Prepared for:

NORTH CAROLINA RENEWABLE POWER - LUMBERTON, LLC
1866 Hestertown Road
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REVISED PSD BACT LIMITS FOR NOx & CO
North Carolina Renewable Power – Lumberton, LLC
Lumberton, North Carolina

Prepared by:

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June 2019

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1 INTRODUCTION

In March 2017, North Carolina Renewable Power (NCRP) submitted a PSD permit application for the addition of poultry litter as a fuel for their biomass power plant in Lumberton, North Carolina. Previously, the plant had been permitted to burn only wood. The application included an analysis of the Best Available Control Technology (BACT) for several pollutants, including carbon monoxide (CO) and nitrogen oxides (NO_X). Since that time, NCRP has determined that the proposed numerical BACT limits for these two pollutants are unachievable, despite having installed the appropriate control measures proposed in the BACT analysis. At the time of the original BACT analysis, the were no boilers of similar configuration firing poultry litter to provide empirical evidence on which to base the numeric limits. Consequently, they were estimated using process knowledge. Subsequently, the plant has had an opportunity to develop emissions data using the CO and NO_X continuous emission monitoring systems installed on the plant's stack. After considerable effort expended to minimize both of these pollutants using the controls deemed to be BACT, NCRP has determined a new set of limits for both of these pollutants that can be achieved.

The purpose of this revision is to propose new limits based on actual operation of the boilers at the plant while firing a mixture of wood and poultry litter. This revision does not include changes to the control technologies proposed in the original BACT analysis. The table below summarizes these newly proposed BACT limits.

Table 1.1 BACT Limits Summary

Pollutant	Emission Limits when burning non-CISWI-subject wood and poultry litter mix [Compliance Method]	Control Technology
Carbon monoxide (CO)	0.65 lb/MMBtu [[CEMS: 30-day rolling average]	Good combustion control
Nitrogen oxides (NO_X)	0.17 lb/MMBtu [CEMS: 30-day rolling average]	Selective non-catalytic reduction (SNCR)

2 CARBON MONOXIDE

CO is generated during the combustion process as the result of incomplete thermal oxidation of the carbon contained within the fuel. As previously determined in the original BACT analysis, the application of good combustion practices represents BACT control.

2.1 BACT Determination for CO

The facility proposes good combustion practices, which includes the addition of an overfire air system, which was installed in 2017, to minimize CO emissions from the wood/litter-fired boilers. Based on recent operation of the boilers and optimization of CO control, the facility has determined that the lowest numeric limit that can be achieved for CO is 0.65 lbs/MMBtu on a 30-day rolling average when combusting a mix of wood and poultry litter as fuel. Therefore, NCRP proposes this limit as BACT.

3 NITROGEN OXIDES BACT

NO_X primarily consists of nitrogen oxide (NO) and nitrogen dioxide (NO_2). NO_X emissions from combustion sources consist of two components: thermal NO_X and fuel NO_X. Thermal NO_X results when atmospheric nitrogen is oxidized at the high temperatures occurring in the boiler firebox to yield NO, NO_2, and other oxides of nitrogen. Most thermal NO_X is formed in high-temperature areas where combustion air has mixed sufficiently with the fuel to produce a peak temperature. As previously determined in the original BACT analysis, the application of selective non-catalytic reduction (SNCR) represents BACT control.

3.1 BACT Determination for NO_X

Based on recent operation of the boilers and optimization of the SNCR control technology, the facility has determined that the lowest numeric limit that can be achieved for NO_X is 0.17 lbs/MMBtu on a 30-day rolling average when combusting a mix of wood and poultry litter as fuel. Therefore, NCRP proposes this limit as BACT.