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: 122015-003 Project Number: 2015-03-068

Installation Name: Columbia Municipal Power Plant

Installation Address: 1501 Business Loop 70 East, Columbia, MO 65201

Location Information: Boone County, S7, T48N, R12W

Application for Authority to Construct was made for:
Conversion of Boilers 6 and 7 to burn 100% woody biomass, replacement of the grate and fuel feeder on Boilers 6 and 7, installation of over-fire air on Boilers 6 and 7, installation of an economizer on Boiler 8, and installation of low NO_x burners with 20% flue gas recirculation on Boiler 8. This review was conducted in accordance with Section (8) of 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.

Alana L. Hess

Prepared by
Alana Hess
New Source Review Unit

Kyra L. Moore

Director or Designee
Department of Natural Resources

DEC 0 8 2015

Effective Date

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within eighteen months from the effective date of this permit. The permittee should notify the Air Pollution Control Program if construction or modification is not started within eighteen 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 Air Pollution Control Program of the anticipated date of startup of these modified air contaminant sources. The information must be made available not more than 60 days but at least 30 days in advance of this date. Also, you must the Department of Natural Resources' Northeast Regional Office within 15 days after the actual startup of these modified air contaminant sources.

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

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, Missouri 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, your application, and associated correspondence constitutes your permit to construct. The permit allows you to construct <u>and</u> operate your modified air contaminant sources, 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 Air Pollution Control Program, P.O. Box 176, Jefferson City, Missouri 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(12)(A)10. "Conditions required by permitting authority."

Columbia Municipal Power Plant
Boone County, S7, T48N, R12W

1. Particulate Emission Limitations
   A. Columbia Municipal Power Plant shall emit less than 0.082 pounds of PM per MMBtu of heat input from Boilers 6 and 7.

   B. Columbia Municipal Power Plant shall emit less than 0.078 pounds of filterable PM_{10} per MMBtu of heat input from Boilers 6 and 7.

   C. Columbia Municipal Power Plant shall emit less than 0.056 pounds of filterable $PM_{2.5}$ per MMBtu of heat input from Boilers 6 and 7.

   D. Columbia Municipal Power Plant shall demonstrate compliance with Special Conditions 1.A, 1.B, and 1.C by conducting stack testing according to Special Condition 9.

2. Control Device Requirement – Fabric Filter
   A. Columbia Municipal Power Plant shall control filterable particulate matter emissions from Boilers 6 and 7 using fabric filters.

   B. The fabric filters shall be operated and maintained in accordance with the manufacturer's specifications. The fabric filters shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that Department of Natural Resources' employees may easily observe them.

   C. Replacement filters shall be kept on hand at all times. The filters shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).

   D. Columbia Municipal Power Plant shall monitor and record the operating pressure drop across the fabric filters at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions

SPECIAL CONDITIONS:

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

specified by the manufacturer's specifications to be between 1 inch water column and 8 inches of water column.

E. Columbia Municipal Power Plant shall maintain a copy of the fabric filter manufacturer's specifications on site.

F. Columbia Municipal Power Plant shall maintain an operating and maintenance log for the fabric filters 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.

3. Control Device Requirement – Low NO_x Burners and Flue Gas Recirculation
   A. Columbia Municipal Power Plant shall control emissions from Boiler 8 using low NO_x burners and flue gas recirculation.

   B. The low NO_x burners and flue gas recirculation system shall be operated and maintained in accordance with the manufacturer's specifications.

   C. Columbia Municipal Power Plant shall maintain a copy of the manufacturer's specifications for the low NO_x burners and flue gas recirculation system on site.

   D. Columbia Municipal Power Plant shall maintain an operating and maintenance log for the low NO_x burners and flue gas recirculation system 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.

4. NO_x Emission Limitation
   A. Columbia Municipal Power Plant shall emit less than 0.137 pounds of NO_x per MMBtu of heat input from Boiler 8, based on a 30-day rolling average.

   B. Columbia Municipal Power Plant shall install, maintain, and operate NO_x CEMS on Boilers 6, 7, and 8 in accordance with §60.13, 40 CFR Part 60 Appendix B (Performance Specifications 2 and 6), and 40 CFR Part 60 Appendix F (Quality Assurance Procedures) or 40 CFR Part 75 .

SPECIAL CONDITIONS:

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

C. Columbia Municipal Power Plant shall calculate the 30-day rolling average NO_x emission rate as the sum of all hourly NO_x emission rates (lb/MMBtu) divided by the number of hours of operation during the most recent 30-day period. Columbia Municipal Power Plant shall calculate the 30-day rolling average at the end of each calendar day.

5. CO BACT

A. Columbia Municipal Power Plant shall not exceed the CO BACT limits listed in Table 1. These limits apply at all times including startup, shutdown, and malfunction.

Table 1: CO BACT

Emission Point	Description	CO BACT
EP01	Boiler 6	0.27 lb/MMBtu, based on a 30-day rolling average and the use of over-fire air and good combustion practices
EP02	Boiler 7	0.27 lb/MMBtu, based on a 30-day rolling average and the use of over-fire air and good combustion practices
EP03	Boiler 8	0.08 lb/MMBtu, based on a 30-day rolling average and the use of good combustion practices

B. Columbia Municipal Power Plant shall operate the boilers using good combustion practices and over-fire air in accordance with the manufacturer's specifications.

C. Columbia Municipal Power Plant shall retain a copy of each boiler's manufacturer specifications on site.

D. Columbia Municipal Power Plant shall install, maintain, and operate a CO CEMS on Boilers 6, 7, and 8 in accordance with §60.13, 40 CFR Part 60 Appendix B (Performance Specification 4, 4A, or 4B), and 40 CFR Part 60 Appendix F (Quality Assurance Procedures) to measure and record the CO emission rate (lb/MMBtu) from each boiler.

E. Columbia Municipal Power Plant shall calculate the 30-day rolling average CO emission rate as the sum of all hourly CO emission rates (lb/MMBtu) divided by the number of hours of operation during the most recent 30-day period. Columbia Municipal Power Plant shall calculate the 30-day rolling average at the end of each calendar day.

SPECIAL CONDITIONS:

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

F. Columbia Municipal Power Plant shall conduct tune-ups of Boilers 6, 7, and 8.
   1) Columbia Municipal Power Plant shall conduct initial tune-ups of the boilers no later than 180 days after the completion of each boiler's modifications.
   2) The tune-up frequency for Boiler 6 shall be once every five years. (No more than 61 months after the previous tune-up).
   3) The tune-up frequency for Boilers 7 and 8 shall be biennially. (No more than 25 months after the previous tune-up).
   4) During each tune-up, Columbia Municipal Power Plant shall:
      a) As applicable, inspect the burner, and clean or replace any components of the burner as necessary (Columbia Municipal Power Plant may delay the burner inspection until the next scheduled unit shutdown, not to exceed 36 months from the previous inspection).
      b) Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if available.
      c) Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly (Columbia Municipal Power Plant may delay the inspection until the next scheduled unit shutdown, not to exceed 36 months from the previous inspection).
      d) Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available, and with any nitrogen oxide requirement to which the unit is subject.
      e) Record the concentrations in the effluent stream of CO in parts per million, by volume, and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements shall be taken using CO CEMS.
      f) Maintain on-site and submit, if requested by the Director, a report containing the following information:
         (i) The concentrations of CO in the effluent stream in parts per million, by volume, and oxygen in volume percent, measured at high fire or typical operating load, before and after the tune-up of the boiler.

SPECIAL CONDITIONS:

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

(ii) A description of any corrective actions taken as a part of the tune-up of the boiler.

g) If a boiler is not operating on the required date for a tune-up, the tune-up shall be conducted within 30 days of startup.

6. Operational Limitations

A. Columbia Municipal Power Plant shall limit the heat input of Boiler 6 to 62,000 MMBtu of biomass per consecutive 12-month period.

B. Columbia Municipal Power Plant shall limit the heat input of Boiler 7 to 1,624,980 MMBtu of biomass per consecutive 12-month period.

C. Columbia Municipal Power Plant shall exclusively combust biomass meeting the definition of clean cellulosic biomass at 40 CFR Part 241.2 in Boilers 6 and 7.

D. Columbia Municipal Power Plant shall limit the heat input of Boiler 8 to 1,848,360 MMBtu of natural gas in any consecutive 12-month period.

E. Columbia Municipal Power Plant shall determine and record the heat input (MMBtu) to each boiler for every hour or part of an hour any fuel is combusted using the procedures in 40 CFR Part 75 Appendix F.

F. Columbia Municipal Power Plant shall calculate the monthly heat input to each boiler as the sum of all hourly heat inputs to the boiler as recorded by the installation's CEMS during the calendar month.

G. Columbia Municipal Power Plant shall calculate and record the 12-month rolling total heat input for each boiler as the sum of each monthly heat input for the 12 most recent months. Columbia Municipal Power Plant shall calculate the 12-month rolling total heat input at the end of each calendar month.

H. Columbia Municipal Power Plant shall cease combusting coal by no later than January 30, 2016.

7. Modeling Analysis Requirements

A. Columbia Municipal Power Plant shall notify the Air Pollution Control Program before initial startup of any modifications to the facility design that could impact the release parameters specified in the Memorandums from the Modeling Unit titled, "AAQIA for the Columbia Municipal Power Plant –

SPECIAL CONDITIONS:

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

PSD Modeling – CO and HAPs" (May 2015) and "AAQIA for the Columbia Municipal Power Plant – PSD Modeling – CO Limit – Revision #1" (August 2015) and those specifically listed in Table 3. In the event the Air Pollution Control Program determines that the changes are significant, Columbia Municipal Power Plant shall submit an updated AAQIA to the Air Pollution Control Program that continues to demonstrate compliance with the NAAQS for CO and Missouri's HAP RALs.

Table 3: City of Columbia Power Plant – Stack Parameters

Emission Point	EP01 & EP02	EP03
Stack ID	S5	S6
Description	Boilers 6 & 7	Boiler 8
Release Type	Point	Point
Easting (m)	559191.90	559169.67
Northing (m)	4313074.11	4313031.56
Elevation (m)	233.48	233.48
Stack Height (m)	91.44	19.20
Stack Diameter (m)	2.44	1.52
100% Load		
Stack Exit Temperature (K)	455.37	433.15
Stack Exit Gas Velocity (m/s)	14.94	21.03
75% Load		
Stack Exit Temperature (K)	447.04	433.15
Stack Exit Gas Velocity (m/s)	11.95	15.77
50% Load		
Stack Exit Temperature (K)	437.71	413.71
Stack Exit Gas Velocity (m/s)	8.96	12.62

B. Columbia Municipal Power Plant shall not emit CO in excess of the limits listed in Table 4.

SPECIAL CONDITIONS:

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

Table 4: CO Modeling Limits

Emission Point	Description	Load	Block Hourly Limit (lb/hr)	8-Hour Rolling Average Limit (lb/hr)
EP01 & EP02	Boilers 6 & 7 combined	76% - 100%	2,785.50	1,361.80
		51% - 75%	2,785.50	1,392.80
		≤50%	2,166.50	1,392.80
EP03	Boiler 8	76% - 100%	84.40	42.20
		51% - 75%	63.30	31.70
		≤50%	63.30	21.10

1) Columbia Municipal Power Plant shall demonstrate compliance with the CO limits using the CO CEMS required by Special Condition 6.D.
2) If an exceedance of the CO modeling limits occurs, Columbia Municipal Power Plant shall submit a revised modeling analysis to the Air Pollution Control Program no later than 90 days after the date of the exceedance.
3) Columbia Municipal Power Plant shall calculate the 8-hour rolling average CO emission rate as the average of all hourly CO emission rates (lb/MMBtu) for the most recent 8-hour period. Columbia Municipal Power Plant shall calculate the 8-hour rolling average at the end of each hour.

8. Recordkeeping and Reporting Requirements
   A. Columbia Municipal Power Plant shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request.

   B. Columbia Municipal Power Plant shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than 10 days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

SPECIAL CONDITIONS:

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

9. Performance Testing

   A. Columbia Municipal Power Plant shall conduct performance testing to determine the PM, filterable PM_{10}, and filterable $PM_{2.5}$ emission rates from Boilers 6 and 7. Performance testing shall be conducting in accordance with EPA Test Methods 5 and 201A or other test methods upon Air Pollution Control Program approval.

   B. These tests shall be performed no later than 180 days after ceasing coal combustion and completion of the grate replacement, fuel feeder replacement, and over-fire air installation on Boilers 6 and 7. Subsequent performance testing is required once every five years.

   C. Testing shall be conducted at loads of not less than 224 MMBtu/hr for Boiler 6 and 334 MMBtu/hr for Boiler 7.
      1) If the stack tested loads are below those listed above, Columbia Municipal Power Plant shall apply for and obtain an amendment to this permit which limits the maximum hourly usage of the boilers to 110% of the stack tested loads.

   D. Columbia Municipal Power Plant shall record the operating pressure drop across the fabric filters during each test run.

   E. Columbia Municipal Power Plant shall record the type and quantity of biomass being combusted during each test run.

   F. A completed Proposed Test Plan Form (enclosed) shall be submitted to the Air Pollution Control Program 30 days prior to the proposed test date so that the Air Pollution Control Program may arrange a pretest meeting, if necessary, and assure that the test date is acceptable for an observer to be present. The Proposed Test Plan may serve the purpose of notification and must be approved by the Director prior to conducting the required emission testing.

   G. <u>Two copies</u> of a written report of the performance test results shall be submitted to the Director 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 <u>complete sample calculations</u> from the required U.S. EPA Method for at least one sample run.

SPECIAL CONDITIONS:

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

H. The test report is to fully account for all operational and emission parameters addressed both in the permit conditions as well as in any other applicable state or federal rules or regulations.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (8) REVIEW
Project Number: 2015-03-068
Installation ID Number: 019-0002
Permit Number:

Installation Address:
Columbia Municipal Power Plant
1501 Business Loop 70 East
Columbia, MO 65201

Boone County, S7, T48N, R12W

REVIEW SUMMARY

- Columbia Municipal Power Plant has applied for authority to convert Boilers 6 and 7 to burn 100% woody biomass, replace the grate and fuel feeder on Boilers 6 and 7, install over-fire air on Boilers 6 and 7, install an economizer on Boiler 8, and install low NO_x burners with 20% flue gas recirculation on Boiler 8.

- The application was deemed complete on May 15, 2015.

- Hazardous Air Pollutant emissions are expected from the combustion of biomass in Boilers 6 and 7 and the combustion of natural gas in Boiler 8. Potential emissions of acrolein (107-02-8), benzene (71-43-2), chlorine (7782-50-5), dioxins/furans, and polycyclic organic matter for the project exceeded their respective SMALs; therefore, modeling was conducted.

- 40 CFR Part 60, Subpart Da – *Standards of Performance for Electric Utility Steam Generating Units* is not applicable to the installation. Boilers 6 and 7 are not subject to this regulation as after this project they will no longer combust a fossil fuel. The changes made to Boiler 8 as part of this project do not meet the definition of modification at §60.2 as the changes do not increase the potential hourly emission rates of PM, SO_x, or NO_x from the boiler (pollutants to which the standard applies).

- 40 CFR Part 63, Subpart DDDDD – *National Emission Standards for Industrial, Commercial, and Institutional Boilers and Process Heaters* is not applicable to the boilers as after this project the installation will be an area source of HAPs.

- 40 CFR Part 63, Subpart JJJJJJ – *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources* is applicable to Boilers 6 and 7. Boiler 6 is required to comply with the requirements for limited-use boilers while Boiler 7 is required to comply with the requirements for biomass boilers. Boiler 8 is not subject to this regulation as gas-fired boilers are exempt per §63.11195(e).

- Fabric filters are being used to control emissions of PM, filterable PM_{10}, and filterable $PM_{2.5}$ from Boilers 6 and 7. Low NO_x burners with 20% flue gas recirculation are being used to control NO_x emissions from Boiler 8. Over-fire air and good combustion practices are being used to control CO emissions from Boilers 6, 7, and 8.

- This review was conducted in accordance with Section (8) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*. This project is a major modification for CO at an existing major stationary source. Special Condition 1 ensures that the modifications do not result in a significant net emissions increase of PM, total PM_{10}, or total $PM_{2.5}$.

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

- This installation is on the List of Named Installations at 10 CSR 10-6.020(3)(B), Table 2 Item #26 “fossil-fuel-fired steam electric plants of more than 250 MMBtu/hr heat input”; therefore, the installation’s major source level is 100 tons per year and fugitive emissions are counted towards major source applicability.

- Screen modeling of CO, acrolein, benzene, chlorine, dioxins/furans, and polycyclic organic matter was conducted as part of this project to determine the ambient impact of these emissions.

- Emission testing is required to determine the PM, the filterable PM_{10}, and the filterable $PM_{2.5}$ emission rates from the combustion of biomass in Boilers 6 and 7 and ensure that the net emissions increase remains below the significance levels.

- The installation is required to amend their Part 70 operating permit application 2015-06-041 to include the conditions of this permit within one year after the issuance date of this permit.

- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Columbia Municipal Power Plant is an existing electric generating facility. Electric generating equipment includes a 248 MMBtu/hr coal-fired Boiler 6, a 371 MMBtu/hr coal-fired Boiler 7, a 422 MMBtu/hr gas-fired Boiler 8, a 12.5 MW gas-fired combustion turbine, two 1500 kW diesel limited-use generators, a 2,180 kW diesel limited-use generator, two 2,000 kW diesel limited-use generators, and four 1,112 kW diesel limited-use generators. Additional emission sources at the installation include haul roads, a fuel storage pile, conveyors, diesel storage tanks, a parts washer, and water treatment tanks. Ash collected by the baghouses is sluiced to an existing ash pond; therefore, ash handling is not considered an emission source.

The installation is an existing major source for both construction permits and operating permits.

The following New Source Review permits have been issued to Columbia Municipal Power Plant by the Air Pollution Control Program:

Permit Number	Description
0298-016	Section (5) new landfill cell
092000-018	Section (5) diesel generators and storage tanks
082003-003	Section (5) diesel generator
092003-019	Section (5) diesel generator
042004-013	Section (5) diesel generator
122007-006	Section (5) four new diesel generators and diesel storage tanks
042008-003	Temporary permit – expired
102012-005	Temporary permit – expired
042013-013	Temporary permit – expired
062015-004	Temporary permit to test corn stover and switch grass blend

PROJECT DESCRIPTION

Columbia Municipal Power Plant wishes to cease combusting coal in Boilers 6 and 7 by no later than January 31, 2016 so as to become a HAP area source and avoid becoming subject to 40 CFR Part 63, Subpart DDDDD. The installation will be converting Boilers 6 and 7 from coal to 100% woody biomass. The installation has already been combusting up to 50% biomass in Boilers 6 and 7 as a determination, Project 2009-04-052, was made in 2009 that the existing fuel feeder systems on the stoker-spreader boilers were capable of accommodating up to 50% biomass.

In order to convert to 100% woody biomass, the installation is making the following modifications to Boilers 6 and 7:

- Fuel feeder replacement
- Over-fire air installation
- Grate replacement

These modifications are being made to allow for the combustion of 100% biomass and are not expected to increase the maximum hourly design rates of the boilers.

The installation is also requesting to modify Boiler 8 by installing low NO_x burners with 20% flue gas recirculation and replacing the existing air heater with an economizer. These modifications are not expected to increase the maximum hourly design rate of the boiler.

In order to ensure that the project remains below the significance levels for PM, total PM_{10}, total $PM_{2.5}$, SO_x, NO_x, VOC, and CO_2e, the installation has requested the following restrictions:

- Limit Boiler 6’s annual heat input to 62,000 MMBtu per year (250 hours per year) included in Special Condition 6.A.
- Limit Boiler 7’s annual heat input to 1,624,980 MMBtu per year (50% annual capacity) included in Special Condition 6.B.
- Limit Boiler 8’s annual heat input to 1,848,360 MMBtu per year (50% annual capacity) included in Special Condition 6.D.

Additional restrictions have been included in the permit by the Air Pollution Control Program to further ensure that the project remains below the significance levels for PM:

- The installation based the biomass emissions calculations in their application on a PM emission factor of 0.0319 lb/MMBtu obtained from their September 2006 stack test. The installation also used this emission factor for filterable PM_{10} and filterable $PM_{2.5}$ emissions. A review of the September 2006 stack test by the Air Pollution Control Program revealed that during the stack test the boiler only combusted coal. As the Air Pollution Control Program believes PM, filterable PM_{10}, and filterable $PM_{2.5}$ emission rates for biomass are dissimilar from coal, the Air Pollution Control Program has not accepted the 0.0319 lb/MMBtu for biomass combustion. The installation believes that the PM, filterable PM_{10}, and filterable $PM_{2.5}$ emission factors for fabric filter controlled wood residue combustion in AP-42 Table 1.6-1 are too high and that actual emissions will be closer to the emission factor established for coal. The Air Pollution Control Program has established limits in Special Condition 1 for PM, filterable PM_{10}, and filterable $PM_{2.5}$ by calculating the maximum PM, filterable PM_{10}, and filterable $PM_{2.5}$ emission factors (lb/MMBtu) that can occur from Boilers 6 and 7 and still result in a net emissions increase for the project below the significance levels for these pollutants. Stack testing is required to demonstrate compliance. If testing indicates emissions in excess of the emission limits in Special Condition 1, the installation will be in violation of PSD permitting requirements.

NET EMISSIONS INCREASE

A NEI analysis examines all the emission increases and decreases that have occurred at the installation for the air pollutants of concern during a contemporaneous time period. The amount of these emission increases and decreases are determined by finding the actual emissions (average of a representative two-year baseline period), if available.

After the NEI analysis has determined the amount of actual and potential emissions for all of the emission units where increases and decreases have occurred, or will occur during this period, the increases are added together and the decreases are subtracted from this total. If the resulting level of emissions from the netting is below the significance level for that air pollutant, then the project is evaluated as a de minimis review instead of a major (PSD) review.

An increase or decrease in actual emissions is contemporaneous with the increase from the particular change only if it occurs between the date five years before construction on the particular change commences and the date that the increase from the particular change occurs.

An increase or decrease in actual emissions is creditable only if the permitting authority has not relied on it in issuing a permit for the source under this section and the permit is in effect when the increase in actual emissions from the particular change occurs.

A decrease in emissions is creditable only to the extent that:

- The old level of actual emissions or the old level of allowable emissions, whichever is lower, exceeds the new level of potential emissions;

- It is enforceable as a practical matter at and after the time that actual construction on the particular change begins; and
- It is approximately the same qualitative significance for public health and welfare as that attributed to the increase for the particular change.

PM NEI Analysis (tons per year)

Emission Source	PAE	BAE 12/2009 – 11/2011	Excluded per §52.21(b)(41)(ii)(c)	NEI
EP01	2.54	2.63	-	(0.09)
EP02	66.62	17.56	26.62	22.44
EP03	1.72	0.004	1.72	-
INS08	2.37	0.13	-	2.25
INS09	0.13	0.01	-	0.12
INS10	0.13	0.01	-	0.12
Project	73.52	20.33	28.34	24.84

Total PM_{10} NEI Analysis (tons per year)

Emission Source	PAE	BAE 12/2009 – 11/2011	Excluded per §52.21(b)(41)(ii)(c)	NEI
EP01	2.95	4.50	-	(1.56)
EP02	77.19	30.35	30.84	15.99
EP03	6.89	0.02	6.87	-
INS08	0.47	0.03	-	0.45
INS09	0.06	0.003	-	0.06
INS10	0.06	0.003	-	0.06
Project	87.61	34.91	37.71	14.99

Total $PM_{2.5}$ NEI Analysis (tons per year)

Emission Source	PAE	BAE 12/2009 – 11/2011	Excluded per §52.21(b)(41)(ii)(c)	NEI
EP01	2.26	3.65	-	(1.39)
EP02	59.31	24.61	23.70	11.00
EP03	6.89	0.02	6.87	-
INS08	0.12	0.01	-	0.11
INS09	0.01	0.0005	-	0.01
INS10	0.01	0.0005	-	0.01
Project	68.60	28.28	30.57	9.74

SO_x NEI Analysis (tons per year)

Emission Source	PAE	BAE 10/2012 – 09/2014	Excluded per §52.21(b)(41)(ii)(c)	NEI
EP01	0.78	215.51	-	(214.73)
EP02	20.31	846.41	12.84	(838.94)
EP03	0.54	0.04	0.50	-
Project	21.63	1,061.96	13.34	(1,053.67)

NO_x NEI Analysis (tons per year)

Emission Source	PAE	BAE 03/2010 – 02/2012	Excluded per §52.21(b)(41)(ii)(c)	NEI
EP01	15.19	75.04	-	(59.85)
EP02	398.12	181.43	200.09	16.61
EP03	126.85	1.69	126.49	(1.33)
Project	540.16	258.15	326.57	(44.57)

VOC NEI Analysis (tons per year)

Emission Source	PAE	BAE 08/2012 – 07/2014	Excluded per §52.21(b)(41)(ii)(c)	NEI
EP01	0.53	4.68	-	(4.15)
EP02	13.81	15.19	-	(1.37)
EP03	4.98	0.38	4.60	-
Project	19.32	20.24	4.60	(5.52)

CO_2e NEI Analysis (tons per year)

Emission Source	PAE	BAE 12/2009 – 11/2011	Excluded per §52.21(b)(41)(ii)(c)	NEI
EP01	6,496.16	15,191.94	-	(8,695.78)
EP02	170,260.04	100,951.08	68,038.05	1,270.91
EP03	108,218.60	266.80	107,956.02	(4.22)
Project	284,974.80	116,409.82	175,994.07	(7,429.09)

This project is a major modification for CO requiring PSD review.

