NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date:

Region: Fayetteville Regional Office
County: Robeson
NC Facility ID: 7800166
Inspector's Name: Gregory Reeves
Date of Last Inspection: 04/26/2019
Compliance Code: W / Violation - procedures

Facility Data

Applicant (Facility's Name): North Carolina Renewable Power - Lumberton, LLC

Facility Address:
North Carolina Renewable Power - Lumberton, LLC
1866 Hestertown Rd
Lumberton, NC 28358

SIC: 4911 / Electric Services
NAICS: 221112 / Fossil Fuel Electric Power Generation

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 15A NCAC 02D .0540
NSPS: N/A
NESHAP: N/A
PSD: N/A
PSD Avoidance: Yes
NC Toxics: Yes
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Tim Cotner Plant Manager (910) 887-6313 1866 Hestertown Road Lumberton, NC 28359	Carey Davis Executive Vice President (205) 403-5273 2100 Southbridge Parkway, Suite 540 Birmingham, AL 35209	Rick Houser EH&S Manager (910) 887-6314 1866 Hestertown Road Lumberton, NC 28358

Application Data

Application Number: 7800166.19B
Date Received: 02/26/2019
Application Type: Modification
Application Schedule: TV-Reopen for Cause

Existing Permit Data

Existing Permit Number: 05543/T26
Existing Permit Issue Date: 10/11/2019
Existing Permit Expiration Date: 08/31/2022

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2018	156.30	158.21	57.59	537.41	17.69	11.55	7.86 [Hydrogen chloride (hydrochlori]
2017	93.30	186.60	2.15	1262.20	19.71	11.71	7.16 [Hydrogen chloride (hydrochlori]
2016	7.57	47.93	1.28	408.17	8.91	4.77	3.21 [Hydrogen chloride (hydrochlori]
2015	3.17	40.85	1.02	186.35	5.74	2.17	1.46 [Hydrogen chloride (hydrochlori]
2014	---	---	---	---	---	---	.00E+00 [Antimony & Compounds (total)]

Review Engineer: Betty Gatano

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue 05543/T27
Permit Issue Date:
Permit Expiration Date:

1. Purpose of Applications

North Carolina Renewable Power – Lumberton, LLC (NCRP) currently holds Title V Permit No. 05543T26 with an expiration date of August 31, 2022 for a cogeneration power plant in Lumberton, Robeson County, North Carolina. The following permit applications are being consolidated under this permit:

- Permit Application No. 7800166.19A – This application is a minor modification to add poultry cake as permitted fuel for the facility's boilers (ID Nos. ES-1A and ES-1B). The facility is currently permitted to burn up to 85% poultry litter (based on potential emissions). The maximum fuel mix proposed with this application will be up to 85% poultry litter and a wood and poultry cake combination of 15%, by weight. The actual fuel mix is expected at approximately 40% percent poultry litter, with the remaining 60% as wood and poultry cake, according to plant personnel.

- Permit Application No. 7800166.19B – This permit modification is a re-open for cause issued by the DAQ in a letter dated February 26, 2019. The re-open for cause addresses Prevention of Significant Deterioration (PSD) applicability for the fourth belt dryer (ID No. ES-21) at the facility.

- Permit Application No. 7800166.19C – The 502(b)(10) notification was received on February 18, 2019. NCRP proposes to add a fly ash storage pile to the site.

- Permit Application No. 7800166.19D – The 502(b)(10) notification was received on May 24, 2019. NCRP proposes to add eggshells for control of sulfur dioxide (SO_2) emissions from the facility's boilers (ID Nos. ES-1A and ES-1B).

2. Facility Description

As currently permitted, NCRP fires non-CISWI subject wood and poultry litter in its two stoker boilers (ID Nos. ES-1A and ES-1B). The boilers operate as cogeneration units, with the steam produced used to generate electricity in the existing turbine and sold to the local utility.

The boilers are equipped with several different controls to reduce pollutant emissions. Each boiler is equipped with a selective non-catalytic reduction (SNCR) system (ID Nos. CD-1A3 and CD-1B3). After the treatment with ammonia, the exhaust gas is sent to multiclones (ID Nos. CD-1A2 and CD-1B2) followed by bagfilters (ID Nos. CD-1A and CD-1B) to reduce the particulate matter (PM) emissions. If controls are required for SO_2 or acid gases to meet emission limits, two dry sorbent injection systems (ID Nos. CD1A4 and CD1B4) are used to inject either sodium sesquicarbonate (trona) or sodium bicarbonate in the flue gas exhaust between the multiclones and the bagfilters. The most recent inspection report[1] indicated the dry sorbent injection system is currently used only sporadically as needed but will likely increase as the percentage of poultry litter being introduced into the fuel blend increases.

NCRP is also permitted to operate four belt dryers (ID Nos. ES-17, ES-18, ES-19, and ES-21) and a drum dryer (ID No. ES-22). The belt dryers are used to reduce the moisture content of wood chips from 50% to 7%. Although the dryers can be used to dry the wood chips that will be fed to the

[1] Greg Reeves (04/25/2018).

boilers, this situation is highly unlikely. The primary purpose of the belt dryers is to dry wood chips to be sold offsite as product. Hot water from the condenser on the steam turbine is the sole source of heat for the belt dryers. These three belt dryers (ID no. ES-17, ES-18, and ES-19) have been constructed and are operating. The drum dryer will have a natural gas-fired burner and will be controlled by a multi-cyclone (ID No. CD-6) and a regenerative thermal oxidizer (ID No. CD-7). The drum dryer will primarily be used to dry and "sanitize" wood chips for sale to (primarily overseas) customers, but some of the drum dryer's output will be fuel for the boilers. Construction on the drum dryer and the fourth belt dryer has not yet begun.

3. Application Chronology

December 14, 2018	DAQ issued a re-open for cause letter to address PSD applicability for the fourth belt dryer (ID No. ES-21) at the facility. The letter was sent via certified mail but was never received by NCRP.
January 22, 2019	DAQ received a permit application for a minor modification under 15A NCAC 02Q .0515. The application was not signed by the responsible official nor was the correct permit fee submitted.
February 1, 2019	DAQ received a signed permit application (7800166.19A) with the remaining permit fee for a minor modification under 15A NCAC 02Q .0515. The permit application was deemed complete.
February 12, 2019	DAQ issued a second re-open for cause letter (7800166.19B) to address PSD applicability for the fourth belt dryer (ID No. ES-21) at the facility. The letter was sent via certified mail and was delivered to NCRP on February 20, 2019.
February 13, 2019	DAQ issued an acknowledgement letter allowing NCRP to implement the proposed changes in the minor modification immediately, provided the facility complied with both the applicable requirements governing the changes and the interim permit terms and monitoring, recordkeeping, and reporting conditions identified in the application.
February 18, 2019	DAQ received a 502(b)(10) request (7800166.19C) from NCRP to add a fly ash storage pile at the site.
February 26, 2019	DAQ issued a 502(b)(10) acknowledgement letter for the project to add a fly ash storage pile.
February 26, 2019	DAQ received a response to the re-open for cause letter from NCRP. The facility waived its 60-day notice requirement and agreed to accept a 40 ton per consecutive 12 month period on VOC emissions from the fourth belt dryer (ID No. ES-21).
March 12, 2019	Greg Reeves of Fayetteville Regional Office (FRO) provided comments on the permit application for minor modification.

March 14, 2019	Betty Gatano e-mailed Frank Burbach, consultant for NCRP, with questions about the minor modification and requested an updated D1 form and emission calculations that included the fly ash pile and belt dryers.
May 17, 2019	Frank Burbach provided a response including revised calculations.
May 24, 2019	DAQ received a 502(b)(10) request (7800166.19C) from NCRP to add eggshells to the boiler fuel for control of SO_2 emissions from the boilers.
May 31, 2019	DAQ issued a 502(b)(10) acknowledgement letter for the project to add eggshells to the boiler fuel.
June 12, 2019	In an e-mail, NCRP requested to modify the emission source description of the belt dryers (ID no. ES-17, ES-18, ES-19, and ES-21). NCRP requested to change the capacity in the emission description from 6 tons per hour, each to 30 tons per hour, each.
June 21, 2019	Fran Burbach submitted updated, revised emission calculations. In reviewing the revised emission calculations, Betty Gatano discovered that formaldehyde emissions from the belt dryers exceeded the Toxic Air Pollutant (TAP) Permitting Emission Rate (TPER).
August 5, 2019	NCRP submitted air dispersion modeling for formaldehyde.
August 15, 2019	In an e-mail, Nancy Jones of the AQAB of the DAQ approved the air dispersion modeling and indicated it showed compliance with NC Air Toxics. The official memorandum, which includes revised modeling associated with PSD permit application 7800166.17C, is under development.
August 16, 2019	Draft permit and permit review forwarded internally for comments.
August 21, 2019	Received comments from Greg Reeves of the FRO.
September 3, 2019	Nancy Jones e-mailed Santosh Chandura, consultant for NCRP, regarding questions related to the PSD modeling.
September 26, 2019	Received comments from Mark Cuilla, Permitting Supervisor.
Oct. 21 and 28, 2019	Santosh Chandura provided the requested information to Nancy Jones.
October 30, 2019	Nancy Jones approved the air dispersion modeling.
November 1, 2019	Draft permit and review forwarded to facility.
November 15, 2019	Received comments from Rick Houser from NCRP.
November 18, 2019	Received comments from Frank Burbach
November 22, 2019	Draft permit and permit review forwarded to public notice.

4. Permit Modifications/Changes and TVEE Discussion

The following table describes the changes to the current permit as part of this modification.

Pages	Section	Description of Changes
Cover and throughout	--	Updated all dates and permit revision numbers.
3	1.0 - Equipment table	• Modified description of boilers (ID Nos. ES-1A and ES-1B) to include poultry cake as a fuel and eggshells (2 tons/hour maximum rate). • Modified the maximum capacity of the belt dryers (ID Nos. ES-17, ES-18, ES-19, and ES-21) to 30 tons per hour. • Added fly ash storage pile (ID No. ES-23).
4	2.1 A.1 – Equipment list	Modified description of boilers (ID Nos. ES-1A and ES-1B) to include poultry cake as a fuel and eggshells (2 tons/hour maximum rate).
4	2.1 A – Regulations table	Added equation for allowable PM pursuant with 15A NCAC 02D .0504 when firing wood, poultry litter, and poultry cake.
5	2.1 A.1.b	• Added equation for allowable PM pursuant with 15A NCAC 02D .0504 when firing wood, poultry litter, and poultry cake. • Renumbered permit condition accordingly.
14	2.1 C – Equipment List	Modified the maximum capacity of the belt dryers (ID Nos. ES-17, ES-18, ES-19, and ES-21) to 30 tons per hour, each.
14	2.1 C – Regulations table	• Removed reference to source testing. • Added reference to PSD avoidance condition for VOC emissions from the fourth belt dryer (ID No. ES-21).
--	2.1 C.1 (old numbering)	Removed condition requiring testing of the belt dryers. The Permittee completed the required testing on August 22 and 23, 2018.
14	2.1 C.1 (new numbering)	Added permit condition for PSD avoidance condition for VOC emissions from the fourth belt dryer (ID No. ES-21).
19	2.1 E	Added fly ash storage pile (ID No. ES-23).
25	2.2 A.3.d	Removed formaldehyde from the facility-wide TPER table.
25	2.2 B.1	Added modeled emission limits for formaldehyde that demonstrate compliance with NCAC 02D .1100 for non-GACT emission sources.
28 – 37	Section 3	Updated the General Conditions to the most recent revision (V5.3 08/21/2018).
--	Attachment 1	Updated the list of acronyms.

The following changes were made to the Title V Equipment Editor (TVEE) under this permit modification.

- Product description for the boilers (ID Nos. ES-1A and ES-1B) was modified to include the poultry cake and eggshells.
- The maximum capacity of the belt dryers (ID Nos. ES-17, ES-18, ES-19, and ES-21) was modified to 30 tons per hour, each.
- Fly ash storage pile (ID No. ES-23) was added.

5. Minor Modification (Application No. 7800166.19A)

Poultry cake (aka press cake) is a byproduct of poultry rendering. Fats, oils and greases from mortalities and other poultry processing operations are converted into solid fuel through stages of evaporation and centrifuge to form the cake. Poultry cake has been approved by the North Carolina Utilities Commission for renewable energy certificates (RECs). The DAQ also issued a Non-Hazardous Secondary Material (NHSM) determination on September 13, 2018 and concluded poultry cake is not a solid waste when used as fuel in a combustion unit. A copy of the NHSM determination is included as Attachment 1 to this document.

As shown in the table below and as specified in the NHSM determination, "all contaminants show that the measured contaminant levels in the press cake are within the range of contaminant concentrations in the traditional fuel (biomass and coal) …" No change in potential emissions are expected as a result of burning poultry cake as fuel.

Table: Comparison of Press Cake Contaminants to Analogous Fuels

Pollutants	Coal	Wood and Biomass Materials	PHW Press Cake Average
Heat Value (Btu/lb)	8,500 – 14,000	4,500 – 9,000	11,861
Antimony	ND - 6.9	ND – 6.0	0.91
Arsenic	ND - 174	ND – 298	0.24
Beryllium	ND - 206	ND – 10	0.15
Cadmium	ND - 19	ND – 17	0.11
Chromium	ND - 168	ND – 340	7.88
Cobalt	ND - 25.2	ND – 213	0.25
Lead	ND - 148	ND – 229	1.04
Manganese	ND - 512	ND – 15800	37.0
Mercury	ND - 3.1	ND – 1.1	0.01
Nickel	ND - 730	ND – 175	3.68
Selenium	ND - 74.3	ND – 9.0	0.47
Formaldehyde	NA	1.6 - 27	11.4
Halogens			
Chlorine	ND – 9,080	ND – 5,400	2,932
Fluorine	ND – 178	ND - 128	18.7
Nitrogen (N)	13600-54000	2200-4600	52,467
Sulfur (S)	740-61300	ND-6100	4,890

Note: All data are reported on a dry weight basis unless indicated otherwise.

Since initially firing poultry litter, NCRP has experienced issues with clinker build up in the boilers. Clinkers, or slag, are made up of non-combustible elements and minerals in wood and poultry litter. When burned, these non-combustible materials melt and fuse together forming clinkers in the high-temperature furnace area of boilers. Clinkers at NCRP have been found primarily on the boilers' water wall tubes and super heater tubes.

Heat transfer is reduced because of the clinkers, and NCRP must operate its boilers at higher temperature to ensure adequate steam production. Increased emissions of nitrogen oxides (NOx) are

produced during the combustion process as a result of these elevated temperatures (i.e., thermal NOx).

Poultry cake is a cleaner burning fuel with a lower ash content than wood. NCRP intends to supplement wood in its fuel mix with poultry cake. NCRP anticipates actual emissions of NOx may improve with the firing of poultry cake because the cleaner burning fuel is expected to reduce clinker formation, thereby reducing thermal NOx emissions.

Emissions

Emissions from the boilers, which are provided in the table below, are not expected to increase with this modification. The contaminants for the poultry cake are within the range for wood/biomass and coal as noted above. Although nitrogen in the poultry cake is much higher than wood/ biomass, an increase is NOx emissions from this fuel is not anticipated. NCRP anticipates the poultry cake will reduce overall NOx emissions because it prevents the buildup of ash on the boiler tubes that elevates the air temperatures resulting in excessive thermal NOx. The facility also monitors NOx emissions via a continuous emission monitoring system (CEMS) to ensure emission limits are met.

Pollutant	**Potential Emissions (tpy)**
CO	1,224.2
NO_x	320.2
SO_2	301.3
PM (filterable)	56.5
PM10 (filterable + condensible)	67.8
PM2.5 (filterable + condensible)	50.9
VOC	56.5
Lead	0.09
H_2SO_4	58.4
CO2e	438,825

Regulatory Review

The boilers (ID Nos. ES-1A and ES-1B) are subject to the following regulations.

- 15A NCAC 02D .0504 "Particulates from Wood Burning Indirect Heat Exchangers" – This rule applies to the boilers (ID Nos. ES-1A and ES-1B) because the primary material fired in the boilers is wood. The allowable PM emission rate in pounds per million Btu is calculated using the following equations:

For firing wood only Ec = $1.1698 \times Q^{-0.223}$ Where Ec = the emission limit for PM for firing wood only in lb/million Btu Q = the maximum heat input in million Btu per hour from firing wood only combusted in the source Q = (215 million Btu per hour heat input each) * 2 Q= 430 million Btu per hour. Ec = $1.1698 \times 430^{-0.223}$ **E_e = 0.30 lb/million Btu**
For fuel (non-wood) only as specified in 15A NCAC 02D .0503 Ec = $1.090 \times Q^{-0.2594}$ Where Ec = the emission limit for PM for fuel wood only in lb/million Btu Q = the maximum heat input in million Btu per hour from firing wood only combusted in the source Q = (215 million Btu per hour heat input each) * 2 Q= 430 million Btu per hour. Ec = $1.090 \times 430^{-0.2594}$ **E_e = 0.23 lb/million Btu**
For firing wood with poultry litter/poultry cake Ec = [(Ew)(Qw) + (Eo)(Qo)] /Qt. Where Ec = the emission limit for combination or combined emission sources in lb/million Btu. Ew = emission limit for wood only in lb/million Btu = 0.30 lb/million Btu Eo = emission limit for other fuels only in lb/million Btu = 0.23 lb/million Btu Qw = the actual wood heat input to the combination or combined emission sources in Btu/hr. Qo = the actual other fuels heat input to the combination or combined emission sources in Btu/hr. Qt = Qw + Qo and is the actual total heat input to combination or combined emission sources in Btu/hr. **Ec = [(0.30)(Qw) + (0.23)(Qo)]/Qt**

The permit will be modified to add the equation for combination fuels to Section 2.1 A.1.b under this permit modification.

- 15A NCAC 02D .0524 "New Source Performance Standards (NSPS)" – With the addition of poultry litter as fuel, the boilers (ID Nos. ES-1A and ES-1B) became subject to "New Source Standards for Industrial-Commercial-Institutional Steam Generating Units," 40 CFR 60 Subpart

Db because the change was deemed a modification under NSPS. The addition of poultry cake as a fuel does not affect the boilers status with respect to NSPS.

- 15A NCAC 02D .0530 "Prevention of Significant Deterioration" – NCRP previously triggered Best Available Control Technology (BACT) analyses for firing non-CISWI subject wood and later for firing non-CISWI wood and poultry litter in the boilers. The BACT limits for non-CISWI subject wood and poultry litter are being added to the permit via Application No. 7800166.17C, which is being processed separately from this permit modification. The addition of poultry cake as a fuel does not trigger a PSD analysis. See Section 9 below for more discussion on PSD and BACT.

- 15A NCAC 02D .0614 "Compliance Assurance Monitoring" (CAM) – CAM is applicable to the boilers at NCRP. This modification does not affect the boilers status with respect to CAM. See Section 9 below for more discussion on CAM.

- 15A NCAC 02D .1111 "Maximum Achievable Control Technology (MACT)" – NCRP has accepted an avoidance condition to be classified as an area source of hazardous air pollutants (HAPs). As an area source, the boilers are subject to the "NESHAP for Areas Sources: Industrial, Commercial, and Institutional Boilers," 40 CFR 63 Subpart JJJJJJ (also referenced as General Available Control Technology (GACT) Subpart 6J). The boilers were constructed prior to June 4, 2010 and are considered existing boilers under this rule. Additionally, the boilers fall in the biomass subcategory under the rule, which "includes any boiler that burns any biomass and is not in the coal subcategory." The addition of poultry cake as a fuel for these boilers does not affect the facility status with respect to GACT Subpart 6J.

- 15A NCAC 02Q .0317 "Avoidance Conditions" – NCRP has accepted facility-wide avoidance conditions for avoidance of 15A NCAC 02D .1111, Maximum Achievable Control Technology. The permit currently limits emissions of any single HAP to less than 10 tons per year and to less than 25 tons per year for any combination of HAPs for avoidance of becoming a Title III major facility. The addition of poultry cake as a fuel for these boilers does not affect the HAP status of the facility.

- 15A NCAC 02Q .0400 "Acid Rain Procedures" – The boilers (ID Nos. ES-1A and ES-1B) at NCRP are currently subject to the Acid Rain Program in accordance with 40 CFR 72 and 15A NCAC 02Q .0400. Even though the boilers no longer burn coal, natural-gas, or fuel-oil, (except for the small amount during startup), the boilers are still considered fossil-fuel fired boilers under the Acid Rain Program. As specified in 40 CFR 72.2, fossil fuel-fired "means the combustion of fossil fuel or any derivative of fossil fuel, alone or in combination with any other fuel, *independent of the percentage of fossil fuel consumed in any calendar year* (expressed in mmBtu)" [emphasis added]. This definition is not found in the PSD regulations under 40 CFR Part 51, and thus, the boilers are NOT considered fossil fuel-fired boilers under PSD. The addition of poultry cake as a fuel for these boilers does not affect the facility status with respect to 02Q .0400.

- Senate Bill 3 (Session Law 2007-397) – The permit currently includes SB3 limits for burning non-CISWI subject wood only in the boilers. The addition of poultry cake as a fuel for these boilers does not affect the SB3 status of the facility.

- 40 CFR Part 97, Subparts, AAAAA, BBBBB, and CCCCC, Cross State Air Pollution Rule [CSAPR] – The boilers at NCRP were previously subject to the 15A NCAC 02D .2400, "Clean Air Interstate Rules" (CAIR). When this rule expired on February 1, 2016, the NCDAQ reopened the permit to remove references to CAIR and replace them with CSAPR. Air Permit No. 05543T23 was issued on March 28, 2016 with the CSAPR rules. These rules are federally-enforceable only, and continued compliance is anticipated. This modification does not affect the facility status with respect to CSAPR.

6. Re-Open for Cause (Application No. 7800166.19B)

On May 10, 2017, the DAQ issued Air Permit No. 05543T24 to NCRP to add a drum dryer (ID No. ES-22) and a fourth belt dryer (ID No. ES-21) to the permit. The belt dryer was to be identical to the three previously permitted belt dryers (ID Nos. ES-17, ES-18, and ES-19), which had not been constructed at that time. Emissions from all belt dryers were expected to be negligible, and the permit required NCRP to conduct testing of the belt dryers to verify this assumption.

Belt dryers ES-17, ES-18, and ES-19 have since been installed, and operation of dryers ES-18 and ES-19 began on March 9, 2018. Testing of the belt dryers occurred on August 22 and 23, 2018. Because all belt dryers are identical, DAQ allowed NCRP to test one of the belt dryers as representative of all. Results of the August 2018 testing showed emissions of volatile organic compounds (VOCs) from a single belt dryer exceeded the significant emission rate (SER) for a PSD major facility as shown in the table below.

Stack ID	Emissions of VOCs (lb/hr)	Production Rate (tons/hr)	VOC Emission Factor (lb/ton)	Annual Emissions of VOC (tpy)	SER for VOC (tpy)
Stack 1	2.20	21.8	0.101	**81.6**	**40**
Stack 3	2.27	32.3	0.070		
Stack 6	2.54		0.079		
Stack 8	2.31		0.072		
Total of 4 Stacks	9.32	---	--		
Total for belt dryer	**18.64**	**--**	**--**		

Notes:
- Brent Hall of the Stationary Source Compliance Branch of the DAQ reviewed the source test report and approved the results in a memorandum dated November 2, 2018.
- Each belt dryer has eight stacks, and DAQ allowed testing of only four stacks. The test results were then doubled to represent emissions from the entire belt dryer.
- Annual emissions were based on operation of 8,760 hours per year.

Assuming all belt dryers are identical, the test results indicate the addition of the fourth belt dryer (ID No. ES-21) to Air Permit No. 05543T24 was a PSD modification. However, NCRP did not conduct a PSD analysis for this modification. Because the fourth belt dryer has not been constructed nor operated, this situation can be rectified by amending the permit to add a 40 ton per year PSD avoidance limit for VOC from the belt dryer.

On February 12, 2019, DAQ issued a re-open for cause letter to NCRP providing the facility a 60-day notice that DAQ intended to reopen the Title V air quality permit to add the 40 ton per year PSD

avoidance limit. NCRP submitted a letter dated agreeing to this emission limit and waiving the 60-day notice.

The PSD avoidance condition is provided below. The highest VOC emission factor (0.101 lb VOC/ton) from the 2018 source testing will be required to calculate emissions from the belt dryer.

Section 2.1 C.1

1. 15A NCAC 02Q .0317: AVOIDANCE CONDITIONS FOR 15A NCAC 02D .0530: PREVENTION OF SIGNIFICANT DETERIORATION

a. In order to avoid applicability of this regulation, this source **(ID Nos ES-21)** shall discharge into the atmosphere less than 40 tons of VOCs per consecutive 12-month period.

Testing [15A NCAC 02Q .0508(f)]

b. If emission testing is required, the Permittee shall perform such testing in accordance with General Condition JJ. If the results of this test are above the limit given in Section 2.1 C.1.a., the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530.

Monitoring/Recordkeeping [15A NCAC 02Q .0508(f)]

c. The Permittee shall maintain records of the throughput of material dried by the belt dryer. The throughput shall be recorded monthly in a logbook (written or electronic format). The Permittee shall be deemed in noncompliance with 15A NCAC 02D .0530 if the throughput is not monitored or the records maintained.
d. Calculations of VOC emissions per month shall be made at the end of each month. VOC emissions shall be determined by multiplying the total amount of material dried by the belt dryer per month by the 0.101 pounds of VOC per ton of material dried in the belt dryer. This emission factor was developed from site specific testing on August 22 and 23, 2018. The Permittee shall be deemed in noncompliance with 15A NCAC 02D .0530 if the VOC emissions are not monitored or if the amount of VOC emissions exceed the limit in Section 2.1 C.1.a above.
e. Calculations and the total amount of VOC emissions shall be recorded monthly in a logbook (written or electronic format). The Permittee shall be deemed in noncompliance with 15A NCAC 02D .0530 if the VOC emissions are not recorded.

Reporting [15A NCAC 02Q .0508(f)]

f. The Permittee shall submit a summary report of monitoring and recordkeeping activities given in Sections 2.1 C.1.c through e above postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. The report shall contain the monthly VOC emissions for the previous 17 months. The emissions must be calculated for each of the 12-month periods over the previous 17 months.

Note belt dryers ES-17, ES-18, and ES-19 were added to the permit when the boilers were initially permitted to fire poultry litter under Air Permit No. No. 05543T21 issued on May 29, 2015. DAQ subsequently deemed that modification as PSD major modification, and a BACT analysis was required for these three belt dryers. The BACT emission limits for these belt dryers are being added to the permit via Application No. 7800166.17C, which is being processed separately from this permit modification.

The facility also tested for emissions of formaldehyde and methanol during the August 2018 stack test. The results are shown in the table below. When the emissions are scaled for all four belt dryers, formaldehyde emissions exceed the TPER of 0.16 lb/hr for unobstructed, vertical stacks.

Stack ID	Emission Test Results		Production
	Formaldehyde	Methanol	Rate
Stack 1	0.03 lb/hr	0.04 lb/hr	21.8 tons/hr
Stack 3	0.03 lb/hr	0.03 lb/hr	32.3 tons/hr
Stack 6	0.04 lb/hr	0.02 lb/hr	
Stack 8	0.03 lb/hr	0.03 lb/hr	
Total 4 Stacks	0.13 lb/hr	0.12 lb/hr	---
Total 8 Stacks (1 Belt Dryer)	**0.26 lb/hr**	**0.24 lb/hr**	**---**
Total 4 Belt Dryers	**1.04 lb/hr**	**0.96**	**---**

Notes:
- Brent Hall of the Stationary Source Compliance Branch of the DAQ reviewed the source test report and approved the results in a memorandum dated November 2, 2018.
- Each belt dryer has eight stacks, and DAQ allowed testing of only four stacks. The test results were then doubled to represent emissions from the entire belt dryer.

NCRP conducted facility-wide air dispersion modeling for formaldehyde to demonstrate compliance with NC Air Toxics. Modeled emissions impact for formaldehyde is shown in the table below as a percentage of the applicable acceptable ambient level (AAL). The air dispersion modeling was reviewed by Nancy Jones of the AQAB, and the results were provided in a memorandum dated October 30, 2019. The modeling analysis demonstrated facility-wide toxics emissions impacts are below applicable standards on a source-by-source basis, as shown in the table below.

TAP	Averaging Period	Max. Conc. (mg/m^3)	AAL (mg/m^3)	% of AAL
Formaldehyde	1-hour	0.0318	0.15	21 %

Sources of formaldehyde emissions at NCRP include the boilers (ID Nos. ES-1A and ES-1B), the emergency fire pump (ID No. IES-1), the belt dryers (ID Nos. ES-17, ES-18, ES-19, and ES-21), and the drum dryer (ID No. ES-22). The boilers and fire pump are subject to GACT standards under 40 CFR Part 63. Such emission sources are exempt from NC Air Toxics in accordance with 15A NCAC 02Q .0702(a)(27)(b). Therefore, formaldehyde emission limits for these sources will not be included in the permit. The following emission limits for formaldehyde emitted from the belt dryers and the drum dryer, which are not GACT sources, will be included in the permit:

Section 2.2 B.1

State Enforceable Only

1. 15A NCAC 02D .1100: CONTROL OF TOXIC AIR POLLUTANTS

a. Pursuant to 15A NCAC 02D .1100 and in accordance with the approved application for an air toxic compliance demonstration, the following permit limits shall not be exceeded.

Emission Source	Toxic Air Pollutant	Emission Limit
Biomass belt dryer (ID No. ES-17)	Formaldehyde	0.26 lb/hr
Biomass belt dryer (ID No. ES-18)	Formaldehyde	0.26 lb/hr
Biomass belt dryer (ID No. ES-19)	Formaldehyde	0.26 lb/hr
Biomass belt dryer (ID No. ES-21)	Formaldehyde	0.26 lb/hr
Drum dryer (ID No. ES-22)	Formaldehyde	0.01 lb/hr

b. The Permittee has submitted a toxic air pollutant dispersion modeling analysis dated August 5, 2019 for the facility's toxic air pollutant emissions as listed in the above table. The modeling analysis was reviewed and approved by the AQAB on October 30, 2019. Placement of the emission sources, configuration of the emission points, and operation of the sources shall be in accordance with the submitted dispersion modeling analysis and should reflect any changes from the original analysis submittal as outlined in the AQAB review memo.

c. No testing/monitoring/recordkeeping/reporting shall be required to demonstrate compliance with 15A NCAC 02D .1100.

* The Permittee elected to include emissions sources exempted by 15A NCAC 02Q .0702(a)(27) in facility-wide air modeling conducted to demonstrate compliance with 15A NCAC 02D .1100.

Finally, NCRP has requested to change the emission description of the belt dryers in the emission source table, Section 1, of the permit. No permit application is needed for this change, because the emission description is not an enforceable permit limit. The facility selected 30 tons per hour for each belt dryer, and this throughput was used to calculate potential to emit for VOCs from the belt dryers. Detailed calculations for the VOC emissions for the belt dryers are provided in Attachment 2.

7. 502(b)(10) Notifications (Application No. 7800166.19C)

This 502(b)(10) notification was received on February 18, 2019. NCRP proposes to store fly ash, which is a by-product of the combustion of wood bio-mass and poultry litter, in a pile at the facility. In the current plant configuration, fly ash from the boilers is contained in a fly ash silo. From there, the fly ash product is routed through a pug mill that sprays water on the fly ash for cooling and augers the material into transfer truck trailers.

NCRP proposes to transfer the fly ash from the pug mill to a storage pile for cooling and dewatering. Once cooled and dried, the fly ash will be shipped off site as product. The cooled and dewater ash is safer for transport and will weigh less, thereby providing more product to the end user.

Emissions

Fugitive emissions of particulate matter are expected from the proposed storage pile. PM emissions from the fly-ash pile will result from several distinct source activities within the storage cycle:

1. Loading of fly ash onto the storage pile (batch operations).
2. Wind erosion of pile surfaces and ground areas around piles.
3. Equipment traffic in storage area.
4. Loadout of fly ash for shipment (batch operations).

Particulate matter emissions resulting from these activities are provided in the table below. Detailed calculations for the PM emissions from the fly ash storage area are provided in Attachment 3.

Pollutant	Potential Emissions (tpy)
PM	35.3
PM10	14.3
PM2.5	4.2

NCRP is not one of the 28 named categories under PSD regulations. In accordance with 40 CFR 51.166(b)(2)(v), "fugitive emissions shall not be included in determining for any of the purposes of this section whether a physical change in or change in the method of operation of a major stationary source is a major modification, unless the source belongs to one of the source categories listed in paragraph (b)(1)(iii) of this section." Because all of the emissions associated with the storage pile are fugitive, this modification does not trigger a PSD analysis.

Increased emissions of TAPs are also associated with this modification. The TAP emissions were calculated by applying site-specific ash analysis to the PM emissions, as shown in Attachment 3. The results for each TAP were then compared to its TPER as shown the table below. Emissions are below their TPER for each TAP.

TAP	Weight Fraction	Emission Rate			TPER		
		lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr
Arsenic	8.50E-08	4.83E-06	1.16E-04	5.99E-03			0.053
Beryllium	1.00E-10	5.68E-09	1.36E-07	7.05E-06			0.28
Cadmium	1.90E-10	1.08E-08	2.59E-07	1.34E-05			0.37
Chromium	1.00E-09	5.68E-08	1.36E-06	7.05E-05		0.013	
Manganese	2.48E-07	1.41E-05	3.38E-04	1.75E-02		0.63	
Nickel	7.00E-09	3.98E-07	9.54E-06	4.94E-04		0.013	

Notes:
Daily emissions calculated by multiplying hourly emissions by 24 hours rather than dividing annual emissions by 365 days per year, for a worst case estimate.

The facility conducted facility-wide modeling for TAPs as part of the PSD permit application (7800166.17C). Results of the air dispersion modeling were approved by Matt Porter of the Air Quality Analysis Branch (AQAB) in a memorandum dated July 28, 2018. Three of the TAPs modeled – arsenic, beryllium, and cadmium – were identified in the site-specific fly ash analysis, as noted above. The results of the air dispersion modeling and the AALs for these three TAPs are provided in the table below.

Pollutant	Averaging Period	Maximum Modeled Impacts % of AAL	AAL ($\mu g/m^3$)
Arsenic	Annual	5.3 %	2.1 x 10-3
Beryllium	Annual	0.1 %	4.1 x 10-3
Cadmium	Annual	0.2 %	5.5 x 10-3

Based on the margin of compliance for the air dispersion modeling and the TAP emissions being less than their TPER, no further analysis for NC Air Toxics is necessary. Compliance with NC Air Toxics is anticipated.

Regulations

The only regulation applicable to the proposed storage pile is 15A NCAC 02D .0540, "Particulates from Fugitive Dust Emission Sources." This rule requires owners and operators to not cause or allow fugitive dust emissions to cause or contribute to substantive complaints or excess visible emissions beyond the property boundary. Reference to this rule is found in General Condition MM of the permit. Compliance with this rule is anticipated.

8. 502(b)(10) Notifications (Application No. 7800166.19D)

A 502(b)(10) letter was received on May 24, 2019 for the use of eggshells to supplement the dry sorbent injection (DSI) systems in controlling acid gases and SO_2 from the facility's boilers (ID Nos. ES-1A and ES-1B).

As currently permitted, NCRP fires non-CISWI subject wood and poultry litter in its two stoker boilers (ID Nos. ES-1A and ES-1B). The boilers at NCRP are equipped with several different controls to reduce pollutant emissions, including the use of DSI systems (ID Nos. CD1A4 and CD1B4) to control acid gases and SO_2. The DSI systems are used to inject either sodium sesquicarbonate (trona) or sodium bicarbonate in the flue gas exhaust between the multiclones and the bagfilters. The control efficiency of the sorbent injection systems is expected to be 80% to 95% for acid gases, such as hydrogen chloride (HCl).

NCRP recently conducted a trial burn[2] using poultry eggshells to supplement the DSI controls. The eggshells, which consist almost entirely of calcium carbonate, were fed into the boilers by mixing them into the fuel. As indicated in the 502(b)(10) letter, the trial burn results showed great success in reducing SO_2 emissions, and the facility intends to use eggshells on a permanent basis.

Poultry eggshells are typically composed of calcium carbonate ($CaCO_3$) (94%), magnesium carbonate (1%), calcium phosphate (1%) and organic matter (4%).[3] A study examining eggshells for

[2] Trial burn approved by DAQ in letter dated September 13, 2018.

[3] Phang Yee Jian (2015) "Flue Gas Desulpurization Using Adsorbent Prepared from Waste Abundant Eggshells." Retrieved from

human nutrition identified trace metals in eggshells from the Netherlands and Slovakia.[4] The analysis of the eggshells is provided in the table below. The analysis identified four TAPs – cadmium, chromium, fluorides, and mercury – among other trace metals in the eggshells.

Component		Slovakian[1]	ES1[2]	ES2[2]	ES3[2]
N	mg/g	3.96 (0.24)	4.01	3.90	4.02
NH_3	mg/g	0.38 (0.11)	0.65	0.66	0.68
Ca	mg/g	401 (7.21)	385	393	387
Mg	mg/g	4.50 (0.50)	3.6	3.6	3.5
P (Total)	mg/g	0.99 (0.21)	1.50	0.20	1.90
Sr	μg/g	372 (161)	380	880	320
Zn	μg/g	5.13 (0.53)	5.0	5.0	.0
Fe	μg/g	22.4 (1.08)	23.0	23.0	22.5
Cu	μg/g	7.7 (1.37)[3]	10.0	13.0	7.5
B	μg/g	≤0.5[3]	0.5	0.5	0.8
Cr	μg/g	0.12 (0.05)[3]	0.20	0.40	0.25
F	μg/g	3.75 (1.04)[3]	6.0	5.5	3.0
Se	ng/g	23.5 (5.0)[3]	45	50	53
V	μg/g	<0.5[3]	<0.5	<0.5	<0.5
Pb	μg/g	<0.5	1.10	1.30	0.53
Al	μg/g	<5	2.0[4]	2.0[4]	2.0[4]
Cd	ng/g	<50	18.0[4]	24.0[4]	3.0[4]
Hg	μg/g	<0.2	<0.2	<0.2	<0.2

[1]Slovakian data (n = 12) are presented as means (SD). For B, V, Pb, Al, Cd, and Hg, the amounts were below the detection limit of the method.

[2]ES1 = Dutch 'four cereal' egg, and ES2 = Dutch 'Gras' egg, ES3 = Dutch battery egg.

[3]n = 6.

[4]Estimated amount.

The boilers at NCRP are subject to 15A NCAC 02D .1111, "Maximum Achievable Control Technology" as promulgated in 40 CFR Part 63, Subpart JJJJJJ, "National Emission Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers" (i.e., GACT Subpart 6J) Because the boilers are subject to a GACT standard under 40 CFR Part 63, they are exempt from NC Air Toxics in accordance with 15A NCAC 02Q .0702(a)(27). However, the DAQ must evaluate TAP emissions from the boilers to demonstrate that burning the eggshells would not present "an unacceptable risk to human health," in accordance with G.S. 143-215. 107(b) as codified on May 1, 2014.

The analysis from the eggshell study and the feed rate of 2 ton of eggshells per hour were used to estimate worst case emissions from burning eggshells. PM emissions from the boilers are controlled with bagfilters, and a control efficiency of 80% of the TAP metals was used in the emission estimates. This control efficiency is specified in the Prevention of Significant Deterioration permit application (7800166.17C) for PM control from the boilers. Worst-case emissions for these TAPs are provided the table below.

http://eprints.utar.edu.my/1741/1/Flue_Gas_Desulphurization_using_Adsorbent_Prepared_from_Waster_Abundant_Eggshell.pdf

[4] Schaafsma, A., et al. (2000) "Mineral, Amino Acid, and Hormonal Composition of Chicken Eggshell Powder and the Evaluation of Its Use in Human Nutrient." retrieved from https://myplasticfreelife.com/wp-content/uploads/2014/01/poultrysci79-1833.pdf

Compound	Analysis	TAP Emission Rate			TPER			Is TPER exceeded?
		(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	
Chromium	0.4 µg/g	3.2E-04	0.00768	2.8			0.0056	YES
Fluoride	6 µg/g	0.005	0.1152	42.0	0.064	0.34		NO
Cadmium	24 ng/g	1.9E-05	0.000461	0.17			0.37	NO
Mercury	<0.2 µg/g	1.6E-04	0.00384	1.4		0.013		NO

Notes:
- The highest reported metal composition of TAPs measured in the eggs was used as a worst-case assumption.
- A feed rate of 2 ton/hr of eggshells is assumed.
- Bagfilters on the boilers were assumed to have a control efficiency of 80% for TAP metals.
- 8760 hours were used to calculate annual emissions (lb/yr).
- Example calculation for fluoride emissions
  Fluoride emissions = (6 µlb/lb)*(2,000 lb/hr)*(lb/1E6 µlb)(1-0.80) = 2.4E-3 lb/hr

As seen in the table above, worst-case emissions of cadmium, fluorides, and mercury are below their TPERs. However, worst-case emissions of chromium exceeded its TPER, and emissions of this TAP were investigated further.

Emissions of chromium were next compared with 2018 modeled emissions to determine if the use of eggshells poses an unacceptable risk to human health. The comparison is provided in the table below. Although emissions of chromium from burning eggshells represent a 106% increase in chromium emissions, the increased emissions do not pose an unacceptable risk to human health, given the larger margin of compliance in the previous modeling (only 3.9% of the AAL).

TAP	2018 Air Modeling					
	Modeled Emission Rate (lb/hr)	Averaging Period	Modeled Concentration (µg/m^3)	AAL (µg/m^3)	Maximum Modeled Impacts % of AAL	Potential Emission Rate from Eggshells (lb/hr)
Non-specific Chromium VI	3.01E-04	Annual	3.24E-06	8.3E-05	3.9%	3.2E-04

Notes:
- Air dispersion modeling was approved by Matt Porter, meteorologist with the AQAB of the DAQ, in a memorandum dated June 26, 2018.
- E-mail from Matt Porter dated May 30, states, in part, "… added impacts from burning eggshells would bring them up to ~8% of the annual Chromium AAL. So they'd still be well below the AAL."

9. NSPS, NESHAPS/MACT, NSR/PSD, 112(r), CAM

NSPS

The boilers (ID Nos. ES-1A and ES-1B) at NCRP are subject to "Industrial-Commercial-Institutional Steam Generating Units," 40 CFR 60 Subpart Db. This modification does not affect the NSPS status of the boilers.

NESHAPS/MACT/GACT

NCRP has accepted permit conditions to limit emissions to less than 10 tons per year for any single HAP and to less than 25 tons per year for any combination of HAPs. With these limits, the facility is

considered an area source (minor source) of HAP emissions. This modification does not affect the HAP status of the facility and the facility remains a HAP minor facility after modification.

GACT Subpart 6J
Because the facility is a minor source of HAP emissions, the non-CISWI subject wood/poultry litter-fired boilers (ID Nos. ES-1A and ES-1B) are subject to the "NESHAP for Area Sources: Industrial, Commercial, and Institutional Boilers," 40 CFR 63 Subpart JJJJJJ (aka GACT Subpart 6J). This modification does not affect the GACT status of the boilers.

GACT Subpart ZZZZ
The diesel-fired emergency fire pump (ID No. IES-1) is subject to the "NESHAP for Stationary Reciprocating Internal Combustion Engines," 40 CFR 63 Subpart ZZZZ. This modification does not affect the GACT status of this engine.

PSD
NCRP is a currently classified as a minor source under PSD and has accepted PSD avoidance limits for emissions of NOx, CO, and SO_2 as specified in Section 2.2 A.2 of the permit. Modifications associated with permit applications 7800166.19A, .19B, .19C, and .19D do not trigger any additional BACT analyses. Therefore, these modifications do not affect the PSD status of the facility, and the facility will continue to be classified as minor source under PSD.

However, actual emissions as measured via CEMs indicate emissions of CO from NCRP are at PSD major source levels. Because CO emissions exceed the PSD avoidance limit, NCRP is in noncompliance with PSD and is following Special Order by Consent (SOC) 2017-001 and the Schedule of Compliance specified in Section 2.3 of the permit to address the noncompliance issues. The facility has submitted a PSD permit application (7800166.17C) as required by SOC 2017-001 to add BACT limits when poultry litter and wood are fired in the boilers. When the PSD permit is issued, the facility's classification will be changed to major under PSD and noncompliance with PSD will be resolved.

112(r)
The facility is not subject to the requirements the Risk Management Program under Section 112(r) of the Clean Air Act requirements because it does not store any of the regulated substances in quantities above the thresholds in the Rule. This modification does not affect the 112(r) status of the facility

CAM
40 CFR Part 64 is applicable to any pollutant-specific emission unit, if the following three conditions are met:

- the unit is subject to any (non-exempt: e.g. pre November 15, 1990, Section 111 or Section 112 standard) emission limitation or standard for the applicable regulated pollutant.
- the unit uses any control device to achieve compliance with any such emission limitation or standard.
- the unit's precontrol potential emission rate exceeds either 100 ton per year (for criteria pollutants) or 10/25 tons per year (for HAPs).

The boilers (ID Nos. ES-1A and ES-1B) at NCRP are subject to CAM because the facility uses multiclones and bagfilters on the boilers to comply with the emission limits under 15A NCAC 02D

.0504/.0503. This modification does not affect the CAM status of the facility, and continued compliance with CAM is anticipated.

10. Facility Wide Air Toxics

North Carolina G.S. 143-215.107(a) exempts certain emission sources subject to federal regulations – including sources subject to MACT/GACT standards – from NC air toxics regulations provided their emissions do not "present an unacceptable risk to human health," in accordance with G.S. 143-215. 107(b) as codified on May 1, 2014.

The facility conducted facility-wide modeling for TAPs as part of the PSD permit application (7800166.17C). The air modeling results were approved by Matt Porter of the AQAB in a memorandum dated July 28, 2018. The memo indicated the modeling of maximum-allowable TAPs emissions adequately demonstrated compliance with AALs outlined in 15A NCAC 02D.1104, on a source-by-source basis, for ammonia, arsenic, benzene, benzo(a)pyrene, beryllium, cadmium, chlorine, ethylene dibromide, hydrogen chloride, non-specific chromium VI, sulfuric acid, and vinyl chloride. Emission of these TAPs are primarily from the boilers and the fire pump, which are both subject to GACT standards and are exempt from NC Air Toxics in accordance with 15A NCAC 02Q .0702(a)(27)(b). However, modeled emission limits for ammonia storage tank (ID No. ES-15) were included in the permit, as this emission source is not subject to any GACT standard.

As noted previously in Section 6, the facility conducted facility-wide modeling for formaldehyde as part of this permit modification because emission testing of the belt dryers indicated formaldehyde emissions exceeded the TPER. A permit condition for the modeled emissions of formaldehyde from the belt dryers and drum dryer will be added to the permit. Compliance is anticipated.

NCRP demonstrated emissions of benzene, benzo(a)pyrene, formaldehyde, hexane, and toluene were lower than their associated TPERs when the drum dryer was added to the permit under Air Permit No. 05543T24. Formaldehyde will be removed from the TPER table under this permit modification because air dispersion modeling was required to demonstrate compliance with NC Air Toxics, as noted previously. No other changes to the 15A NCAC 02Q .0711 condition are required under this permit modification, and continued compliance is anticipated.

11. Facility Emissions Review

Facility-wide potential emissions are provided in the table below. Actual emissions from 2014 to 2018 are provided in the header of this permit review.

Pollutant	Potential Emissions (tpy)
CO	1,243.5
NO_x	367.5
SO_2	302.0
PM	111.2
PM10	97.4
PM2.5	67.5
VOC	365.3
Lead	0.09

Pollutant	Potential Emissions (tpy)
H_2SO_4	58.4
CO2e	438,825

12. Compliance Status

Greg Reeves of FRO conducted a compliance inspection at the facility on April 26, 2019, and the facility appeared to be in compliance with the air quality permit at the time of the inspection, except for the CO emission exceedances. NCRP is following requirements of the Special Order by Consent (SOC) 2017-001 and the schedule of compliance in the permit allowing NCRP to operate until the facility returns to compliance at the issuance of the PSD permit.

The facility operating as Lumberton Energy, LLC and NCRP has had the following compliance issues within the past five years:

- On March 25, 2014, Lumberton Energy, LLC was issued a Notice of Deficiency (NOD) for failure to conduct an energy assessment per the requirements of GACT Subpart 6J.
- On May 15, 2015, NCRP was issued a NOD for a late report.
- On June 29, 2016, NCRP was issued a NOV/NRE for exceeding SB3 limits for $PM_{2.5}$, SO_2, and NO_x; for having excessive COMS downtime in violation of NSPS Subpart Db, and for failing to conduct source testing within 180 days of startup of the boilers.
- On August 1, 2016, SOC 2016-002 was issued to address violations cited in the NOV/NRE on June 29, 2016. The order also addressed issues relating to CO emissions. NCRP paid $9,000 for these violations under the SOC.
- On September 12, 2016, NCRP was issued a NOD for failure to submit a Notice of Compliance Status within 120 days of initial tune-up of the boilers.
- On October 28, 2016, the facility submitted a "Compliance Plan" as required by SOC 2016-002. The Plan stated that the facility intends to submit a PSD application.
- On November 16, 2016, the facility was issued a NOV/NRE for exceeding the PSD avoidance limit for CO emissions.
- On February 27, 2017, SOC 2017-001 was issued to address exceedances of the PSD avoidance limit for CO emissions. The facility is required to submit a PSD permit application within 30 days of issuance the SOC. The facility is also required to pay $15,000 plus stipulated penalties under the SOC.
- On March 13, 2017, NCRP was issued a NOV/NRE for exceeding SB3 limits for NOx, for having excessive COMs downtime in violation of NSPS Subpart Db, and for exceeding the PSD avoidance limit for CO emissions.
- On June 25, 2017, NCRP was issued a NOV/NRE for exceeding SB3 limits for NOx and for exceeding the PSD avoidance limit for CO.
- On June 30, 2017, NCRP was issued a NOV for various violations related to deficient maintenance practices, control device removal, and deficient monitoring, recordkeeping and reporting.
- On July 25, 2017 a civil penalty was assed in the amount of $11,555, including costs, for the violations cited in the NOV/NREs dated March 13 and June 15, 2017. The civil penalty was paid in full on September 8, 2019.
- On November 27, 2018, NCRP was issued a NOV/NRE for exceeding SB3 limits for NOx.

- On February 28, 2019, a civil penalty was assessed in the amount of $8,596, including costs, for the violations cited in the NOV/NRE dated November 27, 2018. The civil penalty was paid in full on April 5, 2019.

13. Public Notice/EPA and Affected State(s) Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0525, the EPA will have a concurrent 45-day review period. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA. Also pursuant to 02Q .0522, a notice of the DRAFT Title V Permit shall be provided to each affected State at or before the time notice provided to the public under 02Q .0521 above. South Carolina is an affected state within 50 miles of this facility.

14. Other Regulatory Considerations

- A P.E. seal was not required for these permit applications.
- No zoning consistency determination was required for these permit applications.
- A permit fee of $970 was required for Permit Application No. 7800166.17A and partially submitted on January 22, 2019. The remainder was submitted on February 1, 2019.

15. Recommendations

The permit modification applications for North Carolina Renewable Power - Lumberton, LLC located in Lumberton, Robeson County, NC have been reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined that this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources. The DAQ recommends the issuance of Air Permit No. 05543T26.

Attachment 1
NHSM Determination

North Carolina Department of Environmental Quality

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

October 15, 2015

Mr. Steven Ingle
Vice President of Engineering
North Carolina Renewable Power, LLC
4599 East Lake Boulevard
Birmingham, AL 35217

SUBJECT: Applicability Determination Nos. 2671 and 2672 – Secondary Material Determinations
North Carolina Renewable Power - Lumberton, LLC and
North Carolina Renewable Power - Elizabethtown, LLC
Facility ID Nos. 7800166 and 0900043
Lumberton, Robeson County and Elizabethtown, Bladen County

Dear Mr. Ingle:

The North Carolina Division of Air Quality (NC DAQ) received your letter dated July 20, 2015 summarizing your analysis of creosote treated wood (CTW) including creosote treated railroad ties and utility poles. North Carolina Renewable Power - Lumberton, LLC (NCRP-L) and North Carolina Renewable Power - Elizabethtown, LLC (NCRP-E) are proposing to burn CTW as a fuel in the four existing non-CISWI wood-fired combustion units (boilers) rated at 180 million Btu per hour each (two boilers at each facility). Air emissions from these sources are each controlled by their respective multicyclones, bagfilters, sorbent injection systems and selective non-catalytic reduction (SNCR) systems. The boilers are used to generate steam that operates the associated turbine/generator to produce electricity for sale to the local utility. The boilers were designed to burn multiple fuels, including wood, coal, fuel oil, tired-derived fuel, pelletized paper fuel and flyash briquettes.

Creosote treated wood is a non-hazardous secondary material (NHSM) within the meaning of Title 40, Part 241 of the Code of Federal Regulations (40 CFR Part 241). The creosote treated wood described in the letter referenced above is processed and meets the legitimacy criteria provided in 40 CFR 241.3(d)(1). Therefore the NC DAQ has determined that this material is not a solid waste when used as fuel in a combustion unit. This determination relies on the language of the current Federal rule defining NHSM, discussions NC DAQ has had with representatives of the EPA, and on the proposed changes to the NHSM rule.

Processing of Discarded NHSM – 40 CFR 241.3(b)(4)

Pursuant to 40 CFR 241.2, "processing" means any operations that transform discarded NHSM into a non-waste fuel. "Processing" includes, but is not limited to, operations necessary to: remove or destroy contaminants; significantly improve fuel characteristics of the material, *e.g.* sizing or drying the material in combination with other operations; or chemically improve the as-fired energy content. Minimal operations that result only in modifying the size of the material by shredding do not constitute processing for purposes of this definition. "Secondary material" means any material that is not the primary product of a manufacturing or commercial process, and can include post-consumer material, off-specification commercial chemical products or manufacturing chemical intermediates, post-industrial material, and scrap.

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The creosote treated wood that NCRP proposes to burn is collected directly from the railroad and utility companies by National Salvage & Service Corporation (National Salvage) or a similar vendor for processing before delivery to NCRP. The CTW is currently collected, separated and processed into a uniform chipped product by National Salvage and then will be directly transferred to NCRP for storage, blending and combustion. These materials will be blended with biomass-based fuels at approximately 25% CTW to 75% non-CISWI wood and/or poultry litter (recently permitted). NCRP proposes that National Salvage will significantly improve the fuel combustion properties of the CTW in order to produce an engineered fuel prior to use in the boilers. National Salvage and NCRP will improve the fuel characteristics of the material through visual inspection, sampling/testing, screening (removal of foreign materials), sizing, grinding, blending with non-CISWI wood, and drying and aging of wood. The CTW will be sampled and tested regularly for moisture content, ash content and approximate heat value. Quality assurance testing on representative samples on a batch basis will ensure that contaminant levels are comparable to or less than those found in traditional fuels which the boilers are designed to burn. Large physical materials will be removed manually and by mechanical screening. Ferrous metal substances will be removed by passing the material through a magnetic separation system. NCRP will conduct secondary screening on site for metals encountered if necessary. Then the CTW will be stored in an appropriate storage area until it is blended with the primary non-CISWI wood storage pile as soon as possible but normally within 10 days of arrival with the existing biomass to ensure adequate consistency in moisture and energy content, and limit emissions from combustion.

NC DAQ has determined that the processing steps described above meet the regulatory definition of "processing" in 40 CFR 241.2 with further support from a recent EPA determination of proposed NHSM fuels.[1]

Managed as a Valuable Commodity – 40 CFR 241.3(d)(1)(i)

Normally within 24 hours of processing by National Salvage or a similar vendor, the material will be transported by truck for delivery to the NCRP facility. Each truck will be weighed to confirm delivery quantity. NCRP will store the CTW in a covered concrete lined pad prior to using it as a fuel to prevent moisture uptake in the material. Use of the concrete lined pad, particularly to limit moisture intake, is consistent with typical management of wood chips and other biomass fuels. In addition, NCRP has indicated that it will normally blend and store the processed CTW for less than 10 days prior to burning the material as a fuel. The NC DAQ concludes that these management practices satisfy the requirement that the NHSM be managed as a valuable commodity, and if so managed, the CTW meets the legitimacy criterion pursuant to 40 CFR 241.3(d)(1)(i).

Meaningful Heating Value – 40 CFR 241.3(d)(1)(ii)

In the preamble to the final NHSM definitional rule, US EPA indicated that materials with a heat content of at least 5,000 Btu per pound (Btu/lb) presumptively satisfy this criterion.[2] NCRP referenced the analyzed composite samples of CTW collected by National Salvage for CPI USA North Carolina in a previous NHSM determination[3] that stated the average as-received lower heating value (LHV) of that CTW was 5,083 Btu/lb as noted in the data attached to your request.

[1] See Letter dated April 3, 2012 from Becky Weber, Director, Air and Waste Management Division , US EPA Region 7, to Mr. Gregory Haug, PE of Resource Enterprises, LLC. http://www.epa.gov/osw//nonhaz/define/pdfs/Lhoist-engineered-fuels.pdf
[2] 78 Fed. Reg. 9172 (Feb. 7, 2013).
[3] http://ncair.org/permits/memos/NHSM_Determination_CPI_USA-NC.pdf

NCRP also referenced the analyzed composite samples of CTW collected by Craven County Wood Energy in a previous NHSM determination[4] that stated the average as-received lower heating value (LHV) of that CTW was 6,277 Btu/lb as noted in the data attached to your request.

Since the processed CTW will have an average heat content greater than 5,000 Btu/lb (approximately 5,680 Btu/lb LHV), the proposed fuel from the processed material satisfies this legitimacy criterion. The NC DAQ has determined that the material has meaningful heating value and meets the legitimacy criterion under 40 CFR 241.3(d)(1)(ii).

Comparable Contaminant Concentrations – 40 CFR 241.3(d)(1)(iii)

In order for a NHSM to be classified as a non-solid waste fuel, it must "contain contaminants or groups of contaminants *at levels comparable in concentration to or lower than* those in traditional fuels which the combustion unit is designed to burn."[5]

Contaminants

Contaminants are defined as "all pollutants identified in the Clean Air Act sections 112(b) or 129(a)(4) *including the elements chlorine, fluorine, nitrogen, and sulfur in cases where non-hazardous secondary material are burned as fuel and combustion will result in the formation of hydrogen chloride, hydrogen fluoride, and nitrogen oxides or sulfur dioxide*."[6] In addition to a specific list of pollutants and precursors that fall within the definition of "contaminants," the listing also excludes pollutants that are unlikely to be found in non-hazardous secondary materials as well as individual cresol and xylene isomers.[7]

The NC DAQ reviewed the concentrations of the following contaminants in the CTW:

- **Metals:** Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Lead, Manganese, Mercury, Nickel, and Selenium
- **Halogens:** Chlorine, Fluorine
- **Additional Precursors:** Nitrogen, Sulfur

[4] http://ncair.org/permits/memos/AppDet_2400_Secondary.pdf

[5] 40 CFR 241.3(d)(1)(iii) (February 7, 2013) (*emphasis added*). Note effective April 8, 2013; however, this rule revision does not affect the outcome of this determination.

[6] 40 CFR 241.2 (February 7, 2013) (*emphasis added*).

