

STATE OF MISSOURI



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

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

Permit Number: 062016-014      Project Number: 2016-02-044

Installation Number: 099-0016

Parent Company: Ameren Corporation

Parent Company Address: 1901 Chouteau Ave, St. Louis, MO 63103

Installation Name: Ameren Missouri Rush Island Energy Center

Installation Address: 100 Big Hollow Road, Festus, MO 63028

Location Information: Jefferson County, S4,5,8,9, T39N, R07E

Application for Authority to Construct was made for:  
Ash handling systems. 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.

Handwritten signature of David Little.

Prepared by  
David Little, PE  
Environmental Engineer III  
New Source Review Unit

Handwritten signature of Kyma L. Brown.

Director or Designee  
Department of Natural Resources

JUN 30 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 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."*

Ameren Missouri Rush Island Energy Center  
Jefferson County, S4,5,8,9, T39N, R07E

1. Paved Haul Roads
  - A. Ameren Missouri Rush Island Energy Center shall pave all surfaces as indicated in Appendix B with materials such as asphalt, concrete, or other materials subject to approval by the Air Pollution Control Program.
  - B. Ameren Missouri Rush Island Energy Center shall conduct maintenance and/or repair of the road surface as necessary to ensure that the physical integrity of the pavement is adequate to achieve control of fugitive emissions from these areas while the plant is operating. Records of all maintenance and repair activities shall be kept on site indicating the specific activity, road location, and date.
  - C. Ameren Missouri Rush Island Energy Center shall water, sweep, vacuum, or otherwise clean the haul roads indicated in Appendix B whenever conditions exist which would cause visible fugitive emissions to enter the ambient air beyond the property boundary. Watering may be suspended when the ground is frozen, during periods of freezing conditions when watering would be inadvisable for traffic safety reasons, or when there will be no traffic on the roads. Sweeping/vacuuming may be suspended when there will be no traffic on the roads. Records of all activities shall be kept on site indicating the specific activity and date.
2. Submerged Flight Conveyor
  - A. Ameren Missouri Rush Island Energy Center shall route all unit 1 and unit 2 economizer ash and bottom ash through a submerged flight conveyor (emission units EU0016 or EU0017, respectively) before depositing the ash into bunkers.
  - B. The initial portion of the submerged flight conveyors shall be submerged in water during operation.
3. Capture Device
  - A. Ameren Missouri Rush Island Energy Center shall completely enclose the units as indicated in Table 1.

**SPECIAL CONDITIONS:**

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

Table 1: Units with Total Enclosure

Emission Unit	Description	Capture Device	Notes
EU0014A	Transfer from unit 1 ESP or unit 2 ESP to silo 1	Total enclosure	This is an enclosed pneumatic transfer. There is not an extra enclosure around the pneumatic system.
EU0014B	Silo 1 filling	Total enclosure silo	The silo is its own enclosure. Openings are routed to control devices.
EU0014C	Silo 1 wet mixer	Total enclosure	The mixer is its own enclosure.
EU0015A	Transfer from unit 1 ESP or unit 2 ESP to silo 2	Total enclosure	This is an enclosed pneumatic transfer. There is not an extra enclosure around the pneumatic system.
EU0015B	Silo 2 filling	Total enclosure silo	The silo is its own enclosure. Openings are routed to control devices.
EU0015C	Silo 2 wet mixer	Total enclosure	The mixer is its own enclosure.

- B. Ameren Missouri Rush Island Energy Center shall load unconditioned fly ash from silo 1 and silo 2 only to enclosed trucks.
- 1) Unconditioned fly ash is ash that does not meet the definition of conditioned in 40 CFR 257.80(b)(2), but that also does not have free liquids, e.g. unconditioned means dry ash.

**SPECIAL CONDITIONS:**

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

- 2) The unconditioned fly ash shall be loaded using a telescoping spout that maintains contact with the truck opening. A vapor tight seal is not required.
- 3) The trucks shall be enclosed to the extent that the only truck opening is the opening through which ash passes from the spout to the truck. The difference between the truck opening cross sectional area and spout cross sectional area shall be minimal, e.g. open top trucks are not permitted.

4. Control Device - Filters

- A. Ameren Missouri Rush Island Energy Center shall control emissions from the units indicated in Table 2 using filters.

Table 2: Filters

Emission Point	Location/Description
EP0014A	Transfer from unit 1 ESP or unit 2 ESP to silo 1
EP0014B	Silo 1 filling
	Silo 1 dry loadout
EP0014C	Silo 1 wet mixer
EP0015A	Transfer from unit 1 ESP or unit 2 ESP to silo 2
EP0015B	Silo 2 filling
	Silo 2 dry loadout
EP0015C	Silo 2 wet mixer

- B. The filters shall be operated and maintained in accordance with the manufacturer's specifications which shall be kept on site.
- C. Filters EP0014A and EP0015A shall be equipped with a leak detection system, which shall be operated and maintained in accordance with manufacturer's specifications, which shall be kept on site.
- D. Filters EP0014B, EP0015B, EP0014C, and EP0015C shall emit zero visible emissions. Ameren Missouri Rush Island Energy Center shall demonstrate compliance by monitoring and recording visible emissions from each filter at least once every 24 hours. Method 22 shall be used.
- E. Replacement filters shall be kept on hand at all times. The filters shall be made of fibers appropriate for operating conditions expected to occur when handling coal combustion residuals. The replacement filter material type and weight shall meet or exceed the specifications of the existing

**SPECIAL CONDITIONS:**

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

filter. The air to cloth ratio or air to filter ratio shall not be increased when filter replacement is performed.

- F. Ameren Missouri Rush Island Energy Center shall maintain a copy of the pneumatic system manufacturer's design specifications and filter manufacturer's performance warranties on site.
  - G. Ameren Missouri Rush Island Energy Center shall maintain an operating and maintenance log for the filters which shall include the following:
    - 1) Maintenance activities, with inspection schedule, repair actions, and replacements, etc. and
    - 2) Dates of all above schedules, incidents, activities, and actions.
  - H. Ameren Missouri Rush Island Energy Center shall maintain a malfunction log for the filters which shall include but not be limited to the following, incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions.
5. Control Device – Wet Mixers
- A. Ameren Missouri Rush Island Energy Center shall condition all fly ash from silo 1 and silo 2 that isn't dry loaded to trucks by using a wet mixer (EU0014C or EU0015C, respectively).
  - B. Ameren Missouri Rush Island Energy Center shall condition the mixer ash to a minimum 4.8% weight moisture, prior to loading into trucks.
  - C. Compliance shall be demonstrated through conducting testing as indicated in Special Condition 6 and following a written/electronic SOP report. At a minimum the SOP report shall indicate the following target criteria at each mixer necessary to indicate compliance with the 4.8% weight moisture limit. The actual values present shall be recorded for each batch loaded. A batch is defined as the amount a mixer can mix at once, and more than one batch may be needed to fill a truck. Periods of no operation shall be indicated.
    - 1) Date, time
    - 2) Indication of silo 1 mixer or silo 2 mixer
    - 3) Water rate e.g. gal/hr, gal/batch
    - 4) Ash rate e.g. ton/hr, ton/batch
    - 5) Batch mix time
    - 6) Number of batches
    - 7) A comparison of actual values to target values
6. Moisture Testing
- A. Ameren Missouri Rush Island Energy Center shall test fly ash exiting from

**SPECIAL CONDITIONS:**

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

- silos 1 mixer and silo 2 mixer (EU0014D and EU0015D) for moisture content.
  - B. Testing shall be conducted using a moisture probe. The probe shall be calibrated, operated, and maintained in accordance with manufacturer's specifications which shall be kept on site.
  - C. Testing shall be conducted in a manner to represent an entire batch, e.g. at more than one elevation and location in the conditioned ash pile within the truck. Testing shall be representative of normal operation. Ameren Missouri Rush Island Energy Center shall develop and follow a written/electronic sampling protocol.
  - D. Testing shall be conducted at least once on every 2,400 tons of conditioned ash throughput, per mixer.
  - E. Ameren Missouri Rush Island Energy Center shall record on site the following data from each test:
    - 1) Date, time
    - 2) Indication of silo 1 mixer or silo 2 mixer
    - 3) Number of probings per batch
    - 4) Moisture content of each probing
    - 5) Average moisture content of the batch
  - F. The average moisture content of the batch shall be used to demonstrate compliance with the 4.8% limit. Average moisture content below the 4.8% limit will be considered a derivation and corrective actions shall be implemented within 48 hours. A derivation does not necessarily indicate a violation of the 4.8% limit.
  - G. When there are three or more consecutive derivations at a respective mixer and corrective actions fail to return the moisture to a level above the 4.8% limit, then the permittee shall submit a complete Application for Authority to Construct to the Air Pollution Control Program within 90 days of the last derivation. The application shall account for the emission increase due to reduced moisture content.
7. Record Keeping and Reporting Requirements
- A. Ameren Missouri Rush Island Energy Center 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. Ameren Missouri Rush Island Energy Center shall report to the Air

