PERMIT BOOK

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: 012006-019D Project Number: 2007-06-080

Parent Company: Great Plains Energy, Inc.

Parent Company Address: 1201 Walnut Street, Kansas City, MO 64141

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

Installation Address: 20250 Highway 45 North, Weston, MO 64098

Location Information: Platte County, S31, T54N, R36W

Application for Authority to Construct was made by KCPL for:
Installation of a pulverized coal boiler and associated pollution control equipment (Iatan Unit 2), a fuel-oil fired auxiliary boiler, emergency fire pumps, a fuel oil storage tank and a combustion by-product landfill. Modification of an existing electrical utility steam generating unit (Iatan Unit 1) to upgrade the pollution control system and increase the heat input rate. This review was conducted in accordance with Section (8), 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.

OCT 2 7 2008

EFFECTIVE DATE

Steven Julian for LK

DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within 18 months from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within 18 months 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 devises 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 start up of this (these) air contaminant sources(s). The information must be made available not more than 60 days but at least 30 days in advance of this date. 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 start up of this (these) air contaminant source(s).

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.

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."

Kansas City Power & Light Company – Iatan Generating Station
S31, T54N, R36W, Platte County, Missouri

1. Specifications, Operating Limits and Emission Limits for Coal Storage and Handling.

   A. The coal storage pile footprint area (active and in-active storage) shall not exceed 36.3 acres.

   B. The rail car unloading rate shall not exceed 4,000 tons of coal per hour, averaged over the duration of a train-set unloading event.

   C. Required Pollution Control Techniques and Equipment. The following conditions represent best available control technology (BACT) for coal storage and handling.
      1) Particulate emissions from rail car unloading shall be controlled by a baghouse.
      2) A water/chemical dust suppressant mixture shall be applied to the coal at a point between the rail car unloading hopper and the transfer tower.
      3) Kansas City Power & Light Company (KCPL) shall periodically add water and/or chemical dust suppressant to the top of the coal storage pile. A system shall be designed, constructed and operated to allow for distribution of water and/or chemical dust suppressant over the top of the coal storage pile. The use of truck-mounted pumps is acceptable provided that this method is capable of effective distribution over all areas of the storage pile.
      4) Coal conveyance and transfer systems shall be enclosed and vented to a baghouse. For any portions of the coal conveyance system that can not be enclosed and vented to a baghouse, KCPL must receive prior written authorization from the Air Pollution Control Program for an alternate control method prior to startup.
      5) A telescoping chute shall be used to drop coal from conveying equipment to the storage pile and the free fall distance from the end of the chute to the top of the coal pile shall be less than ten (10) feet.

SPECIAL CONDITIONS:

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

6) Particulate emissions from coal crushing and transfer operations shall be controlled by a baghouse.
7) Particulate emissions from the pulverized coal storage silos shall be controlled by a baghouse.
8) Housekeeping measures such as sweeping, water washing and vacuuming shall be used to clean equipment, structures and pavement to prevent or minimize generation of fugitive particulate emissions to the extent practicable.

D. Coal storage, handling and processing shall be conducted in compliance with 40 CFR Part 60, Subpart Y, *Standards of Performance for Coal Preparation Plants,* as incorporated in 10 CSR 10-6.070.

E. Coal storage, handling and processing operations shall be conducted in compliance with 10 CSR 10-6.170, *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin.*

2. Specifications, Operating Limits and Emission Limits for Iatan Unit 1 (pulverized coal boiler and the associated pollution control equipment).

A. The Unit 1 boiler shall utilize a low-sulfur (less than 1.4 lbs SO_2/MMBTU generated upon combustion) subbituminous coal as the primary fuel. The heat input to the boiler shall not exceed 7,800 million British Thermal Units (MMBTU) per hour. No. 2 fuel oil with a sulfur content of less than 0.05 percent shall be used for light off, startup and flame stabilization. No other fuels shall be used without receiving prior written authorization from the Air Pollution Control Program.

B. KCPL shall install and effectively operate an SCR unit for the Unit 1 boiler. At least 120 days prior to initial startup, KCPL shall submit to the Air Pollution Control Program design specifications and an operations and maintenance manual for the SCR unit to include the following:
1) Catalyst type, volume and pitch;
2) Catalyst vendor;
3) Catalyst bed elevation and layout drawings;
4) Piping and instrumentation diagrams for the catalyst beds and the ammonia injection system;
5) Process flow diagrams;
6) Anticipated inlet NO_x rate;
7) Anticipated ammonia injection rate;
8) Anticipated ammonia slip;
9) Anticipated flue gas temperatures through the SCR unit;

SPECIAL CONDITIONS:

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

10) A description of catalyst monitoring and replacement procedures;
11) A description of ammonia and NO_x monitoring equipment and procedures; and
12) A description of equipment and procedures that will be utilized to prevent or minimize masking, plugging, poisoning, accumulation of sulfates or other deterioration in catalyst performance.

C. KCPL shall install and effectively operate a flue gas desulfurization system (wet scrubber) for the Unit 1 boiler. At least 120 days prior to initial startup, KCPL shall submit to the Air Pollution Control Program design specifications, process flow diagrams, elevation and layout drawings and an operations and maintenance manual for the flue gas desulfurization system.

D. KCPL shall install and effectively operate a fabric filtration system (baghouse(s)) for the Unit 1 boiler. At least 120 days prior to initial startup, KCPL shall submit to the Air Pollution Control Program design specifications, process flow diagrams, elevation and layout drawings and an operations and maintenance manual for the fabric filtration system.

E. The following emission limits apply to the stack that is associated with the modified Unit 1 pulverized coal boiler and associated pollution control equipment. KCPL shall not exceed the following emission limits:

1) Nitrogen Oxides (NO_x) - 0.09 lbs/MMBTU, based on a 30 day rolling average.
2) Sulfur Dioxide (SO_2) - 0.07 lbs/MMBTU, based on a 30 day rolling average.
3) SO_2 – 4,212 lbs/hr, based on a 24-hour rolling average.
4) SO_2 – 6,630 lbs/hr, based on a 3-hour block average.
5) Particulate Matter Less Than Ten Microns in Aerodynamic diameter (PM_{10}) – 0.0244 lbs/MMBTU, based on a 30 day rolling average. This limit includes both filterable and condensable particulate matter.
6) Filterable PM_{10} – 0.014 lbs/MMBTU, based on a 3-hour rolling average.
7) Filterable Particulate Matter – 0.015 lbs/MMBTU, based on a 3-hour rolling average.
8) Opacity – 15 percent (6-minute average) excluding periods of start-up and shut-down, except for one 6-minute period per hour of not more than 27 percent.
9) Carbon Monoxide (CO) - 0.16 lbs/MMBTU, based on a 30 day rolling average.

SPECIAL CONDITIONS:

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

10) Volatile Organic Compounds (VOC) – 0.0036 lbs/MMBTU, test method average.
11) Vapor Phase Mercury – KCPL shall comply with the following three (3) limits:
    a) 39 X 10^{-6} lbs/gross MWh, based on a rolling annual average;
    b) The federally established emission limitation applicable to this unit; and,
    c) 210 lbs/year, total for Unit 1 and Unit 2, based on a rolling annual average.
12) Sulfuric Acid Mist (H_2SO_4) – 0.0052 lbs/MMBTU, test method average.
13) Lead (Pb) – 5.93 X 10^{-6} lbs/MMBTU, test method average.
14) Hydrogen Fluoride (HF) – 33.15 lbs/hr, test method average.

Note: These emission limits (except the opacity limit) include periods of start-up, shutdown and malfunction; see also 10 CSR 10-6.050 and the definitions in 10 CSR 10-6.020.

F. KCPL shall maintain the pulverized coal boiler and associated air pollution control equipment in accordance with good air pollution control practices to assure proper functioning of the equipment and minimize malfunctions.

3. Specifications, Operating Limits and Emission Limits for Iatan Unit 2 (supercritical pulverized coal boiler and the associated pollution control equipment)

A. The Unit 2 boiler shall utilize a low-sulfur (less than 1.4 lbs SO_2/MMBTU generated upon combustion) subbituminous coal as the primary fuel. The heat input to the boiler shall not exceed 8,100 MMBTU per hour. No. 2 fuel oil with a sulfur content of less than 0.05 percent shall be used for light off, startup and flame stabilization. No other fuels shall be used without receiving prior written authorization from the Air Pollution Control Program.

B. KCPL shall install and effectively operate an SCR unit for the Unit 2 boiler. At least 120 days prior to initial startup, KCPL shall submit to the Air Pollution Control Program design specifications and an operations and monitoring manual for the SCR unit to include the information listed in Special Condition 2.B.

SPECIAL CONDITIONS:

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

C. KCPL shall install and effectively operate a flue gas desulfurization system (wet scrubber) for the Unit 2 boiler. At least 120 days prior to initial startup, KCPL shall submit to the Air Pollution Control Program design specifications, process flow diagrams, elevation and layout drawings and an operations and maintenance manual for the flue gas desulfurization system.

D. KCPL shall install and effectively operate a fabric filtration system (baghouse(s)) for the Unit 2 boiler. At least 120 days prior to initial startup, KCPL shall submit to the Air Pollution Control Program design specifications, process flow diagrams, elevation and layout drawings and an operations and maintenance manual for the fabric filtration system.

E. The following emission limits apply to the stack that is associated with the Unit 2 pulverized coal boiler and associated pollution control equipment. KCPL shall not exceed the following emission limits:

1) NO_X - 0.07 lbs/MMBTU, based on a 30 day rolling average.
2) SO_2 - 0.06 lbs/MMBTU, based on a 30 day rolling average.
3) SO_2 – 4,374 lbs/hr, based on a 24-hour rolling average.
4) SO_2 – 6,885 lbs/hr, based on a 3-hour block average.
5) PM_{10} - 0.0236 lbs/MMBTU, based on a 30 day rolling average. This limit includes both filterable and condensable particulate matter.
6) Filterable PM_{10} – 0.014 lbs/MMBTU, based on a 3-hour rolling average.
7) Filterable Particulate Matter – 0.015 lbs/MMBTU, based on a 3-hour rolling average.
8) Opacity – 15 percent (6-minute average) excluding periods of start-up and shut-down, except for one 6-minute period per hour of not more than 27 percent.
9) CO - 0.14 lbs/MMBTU, based on a 30 day rolling average.
10) VOC – 0.0036 lbs/MMBTU, test method average.
11) Vapor Phase Mercury – KCPL shall comply with the following three (3) limits:
    a) 39×10^{-6} lbs/gross MWh, based on a rolling annual average;
    b) The federally established emission limitation applicable to this unit; and,
    c) 210 lbs/year, total for Unit 1 and Unit 2, based on a rolling annual average.

SPECIAL CONDITIONS:

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

12) Sulfuric Acid Mist (H_2SO_4) – 0.0052 lbs/MMBTU, test method average.
13) Lead (Pb) – 5.93 X 10^{-6} lbs/MMBTU, test method average.
14) HF – 34.43 lbs/hr, test method average.

Note: These emission limits (except the opacity limit) include periods of start-up, shutdown and malfunction; see also 10 CSR 10-6.050 and the definitions in 10 CSR 10-6.020.

F. KCPL shall maintain the pulverized coal boiler and associated air pollution control equipment in accordance with good air pollution control practices to assure proper functioning of the equipment and minimize malfunctions.

4. Specifications, Operating Limits and Emission Limits for Ash Handling and Disposal.

A. Fly ash shall be conveyed pneumatically to a storage silo. Emissions from the storage silo shall be controlled by a baghouse.

B. A shrouded load-out spout with a vacuum return that is routed to a baghouse or fabric filter shall be used to control emissions when loading marketed fly ash from the fly ash silo to trucks that are leaving the site.

C. Fly ash that is destined for the landfill shall be conditioned to at least 10 percent moisture content before it is disposed of in the landfill.

D. Bottom ash removed from the pulverized coal boilers shall be conditioned to at least 20 percent moisture prior to subsequent handling.

5. Specifications, Operating Limits and Emission Limits for Limestone Handling.

A. Particulate emissions from the limestone conveyor system (for reclamation of limestone from the storage pile) shall be controlled by a baghouse.

B. Particulate emissions from the limestone day storage bins shall be controlled by baghouses.

C. With regard to limestone handling, KCPL shall comply with the *New Source Performance Standard for Nonmetallic Mineral Processing Plants*, 40 CFR Part 60, Subpart OOO, as incorporated in 10 CSR 10-6.070.

6. Specifications, Operating Limits and Emission Limits for an Auxiliary Boiler.

SPECIAL CONDITIONS:

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

A. The auxiliary boiler shall be fired with No. 2 fuel oil. The sulfur content of the fuel oil shall not exceed 0.05 percent sulfur by weight.

B. Heat input to the auxiliary boiler shall not exceed 219.4 MMBTU/hr or 1,560 gal/hr.

C. The auxiliary boiler shall not be operated more than 876 hours per calendar year.

D. The following emission limits apply to the auxiliary boiler. KCPL shall not exceed the following emission limits:
   1) NO_X - 0.100 lbs/MMBTU, test method average.
   2) SO_2 - 0.052 lbs/MMBTU, test method average.
   3) PM_{10} - 0.024 lbs/MMBTU, test method average. (Note: This is a BACT limit, based on good combustion practices and clean fuel.)
   4) Particulate Matter – 0.030, lbs/MMBTU, test method average. (Note: This is a BACT limit, based on good combustion practices and clean fuel.)
   5) CO - 0.04 lbs/MMBTU, test method average. (Note: This is a BACT limit and the control technology selected to meet this BACT limit is good combustion practices.)
   6) VOC – 0.005 lbs/MMBTU, test method average. (Note: This is a BACT limit and the control technology selected to meet this BACT limit is good combustion practices.)

7. Specifications and Operating Limits for a Fuel Oil Storage Tank.

A. The fuel oil storage tank shall be a vertical fixed roof tank with a maximum capacity of 500,000 gallons.

B. The throughput shall not exceed 1,872,817 gallons per year. Fuel oil sulfur analysis must be conducted by KCPL or the fuel oil supplier for each shipment of fuel oil delivered to the storage tank.

8. BACT for Cooling Towers

A. The cooling towers shall be equipped with high efficiency drift eliminators that are designed to reduce drift to less than 0.0005 percent. Verification of drift loss shall be by manufacturer's guaranteed drift loss and shall be kept on site and made readily available to Department of Natural Resources' employees upon request.

SPECIAL CONDITIONS:

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

B. The cooling tower(s) shall be operated and maintained in accordance with the manufacturer's specifications. Manufacturer's specifications shall be kept on site and made readily available to Department of Natural Resources' employees.

C. The cooling water circulation rate shall not exceed 25,800 thousand gallons per hour (= 18,834 mmgal/mth = 226,008 mmgal/yr).

D. KCPL shall keep records of the monthly and 12-month rolling averages of the amount of water circulated.

E. The total dissolved solids (TDS) concentration in the circulated cooling water shall not exceed a TDS concentration of 15,000 parts per million (ppm). A TDS sample shall be collected and the results recorded daily to verify the TDS concentration.

9. Baghouses and Other Particulate Control Devices

A. All baghouses shall be operated and maintained in accordance with the manufacturer's specifications. Each baghouse shall be equipped with a gauge that indicates pressure drop across the control device. Pressure gauges or a visual display of the pressure data (i.e., monitor or chart) shall be located such that the Department of Natural Resources' employees may easily observe them during a site visit. Replacement filters for the baghouses shall be kept on hand at all times. The bags shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).

B. KCPL shall monitor and record the operating pressure drop across the baghouses at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer.

C. KCPL shall maintain an operating and maintenance log for the baghouses which shall include the following:
   1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
   2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

D. Bin vent filters, cyclones and other particulate control devices shall be

SPECIAL CONDITIONS:

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

operated in accordance with manufacturer's recommendations and shall receive periodic inspection and maintenance to ensure proper operation.

10. Haul Roads

A. Paved Roads

1) Maintenance and/or repair of the road surface shall be conducted as necessary to ensure that the physical integrity of the pavement is adequate to achieve control of fugitive emissions from these roads.

2) KCPL shall periodically water, wash and/or otherwise clean all of the paved portions of the haul roads as necessary to achieve control of fugitive emissions from these roads.

B. Unpaved Roads and Storage Pile Vehicle Activity Area

KCPL shall control emissions from all unpaved haul roads by **either** documented watering or the application of chemical dust suppressant.

1) Chemical Dust Suppressant

a) The suppressant (such as magnesium chloride, calcium chloride, lignosulfonates, etc.) shall be applied in accordance with the manufacturer's suggested application rate and re-applied as necessary to achieve control of fugitive emissions from these areas.

b) KCPL shall keep records of the time, date, and the amount of material applied for each application of chemical dust suppressant agent on these areas. The records shall be kept on site for not less than five (5) years, and made available to Department of Natural Resources' personnel upon request.

2) Documented Watering

a) Water shall be applied in accordance with a recommended application rate of 100 gallons per day per 1,000 square feet of unpaved/untreated surface area of haul roads/vehicle active area as necessary to achieve control of fugitive emissions from these areas.

b) KCPL shall maintain a log that documents daily water applications. This log shall include, but is not limited to, date and volumes (e.g., number of tanker applications and/or total gallons used) of water application. The log shall also record rationale for not applying water on day(s) the areas are in use (e.g., meteorological situations, precipitation events,

SPECIAL CONDITIONS:

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

freezing, etc.).

c) Meteorological precipitation of any kind, (e.g. a quarter inch or more rainfall, sleet, snow, and/or freeze thaw conditions) which is sufficient in the amount or condition to achieve control of fugitive emissions from these areas while the areas are in use, may be substituted for water application until such time as conditions warrant application of water.

d) Watering may also 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. KCPL shall record a brief description of such events in the same log that documents the watering.

e) The records shall be kept on site for not less than five (5) years, and made available to Department of Natural Resources' personnel upon request.

C. Daily Limits for Haul Roads

1) KCPL shall not exceed 2,010 tons hauled per day for the main facility entrance road.

2) KCPL shall not exceed 3,552 tons hauled per day for the landfill road.

For the purpose of this Special Condition, "main facility entrance road" is defined as the road that runs in a southwesterly direction from State Highway 45 to the power plant and in various directions in the near vicinity of the power plant. The southern most extent of the main facility entrance road will be the limestone unloading area. "Landfill road" is defined as the road that runs from the power plant to the landfill. Tons hauled per day shall include the weight of fly ash, bottom ash, gypsum and limestone hauled in association with the operation of the Unit 1 and Unit 2 boilers.

In-coming and out-going truck weights shall be recorded for both roads. Truck weights may be obtained from certified scale records from the material point of origin or KCPL's on site scale(s). KCPL shall keep scale records to demonstrate compliance with this Special Condition. These records shall be kept on site for not less than five (5) years, and made available to Department of Natural Resources' personnel upon request.

11. Restriction of Public Access – Fencing or Physical Barrier to Restrict Public

SPECIAL CONDITIONS:

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

Access to Property

KCPL shall preclude public access to property that is considered within the non-ambient air zone with respect to the air quality impact analysis conducted for this permit. Installation and maintenance of a fence or other physical barrier shall be the means to preclude public access. Figure 4 of the August 6, 2008 ambient air quality impact analysis memorandum depicts the property boundary (precluded areas). KCPL shall complete construction of the physical barrier prior to commencing operation of the modified Unit 1 boiler.

12. Compliance Testing

A. Initial performance/certification testing shall be conducted in order to verify compliance with special conditions 2.E.(1) through (14), 3.E.(1) through (14), 6.D.(1) through (6) and to certify the accuracy of the continuous emission monitoring systems (CEMS).

B. The performance/certification tests shall be performed within 60 days of achieving the maximum production rate, but no later than 180 days after initial startup.

C. The date on which performance/certification tests are conducted shall be pre-arranged with the Air Pollution Control Program a minimum of 30 days prior to the proposed test so that a pretest meeting may be arranged if necessary, and to assure that the test date is acceptable for an observer to be present. A completed Proposed Test Plan form (copy enclosed) may serve the purpose of notification and must be approved by the Air Pollution Control Program prior to conducting the required emission testing.

D. During the initial performance tests KCPL shall analyze a minimum of ten (10) representative samples of as-received coal for the following parameters:
   1) Higher Heating Value
   2) Ash
   3) Moisture
   4) Sulfur
   5) Arsenic
   6) Beryllium
   7) Cadmium
   8) Chlorine
   9) Chromium

SPECIAL CONDITIONS:

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

10) Fluorine
11) Lead
12) Manganese
13) Mercury
14) Nickel
15) Selenium

The analytical results shall be submitted with the performance test report.

E. As part of the initial performance test, KCPL shall measure emission rates for hydrogen fluoride, arsenic, beryllium, cadmium, chromium, cobalt, manganese, nickel and selenium from the pulverized coal boilers. In the event that the measured emission rates of these HAPs exceed the emission rates used in the air quality analysis, then KCPL shall be required to submit to the Air Pollution Control Program a revised ambient air quality analysis for these pollutants.

F. As part of the performance/certification test plan, KCPL shall include details regarding the CEMS to include the following:
1) Manufacturer's specifications for the analyzers,
2) A description of how the installation of sampling probes and lines was conducted to ensure compliance with applicable regulatory requirements and to ensure delivery of a properly conditioned representative sample of stack gas to the analyzer(s), and
3) A description of the testing procedures and methods that will be utilized to certify the accuracy of the CEMs.

G. Two (2) copies of a written report of the performance test results shall be submitted to the Director of the Air Pollution Control Program within 30 days of completion of any required testing. The report must include legible copies of the raw data sheets, analytical instrument laboratory data, and complete sample calculations from the required EPA method for at least one (1) sample run.

H. With regard to the pulverized coal fired boilers, stack testing for VOC, sulfuric acid mist, lead, hydrogen fluoride, condensable particulate matter and filterable PM_{10} shall be repeated at least once every 2 years and the results shall be reported to the Air Pollution Control Program. The date on which these stack tests are conducted must be pre-arranged with the Air Pollution Control Program a minimum of 30 days prior to the proposed test so that a pretest meeting may be arranged if necessary, and to assure that the test date is acceptable for an observer to be present. A

SPECIAL CONDITIONS:

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

completed Proposed Test Plan form (copy enclosed) may serve the purpose of notification and must be approved by the Air Pollution Control Program prior to conducting the required emission testing.

13. Continuous Emission Monitoring System (CEMS)/Continuous Opacity Monitoring System (COMS) – Pulverized Coal Boilers (Units 1 and 2).

A. KCPL shall install, certify, operate, calibrate, test and maintain CEMS for NO_X, SO_2, CO and any necessary auxiliary monitoring equipment in accordance with all applicable regulations. If there are conflicting regulatory requirements, the more stringent shall apply.

B. KCPL shall install, certify, operate, calibrate, test and maintain COMS for opacity in accordance with all applicable regulations. If there are conflicting regulatory requirements, the more stringent shall apply.

C. KCPL shall install, certify, operate, calibrate, test and maintain CEMS for vapor phase mercury in accordance with the Environmental Protection Agency's regulations published in the May 18, 2005 Federal Register. See 40 CFR Part 75, Appendices A, B and K.

D. KCPL shall install, certify, operate, correlate and maintain CEMS for particulate matter in accordance with the performance specification and quality assurance procedures of 40 CFR Part 60, Appendix B, Performance Specification 11 and Appendix F, Procedure 2.

E. KCPL shall install and operate a data acquisition and handling system to calculate emissions in terms of the emission limitations specified in this permit.

F. Compliance with the NO_X, SO_2 and CO emission limits for the pulverized coal boilers shall be demonstrated through the use of the required CEMS.

G. Compliance with the opacity limit for the pulverized coal boilers shall be demonstrated through the use of the required COMS.

H. Compliance with the PM_{10}, filterable PM_{10} and filterable particulate matter emission limits for the pulverized coal boilers shall be demonstrated through the use of the required CEMS, however data gathered from the CEMS shall be adjusted as follows:

$$PM_{10} = PM_{CEM} + PM_{CONDENSIBLE} - PM_{>10}$$

SPECIAL CONDITIONS:

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

$$\text{Filterable } PM_{10} = PM_{CEM} - PM_{>10}$$

Where,

PM_{CEM} = reported value from the particulate matter CEMS.
= Filterable particulate matter.
$PM_{CONDENSIBLE}$ = condensible particulate matter, from the stack test data.
$PM_{>10}$ = mass fraction of particulate matter greater than ten microns in diameter (from stack test data) multiplied by PM_{CEM}.

I. Compliance with the mercury emission limits for the pulverized coal boilers shall be demonstrated through use of the required CEMS.

14. Operational Monitoring

A. KCPL shall maintain an operational log, which shall detail each startup, shutdown, and malfunction of the pulverized coal boilers and associated pollution control systems.

B. KCPL shall maintain an operational log, which shall detail each startup, shutdown, and malfunction of the auxiliary boiler. This operations log shall include a running total of the hours per year the auxiliary boiler is on-line.

C. KCPL shall maintain an operational log for the emergency fire pump and the emergency electrical generator that includes a running total of the hours per year these units are in use; the total shall not exceed 200 hours for each unit.

D. KCPL shall maintain inspection, maintenance, and repair log(s) for the pulverized coal boilers and associated pollution control systems.

E. KCPL shall record the analysis of higher heating value, ash, sulfur and moisture content of every shipment of coal that is delivered to the installation, using a sample that is collected in a manner representative of the entire shipment.

F. KCPL shall analyze a representative sample of fuel oil from the fuel oil storage tank for sulfur content and higher heating value at least once per year. As an alternative, KCPL may use analytical results from the fuel vendor.

SPECIAL CONDITIONS:

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

G. KCPL shall continuously monitor and record the following process parameters:

1) Operating status of each major piece of equipment;
2) Gross kilowatts produced by the turbine(s) associated with the pulverized coal boilers and auxiliary boiler;
3) Mass feed rate of coal fed to the pulverized coal boilers;
4) Mass feed rate of fuel oil fed to the auxiliary boiler;
5) Pressure drop across the baghouses that are associated with the Unit 1 and Unit 2 pulverized coal boilers;
6) Ammonia injection rate for the SCR system;
7) Inlet NO_x upstream of the SCR system;
8) Flue gas temperature in the vicinity of ammonia injection;
9) Flue gas temperature at the outlet of the SCR catalyst; and
10) Pressure drop across the SCR catalyst.

15. Recordkeeping

A. KCPL shall maintain daily records for railcar unloading operations. For each train-set unloaded, KCPL shall record the total duration of the unloading event and total mass of coal unloaded. KCPL shall calculate an average unloading rate for each unloading event to demonstrate compliance with Special Condition 1.B of this permit.

B. KCPL shall maintain daily records to demonstrate compliance with the heat input rate limitations specified in Special Conditions 2.A., 3.A. and 20 of this permit.

C. KCPL shall maintain daily records to document the tonnage of combustion by-products and limestone hauled to demonstrate compliance with Special Condition 10.C. of this permit.

D. KCPL shall maintain all records required by this permit for not less than five (5) years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request.

16. Reporting

A. KCPL shall report to the Air Pollution Control Program's Enforcement

SPECIAL CONDITIONS:

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

Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten (10) days after the day in which emissions exceed the limits established by this permit.

B. KCPL shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten (10) days after the day in which operation of equipment at this installation is not in accordance with any operational limitation or condition established by this permit.

C. KCPL shall comply with the requirements of 10 CSR 10-6.050 with regard to Start-Up, Shutdown and Malfunction Conditions.

D. KCPL shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten (10) days after the date in which it is discovered that emission factors used in this permit (or permit application) underestimated actual emissions.

17. Post-Construction Ambient Air Monitoring

A. KCPL shall conduct post-construction ambient air monitoring for mercury and PM_{10} for a minimum of one (1) year after the pulverized coal boiler is fully operational. The monitoring period shall begin within six (6) months of the date that the Unit 2 pulverized coal boiler becomes fully operational. Monitoring may be discontinued upon written request and receipt of approval from the Air Pollution Control Program's Director.

B. The monitoring shall be conducted under an approved Quality Assurance Project Plan at sites approved by the Air Pollution Control Program.

C. The Quality Assurance Project Plan shall be submitted to the Air Pollution Control Program at least (12) twelve months prior to the date that the Unit 2 pulverized coal boiler becomes fully operational.

D. In the event that post-construction monitoring reveals a concentration of mercury, at or beyond the property boundary, in excess of 0.14 micrograms per cubic meter, 24-hour averaging time, then KCPL shall submit a corrective action plan to the Air Pollution Control Program within 20 days of receipt of such analytical results. The corrective action plan shall specify additional control measures that will be employed to control mercury emissions from combustion by-product handling and disposal.

SPECIAL CONDITIONS:

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

E. The post-construction PM_{10} monitoring shall be evaluated along with the pre-construction monitoring data collected at this location. The purpose of this portion of the monitoring exercise is to evaluate the 24-hour PM_{10} increment standard. If this evaluation demonstrates a contribution greater than the increment standard from the new project emissions, then KCPL shall submit a corrective action plan to the Air Pollution Control Program to address this finding. The corrective action plan shall identify alternatives to reduce particulate emissions/impacts. The corrective action plan will be due 30 days from a finding of excessive concentration.

18. This project will create excess netting emissions reductions totaling approximately 3,500 tons of NO_x and 12,200 tons of SO_2. KCPL shall not use these excess emission reduction credits for SO_2 and NO_x to avoid the applicability of BACT in any future permit applications to construct additional units at the Iatan Station or to modify Iatan Units 1 or 2 during the contemporaneous period (2001 to 2010).

19. In the event that there are conflicting requirements or specifications when comparing state and federal regulations and laws, the contents of the amended permit application and the conditions of this permit, the most stringent requirements or specifications shall apply.

20. The Unit 1 boiler heat input rate shall not exceed 6,600 MMBTU/hr. KCPL shall record and report pursuant to this condition within 90 days of issuance of this permit. After the new pollution controls (SCR, baghouse and wet scrubber) are in place and fully operational, the Unit 1 boiler heat input rate may exceed 6,600 MMBTU/hr, but shall not exceed 7,800 MMBTU/hr.

21. The purpose of this condition is to determine a more accurate heat input measurement than the method in use as of January 2006. KCPL may propose alternate methods for making this compliance demonstration. Prior to using any alternate methods KCPL must receive written approval from the Director of the Air Pollution Control Program. Heat input rate compliance demonstrations (see Special Conditions 2.A., 3.A. and 20) shall be accomplished using coal mass feed rate data, oil volumetric flow rate data and heating value analyses of the coal and oil. The higher heating value for coal used in the heat input rate compliance calculations shall be at least 95 percent of the 30-day rolling average of as-received coal higher heating values. The higher heating value for oil used in the heat input rate compliance calculations shall be the results of KCPL's most recent analysis, or 135,000 BTU/gallon, whichever is greater. The 95^{th} percentile heat input rate for any given 24-hr period shall not exceed the rates specified in Special conditions 2.A., 3.A. and 20. The 95^{th} percentile heat input rate shall be

SPECIAL CONDITIONS:

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

calculated at least once per hour and shall include data from the 24-hour period that just passed.

22. Within 90 days after initial startup of the modified Unit 1 boiler, KCPL shall submit to the Air Pollution Control Program detailed descriptive information (e.g., as-built drawings, copies of work orders, copies of contracts) to cover the following:

    A. Low-NO_x burner design.

    B. Burner and over-fire air port locations and specifications relating to the revised combustion system.

    C. Modifications to the turbine/generator set.

    D. Increased economizer surface area.

    E. Modifications to the bottom ash and economizer ash handling system(s).

    F. Modifications to the boiler feedwater pump.

23. Superseding Condition

    The conditions of this permit supersede all special conditions found in construction permits previously issued by the Air Pollution Control Program (Permit Numbers 12006-019, 12006-019A, 12006-019B and 12006-019C).

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (8) REVIEW
Project Number: 2007-06-080
Installation ID Number: 165-0007
Permit Number: 012006-019D

Kansas City Power & Light Company
Iatan Generating Station
20250 Highway 45 North
Weston, MO 64098

Complete: January 17, 2008
Reviewed: February-August 2008

Parent Company:
Great Plains Energy, Inc.
1201 Walnut Street
Kansas City, MO 64141

Platte County, S31, T45N, R36W

REVIEW SUMMARY

- Kansas City Power & Light Company (KCPL), a subsidiary of Great Plains Energy, Inc., has applied for and received authority to construct a new pulverized coal-fired boiler at the existing Iatan Generating Station. KCPL has also been permitted to modify the existing Unit 1 generating unit to increase the heat input and upgrade the pollution control system. Construction permit 012006-019 was issued in January 2006 and amended three times in 2007; now KCPL has applied for a fourth amendment to the permit. The overall project and each of the amendments are discussed in more detail in the installation description and project description sections of this review summary.

- The overall project is considered as a major modification to KCPL's Iatan power plant. Net emissions increases from the overall project are above Prevention of Significant Deterioration (PSD) significant emission rates for CO, particulate matter, PM_{10}, VOC and sulfuric acid mist. Net emissions increases associated with this fourth amendment request are below PSD significant emission rates for NO_x, CO, SO_2 particulate matter, PM_{10}, VOC and sulfuric acid mist.

- With regard to the overall project, the Best Available Control Technology (BACT) requirements apply to the pollutants CO, particulate matter, PM_{10}, VOC and sulfuric acid mist. The BACT analyses for CO, particulate matter and PM_{10} are presented in the January 2006 construction permit review summary. The BACT analysis for sulfuric acid mist is presented in this review summary.

- KCPL's original permit application (July 2005) predicted a net emissions decrease for sulfuric acid mist and at that time KCPL concluded that a BACT analysis would not be required. However, further analysis, which was prompted

by public commentary on the original draft permit, has revealed that there will be a net emissions increase for sulfuric acid mist. The main point of uncertainty in the net emissions increase calculations conducted for the January 2006 permit was the existing Unit 1 sulfuric acid mist emissions. Per Special Condition Number 22 of the January 2006 permit, KCPL conducted stack testing to determine the emission rate of sulfuric acid mist from the existing Unit 1 boiler. After evaluating the stack test results and considering the anticipated emissions from the modified Unit 1, KCPL has determined that there will be a net emissions increase above the PSD significant emission rate for sulfuric acid mist. Accordingly KCPL has submitted a BACT analysis for sulfuric acid mist with this fourth amendment request.

- With regard this fourth amendment request, the BACT evaluation resulted in a lowering of the sulfuric acid mist emission limit from 0.0055 pounds per MMBTU to 0.0052 pounds per MMBTU; this represents a 20.9 ton per year potential emissions reduction.

- Due to the addition of selective catalytic reduction for NO_x control and a wet scrubber for SO_2 control on the Iatan Unit 1 boiler, there will be a net emissions decrease for NO_x and SO_2 for the overall project.

- This installation is located in Platte County, an attainment area for all criteria air pollutants.

- This installation is on the List of Named Installations [10 CSR 10-6.020(3)(B), Table 2] Number 27 - *Fossil-fuel fired steam electric plants of more than 250 million British thermal units per hour heat input*.

- Air quality modeling for this project was performed to determine the ambient impact of air pollutants. Based upon the air dispersion modeling reviewed by the Air Pollution Control Program staff, the study submitted by KCPL is complete and demonstrates that KCPL will not contribute to any violation of the National Ambient Air Quality Standards (NAAQS) or available increment.

INSTALLATION DESCRIPTION

KCPL has applied for and received authority to install a pulverized coal boiler, an auxilliary boiler, associated storage, handling and pollution control equipment, a fuel oil storage tank and a landfill, all adjacent to the existing Iatan Generating Station (Installation ID Number 165-0007). The existing installation consists of a pulverized coal boiler with an electrostatic precipitator, coal and ash handling facilities and an ash pond. The existing boiler is a dry bottom, wall-fired unit utilizing subbituminous coal as the primary fuel. Fuel oil (Number 1, Number 2 and used oil) is used for start-up, and as back-up fuel. The installation received a permit from EPA in 1977 and began operation in 1980. The following construction permits/amendments have been issued to KCPL from the Air Pollution Control Program.

Table 1 - Previously Issued Construction Permits/Amendments

Permit Number	Description
1293-004	A Section (5) permit involving a decrease to the amount of power delivered to the Unit 1 electrostatic precipitator.
012006-019	A Section (8) permit for installation of a pulverized coal boiler and associated pollution control equipment (Iatan Unit 2), a fuel-oil fired auxiliary boiler, emergency fire pumps, a fuel oil storage tank and a combustion by-product landfill. Modification of an existing electrical utility steam generating unit (Iatan Unit 1) to upgrade the pollution control system and increase the heat input rate.
012006-019A	An amendment to permit number 012006-019 specifying that the Unit 2 boiler will be a supercritical boiler. The amendment was made in accordance with the stipulation agreement between KCPL and the Sierra Club.
012006-019B	An amendment to permit number 012006-019A incorporating the following Unit 1 modifications: replacement of existing low-NO_x burners, addition of over-fire air ports, turbine overhaul/partial replacement work, increase of economizer surface area and replacement/modification of the ash handling system. This amendment also modified the emission limitations for NO_x, SO_2 and sulfuric acid mist in accordance with the stipulation agreement between KCPL and the Sierra Club.
102006-019C	An amendment to permit number 012006-019B that added a third sentence to Special Conditions 2.E.12 and 3.E.12, for the intended purpose of clarifying the sulfuric acid mist emission limitations for the Unit 1 and Unit 2 boilers.

A Part 70 Operating Permit (Permit Number OP1999160) was issued by the Air Pollution Control Program in October 1999. KCPL submitted a Part 70 Permit renewal application in October 2004. The Part 70 Permit renewal application is currently under technical review. The installation's Phase II Acid Rain Permit was renewed in 2006 and expires at the end of 2009.

PROJECT DESCRIPTION

KCPL is in the process of constructing the Iatan Unit 2 Generating Station. The Unit 2 boiler is a supercritical pulverized coal boiler with a maximum heat input of 8,100 MMBTU/hr. The Unit 2 boiler is a tangentially-fired dry bottom boiler that will combust low sulfur subbituminous coal as the primary fuel and Number 2 fuel oil for start-up. The steam produced as a result of fuel combustion will be routed to a turbine. The turbine/generator set is expected to have a nominal gross electric output of approximately 930 megawatts. Pollution control devices for the Unit 2 boiler include selective catalytic reduction (SCR) with ammonia injection for NO_x control, a baghouse for control of particulate matter and a wet scrubber for control of SO_2.

KCPL is also in the process of construction for a major modification to the existing Unit 1 generating station. KCPL is upgrading the pollution control system for the Iatan Unit 1 boiler and they are also making modifications to the system to facilitate an increased heat input rate to the boiler. The maximum hourly design rate will increase to 7,800 MMBTU/hr. The pollution control upgrade to the Iatan Unit 1 boiler entails removal of the electrostatic precipitator and replacement with a baghouse, installation of an SCR with ammonia injection for NO_x control and installation of a wet scrubber for control of

SO_2.

Other emission sources for this project include the following:

- Coal Storage and Handling

  Coal will be delivered to the site by rail, to the existing rail car unloading area. In order to meet the requirements of this permit, KCPL will be required to install a baghouse to control particulate emissions from the rail car unloading process. In the permit application, KCPL indicates that the coal will be a low sulfur subbituminous coal from Wyoming. A rotary rail car dumper will dump the coal into a below grade hopper. A system of conveyers, a rotary stacker/reclaimer and transfer towers will be used to deliver coal to storage, crushing and boiler operations. A combination of crushers and pulverizers will be used to pulverize the coal to a consistency similar to talcum powder.

- Ash Handling and Disposal

  Fly ash from the coal-fired boilers will be conveyed pneumatically to a storage silo and will subsequently be transferred to a haul truck. Fly ash that is destined for the landfill will be conditioned by mixing with water in a pug mill. Marketable fly ash will be transferred to a haul truck via a telescoping chute.

  Bottom ash from the coal-fired boilers will be placed in a storage pile and then loaded into a haul truck for delivery to off-site users (such as cement kilns), or delivered to the on-site landfill.

- Auxiliary Boiler and Fuel Oil Tank

  The auxiliary boiler will use Number 2 fuel oil and will have a maximum heat input rate of 219.4 MMBTU/hr. Operation of this boiler is limited to 876 hours per year. A 500,000 - gallon capacity above ground tank will be installed for fuel oil storage.

- Limestone Handling

  Limestone will be used for SO_2 scrubbing. Limestone will be delivered by truck or rail and will be placed in a storage pile and then conveyed to storage bins for use in the wet scrubbers.

- Haul Roads

  Truck traffic will include limestone deliveries, combustion by-product hauling to the landfill and off-site and gypsum hauling.

- Cooling Towers

  The cooling towers will be a source of particulate emissions.

- Emergency Fire Pump

  An emergency fire pump will be installed as part of this project. The emergency fire pump will utilize fuel oil and will be limited to 200 hours per year of operation. The emergency fire pump will be rated at 550 horsepower.

- Emergency Electrical Generator

  A 2,200 horsepower emergency electrical generator will be installed as part of this project. The emergency electrical will be limited to 200 hours per year of operation.

Details of Fourth Amendment Request

As engineering on this project has progressed KCPL has kept APCP informed and has sought permit amendments to reflect any changes, or availability of more detailed specification, in the design and operation of the installation. Several Unit 1 Generating Station changes were described in the amendment request and review summary for Permit Number 012006-019B. Now, in this fourth amendment request KCPL wishes to make the following modifications and has requested permit amendments to reflect these modifications:

- Relocation of the Unit 1 and Unit 2 boiler stacks

  In the original application, it was envisioned that the Unit 1 boiler would continue to use the existing Unit 1 stack, and that Unit 2 would have its own new stack. The design has been modified so that the stacks for the two boilers will share a common shell and the existing Unit 1 stack will be abandoned. While this change affects the exhaust parameters for both boilers, it does not affect the emission rates for either boiler.

- Relocation of the facility fence line

  The facility's fence line, used to identify ambient air in the dispersion modeling analyses, has been modified to represent the area that will be fenced prior to startup of the modified Iatan Unit 1. An area near where the plant access road meets the highway has also been excluded, to allow for guest use of a ball field in that location in addition to parking and potential viewing area of the wetland mitigation area currently under construction.

- Relocation of the diesel-fired emergency fire pump engines and increased capacity

  The original permit application contained two emergency fire pump engines identified as EP-32 and EP-33. EP-32 was rated at 460 horsepower (hp) and EP-33 was rated at 265 hp. Modifications proposed in this application for amendment increase the size of EP-32 to 550 hp and it would then be the only

engine in fire pump service. EP-33 is being increased to 2,200 hp and it is being re-designated as an emergency electrical generator.

- Addition of cells to the cooling tower and a decrease in water recirculation rate

  The cooling tower design has been revised to 24 cells and the water circulation rate has been reduced from 501,600 to 430,000 gallons per minute. The reduction in water circulation rate yields a reduction in PM_{10} emissions.

- Changes to new building dimensions and locations

  Multiple changes have been made to building locations and dimensions. As downwash structures, the new building parameters are taken into account in the downwash analyses for point sources.

- Increases in coal storage pile areas

  The areas of both long-term coal storage piles are being increased because of coal delivery concerns. The EP-02 coal storage pile is increasing from 20.66 to 24 acres and the EP-13 coal storage pile is increasing from 3.34 to 11 acres. While this impacts the particulate emissions due to wind erosion, it does not affect the activity related emissions which are calculated on a pound per hour basis, regardless of pile size.

- Changes to the landfill dimensions and emission rates

  The total area of the landfill is being decreased from 140 acres to 120 acres. The PM_{10} emission factor for fly ash unloading is increasing due to a change in the minimum moisture content of the fly ash. The original construction permit specified that fly ash destined for the landfill must be conditioned to at least 20 percent moisture prior to subsequent handling. KCPL is proposing to reduce this minimum moisture content to 10 percent. This change is requested in response to equipment manufacturer recommendations as to the proper moisture content to ensure proper mixing while addressing fugitive dust concerns upon disposal. Equipment manufactures have indicated that moisture contents over 10 percent could cause the fly ash to set-up in the mixer or during transport to disposal. When thoroughly mixed at 10 percent moisture content fugitive dust is controlled upon disposal. This change impacts three emission sources; the transfer of fly ash from the storage bins to haul trucks, EP-7A and EP-24, as well as transfer of fly ash to the landfill, EP-35A.

- Material handling equipment changes

  The maximum hourly design rate (MHDR) for limestone transfer has decreased from 1,000 to 800 tons per hour. This modification affects the limestone reclaim fugitive emissions, EP-20, and stack emissions, EP-21. The MHDR for transferring limestone to each of the two storage bins, EP-22A and 22B, decreased from 800 to 400 tons per hour.

- Changes to the capacity of coal handling sources

  Transfer Tower #1A, EP-10, has been removed from the design for the coal handling and conveyance system.

  KCPL's original application proposed to modify the existing coal crusher and increase its capacity from 1,500 to 3,000 tons per hour. Rather than modify the existing crusher tower, the design has been revised to include a second crusher tower with a 1,500 ton per hour capacity. There is therefore no increase in emissions associated with the addition of EP-4B. Both crusher towers are currently limited by the capacities of the conveyors exiting the crusher towers.

  The MHDR for the active coal storage pile reclaim conveyor, EP-14, is being increased from 1,750 to 3,500 tons per hour.

- Reconfiguration of haul roads and changes to permitted haul road emissions

  The original permit application contained two separate haul roads exiting the facility, one to the east and one to the north. The haul road exiting the facility to the east has been removed. All saleable waste products, as well as limestone will pass through a single facility entrance.

  Per KCPL's request the haul road limits contained in Special Condition 10.C. will changed as shown in Table 2.

Table 2 – Original Permit and Amended Permit Haul Road Limits

Original Permit		Amended Permit
Description	Limit (tons/day)	Limit (tons/day)
Unit 1 Fly Ash Sold	343.3	
Unit 1 Bottom Ash Sold	205.5	
Unit 1 Gypsum Sold	0.0	
Unit 1 Fly Ash to Landfill	410.9	
Unit 1 Bottom Ash to Landfill	0.0	
Unit 1 Gypsum to Landfill	592.8	
Unit 1 Limestone	301.5	
Unit 2 Fly Ash Sold	356.5	
Unit 2 Bottom Ash Sold	213.4	
Unit 2 Gypsum Sold	0.0	
Unit 2 Fly Ash to Landfill	426.7	
Unit 2 Bottom Ash to Landfill	0.0	
Unit 2 Gypsum to Landfill	615.6	
Unit 2 Limestone	330.0	
Total Through Facility Entrance	1,750.2	2,010

Total to Landfill	2,046.0	3,552

- Modification of the Unit 1 boiler feedwater pump

  KCPL will modify the Unit 1 boiler feedwater pump, to include replacement or modification of blades, diaphragm(s) and the lubrication system. This will result in an increased flow rate capability.

In this fourth amendment request KCPL has also provided a BACT analysis for sulfuric acid mist and revised ambient air quality impact analyses.

EMISSIONS/CONTROLS EVALUATION

- Pulverized Coal-Fired Boilers

  The emission factors and emission rates from the Unit 1 and Unit 2 boilers are not affected by this fourth amendment request. However, the change to the exhaust parameters does affect dispersion modeling results.

- Coal Storage and Handling

  PM_{10} emissions will increase, as compared to the original permit, due to the increased area of the storage piles. PM_{10} emissions from wind erosion are expected to increase by approximately 2.8 tons per year.

- Ash Handling and Disposal

  The fly ash handling and disposal PM_{10} emission factor is being increased due to a lowering of the moisture content. The emission factor formula is from AP-42 Section 13.2.4, *Aggregate Handling and Storage Piles* (1/95). PM_{10} emissions from fly ash handling and disposal are expected to increase approximately 60 pounds per year.

- Haul Roads

  Potential emissions of PM_{10} from the haul roads are anticipated to decrease approximately 3 tons per year. This reduction is attributable to the decrease in annual tonnage for combustion by-products, as described in Section 2 of KCPL's application for amendment.

- Cooling Towers

  The lowering of the recirculation rate will result in an emissions reduction of approximately 11.8 tons per year of PM_{10}.

- Diesel-fired Emergency Fire Pump Engine and Emergency Electrical Generator

Increased capacity results in a potential emissions increase for NO_x and CO and SO_2 of 6.3, 1.4 and 0.4 tons per year, respectively. The engines will still be limited to 200 hours per year.

Table 3: Emissions Summary for Amendment (tons per year)

Pollutant	Regulatory *De Minimis* Levels	Existing Potential Emissions	Existing Actual Emissions (2007 EIQ)	*Potential Emissions Increase
PM_{10}	15.0	Major	531	-11.5
SO_2	40.0	Major	14290	0.4
NO_x	40.0	Major	6675.5	6.3
VOC	40.0	Major	74.8	0.5
CO	100.0	Major	622.8	1.4
HAPs	10.0/25.0	Major	73.3	< 0.01
H_2SO_4 mist	7.0	Major	N/D	-20.1[1]

* Potential emissions increase for sulfuric acid mist is calculated as follows: Permit 12006-019C limit (0.0055 lbs/MMBTU) – Permit 12006-019D limit (0.0052 lbs/MMBTU) X Maximum Hourly Design Rate (15,900 MMBTU/hr, both boilers) X 8,760 hrs/yr **/** 2000 pounds/ton = -20.9 tons per year.

Net emissions increases (future potential emissions – past actual emissions) associated with this fourth amendment request are below PSD significance levels for all pollutants. Based on the BACT emission limits of this amended permit and the Unit 1 stack test results (May 2006), the net emissions increase for sulfuric acid mist for the overall project is approximately 158 tons per year. This exceeds the PSD significance level of 7 tons per year for the overall project.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (8) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. This fourth amendment request is subject to Section (8) of the rule due to the sulfuric acid mist BACT determination.

APPLICABLE REQUIREMENTS

KCPL shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations must be consulted for specific record keeping, monitoring, and reporting requirements. 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
  The emission fee is the amount established by the Missouri Air Conservation Commission annually under § 643.079(1), RSMo.

- *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 10-2.070
- *Open Burning Restrictions*, 10 CSR 10-2.100
- *Start-Up, Shutdown and Malfunction Conditions*, 10 CSR 10-6.050

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Sulfur Compounds,* 10 CSR 10-6.260
- *Acid Rain Source Permits Required*, 10 CSR 10-6.270
- *Restriction of Emission of Particulate Matter From Industrial Processes*, 10 CSR 10-6.400
- *Emission Limitations and Emissions Trading of Oxides of Nitrogen,* 10 CSR 10-6.350
- *Emissions Banking and Trading*, 10 CSR 10-6.410
- *New Source Performance Regulations*, 10 CSR 10-6.070
  - *Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978*, 40 CFR Part 60, Subpart Da
  - *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units,* 40 CFR Part 60, Subpart Db
  - *Standards of Performance for Coal Preparation Plants,* 40 CFR Part 60 Subpart Y
  - *Standards of Performance for Nonmetallic Mineral Processing Plants,* 40 CFR Part 60, Subpart OOO

BACT ANALYSIS

Any new source or major modification subject to Section (8) of 10 CSR 10-6.060, *Construction Permits Required*, must conduct a Best Available Control Technology (BACT) analysis on any pollutant that has a net emissions increase above PSD significance levels. For this overall project, the net emissions increase for particulate matter, PM_{10}, CO, VOC and sulfuric acid mist are greater than PSD significant emission levels. Therefore a BACT analysis is required for each of these pollutants. A BACT analysis is not required for NO_x or SO_2 since there is a net emissions reduction for these pollutants after adding controls to the Unit 1 boiler. The BACT analyses for CO, particulate matter and PM_{10} are presented in the January 2006 construction permit review summary. The BACT analysis for sulfuric acid mist is presented in this review summary. See also the fourth bullet item of this review summary for an explanation of

why the BACT analysis for sulfuric acid mist was conducted after the BACT analyses for particulate matter, PM_{10}, CO and VOC.

BACT is defined at 10 CSR 10-6.020(2)(B), item 5, as follows:

> *An emission limitation (including a visible emission limit) based on the maximum degree of reduction for each pollutant which would be emitted from any proposed installation or major modification which the director on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for the installation or major modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of the pollutant. In no event shall application of BACT result in emissions of any pollutant which would exceed the emissions allowed by any applicable emissions control regulation, including New Source Performance Standards established in 10 CSR 10-6.070 and 40 CFR Part 60 and National Emission Standards for Hazardous Air Pollutants established in 10 CSR 10-6.080 and 40 CFR Part 61. If the director determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emission limitation infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. This standard, to the degree possible, shall set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation and shall provide for compliance by means which achieve equivalent results.*

KCPL prepared a BACT analysis as part of the application for amendment – see Section 4. The Air Pollution Control Program's BACT analysis considers the information submitted by KCPL, along with additional information from various sources. Excerpts from KCPL's application for amendment are utilized (and modified) in this discussion of BACT; additional information is added as appropriate.

Sulfuric acid mist emissions are a result of SO_2 in the flue gas stream oxidizing to SO_3 and then forming H_2SO_4 when in contact with water vapor. As the vapors cool a fine aerosol of sulfuric acid mist is formed. Sulfuric acid mist generation and control is influenced by a variety of physical and chemical properties and phenomena, to include:

- Sulfur content of the fuel
- Moisture in the flue gas (from fuel and pollution control devices)
- Oxygen availability from combustion air and SCR catalyst
- Flue gas temperature throughout the boiler, heat transfer equipment and pollution control systems
- Alkalinity of the fly ash
- Extent of ammonia slip from the SCR
- Fluid mechanics throughout the boiler and pollution control systems
- Liquid cohesive forces, particle size and particle velocity
- Scrubbing liquid atomization characteristics

This BACT review summary is not intended to be a thorough discussion of combustion chemistry, fluid dynamics and plant engineering as it relates to sulfuric acid mist generation and control, but obviously the physical and chemical processes are very complex and not entirely predictable; particularly when given the differences in design and operation of power plants from which there is actual test data.

KCPL identified three control technologies that have the potential to reduce sulfuric acid mist emissions from Iatan Units 1 and 2. These are:

- Alkali injection
- Selective catalytic reduction (SCR), a fabric filter, and a wet FGD system (this is the currently planned control system line-up for the Iatan units)
- SCR, a fabric filter, and a wet FGD system followed by a wet ESP

In addition this review summary includes a brief discussion of an alternative pollution control train - SCR, dry FGD, followed by a fabric filter.

ALKALI INJECTION

In recent years, there has been considerable research into alkali injection to control opacity problems resulting from sulfuric acid mist emissions. These opacity problems have occurred on high-sulfur coal-fired units with the retrofit installation of SCR systems to reduce NO_x emissions. The catalyst in an SCR contributes to the conversion of sulfur dioxide to sulfur trioxide which combines with water and condenses to form sulfuric acid mist. Alkali injection has been demonstrated to be an effective method to reduce sulfuric acid mist emissions on units that fire high sulfur fuels and have retrofit SCR systems.

Several different alkalis have been used to reduce sulfuric acid mist emissions. These include ammonia, sodium bisulfite (SBS), trona, and hydrated lime.

According to KCPL's application for amendment, the use of alkali injection to control sulfuric acid mist emissions has not been applied to coal-fired units that utilize Powder River basin (PRB) coal. One reason is that PRB coal has relatively low sulfur concentrations and another reason, more important to the Iatan BACT evaluation, is that the fly ash produced by firing PRB coal has a high level of alkalinity. The alkaline PRB fly ash provides significant sulfuric acid mist control.

During the course of this permit review APCP became aware of a pending application in Iowa wherein the applicant is proposing alkali injection, combined with wet FGD, as BACT for sulfuric acid mist control. This application (Interstate Power and Light, Sutherland Unit 4, Submitted January 2007) is for a large pulverized coal boiler that will combust primarily PRB coal. The plans for Sutherland Unit 4 include combustion of several fuels, other than, or blended with, PRB: these include bituminous coals (higher sulfur content than PRB) and potentially biomass. With this application in mind and

considering the Babcock Borsig Power field test data presented in Table 6 of *"Emissions of Sulfur Trioxide from Coal-Fired Power Plants", Journal of the Air and Waste Management Association, Volume 54, page 757* it appears that alkali injection may result in additional sulfuric acid control, even for PRB-fired units. How much additional sulfuric acid control and whether this would create additional maintenance problems in the boiler equipment, or adversely affect operation of the SCR unit, is not known.

Alkali injection is being rejected as a viable BACT sulfuric acid mist control technology for the Iatan units. The Iatan units will utilize PRB coal which naturally produces a highly alkaline fly ash upon combustion. It is questionable whether injection of additional alkali will provide effective additional control of sulfuric acid mist emissions and the APCP is not aware of any case studies that demonstrate the effectiveness of alkali injection for PRB-fired units.

SCR / FABRIC FILTER / WET FGD

An emission control system consisting of an SCR to control NO_x, a fabric filter to control particulates, and wet flue gas desulfurization (FGD) to control sulfur dioxide emissions is planned for Iatan Units 1 and 2. Installation of this control system lineup will have an impact (both negative and positive) on sulfuric acid mist emissions. Overall, the installation of the SCR, fabric filter, and wet FGD control system line up will result in the reduction of sulfuric acid mist emissions from the units compared to the baseline.

A component of the emission control system that will contribute to the production of sulfuric acid mist is the SCR. In the SCR, sulfur dioxide converts to sulfur trioxide by utilizing oxygen from the SCR catalyst. This is in addition to the SO_2 to SO_3 conversion that occurs during the combustion process. KCPL indicates that, typically, one percent or less of the SO_2 will convert to SO_3 in the boiler and they use a one percent figure in their baseline calculations. In the SCR, additional SO_2 converts to SO_3 as the flue gas passes through each catalyst layer. According to KCPL the anticipated maximum level of conversion in the Iatan Units 1 & 2 SCRs is one-half percent per layer. The Iatan SCRs will have four levels for catalyst (two will be filled initially). Consequently, KCPL predicts that up to two percent of the SO_2 may be converted to SO_3 as the flue gas passes through the Iatan SCRs. Other literature reviewed as part of this BACT analysis predicts anywhere from 0.5 to 3 percent conversion of SO_2 to SO_3 in an SCR unit. There is also a range of values reported for SO_2 to SO_3 conversion in the boiler and relatively lower sulfur content in the fuel translates to lower SO_2 to SO_3 conversion. KCPL uses a 3 percent overall SO_2 to SO_3 conversion in their baseline calculations; APCP is utilizing a more conservative 2.5 percent overall SO_2 to SO_3 conversion rate.

The installation of a fabric filter followed by wet FGD will provide control of sulfuric acid mist emissions on a PRB coal-fired unit. The primary devices that will provide sulfuric acid mist control for Iatan Units 1 & 2 are the fabric filters. A fabric filter provides control of sulfuric acid mist on a PRB coal-fired unit because the flue gas containing sulfuric acid must pass through the dust cake on the filter bags. This results in good contact between the sulfuric acid and the ash. The PRB ash has high alkalinity and

consequently sulfuric acid removal occurs as the flue gas passes through the fabric filter.

Some additional control of sulfuric acid will occur as the flue gas is treated by the wet FGD system. The sulfuric acid in the absorber will be in the form of a very fine particulate which will be partially controlled by a wet absorber. A significant portion of the sulfuric acid mist will physically bypass the scrubbing liquid droplets as the sulfuric acid mist travels upward and the scrubbing liquid travels downward through the wet scrubber. Test data from units that fire higher sulfur coal show that wet FGD systems may be able to reduce sulfuric acid emissions 30 to 50 percent. It is not known if similar control levels can be achieved by an absorber on a PRB coal-fired unit where the sulfuric acid levels entering the absorber are much less. KCPL and APCP are not aware of any actual test data for this control arrangement for a PRB coal-fired unit.

KCPL indicates in the application for amendment that a control level of approximately 90 percent should be expected on a PRB coal-fired unit equipped with fabric filter and wet FGD system. This appears to be a fairly reasonable estimate based upon review of other sources, such as the Southern Company paper – "Estimating Sulfuric Acid Aerosol Emissions from Coal-Fired Power Plants", Revision 3, 2005.

SCR / FABRIC FILTER / WET FGD / WET ESP

A wet electrostatic precipitator installed in addition to the planned control system line up of SCR, fabric filter, and wet FGD could potentially provide further reductions of sulfuric acid mist from Iatan Units 1 & 2.

A wet ESP system functions very similarly to a dry ESP. The difference is that the wet ESP is located downstream of the absorber where the flue gas is saturated with water. A wet ESP has discharge and collecting electrodes. A high voltage differential is established between the electrodes which causes migration of particles to the collecting electrodes. Material collected on the collecting electrodes is removed using water wash. Wet ESPs are effective in collecting fine water droplets, aerosols, and sulfuric acid mist.

There are a very limited number of operating wet ESPs on utility boilers. There are a few installations where wet ESP's have been installed downstream of ammonia scrubbers to control aerosol emissions (Dakota Gasification, Burger). Wet ESPs have also been installed on units that fire fuels such as Orimulsion™ or petroleum coke that produce high levels of sulfuric acid mist (Dalhousie, Colson Cove, AES Deepwater).

Wet ESPs are also planned on several new units that fire high-sulfur coals. All of these planned new units that will have wet ESPs include SCRs and will produce high levels of sulfuric acid mist that must be controlled. The uncontrolled sulfuric acid mist levels at the SCR outlet on these high-sulfur coal-fired units will be at least an order of magnitude higher than would be expected at the SCR outlet on a PRB coal-fired unit.

There are no PRB or low-sulfur western coal-fired units planned or in operation that

include wet ESPs. Wet ESPs have not been required on low-sulfur coal-fired units because of the relatively low sulfuric acid mist emissions resulting from those units. Due to the lack of any wet ESP installations on low-sulfur coal-fired units, it is difficult to predict the level of sulfuric acid mist emissions that would be achievable with the installation of a wet ESP on the Iatan units.

Equipment vendors have provided sulfuric acid mist emission guarantees for pulverized high-sulfur coal-fired units with control system lineups that have included SCR, wet FGD, and wet ESPs. These guarantees have been as low as 0.005 lbs/MMBtu (approximately 1.5 ppm).

The sulfuric acid mist concentrations at the SCR outlet on a PRB coal-fired unit will be much lower than the concentrations on the high-sulfur coal-fired units. Consequently, it is reasonable to expect that a sulfuric acid mist emission rate less than 0.005 lbs/MMBtu could be achieved if wet ESPs were installed at Iatan. KCPL's evaluation assumed that sulfuric acid mist emissions of 0.0036 lbs/MMBtu would be achievable for Iatan Units 1 & 2, with addition of a wet ESP to the pollution control system. APCP expects that wet ESP performance would be better, approaching 0.0025 lbs/MMBTU.

SCR / DRY FGD/FABRIC FILTER

An alternative pollution control train that is being used for some of the newer PRB boiler installations is an SCR followed by a spray dry absorber (or dry flue gas desulfurization) and then fabric filtration (baghouse). Dry FGD uses the same primary chemical reactions as a wet FGD system in which the flue gas contacts alkaline slurry (typically lime slurry for dry FGD and limestone slurry for wet FGD) to remove SO_2 emissions. However, the quantity of water introduced to the flue gas in a dry FGD is limited so that the flue gas does not reach saturation temperatures. The dry FGD product and fly ash is then collected in the fabric filter (baghouse) located downstream of the FGD system along with the fly ash. This pollution control train may provide better sulfuric acid mist control as compared to the SCR/fabric filter/wet FGD train due to placement of the fabric filter downstream of cooling affect and alkali addition of flue gas desulfurization system. However the wet FGD is more efficient with regard to SO_2 control. Any increased control efficiency for sulfuric acid mist is more than offset by decreased SO_2 control efficiency.

ENERGY, ENVIRONMENTAL, AND ECONOMIC IMPACTS

The three sulfuric acid mist control alternatives that were determined to be technically feasible for Iatan Units 1 and 2 are:

- Install SCR, fabric filters, and wet FGD systems
- Install SCR, fabric filters, wet FGD, and wet ESP systems
- Install SCR, dry FGD, followed by fabric filters

In conducting a BACT analysis it is necessary to evaluate technically feasible control alternatives for energy, environmental, and economic impacts.

All three of the sulfuric acid mist control schemes under consideration include the installation of SCRs, fabric filters, and FGD systems. Although this equipment provides control of sulfuric acid mist it is primarily being installed to control NO_x, particulate and SO_2 emissions. The difference between the first two control schemes is the installation of a wet ESP. Consequently, the following evaluation concentrates on the impacts of installing wet ESP equipment.

ENERGY

In a wet ESP, an electrical field is created between the discharge and collecting electrodes to control sulfuric acid mist emissions. Energy is required to create this electrical field. In addition, there will be pressure loss that occurs as the flue gas passes through the wet ESP and associated ductwork. The ID fans will consume additional energy to overcome this pressure loss.

Multiple field wet electrostatic precipitators will be required to reduce sulfuric acid mist emissions to 0.0036 lbs/MMBtu for Iatan Units 1 and 2. The wet ESPs will require substantial electrical power to operate transformer/rectifiers to create the electrical fields. In addition, smaller quantities of power will be needed to operate wash pumps and other miscellaneous equipment associated with the SCR. The estimated direct power consumption to operate a wet electrostatic precipitator on Iatan Unit 1 is 2.2 MW. The estimated direct electrical power to operate a Unit 2 wet ESP is 2.3 MW.

In addition to the direct power needed to operate the wet ESPs, ID fan power will be consumed to overcome the pressure loss across the wet ESP and associated ductwork. The pressure loss may range between 1 and 5 inches water column (w.c.) depending on the configuration of the wet ESP and ductwork. For this evaluation KCPL assumed a 2 inch w.c. pressure loss for the Iatan units. The estimated power consumption associated with the wet ESP pressure loss is 840,000 kW for Unit 1 and 870,000 kW for Unit 2.

The total estimated power consumption for the Unit 1 wet ESP system is 3.04 MW. The Unit 2 estimated power consumption is 3.17 MW. The installation of wet ESPs on Iatan Units 1 & 2 adds approximately 0.41 percent to the plant's auxiliary electrical load.

ENVIRONMENTAL

Installing wet ESPs at the Iatan station would result in the reduction of approximately 195 tons per year of sulfuric acid mist emissions. However, operation of wet ESPs increases plant auxiliary electrical power reducing the net generation capability of the Iatan facility. The lost generation due to operation of the wet ESPs would need to be made up by other generating facilities. The NO_x, SO_2 and CO emitted from these other generating facilities could partially offset the sulfuric acid mist emission reduction at Iatan, dependent on the type of generating facility.

With regard to the SCR, dry FGD, fabric filter pollution control train, this may provide better sulfuric acid mist control as compared to the SCR, fabric filter, wet FGD pollution control train due to placement of the fabric filter downstream of the flue gas

desulfurization system and other factors; however the wet FGD is more efficient with regard to SO_2 control. Any increased control efficiency for sulfuric acid mist would be offset by decreased SO_2 control efficiency.

ECONOMIC

KCPL conducted an economic evaluation with regard to installation and operation of wet ESP for sulfuric acid mist control. The results of this evaluation are summarized in Tables 4-4 and 4-5 of the application for amendment. KCPL concluded that installation and operation of a wet ESP adds over $33 million to the total annualized cost for Iatan Units 1 and 2, this translates to an incremental control cost (cost of adding Wet ESP) of approximately $170,000 per ton of sulfuric acid mist removed.

Conclusion Regarding Selection of BACT Control Technology/Methods of Operation

Alkali injection upstream of the baghouse is not proven and demonstrated for this type of unit, and the benefit is questionable. Installation and operation of a wet ESP has energy costs that could also translate, indirectly, to environmental costs due to lost electricity generation. Addition of wet ESP to the proposed pollution control train would cost approximately $170,000 per ton of additional sulfuric acid mist removed. Utililzation of an SCR, dry FGD, fabric filter pollution control train may result in lower sulfuric acid mist emissions as compared to what KCPL is proposing, but any reduction of sulfuric acid mist would be offset by increased SO_2 emission. For the reasons set forth above APCP concurs with KCPL that the SCR, fabric filter, wet FGD pollution control train is appropriate BACT control technology for sulfuric acid mist.

BACT Emission Limitation

After defining the appropriate BACT control technology the question becomes - What is an achievable emission limitation that represents a maximum degree of reduction? Since there is no emissions data available for a similar unit the BACT emission limit is based on contemplative speculation, examination of BACT emission limits contained in recent permits and the vendor representations supplied by the applicant. The worst-case sulfur content per the existing and amended permits will be 1.4 pounds of SO_2 per MMBTU. Applying a 2.5 percent SO_2 to SO_3 conversion rate across the boiler and SCR, the uncontrolled sulfuric acid mist pounds per MMBTU is calculated as follows: 1.4 X 0.025 X (98/64) = 0.0536 pounds per MMBTU. Note: 98 and 64 are the molecular weights of H_2SO_4 and SO_2, respectively. Then applying estimated overall control efficiency through the baghouse and wet FGD of 90 percent the result is predicted emissions of 0.00536 pounds per MMBTU of sulfuric acid mist. A small portion of SO_3 will react with ammonia slip from the SCR unit to form ammonium sulfate and ammonium bisulfate rather than sulfuric acid; with this in mind, the BACT emission limit is set at 0.0052 pounds per MMBTU. This limit is supported by a representation made by the vendor that the equipment can achieve 0.005 pounds per MMBTU. A sulfuric acid mist BACT emission limit of 0.0052 pounds per MMBTU also seems reasonable when compared to emission limits in other recently issued permits for power plants that will utilize PRB/Subbituminous coal in a pulverized coal boiler.

Table 4 – BACT Sulfuric Acid Mist Limits from Recently Issued Permits

Company	Permit Date	Installation		Fuel, Boiler Type, Pollution Control Train	Sulfuric Acid Mist Limit	
		City or County	State		lb/MMBTU	Demonstrated
Western Farmers Electric Coop	02/09/2007	Choctaw County	OK	Subbituminous PC SCR,FF,WFGD	0.005	No
Public Service Company of Colorado – Unit 3	07/05/2005	Pueblo County	CO	PRB PC SCR,DFGD,FF	0.0042	Unknown
Sandy Creek Energy	3/10/05	McClennan County	TX	PRB PC SCR,DFGD,FF	0.0037	Unknown
Omaha Public Power District - Nebraska City Unit 2	3/9/2005	Otoe County	NB	Subbituminous PC SCR,DFGD,FF	0.0042	Unknown
Wisconsin Public Service - Weston Plant 4	10/19/2004	Marathon County	WI	PRB Supercritical PC SCR,DFGD,FF	0.005	Unknown
Intermountain Power Service Corporation	10/15/2004	Millard County	UT	Subbit/Bit. Blend PC SCR,FF,WFGD	0.0044	Unknown
Plum Point Associates	08/20/03	Mississippi County	AR	Subbituminous PC SCR,DFGD,FF	0.0061	Unknown
Mid American Energy Company	06/17/02	Council Bluffs	IA	PRB Supercritical PC SCR,DFGD,FF, ACI	0.00421	Yes[1.]

1. May 2007 initial compliance stack testing results – 0.00137 lbs/MMBTU

Acronyms

PC – pulverized coal boiler, SCR – selective catalytic reduction, FF – fabric filter, WFGD – wet flue gas desulfurization, DFGD – dry flue gas desulfurization, ACI – activated carbon injection

AMBIENT AIR QUALITY IMPACT ANALYSIS

The ambient air quality impact analysis indicates that this project will not cause ambient air concentrations above acceptable levels. The results of a preliminary impact analysis indicate that ambient air concentrations for CO will be below the modeling significance levels listed in Table 4 of 10 CSR 10-6.060(11), therefore additional analysis was not required. Ambient air concentrations for PM_{10} are predicted to be greater than modeling significance levels but below levels that would present a problem with regard to the national ambient air quality standard or PSD increment consumption. Please refer to the incorporated ambient air quality impact analysis memorandum for additional information.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (8) of 10 CSR 10-6.060, *Construction Permits Required*, I recommend permit issuance, with special conditions.

_____ _____

Steve Jaques, P.E. Date
Environmental Engineer

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- Kansas City Power & Light Company - Iatan Generating Station
  Construction Permit Amendment Application
  Dated June 2007, Received June 28, 2007
  (Prepared by Trinity Consultants)

- Letter, with attachments, dated August 27, 2007, from Paul Ling (KCPL) to Kyra Moore (APCP) regarding Kansas City Power & Light Company - Iatan Generating Station, Construction Permit Amendment Application, PM Increment Modeling

- Letter, with attachments, dated January 17, 2008, from Paul Ling (KCPL) to Kyra Moore (APCP) regarding Kansas City Power & Light Company - Iatan Generating Station, Construction Permit Amendment Application, Visibility Analysis

- Air Pollution Control Program Internal Memorandum, dated August 6, 2008 from Kelly Robson to Steve Jaques regarding Ambient Air Quality Impact Analysis (AAIQIA) for Kansas City Power & Light Company - Iatan Generating Station, Prevention of Significant Deterioration (PSD) Modeling

- Air Pollution Control Program Internal Memorandum, dated August 20, 2008 from Kelly Robson to Steve Jaques regarding Ambient Air Quality Impact Analysis (AAIQIA) – Correction – for Kansas City Power & Light Company - Iatan Generating Station, Prevention of Significant Deterioration (PSD) Modeling

Mr. Paul Ling
Environmental Manager
Kansas City Power & Light Company
1201 Walnut Street
Kansas City, MO 64106

RE: Amendment to Permit Number: 012006-019C
Project Number: 2007-06-080

Dear Mr. Ling:

Enclosed with this letter is your amendment to Permit Number 012006-019C which was for the installation of a new pulverized coal boiler and associated pollution control equipment at Kansas City Power and Light's Iatan Generating Station. The permit also covers modification to the pollution control system and an increase in the heat input rate for Iatan Unit 1.

The permit and review summary were amended to include more details regarding the project that evolved with more detailed engineering and planning, the modifications include:

- Relocation of the Unit 1 and Unit 2 boiler stacks
- Relocation of the facility fence line
- Relocation of the diesel-fired emergency fire pump engines and increased capacity
- Addition of cells to the cooling tower and a decrease in water recirculation rate
- Changes to new building dimensions and locations
- Increases in coal storage pile areas
- Changes to the landfill dimensions and emission rates
- Material handling equipment changes
- Reconfiguration of haul roads and changes to permitted haul road emissions
- Modification of the Unit 1 boiler feedwater pump

In addition the best available control technology (BACT) analysis for sulfuric acid mist, and the associated emission limit, is included in this amendment.

The Special Conditions of the previous permits (012006-019, 012006-019A, 012006-019B and 012006-019C) are being replaced/superseded by the Special Conditions of this amended permit (012006-019D). You will notice that our approach for the review summary portion of this amendment departs from the approach that was taken in the previous amendments

(012006-019A, 012006-019B and 012006-019C). We believe that due to the history of amendments and where KCPL is with respect to the on-going construction of the plant, it adds clarity to approach this review summary with more emphasis on the amendment request and less emphasis on the original permitting action. However, this does not invalidate previous review summaries, nor does it relieve KCPL from any representations that were made in the previous permit application or applications for amendment.

If you have any questions regarding this amended permit, please contact Steve Jaques at the departments' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or telephone (573) 751-4817. Thank you for your time and cooperation.

Sincerly,

AIR POLLUTION CONTROL PROGRAM

Kyra L. Moore
Permit Section Chief

KLM:sjl

Enclosure

c: Kansas City Regional Office
PAMS File: 2007-06-080