

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: 042016-005 Project Number: 2015-02-045

Installation Number: 083-0001

Parent Company: Great Plains Energy

Parent Company Address: P.O. Box 418679, Kansas City, MO 64141

Installation Name: Kansas City Power & Light - Montrose Generating Station

Installation Address: 400 SW Highway P, Clinton, MO 64735

Location Information: Henry County, S29,31,32, T41N, R27W

Application for Authority to Construct was made for:
Activated carbon injection and flue gas conditioning at Units 2 and 3 for proposed compliance with 40 CFR 63 Subpart UUUUU. 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
New Source Review Unit

Handwritten signature of Kyrna L Moore.

Director or Designee
Department of Natural Resources

Handwritten date April 7, 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 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 Department's Air Pollution Control Program of the anticipated date of startup of these air contaminant sources. The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources' regional office responsible for the area within which you are located within 15 days after the actual startup of these air contaminant sources.

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

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 sources(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 at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

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

Project Number: 2015-02-045
Installation ID Number: 083-0001
Permit Number:

Installation Address:

Kansas City Power & Light - Montrose Generating Station
400 SW Highway P
Clinton, MO 64735

Parent Company:

Great Plains Energy
P.O. Box 418679
Kansas City, MO 64141

Henry County, S29,31,32, T41N, R27W

REVIEW SUMMARY

- Kansas City Power & Light - Montrose Generating Station has applied for authority to install activated carbon injection and flue gas conditioning at Units 2 and 3 for proposed compliance with 40 CFR 63 Subpart UUUUU.
- The application was deemed complete on April 1, 2015.
- HAP emissions are expected from the proposed equipment. Potential HAP emissions from EP-09, 10, 11, 12, and 13 are expected to increase in proportion with the filterable PM increase from these emission units, due to the increased ash handling rate. HAPs will decrease from EP-07 and EP-08. Potential HAP emissions show a decrease.
- None of the NSPS under 40 CFR 60 apply to the project emission units. This project does not trigger NSPS modification or reconstruction.
- None of the NESHAPs under 40 CFR 61 apply to the project emission units.
- 40 CFR 63 Subpart UUUUU *National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units* applies to Units 2 and 3. Activated carbon and flue gas conditioning are anticipated to bring the units into compliance.
- A silo filter and ESPs are being used to control the filterable PM. Activated carbon and ESPs will control mercury, but mercury isn't experiencing an emission increase at the stack.
- 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. A permit was required because the potential emissions of activated carbon emitting from the stack at maximum design or expected injection rates exceeds the PM₁₀ insignificant emission exemption level in 10 CSR 10-6.061(3)(A)3.A.

- This installation is located in Henry County, an attainment area for all criteria pollutants.
- 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.
- Emission testing originating from this permit review is not required. MACT UUUUU requires testing.
- Submittal of an application to amend the Part 70 Operating Permit is required for this installation within 1 year of equipment startup.
- Approval of this permit is recommended without special conditions.

INSTALLATION DESCRIPTION

Kansas City Power & Light Company operates an existing, baseload, electric generating station near Montrose. Power is produced by three units, Unit 1 (EP-06), Unit 2 (EP-07), and Unit 3 (EP-08). Each unit is dry bottom and tangentially fired with coal as the primary fuel. The units began operation in 1958, 1960, and 1964, respectively. Montrose was originally a mine-mouth installation, but switched to Powder River Basin (PRB) subbituminous coal in the late 1980s. Each unit has its own dedicated ESP. Fly ash is primarily landfilled on site, and the dry landfill has not received a NSR permit. A landfill expansion was deemed no construction permit required. The following NSR permits have been issued to Montrose from the Air Pollution Control Program.

Table 1: Permit History

Permit Number	Description
0296-004	Railcar receiving
0699-008	Emergency generator
042012-003	Major review for low NO _x burner tips and separated over fired air
042012-003A	Clarification of CEMS requirement
062014-008	Temporary permit for sorbent injection testing
082015-008	Temporary permit for sorbent injection testing

PROJECT DESCRIPTION

Montrose proposes to inject activated carbon and a flue gas conditioning agent at each Unit 2 and 3 between the boilers and dedicated ESPs. The purpose is for proposed compliance with 40 CFR 63 Subpart UUUUU (MATS rule). Brominated activated carbon (BAC) should reduce mercury emissions, while the flue gas conditioning agent

RESPond should increase the PM control efficiency of each ESP. Each unit will see activated carbon injected up to 300 lb/hr and RESPond injected up to 104 lb/hr. Expected injection rates are 65 and 62 lb/hr respectively per unit. Since potential emissions were evaluated at the much higher maximum throughput a special condition was not included to limit the project to the expected usage.

Activated carbon and RESPond will be delivered on existing paved roads (EP-17). Activated carbon will be pneumatically received into a new filter controlled silo (EP-16). After being injected, a small portion of the activated carbon will emit from Unit 2 (EP-07) and Unit 3 (EP-08), as the ESPs are not 100% efficient. However, an overwhelming decrease in overall stack emissions is expected. The increase in ESP performance and decrease in stack emissions result in increased fly ash handling through EP-09, 10, 11, 12, 13, and 18. These emission units are summarized in Table 2.

EMISSIONS/CONTROLS EVALUATION

The MATS limits are federally enforceable, therefore those limits were not included as special conditions in this permit. If the MATS rule no longer existed, then it is assumed Montrose would not inject BAC or RESPond. Therefore the project emission increases that triggered the need for this permit also would not exist, and again the MATS limits would not need to be included as special conditions in this permit. In the case of Montrose Units 2 and 3, proposed compliance with the MATS rule results in an emission increase from other associated emission units.

Activated carbon is a powder-like substance with Montrose's vendor claiming approximately 50% smaller than 17 to 18 microns and 5% smaller than 3 microns. Insufficient data is available to interpolate with certainty the amount smaller than 10 microns. Other carbon vendors claim higher portions of PM₁₀ and PM_{2.5}. The particle size distribution was conservatively assumed 100% PM, 50% PM₁₀ and 25% PM_{2.5} for this review, obtained from other carbon vendors. Therefore a special condition limiting the particle size distribution to Montrose's vendor specifications was not included. If linear interpolation is used on Montrose's vendor specifications to estimate the PM₁₀ fraction a permit is still triggered.

RESPond is a liquid solution containing salts. The MSDS does not show ingredients containing VOC or HAP, but does not detail each ingredient. Dried salts (PM) may form from its use, however they were not evaluated for this review because other aspects of this review trigger permit need, and any PM from RESPond will be represented in an emission test or CEMS. RESPond is designed to modify fly ash resistivity in order to maintain or improve ESP performance. Fly ash resistivity has a desired range for optimum ESP performance. Fly ash from high sulfur coal falls into this range. Generally, the switch to low sulfur PRB coal decreased ESP performance as the PRB fly ash has high resistivity outside of the desired range. RESPond will likely reduce the PRB fly ash resistivity back into the desired range.

Table 2: Project Emission Units

Emission Unit	Description	Emission Calculation Method
¹ EP-07	Unit 2	No increase
¹ EP-08	Unit 3	No increase
EP-09, 10, 11	Unloading fly ash from silos to trucks	PTE - BAE
EP-12	Unloading fly ash to landfill	PTE - BAE
EP-13	Landfill activities	PTE - BAE
² EP-17	Haul roads – carbon and sorbent receiving	PTE
² EP-18	Haul roads – fly ash and carbon shipping to landfill	PTE - BAE
EP-16	Carbon silo	PTE

¹ Unit 2 and Unit 3 have a combined stack.

² Travel is on existing roads EP-14 and EP-15. EP-17 and EP-18 are new for clarity of the project emission units versus existing emissions.