Excluded emissions are the portion of each source's emissions following the project that the existing sources could have accommodated during the baseline period and that are unrelated to this project. As the baseline annual heat input to Boiler 6 is greater than the requested future annual heat input to Boiler 6, it is clear that the boiler was both physically and operationally capable of accommodating the requested annual heat input during the baseline period. Although the baseline annual heat input in Boiler 7 is lower than the requested future annual heat input, the Air Pollution Control Program is confident that Boiler 7 could have accommodated the requested future annual heat input during the baseline period as Columbia Municipal Power Plant has submitted documentation indicating that Boiler 7 was physically and operationally ready for an average of 6,822 hours during the baseline period (which equates to 2,530,777 MMBtu). Although the baseline annual heat input in Boiler 8 is lower than the requested future annual heat input, the Air Pollution Control Program is confident that Boiler 8 could have accommodated the requested future annual heat input during the baseline period as Columbia Municipal Power Plant has submitted documentation indicating that Boiler 8 was physically and operationally ready for an average of 7,644 hours during the baseline period (which equates to 3,225,768 MMBtu).

EMISSIONS/CONTROLS EVALUATION

Baseline actual emissions of SO_2, NO_x, and CO_2 were obtained from the installation's existing CEMS as reported in EPA's Air Markets Program Data (http://ampd.epa.gov/ampd/).

Biomass Combustion (EP01 & EP02)

The emission factors for condensable particulates, SO_2, NO_x, and VOC used in this analysis were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 1.6 "Wood Residue Combustion in Boilers" (September 2003).

CO_2, CH_4, and N_2O emission factors and global warming potentials were obtained from 40 CFR Part 98 (revision date December 11, 2014).

The emission factors for individual HAPs used in this analysis were obtained from the National Council for Air and Stream Improvement technical bulletin #858, *Compilation of 'Air Toxic' And Total Hydrocarbon Emissions Data For Sources At Kraft, Sulfite, And Non-Chemical Pulp Mills*, Table 20A "Summary of 'Air Toxic' Emissions from Wood-Fired Boilers" (February 2003).

The maximum allowable emission factors for PM, filterable PM_{10}, and filterable $PM_{2.5}$ were calculated as part of this project and are restricted to 0.082 lb/MMBtu, 0.078 lb/MMBtu, and 0.056 lb/MMBtu, respectively, by Special Condition 1.

Coal Combustion (EP01 & EP02)

The PM emission factor was obtained from stack testing conducted at the installation in September of 2006. Filterable PM_{10} and filterable $PM_{2.5}$ emission factors were calculated using the PM emission factor and the particle size distribution for baghouse controlled spreader stoker boilers in AP-42 Table 1.1-9 (September 1998).

The emission factors for condensable particulates and VOC used in this analysis were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 1.1 "Bituminous and Subbituminous Coal Combustion" (September 1998).

CH_4 and N_2O emission factors and global warming potentials were obtained from 40 CFR Part 98 (revision date December 11, 2014).

Natural Gas Combustion (EP03)

The emission factors for PM, total PM_{10}, total $PM_{2.5}$, SO_2, VOC, and individual HAPs used in this analysis were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 1.4 "Natural Gas Combustion" (July 1998).

CO_2, CH_4, and N_2O emission factors and global warming potentials were obtained from 40 CFR Part 98 (revision date December 11, 2014).

The NO_x emission factor is based on information submitted by the low NO_x burner and flue gas recirculation vendor. To ensure that the NO_x emission rate is appropriate, the installation is limited to the vendor supplied emission rate in Special Condition 4.

Paved Haul Road (INS08)

Emissions from the 0.15 mile paved haul road were calculated using Equation 2 from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 13.2.1 “Paved Haul Roads” (January 2011), a silt loading of 9.7 g/m^2, a mean vehicle weight of 27.5 tons, and 105 days per year with at least 0.01” of precipitation.

Truck Unloading and Storage Pile Loadout (INS09 and INS10)

Emissions were calculated using Equation 1 from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 13.2.4 “Aggregate Handling and Storage Piles” (November 2006), a mean wind speed of 9.2 mph, and a material moisture content of 4.8%. The actual moisture content of the biomass is much higher; however, 4.8% is the maximum moisture content for which an A rated emission rate can be obtained.

Wind erosion of the biomass storage pile does result in particulate emissions; however, as the size of the existing biomass storage pile will not be changing, there is expected to be no increase in emissions due to wind erosion compared to the baseline period.

Potential emissions of the application represent the potential of the project at the maximum annual usage rates in Special Conditions 6.A, 6.B, and 6.D. The following tables provide an emissions summary for this project.

Project Emissions Summary (tons per year)

Pollutant	Regulatory *De Minimis* Levels	Existing Potential Emissions	Existing Actual Emissions (2014 EIQ)	Project NEI	New Installation PTE
PM	25.0	Major	N/A	24.84	N/D
Total PM_{10}	15.0	Major	16.81	14.99	N/D
Total $PM_{2.5}$	10.0	Major	15.78	9.74	N/D
SO_x	40.0	Major	1,046.22	(1,053.67)	N/D
NO_x	40.0	Major	163.84	(44.57)	Major
VOC	40.0	N/D	1.51	(5.52)	N/D
CO	100.0	Major	93.31	135.97	Major
CO_2e	100,000	Major	N/A	(7,429.09)	Major
HAPs	25.0	Major	20.39	N/A	10.90

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

Individual HAP Emissions Summary (tons per year)

Pollutant	CAS No.	SMAL	Existing Actual Emissions (2014 EIQ)	Project PTE	New Installation PTE
Benzene	71-43-2	2	0.15	2.78	2.80
Hexane	110-54-3	10	N/D	1.88	1.88
Formaldehyde	50-00-0	2	0.23	1.16	1.75
Methanol	67-56-1	10	N/D	0.73	0.73
Chlorine	7782-50-5	0.1	0.03	0.67	0.67
Hydrogen Chloride	7647-01-0	10	17.06	0.57	0.57
Styrene	100-42-5	1	0.07	0.54	0.54
Dichloromethane	75-09-2	10	0.01	0.46	0.46
Acetaldehyde	75-07-0	9	0.03	0.19	0.23
Carbon Disulfide	75-15-0	1	N/D	0.11	0.11
1,1,2-Trichloroethane	79-00-5	1	N/D	0.10	0.10
Naphthalene	91-20-3	10	0.003	0.08	0.14
Acrolein	107-02-8	0.04	0.14	0.07	0.07
Xylene	1330-20-7	10	0.001	0.06	0.11
1,1,1-Trichloroethane	71-55-6	10	0.001	0.05	0.05
Propionaldehyde	123-38-6	5	0.002	0.05	0.05
1,2,4-Trichlorobenzene	120-82-1	10	N/D	0.05	0.05
Tetrachloroethylene	127-18-4	10	N/D	0.04	0.04
Chloramben	133-90-4	1	N/D	0.03	0.03
Methyl Chloride	74-87-3	10	N/D	0.03	0.03
Trichloroethylene	79-01-6	10	0.001	0.03	0.03
Chloroform	67-66-3	0.9	0.001	0.03	0.03
Dibutyl Phthalate	84-74-2	10	N/D	0.03	0.03
1,2-Dichloropropane	78-87-5	1	0.001	0.03	0.03
1,2-Dichloroethane	107-06-2	0.8	0.001	0.02	0.02
Toluene	108-88-3	10	0.03	0.02	0.14
Polycyclic Organic Matter		0.01	N/D	0.02	0.03
Phosphorus	7723-14-0	0.1	0.001	0.02	0.02
Cumene	98-82-8	10	N/D	0.02	0.02
Chlorobenzene	108-90-7	10	0.001	0.01	0.01
Manganese Compounds	20-12-2	0.8	0.06	0.01	0.01
Bromomethane	74-83-9	10	0.001	0.01	0.01
Phenol	108-95-2	0.1	0.002	0.01	0.01

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

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 project is a major modification for CO at an existing major stationary source. Special Condition 1 ensures that the modifications do not result in a significant net emissions increase of PM, total PM_{10}, or total $PM_{2.5}$.

APPLICABLE REQUIREMENTS

Columbia Municipal Power Plant shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific recordkeeping, monitoring, and reporting requirements.

Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- 10 CSR 10-6.065 *Operating Permits*

- 10 CSR 10-6.110 *Submission of Emission Data, Emission Fees and Process Information*

- 10 CSR 10-6.165 *Restriction of Emission of Odors*

- 10 CSR 10-6.170 *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*

- 10 CSR 10-6.220 *Restriction of Emission of Visible Air Contaminants*
    - As these modifications are less than 50% of the cost of new boilers, the boilers meet the definition of existing at 10 CSR 10-6.020(2)(E)44.B and are subject to a standard of 20% opacity with an exception of up to 60% opacity for a period of time not aggregating more than six minutes in any 60 minutes.

SPECIFIC REQUIREMENTS

- 10 CSR 10-6.075 *Maximum Achievable Control Technology Regulations*
    - 40 CFR Part 63, Subpart JJJJJJ – *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources* is applicable to Boilers 6 and 7. Boiler 6 is required to comply with the requirements for limited-use boilers while Boiler 7 is required to comply with the requirements for biomass boilers. Boiler 8 is not subject to this regulation as gas-fired boilers are exempt per §63.11195(e).

- 10 CSR 10-6.260 *Restriction of Emission of Sulfur Compounds* is applicable and limits SO_2 emissions from Boilers 6 and 7 to 8 lb/MMBtu. AP-42 Table 1.6-2 provides an SO_2 emission factor of 0.025 lb/MMBtu for Boilers 6 and 7 indicating compliance. Boiler 8 is exempt from this regulation per 10 CSR 10-6.220(1)(A)2 as it exclusively combusts pipeline grade natural gas.

- 10 CSR 10-6.270 *Acid Rain Source Permits Required*

- 10 CSR 10-6.405 *Restriction of Particulate Matter Emissions From Fuel Burning Equipment Used for Indirect Heating* is applicable to Boilers 6, 7, and 8.
    - The uncontrolled PM PTE of Boiler 6 is 17.36 tons based on an uncontrolled PM emission factor of 0.56 lb/MMBtu in AP-42 Table 1.6-1 and the annual heat input restriction in Special Condition 6.A; therefore,

40 CFR Part 64 *Compliance Assurance Monitoring* is not applicable to Boiler 6. The controlled PM emission rate is limited to 0.082 lb/MMBtu by Special Condition 1.A which demonstrates compliance.

- The uncontrolled PM PTE of Boiler 7 is 454.99 tons based on an uncontrolled PM emission factor of 0.56 lb/MMBtu in AP-42 Table 1.6-1 and the annual heat input restriction in Special Condition 6.C; therefore, 40 CFR Part 64 *Compliance Assurance Monitoring* is applicable to Boiler 7. The permittee shall revise their Part 70 operating permit application 2015-06-041 within one year of completion of the modifications to Boiler 7. The revisions shall include a CAM plan for Boiler 7.
- Boiler 8 combusts natural gas and is deemed to be in compliance with this regulation per 10 CSR 10-6.405(1)(C).

BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

Applicability and Scope

Columbia Municipal Power Plant is an existing major stationary source with existing potential emissions of PM, total PM_{10}, total $PM_{2.5}$, SO_x, NO_x, CO_2e, and CO in excess of the major source threshold for named sources of 100 tons per year.

The net emissions increase analysis for this project indicates that the project does not result in a significant net emissions increase of PM, total PM_{10}, total $PM_{2.5}$, SO_x, NO_x, or CO_2e; therefore, BACT requirements apply only to CO. The only CO emission sources associated with this project are Boilers 6, 7, and 8.

A BACT analysis is done on a case by case basis and is performed in general by using a “top-down” method. The following steps detail the top-down approach:

1. Identify all potential control technologies – must be a comprehensive list, it may include technology employed outside the United States and must include the Lowest Achievable Emission Rate (LAER) determinations.
2. Eliminate technically infeasible options – must be well documented and must preclude the successful use of the control option.
3. Rank remaining control technologies – based on control effectiveness, expected emission rate, expected emission reduction, energy impacts, environmental impacts, and economic impacts.
4. Evaluate the most effective controls – based on a case-by-case consideration of energy, environmental, and economic impacts.
5. Select BACT.

CO BACT for spreader stoker Boilers 6 and 7

CO is emitted from woody biomass-fired boilers as a result of the incomplete combustion of fuel. This incomplete combustion results in a loss of boiler efficiency. Therefore, it is desirable to minimize CO emissions as much as possible in order to increase boiler efficiency and reduce fuel use. Boiler CO emission control requires reduction of the CO formation during fuel combustion or reduction of the CO in the boiler exhaust after formation (i.e., post-combustion control).

The following control technologies were identified:

- Good Combustion Practices such as:
  - Boiler tuning
  - Combustion Optimization
  - Operation procedures including during periods of startup, shutdown, and malfunction
  - Instrumentation and controls
  - Reduce air leakages
  - Reduce slagging and fouling of heat transfer surfaces
  - Preventative maintenance
- Oxidation Catalyst
- Thermal Oxidation

Good Combustion Practices

CO is emitted from the boiler as a result of incomplete combustion of fuel and loss of boiler efficiency. The most direct approach for reducing CO emissions is to maximize combustion efficiency through good combustion practices while at the same time minimizing NO_x formation. In general, a balance must be struck between CO and NO_x emissions as NO_x and CO emissions resulting from combustion are inversely related. This involves proper staging of the combustion process by monitoring and controlling the operating parameters of the boilers to ensure continual operation as close to optimum (i.e., minimum emission) conditions as possible. As part of this project, Columbia Municipal Power Plant will be installing over-fire air on Boilers 6 and 7. The addition of over-fire air is a method of combustion staging in the furnace in which a portion of the combustion air is redirected from the lower fuel rich area to a location higher in the furnace. Over-fire air also limits the amount of oxygen available during the phase of combustion when NO_x is formed.

Oxidation Catalyst

Catalytic oxidation is an available post-combustion CO control technology. A CO oxidation catalyst system works to reduce CO emissions by routing the boiler exhaust gases through a reactor containing catalyst material. The catalytic material typically used is a precious metal such as platinum or palladium. The catalyst oxidizes CO to CO_2. The catalyst also oxidizes other gases in the boiler exhaust passing through the reactor such as VOC and SO_2. The precious metal catalyst is prone to plugging in high particulate environments. The exhaust gas temperature must be greater than 500°F to 600°F for this CO catalytic reaction to take place with acceptable effectiveness. Placement of the oxidation catalyst after the fabric filter would require reheating of the exhaust gas, increasing emissions from the combustion of additional fuel. The oxidation catalyst is also damaged by acid gases; therefore, a dry sorbent injection system would need to be installed prior to the oxidation catalyst. In order for oxidation catalyst to be technically feasible on Boilers 6 and 7 a complete redesign of the existing boiler exhaust ducting, modification of the existing fabric filters, reheating of the exhaust gas, and installation of a dry sorbent injection system prior to the catalyst to control acid gases would be required.

The increase in emissions associated with a new exhaust gas heater; the cost impacts of a new exhaust gas heater, dry sorbent injection system, and duct modifications[1]; and the energy impacts of a new exhaust gas heater render this control technology inappropriate for application on Boilers 6 and 7.

Thermal Oxidation

Thermal oxidation also oxidizes CO to CO_2, but without the use of a catalyst. Temperatures in excess of 1,500°F are required. Thermal oxidation would require heating of the exhaust gas, increasing emissions from the combustion of additional fuel.

Thermal oxidation would result in greater emissions, cost, and energy increases than catalytic oxidation; therefore, this control technology is considered inappropriate for application on Boilers 6 and 7.

Good combustion practices including the installation of over-fire air have been selected as BACT for Boilers 6 and 7. This determination is consistent with the most recent spreader stoker boiler conversions in the RBLC for Virginia Electric and Power Company's Altavista, Hopewell, and Southampton Power Stations[2]. The BACT limit established for Virginia Electric and Power Company's Altavista, Hopewell, and Southamption Power Stations and proposed by the applicant is 0.30 lb/MMBtu on a 30-day rolling average. Based on information obtained by an information request to Virginia's Department of Environmental Quality, Virginia Electric and Power Company's boilers are meeting their BACT limits with a comfortable margin of compliance:

- CO CEMS data obtained for the Hopewell Power Station's Unit 1 indicates 30-day rolling average CO emission rates ranging from 0.14 lb/MMBtu – 0.23 lb/MMBtu.
- CO CEMS data obtained for the Hopewell Power Station's Unit 2 indicates 30-day rolling average CO emission rates ranging from 0.14 lb/MMBtu – 0.25 lb/MMBtu.
- CO CEMS data obtained for the Southampton Power Station's Unit 1 indicates 30-day rolling average CO emission rates ranging from 0.17 lb/MMBtu – 0.27 lb/MMBtu.
- CO CEMS data obtained for the Southampton Power Station's Unit 2 indicates 30-day rolling average CO emission rates ranging from 0.18 lb/MMBtu – 0.27 lb/MMBtu.

Based on the information provided by Virginia's Department of Environmental Quality for the Hopewell and Southampton Power Stations, the Air Pollution Control Program believes that 0.27 lb/MMBtu on a 30-day rolling average is BACT for Boilers 6 and 7.

<u>CO BACT for natural gas Boiler 8</u>

CO is emitted from natural gas boilers as a result of the incomplete combustion of fuel.

[1] A cost analysis is available in the application.
[2] RBLC IDs VA-0316, VA-0317, and V-0318.

This incomplete combustion results in a loss of boiler efficiency. Therefore, it is desirable to minimize CO emissions as much as possible in order to increase boiler efficiency and reduce fuel use. Boiler CO emission control requires reduction of the CO formed by fuel combustion or reduction of the CO in the boiler exhaust (i.e., postcombustion control).

The following control technologies were identified:

- Good Combustion Practices such as:
    - Boiler tuning
    - Combustion Optimization
    - Operation procedures including during periods of startup, shutdown, and malfunction
    - Instrumentation and controls
    - Reduce air leakages
    - Reduce slagging and fouling of heat transfer surfaces
    - Preventative maintenance
- Oxidation Catalyst
- Thermal Oxidation

Good Combustion Practices

CO is emitted from the boiler as a result of incomplete combustion of fuel and loss of boiler efficiency. The most direct approach for reducing CO emissions is to maximize combustion efficiency through good combustion practices while at the same time minimizing NO_x formation. In general, a balance must be struck between CO and NO_x emissions as NO_x and CO emissions resulting from combustion are inversely related. This involves proper staging of the combustion process by monitoring and controlling the operating parameters of the boilers to ensure continual operation as close to optimum (i.e., minimum emission) conditions as possible.

Oxidation Catalyst

Catalytic oxidation is an available post-combustion CO control technology. A CO oxidation catalyst system works to reduce CO emissions by routing the boiler exhaust gases through a reactor containing catalyst material. The catalytic material typically used is a precious metal such as platinum or palladium. The catalyst oxidizes CO to CO_2. The catalyst also oxidizes other gases in the boiler exhaust passing through the reactor such as VOC and SO_2. The exhaust gas temperature must be greater than 500°F to 600°F for this CO catalytic reaction to take place with acceptable effectiveness.

Based on a site inspection of Boiler 8, it is not viable to install the ductwork that would be required to install the CO catalyst downstream of the economizer; therefore, in order to achieve the temperature necessary for CO emissions removal across the catalyst, the gas leaving the existing ID fan will need to be reheated. This arrangement is typically called a tail-end installation. Supplemental heating would be provided by a natural gas duct burner. A new gas-to-gas heat exchanger would be installed to recapture the supplemental heat to the extent practical. A new ID fan would be required to overcome the additional system draft resistance associated with the new equipment.

The increase in emissions associated with a new natural gas duct burner, the cost impacts of a new natural gas duct burner and duct modifications[3], and the energy impacts of a new natural gas duct burner render this control technology inappropriate for application on Boiler 8.

Thermal Oxidation

Thermal oxidation also oxidizes CO to CO_2, but without the use of a catalyst. Temperatures in excess of 1,500°F are required.

Thermal oxidation would result in greater emissions, cost, and energy increases than catalytic oxidation; therefore, this control technology is considered inappropriate for application on Boiler 8.

Good combustion practices have been selected as BACT for Boiler 8. This determination is consistent with recent determinations in the RBLC for the modification of an existing natural gas-fired boiler. The BACT limit proposed by the applicant is 0.08 lb/MMBtu on a 30-day rolling average. As this is an existing boiler, the boiler is not expected to achieve the same level of boiler efficiency (complete combustion) as a newer boiler. The low NO_x burners, while lowering NO_x emissions can increase CO emissions given the inverse relationship between CO emissions and NO_x emissions from combustion. Given the age of the boiler and the inverse relationship between CO and NO_x, the Air Pollution Control Program agrees that the proposed limit is BACT.

AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient air quality modeling was performed to determine the ambient impact of CO, Acrolein, Benzene, Chlorine, Dioxins/Furans, and Polycyclic Organic Matter (POM). Modeling was performed for three different load scenarios (100% load, 75% load, and 50% load) and four different operating scenarios (rural with and without downwash and urban with and without downwash) using AERSCREEN. The highest modeled impacts are provided in the following table:

[3] A cost analysis is available in the application.

Pollutant	Load	Operating Scenario	Modeled Impact ($\mu g/m^3$)	SIL/RAL ($\mu g/m^3$)	Time Period
CO	50%	Urban-Downwash	1,127.25	2,000	1-hour
	100%		393.03	500	8-hour
Acrolein	100%	Urban-Downwash	0.02	6.9	24-hour
			0.00334	0.02	Annual
Benzene	100%	Urban-Downwash	0.556	1.0	24-hour
			0.0902	1.2	Annual
Chlorine	All[4]	Urban[5]	0.124	3.95	24-hour
			0.0206	3.95	Annual
Dioxins/Furans	All[4]	Urban[5]	0.0000435	0.3	Annual
POM	50%	Urban-Downwash	0.00481	0.16	24-hour
			0.000802	0.16	Annual

The results indicate that the modeled impacts of each pollutant are below its respective SIL/RAL; therefore, no further requirements are deemed necessary.

For a more detailed discussion of the modeling results, please refer to the modeling memorandum titled, "AAQIA for the Columbia Municipal Power Plant – PSD Modeling – CO and HAPs" (May 2015) and "AAQIA for the Columbia Municipal Power Plant – PSD Modeling – CO Limit – Revision 1" (August 2015).

STAFF RECOMMENDATION

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

Alana L. Hess
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, March 6, 2015, received March 18, 2015, revised April 1, 2015, April 6, 2015, April 14, 2015, May 18, 2015, June 18, 2015, and July 13, 2015, designating Columbia Municipal Power Plant as the owner and operator of the installation.
- Ambient Air Quality Analysis for the Columbia Municipal Power Plant – PSD Modeling – CO and HAPs (May 2015)
- Ambient Air Quality Analysis for the Columbia Municipal Power Plant – PSD Modeling – CO Limit – Revision #1 (August 2015)

[4] Differences in concentrations between operating loads were minimal.
[5] The use of building downwash did not impact overall emissions.

APPENDIX A

Abbreviations and Acronyms

%............ percent
ºF .... degrees Fahrenheit
acfm .... actual cubic feet per minute
BACT...... Best Available Control Technology
BMPs...... Best Management Practices
Btu.......... British thermal unit
CAM........ Compliance Assurance Monitoring
CAS .... Chemical Abstracts Service
CEMS ..... Continuous Emission Monitor System
CFR .... Code of Federal Regulations
CO.......... carbon monoxide
CO_2 .... carbon dioxide
CO_2e .... carbon dioxide equivalent
COMS ..... Continuous Opacity Monitoring System
CSR .... Code of State Regulations
dscf .... dry standard cubic feet
EIQ.......... Emission Inventory Questionnaire
EP .... Emission Point
EPA .... Environmental Protection Agency
EU........... Emission Unit
fps........... feet per second
ft.............. feet
GACT...... Generally Available Control Technology
GHG........ Greenhouse Gas
gpm .... gallons per minute
gr .... grains
GWP .... Global Warming Potential
HAP .... Hazardous Air Pollutant
hr .... hour
hp............ horsepower
lb............. pound
lbs/hr ...... pounds per hour
MACT ..... Maximum Achievable Control Technology
$\mu g/m^3$ ...... micrograms per cubic meter
m/s .... meters per second
Mgal .... 1,000 gallons
MW .... megawatt
MHDR..... maximum hourly design rate
MMBtu.... Million British thermal units
MMCF..... million cubic feet
MSDS ..... Material Safety Data Sheet
NAAQS... National Ambient Air Quality Standards
NESHAPs National Emissions Standards for Hazardous Air Pollutants
NO_x......... nitrogen oxides
NSPS...... New Source Performance Standards
NSR........ New Source Review
PM .... particulate matter
$PM_{2.5}$....... particulate matter less than 2.5 microns in aerodynamic diameter
PM_{10}........ particulate matter less than 10 microns in aerodynamic diameter
ppm........ parts per million
PSD .... Prevention of Significant Deterioration
PTE......... potential to emit
RACT...... Reasonable Available Control Technology
RAL .... Risk Assessment Level
SCC........ Source Classification Code
scfm .... standard cubic feet per minute
SDS .... Safety Data Sheet
SIC.......... Standard Industrial Classification
SIP.......... State Implementation Plan
SMAL ..... Screening Model Action Levels
SO_x......... sulfur oxides
SO_2......... sulfur dioxide
tph.......... tons per hour
tpy .... tons per year
VMT........ vehicle miles traveled
VOC........ Volatile Organic Compound

Response to Public Comments on the
Prevention of Significant Deterioration Permit for
Columbia Municipal Power Plant (019-0002)
Project 2015-03-068

The draft Prevention of Significant Deterioration Permit, Project 2015-03-068, for Columbia Municipal Power Plant (019-0002) was placed on public notice as of August 21, 2015, for a 40-day comment period. The public notice was published on the Department of Natural Resources' Air Pollution Control Program's web page at: http://www.dnr.mo.gov/env/apcp/PermitPublicNotices.htm and in the Columbia Daily Tribune on Friday, August 21, 2015.

On September 29, 2015, the Air Pollution Control Program received comments from Mark A. Smith, Air Permitting and Compliance Branch Chief for EPA Region VII. On September 30, 2015, the Air Pollution Control Program received comments from Caroline Pufalt, Conservation Chair for the Missouri Chapter of the Sierra Club. The Air Pollution Control Program did not receive any other comments on the draft Prevention of Significant Deterioration Permit while it was on public notice. The comments from EPA and the Sierra Club are addressed below.

EPA Comment #1:
First, CMPP is proposing to undertake an environmentally beneficial project to reduce nitrogen oxide (NO_x) emissions and cease coal combustion at their facility located in Columbia, Missouri. The facility, which is a major stationary source under the Prevention of Significant Deterioration (PSD) regulation, consists of three boilers. Boilers 6 and 7 are coal and biomass fired stoker units. Boiler 8 is a natural gas fired unit. For Boiler 8, CMPP proposes to install a low NO_x combustion system (LNB) with flue gas recirculation (FGR) and to replace the existing air heater with an economizer. For Boilers 6 and 7, CMPP proposes to cease coal combustion and only burn biomass. To facilitate operation of 100% biomass, Boiler 6 and Boiler 7 will replace the grates, add fuel feeder equipment and install over-fire air. CMPP plans to cease coal combustion as of January 30, 2016.

The grate replacement, fuel feeder replacement and the installation of over-fire air on Boilers 6 and 7 appear to be modifications, as defined in 40 CFR §60.2, necessary to burn 100% biomass. In the Emissions Calculations section of its permit application, CMPP appears to exclude certain emissions from its calculations of projected actual emissions increases, pursuant to 40 CFR §52.21(b)(41)(ii)(c). As that provision states, if these modifications are related to the increased use of Boiler 7, then the emissions associated with this increase may not be excludable. Therefore, EPA recommends MDNR require CMPP to explain how Boiler 6 and Boiler 7 were each capable of 100% biomass without the modification being undertaken or how the modifications are otherwise unrelated to the significant increase in anticipated operations. Likewise, CMPP should explain how the modifications being made to Unit 8, including the economizer, affect the ability of the unit to operate more in the future. Again, any resulting emissions increases that are related to the economizer project may not be excludable from projected actual emissions.

Additionally, based on CMPP's claimed heat input capacities in its permit application, Boiler 6 operated at a capacity factor of 2 – 18% in the baseline years 2009 to 2014; Boiler 7 operated at a capacity factor of 7 – 32% and Boiler 8 at a capacity factor of 0 – 4%. CMPP proposes to limit the use of Boiler 6 to 250 hours per year, or an approximate capacity factor of 3% – well within the historical operations of the boiler. For Boilers 7 and 8, CMPP proposes to limit the boilers to 4,380 hours per year, representing an approximate 50% capacity factor. Where Units 7 and 8 operated well below their projected actual emissions, it calls into question if emissions excluded from projected emissions could have been be achieved in the baseline, or not.

During the 60 month baseline period, Boilers 6, 7 and 8 were completely shut down for 33, 18 and 39 months, respectively. Further, Boilers 6, 7, and 8 operated at greater than 50% of the design heat input for only 11, 26, and 3 months respectively. Some of the units were off-line for extended periods of time. EPA recommends MDNR require CMPP to submit an analysis for each month in the 60-month baseline period describing the physical and economic readiness of Boilers 6, 7 and 8 to operate. CMPP should provide a detailed discussion demonstrating that the units were available to be operated during these shutdown months. If the units were not available, then CMPP may not be able to claim credit for excludable emissions during these months.

Lastly, CMPP calculates excludable emissions for each pollutant by multiplying the highest mass emissions in a single month by 12, in order to annualize those emissions. This approach may be problematic, especially if, as noted above, a unit was unable to operate during any of those 12 months or the emissions were not excludable because they are related to the project. Monthly mass emissions are comprised of two elements, the monthly heat input and the pollutant emission rate. In the months in which CMPP selected the highest mass emissions, the result was a consequence of a higher emission rate than would be allowed following the project. As one example, the annualized SO_2 rate used to exclude emissions for Unit 7 was 3.23 lb SO_2/mmBtu, rather than the 0.22 lb/mmBtu expected following the biomass conversion. Since CMPP is not allowed to burn coal or emit SO_2 at 3.23 lb/mmBtu in the future, emissions should not be annualized and excluded on this basis. EPA observed that this same technique was used by CMPP for all pollutants, and recommends that MDNR require CMPP to re-characterize these emissions by multiplying the incremental heat input that could have been accommodated during the baseline, if any, by the post project emission rate. This assures that any unutilized heat input, if creditable, is available for use following the project at its future permitted rate.

In summary, EPA questions CMPP's assertion that these boilers were capable of operating at a sustained level of operations claimed in the "excludable" emissions analysis and recommends that MDNR require CMPP to address the comments above. To be clear, in making these comments EPA is not rendering a specific determination on the applicability of the NSR program's requirements to the projects contained in CMPP's permit application.

Columbia Municipal Power Plant's Response:
The CMPP would like to reiterate that this project will not cause or contribute to an increase in operation of the CMPP. As previously stated this project will not cause an increase in utilization of the facility as facility operation is driven by the City's electric demand. Any future increase in utilization would be caused by demand growth.

MDNR's Response:
Columbia Municipal Power Plant is not able to combust 100% biomass in Boilers 6 and 7 without the replacement of their fuel feeders. Without the replacement of the fuel feeders, Boilers 6 and 7 would only be able to accommodate 50% biomass per Project 2009-04-052.

Columbia Municipal Power Plant has stated that none of the modifications included within this PSD permit will increase the maximum hourly design heat inputs of the boilers. Boiler 6 has a maximum hourly design rate of 248 MMBtu/hr. Boiler 7 has a maximum hourly design rate of 371 MMBtu/hr. Boiler 8 has a maximum hourly design rate of 422 MMBtu/hr.

The excludable emissions analysis has been re-evaluated using the incremental heat input that could have been accommodated during the baseline period and multiplying by the post project emission rate. As the baseline annual heat input to Boiler 6 is greater than the requested future annual heat input to Boiler 6, it is clear that the boiler was both physically and operationally capable of accommodating the requested annual heat input during the baseline period. Although the baseline annual heat input in Boiler 7 is lower than the requested future annual heat input, Columbia Municipal Power Plant has submitted documentation indicating that Boiler 7 was physically and operationally ready for an average of 6,822 hours during the baseline period (which equates to 2,530,777 MMBtu); therefore, Boiler 7 could have accommodated 1,624,980 MMBtu of heat input during the baseline period. Although the baseline annual heat input in Boiler 8 is lower than the requested future annual heat input, Columbia Municipal Power Plant has submitted documentation indicating that Boiler 8 was physically and operationally ready for an average of 7,644 hours during the baseline period (which equates to 3,225,768 MMBtu); therefore, Boiler 8 could have accommodated 1,848,360 MMBtu of heat input during the baseline period.

The re-evaluation of the excludable emissions analysis required a lowering of the filterable $PM_{2.5}$ emission limitation in Special Condition 1 in order for the project to remain below the significance levels for total $PM_{2.5}$, but also allowed for an increase in the PM and filterable PM_{10} emission limitations.

EPA Comment #2:
Second, Special Condition 2.A. of the draft permit requires CMPP to “control emissions from Boilers 6 and 7 using fabric filters as specified in the permit application.” After a thorough review and search of CMPP Boiler 8 NO_x Reduction Project Air Permit Application, EPA is unable to locate any reference or specifications for fabric filter control devices. Additionally, permit condition references to an application that is not appended to the permit may not be enforceable from a practical matter. Also, for the purpose of added clarity, MDNR-APCP should consider indicating that these fabric filters are in place to control emissions of particulate matter. In as much as there is no fabric filter discussion in the construction permit application, EPA strongly encourages MDNR-APCP to remove the reference to the permit application and insert the actual specific operating specifications used by CMPP to control PM from Boilers 6 and 7 into Special Condition 2.A.

Columbia Municipal Power Plant’s Response:
CMPP has no issue with the removal of the "as specified in the permit application" language.

MDNR’s Response:
Special Condition 2.A has been revised to read, “Columbia Municipal Power Plant shall control filterable particulate matter emissions from Boilers 6 and 7 using fabric filters.”

EPA Comment #3:
Third, Special Condition 3 of the draft permit requires CMPP to install low NO_x burners and flue gas recirculation on Boiler 8 as specified in the permit application. However, after a thorough review and search of CMPP Boiler 8 NO_x Reduction Project Air Permit Application, EPA is unable to identify any specifications of the proposed low NO_x burners and flue gas recirculation. In addition to the low NO_x burners and flue gas recirculation, CMPP is planning on installation an economizer on Boiler 8; however, the economizer is not mentioned in Special Condition 3. Again, a permit condition reference to an application that is not appended to the permit may not be enforceable. This unenforceability is highlighted by the lack of specifics in the permit application. EPA strongly recommends MDNR-APCP require CMPP to modify their Boiler 8 NO_x Reduction Project Air Permit Application to include a complete and accurate description of the proposed Boiler 8 NO_x control. This description should describe how the low NO_x burners, flue gas recirculation and economizer serve as NO_x control. The discussion should include all specifications including controls to be monitored to verify stated NO_x control. MDNR-APCP should then include all of the CMPP supplied detail in Special Condition 3, to allow for compliance verification.

Columbia Municipal Power Plant's Response:
CMPP has no issue with the removal of the "as specified in the permit application" language. CMPP believes the current permit language is sufficient and NOx is continuously monitored and reported under Part 75.

MDNR's Response:
The "as specified in the permit application" language has been removed from the permit. In order to ensure that the low NO_x burners and flue gas recirculation are being properly maintained and operated to achieve a lower NO_x emission rate, an emission limitation of 0.137 lb/MMBtu has been included in the permit (see Special Condition 4). Compliance shall be demonstrated on a 30-day rolling average using the existing NO_x CEMS.

EPA Comment #4:
Fourth, Special Condition 4.B. of the draft permit requires CMPP to periodically water, wash and/or otherwise clean the pavement to achieve control of fugitive emissions. The term "periodically" may be too vague to be enforceable from a practical matter. Permit conditions must contain sufficient detail to ensure the facility clearly understands the obligations in the permit. Therefore, EPA recommends MDNR-APCP clearly specify a haul road maintenance frequency, with appropriate record keeping for verification.

Columbia Municipal Power Plant's Response:
CMPP believes the current permit language is sufficient.

MDNR's Response:
Special Condition 4 was intended to require the installation to water the haul road as necessary to comply with 10 CSR 10-6.170 *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin.* The installation was given no credit for haul road watering in project emissions calculations. As 10 CSR 10-6.170 applies to the entire installation and does not specifically need to be addressed within this PSD permit, this special condition is being removed (the new NOx requirement detailed in MDNR's response to EPA Comment #4 was added to the permit as Special Condition 4 so that there is no gap in special condition numbering). The installation's operating permit will address 10 CSR 10-6.170 compliance.

EPA Comment #5:
Fifth, CO BACT incorporated into Special Condition 5.B. of the draft permit requires CMPP to operate their boilers using good combustion practices and over-fire air. The discussion of the BACT analysis MDNR-APCP performed and included on pages 20-22 in the Review Summary for the draft permit for spreader stoker boilers 6 and 7, identifies explicit good combustion practices that should be employed to obtain CO BACT control. Therefore, EPA strongly recommends MDNR-APCP incorporate these explicit activities in Special Condition 5.B. BACT should include an identified boiler tuning frequency; detailed steps to achieve combustion optimization; specific instruments and controls (including operating ranges and/or set points); the steps to reduce air leakage, heat transfer surface fouling; and specific preventative measures.

Additionally, the CO BACT selected for the natural gas-fired Boiler 8 is identified as a good combustion practice. Again, the discussion of the BACT analysis MDNR-APCP performed and included in the Review Summary of the draft permit, identifies explicit good combustion practices that should be employed to obtain CO BACT control. Therefore, EPA strongly recommends MDNR-APCP incorporate these explicit activities into the Special Condition. BACT should include an identified boiler tuning frequency; detailed steps to achieve combustion optimization; specific instruments and controls (including operating ranges and/or set points); the steps to reduce air leakage, heat transfer surface fouling; and specific preventative measures.

Columbia Municipal Power Plant's Response:
CMPP believes the current permit language is sufficient and under terms of the permit CO CEMS will be installed that tracks CO on a 1-hr, 8-hr and 30 day rolling average which will show good combustion practices are being utilized.

MDNR's Response:
The CO BACT limits and CO modeling limits in Special Conditions 5.A and 7.B ensure that the boilers are operating according to good combustion practices. Boilers 6 and 7 are subject to the requirements of MACT JJJJJJ which already specifies a boiler tune-up frequency of every five years for Boiler 6 (limited-use) and a biennial boiler tune-up frequency for Boiler 7 (biomass-fired). Boiler 8 is not subject to MACT JJJJJJ; therefore, a biennial tune-up frequency was deemed necessary for the permit. In order to clarify these requirements, Special Condition 5.F has been added to the permit.

EPA Comment #6:
Sixth, the CO BACT requirement in Special Condition 5.E. requires CMPP to calculate the 30-day rolling average CO emission rate as the sum of all hourly CO emission rates (lb/MMBtu) divided by the number of hours of operation during the most recent 30-day period. What is unclear is as what frequency CMPP is required to calculate the rolling average. EPA recommends MDNR-APCP specify how often CMPP is to "roll the data" to verify compliance with the BACT limit.

Columbia Municipal Power Plant's Response:
CMPP has no issue with this being specified in the permit.

MDNR's Response:
Special Condition 5.E has been modified to clarify that the 30-day rolling average CO emission rate must be calculated on a daily basis.

EPA Comment #7:
Seventh, Special Condition 6.G. presents an operational limitation requiring CMPP to calculate and record the 12-month rolling total heat input for each boiler as the sum of each monthly heat input for the most recent 12-months. It is unclear, however, whether or not CMPP is being required to "roll the data" monthly. EPA recommends MDNR-APCP include additional specificity to Special Condition 6.G. identifying the roll frequency.

> **Columbia Municipal Power Plant's Response:**
> CMPP has no issue with this being specified in the permit.
>
> **MDNR's Response:**
> Special Condition 6.G has been modified to clarify that the 12-month rolling total heat input must be calculated on a monthly basis.

EPA Comment #8:
Finally, the draft permit Review Summary Project Description begins by stating that Columbia Municipal Power Plant "wishes" to cease combusting coal in Boilers 6 and 7 by no later than January 31, 2016. However, CMPP states on page 1-1 of the project application introduction that they "will cease combustion as of January 30, 2016." Therefore, the cessation of coal combustion is not a "wish" but a "must". This being the case, this cessation of coal combustion by no later than January 31, 2016 is more appropriately an enforceable permit condition and EPA recommends MDNR-APCP include this requirement as a Special Condition.

> **Columbia Municipal Power Plant's Response:**
> CMPP has no issue with the cessation of coal combustion being a permit condition and requests the condition state that the cessation of coal combustion be no later than 1/30/16.
>
> **MDNR's Response:**
> Special Condition 6.H has been added to the permit which requires the cessation of coal combustion by no later than January 30, 2016.

Sierra Club Comments:
In MDNR's evaluation, does this project meet the requirements for biomass compliance under the Clean Power Plan? In order to be considered as complying with the CPP as zero emission generation, it should be determined that burning the project's biomass produces less CO2 than if that biomass had not been burned. Has this project been evaluated against that criteria? If not, why not?

> **Columbia Municipal Power Plant's Response:**
> Boiler 6 and 7 are not affected EGU's under the Clean Power Plan (CPP).
>
> §60.5845 What affected EGUs must I address in my State plan?
>
> (b) An affected EGU is a steam generating unit, IGCC, or stationary combustion turbine that meets the relevant applicability conditions specified in paragraph (b)(1) through (3) of this section except as provided in §60.5850.

(2) Has a base load rating (i.e., design heat input capacity) greater than 260 GJ/hr (250 MMBtu/hr) heat input of fossil fuel (either alone or in combination with any other fuel);

§60.5850 What EGUs are excluded from being affected EGUs?

(a) EGUs that are excluded from being affected EGUs are:

(3) Non-fossil units (i.e., units that are capable of combusting 50 percent or more non-fossil fuel) that have always historically limited the use of fossil fuels to 10 percent or less of the annual capacity factor or are subject to a federally enforceable permit limiting fossil fuel use to 10 percent or less of the annual capacity factor.

Boiler 6 and 7 will be permitted to burn 100% biomass and are therefore not affected EGUs under the CPP. Since they are not affected EGU's no CPP requirements need to be addressed.

MDNR's Response:
This permit is being issued under 10 CSR 10-6.060(8) which incorporates §52.21 Prevention of Significant Deterioration of Air Quality by reference. §52.21 does not require an evaluation against the criteria in the Clean Power Plan. Compliance with the Clean Power Plan will be determined as the Air Pollution Control Program develops Missouri's state plan.

Christian Johanningmeier
Power Production Superintendent
Columbia Municipal Power Plant
P.O. Box 6015
Columbia, MO 65201

RE: New Source Review Permit - Project Number: 2015-03-068

Dear Mr. Johanningmeier:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. Also, note the special conditions on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your new source review permit application, and submittal of a revised Part 70 operating permit renewal application is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to §§621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the administrative hearing commission, whose contact information is: Administrative Hearing Commission, Truman State Office Building, Room 640, 301 W. High Street, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: www.oa.mo.gov/ahc.

If you have any questions regarding this permit, please do not hesitate to contact Alana Hess, at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:ahl

Enclosures

c: Northeast Regional Office
PAMS File: 2015-03-068

Permit Number: