JUN 22 2017

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

RE: Prevention of Significant Deterioration Permit Amendment - Permit Number: 122015-003A  
Project Number: 2017-02-051; Installation Number: 019-0002

Dear Mr. Johanningmeier,

The Missouri Department of Natural Resources' Air Pollution Control Program has reviewed your request to install a supplemental 40 MMBtu/hr natural gas burner on Boiler 7 to trim carbon monoxide (CO) emissions. Modeling for the conversion of Boiler 7 from coal to biomass conducted by Columbia Municipal Power Plant showed that some supplemental natural gas would aid Boiler 7 in consistently meeting the CO Best Available Control Technology (BACT) limit of 0.27 lb/MMBtu on a 30-day rolling average in Prevention of Significant Deterioration (PSD) Permit 122015-003. The natural gas burner will be used during periods of start-up, shutdown, and other times during which combustion conditions would result in higher CO emissions. The natural gas burner will not increase Boiler 7's maximum hourly design rate (MHDR) of 371 MMBtu/hr. A maximum of 350,400 MMBtu of natural gas would be combusted in a year. Columbia Municipal Power Plant is not requesting to increase the 12-month rolling total usage limit of 1,624,980 MMBtu on Boiler 7; therefore, any natural gas combustion in the boiler will be offset by a decrease in the allowable amount of biomass combustion during a 12-month rolling period.

Net Emissions Increase

Projected actual emissions from Boiler 7 continue to be based on 1,624,980 MMBtu. The combustion of natural gas results in a lower emission rate than biomass for all criteria pollutants as indicated in Table 1. Projected actual emissions of all criteria pollutants, except CO, remain unchanged from PSD Permit 122015-003 as projected actual emissions are already based on the worst-case fuel (biomass) for Boiler 7. Projected actual emissions of CO have increased as Boiler 6's CO BACT limit is increasing, see the CO BACT analysis portion of this amendment for further information.
Table 1: Criteria Pollutant Natural Gas and Biomass Emission Rate Comparison

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Natural Gas Emission Factor (lb/MMBtu)</th>
<th>Emission Factor Source</th>
<th>Biomass Emission Factor (lb/MMBtu)</th>
<th>Emission Factor Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>0.0019 Filterables AP-42 Table 1.4-2</td>
<td></td>
<td>0.082 Filterables Permit Limit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0056 Condensables AP-42 Table 1.4-2</td>
<td></td>
<td>0.017 Condensables AP-42 Table 1.6-1</td>
<td></td>
</tr>
<tr>
<td>PM_{10}</td>
<td>0.0019 Filterables AP-42 Table 1.4-2</td>
<td></td>
<td>0.078 Filterables Permit Limit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0056 Condensables AP-42 Table 1.4-2</td>
<td></td>
<td>0.017 Condensables AP-42 Table 1.6-1</td>
<td></td>
</tr>
<tr>
<td>PM_{2.5}</td>
<td>0.0019 Filterables AP-42 Table 1.4-2</td>
<td></td>
<td>0.056 Filterables Permit Limit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0056 Condensables AP-42 Table 1.4-2</td>
<td></td>
<td>0.017 Condensables AP-42 Table 1.6-1</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>0.082 AP-42 Table 1.4-1</td>
<td></td>
<td>0.27 Permit BACT Limit</td>
<td></td>
</tr>
<tr>
<td>SO_{2}</td>
<td>0.00059 AP-42 Table 1.4-2</td>
<td></td>
<td>0.025 AP-42 Table 1.6-2</td>
<td></td>
</tr>
<tr>
<td>NO_{x}</td>
<td>0.098 AP-42 Table 1.4-1</td>
<td></td>
<td>0.49 AP-42 Table 1.6-2</td>
<td></td>
</tr>
<tr>
<td>VOC</td>
<td>0.0054 AP-42 Table 1.4-2</td>
<td></td>
<td>0.017 AP-42 Table 1.6-3</td>
<td></td>
</tr>
<tr>
<td>CO_{2e}</td>
<td>117.10 40 CFR 98</td>
<td></td>
<td>209.55 40 CFR 98</td>
<td></td>
</tr>
</tbody>
</table>

The combustion of up to 40 MMBtu/hr of natural gas in Boiler 7 will result in increased emissions of hexane; however, hexane emissions from the entire installation remain below the Screening Model Action Level (SMAL) of 10 tons per year at 2.13 tons per year.

CO BACT

As Columbia Municipal Power Plant's request affects the existing BACT limit on Boiler 7, a new BACT analysis was performed using the top-down method as described in PSD Permit 122015-003. The Air Pollution Control Program was unable to identify any new control technologies beyond those listed in PSD Permit 122015-003. For the reasons stated within PSD Permit 122015-003 oxidation catalyst and thermal oxidation were deemed inappropriate; therefore, BACT was determined to be good combustion practices. 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.

The BACT limit established for Virginia Electric and Power Company’s Altavista, Hopewell, and Southampton Power Stations 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.

\[^{1}\text{RBLC IDs VA-0316, VA-0317, and VA-0318.}\]
• 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 had previously determined that the CO BACT limits for Boilers 6 and 7 should be 0.27 lb/MMBtu; however, during the new BACT analysis it was determined that the Air Pollution Control Program erroneously failed to account for the combustion of fossil fuels in the biomass boilers at the Hopewell and Southampton Power Stations during start-up.

The Title V operating permit for the Hopewell Power Station indicates that Units 1 and 2 are each equipped with supplemental 27.5 MMBtu/hr natural gas burners for start-up. The Title V operating permit for the Southampton Power Station indicates that Units 1 and 2 are each equipped with supplemental 27.5 MMBtu/hr fuel oil burners for start-up.

AP-42 indicates that natural gas burners can achieve CO emissions of 0.08 lb/MMBtu and fossil fuel burners can achieve CO emissions of 0.04 lb/MMBtu.

Based on all of the information indicated above, the Air Pollution Control Program believes that the CO BACT limit for Boiler 7 while combusting woody biomass and up to 40 MMBtu/hr natural gas is 0.27 lb/MMBtu on a 30-day rolling average and the CO BACT limit for Boiler 6 while combusting 100% woody biomass is 0.29 lb/MMBtu on a 30-day rolling average.

**Ambient Air Quality Impact**

The installation believes that they will still be able to achieve compliance with the CO modeling emission limits in Special Condition 7 of PSD Permit 122015-003; therefore, no CO modeling was performed as part of this amendment.

**Special Conditions**

PSD Permit 122015-003 is revised by replacing Special Conditions 5.A, 6.B, 6.C, and 9.C with the special conditions contained in this amendment.

- Special Condition 5.A contained the erroneous BACT limits; therefore, this special condition required revision to incorporate the new BACT limits.
• Special Condition 6.B contained the 1,624,980 MMBtu biomass heat input limit for Boiler 7; therefore, this special condition required revision to include natural gas in the heat input limit.

• Special Condition 6.C required Boiler 7 to exclusively combust biomass; therefore, this special condition requires revision to allow for the combustion of natural gas.

• Special Condition 9.C contained the operating requirements for Boiler 7 during particulate matter testing required to demonstrate compliance with Special Condition 1. Natural gas has a significantly lower particulate emission rate than biomass; therefore, Special Condition 9.C was revised to clarify a minimum biomass firing rate during the performance testing.

Applicable Requirements

40 CFR Part 60, Subpart Da – Standards of Performance for Electric Utility Steam Generating Units is not applicable to Boiler 7. Boiler 7 is not capable of combusting more than 250 MMBtu/hr heat input of fossil fuel; therefore, Boiler 7 does not meet the applicability criteria at §60.40a(a)(1).

40 CFR Part 63, Subpart DDDDD – National Emission Standards for Industrial, Commercial, and Institutional Boilers and Process Heaters is not applicable to the installation. The installation became an area source of HAP on January 30, 2016 when coal combustion ceased. The installation will remain an area source of HAP after the installation of the 40 MMBtu/hr natural gas burner on Boiler 7.

40 CFR Part 63, Subpart JJJJJ – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources is applicable to Boiler 7. Per §63.11237 the biomass subcategory includes any boiler that burns any biomass and is not in the coal subcategory; therefore, Boiler 7 shall comply with the applicable requirements for the biomass subcategory.

10 CSR 10-6.220, 10 CSR 10-6.260, 10 CSR 10-6.405 continue to apply to Boiler 7.

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, United States Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: www.oa.mo.gov/ahc.
If you have any questions regarding this amendment, please do not hesitate to contact Alana Hess, at the department’s 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

Kendall B. Hale
Permits Section Chief

KBH:shj

Enclosures

c: Northeast Regional Office
   PAMS File: 2017-02-051
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

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
<table>
<thead>
<tr>
<th>Emission Point</th>
<th>Description</th>
<th>CO BACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP01</td>
<td>Boiler 6</td>
<td>0.29 lb/MMBtu, based on a 30-day rolling average and the use of over-fire air and good combustion practices</td>
</tr>
<tr>
<td>EP02</td>
<td>Boiler 7</td>
<td>0.27 lb/MMBtu, based on a 30-day rolling average and the use of over-fire air and good combustion practices</td>
</tr>
<tr>
<td>EP03</td>
<td>Boiler 8</td>
<td>0.08 lb/MMBtu, based on a 30-day rolling average and the use of good combustion practices</td>
</tr>
</tbody>
</table>

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

   C. Boiler 6 and 7 Fuel Restrictions
      1) Columbia Municipal Power Plant shall exclusively combust biomass meeting the definition of clean cellulosic biomass at 40 CFR Part 241.2 in Boiler 6.
      2) Columbia Municipal Power Plant shall combust biomass meeting the definition of clean cellulosic biomass at 40 CFR Part 241.2 or natural gas in Boiler 7. No other fuels are permitted. The heat inputs to Boiler 7 from biomass and natural gas shall be combined to demonstrate compliance with Special Condition 6.B.
SPECIAL CONDITIONS:
The permittee is authorized to construct and operate subject to the following special conditions:

9. Performance Testing
   C. Testing shall be conducted at loads of not less than 224 MMBtu/hr for Boiler 6 and 334 MMBtu/hr of biomass 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.
Response to Public Comments on the
Prevention of Significant Deterioration Permit for
Columbia Municipal Power Plant (019-0002)
Project 2017-02-051

The draft Prevention of Significant Deterioration Permit Amendment, Project 2017-02-051, for Columbia Municipal Power Plant (019-0002) was placed on public notice as of April 7, 2017, 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, April 7, 2017. The Air Pollution Control Program received no comments on the draft Prevention of Significant Deterioration Permit Amendment during the public comment period.