

**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: 102016-003

Project Number: 2016-05-042  
Installation Number: 510-0204

Parent Company: BJC Health System

Parent Company Address: 8300 Eager Road, Mail Stop: 90-75-582, St. Louis, MO 63144

Installation Name: Barnes-Jewish Hospital

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

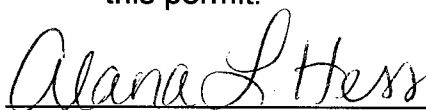
Location Information: City of St. Louis

Application for Authority to Construct was made for:

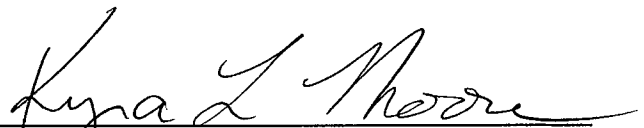
The installation of six dual-fired (natural gas and fuel oil #2) boilers, five diesel emergency generators, a cooling tower, three underground storage tanks, three day storage tanks, and a natural gas-fired air handling unit. This review was conducted in accordance with Section (6) of Missouri State 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.



Prepared by  
Alana Hess  
New Source Review Unit



Director or Designee  
Department of Natural Resources

OCT 17 2016

Effective Date

**STANDARD CONDITIONS:**

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Enforcement and Compliance Section of 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.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your 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.

You must notify the Enforcement and Compliance Section of the Department's Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available within 30 days of actual startup. Also, you must notify the Department's St. Louis Regional Office within 15 days after the actual start up of this (these) air contaminant source(s).

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

You 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 you choose to appeal, you 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 you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your 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 using the contact information below.

**Contact Information:**  
Missouri Department of Natural Resources  
Air Pollution Control Program  
P.O. Box 176  
Jefferson City, MO 65102-0176  
(573) 751-4817

The regional office information can be found at the following website:  
<http://dnr.mo.gov/regions/>

**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  
City of St. Louis

1. NO<sub>x</sub> Emission Limitation
  - A. Barnes-Jewish Hospital shall emit less than 40.0 tons of NO<sub>x</sub> in any consecutive 12-month rolling period from the NO<sub>x</sub> emission sources associated with this project as identified in Table 1.

**Table 1: Project NO<sub>x</sub> Emission Sources**

<b>Emission Source</b>	<b>Description</b>	<b>Location</b>
EP-32A	Boiler #1 – 6.12 MMBtu/hr natural gas or fuel oil #2	North Building
EP-32B	Boiler #2 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32C	Boiler #3 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32D	Boiler #4 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32E	Boiler #5 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32F	Boiler #6 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-33A	Emergency Generator #1 – 2,937 HP diesel	
EP-33B	Emergency Generator #2 – 2,937 HP diesel	
EP-33C	Emergency Generator #3 – 2,937 HP diesel	
EP-35	Air Handling Unit – 1.05 MMBtu/hr natural gas	
EP-33D	Emergency Generator #1 – 1,474 HP diesel	St. Louis Children's Hospital
EP-33E	Emergency Generator #2 – 1,474 HP diesel	

- B. Barnes-Jewish Hospital shall maintain records of monthly and 12-month rolling total NO<sub>x</sub> emissions from the emission sources identified in Table 1 using Attachment A or an equivalent form, such as an electronic form, approved by the Air Pollution Control Program.
2. Emergency Generator Requirements
  - A. The engines identified in Table 2 shall meet the definition of *emergency stationary internal combustion engine* at §60.4219.

**SPECIAL CONDITIONS:**

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

**Table 2: Engines required to meet the definition of *emergency stationary internal combustion engine* in 40 CFR Part 60, Subpart IIII**

<b>Emission Source</b>	<b>Description</b>	<b>Location</b>
EP-33A	Emergency Generator #1 – 2,937 HP diesel	North Building
EP-33B	Emergency Generator #2 – 2,937 HP diesel	
EP-33C	Emergency Generator #3 – 2,937 HP diesel	
EP-33D	Emergency Generator #1 – 1,474 HP diesel	St. Louis Children's Hospital
EP-33E	Emergency Generator #2 – 1,474 HP diesel	

## 3. Boiler Requirements

- A. The dual-fuel fired boilers identified in Table 3 shall meet the definition of *gas-fired boiler* at §63.11237.

