

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

G506727210

FACILITY: WILLIAM BEAUMONT HOSPITAL		SRN / ID: G5067
LOCATION: 3601 W. 13 MILE RD., ROYAL OAK		DISTRICT: Southeast Michigan
CITY: ROYAL OAK		COUNTY: OAKLAND
CONTACT: Debra De Napoli , Safety Director		ACTIVITY DATE: 07/24/2014
STAFF: Rebecca Loftus	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT:		
RESOLVED COMPLAINTS:		

On July 24, 2014, I, Rebecca Loftus, and Sam Liveson from the Department of Environmental Quality's (DEQ) Air Quality Division (AQD), conducted an inspection of William Beaumont Hospital-Royal Oak (Beaumont), SRN: G5067, located at 3601 W 13 Mile Road, in Royal Oak, Michigan. The purpose of this inspection was to determine the Beaumont's compliance with the Federal Clean Air Act Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act of 1994, PA 451, as amended, Michigan's Air Pollution Control Rules, and the conditions established in Renewable Operating Permit (ROP) No. MI-ROP-G5067-2009, Permit to Install (PTI) No. 180-12A, and PTI No. 205-02C.

At the time of my inspection, PTI No. 180-12A and 205-02C were being rolled into the ROP renewal; the anticipated ROP renewal issuance date is September 2014. My inspection report below focuses on the applicable regulations from each permit; some of the conditions in MI-ROP-G5067-2009 are obsolete and replaced by conditions found in the newer PTIs.

**Contacts**

Upon arriving at the facility, Sam and I met with the following staff:

- Ms. Debra F. DeNapoli, Safety Director, overall environmental compliance, 248-551-7085
- Ms. Amy Blazejewski, Environmental, Health, and Safety Program Manager at JLL, 248-551-8826
- Mr. Clayton Dees, Superintendent Building Systems, 248-898-1352
- Mr. Dave Mutschler, Electromechanical Senior Technician, sterilizers, 248-551-7384
- Mr. Ron Boyd, Supervisor, sterilizers, 248-898-7443
- Mr. Gerald Meek, Power Plant Supervisor, power plant operations, 248-551-6351
- Mr. Howard Bosch, Power Plant Leader
- Mr. Erik Lewis, Beaumont Staff, garage and cold cleaners
- Mr. Ken Paczkowski, Supervisor Carpentry and Paint Shop, paint booth and wood shop, 248-551-6331
- Mr. Andy Rusnak, Environmental Engineer at Derenzo and Associates, records, 517-324-1880

**Permits Overview**

**ROP No. MI-ROP-G5067-2009**

On July 23, 2009, ROP No. MI-ROP-G5067-2009 was issued to Beaumont for the operation of five boilers, 12 emergency internal combustion generators, three ethylene oxide sterilizers, two cold cleaners, and a paint spray booth operated under the Rule 287(c) exemption.

**PTI Nos. 180-12 and 180-12A**

On November 19, 2012, Beaumont applied for a PTI to have enforceable limits/language that would designate 12 existing reciprocating internal combustion engines (RICE) as "emergency RICEs". They also requested to modify the No 2. Fuel Oil Testing Language in the ROP to allow them to use an approved default No. 2 fuel oil Btu content and fuel supplier certifications (in lieu of testing). The Boilers were also pulled into this permit because of the Fuel Oil Flexible Group. Now all language pertaining to Fuel for the entire facility can be found under FG-FUELOIL. PTI No. 180-12 was issued to Beaumont on January 17, 2013.

On November 18, 2013, Beaumont requested to modify PTI No. 180-12 to replace three existing RICEs with two CAT 3516C emergency RICEs. PTI No. 180-12A was issued to Beaumont on December 20, 2013.

**PTI Nos. 205-02B and 205-02C**

On April 8, 2013, Beaumont applied for a modification of PTI 205-02A (the permit for the ethylene oxide sterilizers with scrubber control). The existing Sterilizers used a sterilant blend that is being phase out in the US so Beaumont needed to replace these units. There are four new units (two Model 8XL and two Model 5XL); only three can operate at a time. Beaumont was given permission via email to remove the existing equipment and install new any time after July 18, 2013. The paper copy of the PTI 205-02B, was issued on July 23, 2013.

On January 31, 2014, Beaumont applied for a modification to PTI 205-02B. Due to increase of sterilization demand Beaumont needed to modify their permit to allow all four units to operate simultaneously; and therefore increase the allowable emissions. In their application, Beaumont demonstrated that the two Model 5XL units can exhaust to the same scrubber simultaneously and still control emissions to a 99.5% reduction efficiency. PTI No. 205-02C was issued on March 13, 2014.

**Facility Overview**

During the inspection, Beaumont staff escorted us through the campus and explained the location and details of each process. Copies of all record keeping were provided at the time of the inspection (see attached records).

The Beaumont Royal Oak campus consists of more than one million square feet of occupied space. The campus is equipped with five boilers which primarily combust natural gas to provide steam to the campus. The steam is used throughout the hospital for heating, sterilization, and cooking purposes. Hospitals are required to have a backup fuel supply in the event of a disruption of natural gas service to the facility; therefore, the facility's boilers are also capable of combusting fuel oil No. 2 for emergency purposes. Similarly, hospitals are also required to maintain electrical service in the event of power outages; for this reason Beaumont previously installed twelve No. 2 oil backup generators. In addition to the backup generators, Beaumont has two Cogeneration Engines that can be utilized to supply power to the hospital and have recently been re-classified as emergency use only.

The boilers, engines, and generators are located throughout the campus at the following locations:

Location	Equipment
West Powerhouse	Boilers 1 through 5, Cogen Engine 1, Cogen Engine 2, and Emergency Generators #1-7 Emergency Generators 1R will replace #3 and 2R will replace #4 and #5
East Powerhouse	Emergency Generators 8 and 9
Research Building	Three emergency generators labeled Research Generators 1-3

Beaumont also has multiple fuel oil storage tanks: two 20,000 gallon storage tanks located in the West Powerhouse, one 40,000 gallon storage tank located in the East Powerhouse, and one 6,000 gallon storage tank located outside the Research & Development building.

In the basement of the hospital, Beaumont operates four ethylene oxide sterilizers to sterilize surgical instruments and tools. The ethylene oxide emissions are controlled by an acid scrubber and dry chemical filtration system.

Throughout the campus, Beaumont operates miscellaneous equipment that has the potential to emit air contaminants of concern, including: cold cleaners, a paint spray booth, a woodshop sander with dust collector, welding equipment, research boilers, and hot water heaters.

**Boilers and Emergency Generators**

The five boilers at Beaumont are covered under multiple flexible groups in the ROP (EU-BOILER1, FG-247-97B, FG-BOILER4&5, and FG-33-1) and fuel for the entire facility can be found under FG-FUELOIL in PTI No. 180-12A. At the time of my inspection only Boilers #3 and #5 were operating; no visible emissions were observed from their stacks. The routine preventative maintenance events for all hospital equipment including the boilers, generators, and cogenerators are recorded on a weekly, monthly, and yearly basis, by a computer software program. AQD staff verified that the facility is maintaining these maintenance records during the inspection.

**EU-BOILER1**

The conditions established for Boiler 1 are listed under emission unit EU-BOILER. Boiler 1 is a "Keller Model N. DS-30" boiler with a heat capacity of 39 MM BTU/hr capable of producing 30,000 pounds of steam/hr. Boiler 1 is capable of burning either natural gas or fuel oil No. 2.

Based on the provided 12-month rolling emission records, through July 2014, Boiler 1 emitted 6.6 tons of NOx and 21.6 pounds of SO2 (see attached records). From January through June of 2014 Beaumont used 1000 gallons of fuel oil in Boiler 1.

#### FG-247-97B

The flexible group FG-247-97B includes Boiler 2 and emergency generators 5, 6, and 7 which were originally permitted under PTI #247-97B. Boiler 2 is identified as EU-BOILER2 in the ROP and the emergency generators are identified as EU-ELECGEN5, EU-ELECGEN6, and EU-ELECGEN7.

Boiler 2 is a "Cleaver-Brooks Model D-60E Boiler" with a heat input capacity of 48.2 MM BTU/hour using natural gas fuel and 46.4 MM BTU/hour using fuel oil No. 2. The boiler is capable of producing 40,000 pounds of steam per hour and can combust natural gas or fuel oil No. 2.

The ROP establishes a natural gas usage limit of 420 MM cubic feet and a fuel oil No. 2 usage limit of 200,000 gallons per 12-month rolling period. As of July 2014, the 12-month rolling records (attached) indicate Boiler 2 combusted 150.3 MM cubic feet of natural gas and 77 gallons of fuel oil.

Boiler 2 has a SO2 emission limit of 247.2 pounds per day and a NOx emission limit of 23 tons per 12-month rolling period. The 12-month rolling records indicate that Boiler 2 emitted 34.8 pounds of SO2 (because of the low sulfur content fuel) and 9.47 tons of NOx.

For Emergency Generators 5, 6, and 7, the ROP establishes a combined fuel oil usage limit of 65,000 gallons per 12-month rolling period. The 12-month rolling records indicate that 5821 gallons of fuel oil were combusted by these three generators.

The fuel oil combusted in Boiler 2 and the emergency generators is subject to the same fuel analysis guidelines as Boiler 1, however the fuel oil has a 0.20% sulfur limit by weight. As mentioned above, the sulfur content in the latest shipment of fuel oil was less than 0.0015% by weight.

#### FG-BOILER4&5

The flexible group FG- BOILER4&5 establishes permit conditions for Boilers 4 and 5. Both Boiler 4 and Boiler 5 have heat capacities of 48 MM BTU/hour and are capable of producing 40,000 pounds of steam per hour and can combust natural gas or fuel oil No. 2.

The ROP establishes natural gas usage limit of 693.8 MM cubic feet and a fuel oil usage limit of 5,250 gallons for Boilers 4 and 5 combined per 12-month rolling period. As of July 2014, the 12-month rolling records indicate that 111.6 MM cubic feet of natural gas and 906 gallons of fuel oil were combusted by the two boilers.

Boilers 4 and 5 share a 240 pounds per day SO2 emission limit and a 48.5 tons NOx emission limit per 12-month rolling period. The 12-month rolling records indicate that 19.6 pounds of SO2 and 7.3 tons of NOx were emitted.

The fuel oil combusted in the Boilers 4 and 5 is subject to a 0.20% by weight sulfur limit. As mentioned above, the sulfur content in the latest shipment of fuel oil was less than 0.0015% by weight.

#### FG-33-01

The flexible group FG-33-01 includes Boiler 3 and emergency generators 8 and 9 which were incorporated into the ROP from PTI 33-01. Boiler 3 is identified as EU-BOILER3 and the emergency generators are identified as ELECGEN8 and ELECGEN9.

Boiler 3 is a "Cleaver-Brooks Model D-60E Boiler" with a heat input capacity has a heat capacity of 48.2 MM BTU per hour and is capable of producing 40,000 pounds of steam per hour and can combust natural gas or fuel oil No. 2.

The ROP establishes a natural gas usage limit of 420 MM cubic feet and a fuel oil usage limit of 200,000 gallons per 12-month rolling period. As of July 2014, the 12-month rolling records indicate that Boiler 3 combusted 145.3 MM cubic feet of natural gas and 1610 gallons of fuel oil.

Boiler 3 has a SO<sub>2</sub> emission limit of 247.2 pound per day and a NO<sub>x</sub> emission limit of 23 tons per 12-month rolling period. The 12-month rolling records indicate that Boiler 3 emitted 34.8 pounds of SO<sub>2</sub> (because of the low sulfur content fuel) and 9.47 tons of NO<sub>x</sub>.

For Emergency Generators 8 and 9, the ROP has a combined fuel oil usage limit of 65,000 gallons per 12-month rolling period. The 12-month rolling records indicate that 2928 gallons of fuel oil were combusted by these two generators.

#### **FG-COGEN**

The flexible group FG-COGEN includes two "Fairbanks-Morse" cogeneration engines capable of producing 1928 Kilowatts of electricity with a heat input of 17 MMBTU/hour. The engines are also capable of producing 2,000 pounds of steam per hour. The cogeneration engines are labeled COGEN1 and COGEN2 in the ROP.

Natural gas and fuel oil usage records are being maintained for the COGEN engines; however, the ROP does not contain specific natural gas and fuel oil usage limits. As of July 2014, the 12-month rolling records indicate that COGEN1 combusted 2000 cubic feet of natural gas and 4178 gallons of fuel oil and COGEN2 combusted 123,000 cubic feet of natural gas and 2669 gallons of fuel oil.

The ROP does establish a combined NO<sub>x</sub> emission limit for FG-COGEN of 82.2 ton per 12-month rolling time period. The 12-month rolling records indicate that the two units emitted 1653.4 pounds of NO<sub>x</sub>.

The fuel oil combusted in the cogeneration engines is in compliance with the 0.2% sulfur by weight limit established in the ROP.

#### **FG-DCENGINES**

This flexible group is no longer applicable. As stated above, all fuel requirements are now covered under FG-FUELOIL in PTI No. 180-12A.

#### **FG-ELECGEN1&2R**

2,000 kilowatts (kW) diesel-fueled emergency engines manufactured in 2013. At the time of my inspection, I was told 1R is schedule to be installed in February 2015 and 2R in July 2015. Compliance with the permit conditions will be determined at the next AQD inspection. FG-FUELOIL in PTI No. 180-12A

This flexible group covers all emission units that use fuel oil. As per FG-FUELOIL in PTI No. 180-12A, the latest fuel oil report was received on July 31, 2014. The report indicated Beaumont received "ultra-low sulfur oil" (less than 0.0015% sulfur by weight) from their oil supplier for use at the facility.

#### **Sterilizers**

The previous three sterilizers used a sterilant blend that was phased out in the United States so Beaumont replaced these units with four new units (two Model 8XL and two Model 5XL). Ethylene oxide emissions must be control to a 99.5% reduction efficiency The control system consists of acid scrubbers in series followed by a dry chemical filter.

The sterilizers are used to sterilize surgical tools and other sensitive medical equipment. After sterilization, an oil-sealed pump removes gas from the chamber and the gas is vented to an acid scrubber and through a dry chemical bed filter. Ethylene oxide is converted to ethylene glycol after being sent through the sulfuric acid scrubber. Ethylene glycol is collected in a holding tank at the bottom of the scrubber. Finally, aeration of the chamber containing the sterilized parts takes place for 12 hours to remove residual ethylene oxide using an oil-sealed vacuum pump. Each sterilization cycle is approximately 14-15 hours in duration; with one hour contact time and 12 hours aeration.

During the inspection AQD staff verified that monthly and weekly preventative maintenance checks are performed on the vacuum pumps, chambers, and emission control equipment (see attached records). In the application for PTI 205-02C, Beaumont demonstrated that the control system is meeting the 99.5% ethylene oxide destruction efficiency and hourly emission limit established in the PTI. The pH of the acid scrubbing solution is checked monthly with litmus paper to ensure that that pH is less than 3.0. The scrubbing solution is changed approximately every three years.

Beaumont provided copies of the records (see attached) that show their calculations for ethylene oxide emissions. The 8XL Models use 0.37lbs/load and the 5 XL models use 0.22 lbs/load.

The hospital is maintaining the following records as required by their ROP: monthly number of loads, monthly ethylene oxide emissions and 12 month rolling emissions. The records provided indicate that the hospital is in compliance with the recordkeeping, monitoring, and emission limits for the ethylene oxide sterilizers (see attached records for details). All sterilizers are in compliance with the lbs/load limits and the 3.69lb/year emission limit.

**FG-287(c)**

The flexible group FG-287(c) addresses a paint spray booth located in Beaumont's woodshop. AQD staff verified that the paint spray filters were installed and properly maintained during the inspection. The facility uses HVLP applicator guns in the booth and paint usage records are being maintained on-site. The paint usage for all of 2013 was reported as 0 gallons (not used).

**FG-COLDCLEANERS**

The hospital operates two cold cleaners. One of the cold cleaners is located in the West Powerhouse and the other is located in the garage. The cold cleaner in the West Powerhouse uses "Armakleen MPC Cleaning Solution" which is an aqueous alkaline cleaning solution consisting of mainly sodium carbonate and water. Proper cold cleaner operating procedures were posted on this cold cleaner. The cold cleaner in the landscaping/utility section building uses recycled "Safety-Kleen 105" cleaning solvent. "Safety-Kleen" is composed of 99-100% by weight mineral spirits. Proper cold cleaning procedures were also posted above this cold cleaner. The lids of both cold cleaners were closed at the time of the inspection although it did not appear that either cold cleaner had been recently used. The MSDS sheets for the two cold cleaners are available in the AQD file.

**Miscellaneous Equipment**

Beaumont has a sanding area in the woodshop where particulate emissions are controlled by a "Torit" baghouse located along the outside of the building. The woodworking operations appear to be exempt from obtaining a Permit to Install (PTI) pursuant Rule 285(l)(vi)(C). During my inspection, I noted that the dust collector appeared to be maintained and did not observe any fugitive dust.

In the garage, hand welders are occasionally used; these activities appear to be exempt from obtaining a PTI pursuant Rule 285(i).

As mentioned earlier, Beaumont has multiple above and below ground fuel oil storage tanks; these appear to be exempt from a obtaining a PTI pursuant to Rule 284(d) and do not appear to be subject to 40 CFR Part 60, Subpart Kb.

This campus also has multiple heating units that appear to be exempt from a obtaining a PTI pursuant to Rule 282(b)(i). Beaumont currently lists the following units under this exemption: Research Boilers 1, 2, 9, 10, and 11, Eight Lochinvar hot water heating boilers, and two domestic hot water heating boilers.

During the inspection, Beaumont staff also mentioned installing additional emergency generators for the new expansion. Mr. Rusnak will follow-up with Beaumont regarding any additional permits that may be needed prior to installing the new generators.

**Michigan Air Emission Reporting System (MAERS)**

The Source Reported Emissions for 2013 are as follows:

NOx	31.5	Tons
CO	23	Tons
VOC	1.5	Tons
PM2.5Primary	2.0	Tons
SO2	921.95	lbs

Ammonia	254.77 lbs
Lead	0.26 lbs

As noted in this report, each emission unit and flexible group appears to be in compliance with the limits established in ROP No. MI-ROP-G5067-2009, PTI No. 180-12A, and PTI No. 205-02C.

**Federal Regulations**

Equipment located at Beaumont is subject to the following Federal Regulations:

- The National Emission Standards for Hazardous Air Pollutants for Hospital Ethylene Oxide Sterilizers, 40 CFR, Part 63, Subpart WWWW
- The National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE), 40 CFR, Part 63, Subpart ZZZZ,
- The Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, 40 CFR, Part 60, Subpart IIII (1R and 2R emergency generators)
- The Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, 40 CFR, Part 60, Subpart Dc.
- The National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources, 40 CFR, Part 63, Subpart JJJJJ.

Each Federal Regulation was assessed during permitting; the ROP and PTIs have specific conditions which Beaumont uses to demonstrate compliance with these Federal Regulations.

**Conclusion**

Based on information gathered and reviewed, at this time, William Beaumont Hospital - Royal Oak appears to be in compliance with the Federal Clean Air Act, Michigan's Air Pollution Control Rules, and the conditions established in ROP No. MI-ROP-G5067-2009, PTI No. 180-12A, and PTI No. 205-02C.

NAME Rebecca J. [Signature] DATE 8/12/14 SUPERVISOR CJE