfield, Michigan 48075-4818

Phone 248-849-8088

Fax: 248-849-2840

E-mail: Gary.Campbell@Asension.org

PTI Nos.: 268-02 dated February 10, 2003 (PSD and ROP opt-out for boilers: FG-Boilers, SC 2.1 SO2 limit: 39 TPY and corresponding fuel limits FG-Boilers, SC 2.2: 0.5% sulfur & FG-Boilers, SC 2.3: 1,098,594 gallons of fuel oil per year; 140,000 BTU per gallon) and 185-94A dated October 7, 1997 (EO sterilizers). EO sterilizers (4) were idled since August 2014 and were permanently removed about September 2015.

PTI voids: PTI Nos. 36-98 for existing heating boilers (03/19/1998), 185-94 for EO sterilizer (10/07/1997) and 686-84 for three boilers (03/19/1998)

To be voided: 185-94A dated October 7, 1997 (EO sterilizers). The permit must be voided as the sterilizers were removed permanently about September 2015. Sterilizers were idled since August 2014.

Subject to: New Source Performance Standards (NSPS Dc) for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR, Part 60, Subpart Dc). Fuel oil (ULSD) backup for two of three boilers (Boiler Nos. 1 & 2 & not 3 [NG only]). Boiler Nos. 1 [32.4 MM BTU / Hr.] and 3 [16.7 MM BTU / Hr.] are subject to NSPS Dc. PTI Grandfathered [installed: 1963] Boiler No. 2 [32.4 MM BTU / Hr.] is not subject to NSPS Dc. However, grandfathered Boiler No. 2 is also incorporated into the PSD / ROP opt-out permit (PTI No. 268-02).

NSPS Dc Revisions: 1. 72 FR 32759 = Page 32759 Federal Register / Vol. 72, No. 113 / Wednesday, June 13, 2007 / Rules and Regulations / Final Rule – to add compliance alternatives and to revise certain recordkeeping and reporting requirements. 2. 74 FR 5091 = Page 5091 Federal Register / Vol. 74, No. 17 / Wednesday, January 28, 2009 / Rules and Regulations / Final Rule - to correct technical and editorial errors.

Subject to: Cat II Fee (Boiler No. 1 – Fuel oil backup NSPS Dc. Boiler No. 3 – NSPS Dc boiler. NG only. Boiler No. 2 – PTI Grandfathered but part of the permit for PSD / ROP opt-out purposes. Not NSPS Dc. Fuel oil backup).

Boilers (principally natural gas fired with or without fuel oil backup) may be subject to: NESHAP / MACT 6J, 40 CFR Part 63, Subpart JJJJJJ / 6J National Emission Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers, Page 15554, Federal Register / Vol. 76, No. 54 / Monday, March 21, 2011 / Rules and Regulations / Final rule. This rule does NOT apply to boilers that burn only gaseous fuels or any solid waste. The hospital's boilers may be considered gas fired if records that prove annual 48-hour-limit are kept.

Not subject to: NESHAP / MACT Area Source WWWW (W5) National Emission Standards for Hospital Ethylene Oxide Sterilizers (Page 73611, Federal Register /Vol. 72, No. 248 / Friday, December 28, 2007 /Rules and Regulations / Final rule) - This final rule applies to any existing or new hospital ethylene oxide sterilization facility that is an area source of HAP. The sterilizers were removed about September 2015. Hospital Sterilizers are not subject to National Emission Standards for Hazardous Air Pollutants (NESHAP) for Ethylene Oxide Commercial Sterilization and Fumigation Operations (40 CFR, Part 63, Subpart O).

Providence's three (3) emergency generators may be subject to: RICE MACT 4Z, Area Source NESHAP / MACT ZZZZ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines and National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines / Final rule (Page 3568, Federal Register / Vol. 73, No. 13 / Friday, January 18, 2008 / Rules and Regulations / Final rule). AQD has NOT taken delegation and an attempt is not made to determine compliance.

Not subject to (CI RICE Diesel generators were installed before April 2006): 40 CFR Part 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition (CI) Internal Combustion Engines (ICE) Page 39154 Federal Register / Vol. 71, No. 132 / Tuesday, July 11, 2006 / Rules and Regulations /Final rule).

On November 16, 2017, I conducted a level-2 FY 2018 SM CMS scheduled inspection of Providence Hospital ("Providence") located at 16001 West Nine Mile Road, Southfield, Michigan 48075-4818. The inspection was conducted to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451; and Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) rules.

During the inspection, Mr. Gary Campbell (Cell: 248-550-7532; Operations: 248-867-8656; E-mail: Gary.Campbell@Asension.org), Chief Engineer, and Mr. John Dadourian (Operations: 248-867-8656) assisted me. Ms. Tiffany Ridout (Cell: NA; Phone: 248-849-3446; E-mail: Tiffany.Ridout@Asension.org)

Ms. Linda Lawrence (Phone: 248-849-3491; E-mail: Linda.Lawrence@StJohn.org) was not present. Ms. Wanda Korzowski moved to Novi. Both were involved in the sterilizers.

Mr. Joseph Serra (Phone 248-849-8088, Fax: 248-849-2840, E-mail: jserra@providence-hospital.org), manager, plant operations, buildings and grounds, retired about May 01, 2015. Ms. Sally Johnson (Phone: 248-849-3491), Supervisor, Central Sterile Processing, separated about 2010. Mr. Kurtis VanDeWiele and Ms. Toni Patton, manager, Central Sterile Processing, separated from St. John Providence about 2008

PTI No. 185-94A Four Ethylene Oxide Sterilizers (3M Steri-Vac 5-XL) with two Donaldson EO Abator.

EO Sterilizers (four Steri-Vac 3M) were idled since August 2014. "DO NOT USE" signs were posted on them. The sterilizers were permanently removed about September 2015. Hence, PTI No. 185-94A must be voided.

Three Hydrogen Peroxide (H₂O₂) Plasma Sterilizers are present: two large machines (Sterrad 100S) with one-hour sterilization cycle and one small machine (Sterrad NX) with 25 minutes cycle. H₂O₂ Plasma machines have replaced EO satirizers (FY 2015).

PTI No. 268-02 and NSPS Dc Boilers.

FG-Boilers: EU-Boiler1 (2003 NSPS Dc) and EU-Boiler2 (1963 non-NSPS Dc)

1. Boiler No. 1: English Boiler (Richmond, Virginia). Model 25 SC 250. Serial No. 22072. Heating surface = 2,946 sq. ft. 25,000 pounds per hour steam, 32.4 million BTU per hour, natural gas (with fuel oil back-up). Built in 2002 and installed in 2003 (after June 9, 1989). Low-NOx dual fuel (NG & ULSD diesel) burner. Subject to NSPS Dc.
2. Boiler No. 2: The Wickes Boiler Co. (Saginaw, Michigan). Model M67567M. ASME # 5894. HSB # 5894. NB No. 2756. Heating surface = 2,700 sq. ft. 25,000 pounds per hour steam, 32.4 million BTU per hour, natural gas (with fuel oil back-up). Installed in 1963. Part of PTI No. 268-02 to become synthetic minor source for PSD (SO₂). Boiler No. 2 was previously covered by PTI Nos. 36-98 and 686-84. Not subject to NSPS Dc as it was installed in 1963 (before June 9, 1989).
3. Boiler No. 3: Kewanee. Model H3S-500-G. Serial No. 14065. Heating surface = 2,500 sq. ft. 150 psi steam. 500 HP, 16.7 million BTU per hour (with no fuel oil back-up, i.e. natural gas only). This boiler is not part of PTI No. 268-02. Subject to NSPS Dc. Installed in 1999 (after June 9, 1989).

All boilers burn 15 ppm sulfur (S) ultra-low sulfur diesel (15 ppm S ULSD) as a back-up fuel. All boilers burn predominantly pipeline quality sweet natural gas. ULSD is generally fired for annual testing purposes only.

Potential-to-Emit (PTE)

Thousand = M = 1,000 = $1 * 10^3$ and Million = MM = 1,000,000 = $1 * 10^6$

Based upon emission factor = 100 pounds of NO_x per MM CF NG burned, 1 CF of NG \equiv M BTU, continuous operation of boilers \equiv 8,760 hours per year, 2,000 pounds per ton,

1 MM BTU per hour \equiv 0.44 tons of NO_x per year emissions for 1 MM BTU per hour NG fired boiler.

Considering space heating boilers operate less than half time in the year (heating season only), 1 MM BTU per hour \equiv 0.22 tons of NO_x per year.

Furthermore, it may be noted that all boilers do NOT operate at the same time; some boilers are backup boilers.

Total boiler capacity at Providence = 81.5 MM BTU per hour.
PTE = $81.5 * 0.22 = 17.93 \approx 18$ tons of NOx per year.

Pursuant to Rule 336.1282(b) then (now Rule 336.1282(2)(b)(i)), the boilers burning sweet natural gas (up to 50 million BTU per hour) are exempt from Rule 336.1201 (Permit-to-Install). In addition, Pursuant to Rule 336.1282(b) then (now Rule 336.1282(2)(b)(ii)), the fuel oil fired boilers (up to 20 million BTU per hour) are exempt from Rule 336.1201 (Permit-to-Install) subject to the condition that fuel oil (limited to No.1 and No.2) burnt has sulfur content no greater than 0.40 percent by mass. It may be noted that NSPS Dc allows sulfur content up to 0.50 percent sulfur by mass (0.5 pounds of sulfur dioxide per million BTU heat input). Boiler No. 1 has a design capacity of 32.4 (>20) million BTU heat input per hour. Therefore, Boiler No. 1 (32.4 million BTU per hour, natural gas with fuel oil back-up) is a part of PTI No. 268-02. Boiler No. 3 (6.7 million BTU per hour, natural gal only) is not part of the permit.

PTI (Rule 201) grandfathered Boiler #2 (natural gas fired with fuel oil backup) was installed in 1963. In 1999 (Boiler #3) and 2003 (Boiler #1), Providence installed two natural gas fired boilers of capacity 16.7 million BTU per hour (Boiler No. 3 with no fuel oil back-up) and 32.4 million BTU per hour (Boiler No. 1 with fuel oil back-up), respectively. These boilers are subject to federal New Source Performance Standards for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR, Part 60, Subpart Dc). Hence, pursuant to Act 451 of 1994, as amended § 324.5522 (1)(b), the entire hospital facility is subject to Category II air quality fees. Pursuant to Rule 336.1282(2)(b), the 16.7 MMBTU/ hour boiler (Boiler No. 3, 1999) is exempt from Rule 336.1201 (Permit-to-Install). Two 32.4 MMBTU/ hour boilers (Boiler Nos. 1 [2003] and 2 [1963] and not 3 [1999]) are covered by PTI No. 268-02. Boiler #1 is equipped with low-NOx burner.

According to PTI No. 268-02, in 2003, Providence replaced the existing Boiler No. 1 with a new, which is also called Boiler No. 1, 32.4 million BTU per hour (natural gas with fuel oil back-up) boiler. 32.4 million BTU per hour (natural gas with fuel oil back-up) Boiler No. 2 is also incorporated into this permit although it is grandfathered (installed: 1963 before 1967) because Providence wanted a synthetic minor permit (SO₂) pursuant to federal Prevention of Significant Deterioration (PSD) regulations (PTI No. 268-02, FG-Boilers, SC 2.1 limit: 39 tpy sulfur dioxide). Although Boiler No. 3 (natural gas only) is not covered by this permit, it is subject to NSPS Dc since 1999.

Prior to the May 15, 2006, Violation Notice was sent to Providence due to non-compliance with NSPS Subpart Dc (PTI No. 268-02, EU-Boiler1, SC 1.1). Refer to the letter of violation dated May 15, 2006 for details. Providence has now (FY2018) achieved compliance (PTI No. 268-02, EU-Boiler1, SC 1.1).

After May 15, 2006, Providence submitted NSPS Dc notification for Boiler 1, which began operation on March 12, 2003 (PTI No. 268-02, EU-Boiler1, SC 1.2). Please refer to March 24, 2003, letter from Mr. Joseph Serra regarding NSPS Dc notification.

After May 15, 2006, Providence has installed natural gas meter for the kitchen. Boiler No. 3 has its own meter. Every natural gas meter is read. Boilers' natural gas usage is determined using main, kitchen, etc. meters. Amount (gallons) of fuel oil used is determined using a dip-stick method.

Fuel oil (15 ppm sulfur ULSD Diesel) is used only during annual boiler testing (PTI No. 268-02, FG-Boilers, SC 2.3 limit: 1,098,594 gallons per 12-month, 0.5%S, 137,000 BTU per gallon). The fuel oil burning test lasts a couple of hours. Only off-road Ultra Low Sulfur Diesel (ULSD 15 ppm S) (PTI No. 268-02, FG-Boilers, SC 2.2, SC 2.5 limit: 0.5%S & sulfur content documentation) is used in both boilers and generators.

One shipment of off-road ULSD Diesel (15 ppm sulfur) was received on January 15, 2015 (\$/Gal = \$1.9990 for \$5,789.20) from D & W Oil Company, 14330 Wyoming Ave., Detroit, Michigan 48238 (313-834-2580). One shipment of off-road ULSD Diesel (15 ppm sulfur, 3,900 gallons) was received on January 25, 2017, from D & W Oil Company, 14330 Wyoming Ave., Detroit, Michigan 48238 (313-834-2580). There are two fuel oil tanks: 12,000-gallon North Tank and 15,000-gallon South Tank.

Fuel (natural gas and off-road ULSD Diesel) usage records are kept (PTI No. 268-02, FG-Boilers, SC 2.4) and reported via MAERS on an annual basis. Only ULSD (15 ppm sulfur) Diesel is used and ULSD supply records are available (PTI No. 268-02, FG-Boilers, SC 2.5).

Utilities usage spreadsheet has the required information on monthly and annual basis: make-up boiler feed water, pounds of steam produced, water cost, salt cost, natural gas usage, natural gas cost, etc.

CY 2016: Providence used 130 MM SCF of natural gas (\$573,842.43). 130 MM SCF per year usage results in 6.5 tons of NOx per year emissions. The permit has neither natural gas usage limit nor nitrogen oxides emissions limit.

Fuel oil back-up boilers (Boiler Nos. 1 & 2 and not 3) are tested annually while burning ULSD and all boilers are fired only with natural gas.

NSPS Dc Revisions:

1. 72 FR 32759 = Page 32759 Federal Register / Vol. 72, No. 113 / Wednesday, June 13, 2007 / Rules and Regulations / Final Rule – to add compliance alternatives and to revise certain recordkeeping and reporting requirements.
2. 74 FR 5091 = Page 5091 Federal Register / Vol. 74, No. 17 / Wednesday, January 28, 2009 / Rules and Regulations / Final Rule - to correct technical and editorial errors.

The NSPS revisions simplified the natural gas usage recordkeeping.

NESHAP / MACT 6J Area Boiler MACT

As the boilers are designed to be capable of burning liquid fuels such as fuel oil, Providence's boilers are subject to: NESHAP / MACT 6J, 40 CFR Part 63, Subpart JJJJJJ / 6J National Emission Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers, Page 15554, Federal Register / Vol. 76, No. 54 / Monday, March 21, 2011 / Rules and Regulations / Final rule. This NESHAP / MACT 6J rule does NOT apply to boilers that burn only gaseous fuels or any solid waste; the hospital's boilers are designed for liquid fuels, such as fuel oil, as well.

AQD has decided not to take delegation of these standards and therefore no attempt has been made to evaluate the hospital's compliance with NESHAP / MACT 6J.

The final rule sets different requirements for boilers based on their size, which is defined as follows:

- ✓ Large area source boilers have a heat input capacity equal to or greater than 10 million British thermal units (Btu) per hour (MMBtu/hr).
- ✓ Small area source boilers have a heat input capacity less than 10 MMBtu/hr.

The hospital has three large area source MACT 6J natural gas fired boilers (with fuel oil back-up) based upon design capacity (two 32.4 MM BTU / hour and one 16.7 MM BTU / hour). An affected source is an existing source if you commenced construction or reconstruction of the affected source on or before June 4, 2010. Hence the hospital's boilers are existing boilers concerning the NESHAP / MACT 6J (installed in 1963, 1999, 2003). Existing area source boilers (biomass and oil) are required comply with the following:

1. Tune-up every other year (biennial)
2. No numeric emission limits

A gas-fired boiler that periodically fires liquid fuels during gas curtailment and supply emergencies or for periodic (not to exceed a total of 48 hours during any calendar year) testing is still considered a gas-fired boiler. The hospital's boilers may be considered gas fired if records that prove 48-hour-limit are kept. In that case (< 48 hours), the NESHAP / MACT 6J rule does NOT apply to boilers that burn only gaseous fuels or any solid waste (solid waste rules apply).

The following notification requirements may apply:

1. Initial Notification: no later than September 17, 2011
2. Notification of Compliance Status subject to tune-ups: No later than July 19, 2012

AQD has decided not to take delegation of these standards and therefore no attempt has been made to evaluate the hospital's compliance with NESHAP / MACT 6J.

The hospital was subject to 40 CFR Part 63, Subpart DDDDD, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters (Federal Register / Vol. 69, No. 176 / Monday, September 13, 2004 / Page 55218 / Rules and Regulations). However, on June 8, 2007, US Court of Appeals had mandated that EPA vacate the Boiler MACT Rule in its entirety; in the interim period, 112(j) MACT permit was required. US EPA re-promulgated the Area Source Boiler MACT as NESHAP / MACT 6J.

Three emergency diesel generators

There are three emergency diesel generators:

1. Emergency Generator 1: Caterpillar Model SR4B. Serial No. 9DR04139. Engine Model No. 3406 (2001). Engine Serial No. 47R07560. 500 kVA, 400 kW (0.4 MW). 60 Hertz. PF=0.8. Non-resettable hours meter reading = 1,587 hours (11/02/2017 load test)

2. Emergency Generator 2: Removed about 2014.
3. Emergency Generator 3: Caterpillar Model NA. Serial No. NA. Engine Model No. 3412 (2002). Engine Serial No. 1EZ02521. 1,000 kVA, 800 kW (0.8 MW). 80 Hertz. PF=0.8. Non-resettable hours meter reading = 3,412 hours (11/02/2017 load test)
4. Emergency Generator 4: Caterpillar Model 3508 (1999). Serial No. NA. Engine Model No. 3508. Engine Serial No. 23Z07679. 1125 kVA, 900 kW (0.9 MW). NA Hertz. PF=0.8. Non-resettable hours meter reading = 975 hours (11/02/2017 load test)

All generators tested periodically:

1. Once per week: 15-minute no load test.
2. Once per month: 1-hour load test.
3. Once in three years: 4-hour load test

Each generator has its own day ULSD Diesel tank (about 100 gallon). Diesel is pumped from two large storage tanks (12,000-gallon North Tank and 15,000-gallon South Tank) to the day tanks (about 100 gallon each).

Area RICE MACT 4Z Diesel Emergency Generator -

Change oil/filter & inspect hoses/belts every 500 hours or annually; inspect air cleaner (CI) or spark plugs (SI) every 1,000 hours or annually. No emission standards.

These activities appear to be performed as part of preventive maintenance.

PTI Exemption - CI RICE Engines

Fuel usage for Caterpillar Generators is as follows:

1500 kW \equiv 105 gallons per hour diesel (DMC)
1050 kW \equiv 74 gallons per hour diesel
750 kW \equiv 55 gallons per hour diesel
600 kW \equiv 46 gallons per hour diesel
300 kW \equiv 28 gallons per hour diesel

Hence, a diesel generator up to 1 MW is exempt from Rule 336.1201 (Permit-to-Install) pursuant to Rule 336.1285(2)(g). It may be noted that some engines convert heat to work more efficiently than others. Recent engine designs have efficiencies up to 40% for heat to shaft work conversion. Converting work to electricity is up to 95% efficient.

RICE MACT 4Z: Emergency diesel generators may be subject to RICE MACT 4Z, Area Source NESHAP / MACT ZZZZ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines and National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines / Final rule (Page 3568, Federal Register / Vol. 73, No. 13 / Friday, January 18, 2008 / Rules and Regulations / Final rule). For questions

regarding the Area MACT 4Z, Providence must deal directly with Region 5, US EPA, Chicago. If and only if the engine operates as an emergency engine under the rule (40 CFR 63.6675 & 63.6640; exceptions apply, e.g., interruptible service contract with a power utility) and is located at residential, institutional, or commercial establishments (including hospitals), the generators are exempt from RICE MACT. These generators seem to satisfy emergency only requirement.

AQD has not taken delegation of these standards and therefore no attempt has been made to evaluate the Providence's compliance with NESHAP / MACT 4Z.

Three emergency diesel generators are not subject to (installed before 2006): NSPS 4I, 40 CFR Part 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition (CI) Internal Combustion Engines (ICE) Page 39154 Federal Register / Vol. 71, No. 132 / Tuesday, July 11, 2006 / Rules and Regulations /Final rule) because the generators were installed before 2006.

Conclusion

Hospital EO sterilizers were removed about September 2015. The boilers are in compliance with NSPS Dc and the permit.

NAME J. Alexander Hall DATE 01/29/2018 SUPERVISOR Joyce