

STATE OF MISSOURI



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 022013-004

Project Number: 2011-10-041
Installation Number: 510-0204

Parent Company: BJC Healthcare
Parent Company Address: 600 S. Taylor, St. Louis, MO 63110
Installation Name: Barnes-Jewish Hospital
Installation Address: 1 Barnes-Jewish Hospital Plaza, St. Louis, MO 63110
Location Information: St. Louis City

Application for Authority to Construct was made for:
The installation of dual-fired boilers, diesel emergency generators, fuel storage tanks, ethylene oxide sterilizers, cooling towers, and miscellaneous natural gas combustion equipment. This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*.

- Standard Conditions (on reverse) are applicable to this permit.
- Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

FEB 25 2013

EFFECTIVE DATE

DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if the permittee fails to begin construction or modification within two years from the effective date of this permit. The permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

The permittee will be in violation of 10 CSR 10-6.060 if the permittee fails to adhere to the specifications and conditions listed in the application, this permit, and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

The permittee shall notify the Department's Air Pollution Control Program of the anticipated date of startup of these air contaminant sources. The information shall be made available within 30 days of actual startup. Also, the permittee shall notify the Department of Natural Resources' St. Louis Regional Office within 15 days after the actual startup of these air contaminant sources.

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

The permittee may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If the permittee chooses to appeal, the permittee must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If the permittee chooses not to appeal, this certificate, the project review, and the application and associated correspondence constitutes the permit to construct. The permit allows the permittee to construct and operate the air contaminant sources, but in no way relieves the permittee of the obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources, and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060(12)(A)10. "Conditions required by permitting authority."

Barnes-Jewish Hospital
St. Louis City

1. **Superseding Condition**
The conditions of this permit supersede all special conditions found in the previously issued construction permits 97-07-044T, 99-11-076, 00-04-020, 01-02-006, 01-05-008, 01-02-006, and 01-12-038 issued by the City of St. Louis' Division of Air Pollution Control.
2. **Nitrogen Oxides (NO_x) Emission Limitation**
 - A. The permittee shall emit less than 40.0 tons of NO_x in any consecutive 12-month period from the entire installation as identified in Table 2.
 - B. Attachment A or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with NO_x emission limitation.
3. **Ethylene Oxide (CAS #75-21-8) Emission Limitation**
 - A. The permittee shall emit less than 0.1 tons of Ethylene Oxide (75-21-8) emissions from the entire installation as identified in Table 2.
 - B. Attachment B or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Ethylene Oxide (75-21-8) emission limitation.
4. **Emergency Generator Requirements**
The permittee shall install a nonresettable meter on each engine.
5. **Fuel Requirements**
 - A. The permittee shall only combust natural gas or fuel oil #2 in the installation's boilers.
 - B. The permittee shall only combust diesel in the installation's emergency generators.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- C. The permittee shall not combust fuel oil #2 or diesel containing sulfur in excess of 0.0015 weight percent.
 - D. The permittee shall obtain the sulfur content for each delivery of fuel oil #2 and diesel from the fuel vendors or conduct their own fuel analysis to evaluate the sulfur content weight percent of the the fuel oil #2/diesel.
6. Record Keeping and Reporting Requirements
- A. The permittee shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request.
 - B. The permittee shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten days after the end of the month during which records indicate an exceedance of the NO_x emission limitation.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW

Project Number: 2011-10-041
Installation ID Number: 510-0204
Permit Number:

Barnes-Jewish Hospital
1 Barnes-Jewish Hospital Plaza
St. Louis, MO 63110

Complete: November 2, 2012

Parent Company:
BJC Healthcare
600 S. Taylor
St. Louis, MO 63110

St. Louis City

REVIEW SUMMARY

- This permit does not allow for the installation of any new equipment. This review is a remedial action to correct errors within previously issued construction permits and to permit equipment that was installed without properly obtaining a construction permit. For a full list of affected equipment see Table 2.
- Ethylene Oxide (75-21-8) will be emitted from the Ethylene Oxide Sterilizers at the installation. Additional HAPs will be emitted from fuel combustion.
- 40 CFR Part 60, Subpart Dc – *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* is applicable to EP-11A Boiler #7, EP-11B Boiler #8, EP-11C Boiler #9, and EP-12 Boiler #10.
- 40 CFR Part 60, Subpart IIII – *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* is applicable to EP-15 Emergency Generator and EP-16 Emergency Generator.
- 40 CFR Part 63, Subpart ZZZZ – *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines* is applicable to EP-15 Emergency Generator and EP-16 Emergency Generator. The other generators located at the installation are not subject as they are existing institutional emergency stationary RICE located at an area source. [§63.6590(b)(3)(viii)]
- 40 CFR Part 63, Subpart WWWW – *National Emission Standards for Hospital Ethylene Oxide Sterilizers* is applicable to EP-17A Ethylene Oxide Sterilizer #1, EP-17B Ethylene Oxide Sterilizer #2, EP-17C Ethylene Oxide Sterilizer #3, and EP-17D Ethylene Oxide Sterilizer #4.

- 40 CFR Part 63, Subpart JJJJJJ – *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources* is applicable to EP-01A Boiler #1, EP-01B Boiler #2, EP-01C Boiler #3, EP-11A Boiler #7, EP-11B Boiler #8, EP-11C Boiler #9, and EP-12 Boiler #10.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*. Potential emissions of NO_x are conditioned below *de minimis* levels. Potential emissions of Ethylene Oxide (75-21-8) are conditioned below the SMAL.
- This installation is located in St. Louis City, a moderate nonattainment area for the 8-hour ozone standard, a nonattainment area for the 1997 PM_{2.5} standard, and an attainment area for all other criteria pollutants.
- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 100 tons per year for VOC and NO_x and 250 tons per year for all other criteria pollutants. Fugitive emissions are not counted toward major source applicability.
- Ambient air quality modeling was not performed since potential emissions of the application are below *de minimis* levels and SMALs.
- Emission testing is not required for the equipment.
- The installation has a Part 70 Renewal application, Project 2006-05-065, currently submitted at the Air Pollution Control Program; however, upon issuance of this construction permit the installation will qualify for a Basic Operating Permit. A Basic Operating Permit application is required for this installation within 30 days of receipt of this permit. Upon receipt of the Basic Operating Permit application, the existing Part 70 Renewal application will be closed out.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Barnes-Jewish Hospital is an existing medical campus, established as two separate hospitals in the early 1900s. The modern medical campus consists of Barnes-Jewish Hospital South, Barnes-Jewish Hospital North, Center for Advanced Medicine (CAM), Center for Outpatient Health (COH), St. Louis Children's Hospital (SLCH), Goldfarb College of Nursing (CON), Clayton Avenue Building (CAB), Taylor Avenue Building (TAB), Barnes Lodge, Yalem, Peters, North Parking Garage, and South Parking Garage. Altogether the medical campus contains 1,158 licensed beds.

The installation has received a number of construction permits from the City of St. Louis' Division of Air Pollution Control; however, due to miscommunication between the City of St. Louis and the Missouri Department of Natural Resources these construction permits contain errors.

Table 1: Permit History

Permit Number	Description
98-07-044T	Expired temporary construction permit.
99-11-076	Installation of EP-12 – a 72.7 MMBtu/hr dual-fired boiler
00-04-020	Installation of EP-11A, EP-11B, and EP-11C – three 44 MMBtu/hr dual-fired boilers.
01-02-006	Increased fuel oil usage in EP-11A, EP-11B, and EP-11C.
01-05-008	Installation of EP-05 – a 500 kW diesel emergency generator.
01-05-008A	Administrative amendment.
01-02-006A	Administrative amendment.
01-12-038	Installation of EP-08A, EP-08B, EP-08C, EP-08D, EP-14A, EP-14B, and EP-14C – four 1,000 kW diesel emergency generators and three 1,250 kW diesel emergency generators.

PROJECT DESCRIPTION

This construction permit is being issued as a remedial action to correct errors within previously issued construction permits and to permit equipment that was installed without properly obtaining a construction permit. This construction permit evaluates the following existing equipment:

Table 2: Installation Equipment List by building

Barnes-Jewish Hospital South – East Pavilion		
Emission Unit	Description	Construction Date
EP-01A	Boiler #1 – natural gas or fuel oil #2 25.106 MMBtu/hr	1971
EP-01B	Boiler #2 – natural gas or fuel oil #2 25.106 MMBtu/hr	1984
EP-01C	Boiler #3 – natural gas or fuel oil #2 25.106 MMBtu/hr	1984
EP-02A	Emergency Generator #1 – diesel 500 kW	2003
EP-02B	Emergency Generator #2 – diesel 500 kW	2003
EP-02C	Emergency Generator #3 – diesel 500 kW	2003
EP-02D	Emergency Generator #4 – diesel 500 kW	2003
-	East Storage Tank – fuel oil #2 15,000 gallons	-
-	West Storage Tank – fuel oil #2 15,000 gallons	-
-	Day Tank #1 – diesel 300 gallons	-
-	Day Tank #2 – diesel 300 gallons	-
-	Day Tank #3 – diesel 300 gallons	-
-	Day Tank #4 – diesel 300 gallons	-
-	Cooling Towers #1	-
-	Cooling Tower #2	-
-	Cooling Tower #3	-

Barnes-Jewish Hospital South – Queeny Tower		
Emission Unit	Description	Construction Date
EP-04	Emergency Generator #12 – diesel 410 kW	1984
EP-05	Emergency Generator #20 – diesel 500 kW	2001
-	South Storage Tank – fuel oil #2 1,500 gallons	-
-	North Storage Tank – fuel oil #2 1,500 gallons	-
-	Day Tank #1 – diesel 750 gallons	-
-	Day Tank #2 – diesel 750 gallons	-
-	Cooling Tower #1	-
-	Cooling Tower #2	-

Barnes-Jewish Hospital South – West Pavilion		
Emission Unit	Description	Construction Date
EP-03A	Emergency Generator #7 – diesel 500 kW	1997
EP-03B	Emergency Generator #8 – diesel 500 kW	1997
EP-03C	Emergency Generator #9 – diesel 500 kW	1997
EP-03D	Emergency Generator #10 – diesel 500 kW	1997
EP-03E	Emergency Generator #11 – diesel 500 kW	1997
-	Day Tank – diesel 500 gallons	-
-	Cooling Tower #1	-
-	Cooling Tower #2	-
-	Cooling Tower #3	-

Barnes-Jewish Hospital South – Southwest Tower		
Emission Unit	Description	Construction Date
EP-14A	Emergency Generator #1 – diesel 1,250 kW	2002
EP-14B	Emergency Generator #2 – diesel 1,250 kW	2002
EP-14C	Emergency Generator #3 – diesel 1,250 kW	2002
-	Storage Tank #1 – fuel oil #2 11,400 gallons	-
-	Storage Tank #2 – fuel oil #2 11,400 gallons	-
-	Day Tank #1 – diesel 200 gallons	-
-	Day Tank #2 – diesel 200 gallons	-
-	Day Tank #3 – diesel 200 gallons	-
-	Cooling Tower #1	-
-	Cooling Tower #2	-
-	Cooling Tower #3	-

Barnes-Jewish Hospital North – Center for Advanced Medicine (CAM)		
Emission Unit	Description	Construction Date
EP-08A	Emergency Generator #1 – diesel 1,000 kW	2002
EP-08B	Emergency Generator #2 – diesel 1,000 kW	2002
EP-08C	Emergency Generator #3 – diesel 1,000 kW	2002
EP-08D	Emergency Generator #4 – diesel 1,000 kW	2002
-	Day Tank #1 – diesel 100 gallons	-
-	Day Tank #2 – diesel 100 gallons	-
-	Day Tank #3 – diesel 100 gallons	-
-	Day Tank #4 – diesel 100 gallons	-
-	Cooling Tower #1	-
-	Cooling Tower #2	-
-	Cooling Tower #3	-

Barnes-Jewish Hospital North – Shoenberg Pavilion		
Emission Unit	Description	Construction Date
EP-17A	Ethylene Oxide Sterilizer #1	1993
EP-17B	Ethylene Oxide Sterilizer #2	1993
EP-17C	Ethylene Oxide Sterilizer #3	2004
EP-17D	Ethylene Oxide Sterilizer #4	2004
-	Cooling Tower #1	-
-	Cooling Tower #2	-
-	Cooling Tower #3	-

Barnes-Jewish Hospital North – Yalem		
Emission Unit	Description	Construction Date
-	Cooling Tower	-

Barnes-Jewish Hospital North – Kingshighway Building		
Emission Unit	Description	Construction Date
-	Cooling Tower #1	-
-	Cooling Tower #2	-

St. Louis Children’s Hospital		
Emission Unit	Description	Construction Date
EP-13A	Emergency Generator #1 – diesel 750 kW	1981
EP-13B	Emergency Generator #2 – diesel 750 kW	1981
EP-13C	Emergency Generator #3 – diesel 750 kW	1981
EP-13D	Emergency Generator #4 – diesel 750 kW	1990
EP-13E	Emergency Generator #5 – diesel 750 kW	1990
EP-13F	Emergency Generator #6 – diesel 750 kW	1990
EP-18	Water Heater – natural gas 2.9 MMBtu/hr	-
-	Storage Tank – fuel oil #2 20,000 gallons	-
-	Cooling Tower #1	-
-	Cooling Tower #2	-
-	Cooling Tower #3	-
-	Cooling Tower #4	-

Goldfarb College of Nursing (CON)		
Emission Unit	Description	Construction Date
EP-15	Emergency Generator – diesel 300 kW	2007
EP-19A	Boiler #1 – natural gas 2 MMBtu/hr	-
EP-19B	Boiler #2 – natural gas 2 MMBtu/hr	-
EP-19C	Boiler #3 – natural gas 2 MMBtu/hr	-
EP-20	Water Heater – natural gas 0.2 MMBtu/hr	-
-	Cooling Tower #1	-
-	Cooling Tower #2	-

Barnes-Jewish Hospital North – Center for Outpatient Health (COH)		
Emission Unit	Description	Construction Date
EP-16	Emergency Generator – diesel 450 kW	2010

Barnes-Jewish Hospital South – South Parking Garage		
Emission Unit	Description	Construction Date
EP-06	Emergency Generator #13 – diesel 400 kW	1984
-	Storage Tank – fuel oil #2 1,500 gallons	-
-	Day Tank – diesel 50 gallons	-

Barnes-Jewish Hospital North – North Parking Garage		
Emission Unit	Description	Construction Date
-	Storage Tank #1 – fuel oil #2 12,000 gallons	-
-	Storage Tank #2 – fuel oil #2 12,000 gallons	-
-	Storage Tank #3 – fuel oil #2 23,750 gallons	-
-	Storage Tank #4 – fuel oil #2 23,750 gallons	-
-	Storage Tank #5 – fuel oil #2 23,750 gallons	-
-	Storage Tank #6 – fuel oil #2 23,750 gallons	-

Clayton Avenue Building (CAB)		
Emission Unit	Description	Construction Date
EP-09	Emergency Generator #1 – diesel 600 kW	1987
EP-10	Emergency Generator #2 – diesel 1,000 kW	1993
EP-21A	Boiler #1 – natural gas 2.049 MMBtu/hr	-
EP-21B	Boiler #2 – natural gas 2.049 MMBtu/hr	-
EP-22A	Dock Heater #1 – natural gas 0.4 MMBtu/hr	-
EP-22B	Dock Heater #2 – natural gas 0.4 MMBtu/hr	-
-	Storage Tank T-1 South – diesel 6,000 gallons	-
-	Storage Tank T-2 North – diesel 6,000 gallons	-
-	Day Tank #1 – diesel 500 gallons	-
-	Day Tank #2 – diesel 500 gallons	-

Taylor Avenue Building (TAB)		
Emission Unit	Description	Construction Date
EP-23	Water Heater – natural gas 0.125 MMBtu/hr	-
EP-24A	WellAwares Water Heater #1 – natural gas 0.1999 MMBtu/hr	-
EP-24B	WellAwares Water Heater #2 – natural gas 0.1999 MMBtu/hr	-
EP-25A	Dock Heater #1 – natural gas 0.075 MMBtu/hr	-
EP-25B	Dock Heater #2 – natural gas 0.075 MMBtu/hr	-
EP-26A	Roof Top Unit #1 – natural gas 0.5 MMBtu/hr	-
EP-26B	Roof Top Unit #2 – natural gas 0.5 MMBtu/hr	-
EP-26C	Roof Top Unit #3 – natural gas 0.35 MMBtu/hr	-
EP-26D	Roof Top Unit #4 – natural gas 0.35 MMBtu/hr	-
EP-26E	Roof Top Unit #5 – natural gas 0.35 MMBtu/hr	-
EP-26F	Roof Top Unit #7 – natural gas 0.5 MMBtu/hr	-

Barnes Lodge		
Emission Unit	Description	Construction Date
EP-27	Boiler – natural gas 1 MMBtu/hr	-
EP-28A	Water Heater #1 – natural gas 0.14 MMBtu/hr	-
EP-28B	Water Heater #2 – natural gas 0.2 MMBtu/hr	-

Barnes-Jewish Hospital South – Peters		
Emission Unit	Description	Construction Date
-	Cooling Tower #1	-
-	Cooling Tower #2	-
-	Cooling Tower #3	-

Barnes-Jewish Hospital North – Power Plant		
Emission Unit	Description	Construction Date
EP-11A	Boiler #7 – natural gas or fuel oil #2 44 MMBtu/hr	1992
EP-11B	Boiler #8 – natural gas or fuel oil #2 44 MMBtu/hr	1992
EP-11C	Boiler #9 – natural gas or fuel oil #2 44 MMBtu/hr	1992
EP-12	Boiler #10 – natural gas or fuel oil #2 72.7 MMBtu/hr	2000

EMISSIONS/CONTROLS EVALUATION

GHG emission factors for fuel combustion were obtained from 40 CFR Part 98 *Mandatory Greenhouse Gas Reporting Rule*.

Natural gas combustion emission factors were obtained from EPA document AP-42, *Compilation of Air Pollution Emission Factors*, Fifth Edition, Section 1.4 “Natural Gas

Combustion” (July 1998). Fuel oil #2 combustion emission factors were obtained from AP-42’s Section 1.3 “Fuel Oil Combustion” (May 2010). For the dual-fired boilers, the worst-case fuel for each pollutant was used to calculate the potential emissions.

Emission factors for the smaller emergency generators (less than 600 HP) were obtained from AP-42’s Section 3.3 “Gasoline and Diesel Industrial Engines” (October 1996). Emission factors for the larger emergency generators (greater than 600 HP) were obtained from AP-42’s Section 3.4 “Large Stationary Diesel and All Stationary Dual-fuel Engines” (October 1996). Potential emissions from the emergency generators were evaluated at 500 hours of annual operation per EPA’s guidance document *Calculating Potential to Emit (PTE) for Emergency Generators* (September 6, 1995).

Potential emissions of Ethylene Oxide (75-21-8) from the Ethylene Oxide Sterilizers were calculated using a mass balance approach assuming 100% emission. The applicant provided manufacturer data for each Ethylene Oxide Sterilizers:

Table 3: Ethylene Oxide Sterilizers - Manufacturer Data

Emission Unit	Description	Manufacturer	Operational Temperature (°C)	Cycle Time (hours)	Ethylene Oxide Usage (g/cycle)	Calculated Emission Rate	
						(lb/hr)	(ton/yr)
EP-17A	Ethylene Oxide Sterilizer #1	3M	37	5.5	170	0.068143	0.29846
EP-17B	Ethylene Oxide Sterilizer #2	3M	55	3.75	170	0.099943	0.43775
EP-17C	Ethylene Oxide Sterilizer #3	Amsco	37	3	100	0.073487	0.32188
EP-17D	Ethylene Oxide Sterilizer #4	Amsco	37	3	100	0.073487	0.32188

Potential emissions from the tanks were calculated using VOC emission factors obtained from EPA’s Factor Information Retrieval System (WebFIRE) on October 18, 2012 for Process SCCs 40301019 (breathing loss) and 40301021 (working loss).

Potential emissions from the cooling towers were calculated using a PM₁₀ emission factor obtained from WebFIRE on October 18, 2012 for Process SCC 38500101. It was assumed that all particulate emissions from the cooling towers are PM_{2.5}; therefore, the PM₁₀ emission factor was used for PM and PM_{2.5} emissions as well.

The following table provides an emissions summary for entire facility. Existing potential emissions of the entire installation were calculated as a part of this project. No new equipment is being installed at the installation as a result of this project, instead this project is being undertaken as a remedial action to correct errors in previous permits; therefore, existing potential emissions and uncontrolled facility-wide potential emissions are the same. Existing actual emissions were taken from the installation’s 2011 Emission Inventory Questionnaire (EIQ). Potential emissions from the installation were evaluated at continuous operation (8760 hours per year) unless otherwise noted above.

Table 4: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions (2011 EIQ)	Uncontrolled Facility-Wide Potential Emissions	Conditioned Facility-Wide Potential Emissions
PM	25.0	19.34	N/A	19.34	2.25
PM ₁₀	15.0	10.38	0.61	10.38	1.21
PM _{2.5}	10.0	3.82	N/A	3.82	0.44
SO _x	40.0	2.78	1.14	2.78	0.32
NO _x	40.0	344.69	11.66	344.69	<40.00
VOC	40.0	12.10	0.60	12.10	1.53
CO	100.0	142.64	2.67	142.64	16.55
GHG	100,000	209,948.34	N/A	209,948.34	24,364.50
HAPs	25.0	3.76	N/A	3.76	0.38
Ethylene Oxide (75-21-8)	0.1 ¹	1.38	N/A	1.38	<0.1
Hexane (110-54-3)	10.0 ²	2.24	N/A	2.24	0.26
Formaldehyde (50-00-0)	2.0 ²	0.10	N/A	0.10	0.01
Benzene (71-43-2)	2.0 ²	0.02	N/A	0.02	0.002
Toluene (108-88-3)	10.0 ²	0.01	N/A	0.01	0.001

N/A = Not Applicable

¹This value represents the SMAL for Ethylene Oxide (75-21-8). In order to avoid modeling, the installation has accepted a 0.1 ton per year emission limitation on Ethylene Oxide (75-21-8).

²This value represents the SMAL for the HAP. As uncontrolled facility-wide potential emissions are below the SMAL, no modeling was required for this HAP.

Conditioned facility-wide potential emissions include the 40 tons per year NO_x emission limitation as required by Special Condition 2. In order to obtain the 40 tons per year NO_x emission limitation the facility will have to reduce fuel combustion which will correspondingly reduce emissions of the other criteria pollutants.

Conditioned facility-wide potential emissions include the 0.1 tons per year Ethylene Oxide (75-21-8) emission limitation required by Special Condition 3.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*. Potential emissions of NO_x are conditioned below *de minimis* levels. Potential emissions of Ethylene Oxide (75-21-8) were conditioned below the SMAL.

APPLICABLE REQUIREMENTS

The permittee shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific recordkeeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved.

GENERAL REQUIREMENTS

- 10 CSR 10-6.065 *Operating Permits*
- 10 CSR 10-6.110 *Submission of Emission Data, Emission Fees and Process Information*
- 10 CSR 10-6.165 *Restriction of Emission of Odors*
- 10 CSR 10-6.170 *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*
- 10 CSR 10-6.220 *Restriction of Emission of Visible Air Contaminants*

SPECIFIC REQUIREMENTS

- 10 CSR 10-6.070 *New Source Performance Regulations*
 - 40 CFR Part 60, Subpart Dc – *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*
 - 40 CFR Part 60, Subpart IIII – *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*
- 10 CSR 10-6.075 *Maximum Achievable Control Technology Regulations*
 - 40 CFR Part 63, Subpart ZZZZ – *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*
 - 40 CFR Part 63, Subpart WWWW – *National Emission Standards for Hospital Ethylene Oxide Sterilizers*
 - 40 CFR Part 63, Subpart JJJJJ – *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources*
- 10 CSR 10-6.260 *Restriction of Emission of Sulfur Compounds*

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*, I recommend this permit be granted with special conditions.

Alana Rugen, EIT
Environmental Engineer II

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- Part 70 Operating Permit Renewal Application Project 2006-05-065, received January 25, 2007, designating BJC Healthcare as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.

Attachment A - NO_x Compliance Worksheet

Barnes-Jewish Hospital
 St. Louis City
 Project Number: 2011-10-041
 Installation ID Number: 510-0204
 Permit Number: _____

This sheet covers the period from _____ to _____
 (month, year) (month, year)

Facility-Wide Natural Gas Combustion				
Emission Unit (EP#)	Amount of Natural Gas Combusted (MMscf)	NO _x Emission Factor (lb/MMscf)	Emission Factor Source	NO _x Emissions ¹ (tons)
01A, 01B, 01C, 11A, 11B, 11C, 12, 18, 19A, 19B, 19C, 20, 21A, 21B, 22A, 22B, 23, 24A, 24B, 25A, 25B, 26A, 26B, 26C, 26D, 26E, 26F, 27, 28A, and 28B		100	AP-42 Table 1.4-1	
Boiler Fuel Oil #2 Combustion				
Amount of Fuel Oil #2 Combusted (1000 gallons)	NO _x Emission Factor (lb/1000 gallons)	Emission Factor Source	NO _x Emissions ² (tons)	
	20	AP-42 Table 1.3-1		
Emergency Generators				
Emission Unit (EP#)	Usage (hours)	NO _x Emission Factor (lb/hr)	NO _x Emissions ³ (tons)	
02A, 02B, 02C, 02D, 03A, 03B, 03C, 03D, 03E, and 05		16.092 ⁴		
04		17.044 ⁵		
06		16.628 ⁵		
08A, 08B, 08C, 08D, and 10		32.184 ⁴		
09		19.310 ⁴		
13A, 13B, 13C, 13D, 13E, and 13F		24.138 ⁴		
14A, 14B, and 14C		40.230 ⁴		
15		2.646 ⁶		
16		3.968 ⁶		
Monthly Facility-Wide NO _x Emissions ⁷ (tons):				
12-Month Rolling Total Facility-Wide NO _x Emissions ⁸ (tons):				

¹NO_x Emissions (tons) = Amount of Natural Gas Combusted (MMscf) x NO_x Emission Factor (lb/MMscf) x 0.0005 (ton/lb)

²NO_x Emissions (tons) = Amount of Fuel Oil #2 Combusted (1000 gallons) x NO_x Emission Factor (lb/1000 gallons) x 0.0005 (ton/lb)

³NO_x Emission (tons) = Usage (hours) x NO_x Emission Factor (lb/hr) x 0.0005 (ton/lb)

⁴AP-42 Table 3.4-1 listed the NO_x Emission Factor as 0.024 lb/hp-hr. The emission factor was multiplied by the engines' horsepower rating to obtain the lb/hr NO_x Emission Factor. A conversion factor of 1.341HP/kW was used to determine the engines' horsepower rating.

⁵AP-42 Table 3.3-1 listed the NO_x Emission Factor as 0.031 lb/hp-hr. The emission factor was multiplied by the engines' horsepower rating to obtain the lb/hr NO_x Emission Factor. A conversion factor of 1.341HP/kW was used to determine the engines' horsepower rating.

⁶40 CFR Part 63, Subpart IIII limits the engines to 4 g/kW-hr. A conversion factor of 0.0022046 lb/g to convert to lb/kW-hr. The emission factor was multiplied by the engines' kW rating to obtain the lb/hr NO_x Emission Factor.

⁷Monthly Facility-Wide NO_x Emissions (tons) = The sum of each source's NO_x Emissions (tons)

⁸12-Month Rolling Total Facility-Wide NO_x Emissions (tons) = Monthly Facility-Wide NO_x Emissions (tons) + the previous 11 Monthly Facility-Wide NO_x Emissions (tons). **The permittee is in compliance with Special Condition #2 if 12-Month Rolling Total Facility-wide NO_x Emissions are less than 40.0 tons.**

Attachment B – Ethylene Oxide (75-21-8) Compliance Worksheet

Barnes-Jewish Hospital
 St. Louis City
 Project Number: 2011-10-041
 Installation ID Number: 510-0204
 Permit Number: _____

This sheet covers the period from _____ to _____
 (month, year) (month, year)

Ethylene Oxide Usage (grams)	Conversion Factor (ton/gram)	Monthly Ethylene Oxide Emissions ¹ (tons)
	1.1023 x 10 ⁻⁶	
12-Month Rolling Total Facility-Wide Ethylene Oxide Emissions² (tons):		

¹Monthly Ethylene Oxide Emissions (tons) = Ethylene Oxide Usage (grams) x Conversion Factor (ton/gram)

²12-Month Rolling Total Facility-Wide Ethylene Oxide Emissions (tons) = Monthly Ethylene Oxide Emissions (tons) + the previous 11 Monthly Ethylene Oxide Emissions (tons). **The permittee is in compliance with Special Condition #3 if 12-Month Rolling Total Facility-Wide Ethylene Oxide Emissions are less than 0.1 tons.**

Mr. Ryan Pirtle
Environmental Engineer
Barnes-Jewish Hospital
Mailstop 90-75-582
4901 Forest Park Ave.
St. Louis, MO 63110

RE: New Source Review Permit - Project Number: 2011-10-041

Dear Mr. Pirtle:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions on the accompanying pages. Operation in accordance with these conditions and with your amended operating permit is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please do not hesitate to contact Alana Rugen at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 526-0189. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:arl

Enclosures

c: St. Louis Regional Office
PAMS File: 2011-10-041

Permit Number: