

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

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

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SEP 19 2011

CERTIFIED MAIL:70051820000233104336
RETURN RECEIPT REQUESTED

Mr. Michael L. Menne
Vice President Environmental Services
Ameren Services
8501 N. State Route 94
West Alton, MO 63386

RE: New Source Review Temporary Permit Request - Project Number: 2011-06-012
Installation ID Number: 183-0001
Temporary Permit Number: **062011-003**
Expiration Date: August 20, 2011

Dear Mr. Menne:

The Missouri Department of Natural Resources' Air Pollution Control Program has completed a review of your request to use a fuel additive called CyClean at the Ameren Missouri Sioux Power Plant, located in West Alton, Missouri. The Air Pollution Control Program is hereby granting your request to conduct this temporary operation at this location in accordance with Missouri State Rule 10 CSR 10-6.060(3).

Ameren Missouri is proposing to test a fuel additive called CyClean at the Sioux Power Plant. The CyClean is added to improve combustion of sub-bituminous coal and remove mercury in cyclone boilers. Typically, Powder River Basin (PRB) coal combustion yields mercury (Hg) species of Hg⁰ or Hg²⁺ and only Hg²⁺ can be captured. Additional mercury removal by the CyClean additive occurs by oxidizing the elemental mercury (Hg⁰ to Hg²⁺) and capturing the Hg²⁺ in the native carbon of the ash where it is collected with the particulate emissions in the ESP. In addition to mercury removal, the addition of CyClean can allow for the optimization of the combustion process and allow for the boiler to operate with reduced NO_x if the operator chooses, although the addition of Cycleclean by itself does not lower NO_x emissions. Lower NO_x emissions are possible because CyClean A improves the bottom slag properties allowing for sustainable operation with deeper combustion staging. When air is redirected to the overfire air (OFA), less oxygen is available at the burner resulting in lower NO_x at the lower section of the boiler where the cyclones are located. Lower oxygen at the burner will result in a higher ratio of CO to CO₂. However, a properly tuned OFA system converts CO to CO₂ in the upper section of the main boiler (there the OFA ports inject the remaining combustion air). Thus, although CO emissions are not expected to increase, the addition of CyClean could indirectly result in an increase in carbon monoxide emissions.

CyClean has two components: A and B. CyClean Additive A is a granular material, while Cycleclean Coal Additive B is a liquid. The Additive A is delivered by covered truck and unloaded onto a stockpile. A front-end loader transfers the material from the stockpile to a hopper. From the hopper, the material is transferred to a screw conveyor and delivered via a bucket elevator to the main coal conveyor belt. The Additive B is added to Additive A at the top of the bucket elevator. The CyClean coal additives are then

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routed along with the coal on the coal conveyor belt to the boilers. CyClean Coal Additive B is a liquid (stored in a tote) that will be added to the coal prior to it being sent to the boilers. CyClean Additive B is a halide salt solution. Once in the boiler, the salts will thermally decompose in the same way as a native halide in the coal. Total halogens from the CyClean and PRB are below that of bituminous coal. Since Additive B is in a liquid form and contains no VOCs or HAPs, there are no emissions associated with its handling.

Ameren Missouri is approved to use 60 tons of CyClean A and 200 gallons of CyClean B during the testing program. Ameren Missouri shall record the amount of CyClean A and CyClean B used and the date and submit those records to the Air Pollution Control Program's Compliance/Enforcement Section within 30 days of the expiration of this permit.

During the testing program, Ameren Missouri should evaluate the affects of the addition of CyClean on boiler operation and emissions. This study will be necessary if Ameren Missouri applies for a permit to use CyClean on a permanent basis. The study should include the following:

- A comparison of boiler operation before and after application of the CyClean coal additives including the maximum output, boiler efficiency and any other key boiler parameters that are necessary to demonstrate boiler performance and the affects of the CyClean additives on its operation.
- A comparison of boiler emissions before and after application of the CyClean coal additives for green house gas, mercury, nitrogen oxide, and CO emissions.
- A description of how the CyClean additives were added, the quantities added, and the ratio of CyClean additives to coal.

You are still obligated to meet all applicable air pollution control rules, Department of Natural Resources' rules, or any other applicable federal, state, or local agency regulations. A copy of this letter should be kept with the unit and be made available to Department of Natural Resources' personnel upon verbal request. If you have any questions regarding this determination, please do not hesitate to contact Michael Mittermeyer at the departments' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or by telephone at (573) 75 1-4817. Thank you for your time and attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM



Kyra L. Moore
Director

JLK:mml

c: PAMS File: 2011-06-012
St. Louis Regional Office