**Table 3: Dual-fuel fired boilers required to meet the definition of *gas-fired boiler* in 40 CFR Part 63, Subpart JJJJJJ**

<b>Emission Source</b>	<b>Description</b>	<b>Location</b>
EP-32A	Boiler #1 – 6.12 MMBtu/hr natural gas or fuel oil #2	North Building
EP-32B	Boiler #2 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32C	Boiler #3 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32D	Boiler #4 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32E	Boiler #5 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32F	Boiler #6 – 6.12 MMBtu/hr natural gas or fuel oil #2	

## 4. Record Keeping and Reporting Requirements

- A. Barnes-Jewish Hospital 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. Barnes-Jewish Hospital shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than 10 days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE  
SECTION (6) REVIEW

Project Number: 2016-05-042

Installation ID Number: 510-0204

Permit Number: **102016-003**

Installation Address:

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

Parent Company:

BJC Health System  
8300 Eager Road, Mail Stop: 90-75-582  
St. Louis, MO 63144

City of St. Louis

REVIEW SUMMARY

- Barnes-Jewish Hospital has applied for authority to install six dual-fired (natural gas and fuel oil #2) boilers, five diesel emergency generators, a cooling tower, three underground storage tanks, three day storage tanks, and a natural gas-fired air handling unit.
- The application was deemed complete on June 27, 2016.
- HAP emissions are expected from the combustion of fuel by the proposed equipment.
- 40 CFR Part 60, Subpart Dc – *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* is not applicable to the new boilers as they are each rated at less 10 MMBtu/hr heat input.
- 40 CFR Part 60, Subpart IIII – *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* is applicable to the emergency generators (EP-33A, EP-33B, EP-33C, EP-33D, and EP-33E).
- 40 CFR Part 63, Subpart ZZZZ – *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines* is applicable to the emergency generators (EP-33A, EP-33B, EP-33C, EP-33D, and EP-33E) compliance is demonstrated by complying with NSPS IIII per §63.6590(c).
- 40 CFR Part 63, Subpart JJJJJJ – *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources* is not applicable to the boilers (EP-32A, EP-32B, EP-32C, EP-32D, EP-32E, and EP-32F) per §63.11195(e) as they will be operated such that they meet the definition of gas-fired boiler at §63.11237.
- No air pollution control equipment is being used in association with the new equipment.

- This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*. Potential PM emissions exceed the de minimis level. Potential NO<sub>x</sub> emissions are conditioned below the de minimis level.
- 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<sub>2.5</sub> 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, NO<sub>x</sub>, and PM<sub>2.5</sub> (as it is located in a non-attainment area) 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 project emissions of NO<sub>x</sub> are conditioned below the de minimis levels and there is currently no NAAQS for PM.
- Emissions testing is not required for the equipment as a part of this permit. Testing may be required as part of other state, federal or applicable rules.
- Barnes-Jewish Hospital is required to include the equipment authorized for installation by this permit is the Intermediate or Part 70 operating permit application required by Construction Permit 092016-012.
- 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 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), Barnes Lodge, Peters, North Parking Garage, Power Plant, Schoenberg Pavilion, East Pavilion, Queeny Tower, Southwest Tower, West Pavilion, Duncan Central Garage, IOH, and South Parking Garage. Altogether the medical campus contains 1,158 licensed beds.

The following new source review permits have been issued to the installation by the City of St. Louis' Division of Air Pollution Control:

**Table 4: City of St. Louis 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.
01-12-038A	Administrative amendment.

The following new source review permits have been issued to the installation by the Air Pollution Control Program:

**Table 5: Air Pollution Control Program Permit History**

Permit Number	Description
022013-004	Clean-up of City of St. Louis Projects
092016-012	Clean-up of City of St. Louis Projects

### PROJECT DESCRIPTION

Barnes-Jewish Hospital has applied for authority to install six dual-fired (natural gas and fuel oil #2) boilers, five diesel emergency generators, a cooling tower, three underground storage tanks, three day storage tanks, and a natural gas-fired air handling unit. Table 6 contains a complete list of equipment installed under this project.

