

*Prepared for:*

**NORTH CAROLINA RENEWABLE POWER - LUMBERTON, LLC**  
1866 Hestertown Road  
Lumberton, NC 28359

**REVISED PSD BACT  
LIMITS FOR NO<sub>x</sub> & CO**  
**North Carolina Renewable Power –  
Lumberton, LLC**  
**Lumberton, North Carolina**

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June 2019

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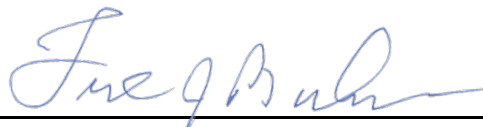
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# 1 INTRODUCTION

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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<sub>x</sub>). 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, there 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<sub>x</sub> 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**

<b>Pollutant</b>	<b>Emission Limits when burning non-CISWI-subject wood and poultry litter mix [Compliance Method]</b>	<b>Control Technology</b>
Carbon monoxide (CO)	0.65 lb/MMBtu [[CEMS: 30-day rolling average]	Good combustion control
Nitrogen oxides (NO <sub>x</sub> )	0.17 lb/MMBtu [CEMS: 30-day rolling average]	Selective non-catalytic reduction (SNCR)

## 2 CARBON MONOXIDE

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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

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NO<sub>x</sub> primarily consists of nitrogen oxide (NO) and nitrogen dioxide (NO<sub>2</sub>). NO<sub>x</sub> emissions from combustion sources consist of two components: thermal NO<sub>x</sub> and fuel NO<sub>x</sub>. Thermal NO<sub>x</sub> results when atmospheric nitrogen is oxidized at the high temperatures occurring in the boiler firebox to yield NO, NO<sub>2</sub>, and other oxides of nitrogen. Most thermal NO<sub>x</sub> 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<sub>x</sub>

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<sub>x</sub> 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.