**SPECIAL CONDITIONS:**

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

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.

8. **Operating Permit**  
Ameren Missouri Rush Island Energy Center shall submit an update to the operating permit to include the provisions of this permit, within one year of the last emission unit commencing operation. Commencing construction and operation of the project emission units may be conducted in phases over several months. Ameren Missouri Rush Island Energy Center shall notify the Compliance/Enforcement Section in writing within 15 days after the commencement of operation of each phase.

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

Project Number: 2016-02-044  
Installation ID Number: 099-0016  
Permit Number:

Installation Address:  
Ameren Missouri Rush Island Energy Center  
100 Big Hollow Road  
Festus, MO 63028

Parent Company:  
Ameren Corporation  
1901 Chouteau Ave  
St. Louis, MO 63103

Jefferson County, S4,5,8,9, T39N, R07E

REVIEW SUMMARY

- Ameren Missouri Rush Island Energy Center has applied for authority to construct ash handling systems.
- The application was deemed complete on April 11, 2016.
- HAP emissions are expected from the proposed equipment. HAPs will be emitted from handling coal ash but in amounts below the respective SMAL.
- None of the NSPS under 40 CFR 60 apply to the project emission units.
- None of the NESHAPs under 40 CFR 61 apply to the project emission units.
- None of the MACTs under 40 CFR 63 apply to the project emission units.
- Water carryover is being used to control emissions from economizer ash, bottom ash, and wastewater sediment. Filters and water are being used to control emissions from fly ash.
- 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 Jefferson County, a nonattainment area for the 8-hour ozone standard and the PM<sub>2.5</sub> standard and an attainment area for all other criteria pollutants. The installation is not located in the Jefferson County lead nonattainment area.
- This installation is on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation is classified as item number 26. Fossil-fuel-fired steam electric plants of more than 250 million British thermal units per hour

heat input. The installation's major source level is 100 tons per year and fugitive emissions are counted toward major source applicability.

- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels.
- Moisture testing is required at the mixers.
- Approval of this permit is recommended with special conditions.

### INSTALLATION DESCRIPTION

Ameren Missouri Rush Island Energy Center is a baseload electric generating station primarily fired by coal. The installation consists of two tangentially fired coal boilers, an auxiliary oil-fired boiler, fuel and ash handling, haul roads, storage piles, and emergency equipment. The installation is a major source of PM, PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, VOC, CO, GHG, and HAPs for construction and operating permits. It is located in Jefferson County. The following New Source Review permits have been issued to Ameren Missouri Rush Island Energy Center from the Air Pollution Control Program.

Table 2: NSR Permit History

Permit Number	Description
0992-017	SO <sub>3</sub> injection
N/A	Temporary permit under project EX22800016006 expired 12/7/1997
0992-017A	Amendment
012001-021	Coal handling
012004-007	Generator
052011-009	Dry sorbent injection
102011-013	Temporary permit for refined coal

### PROJECT DESCRIPTION

Ameren Missouri Rush Island Energy Center proposes changes to the bottom and economizer ash handling systems, fly ash handling systems, as well as the wastewater treatment basin. The existing MRT rail ash loading system under project 2002-05-058 is not affected by this project.

A boiler will drop bottom ash into a respective water filled trough. A boiler's economizer ash will be dry conveyed into the respective trough using existing conveyors. A submerged flight conveyor will pull comingled bottom and economizer ash onto a dry flight conveyor which will drop into a three sided bunker. The comingled ash will then be loaded by front end loader into trucks for shipment offsite. Per boiler, the maximum design rates for bottom ash and economizer ash are 4.6 and 4.4 tph, respectively. The design rates were determined from boiler capacity and coal ash content. Each boiler

will have a respective system as described above.

Fly ash from the existing boiler 1 and boiler 2 ESP hoppers will be pneumatically conveyed into one of two storage silos. Each pneumatic conveying will be equipped with an exhaust filter. The silos will each be equipped with a bin vent filter. Dry (unconditioned) fly ash will be loaded into trucks for shipment offsite. Wet fly ash conditioned to approximately 8-12% moisture (4.8% minimum) will also be loaded into trucks for shipment offsite. Dry fly ash will be loaded from the silos into enclosed trucks using a telescoping spout controlled by the bin vent filter. Alternatively, fly ash will be loaded into a batch mixer, wetted, and then loaded to trucks through a different telescoping spout. The mixer will be controlled by a dedicated exhaust filter. Per boiler/ESP, the maximum design rate for dry fly ash transfer is 14 tph. The design rate was determined from boiler capacity and coal ash content. Each boiler will have a respective system as described above.

Wastewater will be separated from solids in a settling basin. Sediment will be loaded onto a pad using a front end loader, then loaded into trucks for shipment offsite.

All haul roads and front end loader vehicular activity areas will be paved.

Table 3 contains all of the project emission units. Construction and operation may occur in phases over several months.

Table 3: Emission Unit Summary

Emission Unit	Emission Point	Description	Capture Device	Control Device
Economizer ash and bottom ash				
EU0016A	EP0016A	Unit 1 dry flight conveyor drop into bunker 1	N/A	Water carryover
EU0016B	EP0016B	Bunker 1 wind erosion	N/A	Water carryover
EU0016C	EP0016C	Loadout from bunker 1 to trucks using front end loader	N/A	Water carryover
EU0017A	EP0017A	Unit 2 dry flight conveyor drop into bunker 2	N/A	Water carryover
EU0017B	EP0017B	Bunker 2 wind erosion	N/A	Water carryover
EU0017C	EP0017C	Loadout from bunker 2 to trucks using front end loader	N/A	Water carryover
Fly ash				
EU0014A	EP0014A	Transfer from unit 1 ESP or unit 2 ESP to silo 1	Total enclosure	Unit 1 filter collector

EU0014B	EP0014B	Silo 1 filling vent	Total enclosure silo	Unit 1 bin vent filter
EU0014E		Silo 1 dry loadout	Telescoping spout	
EU0014C	EP0014C	Silo 1 mixer	Total enclosure	Water and Unit 1 conditioner filter
EU0014D	EP0014D	Silo 1 mixer loadout	N/A	Water carryover
EU0014E	EP0014F	Silo 1 dry loadout fugitives	N/A	N/A
EU0015A	EP0015A	Transfer from unit 1 ESP or unit 2 ESP to silo 2	Total enclosure	Unit 2 filter collector
EU0015B	EP0015B	Silo 2 filling vent	Total enclosure silo	Unit 2 bin vent filter
EU0015E		Silo 2 dry loadout	Telescoping spout	
EU0015C	EP0015C	Silo 2 mixer	Total enclosure	Water and Unit 2 conditioner filter
EU0015D	EP0015D	Silo 2 mixer loadout	N/A	Water carryover
EU0015E	EP0015F	Silo 2 dry loadout fugitives	N/A	N/A
Wastewater sediment				
EU0018A	EP0018A	Transfer from basin to dewatering pad using front end loader	N/A	Water carryover
EU0018B	EP0018B	Loadout from pad to truck using front end loader	N/A	Water carryover
CCR Paved haul road / vehicular activity routes				
EU0019A	N/D	Unit 1 economizer and bottom ash shipping	N/A	
EU0019B		Unit 1 wet fly ash shipping		
EU0019C		Unit 1 dry fly ash shipping		
EU0019D		Unit 2 economizer and bottom ash shipping		
EU0019E		Unit 2 wet fly ash shipping		
EU0019F		Unit 2 dry fly ash shipping		
EU0019G		Wastewater sediment		

		shipping	
EU0019H		Front end loader at bunker 1	
EU0019I		Front end loader at bunker 2	
EU0019J		Front end loader at wastewater	

N/A = Not applicable, N/D = Not determined

The bunker 1 and bunker 2 three-sided enclosures may provide emission control, however no value was relied upon in the emission calculations or special conditions. The haul roads were segmented in order to calculate emissions. Travel occurs over a contiguous road network.

## EMISSIONS/CONTROLS EVALUATION

### Bottom and economizer ash

The drop from the submerged flight conveyors to the dry flight conveyors was not considered an emission unit as the ash was submerged immediately prior to the drop. Potential emissions from the dry flight conveyors dropping material into bunkers were calculated using the EPA document, *AP-42, Chapter 13.2.4 Aggregate Handling and Storage Piles*, November 2006. Mean wind speed of 9.4 mph was obtained from 30-year data recorded at Lambert Airport. Moisture content of 4.8% was selected as this is the highest value that can be used to maintain the quality rating of the emission calculation method. Actual moisture content may be higher. However, usage of a lower 4.8% is conservative and still results in very low potential emissions of approximately 0.13 tpy PM total for both conveyors. The equation was developed to represent emissions from aggregate handling, but has been used in other industries. Ameren submitted mixed ash silt contents of 4.1% and 3.0%. Conservatively, this review chose 5.0%, which by doing so avoids future testing. The value is within the ranges of other materials listed in the AP-42 chapter. Silt content is not a variable in the emission equation.

Potential emissions from pile wind erosion were calculated using the alternative method in the *WRAP Handbook*, Chapter 9.3, September 2006. The method references an EPA published method. The conservative silt content of 5.0% used. The percent of time unobstructed wind speed exceeds 12 mph was selected at 25% for the unit 2 bunker. Lower values (10%) have been used in other permits, but 25% was provided by the applicant and results in conservatively higher emissions. Unit 1 bunker will be located inside a building, so 10% was used for that bunker. The number of days per year with greater than 0.01 inch of precipitation was conservatively set at zero since bunker 1 will be inside a building, and since a control efficiency was assumed for the material being wet at each bunker. Using zero days avoids double-counting control at bunker 2. The PM, PM<sub>10</sub>, and PM<sub>2.5</sub> control efficiencies of 90%, 90%, and 74%, respectively were used for the material being wet, as obtained from a combination of AP-42 Table B.2-3 AIRS code 061 and the WRAP Handbook pages 2 and 3. Combined bunker wind erosion potential emissions are less than 0.06 tpy PM.

Potential emissions from loading the material into trucks were calculated using the same method as the dry flight conveyors. Moisture content testing is not required because the ash was submerged and 4.8% moisture results in conservatively high potential emissions.

#### Fly ash

Potential emissions from pneumatic transfer from the ESP hoppers to the ash silos were calculated using SCC 30501117 for controlled pneumatic cement supplement unloading. Fly ash is cement supplement. The SCC does not include an emission factor for PM<sub>2.5</sub>. Controlled PM<sub>2.5</sub> emissions were conservatively considered equal to PM<sub>10</sub>.

When the fly ash enters the silos air will be displaced and travel through bin vent filters, one per silo. Potential emissions were calculated using SCC 30501104 for uncontrolled aggregate transfer to bins. Fly ash is siltier than aggregate, so the emission factor was multiplied by the ratio of fly ash to aggregate silt content (80 / 1.6). The factor is based upon 10 mph wind. There will be almost no effect from outside wind upon the activities inside the silos, therefore the factors were reduced by 90%. The SCC does not include a PM<sub>2.5</sub> factor. An uncontrolled PM<sub>2.5</sub> factor was developed by multiplying the PM factor by 10%, which is the approximate 2.5 micron weight percent of fly ash according to a document published by the American Society of Civil Engineers. The control efficiencies of 99.5%, 99.5%, and 99% for PM, PM<sub>10</sub>, and PM<sub>2.5</sub> respectively, were added for the bin vent filters. These values are defaults obtained from the NSR permit unit.

Ash will exit the silos by being fluidized with air blowers. Ash will drop through either dry loadout spouts to enclosed trucks, or drop to batch wet mixers/conditioners then to trucks. Ash will be fluidized to exit the silos, but the transfer from the silos to the trucks and to the mixers then trucks is through gravity, not pneumatic transfer. Potential emissions from the silo exit and mixer operation were calculated using the controlled emission factors for SCC 30501117. Potential emissions from loading conditioned ash from the mixers into trucks were calculated using AP-42 Chapter 13.2.4. The loadout passes through a telescoping spout which may have some capture from the mixer exhaust ventilation. However, conservatively no controls were considered in the calculation, and therefore were not required by special condition. The full wind speed of 9.4 mph was conservatively used. Moisture content of 4.8% was used. Moisture content testing is required as the water has to be added and properly mixed. The moisture isn't inherent. Potential emissions are approximately 0.2 tpy PM for both wet loadouts combined. Special Conditions 5 and 6 ensure initial and continuous compliance with the moisture limit through testing and parametric monitoring.

Potential emissions from the dry ash transfer from the silos to trucks were calculated using the same method as the silo filling air displacement. Captured emissions will be routed back to the silos. Capture efficiency was assumed 95% by using a telescoping spout, enclosed truck, and having an air draw from the spout.

The dry and wet systems and associated haul roads cannot simultaneously be operated at their full potential ash throughput. Therefore the project PTE only includes the system with the higher potential emissions, the conditioned/wet system.

Wastewater sediment

Potential emissions from wastewater sediment handling were calculated using AP-42 Chapter 13.2.4. The full wind speed of 9.4 mph was selected. Moisture content of 4.8% was conservatively selected. The sediment may have a higher moisture content.

HAP Emissions

Economizer, fly, and bottom ash contain particulate HAPs. Potential HAP emissions were calculated using the highest HAP concentrations among five references. The concentrations were multiplied by the economizer, fly, and bottom ash handling PM potential emissions. The references don't indicate whether the HAP concentrations are the compound mass or just the metal portion. Conservatively the full concentration was assumed to be the metal portion for comparison to the SMAL. The compound mass emission rates are therefore slightly higher, but much less than 10/25 tpy.

CCR haul roads

Potential emissions from haul roads were calculated using AP-42 Chapter 13.2.1 *Paved Roads*, January 2011. Silt loading of 4.24 grams/square meter was obtained from testing conducted at a former Ameren coal-fired power plant. 7.4 grams/square meter has been used in other program issued permits. However, that value is from AP-42 for a municipal solid waste landfill whereas this project does not involve landfilling on site. Also, this permit requires haul road cleaning or watering. Silt loading testing is not required for this project.

The following table provides an emissions summary for this project. Existing potential emissions were obtained from the most recent operating permit. Existing actual emissions were obtained from the installation's 2015 EIQ and EPA's facility level information on greenhouse gases tool. Potential emissions of the project represent the PTE of the new processes, assuming continuous operation (8,760 hours per year).

Table 4: Emissions Summary (tpy)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions	Potential Emissions of the Project	New Installation Potential
PM	25.0	Major	N/D	15.76	Major
PM <sub>10</sub>	15.0	8,124.37	589.18	4.05	8,128.42
PM <sub>2.5</sub>	10.0	Major	217.20	1.88	Major
SO <sub>2</sub>	40.0	34,948.95	17,487.39	N/A	34,948.95
NO <sub>x</sub>	40.0	16,398.65	2,903.85	N/A	16,398.65

VOC	40.0	188.75	134.06	N/A	188.75
CO	100.0	1,925.51	1,117.99	N/A	1,925.51
GHG (CO <sub>2</sub> e)	75,000	Major	7,411,571	N/A	Major
GHG (mass)	0.0	Major	7,354,441	N/A	Major
Combined HAPs	25.0	125.77	57.92	6.20E-03	125.77
Antimony	<sup>1</sup> 5.0	N/D	0.02	3.56E-05	N/D
Arsenic	<sup>1</sup> 0.005	N/D	0.03	1.30E-03	N/D
Beryllium	<sup>1</sup> 0.008	N/D	0.002	6.53E-05	N/D
Cadmium	<sup>1</sup> 0.01	N/D	0.009	8.90E-05	N/D
Chromium	<sup>1</sup> 5	N/D	0.08	9.06E-04	N/D
Cobalt	<sup>1</sup> 0.1	N/D	0.02	1.69E-04	N/D
Hydrogen Chloride	10	Major	10.63	N/A	Major
Hydrogen Fluoride	0.1	115.78	46.29	N/A	115.78
Lead	<sup>1</sup> 0.01	N/D	0.003	5.91E-04	N/D
Manganese	<sup>1</sup> 0.8	N/D	0.11	1.89E-03	N/D
Mercury	<sup>1</sup> 0.01	N/D	0.15	3.82E-06	N/D
Nickel	<sup>1</sup> 1	N/D	0.09	6.42E-04	N/D
Selenium	<sup>1</sup> 0.1	N/D	0.64	5.35E-04	N/D

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

2015 EIQ HAP emissions only report from unit 1 and unit 2.

Existing potential emissions obtained from operating permit OP2010-047.

<sup>1</sup> = SMAL

#### 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

Ameren Missouri Rush Island Energy Center 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

- *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.
- *Operating Permits*, 10 CSR 10-6.065
- *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

- 10 CSR 10-6.400 does not apply to the project emission units. All units will either emit less than 0.5 lb/hr PM or will generate only fugitive emissions.

## 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 February 16, 2016, received February 22, 2016, designating Ameren Corporation as the owner and operator of the installation.
- Email communication between Bob LaPlaca and David Little. March 11, 2016 to June 27, 2016.

The following documents are permit references:

- *Characterization of Coal Combustion Residues from Electric Utilities – Leaching and Characterization Data*. EPA. December 2009. EPA-600/R-09/151.

- *Reuse Options for Coal Fired Power Plant Bottom Ash and Fly Ash.* Jayaranjan, Hullebusch, Annachhatre. *Reviews in Environmental Science and Biotechnology.* April 1, 2014.
- *Chemical Constituents in Coal Combustion Product Leachate: Beryllium.* EPRI. November 2006.
- *Coal Ash: Characteristics, Management and Environmental Issues.* EPRI. September 2009.
- *Technical Memorandum, Technical Briefing Paper on Selenium.* Exponent. July 2010.
- *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume 1.* EPA.
- *WRAP Fugitive Dust Handbook.* Countess Environmental. September 7, 2006.
- *Geotechnical Properties of Fly and Bottom Ash Mixtures for Use in Highway Embankments,* *Journal of Geotechnical and Geoenvironmental Engineering, ASCE* 2005.
- *Submittal of Silt Density Study Report Ameren Energy Resources Generating Company Duck Creek Power Plant Facility I.D. 057801AAA: Permit No. 06070048.* Ameren Environmental Services, October 15, 2009.
- *Missouri Emissions Inventory System (MoEIS).* Missouri Department of Natural Resources, 2015. <https://www.dnr.mo.gov/moeis/main/login>
- *Facility Level Information of Greenhouse Gases Tool (flight).* EPA, 2014. <https://ghgdata.epa.gov/ghgp/main.do>
- *Global Climate Station Summaries.* NOAA. <http://gis.ncdc.noaa.gov/map/viewer/#app=cdo&cfg=isdsummaries&theme=isdsummaries>

## 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>EQ</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		

Appendix B: Haul Road Map



02/01/2016  
REV1

Appendix B: Haul Road Map

Note: Green is inbound trucks and red is outbound trucks



Appendix B: Haul Road Map

Note: Green is inbound trucks and red is outbound trucks



Appendix B: Haul Road Map

*Note: Green is inbound trucks and red is outbound trucks*

U2 Bottom Ash Truck Route - 5,742 Feet



Appendix B: Haul Road Map

*Note: Both inbound and outbound trucks use the same route.*



Waste Water Treatment Truck Route - 4,318 Feet

Mr. Bob LaPlaca  
Consulting Environmental Scientist  
Ameren Missouri Rush Island Energy Center  
P.O. Box 66149, MC 602  
St. Louis, MO 63166

RE: New Source Review Permit - Project Number: 2016-02-044

Dear Mr. LaPlaca:

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 with your amended operating permit is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

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

Mr. Bob LaPlaca  
Page Two

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).

If you have any questions regarding this permit, please do not hesitate to contact David Little, 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:dj

Enclosures

c: St. Louis Regional Office  
PAMS File: 2016-02-044

Permit Number: