



## 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: 022018-008

Project Number: 2017-12-042  
Installation Number: 183-0264

Parent Company: Pinnacle Entertainment

Parent Company Address: 3980 Howard Hughes Parkway, Las Vegas, NV 89169

Installation Name: Ameristar Casino - St. Charles

Installation Address: 1 Ameristar Blvd, St. Charles, MO 63301

Location Information: St. Charles County

Application for Authority to Construct was made for:

Permitting four boilers and six emergency generators that were originally installed in 1994, 1997 and 2006. 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

FEB 28 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/>

**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 paragraph (12)(A)10. "Conditions required by permitting authority."*

Ameristar Casino - St. Charles  
 St. Charles County

1. NO<sub>x</sub> Emission Limitation
  - A. Ameristar Casino - St. Charles 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**

Emission Source	Description
EP-1	Boiler #1 – 33.4 MMBtu/hr natural gas Superior Boiler Works (1997), Model Number 6-X-6000, Serial Number 13312
EP-2	Boiler #2 – 33.4 MMBtu/hr natural gas Superior Boiler Works (1997), Model Number 6-X-6000, Serial Number 13313
EP-3	Boiler #3 – 33.4 MMBtu/hr natural gas Superior Boiler Works (1997), Model Number 6-X-6000, Serial Number 13314
EP-4	Boiler #4 – 33.4 MMBtu/hr natural gas Superior Boiler Works (1997), Model Number 6-X-6000, Serial Number 13317
EP-5	Emergency Generator #1, Cummins (1997) 1500kW, Model Number 1500DFLE-1540, Serial Number 1010289041 <sup>a</sup>
EP-6	Emergency Generator #2, Cummins (1997) 1500kW, Model Number 1500DFLE-1540, Serial Number 1010286399 <sup>a</sup>
EP-7	Emergency Generator #3, Cummins (1997) 1500kW, Model Number 1500DFLE-1540, Serial Number 1010289047 <sup>a</sup>
EP-8	Emergency Generator #4 – Cummins (1994) 300 kW, Model Number 300DFCB, Serial Number C960600636 <sup>a</sup>
EP-9	Emergency Generator #5 – Cummins (1994) 175 kW, Model Number 175DGFB, Serial Number 63311J <sup>a</sup>
EP-10	Emergency Generator #6 – Caterpillar (2006) 500 kW, Model Number C15/LC6, Serial Number G6B100018 <sup>a</sup>

<sup>a</sup>The kW rating is the electric kW of the generator

- B. Ameristar Casino - St. Charles 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 another equivalent form that uses the same calculation method as Attachment A.
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**

Emission Source	Description
EP-5	Emergency Generator #1 – 1500 kW
EP-6	Emergency Generator #2 – 1500 kW
EP-7	Emergency Generator #3 – 1500kW
EP-8	Emergency Generator #4– 300 kW
EP-9	Emergency Generator #5– 175 kW
EP-10	Emergency Generator #5– 500 kW

3. Boiler Requirements

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

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

Emission Source	Description
EP-1	Boiler #1 – 33.4 MMBtu/hr natural gas Superior Boiler Works (1997)
EP-2	Boiler #2 – 33.4 MMBtu/hr natural gas Superior Boiler Works (1997)
EP-3	Boiler #3 – 33.4 MMBtu/hr natural gas Superior Boiler Works (1997)
EP-4	Boiler #4 – 33.4 MMBtu/hr natural gas Superior Boiler Works (1997)

4. Fuel Requirement-Boilers and Emergency Generators

- A. Ameristar Casino - St. Charles shall burn exclusively pipeline grade natural gas in all of the four boilers (EP-1, EP-2, EP-3 and EP-4).
- B. Ameristar Casino - St. Charles shall burn ultra-low sulfur diesel fuel (15 ppm sulfur) in their emergency generators (EP-5, EP-6, EP-7, EP-8, EP-9 and EP-10).
- C. Ameristar Casino - St. Charles shall demonstrate compliance with Special Condition 4.B by obtaining records of the diesel fuel's sulfur content from the vendor for each shipment of fuel received or by testing each shipment of fuel for the sulfur content in accordance with the method described in 10 CSR 10-6.040 *Reference Methods*.
- D. Ameristar Casino - St. Charles shall keep the records required by Special Condition 4.B with the unit and make them available for Department of Natural Resources' employees upon request.

5. Record Keeping and Reporting Requirements

- A. Ameristar Casino - St. Charles shall maintain all records required by this permit for not less than five years and shall make them available

**SPECIAL CONDITIONS:**

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

immediately to any Missouri Department of Natural Resources' personnel upon request.

- B. Ameristar Casino - St. Charles shall report to the Air Pollution Control Program's Compliance/Enforcement Section at P.O. Box 176, Jefferson City, MO 65102 or [AirComplianceReporting@dnr.mo.gov](mailto:AirComplianceReporting@dnr.mo.gov) 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 (5) REVIEW

Project Number: 2017-12-042

Installation ID Number: 183-0264

Permit Number: 022018 - 008

Installation Address:

Ameristar Casino - St. Charles  
1 Ameristar Blvd  
St. Charles, MO 63301

Parent Company:

Pinnacle Entertainment  
3980 Howard Hughes Parkway  
Las Vegas, NV 89169

St. Charles County

REVIEW SUMMARY

- Ameristar Casino - St. Charles has applied for authority to permit four boilers and three emergency generators that were originally installed in 1997. Two other emergency generators were installed in 1994 and another in 2006.
- The application was deemed complete on December 26, 2017.
- HAP emissions are expected from the combustion of fuel by proposed equipment.
- 40 CFR 60 Subpart Dc, "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units" applies to the boilers (EP-1, through EP- 4).
- 40 CFR 60 Subpart IIII, "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines" applies to the emergency generators (EP-6 through EP-10).
- 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-5 through EP-10) 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-1, EP-2, EP-3 and EP4) 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 (5) of Missouri State Rule

10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of NOx are conditioned below the de minimis level.

- This installation is located in St. Charles County, a marginal nonattainment area for the 2008 8-hour ozone standard, a moderate nonattainment area for the 1997 PM<sub>2.5</sub> standard, and an attainment/unclassified 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 250 tons per year and fugitive emissions are not counted toward major source applicability.
- Ambient air quality modeling was not performed since potential emissions of the application are limited below de minimis levels.
- 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.
- No Operating Permit is required for this installation because Ameristar Casino – St. Charles has requested a de minimis limit for the entire installation and is issued with the permit.
- Approval of this permit is recommended with special conditions.

#### INSTALLATION DESCRIPTION

Ameristar Casino operates a casino, hotel and entertainment facility in St. Charles, Missouri. When the casino was built in 1994, no Air Pollution Control Program permits were issued. There were two emergency generators installed in 1994 and their emissions would have been calculated below de minimis. Later (1997), four boilers (33.6 mmBTU/hr each) were installed along with three additional emergency generators and an air permit application was never submitted for these pieces of equipment. A sixth emergency generator was added in 2006 and its emissions would have been calculated below 2.75 lbs per hour and determine to be insignificant as stated in 10 CSR 10.6061(3)(A)3A. No permits have been issued to Ameristar Casino - St. Charles from the Air Pollution Control Program, however a permit was needed in 1997 for the four boilers and emergency generators.

#### PROJECT DESCRIPTION

This project is to permit all of the boilers and emergency generators. Ameristar Casino has requested an installation wide limit to below de minimis for NOx. The equipment that is being permitted is listed in Table 1.

## 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).

Emission factors for the larger emergency generators (EP-5, EP-6 and EP-7) (greater than 600 HP) were obtained from AP-42's Section 3.4 "Large Stationary Diesel and All Stationary Dual-fuel Engines" (October 1996). The smaller emergency generators (EP-8, EP-9 and EP-10) (less than 600 HP) were obtained from AP-42's Section 3.3 "Gasoline and Diesel Industrial Engines" (October 1996) and 40 CFR 89/40 CFR 1039 for Tier III engine.

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).

The following table provides an emissions summary for this project. There are no existing potential emissions since no permit has been issued by MoDNR Air Pollution Control Program. Potential emissions of the application represent the potential of the boilers, assuming continuous operation (8760 hours per year). The emergency generators were calculated at 500 hours per year.

Table 4: Emissions Summary (tpy)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Potential Emissions of the Project	<sup>a</sup> New Installation Conditioned Potential
PM	25.0	N/D	6.15	N/D
PM <sub>10</sub>	15.0	N/D	5.78	N/D
PM <sub>2.5</sub>	10.0	N/D	5.77	N/D
SO <sub>x</sub>	40.0	N/D	0.37	N/D
NO <sub>x</sub>	40.0	N/D	100.07	<40.0
VOC	40.0	N/D	4.97	N/D
CO	100.0	N/D	60.34	N/D
GHG (CO <sub>2</sub> e)	N/A	N/D	71,928.14	N/D
GHG (mass)	N/A	N/D	71,511.24	N/D
HAPs	10.0/25.0	N/D	1.12	N/D

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

<sup>a</sup>Ameristar Casino shall balance NO<sub>x</sub> emissions from the boilers and emergency generator so that NO<sub>x</sub> emission will not exceed 40 tons per year. Emissions from all other pollutants are below de minimis.

## 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 conditioned below de minimis levels.

### APPLICABLE REQUIREMENTS

Ameristar Casino - St. Charles 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.

### GENERAL REQUIREMENTS

- *Operating Permits*, 10 CSR 10-6.065 does not apply because Ameristar Casino – St. Charles has requested an installation wide de minimis limit.
- *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*
  - 40 CFR Part 60, Subpart IIII – *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*
    - This regulation applies to the emergency generators (EP-5, EP-6, EP-7, EP-8, EP-9 and EP-10).
- *MACT Regulations*, 10 CSR 10-6.075
  - 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-5, EP-6, EP-7, EP-8, EP-9 and EP-10). 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-1, EP-2, EP-3, and EP-4) 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 (emergency generators).
- 10 CSR 10-5.510 *Control of Emissions of Nitrogen Oxides*
  - The installation chooses to maintain a de minimis NOx limit, therefore this regulation will not apply.

#### 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 November 27, 2017, received December 18, 2017, designating Pinnacle Entertainment as the owner and operator of the installation.

Attachment A - NOx Compliance Worksheet

Ameristar Casino - St. Charles  
 St. Charles County, St. Charles, Missouri  
 Project Number: 2017-12-042  
 Installation ID Number: 183-0264  
 Permit Number: 022018-008

This sheet covers the month of:

Boilers					
Emission Source	Monthly Fuel Usage	NO <sub>x</sub> Emission Factor	Emission Factor Source	Monthly NO <sub>x</sub> Emissions (tons)	
EP-1 Boiler #1	MMscf natural gas	100 lb/MMscf	AP-42 Table 1.4-1		
EP-2 Boiler #2	MMscf natural gas	100 lb/MMscf	AP-42 Table 1.4-1		
EP-3 Boiler #3	MMscf natural gas	100 lb/MMscf	AP-42 Table 1.4-1		
EP-4 Boiler #4	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 (hours)	NO <sub>x</sub> Emission Factor (lb/hr)	Monthly NO <sub>x</sub> Emissions (tons)
EP-5 Emergency Generator #1 1500 kW				47.93	
EP-6 Emergency Generator #2 1500 kW				47.93	
EP-7 Emergency Generator #3 1500 kW				47.93	
EP-8 Emergency Generator #4 300 kW				13.21	
EP-9 Emergency Generator #5 175 kW				7.71	
EP-10 Emergency Generator #6 500 kW				4.69	
Ameristar Casino-St. Charles Emissions					
Emission Sources					Monthly NO <sub>x</sub> Emissions (tons)
Boilers (EP-1, EP-32B, EP-3, EP-4), and Emergency Generators (EP-5, EP-6, EP-7, EP-8, EP-9, and EP-10)					
Monthly Project NO <sub>x</sub> Emissions (tons)					
12-Month Rolling Total Project NO <sub>x</sub> Emissions (tons)					

<sup>1</sup>Monthly NO<sub>x</sub> Emissions (tons) = Monthly Fuel Usage x NO<sub>x</sub> Emission factor (100 lb/MMscf) x 0.0005 (ton/lb).

<sup>2</sup>Monthly Usage (hours) = Current Month's Hourly Meter Reading – Previous Month's Hourly Meter Reading.

<sup>3</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>4</sup>See attached Emission Factor for Emergency Generators spreadsheet.

<sup>5</sup>As reported to the Air Pollution Control Program's Compliance/Enforcement Section ([AirComplianceReporting@dnr.mo.gov](mailto:AirComplianceReporting@dnr.mo.gov)) according to the provisions of 10 CSR 10-6.050.

<sup>6</sup>Monthly Project NO<sub>x</sub> Emissions (tons) = the sum of each emission source's Monthly NO<sub>x</sub> Emissions (tons).

<sup>7</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 the 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>Mgal</b> .....1,000 gallons
<b>°F</b> .....degrees Fahrenheit	<b>MW</b> .....megawatt
<b>acfm</b> .....actual cubic feet per minute	<b>MHDR</b> .....maximum hourly design rate
<b>BACT</b> .....Best Available Control Technology	<b>MMBtu</b> ....Million British thermal units
<b>BMPs</b> .....Best Management Practices	<b>MMCF</b> .....million cubic feet
<b>Btu</b> .....British thermal unit	<b>MSDS</b> .....Material Safety Data Sheet
<b>CAM</b> ..... Compliance Assurance Monitoring	<b>NAAQS</b> ....National Ambient Air Quality Standards
<b>CAS</b> .....Chemical Abstracts Service	<b>NESHAPs</b> National Emissions Standards for Hazardous Air Pollutants
<b>CEMS</b> ..... Continuous Emission Monitor System	<b>NO<sub>x</sub></b> .....nitrogen oxides
<b>CFR</b> .....Code of Federal Regulations	<b>NSPS</b> .....New Source Performance Standards
<b>CO</b> .....carbon monoxide	<b>NSR</b> .....New Source Review
<b>CO<sub>2</sub></b> .....carbon dioxide	<b>PM</b> .....particulate matter
<b>CO<sub>2</sub>e</b> .....carbon dioxide equivalent	<b>PM<sub>2.5</sub></b> .....particulate matter less than 2.5 microns in aerodynamic diameter
<b>COMS</b> ..... Continuous Opacity Monitoring System	<b>PM<sub>10</sub></b> .....particulate matter less than 10 microns in aerodynamic diameter
<b>CSR</b> .....Code of State Regulations	<b>ppm</b> .....parts per million
<b>dscf</b> .....dry standard cubic feet	<b>PSD</b> .....Prevention of Significant Deterioration
<b>EIQ</b> .....Emission Inventory Questionnaire	<b>PTE</b> .....potential to emit
<b>EP</b> .....Emission Point	<b>RACT</b> .....Reasonable Available Control Technology
<b>EPA</b> .....Environmental Protection Agency	<b>RAL</b> .....Risk Assessment Level
<b>EU</b> .....Emission Unit	<b>SCC</b> .....Source Classification Code
<b>fps</b> .....feet per second	<b>scfm</b> .....standard cubic feet per minute
<b>ft</b> .....feet	<b>SDS</b> .....Safety Data Sheet
<b>GACT</b> ..... Generally Available Control Technology	<b>SIC</b> .....Standard Industrial Classification
<b>GHG</b> .....Greenhouse Gas	<b>SIP</b> .....State Implementation Plan
<b>gpm</b> .....gallons per minute	<b>SMAL</b> .....Screening Model Action Levels
<b>gr</b> .....grains	<b>SO<sub>x</sub></b> .....sulfur oxides
<b>GWP</b> .....Global Warming Potential	<b>SO<sub>2</sub></b> .....sulfur dioxide
<b>HAP</b> .....Hazardous Air Pollutant	<b>SSM</b> .....Startup, Shutdown & Malfunction
<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	
<b>m/s</b> .....meters per second	

Installation: Ameristar  
ID:

PTE

Pollutant	Natural Gas (tpy)	Emergency Generators	Total PTE
PM	4.39	1.77	6.15
PM10	4.39	1.40	5.78
PM2.5	4.39	1.38	5.77
SOx	0.35	0.02	0.37
NOx	57.71	42.36	100.07
VOC	3.17	1.80	4.97
CO	48.48	11.86	60.34
HAPs	1.09	0.03	1.12
Formaldehyde	0.0433	0.0038	0.05
CO2e	69,667.08	2261.06	71928.14
GHGmass	69,258.13	2,253.12	71,511.24

Cummins 1997 3x 1500kw	Cummins 1994 300kw	Cummins 1994 175kw	Cat 2006 500kw	Pollutant
0.515317	0.118332	0.069027	0.19722	PM
0.328085	0.118332	0.069027	0.19722	PM <sub>10</sub>
0.318352	0.118332	0.069027	0.19722	PM <sub>2.5</sub>
0.008838	0.000589	0.000344	0.000982	SO <sub>2</sub>
18.32239	1.68337	0.981966	2.805609	NO <sub>2</sub>
4.866886	0.362631	0.211535	0.604383	CO
0.468939	0.137418	0.08016	0.229029	VOC
0.000452	0.00045	0.000263	0.000751	CH <sub>2</sub> O
0.009012	0.001479	0.000863	0.002464	HAPs
944.7484	62.60151	36.51755	104.3356	CO <sub>2</sub>
0.007574	0.000505	0.000295	0.000842	N <sub>2</sub> O
944.8024	62.60454	36.51932	104.3406	GHG <sub>mass</sub>
0.046379	0.002525	0.001473	0.004208	CH <sub>4</sub>

Emission factor for 33.6 mmbtu/hr boilers      100 lb/MMBtu (fuel input)

generator ekw	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)
1500	2012	2140	1596	14.98	108.94	3.2	lb/mmbtu input	AP-42 Table 3.4-1, large engine	47.93
300	402	428	319	3.00	21.79	4.41	lb/mmbtu input	AP-42 Table 3.3-1, small engine	13.21
175	235	250	186	1.75	12.71	4.41	lb/mmbtu input	AP-42 Table 3.3-1, small engine	7.71
500	671	713	532	n/d	n/d	4.0	gram/engine mech kw	40 CFR 89 Tier 3, year 2006	4.69

109 gal/hr for the 1500 ekw genset is conservative compared to online specs of unknown sizes, years, and engine model numbers showing 103.6 gal/hr at full load

conversion

hp per kw	1.341
grams/lb	453.6
engine to generator efficiency	94%
assumed BSFC (btu/hp)	7000
ulsd hhv (btu/gal)	137500

reference

standard conversion  
standard conversion

Caterpillar, Cashman Power Solutions, Designer Database, Generator Power Factor

AP-42 Table 3.4-1, October 1996.

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.

and

137,380 Btu/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 2017-12-042

NOTICE: This spreadsheet is for your use only and should be used with caution. MoDNR does not guarantee the accuracy of the information it contains. This spreadsheet is subject to continual revision and updating. It is your responsibility to be aware of the most current, accurate and complete information available. MoDNR is not responsible for errors or omissions in this spreadsheet. Submittal of the information contained in this spreadsheet (workbook) does not relieve the responsible official of the certification statement signed on the first page of the application.

For Single Plant Operation

Hours per year	24.0	24.0
Days per year	365.0	365.0
Hours per year	8760.0	8760.0

Pollutant	Justification for Limit
PM10	De Minimis

Pollutant	Potential Emissions (t/yr)	De Minimis Limit (t/yr)	Permissible Concentration (t/yr)
PM	1.77	25	0.0007
PM <sub>10</sub>	1.40	15	0.0005
PM <sub>2.5</sub>	1.38	10	0.0005
SO <sub>2</sub>	0.02	40	0.0000
NO <sub>2</sub>	42.36	40	0.0161
VOC	1.80	40	0.0007
CO	11.86	100	0.0045
CH <sub>2</sub> O	0.00	2.00	0.0000
Pb	-	0.01	0.0000
HAPs	0.03	10	0.0000
CO <sub>2</sub>	2,252.99	100	0.8573
N <sub>2</sub> O	0.02	100	0.0000
CH <sub>4</sub>	0.11	100	0.0000
GHG <sub>mass</sub>	2,253.12	100	0.8574
CO <sub>2</sub> eq	2,261.06	100,000	0.8604

Limit Hours per Year
Limit Hours per Year w/ 24 hr day

0.0000

0.0000

Emission Unit	Emission Point	Description	Make & Model	Install Year	MHDR (MMBtu/hr input)	MHDR (MMcf/hr)	Pollutant	HAP?	Emission Factor (lb / MMcf)	Emission Factor Source (SCC)	PTE (lb/hr)	PTE (tpy)
	1	Superior Boiler Work	6-X-6000	1997	33.6	0.0329	PM		7.6		1.0014	4.39
	2	Superior Boiler Work	6-X-6000	1997	33.6	0.0329	PM10		7.6		1.0014	4.39
	3	Superior Boiler Work	6-X-6000	1997	33.6	0.0329	PM2.5		7.6		1.0014	4.39
	4	Superior Boiler Work	6-X-6000	1997	33.6	0.0329	SOx		0.6		0.0791	0.35
		Natural Gas HHV (Btu/cf)					NOx		100		13.1765	57.71
		1,020					VOC		5.5		0.7247	3.17
							CO		84		11.0682	48.48
							Total HAPs		1.888		0.2488	1.09
							2-Methylnaphthalene	y	2.4E-05		0.0000	1.39E-05
							3-Methylchloranthrene	y	1.8E-06		0.0000	1.04E-06
							7,12-Dimethylbenz(a)anthracen	y	1.6E-05		0.0000	9.23E-06
							Acenaphthene	y	1.8E-06		0.0000	1.04E-06
							Acenaphthylene	y	1.8E-06		0.0000	1.04E-06
							Anthracene	y	2.4E-06		0.0000	1.39E-06
							Benz(a)anthracene	y	1.8E-06		0.0000	1.04E-06
							Benzene	y	2.1E-03		0.0003	1.21E-03
							Benzo(a)pyrene	y	1.2E-06		0.0000	6.93E-07
							Benzo(b)fluoranthene	y	1.8E-06		0.0000	1.04E-06
							Benzo(g,h,i)perylene	y	1.2E-06		0.0000	6.93E-07
							Benzo(k)fluoranthene	y	1.8E-06		0.0000	1.04E-06
							Butane		2.1E+00		0.2767	1.21E+00
							Chrysene	y	1.8E-06		0.0000	1.04E-06
							Dibenzo(a,h)anthracene	y	1.2E-06		0.0000	6.93E-07
							Dichlorobenzene	y	1.2E-03		0.0002	6.93E-04
							Ethane		3.1E+00	1-02-006-02	0.4085	1.79E+00
							Fluoranthene	y	3.0E-06	industrial boiler	0.0000	1.73E-06
							Fluorene	y	2.8E-06	natural gas	0.0000	1.62E-06
							Formaldehyde	y	7.5E-02		0.0099	0.043
							Hexane	y	1.8E+00		0.2372	1.04E+00
							Indeno(1,2,3-cd)pyrene	y	1.8E-06		0.0000	1.04E-06
							Naphthalene	y	6.1E-04		0.0001	3.52E-04
							Pentane		2.6E+00		0.3426	1.50E+00
							Phenanathrene	y	1.7E-05		0.0000	9.81E-06
							Propane		1.6E+00		0.2108	9.23E-01
							Pyrene	y	5.0E-06		0.0000	2.89E-06
							Toluene	y	3.4E-03		0.0004	1.96E-03
							Arsenic	y	2.0E-04		0.0000	1.15E-04
							Barium		4.4E-03		0.0006	2.54E-03
							Beryllium	y	1.2E-05		0.0000	6.93E-06
							Cadmium	y	1.1E-03		0.0001	6.35E-04
							Chromium	y	1.4E-03		0.0002	8.08E-04
							Cobalt	y	8.4E-05		0.0000	4.85E-05
							Copper		8.5E-04		0.0001	4.91E-04
							Manganese	y	3.8E-04		0.0001	2.19E-04
							Mercury	y	2.6E-04		0.0000	1.50E-04
							Molybdenum		1.1E-03		0.0001	6.35E-04
							Nickel	y	2.1E-03		0.0003	1.21E-03
							Selenium	y	2.4E-05		0.0000	1.39E-05
							Vanadium		2.3E-02		0.0030	1.33E-02
							Zinc		2.9E-02		0.0038	1.67E-02
							CO2		120,000		15811.76	69,255.53
							Methane		2.3		0.3031	1.33
							N2O		2.2		0.2899	1.27
							CO2e					69,667.08

GWP
1
25
298

GHGmass

69,258.13

Emission Point Number	Emission Unit Number	Description	SCC	Maximum Hourly	Units of Measure	Control Device Number	Control Type	Capture Efficiency (%)	Control Efficiency (%)	Pollutant	Emission Factor	Emission Factor (lbs/Unit)	Emission Rate (lb/hr)	500 hp Potential Emissions (ton/yr)	8750 hrs Allowable Emissions (ton/yr)
	EngSet #1	Large stationary diesel (> 600 bhp)	SCC 2-02-004-01	2140	bhp			N/A	N/A	PM <sub>10</sub>	0.0800	mmBtu	1.348	1.011	17.72
	108.9454545			108.9454545	gallons per hour			N/A	N/A	PM <sub>10</sub>	0.0573	mmBtu	0.858	0.644	11.28
	Model Year 1997			14.98	MMBtu/hour			N/A	N/A	PM <sub>2.5</sub>	0.0556	mmBtu	0.833	0.625	10.94
	1998			1598	kW-hr			N/A	N/A	SO <sub>2</sub>	0.0002	Gallon	0.023	0.017	0.30
								N/A	N/A	NO <sub>2</sub>	0.2000	mmBtu	47.936	35.952	629.96
								N/A	N/A	CO	0.8500	mmBtu	12.733	9.550	167.31
								N/A	N/A	VOC	0.0819	mmBtu	1.227	0.926	16.12
								N/A	N/A	CH <sub>4</sub> O	0.0001	mmBtu	0.001	0.001	0.02
								N/A	N/A	HAPs	0.0018	mmBtu	0.024	0.018	0.31
								N/A	N/A	CO <sub>2</sub>	185.0000	mmBtu	2,471.700	1,863.775	32,478.14
								N/A	N/A	H <sub>2</sub> O	0.0019	mmBtu	0.020	0.015	0.29
								N/A	N/A	GHG <sub>non</sub>	165.0094228	mmBtu	2,471.941	1,863.981	32,479.29
								N/A	N/A	CH <sub>4</sub>	0.0081	mmBtu	0.121	0.091	1.59
	EngSet #2	Industrial diesel (< 600 bhp)	SCC 2-02-001-02	428	bhp			N/A	N/A	PM <sub>10</sub>	0.3100	mmBtu	0.929	0.23	4.07
	21.78909091			21.78909091	gallons per hour			N/A	N/A	PM <sub>10</sub>	0.3100	mmBtu	0.929	0.23	4.07
	Model Year 1994			2.996	MMBtu/hour			N/A	N/A	PM <sub>2.5</sub>	0.3100	mmBtu	0.929	0.23	4.07
	1994			319	kW-hr			N/A	N/A	SO <sub>2</sub>	0.0002	Gallon	0.005	0.0012	0.02
								N/A	N/A	NO <sub>2</sub>	4.4100	mmBtu	13.212	3.30	57.87
								N/A	N/A	CO	0.9500	mmBtu	2.848	0.71	12.47
								N/A	N/A	VOC	0.3800	mmBtu	1.079	0.27	4.72
								N/A	N/A	CH <sub>4</sub> O	0.0012	mmBtu	0.004	0.0009	0.02
								N/A	N/A	HAPs	0.0039	mmBtu	0.012	0.0029	0.05
								N/A	N/A	CO <sub>2</sub>	184.0000	mmBtu	491.344	122.84	2,152.09
								N/A	N/A	H <sub>2</sub> O	0.0013	mmBtu	0.004	0.00	0.02
								N/A	N/A	GHG <sub>non</sub>	164.0079	mmBtu	491.358	122.84	2,162.19
								N/A	N/A	CH <sub>4</sub>	0.0068	mmBtu	0.020	0.00	0.09
	EngSet #3	Industrial diesel (< 600 bhp)	SCC 2-02-001-02	250	bhp			N/A	N/A	PM <sub>10</sub>	0.3100	mmBtu	0.543	0.14	2.38
	12.72727273			12.72727273	gallons per hour			N/A	N/A	PM <sub>10</sub>	0.3100	mmBtu	0.543	0.14	2.38
	Model Year 1994			1.75	MMBtu/hour			N/A	N/A	PM <sub>2.5</sub>	0.3100	mmBtu	0.543	0.14	2.38
	1994			188	kW-hr			N/A	N/A	SO <sub>2</sub>	0.0002	Gallon	0.003	0.0007	0.01
								N/A	N/A	NO <sub>2</sub>	4.4100	mmBtu	7.718	1.93	33.80
								N/A	N/A	CO	0.9500	mmBtu	1.993	0.42	7.28
								N/A	N/A	VOC	0.3800	mmBtu	0.830	0.16	2.78
								N/A	N/A	CH <sub>4</sub> O	0.0012	mmBtu	0.002	0.0005	0.01
								N/A	N/A	HAPs	0.0039	mmBtu	0.007	0.0017	0.03
								N/A	N/A	CO <sub>2</sub>	184.0000	mmBtu	287.000	71.75	1,257.08
								N/A	N/A	H <sub>2</sub> O	0.0013	mmBtu	0.002	0.00	0.01
								N/A	N/A	GHG <sub>non</sub>	164.0079	mmBtu	287.014	71.75	1,257.12
								N/A	N/A	CH <sub>4</sub>	0.0068	mmBtu	0.012	0.00	0.05
	EngSet #4	Acetylene hydro	#N/A	398.872	bhp			N/A	N/A	PM <sub>10</sub>	0.3100	mmBtu	1.547	0.39	6.78
	38.29818182			38.29818182	gallons per hour			N/A	N/A	PM <sub>10</sub>	0.3100	mmBtu	1.547	0.39	6.78
	Model Year 1994			4.991	MMBtu/hour			N/A	N/A	PM <sub>2.5</sub>	0.3100	mmBtu	1.547	0.39	6.78
	1994			532	kW-hr			N/A	N/A	SO <sub>2</sub>	0.0002	Gallon	0.008	0.0019	0.03
								N/A	N/A	NO <sub>2</sub>	4.0000	gram/engine kw	4.991	1.17	20.55
								N/A	N/A	CO	0.9500	mmBtu	4.741	1.19	20.77
								N/A	N/A	VOC	0.3800	mmBtu	1.797	0.45	7.87
								N/A	N/A	CH <sub>4</sub> O	0.0012	mmBtu	0.006	0.0015	0.03
								N/A	N/A	HAPs	0.0039	mmBtu	0.019	0.0048	0.08
								N/A	N/A	CO <sub>2</sub>	184.0000	mmBtu	318.524	204.83	3,685.14
								N/A	N/A	H <sub>2</sub> O	0.0013	mmBtu	0.007	0.00	0.03
								N/A	N/A	GHG <sub>non</sub>	164.0079	mmBtu	318.564	204.84	3,685.31
								N/A	N/A	CH <sub>4</sub>	0.0068	mmBtu	0.033	0.01	0.14







generator ekw	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)
1500	2012	2140	1596	14.98	108.94	3.2	lb/mmbtu input	AP-42 Table 3.4-1, large engine	47.93
300	402	428	319	3.00	21.79	4.41	lb/mmbtu input	AP-42 Table 3.3-1, small engine	13.21
175	235	250	186	1.75	12.71	4.41	lb/mmbtu input	AP-42 Table 3.3-1, small engine	7.71
500	671	713	532	n/d	n/d	4.0	gram/engine mech kw	40 CFR 89 Tier 3, year 2006	4.69

109 gal/hr for the 1500 ekw genset is conservative compared to online specs of unknown sizes, years, and engine model numbers showing 103.6 gal/hr at full load

conversion

hp per kw	1.341
grams/lb	453.6
engine to generator efficiency	94%
assumed BSFC (btu/hp)	7000
ulsd hhv (btu/gal)	137500

reference

standard conversion

standard conversion

Caterpillar, Cashman Power Solutions, Designer Database, Generator Power Factor

AP-42 Table 3.4-1, October 1996.

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.

and

137,380 Btu/gal per U.S. EIA "Monthly Energy Review June 2017", Appendix A, Table A1. assumed 137,500 as approximation.

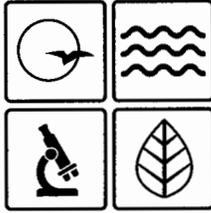
33.6 mmbtu/hr Boilers burning natural gas EP = 100 lb/mmscf AP-42 Table 1.4-1 small boiler, uncontrolled

Emission Factors for Emergency Generators Project 2017-12-042

Cell: K90

Comment: Control Type: Using the pulldown menus in the cells below, select the appropriate control type for each specific emission unit. Leave the cell blank or choose "No Control" if there are no control measures associated with the emission unit.

Control Efficiency %: The Control Efficiency % is found on 11.18.2 Control Table worksheet for PM pollutant. If a Control Efficiency % is different from the Control Table or for a non-PM pollutant you should enter that percentage on the Emission Calculations worksheet for the specific equipment & pollutant. Note: Documentation on the Control Efficiency % may also need to be provided to justify the value entered.



Missouri Department of dnr.mo.gov

# NATURAL RESOURCES

Eric R. Greitens, Governor

Carol S. Comer, Director

**FEB 28 2018**

Mr. Pat McDonald  
Facilities Manager  
Ameristar Casino - St. Charles  
1 Ameristar Blvd  
St. Charles, MO 63301

RE: New Source Review Permit - Project Number: 2017-12-042

Dear Mr. McDonald:

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 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](http://www.oa.mo.gov/ahc).



Recycled paper

Mr. Pat McDonald  
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



Susan Heckenkamp  
New Source Review Unit Chief

SH:kkj

Enclosures

c: St. Louis Regional Office  
PAMS File: 2017-12-042

Permit Number: **02 2 0 1 8 - 0 0 8**