**Table 6: Project Equipment/Emission Source List**

Emission Source	Description	Location
EP-32A	Boiler #1 – 6.12 MMBtu/hr natural gas or fuel oil #2	North Building
EP-32B	Boiler #2 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32C	Boiler #3 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32D	Boiler #4 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32E	Boiler #5 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-32F	Boiler #6 – 6.12 MMBtu/hr natural gas or fuel oil #2	
EP-33A	Emergency Generator #1 – 2,937 HP diesel	
EP-33B	Emergency Generator #2 – 2,937 HP diesel	
EP-33C	Emergency Generator #3 – 2,937 HP diesel	
CWT-11	Cooling Tower – 9,360 gpm, 0.02% drift loss	
ST-2	(3) Underground Storage Tanks – diesel 40,000 gallons each	

DT-2	(3) Day Tanks – diesel 220 gallons each	St. Louis Children's Hospital
EP-35	Air Handling Unit – 1.05 MMBtu/hr natural gas	
EP-33D	Emergency Generator #1 – 1,474 HP diesel	
EP-33E	Emergency Generator #2 – 1,474 HP diesel	

### EMISSIONS/CONTROLS EVALUATION

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). The installation has stated that the dual-fired boilers will meet the definition of gas-fired boiler at §63.11237; therefore, for the pollutants that have a higher hourly emission rate from fuel oil combustion project emissions were evaluated based on 48 hours of fuel oil combustion and 8,712 hours of natural gas combustion. To ensure that a permitting requirement is triggered prior to conversion to fuel oil, Special Condition 3 has been included in the permit.

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) or the NSPS IIII limits at §89.112 Tier 2. 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). To ensure that a permitting requirement is triggered prior to conversion to non-emergency operation, Special Condition 2 has been included in the permit.

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

Potential emissions from the cooling towers were calculated using a PM emission factor established based on the manufacturer's drift loss and a maximum TDS content of 7,700 ppm. PM<sub>10</sub> and PM<sub>2.5</sub> emissions were determined using the maximum PM<sub>10</sub> to PM ratio of 21.348% and the maximum PM<sub>2.5</sub> to PM ratio of 0.196% in "Calculating Realistic PM<sub>10</sub> Emissions from Cooling Towers" (Joel Reisman and Gordon Frisbie).

The following table provides an emissions summary for this project. Existing potential emissions were taken from NSR Permit 092016-012. Existing actual emissions were taken from the installation's 2015 EIQ. Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8760 hours per year) unless otherwise specified above.



**Table 7: Emissions Summary (tpy)**

<b>Pollutant</b>	<b>Regulatory De Minimis Levels</b>	<b>Existing Potential Emissions</b>	<b>Existing Actual Emissions (2015 EIQ)</b>	<b>Potential Emissions of the Project</b>	<b>Conditioned Potential Emissions of the Project</b>
PM	25.0	72.64	N/A	32.79	N/A
PM <sub>10</sub>	15.0	27.30	20.95	9.01	N/A
PM <sub>2.5</sub>	10.0	8.77	13.41	2.33	N/A
SO <sub>2</sub>	40.0	40.05	0.16	7.04	N/A
NO <sub>x</sub>	40.0	200.13	26.01	44.47	<40.0
VOC	40.0	18.87	1.58	29.12	N/A
CO	100.0	100.23	23.57	29.06	N/A
HAPs	25.0	1.76	0.44	0.34	N/A
Hexane	10.0	1.42	0.42	0.29	N/A
Benzene	2 <sup>1</sup>	0.03	0.0005	0.02	N/A
Ethylene Oxide	0.1 <sup>1</sup>	<0.2	N/D	N/A	N/A
Formaldehyde	2 <sup>1</sup>	0.11	0.02	0.01	N/A
Toluene	10.0	0.01	0.001	0.01	N/A
Other individual HAPs	N/A	N/D	N/D	<0.01	N/A

N/A = Not Applicable; N/D = Not Determined

#### PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential PM emissions exceed the de minimis level. Potential NO<sub>x</sub> emissions are conditioned below the de minimis level.

#### APPLICABLE REQUIREMENTS

Barnes-Jewish Hospital shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, 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. For a complete list of applicable requirements for your installation, please consult your operating permit.

<sup>1</sup> This value represents the SMAL. The de minimis level/major source threshold for this individual HAP is 10.0 tons per year.

## GENERAL REQUIREMENTS

- 10 CSR 10-6.065 *Operating Permits*
  - The installation was required to apply for an Intermediate Operating Permit no later than 90 days or a Part 70 Operating Permit no later than one year after the issuance date of NSR Permit 092016-012. The equipment permitted for installation by this permit shall be included in the operating permit application.
- 10 CSR 10-6.110 *Submission of Emission Data, Emission Fees and Process Information*
  - The installation is required to submit a full EIQ for the first full year of operation of the permitted equipment.
- 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 IIII – *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*
    - This regulation applies to the emergency generators (EP-33A, EP-33B, EP-33C, EP-33D, and EP-33E).
- 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*
    - This regulation is applicable to the emergency generators (EP-33A, EP-33B, EP-33C, EP-33D, and EP-33E). Compliance is demonstrated by complying with NSPS IIII per §63.6590(c).
  - 40 CFR Part 63, Subpart JJJJJJ – *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources*.
    - The boilers (EP-32A, EP-32B, EP-32C, EP-32D, EP-32E, and EP-32F) are conditionally exempt from this regulation per §63.11195(e) provided they meet the definition of gas-fired boiler at §63.11237.
- 10 CSR 10-6.260 *Restriction of Emission of Sulfur Compounds*
  - This regulation was rescinded by the State of Missouri on November 30, 2015, but remains federally enforceable as it is still contained in Missouri's State Implementation Plan.

- 10 CSR 10-6.261 Control of Sulfur Dioxide Emissions
  - This regulation applies to all fuel oil fired equipment (dual-fired boilers and emergency generators).
  
- 10 CSR 10-5.510 Control of Emissions of Nitrogen Oxides
  - If the installation chooses to obtain an Intermediate Operating Permit, this regulation will not apply.
  - If the installation chooses to obtain a Part 70, fails to apply for an Intermediate Operating Permit within 90 days after the issuance date of NSR Permit 092016-012, or fails to comply with a 100 tons per 12-month rolling total NO<sub>x</sub> limit, this regulation will apply.

#### STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, it is recommended that this permit be granted with special conditions.

#### PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated April 15, 2016, received May 11, 2016, designating Parent as the owner and operator of the installation.

Attachment A - NO<sub>x</sub> Compliance Worksheet

Barnes-Jewish Hospital

St. Louis City

Project Number: 2016-05-042

Installation ID Number: 510-0204

Permit Number: - 102016 - 003

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

Boilers & Air Handling Unit					
Emission Source	Monthly Fuel Usage		NO <sub>x</sub> Emission Factor	Emission Factor Source	Monthly NO <sub>x</sub> Emissions <sup>2</sup> (tons)
EP-32A Boiler #1	MMscf natural gas		100 lb/MMscf	AP-42 Table 1.4-1	
	Mgal fuel oil #2		20 lb/Mgal	AP-42 Table 1.3-1	
EP-32B Boiler #2	MMscf natural gas		100 lb/MMscf	AP-42 Table 1.4-1	
	Mgal fuel oil #2		20 lb/Mgal	AP-42 Table 1.3-1	
EP-32C Boiler #3	MMscf natural gas		100 lb/MMscf	AP-42 Table 1.4-1	
	Mgal fuel oil #2		20 lb/Mgal	AP-42 Table 1.3-1	
EP-32D Boiler #4	MMscf natural gas		100 lb/MMscf	AP-42 Table 1.4-1	
	Mgal fuel oil #2		20 lb/Mgal	AP-42 Table 1.3-1	
EP-32E Boiler #5	MMscf natural gas		100 lb/MMscf	AP-42 Table 1.4-1	
	Mgal fuel oil #2		20 lb/Mgal	AP-42 Table 1.3-1	
EP-32F Boiler #6	MMscf natural gas		100 lb/MMscf	AP-42 Table 1.4-1	
	Mgal fuel oil #2		20 lb/Mgal	AP-42 Table 1.3-1	
EP-35 Air Handling Unit	MMscf natural gas		100 lb/MMscf	AP-42 Table 1.4-1	
Emergency Generators					
Emission Source	Current Month's Hourly Meter Reading	Previous Month's Hourly Meter Reading	Monthly Usage <sup>3</sup> (hours)	NO <sub>x</sub> Emission Factor (lb/hr)	Monthly NO <sub>x</sub> Emissions <sup>4</sup> (tons)
EP-33A Emergency Generator #1				28.219 <sup>5</sup>	
EP-33B Emergency Generator #2				28.219 <sup>5</sup>	
EP-33C Emergency Generator #3				28.219 <sup>5</sup>	
EP-33D Emergency Generator #1				14.109 <sup>6</sup>	
EP-33E Emergency Generator #2				14.109 <sup>6</sup>	

<sup>2</sup> Monthly NO<sub>x</sub> Emissions (tons) = Monthly Fuel Usage x NO<sub>x</sub> Emission Factor x 0.0005 (ton/lb).

<sup>3</sup> Monthly Usage (hours) = Current Month's Hourly Meter Reading – Previous Month's Hourly Meter Reading

<sup>4</sup> Monthly NO<sub>x</sub> Emission (tons) = Monthly Usage (hours) x NO<sub>x</sub> Emission Factor (lb/hr) x 0.0005 (ton/lb)

<sup>5</sup> This engine is subject to a NO<sub>x</sub> emission limit of 6.4 g/kW-hr by NSPS IIII (§89.112 Tier 2). The engine is rated at 2,000 kW. A conversion factor of 0.0022046 lb/g was used.

<sup>6</sup> This engine is subject to a NO<sub>x</sub> emission limit of 6.4 g/kW-hr by NSPS IIII (§89.112 Tier 2). The engine is rated at 1,000 kW. A conversion factor of 0.0022046 lb/g was used.

<b>SSM Emissions</b>	
<b>Emission Sources</b>	<b>Monthly NO<sub>x</sub> Emissions<sup>7</sup> (tons)</b>
Boilers (EP-32A, EP-32B, EP-32C, EP-32D, EP-32E, and EP-32F), EP-35 Air Handling Unit, and Emergency Generators (EP-33A, EP-33B, EP-33C, EP-33D, and EP-33E)	
<b>Monthly Project NO<sub>x</sub> Emissions<sup>8</sup> (tons):</b>	
<b>12-Month Rolling Total Project NO<sub>x</sub> Emissions<sup>9</sup> (tons):</b>	

<sup>7</sup> As reported to the Air Pollution Control Program's Compliance/Enforcement Section according to the provisions of 10 CSR 10-6.050.

<sup>8</sup> Monthly Project NO<sub>x</sub> Emissions (tons) = The sum of each emission source's Monthly NO<sub>x</sub> Emissions (tons).

<sup>9</sup> 12-Month Rolling Total Project NO<sub>x</sub> Emissions (tons) = the sum of the 12 most recent Monthly Project NO<sub>x</sub> Emissions (tons). **The permittee is in compliance with Special Condition 1 if 12-Month Rolling Total Project NO<sub>x</sub> Emissions are less than 40.0 tons.**

## APPENDIX A

### Abbreviations and Acronyms

<b>%</b> .....	percent	<b>m/s</b> .....	meters per second
<b>°F</b> .....	degrees Fahrenheit	<b>Mgal</b> .....	1,000 gallons
<b>acfm</b> .....	actual cubic feet per minute	<b>MW</b> .....	megawatt
<b>BACT</b> .....	Best Available Control Technology	<b>MHDR</b> .....	maximum hourly design rate
<b>BMPs</b> .....	Best Management Practices	<b>MMBtu</b> ..	Million British thermal units
<b>Btu</b> .....	British thermal unit	<b>MMCF</b> .....	million cubic feet
<b>CAM</b> .....	Compliance Assurance Monitoring	<b>MSDS</b> .....	Material Safety Data Sheet
<b>CAS</b> .....	Chemical Abstracts Service	<b>NAAQS</b> ..	National Ambient Air Quality Standards
<b>CEMS</b> .....	Continuous Emission Monitor System	<b>NESHAPs</b>	National Emissions Standards for Hazardous Air Pollutants
<b>CFR</b> .....	Code of Federal Regulations	<b>NO<sub>x</sub></b> .....	nitrogen oxides
<b>CO</b> .....	carbon monoxide	<b>NSPS</b> .....	New Source Performance Standards
<b>CO<sub>2</sub></b> .....	carbon dioxide	<b>NSR</b> .....	New Source Review
<b>CO<sub>2e</sub></b> .....	carbon dioxide equivalent	<b>PM</b> .....	particulate matter
<b>COMS</b> .....	Continuous Opacity Monitoring System	<b>PM<sub>2.5</sub></b> .....	particulate matter less than 2.5 microns in aerodynamic diameter
<b>CSR</b> .....	Code of State Regulations	<b>PM<sub>10</sub></b> .....	particulate matter less than 10 microns in aerodynamic diameter
<b>dscf</b> .....	dry standard cubic feet	<b>ppm</b> .....	parts per million
<b>EIQ</b> .....	Emission Inventory Questionnaire	<b>PSD</b> .....	Prevention of Significant Deterioration
<b>EP</b> .....	Emission Point	<b>PTE</b> .....	potential to emit
<b>EPA</b> .....	Environmental Protection Agency	<b>RACT</b> .....	Reasonable Available Control Technology
<b>EU</b> .....	Emission Unit	<b>RAL</b> .....	Risk Assessment Level
<b>fps</b> .....	feet per second	<b>SCC</b> .....	Source Classification Code
<b>ft</b> .....	feet	<b>scfm</b> .....	standard cubic feet per minute
<b>GACT</b> .....	Generally Available Control Technology	<b>SDS</b> .....	Safety Data Sheet
<b>GHG</b> .....	Greenhouse Gas	<b>SIC</b> .....	Standard Industrial Classification
<b>gpm</b> .....	gallons per minute	<b>SIP</b> .....	State Implementation Plan
<b>gr</b> .....	grains	<b>SMAL</b> .....	Screening Model Action Levels
<b>GWP</b> .....	Global Warming Potential	<b>SO<sub>x</sub></b> .....	sulfur oxides
<b>HAP</b> .....	Hazardous Air Pollutant	<b>SO<sub>2</sub></b> .....	sulfur dioxide
<b>hr</b> .....	hour	<b>tph</b> .....	tons per hour
<b>hp</b> .....	horsepower	<b>tpy</b> .....	tons per year
<b>lb</b> .....	pound	<b>VMT</b> .....	vehicle miles traveled
<b>lbs/hr</b> .....	pounds per hour	<b>VOC</b> .....	Volatile Organic Compound
<b>MACT</b> .....	Maximum Achievable Control Technology		
<b>µg/m<sup>3</sup></b> .....	micrograms per cubic meter		



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

## DEPARTMENT OF NATURAL RESOURCES

[www.dnr.mo.gov](http://www.dnr.mo.gov)

**OCT 17 2016**

Ms. Emma Hooks  
Director, EH&S Regulatory Compliance  
Barnes-Jewish Hospital  
4901 Forest Park Avenue, Mail Stop: 90-75-582  
St. Louis, MO 63108

RE: New Source Review Permit - Project Number: 2016-05-042

Dear Ms. Hooks:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. Also, note the special conditions on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your new source review permit application and submittal of an Intermediate or Part 70 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.

This permit may include requirements with which you may not be familiar. If you would like the department to meet with you to discuss how to understand and satisfy the requirements contained in this permit, an appointment referred to as a Compliance Assistance Visit (CAV) can be set up with you. To request a CAV, please contact your local regional office or fill out an online request. The regional office contact information can be found at the following website: <http://dnr.mo.gov/regions/>. The online CAV request can be found at <http://dnr.mo.gov/cav/compliance.htm>.

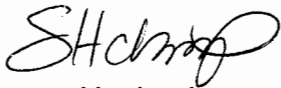
If you were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to §§621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within 30 days after the date this decision 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 administrative hearing commission, whose contact information is: Administrative Hearing Commission, United States Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: [www.oa.mo.gov/ahc](http://www.oa.mo.gov/ahc).

Ms. Emma Hooks  
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If you have any questions regarding this permit, please do not hesitate to contact Alana Hess, at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM



Susan Heckenkamp  
New Source Review Unit Chief

SH:ahj

Enclosures

c: St. Louis Regional Office  
PAMS File: 2016-05-042

Permit Number: **102016-003**