

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: **06 2018 - 009**

Project Number: 2018-03-037
Installation Number: 510-2802

Parent Company: SSM Health

Parent Company Address: 1015 Corporate Square Drive, Suite 110, St. Louis, MO 63132

Installation Name: SSM Cardinal Glennon Childrens Hospital

Installation Address: 1465 South Grand, St. Louis, MO 63104

Location Information: St. Louis City

Application for Authority to Construct was made for:

Installation of five dual-fired 300 HP boilers (10.4 MMBTU/hr each). This review was conducted in accordance with Section (5), 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
Kathy Kolb
New Source Review Unit

Director or Designee
Department of Natural Resources

JUN 26 2018

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 regional office responsible for the area within which you are located 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/>

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

Project Number: 2018-03-037
Installation ID Number: 510-2802
Permit Number: 062018-009

Installation Address:

SSM Cardinal Glennon Childrens Hospital
1465 South Grand
St. Louis, MO 63104

Parent Company:

SSM Health
1015 Corporate Square, Drive Suite 110
St. Louis, MO 63132

St. Louis City

REVIEW SUMMARY

- SSM Cardinal Glennon Childrens Hospital has applied for authority to install five dual-fired 300 HP boilers (10.4 MMBTU/hr each).
- The application was deemed complete on March 16, 2018.
- HAP emissions are expected from the proposed equipment. HAPs of concern from the combustion of natural gas and fuel oil.
- 40 CFR 60 Subpart Dc, "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units" applies to the equipment.
- None of the NESHAPs apply to this installation. None of the currently promulgated MACT regulations apply to the proposed equipment.
- No air pollution control equipment is being used in association with the new equipment.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of all pollutants are below de minimis levels.
- This installation is located in St. Louis City, a moderate nonattainment area for the 8-hour ozone standard (2008), a nonattainment area for the PM-2.5 standard (1997), 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 tpy for VOC, NO_x, and PM_{2.5} (as it is located in a nonattainment 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 emissions of the application are below de minimis levels.
- Emissions testing is not required for the five new boilers as a part of this permit. Testing may be required as part of other state, federal or applicable rules.
- Amendment to the Basic Operating Permit is required for this installation upon renewal in July 2018.

INSTALLATION DESCRIPTION

SSM Cardinal Glennon Children's Hospital, as stated in an email dated May 21, 2018, has three boilers (EU01-2 boilers @ 33.475 MMBTU/hr each dual fired (natural gas and fuel oil) and EU02 boiler @16.738 MMBTU/hr dual fired), six emergency generators (EU03)(3 at the main facility and 3 support at outlying building), one 20,000 gallon diesel storage tank (EU07), and lab hoods (EU08) (various chemical throughputs).

No permits have been issued to SSM Cardinal Glennon Childrens Hospital from the Missouri Depart of Natural Resources Air Pollution Control Program. Existing equipment was permitted by the City of St. Louis.

The following St.Louis City permits have been issued to SSM Cardinal Glennon Childrens Hospital. The installation is currently a minor source with a NOx de minimis limit.

Table 1: Permit History

Permit Number	Description
04-06-013	St. Louis City Local Permit for three boilers

PROJECT DESCRIPTION

SSM Cardinal Glennon Children's Hospital is installing five boilers rate at 10.04 MMBTU/hr each. The primary fuel source will be natural gas, with fuel oil #2 only used during emergencies, curtailment, and for routine maintenance. The boilers will be Miura, Model EX-300 SGO, manufactured in 2018. They will be referred to as Boiler #4, Boiler #5, Boiler #6, Boiler #7 and Boiler #8 and vented through stacks S11 through S15. Although the potential emissions are below de minimis limits, a permit is needed because the installation is already a minor source with a de minimis limit and the hourly emissions are above the insignificant level as stated in 10 CSR 10-6.061 (3)(A)3.A.

Table 2: Project Equipment List

Emission Unit	Equipment Description	MHDR
EU-09	Five boilers-Miura, Model EX-300 SGO, 2018	10.04MMBTU/hr (each)

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 PTE was calculated for the worst case for each fuel source.

The following table provides an emissions summary for this project. Existing potential emissions were taken from the St. Louis City Permit 04-06-013, July 16, 2004 and the six emergency generators were recalculated based on 500 hours of annual operation for this project. Existing actual emissions were taken from the installation's 2017 EIQ (last full EIQ was in 2013). Potential emissions of the application represent the potential of the five new boilers, assuming continuous operation (8760 hours per year).

Table 3: Emissions Summary (tpy)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions ¹	Existing Actual Emissions (2017 EIQ)	Potential Emissions of the Project	New Installation Potential
PM	25.0	N/D	N/A	3.6	N/D
PM ₁₀	15.0	5.85	061	4.15	10.0
PM _{2.5}	10.0	5.85	061	2.79	8.64
SOx	40.0	14.4	0.21	12.98	27.40
NOx	40.0	59.55	0.82	36.05	95.60
VOC	40.0	3.19	0.50	0.36	3.55
CO	100.0	56.37	5.25	9.01	65.38
GHG (CO _{2e})	N/A	N/D	N/A	40,334.84	N/D
GHG (mass)	N/A	N/D	N/A	40,193.41	N/D
HAPs	10.0/25.0	0.84	0.0	0.14	0.98

N/A = Not Applicable; N/D = Not Determined from St. Louis City Source Registration

¹The existing emissions were taken from the St. Louis City Permit 04-06-013, July 16, 2004 which included the three boilers and two cooling towers. The six emergency generators were recalculated for this project and included in the existing potential emissions.

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 all pollutants are below de minimis levels.

APPLICABLE REQUIREMENTS

SSM Cardinal Glennon Childrens 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.

GENERAL REQUIREMENTS

- *Operating Permits*, 10 CSR 10-6.065-Amend current operating permit to reflect the addition of five new boilers.
- *Start-Up, Shutdown, and Malfunction Conditions*, 10 CSR 10-6.050
- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
 - Per 10 CSR 10-6.110(4)(B)2.B(II) and (4)(B)2.C(II) a full EIQ is required for the first full calendar year the equipment (or modifications) approved by this permit are in operation.
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-6.165

SPECIFIC REQUIREMENTS

- *New Source Performance Regulations*, 10 CSR 10-6.070
 - –40 CFR Part 60, Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*
- *MACT Regulations*, 10 CSR 10-6.075
 - 40 CFR Part 63, Subpart JJJJJJ – *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources.*
 - The boilers (EU09) 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)

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), 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 March 6, 2018, received March 19, 2018, designating SSM Health as the owner and operator of the installation.

APPENDIX A

Abbreviations and Acronyms

%percent	Mgal1,000 gallons
°Fdegrees Fahrenheit	MWmegawatt
acfmactual cubic feet per minute	MHDRmaximum hourly design rate
BACTBest Available Control Technology	MMBtuMillion British thermal units
BMPsBest Management Practices	MMCFmillion cubic feet
BtuBritish thermal unit	MSDSMaterial Safety Data Sheet
CAMCompliance Assurance Monitoring	NAAQSNational Ambient Air Quality Standards
CASChemical Abstracts Service	NESHAPs National Emissions Standards for Hazardous Air Pollutants
CEMSContinuous Emission Monitor System	NO_xnitrogen oxides
CFRCode of Federal Regulations	NSPSNew Source Performance Standards
COcarbon monoxide	NSRNew Source Review
CO₂carbon dioxide	PMparticulate matter
CO_{2e}carbon dioxide equivalent	PM_{2.5}particulate matter less than 2.5 microns in aerodynamic diameter
COMSContinuous Opacity Monitoring System	PM₁₀particulate matter less than 10 microns in aerodynamic diameter
CSRCode of State Regulations	ppmparts per million
dscfdry standard cubic feet	PSDPrevention of Significant Deterioration
EIQEmission Inventory Questionnaire	PTEpotential to emit
EPEmission Point	RACTReasonable Available Control Technology
EPAEnvironmental Protection Agency	RALRisk Assessment Level
EUEmission Unit	SCCSource Classification Code
fpsfeet per second	scfmstandard cubic feet per minute
ftfeet	SDSSafety Data Sheet
GACTGenerally Available Control Technology	SICStandard Industrial Classification
GHGGreenhouse Gas	SIPState Implementation Plan
gpmgallons per minute	SMALScreening Model Action Levels
grgrains	SO_xsulfur oxides
GWPGlobal Warming Potential	SO₂sulfur dioxide
HAPHazardous Air Pollutant	SSMStartup, Shutdown & Malfunction
hrhour	tphtons per hour
hphorsepower	tpytons per year
lbpound	VMTvehicle miles traveled
lbs/hrpounds per hour	VOCVolatile Organic Compound
MACTMaximum Achievable Control Technology	
µg/m³micrograms per cubic meter	
m/smeters per second	

Air Pollution Control Program

Table of Hazardous Air Pollutants and Screening Model Action Levels

Chemical	CAS #	SMAL tons/yr	Group ID	VOC	PM	Chemical	CAS #	SMAL tons/yr	Group ID	VOC	PM
ACETALDEHYDE	75-07-0	9		Y	N	CHLOROMETHYL METHYL ETHER	107-30-2	0.1		Y	N
ACETAMIDE	60-35-5	1		Y	N	CHLOROPRENE	126-99-8	1		Y	N
ACETONITRILE	75-05-8	4		Y	N	CHROMIUM (VI) COMPOUNDS		0.002	L	N	Y
ACETOPHENONE	98-86-2	1		Y	N	CHROMIUM COMPOUNDS		5	L	N	Y
ACETYLAMINOFLUORINE, [2-]	53-96-3	0.005	V	Y	Y	CHRYSENE	218-01-9	0.01	V	Y	N
ACROLEIN	107-02-8	0.04		Y	N	COBALT COMPOUNDS		0.1	M	N	Y
ACRYLAMIDE	79-06-1	0.02		Y	N	COKE OVEN EMISSIONS	8007-45-2	0.03	N	Y	N
ACRYLIC ACID	79-10-7	0.6		Y	N	CRESOL, [META-]	108-39-4	1	B	Y	N
ACRYLONITRILE	107-13-1	0.3		Y	N	CRESOL, [ORTHO-]	95-48-7	1	B	Y	N
ALLYL CHLORIDE	107-05-1	1		Y	N	CRESOL, [PARA-]	106-44-5	1	B	Y	N
AMINOBIIPHENYL, [4-]	92-67-1	1	V	Y	N	CRESOLS (MIXED ISOMERS)	1319-77-3	1	B	Y	N
ANILINE	62-53-3	1		Y	N	CUMENE	98-82-8	10		Y	N
ANISIDINE, [ORTHO-]	90-04-0	1		Y	N	CYANIDE COMPOUNDS		0.1	O	Y	N
ANTHRACENE	120-12-7	0.01	V	Y	N	DDE	72-55-9	0.01	V	Y	Y
ANTIMONY COMPOUNDS		5	H	N	Y	DI(2-ETHYLHEXYL) PHTHALATE, (DEHP)	117-81-7	5		Y	N
ANTIMONY PENTAFLUORIDE	7783-70-2	0.1	H	N	Y	DIAMINOTOLUENE, [2,4-]	95-80-7	0.02		Y	N
ANTIMONY POTASSIUM TARTRATE	28300-74-5	1	H	N	Y	DIAZOMETHANE	334-88-3	1		Y	N
ANTIMONY TRIOXIDE	1309-64-4	1	H	N	Y	DIBENZ(A,H)ANTHRACENE	53-70-3	0.01	V	Y	N
ANTIMONY TRISULFIDE	1345-04-6	0.1	H	N	Y	DIOXINS/FURANS		6E-07	D,V	Y	N
ARSENIC COMPOUNDS		0.005	I	N	Y	DIBENZOFURAN	132-64-9	5	V	Y	N
ASBESTOS	1332-21-4	0	A	N	Y	DIBROMO-3-CHLOROPROPANE, [1,2-]	96-12-8	0.01		Y	N
BENZ(A)ANTHRACENE	56-55-3	0.01	V	Y	N	DIBROMOETHANE, [1,2-]	106-93-4	0.1		Y	N
BENZENE	71-43-2	2		Y	N	DIBUTYL PHTHALATE	84-74-2	10		Y	Y
BENZIDINE	92-87-5	0.0003	V	Y	N	DICHLOROBENZENE, [1,4-]	106-46-7	3		Y	N
BENZO(A)PYRENE	50-32-8	0.01	V	Y	N	DICHLOROBENZIDENE, [3,3-]	91-94-1	0.2	V	Y	Y
BENZO(B)FLUORANTHENE	205-99-2	0.01	V	Y	N	DICHLOROETHANE, [1,1-]	75-34-3	1		Y	N
BENZO(K)FLUORANTHENE	207-08-9	0.01	V	Y	N	DICHLOROETHANE, [1,2-]	107-06-2	0.8		Y	N
BENZOTRICHLORIDE	98-07-7	0.006		Y	N	DICHLOROETHYLENE, [1,1-]	75-35-4	0.4		Y	N
BENZYL CHLORIDE	100-44-7	0.1		Y	N	DICHLOROMETHANE	75-09-2	10		N	N
BERYLLIUM COMPOUNDS		0.008	J	N	Y	DICHLOROPHENOXY ACETIC ACID, [2,4-]	94-75-7	10	C	Y	Y
BERYLLIUM SALTS		2E-05	J	N	Y	DICHLOROPROPANE, [1,2-]	78-87-5	1		Y	N
BIPHENYL, [1,1-]	92-52-4	10	V	Y	N	DICHLOROPROPENE, [1,3-]	542-75-6	1		Y	N
BIS(CHLOROETHYL)ETHER	111-44-4	0.06		Y	N	DICHLORVOS	62-73-7	0.2		Y	N
BIS(CHLOROMETHYL)ETHER	542-88-1	0.0003		Y	N	DIETHANOLAMINE	111-42-2	5		Y	N
BROMOFORM	75-25-2	10		Y	N	DIETHYL SULFATE	64-67-5	1		Y	N
BROMOMETHANE	74-83-9	10		Y	N	DIETHYLENE GLYCOL MONOBUTYL ETHER	112-34-5	5	P	Y	N
BUTADIENE, [1,3-]	106-99-0	0.07		Y	N	DIMETHOXYBENZIDINE, [3,3-]	119-90-4	0.1	V	Y	Y
BUTOXYETHANOL ACETATE, [2-]	112-07-2	5	P	Y	N	DIMETHYL BENZIDINE, [3,3-]	119-93-7	0.008	V	Y	Y
BUTYLENE OXIDE, [1,2-]	106-88-7	1		Y	N	DIMETHYL CARBAMOYL CHLORIDE	79-44-7	0.02		Y	N
CADMIUM COMPOUNDS		0.01	K	N	Y	DIMETHYL FORMAMIDE	68-12-2	1		Y	N
CALCIUM CYANAMIDE	156-62-7	10		Y	Y	DIMETHYL HYDRAZINE, [1,1-]	57-14-7	0.008		Y	N
CAPROLACTAM (Delisted)	105-60-2					DIMETHYL PHTHALATE	131-11-3	10		Y	N
CAPTAN	133-06-2	10		Y	Y	DIMETHYL SULFATE	77-78-1	0.1		Y	N
CARBARYL	63-25-2	10	V	Y	Y	DIMETHYLAMINOAZOBENZENE, [4-]	60-11-7	1		Y	N
CARBON DISULFIDE	75-15-0	1		Y	N	DIMETHYLANILINE, [N-N-]	121-69-7	1		Y	N
CARBON TETRACHLORIDE	56-23-5	1		Y	N	DINITRO-O-CRESOL, [4,6-] (Note 6)	534-52-1	0.1	E	Y	Y
CARBONYL SULFIDE	463-58-1	5		Y	N	DINITROPHENOL, [2,4-]	51-28-5	1		Y	N
CATECHOL	120-80-9	5		Y	N	DINITROTOLUENE, [2,4-]	121-14-2	0.02		Y	N
CHLORAMBEN	133-90-4	1		Y	Y	DIOXANE, [1,4-]	123-91-1	6		Y	N
CHLORDANE	57-74-9	0.01		Y	Y	DIPHENYLHYDRAZINE, [1,2-]	122-66-7	0.09	V	Y	Y
CHLORINE	7782-50-5	0.1		N	N	DIPHENYLMETHANE DIISOCYANATE, [4,4-]	101-68-8	0.1	V	Y	N
CHLOROACETIC ACID	79-11-8	0.1		Y	N	EPICHLOROHYDRIN	106-89-8	2		Y	N
CHLOROACETOPHENONE, [2-]	532-27-4	0.06		Y	N	ETHOXYETHANOL, [2-]	110-80-5	10	P	Y	N
CHLOROBENZENE	108-90-7	10		Y	N	ETHOXYETHYL ACETATE, [2-]	111-15-9	5	P	Y	N
CHLOROBENZILATE	510-15-6	0.4	V	Y	Y	ETHYL ACRYLATE	140-88-5	1		Y	N
CHLOROFORM	67-66-3	0.9		Y	N	ETHYL BENZENE	100-41-4	10		Y	N

Air Pollution Control Program

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Chemical	CAS #	SMAL tons/yr	Group ID	VOC	PM	Chemical	CAS #	SMAL tons/yr	Group ID	VOC	PM
ETHYL CHLORIDE	75-00-3	10		Y	N	NITROBENZENE	98-95-3	1		Y	N
ETHYLENE GLYCOL	107-21-1	10		Y	N	NITROBIPHENYL, [4-]	92-93-3	1	V	Y	N
ETHYLENE GLYCOL MONOBUTYL ETHER (Delisted)	111-76-2					NITROPHENOL, [4-]	100-02-7	5		Y	N
ETHYLENE GLYCOL MONOHEXYL ETHER	112-25-4	5	P	Y	N	NITROPROPANE, [2-]	79-46-9	1		Y	N
ETHYLENE IMINE [AZIRIDINE]	151-56-4	0.003		Y	N	NITROSODIMETHYLAMINE, [N-]	62-75-9	0.001		Y	N
ETHYLENE OXIDE	75-21-8	0.1		Y	N	NITROSOMORPHOLINE, [N-]	59-89-2	1		Y	N
ETHYLENE THIOUREA	96-45-7	0.6		Y	Y	NITROSO-N-METHYLUREA, [N-]	684-93-5	0.0002		Y	N
FORMALDEHYDE	50-00-0	2		Y	N	OCTACHLORONAPHTHALENE	2234-13-1	0.01	V	Y	N
GLYCOL ETHER (ETHYLENE GLYCOL ETHERS)		5	P	Y	N	PARATHION	56-38-2	0.1		Y	Y
GLYCOL ETHER (DIETHYLENE GLYCOL ETHERS)		5	P	Y	N	PCB [POLYCHLORINATED BIPHENYLS]	1336-36-3	0.009	X	Y	Y
HEPTACHLOR	76-44-8	0.02		Y	N	PENTACHLORONITROBENZENE	82-68-8	0.3		Y	N
HEXACHLOROENZENE	118-74-1	0.01		Y	N	PENTACHLOROPHENOL	87-86-5	0.7		Y	N
HEXACHLOROBUTADIENE	87-68-3	0.9		Y	N	PHENOL	108-95-2	0.1		Y	N
HEXACHLOROCYCLOHEXANE, [ALPHA-]	319-84-6	0.01	F	Y	N	PHENYLENEDIAMINE, [PARA-]	106-50-3	10		Y	N
HEXACHLOROCYCLOHEXANE, [BETA-]	319-85-7	0.01	F	Y	N	PHOSGENE	75-44-5	0.1		Y	N
HEXACHLOROCYCLOHEXANE, [DELTA-]	319-86-8	0.01	F	Y	N	PHOSPHINE	7803-51-2	5		N	N
HEXACHLOROCYCLOHEXANE, [TECHNICAL]	608-73-1	0.01	F	Y	N	PHOSPHOROUS (YELLOW OR WHITE)	7723-14-0	0.1		N	N
HEXACHLOROCYCLOPENTADIENE	77-47-4	0.1		Y	N	PHTHALIC ANHYDRIDE	85-44-9	5		Y	N
HEXACHLOROETHANE	67-72-1	5		Y	N	POLYCYCLIC ORGANIC MATTER		0.01	V	Y	N
HEXAMETHYLENE,-1,6-DIISOCYANATE	822-06-0	0.02		Y	N	PROPANE SULTONE, [1,3-]	1120-71-4	0.03		Y	Y
HEXAMETHYLPHOSPHORAMIDE	680-31-9	0.01		Y	N	PROPIOLACTONE, [BETA-]	57-57-8	0.1		Y	N
HEXANE, [N-]	110-54-3	10		Y	N	PROPYONALDEHYDE	123-38-6	5		Y	N
HYDRAZINE	302-01-2	0.004		N	N	PROPOXUR [BAYGON]	114-26-1	10		Y	Y
HYDROGEN CHLORIDE	7647-01-0	10		N	N	PROPYLENE OXIDE	75-56-9	5		Y	N
HYDROGEN FLUORIDE	7664-39-3	0.1		N	N	PROPYLENEIMINE, [1,2-]	75-55-8	0.003		Y	N
HYDROQUINONE	123-31-9	1		Y	N	QUINOLINE	91-22-5	0.006		Y	N
INDENO(1,2,3CD)PYRENE	193-39-5	0.01	V	Y	N	QUINONE	106-51-4	5		Y	N
ISOPHORONE	78-59-1	10		Y	N	RADIONUCLIDES		Note 1	Y	N	Y
LEAD COMPOUNDS		0.01	Q	N	Y	SELENIUM COMPOUNDS		0.1	W	N	Y
LINDANE [GAMMA-HEXACHLOROCYCLOHEXANE]	58-89-9	0.01	F	Y	N	STYRENE	100-42-5	1		Y	N
MALEIC ANHYDRIDE	108-31-6	1		Y	N	STYRENE OXIDE	96-09-3	1		Y	N
MANGANESE COMPOUNDS		0.8	R	N	Y	TETRACHLORODIBENZO-P-DIOXIN,[2,3,7,8]	1746-01-6	6E-07	D,V	Y	Y
MERCURY COMPOUNDS		0.01	S	N	N	TETRACHLOROETHANE, [1,1,2,2-]	79-34-5	0.3		Y	N
METHANOL	67-56-1	10		Y	N	TETRACHLOROETHYLENE	127-18-4	10		N	N
METHOXYCHLOR	72-43-5	10	V	Y	Y	TITANIUM TETRACHLORIDE	7550-45-0	0.1		N	N
METHOXYETHANOL, [2-]	109-86-4	10	P	Y	N	TOLUENE	108-88-3	10		Y	N
METHYL CHLORIDE	74-87-3	10		Y	N	TOLUENE DIISOCYANATE, [2,4-]	584-84-9	0.1		Y	N
METHYL ETHYL KETONE (Delisted)	78-93-3					TOLUIDINE, [ORTHO-]	95-53-4	4		Y	N
METHYL HYDRAZINE	60-34-4	0.06		Y	N	TOXAPHENE	8001-35-2	0.01		Y	N
METHYL IODIDE	74-88-4	1		Y	N	TRICHLOROENZENE, [1,2,4-]	120-82-1	10		Y	N
METHYL ISOBUTYL KETONE	108-10-1	10		Y	N	TRICHLOROETHANE, [1,1,1-]	71-55-6	10		N	N
METHYL ISOCYANATE	624-83-9	0.1		Y	N	TRICHLOROETHANE, [1,1,2-]	79-00-5	1		Y	N
METHYL METHACRYLATE	80-62-6	10		Y	N	TRICHLOROETHYLENE	79-01-6	10		Y	N
METHYL TERT-BUTYL ETHER	1634-04-4	10		Y	N	TRICHLOROPHENOL, [2,4,5-]	95-95-4	1		Y	N
METHYLCYCLOPENTADIENYL MANGANESE	12108-13-3	0.1	R	N	Y	TRICHLOROPHENOL, [2,4,6-]	88-06-2	6		Y	N
METHYLENE BIS(2-CHLOROANILINE), [4,4-]	101-14-4	0.2	V	Y	Y	TRIETHYLAMINE	121-44-8	10		Y	N
METHYLENEDIANILINE, [4,4-]	101-77-9	1	V	Y	N	TRIFLURALIN	1582-09-8	9		Y	Y
METHYLNAPHTHALENE, [2-]	91-57-6	0.01	V	Y	N	TRIMETHYLPENTANE, [2,2,4-]	540-84-1	5		Y	N
MINERAL FIBERS		0	T	N	Y	URETHANE [ETHYL CARBAMATE]	51-79-6	0.8		Y	N
NAPHTHALENE	91-20-3	10	V	Y	N	VINYL ACETATE	108-05-4	1		Y	N
NAPHTHYLAMINE, [ALPHA-]	134-32-7	0.01	V	Y	N	VINYL BROMIDE	593-60-2	0.6		Y	N
NAPHTHYLAMINE, [BETA-]	91-59-8	0.01	V	Y	N	VINYL CHLORIDE	75-01-4	0.2		Y	N
NICKEL CARBONYL	13463-39-3	0.1	U	N	Y	XYLENE, [META-]	108-38-3	10	G	Y	N
NICKEL COMPOUNDS		1	U	N	Y	XYLENES (MIXED ISOMERS)	1330-20-7	10	G	Y	N
NICKEL REFINERY DUST		0.08	U	N	Y						
NICKEL SUBSULFIDE	12035-72-2	0.04	U	N	Y						

Air Pollution Control Program Table of Hazardous Air Pollutants and Screening Model Action Levels

Chemical	CAS #	SMAL tons/yr	Group ID	VOC	PM	Chemical	CAS #	SMAL tons/yr	Group ID	VOC	PM
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Legend	
Group ID	
A	Asbestos
B	Cresols/Cresylic Acid (isomers and mixtures)
C	2,4 - D, Salts and Esters
D	Dibenzofurans, Dibenzodioxins
E	4, 6 Dinitro-o-cresol, and Salts
F	Lindane (all isomers)
G	Xylenes (all isomers and mixtures)
H	Antimony Compounds
I	Arsenic Compounds
J	Beryllium Compounds
K	Cadmium Compounds
L	Chromium Compounds
M	Cobalt Compounds
N	Coke Oven Emissions
O	Cyanide Compounds
P	Glycol Ethers
Q	Lead Compounds (except elemental Lead)
R	Manganese Compounds
S	Mercury Compounds
T	Fine Mineral Fibers
U	Nickel Compounds
V	Polycyclic Organic Matter
W	Selenium Compounds
X	Polychlorinated Biphenyls (Aroclors)
Y	Radionuclides
Notes	The SMAL for radionuclides is defined as the effective dose equivalent to 0.3 millirems per year for 7 years exposure associated with a cancer risk of 1 in 1 million

Pollutants				Existing	New Boilers	New Installation
PM					3.6	3.6
PM10				5.846886	4.15	10.00
PM2.5				5.846886	2.79	8.64
Nox				59.55412	36.05	95.60
SOx				14.4163	12.98	27.40
VOCs				3.188857	0.36	3.55
HAPs				0.8395	0.14	0.98
Hexane				0		0.00
Formaldehyde				0		0.00
Polycyclic Organic Matter (POM)				0		0.00
Carbon Monoxide (CO)				56.37286	9.01	65.38

generator kw	generator hp	apprx engine hp	apprx engine mech kw	fuel input (mmbtu/hr)	fuel input (gal/hr)	NOx emission factor	emission factor units	emission factor reference	NOx PTE (lb/hr)	NOx 500 hours	PM emission factor	emission factor units	PM PTE (lb/hr)	PM 500 hours	CO emission factor	emission factor units	CO PTE (lb/hr)	CO 500 hours	SOx emission factor lb/gal	SOx PTE lb/hr	SOX 500 hours	VOC emission factor	emission factor units	VOC PTE lb/hr	VOC 500 hours	HAPs emission factor	emission factor units	HAPs PTE lb/hr	HAPS 500 hours
1250	1676	1783	1330	12.48	90.78	9.2	gram/engine mech kw	40 CFR 89 Tier 1, year 2002	26.97	6.742748	0.54	gram/engine mech kw	1.58308	0.39577	11.4	gram/engine mech	33.42058	8.355145	0.000212	0.019201	0.0048	0.0819	lb / MMBtu	1.022334	0.255584	0.001574	lb / MMBtu	0.019648	0.004912
1252	1679	1786	1332	12.50	90.93	9.2	gram/engine mech kw	40 CFR 89 Tier 1, year 2005	27.01	6.753537	0.54	gram/engine mech kw	1.585613	0.396403	11.4	gram/engine mech	33.47405	8.368513	0.000212	0.019231	0.004808	0.0819	lb / MMBtu	1.02397	0.255992	0.001574	lb / MMBtu	0.019679	0.00492
30	40	43	32	0.30	2.18	4.43	lb/mmbtu input	AP-42 Table 3.3-1, small engine	1.32	0.30293	0.31	lb/mmbtu input	0.092871	0.023218	6.95	lb/mmbtu input	0.284606	0.071151	0.000212	0.000461	0.000115	0.36	lb / MMBtu	0.307851	0.026963	0.003874	lb / MMBtu	0.00116	0.00029
230	308	328	245	2.30	16.70	4.43	lb/mmbtu input	AP-42 Table 3.3-1, small engine	10.19	2.532243	0.31	lb/mmbtu input	0.712014	0.178003	6.95	lb/mmbtu input	2.181579	0.545495	0.000212	0.003533	0.000883	0.36	lb / MMBtu	0.218855	0.206714	0.003874	lb / MMBtu	0.00887	0.00224
231	310	330	246	2.31	16.78	4.0	gram/engine mech kw	40 CFR 89 Tier 3, year 2006	2.17	0.541765	0.2	gram/engine mech kw	0.108353	0.027098	3.5	gram/engine mech	1.896176	0.474045	0.000212	0.003548	0.000887	0.36	lb / MMBtu	0.83045	0.207612	0.003874	lb / MMBtu	0.008936	0.002234
										23.65412				1.416886				26.18286			0.016301				1.208857			0.0195	

conversion	
hp per kw	1.341
grams/lb	453.6
engine to generator efficiency	94%
assumed BSFC (lbu/hp)	7000
used lbw (lbu/gal)	137500
ULSD Density lb/gal	7.05
ULSD sulfur content	0.0015%

reference
standard conversion
Caterpillar, Cashman Power Solutions, Designer Database, Generator Power Factor
AP-42 Table 3.4-1, October 1996.
137,500 lbw/gal obtained from U.S. Energy Information Administration "Large reduction in distillate fuel sulfur content has only minor effect on energy content" Feb 24, 2015.
and
137,380 lbw/gal per U.S. EIA "Monthly Energy Review June 2017", Appendix A, Table A1. assumed 137,500 as approximation.

33.6 mmbtu/hr Boilers burning natural gas EP = 100 lb/mmscf AP-42 Table 1.4-1 small boiler, uncontrolled

Emission Factors for Emergency Generators Project 2018-03-037

SSM Cardinal Glennon Childrens Hospital Existing Equipment permitted by the City of St. Louis

								Total
Pollutants	EU01 Two Boilers	EU02 One Boiler	EU03 Six emergency generators	EU04 Two Cooling Towers	EU07 Diesel Storage Tank	EU08 Lab Hoods		
PM10	2.73		1.416886083	1.7				5.846886
PM2.5	2.73		1.416886083	1.7				5.846886
Nox	35.9		23.65412262					59.55412
SOx	14.4		0.016301379					14.4163
VOCs	1.98		1.208857361					3.188857
HAPs	0.82		0.019499641					0.8395
Hexane	0.65							
Formaldehyde	0.03							
Polycyclic Organic Matter (POM)	0.001							
Carbon Monoxide (CO)	30.19		26.18286097					56.37286

Source: St. Louis City Permit 04-06-013, July, 16, 2004

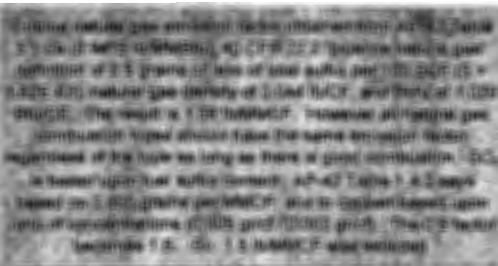
Emission Unit	Emission Point	Description	MHDR (MMBtu/hr input)	Combined MHDR (MMBtu/hr input)	MHDR (MMcf/hr)	Pollutant	CAS	HAP?	Emission Factor (lb / mmcf)	Emission Factor Source (SCC)	Available Pollutant (lb/hr)	Control Device	PTE (lb/hr)	PTE (tpy)
			59.5	59.52	0.0584	PM filterable			1.9		0.1109	none	0.1109	0.49
						PM10			7.6		0.4435	none	0.4435	1.94
						PM2.5			7.6		0.4435	none	0.4435	1.94
						SO2			0.0350		0.0350	none	0.0350	0.15
						NOx			100		5.8350	none	5.8350	25.56
						VOC			5.5		0.3209	none	0.3209	1.41
						CO			84		4.9014	none	4.9014	21.47
						Combined HAPs			1.898		0.1102	none	0.1102	0.48
						POM aggregate group			6.98E-04		4.07E-05	none	4.07E-05	1.78E-04
						2-Methylnaphthalene	91-57-6	y	2.40E-05		1.400E-06	none	1.40E-06	6.13E-06
						3-Methylchloranthrene	56-49-5	y	1.80E-06		1.050E-07	none	1.05E-07	4.60E-07
						7,12-Dimethylbenzanthracene	57-97-6	y	1.60E-05		9.336E-07	none	9.34E-07	4.09E-06
						Acenaphthene	83-32-9	y	1.80E-06		1.050E-07	none	1.05E-07	4.60E-07
						Acenaphthylene	203-96-8	y	1.80E-06		1.050E-07	none	1.05E-07	4.60E-07
						Anthracene	120-12-7	y	2.40E-06		1.400E-07	none	1.40E-07	6.13E-07
						Benanthracene	56-55-3	y	1.80E-06		1.050E-07	none	1.05E-07	4.60E-07
						Benzene	71-43-2	y	2.10E-03		1.225E-04	none	1.23E-04	5.37E-04
						Benzo(a)pyrene	50-32-8	y	1.20E-06		7.002E-08	none	7.00E-08	3.07E-07
						Benzo(b)fluoranthene	205-99-2	y	1.80E-06		1.050E-07	none	1.05E-07	4.60E-07
						Benzo(g,h,i)perylene	191-24-2	y	1.20E-06		7.002E-08	none	7.00E-08	3.07E-07
						Benzo(k)fluoranthene	205-82-3	y	1.80E-06		1.050E-07	none	1.05E-07	4.60E-07
						Butane	106-97-8		2.10E+00		1.225E-01	none	1.23E-01	5.37E-01
						Chrysene	218-01-9	y	1.80E-06		1.050E-07	none	1.05E-07	4.60E-07
						Dibenzo(a,h)anthracene	53-70-3	y	1.20E-06		7.002E-08	none	7.00E-08	3.07E-07
						Dichlorobenzene	25321-22-6	y	1.20E-03		7.002E-05	none	7.00E-05	3.07E-04
						Ethane	74-84-0		3.10E+00		1.809E-01	none	1.81E-01	7.92E-01
						Fluoranthene	206-44-0	y	3.00E-06		1.751E-07	none	1.75E-07	7.67E-07
						Fluorene	86-73-7	y	2.80E-06		1.634E-07	none	1.63E-07	7.16E-07
						Formaldehyde	50-00-0	y	7.50E-02		4.376E-03	none	4.38E-03	1.92E-02
						Hexane	110-54-3	y	1.80E+00		1.050E-01	none	0.1050	0.46
						Indeno(1,2,3-cd)pyrene	193-39-5	y	1.80E-06		1.050E-07	none	1.05E-07	4.60E-07
						Naphthalene	91-20-3	y	6.10E-04		3.559E-05	none	3.56E-05	1.56E-04
						Pentane	109-66-0		2.60E+00		1.517E-01	none	1.52E-01	6.64E-01
						Phenanathrene	85-01-8	y	1.70E-05		9.920E-07	none	9.92E-07	4.34E-06
						Propane	74-98-6		1.60E+00		9.336E-02	none	9.34E-02	4.09E-01
						Pyrene	129-00-0	y	5.00E-06		2.918E-07	none	2.92E-07	1.28E-06
						Toluene	108-88-3	y	3.40E-03		1.984E-04	none	1.98E-04	8.69E-04
						Arsenic	7440-38-2	y	2.00E-04		1.167E-05	none	1.17E-05	5.11E-05
						Barium	7440-39-3		4.40E-03		2.567E-04	none	2.57E-04	1.12E-03
						Beryllium	7440-41-7	y	1.20E-05		7.002E-07	none	7.00E-07	3.07E-06
						Cadmium	7440-43-9	y	1.10E-03		6.419E-05	none	6.42E-05	2.81E-04
						Chromium	7440-47-3	y	1.40E-03		8.169E-05	none	8.17E-05	3.58E-04
						Cobalt	7440-48-4	y	8.40E-05		4.901E-06	none	4.90E-06	2.15E-05
						Copper	7440-50-8		8.50E-04		4.960E-05	none	4.96E-05	2.17E-04
						Manganese	7439-96-5	y	3.80E-04		2.217E-05	none	2.22E-05	9.71E-05
						Mercury	7439-97-6	y	2.60E-04		1.517E-05	none	1.52E-05	6.64E-05
						Molybdenum	7439-98-7		1.10E-03		6.419E-05	none	6.42E-05	2.81E-04
						Nickel	7440-02-0	y	2.10E-03		1.225E-04	none	1.23E-04	5.37E-04
						Selenium	7782-49-2	y	2.40E-05		1.400E-06	none	1.40E-06	6.13E-06
						Vanadium	7440-62-2		2.30E-03		1.342E-04	none	1.34E-04	5.88E-04
						Zinc	7440-66-6		2.90E-02		1.692E-03	none	1.69E-03	7.41E-03
						CO2			120,000		7002.0000	none	7002.000	30,668.76
						Methane			2.3		0.1342	none	0.1342	0.59
						N2O			2.2		0.1284	none	0.1284	0.56
						GHG (mass)								30,669.91
						GHG (CO2e)								30,851.01

highlight equals user input/confirm

Natural Gas HHV (Btu/cf)
1,020

Mfg's spec	11670	scfh		
MHDR (input)	11.9034	MMBtu/hr	per boiler	
# of units	5			
MHDR (output)	10.04	MMBtu/hr	per boiler	

	SO2 (lb/mmcf)	grains sulfur per	scf	grs/cf
AP-42	0.6	2000	1,000,000	0.002
40 CFR 72.2	1.5	0.5	100	0.005
site specific	#VALUE!			#VALUE!



0.05835

100yr GWP 40 CFR 98
Table A-1, Jan 1 2014

CO2	1
CH4	25
N2O	298

Natural gas HHV of 1,020 Btu/cf cited from AP-42 Section 1.4, July 1998.
Dichlorobenzene group CAS 25321-22-6 conservatively assumed as 100% 1,4-dichlorobenzene CAS 106-46-7.

Emission Unit	Emission Point	Description	MHDR (MMBtu/hr input)	Combined MHDR (MMBtu/hr input)	MHDR (1,000 gal/hr)	Pollutant	CAS	HAP?	Emission Factor	Emission Factor Units	Emission Factor Source	Available Pollutant (lb/hr)	Control Device	PTE (lb/hr)	PTE (tpy)
			56.6	56.6	0.412	PM filterable			2		SCC 1-02-005-02 industrial boiler no 2 distillate oil 10-100 MMBtu/hr	0.8230	none	0.8230	3.60
			0.0			PM10			2.30			0.9465	none	0.9465	4.15
			0.0			PM2.5			1.55			0.6378	none	0.6378	2.79
			0.0			SO2			7.2000			2.9628	none	2.9628	12.98
						NOx			20			8.2300	none	8.2300	36.05
						NMTOC as VOC			0.2			0.0823	none	0.0823	0.36
						CO			5			2.0575	none	2.0575	9.01
						Combined HAPS			0.0791			0.0325	none	0.0325	0.14
						POM aggregate group			4.49E-03			1.85E-03	none	1.85E-03	8.10E-03
						POM (particulate only)		y	0.0033			0.0014	none	1.36E-03	5.95E-03
						Formaldehyde	50-00-0	y	6.10E-02		SCC 1-01-004-01 electric generation, no. 6 oil, AP 42 Table 1.3-9	2.5102E-02	none	0.0251	0.11
						Benzene	71-43-2	y	2.14E-04			8.8061E-05	none	8.81E-05	3.86E-04
						Ethylbenzene	100-41-4	y	6.36E-05			2.6171E-05	none	2.62E-05	1.15E-04
						Naphthalene	91-20-3	y	1.13E-03			4.6500E-04	none	4.65E-04	2.04E-03
						1,1,1-Trichloroethane	71-55-6	y	2.36E-04			9.7114E-05	none	9.71E-05	4.25E-04
						Toluene	108-88-3	y	6.20E-03			2.5513E-03	none	2.55E-03	1.12E-02
						o-Xylene	95-47-6	y	1.09E-04			4.4854E-05	none	4.49E-05	1.96E-04
						Acenaphthene	83-32-9	y	2.11E-05			8.6827E-06	none	8.68E-06	3.80E-05
						Acenaphthylene	208-96-8	y	2.53E-07			1.0411E-07	none	1.04E-07	4.56E-07
						Anthracene	120-12-7	y	1.22E-06			5.0203E-07	none	5.02E-07	2.20E-06
						Benz(a)anthracene	56-55-3	y	4.01E-06		1.6501E-06	none	1.65E-06	7.23E-06	
						Benzo(b)fluoranthene	205-99-2	y	1.48E-06		6.0902E-07	none	6.09E-07	2.67E-06	
						Benzo(k)fluoranthene	207-08-9	y	1.48E-06		6.0902E-07	none	6.09E-07	2.67E-06	
						Benzo(g,h,i)perylene	191-24-2	y	2.26E-06		9.2999E-07	none	9.30E-07	4.07E-06	
						Chrysene	218-01-9	y	2.38E-06		9.7937E-07	none	9.79E-07	4.29E-06	
						Dibenzo(a,h)anthracene	53-70-3	y	1.67E-06		6.8721E-07	none	6.87E-07	3.01E-06	
						Fluoranthene	206-44-0	y	4.84E-06		1.9917E-06	none	1.99E-06	8.72E-06	
						Fluorene	86-73-7	y	4.47E-06		1.8394E-06	none	1.84E-06	8.06E-06	
						Indo(1,2,3-cd)pyrene	193-39-5	y	2.14E-06		8.8061E-07	none	8.81E-07	3.86E-06	
						Phenanthrene	85-01-8	y	1.05E-05		4.3208E-06	none	4.32E-06	1.89E-05	
						Pyrene	129-00-0	y	4.25E-06		1.7489E-06	none	1.75E-06	7.66E-06	
						OCDD (dioxin)	3268-87-9	y	3.10E-09		1.2757E-09	none	1.28E-09	5.59E-09	
						Arsenic		y	4		SCC 1-02-005-02 industrial boiler no 2 distillate oil 10-100 MMBtu/hr	2.2633E-04	none	2.26E-04	9.91E-04
						Beryllium		y	3			1.6974E-04	none	1.70E-04	7.43E-04
						Cadmium		y	3			1.6974E-04	none	1.70E-04	7.43E-04
						Chromium		y	3			1.6974E-04	none	1.70E-04	7.43E-04
						Copper		y	6			3.3949E-04	none	3.39E-04	1.49E-03
						Lead		y	9			5.0923E-04	none	5.09E-04	2.23E-03
						Mercury		y	3			1.6974E-04	none	1.70E-04	7.43E-04
						Manganese		y	6			3.3949E-04	none	3.39E-04	1.49E-03
						Nickel		y	3			1.6974E-04	none	1.70E-04	7.43E-04
						Selenium		y	15			8.4872E-04	none	8.49E-04	3.72E-03
						Zinc		y	4		2.2633E-04	none	2.26E-04	9.91E-04	
						CO2			22,300		ib / 1,000 gal	9176.45	none	9176.4500	40192.85
						CH4			0.052			0.02	none	0.0214	0.09
						N2O			0.26			0.11	none	0.1070	0.47
						GHG (mass)									40,193.41
						GHG (CO2e)									40,334.84

Sulfur Content (wt %)	ULSD HHV (Btu/gal)
0.0500%	137,500

EX Series
Mfg spec
units
MHDR
1000gal/hr

82.3 gal/hr
5
0.4115 5 boilers at 1000 gallon per hour

56.58125 MMBtu/hr input

100yr GWP 40 CFR 98
Table A-1, Jan 1 2014

CO2	1
CH4	25
N2O	298

Emission factor for Benzo(b,k)fluoranthene conservatively applied to each (b) and (k)
137,500 Btu/gal obtained from U.S. Energy Information Administration "Large reduction in distillate fuel sulfur content has only minor effect on energy content" Feb 24, 2015.
137,380 Btu/gal per U.S. EIA "Monthly Energy Review June 2017", Appendix A, Table A1. assumed 137,500 as approximation.
PM, PM10, and PM2.5 emission factors cited from AP-42 Table 1.3-1, 1.3-2, 1.3-6 for industrial boiler May 2010.

NSPS Dc defined as oil fired
initial notification
record keep fuel usage per boiler and sulfur content

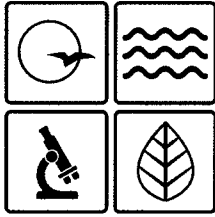
MACT 6J defined as oil fired, new
every other year tune-up as the CO management practice standard
PM limit of 0.03 lb/MMBtu heat input
AP-42 PM emission factors are in compliance with the limit. They equate to:
initial performance test, and every 3 years after
monthly fuel mix records

ib/MMBtu input

PM	0.015
PM10	0.017

Installation: SSM Cardinal Glennon
ID: 510-2802
Calculation Version:
Project Description: 5 new boilers 2018-03-037

Pollutant	Natural Gas PTE (tpy)	Fuel Oil PTE (tpy)	Worst Case PTE (tpy)
PM	0.49	3.60	3.60
PM10	1.94	4.15	4.15
PM2.5	1.94	2.79	2.79
SOx	0.15	12.98	12.98
Nox	25.56	36.05	36.05
VOC	1.41	0.36	1.41
CO	21.47	9.01	21.47
HAPs	0.48	0.14	0.48
CO2	30,668.8	40,192.9	40,192.9
CH4	0.59	0.09	0.59
N2O	0.56	0.47	0.56
GHG (Mass)	30,669.9	40,193.4	40,193.4
GHG (CO2e)	30,851.0	40,334.8	40,334.8



Missouri Department of dnr.mo.gov

NATURAL RESOURCES

Michael L. Parson, Governor

Carol S. Comer, Director

JUN 26 2018

Ms. Leslie Thornburg
Environmental Safety, Security, and Emergency Preparedness Specialist
SSM Cardinal Glennon Childrens Hospital
1015 Corporate square Drive Suite 110
St. Louis, MO 63132

RE: New Source Review Permit - Project Number: 2018-03-037

Dear Ms. Thornburg:

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. 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 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.

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 Sections 621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within thirty 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.



Recycled paper

Ms. Leslie Thornburg
Page Two

If you have any questions regarding this permit, please do not hesitate to contact Kathy Kolb, 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

Kendall B. Hale for

Susan Heckenkamp
New Source Review Unit Chief

SH:shj

Enclosures

c: St. Louis Regional Office
PAMS File: 2018-03-037

Permit Number: **062018-009**