EP-16

Activated carbon pneumatic receiving and transfer (EP-16) are controlled by an exhaust filter. Particle size distribution of cement supplement and activated carbon are comparable. The controlled emission factors for pneumatic cement supplement in the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 11.12, *Concrete Batching*, June 2006 were selected. AP-42 does not contain a PM_{2.5} emission factor for this process, therefore the emission factor was calculated by multiplying the 2.5 micron size distribution for activated carbon of 25% by the AP-42 PM emission factor. The control device is inherent to the process for product recovery. Therefore, no special condition is required for its operation, however the permit is based upon its use. There are no RESPond receiving emissions except for the receiving haul road.

EP-07 and EP-08

Injecting activated carbon at the design capacity with increased ESP control efficiencies shows PM₁₀ and PM_{2.5} emissions from the stack exceeding PSD significance rates. Injecting at the expected rates shows emissions exceeding the PM₁₀ insignificant emission exemption level in 10 CSR 10-6.061(3)(A)3.A. Therefore either method requires a permit. When complying with the MATS PM limit, EP-07 and EP-08 should see a decrease in filterable PM emissions, and the overall project emissions should show a decrease.

Use of brominated activated carbon may result in the formation of hydrobromic acid. This acid is not a HAP or regulated NSR pollutant. PM condensable emissions are not expected to increase.

EP-09, 10, 11, and 12

Baseline throughput for fly ash loadout from silos into trucks was calculated using Unit 2 and Unit 3 coal tonnage and ash content obtained from the 2014-2013 EIQ. This was compared to the total baseline fly ash generation which includes Unit 1. The EIQ reports fly ash unloading to storage, which could be from all three units. The ratio of combined Unit 2 and Unit 3 coal usage to total coal usage was multiplied by the total fly ash throughput to obtain the baseline fly ash throughput for Unit 2 and Unit 3. Using EP-12 should yield a conservatively low baseline actual emissions (BAE) because some of the ash may have been sold offsite and not landfilled. Therefore actual EP-09, 10, and 11 throughput and BAE could be higher.

The emission factors were obtained from SCC 30501117 for cement supplement (fly ash) unloading, pneumatic uncontrolled. The most recent issued operating permit and the draft operating permit describe the unloading system as unloading to enclosed or open trucks using telescoping arms. Therefore this was not assumed as a pneumatic system. The emission factors were reduced by 90% to account for an estimated emission reduction from pneumatic to gravity transfer. The equation from AP-42 Section 13.2.4, *Aggregate Handling And Storage Piles* was not used because the dry fly ash is better represented by uncontrolled transfer of cement supplement than by aggregate transfer. However, 90% control is validated by comparing the emission factors for uncontrolled pneumatic fly ash unloading to AP-42 Section 13.2.4.

Potential Unit 2 and Unit 3 ash throughput was calculated using the lowest stack PM emission rate that meets the MATS limit and that equates to the highest practical ESP PM control efficiency, just under 100% control. This represents the worst case ash throughput during this project and during MATS compliance. Conservatively all of the activated carbon was considered controlled. PRB ash content was obtained from an average of 44 values obtained from U.S. Geological Survey, BNSF Railway, and John T. Boyd Company.

Emissions from unloading fly ash from trucks to the landfill (EP-12) were considered equal to the emissions from EP-09, 10, and 11 but were reduced using the ratios in the TVA/EPRI study described below.

EP-13

Landfill fly ash placement emissions were calculated using AP-42, Section 11.9 *Western Surface Coal Mining*, October 1998, grading. However, another reference has been added for this review, *Fugitive Emissions from a Dry Coal Fly Ash Storage Pile*, TVA & EPRI, August 2012. The document proposes the AP-42 unloading and grading methods result in over-predicted emissions based upon recent monitored data. A ratio of 53:260 can be applied to the AP-42 PM and PM₁₀ emission factors based upon the EPRI document's, Table 1. The ratio is for particles in the range of 10 to 2.5 microns, but the ratio was applied to this project's PM as it was assumed PM would be more similar to the 10 to 2.5 micron range than the 2.5 micron and smaller range. The EPRI document's PM_{2.5} ratio of 19:29 was applied to this project's AP-42 PM_{2.5} emission factor. It was assumed the ratio of the study plant's monitored emissions to the predicted AP-42 emissions would apply to the Montrose emissions. Fly ash silt content of 80% was obtained from AP-42 Table 13.2.4. Average moisture content of 0.13% was obtained from AP-42 Section 11.12 *Concrete Batching*, background document, Tables 18.1 and 18.2, cement supplement.