[7] The definition is as follows: "*Contaminants* means all pollutants listed in Clean Air Act sections 112(b) and 129(a)(4), with the following three modification. This definition includes the elements chlorine, fluorine, nitrogen, and sulfur in cases where non-hazardous secondary materials are burned as a fuel and combustion will result in the formation of hydrogen chloride (HCl), hydrogen fluoride (HF), nitrogen oxides (NO_x), or sulfur dioxide (SO_2). The definition does not include the following pollutants that are either unlikely to be found in non-hazardous secondary materials and products made from such materials or are adequately measured by other parts of this definition: hydrogen chloride (HCl), chlorine gas (Cl_2), hydrogen fluoride (HF), nitrogen oxides (NO_x), sulfur dioxide (SO_2), fine mineral fibers, particulate matter, coke oven emissions, diazomethane, white phosphorus, and titanium tetrachloride. The definition does not include m-cresol, o-cresol, p-cresol, m-xylene, o-xylene, and p-xylene as individual contaminants distinct from the grouped pollutants total cresols and total xylenes." See 78 Fed. Reg. 9212 (Feb. 7, 2013).

Designed, not Permitted to Burn

To determine whether a NHSM satisfies the legitimacy criteria, the current rule requires that the contaminant levels in the NHSM be compared against the levels in "traditional fuels which the combustion unit is designed to burn."[8]

Further, the US EPA issued a Guidance Concept Paper indicating its intent to "address questions raised by industry, assist them in making determinations under the rule, and ensure their use of the flexibility embodied in the rule."[9] The Agency forecasted that the guidance would include a compilation of data it had collected on contaminant levels in traditional fuels which could be used by industry and other interested parties in the contaminant level comparison.

The guidance was provided by US EPA on November 29, 2011. It consists of three tables that provide a range of compiled contaminant concentrations for coal, untreated wood and biomass materials, and fuel oils.[10] The table does not distinguish between concentration levels of different coal ranks (i.e., anthracite, bituminous, sub-bituminous, and lignite) or different types of biomass (i.e., wood, bark, biogas, hogged fuel, and agricultural plant residues).[11] This approach is consistent with the NHSM rule revisions that US EPA finalized on February 7, 2013.

The US EPA codified the meaning of "designed to burn" to include "a traditional fuel that can be or is burned in the particular type of boiler, whether or not the combustion unit is permitted to burn that traditional fuel."[12] Also, in the preamble of final rule US EPA clarified the language regarding potential fuel category groups that any grade/rank (e.g. anthracite, lignite, bituminous and sub-bituminous coal) could be used in the traditional fuel contaminant levels of "designed to burn" fuel for comparison purposes.[13]

NCRP is proposing to burn the processed CTW in their existing boiler systems. NCRP has indicated that their boiler systems are designed to burn solid fuels, including coal, wood, fuel oil, tired-derived fuel, pelletized paper fuel and flyash briquettes, but are currently permitted to burn non-CISWI wood and poultry litter. In accordance with US EPA's interpretation of "designed to burn," the NC DAQ compared the concentrations of contaminants in the CTW to the contaminant levels in coal and woody biomass materials as provided in the November 29, 2011 guidance document and literature values.

Results of the Contaminant Comparison

The US EPA has indicated that a variety of comparisons could be made. For example, the highest contaminant levels in the NHSM could be compared against the highest contaminant levels in the relevant traditional fuels. Alternatively, the average values of the NHSM could be compared with the average values of the traditional fuels. "Anything less could result in 'traditional fuel' samples being considered solid waste if burned in the very combustion units designed to burn them – not the Agency's intent in either the 2011 NHSM

[8] 40 CFR 241.3(d)(1)(iii) (February 7, 2013).

[9] US EPA, "Non-Hazardous Secondary Materials (NHSM) Rule: Comparable Contaminant Guidance Concept Paper" (July 11, 2011. http://www.epa.gov/osw/nonhaz/define/pdfs/nhsm-concept.pdf

[10] US EPA, "Contaminant Concentrations in Traditional Fuels: Tables for Comparison" (November 29, 2011). http://www.epa.gov/osw/nonhaz/define/pdfs/nhsm_cont_tf.pdf

[11] This, despite the fact that a coal fired boiler is designed differently based on the rank of coal it will burn.

[12] 78 Fed. Reg. 9213 (Feb. 7, 2013).

[13] 78 Fed. Reg. 9148 (Feb. 7, 2013).

Attachment 1
NHSM Determination

final rule or February 7, 2013 NHSM final rule."[14] However, using different bases for comparison could lead to different results. The US EPA warned that "[i]t would not be appropriate to compare an average NHSM contaminant value to the high end of a traditional fuel range, as the existence of an average implies multiple data points from which a more suitable statistic (*e.g.*, range or standard deviation) could have been calculated." Finally, the US EPA warned that "in the context of an inspection or enforcement action, the Agency will evaluate the appropriateness of alternative methodologies and data sources on a case-by-case basis when determining whether the legitimacy criteria have been met."[15] The NC DAQ chose to use the maximums and averages for the contaminant comparison while focusing on the biomass average values.

NCRP referenced the analyzed contaminant levels of composite samples of CTW supplied by National Salvage to CPI USA North Carolina in a previous NHSM determination[16]. A summary of the measured contaminant levels and the contaminant levels in coal and biomass materials was provided as attachment to that letter. The contaminant levels for were compared to the biomass averages from US EPA's Office of Air Quality Planning and Standards (OAQPS) database. All contaminants show that the measured contaminant levels in the CTW are within the range of contaminant concentrations in the traditional fuel (biomass and coal) that the existing boiler systems actually burn or is capable of burning (utilizing maximum and average values).

Given the comparability of all relevant contaminants between biomass, coal and CTW as characterized by your submittal, the NC DAQ has determined that the CTW does meet the legitimacy criteria under 40 CFR 241.3(d)(1)(iii).

Conclusion

As described in the letter received from NCRP on July 20, 2015, the creosote treated wood is processed and does meet the legitimacy criteria provided in 40 CFR 241.3(d)(1). Therefore, the NC DAQ has determined that CTW is not a solid waste when used as fuel in a combustion unit and can be classified as non-CISWI wood. As a result of this determination, the existing boilers would not be subject to the combustion source emission standards for biomass fuel promulgated pursuant to Section 129 of the Clean Air Act. If you have any questions regarding this NHSM determination, please contact Mr. Jeff Twisdale at (919) 707-8472.

Sincerely,

for William D. Willets, P.E., Chief, Permitting Section
Division of Air Quality, NCDEQ

Attachment

c: Fayetteville Regional Office
Central Files

[14] 78 Fed. Reg. 9151 (Feb. 7, 2013).
[15] 78 Fed. Reg. 9151 (Feb. 7, 2013).
[16] http://ncajr.org/permits/memos/NHSM_Determination_CPI_USA-NC.pdf

of two representative types of creosote treated wood, CTRT and CTUP, fuel concentrations. The results are contained in Table 2-1.

Table 2-1 presents a summary of analytically measured contaminant concentration ranges based on data collected by U.S. EPA for coal and biomass compared to the analytical data from one CTRT sample and one CTUP sample from potential suppliers in the vicinity of the Southport facility. The CTRT and CTUP data clearly fall below the typical ranges expected for coal and the types of wood listed in the permit for combustion. It is anticipated that the contaminant concentrations of all creosote treated wood received at the Southport facility will have compositions within the range of traditional fuels that the boilers are capable of accommodating, and therefore no change in emissions from the boilers is anticipated.

Table 2-1, Fuel concentration comparisons to CTRT and CTUP

	Range (ppmw)			
Metals	**Coal[1]**	**Biomass[1]**	**CTRT[2]**	**CTUP[3]**
Antimony	ND - 6.9	ND - 6.0	<1.3	<1.1
Arsenic	ND - 174	ND - 298	2.5	0.64
Beryllium	ND - 206	ND -10	<0.32	<0.28
Cadmium	ND - 19	ND - 178	<0.25	<0.23
Chromium	ND - 168	ND - 240	9.6	0.88
Cobalt	ND - 25.2	ND - 213	<3.2	<2.8
Lead	ND - 148	ND - 229	6.1	2.1
Manganese	ND - 512	ND - 15,8000	94.5	71.9
Mercury	MD - 3.1	ND - 1.1	0.065	<0.042
Nickel	ND - 730	ND - 175	5.1	<2.3
Selenium	ND - 74.3	ND - 9.0	<1.3	<1.1
Halogens				
Chlorine	ND - 9,080	ND - 5,200	NA	NA
Fluorine	ND - 178	ND - 128		
Precursors				
Nitrogen	13,600 - 54,000	2,200 - 4,600	1,200	1,300
Sulfur	740 - 61,300	ND - 6,100	700	900

1) US EPA's Contaminant Concentrations in Traditional Fuels: Table for Comparison (Nov. 29, 2011). http://www.epa.gov/osw/nonhaz/define/pdfs/nhsm_cont_tf.pdf
2) Coastal Carolina Clean Power (CCCP) fuel analysis results for CTRT
3) CCCP fuel analysis results for CTUP

Appendix A
Comparison of Contaminant Levels in Creosote Treated Wood with Traditional Fuels
Craven County Wood Energy, L.P.

Metal elements - dry basis			Coal			Wood & Biomass			Fuel Oils			CCWE Tested Concentrations in Creosote Treated Wood					
Contaminant		Units	Full Range[1,2]			Full Range[1,2]			Full Range[1,2]			Utility Poles 9/4/2013	Railroad Ties 10/10/2013	Utility Poles 10/10/2013	Utility Poles 11/18/2013	Maximum	Status
Antimony	(Sb)	ppm	ND	–	10	ND	–	26	ND	–	15.7	<.678	<.500	<.500	<0.791	0	Within range of all fuels
Arsenic	(As)	ppm	ND	–	174	ND	–	298	ND	–	13	<1.36	<1.00	<1.00	<1.58	0	Within range of all fuels
Beryllium	(Be)	ppm	ND	–	206	ND	–	10	ND	–	19	<0.0678	<0.0500	<0.0500	<0.0791	0	Within range of all fuels
Cadmium	(Cd)	ppm	ND	–	28[4]	ND	–	17	ND	–	1	0.244	0.291	<0.100	22.3	22.3	Within range of Coal
Chromium	(Cr)	ppm	ND	–	168	ND	–	340	ND	–	37	0.937	4.84	0.67	1.44	4.84	Within range of all fuels
Cobalt	(Co)	ppm	ND	–	30	ND	–	213	ND	–	9	<0.678	1	<0.500	<0.791	1	Within range of all fuels
Lead	(Pb)	ppm	ND	–	148	ND	–	340	ND	–	57	2.75	5.96	0.542	0.606	5.96	Within range of all fuels
Manganese	(Mn)	ppm	ND	–	512	ND	–	15,800	ND	–	3,300	18.3	123	6.33	61.9	123	Within range of all fuels
Mercury	(Hg)	ppm	ND	–	3.1	ND	–	1.1	ND	–	0	<0.018	<0.0133	<0.0133	<0.021	0	Within range of all fuels
Nickel	(Ni)	ppm	ND	–	730	ND	–	540	ND	–	270	0.742	10.8	<0.250	0.422	10.8	Within range of all fuels
Selenium	(Se)	ppm	ND	–	74.3	ND	–	9	ND	–	4	1.42	<1	1.24	<1.58	1.42	Within range of all fuels
Non-metal elements - dry basis																	
Chloride	(Cl)	ppm	ND	–	9,080	ND	–	5,400	ND	–	1,260	NA	11.9	12	32.6	32.6	Within range of all fuels
Fluoride	(F)	ppm	ND	–	178	ND	–	300	ND	–	14	NA	4.14	7.6	<1.58	7.6	Within range of all fuels
Sulfur	(S)	ppm	740	–	61,300	ND	–	8,700	ND	–	57,000	824	282	309	348	824	Within range of all fuels
HAP compounds																	
PAH[3]	–	ppm	6	–	253	–	–	–	3,900	–	58,655[5]	19,421	31,183	54,893	21,513	54,893	Within range of Fuel Oils

[1]ND = Non Detect

[2]Coal, Wood & Biomass, and Fuel Oil ranges are from U.S. EPA's "Contaminant Concentrations in Traditional Fuels: Tables for Comparison" except as noted.

[3] CCWE tested for 17 PAH compounds.

[4] Gluskoter, H.J. and Lindahl, P.C., (1973), Cadmium - mode of occurrence in Illinois coals. Science, (188), 264-266.

[5] "Characteristics of Spilled Oils, Fuels, and Petroleum Products: 1. Composition and Properties of Selected Oils" U.S. EPA, (2003), Table 12.18.

Attachment 2

Emission Calculations of VOC from the Belt Dryers

Belt Dryer Potential Emissions (ES-17, ES-18, ES-19, ES-21)

VOC and HAP Emission factors to calculate emissions from belt dryers taken from the from the Compliance Air Emissions Test Report (dated Oct 10, 2018)

Belt Dryer Stack Test - Operating Data

	Lbs.	Cu/Ft	Feet	Lbs. / Hr.	Tons / Hr.
Dryer Bed width			21		
A. Dryer Bed Depth stack 1			0.25		
B. Dryer Bed Depth stacks 2,3,4			0.375		
800 RPM belt speed @ min			4.72		
A. Wood Chips	718.6	24.78		43,117.2	21.6
B. Wood Chips	1,077.9	37.17		64,675.8	32.3
Wet Wood Chip weight / cu/ft	29				

VOC Emission Results from Oct 2018 Stack Test

Stack Number	1	3	6	8	Total (for 8 stacks)	
VOC Emission Rates (lb/hr)	2.20	2.27	2.54	2.31		
Feed Rate (ton/hr)	21.6	32.3	32.3	32.3		
VOC Emission Factor (lb/ton)	0.102	0.070	0.079	0.072		
Estimated VOC Emission Rate (lb/hr) @ 30 ton/hr Feed Rate	3.056	2.108	2.359	2.146	19.3	lb/hr

Potential Annual Emissions (lb/hr) = 77.3 lb/hr (ES-17, ES-18, ES-19, ES-22)

Potential VOC Emissions = 84.7 tons/yr (per belt dryer)

NCRP Lumberton has a total of 4 belt dryers. Therefore, Potential VOC emissions from all 4 dryers are = 254.1 tons/yr (ES-17, ES-18, ES-19)

Notes:

1) Each belt dryer has eight stacks, and NC DAQ allowed testing of only four stacks. The test results were then doubled to represent emissions from the entire belt dryer.

2) Annual emissions were based on operation of 8,760 hours oer year.

The facility will be taking a 39 tpy VOC limit for the 4th belt dryer ES-21

Estimated potential VOC emissions from all 4 belt dryers = 293.1 tpy

(254.1 tpy VOC from ES-17, 18, 19 + 39 tpy VOC from ES-21)

Attachment 3

Emission Calculations for the Fly Ash Storage Pile

Truck Filling & Unloading

Data Inputs		Reference
Max Hourly Throughput:	1.5 ton/hr	Capacity of pug mill
Potential annual usage:	13,140 ton/yr	Scaled up short-term usage to potential based on 8,760 hr/yr
Number of Drops:	2	Drop into truck and drop onto ground
$Emission\ Factor\ (\frac{lb}{ton}) = k(0.0032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$		US EPA AP-42, Chapter 13.2.4, Equation 1.
k, particle size multiplier:	0.74 (PM) 0.35 (PM_{10}) 0.053 ($PM_{2.5}$)	US EPA AP-42, Chapter 13.2.4
U, mean wind speed:	6.24 mph	NOAA wind speed data for 2018.
M, material moisture content:	4.8%	US EPA AP-42, Chapter 13.2.4. The actual moisture content will range between 10 and 30 percent; however, the maximum of the range provided for use in Equation 1 was conservatively used.

Emission Calculations	Emission Factor		Usage		Drops		Conversion		Annual Emissions
PM	9.27E-04 lb/ton	x	13,140 ton/yr	x	2 drops	÷	2000 lb/ton	=	1.22E-02 ton/yr
PM_{10}	4.38E-04 lb/ton	x	13,140 ton/yr	x	2 drops	÷	2000 lb/ton	=	5.76E-03 ton/yr
$PM_{2.5}$	6.64E-05 lb/ton	x	13,140 ton/yr	x	2 drops	÷	2000 lb/ton	=	8.72E-04 ton/yr

Wind Erosion

Data Inputs		Reference
Average Pile Size:	0.045 acres	Estimate
$Emission\ Factor\left(\frac{lb}{(day)(acre)}\right) = 1.7\left(\frac{s}{1.5}\right)\left(\frac{365-p}{235}\right)\left(\frac{f}{15}\right)$		Air & Waste Management Association's Air Pollution Engineering Manual (1992), Chapter 4, Equation 5.
s, silt content of material:	81 %	US EPA AP-42, Chapter 13.2.4, Table 13.2.4-1, mean value.
p, number of days with >0.01 in. precipitation per year:	110 days	US EPA AP-42, Chapter 13.2.2, Figure 13.2.2-1.
f, percentage of time wind speed >12 mph at the mean pile height:	87 %	NOAA wind speed data for 2018.
k, particle size multiplier:	1 (PM) 0.5 (PM_{10}) 0.2 ($PM_{2.5}$)	US EPA AP-42, Chapter 13.2.4.

Emission Calculations	Emission Factor		Usage		Surface Area		Conversion		Annual Emissions
PM	578.6 lb/(day)(acre)	x	365 days	x	0.05 acres	÷	2000 lb/ton	=	4.76 ton/yr
PM_{10}	289.3 lb/(day)(acre)	x	365 days	x	0.05 acres	÷	2000 lb/ton	=	2.38 ton/yr
$PM_{2.5}$	115.7 lb/(day)(acre)	x	365 days	x	0.05 acres	÷	2000 lb/ton	=	0.95 ton/yr

Bulldozing/Truck Loading

Data Inputs		Reference
Loading Time:	0.75 hr	Estimate - loading one truck takes 30-45 minutes.
Shipments per Year:	1,460 shipments	Estimate - 2 to 4 shipments daily. Scaled up to 365 days per year.
$PM\ Emission\ Factor\left(\frac{lb}{hr}\right) = \frac{5.7(s)^{1.2}}{(M)^{1.3}}$		US EPA AP-42, Chapter 11.9, Table 11.9-1.
$PM_{2.5}\ Emission\ Factor\left(\frac{lb}{hr}\right) = \frac{1.0(s)^{1.2}}{(M)^{1.4}}$		US EPA AP-42, Chapter 11.9, Table 11.9-1.
s, silt content of material:	81 %	US EPA AP-42, Chapter 13.2.4, Table 13.2.4-1, mean value.
M, moisture content:	10 %	Desired moisture content.
Scaling Factors (applied to PM_{10}):	0.75 (PM_{10}) 0.105 ($PM_{2.5}$)	US EPA AP-42, Chapter 11.9, Table 11.9-1.

Emission Calculations	Emission Factor		Loading Time		Conversion		Annual Emissions
PM	55.7 lb/hr	x	1,095 hr/yr	÷	2000 lb/ton	=	30.51 ton/yr
PM_{10}	21.8 lb/hr	x	1,095 hr/yr	÷	2000 lb/ton	=	11.92 ton/yr
$PM_{2.5}$	5.9 lb/hr	x	1,095 hr/yr	÷	2000 lb/ton	=	3.20 ton/yr

Attachment 3

Emission Calculations for the Fly Ash Storage Pile

Pollutant	Hourly PTE (lb/hr)	Annual PTE Emissions (tpy)
PM	56.81	35.30
PM10	22.31	14.30
PM2.5	6.07	4.20

Notes:

Operating hours for the bulldozing/truck loading is based on 0.75 hours per load * 1460 shipments per year. Operating hours for truck filling/unloading and wind erosion based on 8760 hours per year.

HAP	Weight Fraction	Hourly PTE (lb/hr)	Annual PTE Emissions (tpy)
Antimony	2.00E-09	1.14E-07	7.06E-08
Arsenic	8.50E-08	4.83E-06	3.00E-06
Beryllium	1.00E-10	5.68E-09	3.53E-09
Cadmium	1.90E-10	1.08E-08	6.71E-09
Chromium	1.00E-09	5.68E-08	3.53E-08
Lead	4.00E-09	2.27E-07	1.41E-07
Manganese	2.48E-07	1.41E-05	8.75E-06
Nickel	7.00E-09	3.98E-07	2.47E-07
Selenium	8.00E-09	4.54E-07	2.82E-07
Total HAP	3.50E-07	1.99E-05	1.24E-05