Acreage and rate of disposal are not inputs into the AP-42 grading and EPRI emission methods. According to EPA's Air Markets Program Data, the study plant is rated at 18,923 MMBtu/hr, while Montrose Units 2 and 3 are rated at a combined 4,380 MMBtu/hr. The calculated grading emissions were further reduced by multiplying by the MMBtu ratio of Unit 2 and Unit 3 to the TVA plant, 23.15%. However, since there will be a potential increase in ash placement, then there should be an increase in emissions. The potential to actual increase in ash loadout is 63.53%. This was multiplied by the potential emissions calculated using the above moisture and silt contents. Resulting

project emissions are summarized in Table 3.

No new landfill excavation or increase in landfill size is being considered under this permit. Therefore an increase in wind erosion emissions was not considered for the project emissions. Wind still creates erosion emissions for the overall installation PTE. Natural mitigation from rainfall was not added to the annual PTE since the ash is dry when it is placed.

EP-17 and EP-18

Activated carbon and RESPond receiving haul road emissions (EP-17) were calculated using AP-42 Section 13.2.1, *Paved Roads*, January 2011. The one way distance is approximately 0.1 miles. The average unloaded/loaded truck weight is 25 tons. Silt loading of 7.4 grams per square meter was selected from AP-42 Table 13.2.1-3. No emission controls are used.

Fly ash and activated carbon shipping haul road emissions (EP-18) were calculated using AP-42 Section 13.2.2, *Unpaved Roads*, November 2006. The one way distance is approximately 0.8 miles. The average unloaded/loaded truck weight is 25 tons. 6.4 silt % was selected from AP-42 Table 13.2.2-1. Undocumented watering was proposed in the permit application, but was requested to be removed during the review process. The EIQ includes undocumented watering and this should be removed from the EIQ as the undocumented watering is not federally enforceable. Travel is on existing roads EP-14 and EP-15. EP-17 and EP-18 have been separately identified to calculate project emissions. They are not new physical roads.

Table 3: Project PM Emissions (tpy)

Pollutant	BAC Receiving into Silo PTE	Stack	Ash Silo Loadout to Trucks PTE-BAE	Ash Truck Loadout to Landfill	Ash Landfill Increase	Haul Road PTE-BAE	Potential Emissions of the Project
PM filterable	0.012	-681.94	4.42	0.90	3.78	6.73	-666.10
PM ₁₀ filterable	0.006	-830.46	1.55	0.32	1.29	1.81	-825.48
PM _{2.5} filterable	0.003	-643.57	1.33	0.87	0.38	0.18	-640.82

The stack calculations show the decrease for PM₁₀ filterable is greater than the decrease for PM. This shouldn't be possible. Both the stack PTE and BAE show PM being greater than PM₁₀ filterable, as expected. The error is from the baseline PM being just slightly greater than the baseline PM₁₀ filterable. The emission decreases are federally enforceable and may be used for a future netting analysis. However the decrease amounts should be verified through CEMS or emission testing and reevaluated at the time of the future netting analysis.

Fly ash contains particulate HAPs. Project HAP emissions were calculated using the concentrations in *Reuse Options for Coal Fired Power Plant Bottom Ash and Fly Ash* and *Technical Briefing Paper on Selenium* documents, multiplied by the respective project PM increases and decreases excluding the activated carbon silo and haul roads. For simplicity, the calculations did not use reported actual HAP emissions compared to

MATS limits. Project HAP potential emissions show a decrease.

The following table provides an emissions summary for this project. Existing potential emissions were obtained from the draft operating permit under project 2011-03-080. Existing actual emissions were obtained from the installation's 2014 EIQ. The EIQ shows the MHDR of each Units 2 and 3 to be in the upper 1600's of MMBtu/hr input. However, EPA's Air Markets Program Data shows the MHDR at 2,130 and 2,250 MMBtu/hr input respectively.

Table 4: Emissions Summary (tpy)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions (2014 EIQ)	Potential Emissions of the Project	New Installation Conditioned Potential
PM	25.0	Major	N/D	-666.10	Major
PM ₁₀	15.0	5,865.74	866.31	-825.48	Major
PM _{2.5}	10.0	5,758.98	557.90	-640.82	Major
SO ₂	40.0	65,433.30	8,604.20	N/A	Major
NO _x	40.0	10,313.28	3,420.10	N/A	Major
VOC	40.0	103.40	54.30	N/A	Major
CO	100.0	7,139.40	1,796.26	N/A	Major
GHG (CO ₂ e)	75,000	8,321,786.65	¹ 3,261,167	N/A	Major
GHG (mass)	100.0	Major	N/D	N/A	Major
Combined HAPs	25.0	2,460.65	7.94	-0.89	Major
Arsenic	² 0.005	N/D	N/D	-9.49E-02	N/D
Cadmium	² 0.01	N/D	N/D	-2.35E-02	N/D
Cobalt	² 0.1	N/D	N/D	-3.57E-02	N/D
Chromium III	² 5.0	N/D	N/D	-6.39E-02	N/D
Mercury	² 0.01	N/D	N/D	-5.92E-03	N/D
Manganese	² 0.8	N/D	N/D	-3.96E-01	N/D
Nickel	² 1.0	N/D	N/D	-1.17E-01	N/D
Lead	² 0.01	N/D	N/D	-2.15E-02	N/D
Selenium	² 0.1	N/D	N/D	-1.35E-01	N/D

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

¹ CO₂e obtained from EPA's GHG Reporting Program

² 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

Kansas City Power & Light - Montrose Generating Station 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
- *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

- *Restriction of Emission of Particulate Matter From Industrial Processes*, 10 CSR 10-6.400. This regulation applies to EP-09, 10, and 11. The applicant indicated the fly ash transfer is closed/vapor tight. However, the operating permit describes the process as unloading to enclosed or open trucks using telescoping arms. The emissions could be controlled but may not be; the process isn't fugitive. The PM PTE is 2.60 lb/hr, and allowable emissions are 16.88 lb/hr. Compliance is demonstrated.
- *Restriction of Particulate Matter Emissions From Fuel Burning Equipment Used for Indirect Heating*, 10 CSR 10-6.405. There is not an increase in emissions at the affected units for this project. There will likely be an emission reduction.
- 40 CFR 64 Compliance Assurance Monitoring
- 40 CFR 63 Subpart UUUUU, *National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units*

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated March 13, 2015, received April 1, 2015, designating Kansas City Power & Light as the owner and operator of the installation.

The following documents are permit references:

- Emissions Testing for Particulates, Sulfuric Acid Vapor, Sulfur Dioxide & Mercury on Unit 2 Montrose Station, Missouri Civil & Environmental Consultants, Inc., February 4, 2015.
- Emissions Testing for Particulates, Sulfuric Acid Vapor, Sulfur Dioxide & Mercury on Unit 2 Montrose Station, Missouri Civil & Environmental Consultants, Inc., January 12, 2015.
- EPA Air Markets Program Data website accessed June 16, 2015, <http://ampd.epa.gov/ampd/>
- EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition
- *Impact of Bromide Addition on Air Heater Corrosion*, EPRI, March 2014
- *Powder River Basin Coal Resource and Cost Study*, John T. Boyd Company, September 2011
- *A Critical Review of Published Coal Quality Data From the Southwestern Part of the Powder River Basin, Wyoming*, James Luppens, U.S. Geological Survey, 2011
- *Guide to Coal Mines*, BNSF Railway, June 12, 2013
- *Fugitive Emissions from a Dry Coal Fly Ash Storage Pile*, Stephen Muller et al, Tennessee Valley Authority, Stephanie Shaw, Electric Power Research Institute, 2012
- *Fly Ash Resistivity with Injected Reagents and Predicted Impacts on Electrostatic Precipitators*, Robert Mastropietro, Lodge Cottrell Inc.
- *Integrating Flue Gas Conditioning with More Effective Mercury Control when Considering Current MATS Control Strategies*, Richard Miller, ADA-ES, Inc., June 2014
- *Reuse Options for Coal Fired Power Plant Bottom Ash and Fly Ash* Jayaranjan, Hullebusch, and Annachatre. *Rev Environ Sci Biotechnol*. Published online April 1, 2014. DOI 10.1007/s11157-014-9336-4
- *Technical Memorandum, Technical Briefing Paper on Selenium*, prepared by Exponent for TVA, July 2010, document number 0900462.000 0201 0609 AF26, page 7 of 50 in the pdf

APPENDIX A

Abbreviations and Acronyms

%	percent	m/s	meters per second
°F	degrees Fahrenheit	Mgal	1,000 gallons
acfm	actual cubic feet per minute	MW	megawatt
BACT	Best Available Control Technology	MHDR	maximum hourly design rate
BMPs	Best Management Practices	MMBtu	Million British thermal units
Btu	British thermal unit	MMCF	million cubic feet
CAM	Compliance Assurance Monitoring	MSDS	Material Safety Data Sheet
CAS	Chemical Abstracts Service	NAAQS ...	National Ambient Air Quality Standards
CEMS	Continuous Emission Monitor System	NESHAPs	National Emissions Standards for Hazardous Air Pollutants
CFR	Code of Federal Regulations	NO_x	nitrogen oxides
CO	carbon monoxide	NSPS	New Source Performance Standards
CO₂	carbon dioxide	NSR	New Source Review
CO_{2e}	carbon dioxide equivalent	PM	particulate matter
COMS	Continuous Opacity Monitoring System	PM_{2.5}	particulate matter less than 2.5 microns in aerodynamic diameter
CSR	Code of State Regulations	PM₁₀	particulate matter less than 10 microns in aerodynamic diameter
dscf	dry standard cubic feet	ppm	parts per million
EQ	Emission Inventory Questionnaire	PSD	Prevention of Significant Deterioration
EP	Emission Point	PTE	potential to emit
EPA	Environmental Protection Agency	RACT	Reasonable Available Control Technology
EU	Emission Unit	RAL	Risk Assessment Level
fps	feet per second	SCC	Source Classification Code
ft	feet	scfm	standard cubic feet per minute
GACT	Generally Available Control Technology	SDS	Safety Data Sheet
GHG	Greenhouse Gas	SIC	Standard Industrial Classification
gpm	gallons per minute	SIP	State Implementation Plan
gr	grains	SMAL	Screening Model Action Levels
GWP	Global Warming Potential	SO_x	sulfur oxides
HAP	Hazardous Air Pollutant	SO₂	sulfur dioxide
hr	hour	tph	tons per hour
hp	horsepower	tpy	tons per year
lb	pound	VMT	vehicle miles traveled
lbs/hr	pounds per hour	VOC	Volatile Organic Compound
MACT	Maximum Achievable Control Technology		
µg/m³	micrograms per cubic meter		

Mr. Steve Courtney
Environmental Services
Kansas City Power & Light
P.O. Box 418679
Kansas City, MO 64141

RE: New Source Review Permit - Project Number: 2015-02-045

Dear Mr. Courtney:

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.

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 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the Administrative Hearing Commission. You may contact the Administrative Hearing Commission by writing to them at the Truman State Office Building, Room 640, 301 West High Street, P.O. Box 1557, Jefferson City, Missouri 65102 or you may phone them at (573) 751-2422 or fax them at (573) 751-5018. The Administrative Hearing Commission also has a website and it is located at www.oa.mo.gov/ahc.

Mr. Steve Courtney
Page Two

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 by phone 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:dld

Enclosures

c: Kansas City Regional Office
PAMS File: 2015-02-045

Permit Number: