

**NORTH CAROLINA DIVISION OF  
AIR QUALITY**

**Air Permit Review**

Permit Issue Date: **PROPOSED**

**Region:** Winston-Salem Regional Office  
**County:** Alamance  
**NC Facility ID:** 0100237  
**Inspector's Name:** Stephen Moser  
**Date of Last Inspection:** 04/13/2009  
**Compliance Code:** 3 / Compliance - inspection

<b>Facility Data</b>			<b>Permit Applicability (this application only)</b>
<b>Applicant (Facility's Name):</b> New South Lumber Company, Inc. - Graham Plant  <b>Facility Address:</b> New South Lumber Company, Inc. - Graham Plant 4408 Mt Hermon - Rock Creek Road Graham, NC 27253  <b>SIC:</b> 2421 / Sawmills & Planing Mills General <b>NAICS:</b> 321113 / Sawmills  <b>Facility Classification: Before:</b> Title V <b>After:</b> Title V <b>Fee Classification: Before:</b> Title V <b>After:</b> Title V			<b>SIP:</b> <b>NSPS:</b> <b>NESHAP:</b> <b>PSD:</b> <b>PSD Avoidance:</b> <b>NC Toxics:</b> 2D .1100, 2D .1109, and 2Q .0711 <b>112(r):</b> <b>Other:</b>
<b>Contact Data</b>			<b>Application Data</b>
<b>Facility Contact</b>	<b>Authorized Contact</b>	<b>Technical Contact</b>	<b>Application Number:</b> 0100237.09 A and B <b>Date Received:</b> 9/8/2009 and 10/28/2009 <b>Application Type:</b> 112(j) Part I and State-Only Modification <b>Application Schedule:</b> TV- Significant and State Only  <b>Existing Permit Data</b> <b>Existing Permit Number:</b> 06740/T14 <b>Existing Permit Issue Date:</b> 12/19/2008 <b>Existing Permit Expiration Date:</b> 11/30/2013
Terry Bishop General Manager (336) 376-5801 4408 Mt Hermon-Rock Creek Road Graham, NC 27253	Donald Olson Chief Operating Officer (843) 236-8418 3700 Clay Pond Road Myrtle Beach, SC 29579+7330	Terry Bishop General Manager (336) 376-5801 4408 Mt Hermon-Rock Creek Road Graham, NC 27253	
<b>Review Engineer:</b> Jenny Kelvington  <b>Review Engineer's Signature:</b> _____ <b>Date:</b> _____		<b>Comments / Recommendations:</b>	
		<b>Issue</b> 06740/T15 <b>Permit Issue Date:</b> <b>Permit Expiration Date:</b>	

**I. Purpose of Application**

New South Lumber Company, Inc. - Graham Plant, located in Graham, Alamance County, North Carolina, has submitted two applications to modify their air quality permit.

**Application No. 0100237.09A**, received September 8, 2009, is a Part 2 MACT "Hammer" application for four existing boilers, as listed below:

- **B-1:** 19.1 MMBtu/hr wood fuel-fired boiler (hybrid design) controlled by one multicyclone (12 nine-inch diameter tubes); 1989 startup
- **B-2:** 28.7 MMBtu/hr wood fuel-fired boiler (hybrid design) controlled by two multicyclones (16 nine-inch diameter tubes and 44 six-inch diameter tubes); 1995 startup
- **B-3:** 28.7 MMBtu/hr wood fuel-fired boiler (hybrid design) controlled by two multicyclones (16 nine-inch diameter tubes and 44 six-inch diameter tubes); 1998 startup

- **B-4:** 57.6 MMBtu/hr wood fuel-fired boiler (hybrid design) controlled by two multicyclones (36 nine-inch diameter tubes and 44 six-inch diameter tubes) and one electrostatic precipitator; 2007 startup

**Application No. 0100237.09B**, received October 28, 2009, has been submitted to fulfill the requirements of a Toxics Compliance Demonstration for Combustion Sources “Director’s Call” dated April 27, 2009. NC DAQ modeled ambient impacts of toxic air pollutant (TAP) emissions from combustion sources at this facility using an AERMOD model consistent with 15A NCAC 2D .1100. This modeling showed several toxic air pollutants (TAPs) potentially exceeding their acceptable ambient level (AAL). The permit application proposes operational controls for four wood-fired boilers to ensure no AAL exceedances occur and includes air dispersion modeling, consistent with the provisions of 15A NCAC 2D .1106.

## II. Facility Description

The facility is a lumber mill that processes whole logs into dimensional lumber. The “wet” lumber is dried in one of six permitted lumber kilns whose steam heat is provided by one of four wood fuel fired boilers.

## III. Compliance Status

The facility has been issued three NOV’s in the past five years including one for which New South Lumber paid a civil penalty of \$2,321. All of the violations have been either corrected or resolved at this time. The facility was last inspected on April 13, 2009. According to the inspector, Mr. Steve Moser (WSRO), “Based on the inspection and data reviewed, the facility appeared to be in compliance.”

## IV. Permit Modifications/Changes

*ATTACHMENT to Air Quality Permit No. 06740T15 – Table of Changes*

Page	Section	Description
Cover	-	-amended all dates and permit revision numbers
All	Header	-amended permit revision number
3	1. Table of Permitted Sources	-added 112(j) after ID for all wood-fired boilers
4	2.1.A Table	-added reference to 15A NCAC 2D .1100 and .1109 requirements in the Multiple Emissions Section.
7	2.1.B Table	-added reference to 15A NCAC 2D .1100 and .1109 requirements in the Multiple Emissions Section.
11	2.2.A Table	-moved 15A 2D .1100 to this table.
11-13	2.2.A.1	-added limits for 11 TAPs from boilers ( <b>ID Nos. B-1 to B-4</b> ) -modified limits for 3 TAPs from kilns ( <b>ID Nos. K-1 to K-6</b> ) -added wood combustion limits per consecutive 12-month period for boilers ( <b>ID Nos. B-1 to B-4</b> ) -added initial performance testing requirement for boilers ( <b>ID Nos. B-2 and B-4</b> ) -added TAP compliance monitoring, recordkeeping, and reporting requirements.
14	2.2.A.3	-added 17 limits for TAPs emitted from boilers ( <b>ID Nos. B-1 to B-4</b> ) at facility wide emission rates below the TPERs.

Page	Section	Description
15-16	2.2.C.1	-added 15A NCAC 2D .1109 [CAA § 112(j)] limits for filterable PM, Hg, HCl, and CO for boilers ( <b>ID Nos. B-1 to B-4</b> ) -added initial and periodic testing, monitoring, recording, and reporting requirements for boilers n( <b>ID Nos. B-1 to B-4</b> )
19-26	General Conditions	-updated shell conditions (v3.1)

## V. Regulatory Review

### **15A NCAC 2D .1109 –Case-by-Case MACT**

**Generally:** On July 20, 2007, the D.C. Circuit Court vacated the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers and Process Heaters, which had been promulgated under 40 CFR 63, Subpart DDDDD. The North Carolina Attorney General’s office has determined that the NESHAP vacatur equates to the failure of the U.S. EPA to promulgate a standard as required under Section 112(d) of the Clean Air Act (CAA). As a result, the site-specific Maximum Achievable Control Technology (MACT) standards required under CAA §112(j), commonly referred to as the MACT “hammer” provisions, have been triggered. North Carolina regulations implementing the MACT hammer are found at 15A NCAC 2D .1109. NC On September 14, 2009, the NC DAQ received a Part 2 MACT “Hammer” application from this facility asking that the NC DAQ establish 112(j) emissions limitations.

**Case-By-Case MACT Determination:** Three of the four affected sources (**ID Nos. B-1, B-2, and B-3**) are wet wood-fired boilers, each with a heat input capacity of less than 30 MMBtu/hr. Boiler B-1 is equipped with a single multicyclone while boilers B-2 and B-3 are each equipped with two multicyclones. The fourth source (**ID No. B-4**) is a wet wood-fired boiler with a heat capacity between 30 and 100 MMBtu/hr. Emissions from this boiler are controlled by two multicyclones and one electrostatic precipitator (ESP).

In accordance with the 112(j) application guidance provided by NC DAQ, affected facilities may propose either a total selected metal (TSM) limit or a filterable PM limit. This facility has chosen to comply with the PM limit. Additionally, this facility has proposed to comply with hydrochloric acid (HCl), mercury (Hg) and carbon monoxide (CO) emission limitations that are consistent with the NC DAQ application guidance (<http://daq.state.nc.us/permits/112j/>). However, instead of requiring each individual boiler to remain below these limits, New South Lumber has requested that compliance be based on an average of the emission test results from their four boilers. NC DAQ finds this request acceptable for PM (filterable), HCl, and Hg, as it is consistent with the vacated boiler MACT. The facility will comply with the CO limitation on an individual boiler basis.

The DAQ application guidance lists the emission limits in Table 2.1 based upon the type of fuel combusted and the boiler heat capacity. The emission limits applicable to the four boilers are shown below:

**Table 2.1 emission limits for green wood-fired boilers < 30 MMBtu/hr heat input**  
Boilers (**ID Nos. B-1, B-2, and B-3; 76.5 MMBtu/hr heat input all three boilers combined**)

Particulate Matter (filterable)	0.27 lb/MMBtu
Mercury	0.000005 lb/MMBtu
Hydrogen Chloride	0.02 lb/MMBtu
Carbon Monoxide	269 ppmvd, corrected to 7% O <sub>x</sub>

**Table 2.1 emission limits for green wood-fired boilers with heat inputs greater than or equal to 30 MMBtu/hr and < 100 MMBtu/hr**

**Boiler (ID No. B-4; 57.6 MMBtu/hr heat input)**

Particulate Matter (filterable)	0.27 lb/MMBtu
Mercury	0.000005 lb/MMBtu
Hydrogen Chloride	0.02 lb/MMBtu
Carbon Monoxide	508 ppmvd, corrected to 7% O <sub>x</sub>

The following stack tests have been conducted at the facility:

Date	Boiler No.	Particulate Matter (filterable) lbs/million Btu	Carbon Monoxide lbs/million Btu	Opacity %
Jan 13, 1999	B-2		0.179	
Dec 20, 2000	B-1	0.237		
Nov 1, 2000	B-2	0.203		
Nov 2, 2000	B-3	0.161		
Mar 18, 2008	B-4	0.050		0
May 9, 2008	B-4	0.007		

These tests demonstrate that the filterable PM emissions from all existing wood-fired boilers participating in the emissions averaging option do not exceed the emission limitations in the DAQ guidance individually or on a weighted average. The vacated boiler MACT includes the following equation for determining average weighted emissions based upon the maximum heat inputs of the boilers:

$$\text{Ave Weighted Emissions} = \frac{\sum(Er \times Hm)}{\sum Hm} \quad \text{where } Er = \text{emission rate (lbs/MMBtu)}$$

$$Hm = \text{maximum rated heat input capacity}$$

Using the most recent stack test data:

$$\text{Ave Weighted Emissions} = (19.1 \times 0.237 + 28.7 \times 0.201 + 28.7 \times 0.161 + 57.6 \times 0.007) / (134.1)$$

$$= \mathbf{0.114 \text{ lb/MMBtu}}$$

The average weighted filterable particulate matter emissions are less than half of the Table 2.1 limit of 0.27 lb/MMBtu. Therefore, compliance is indicated. No site specific test data exists for HCl and Hg. The maximum HCl and Hg emission rates listed in NCASI TB858 for wood fired boilers are 0.00163 lb/MMBtu and 0.0000267 lb/MMBtu, respectively. Compliance with all emission limits is expected and will be verified through stack testing. Because the permit restricts wood combustion in boiler B-1 to 1,067 tons per year (500 hours at the maximum firing rate), the annual performance test for boiler B-1 will only be required for each applicable pollutant for which the initial performance test shows to be equal to or greater than the emission limit. Annual performance tests for boilers B-2 to B-4 will be required for each pollutant that is not less than 80 percent of the emission limit during the initial testing.

**State-Enforceable Only**

**15A NCAC 2D .1100–Toxic Air Pollutants**

In response to a Director’s Call issued April 27, 2009, New South Lumber has performed air dispersion modeling, consistent with the provisions of 15A NCAC 2D .1106, for all toxic air pollutants (TAPs) emitted in excess of their respective TPER. The modeling demonstration evaluated arsenic, benzene, beryllium, cadmium, chromium, and nickel emissions from the four boilers and acrolein, formaldehyde, and phenol emissions from the four boilers and six lumber drying kilns. Mr. Jerry Freeman, DAQ Meteorologist II, AQAB, reviewed the dispersion modeling analysis and found it demonstrates compliance, on a source-by-source basis, with the acceptable ambient levels (AAL) for each TAP provided the emission rates modeled are accurate.

TAP	% of AAL	TAP	% of AAL	TAP	% of AAL
Acrolein	47	Beryllium	3	Formaldehyde	95
Arsenic	96	Cadmium	13	Nickel	< 1
Benzene	30	Chromium	< 1	Phenol	4

For the compliance demonstration, the applicant used factors based upon NCASI TB858 emission data for wood-fired boilers to estimate emissions from the boilers. Tables 20A and 20 B of the referenced NCASI bulletin provide the range, medium, and mean of stack tests evaluating HAP emissions from wood-fired boilers. Appendix A-19 & A-19a of the bulletin provides more details for each stack test including the PM control provided. A summary of the NCASI data used as emission factors by the applicant along with relevant emission rates is listed below:

Toxic Air Pollutant	AP-42; Section 1.6 (lb/MMBtu)	NCASI TB858 Factor (lb/MMBtu)			
		Modeled Factor	Table 20A/B Factor Basis	Mechanical Separator Mean	ESP Mean
Acrolein	$4.0 \times 10^{-3}$	$7.8 \times 10^{-5}$	NOR-PLOT average		
Arsenic	$2.2 \times 10^{-5}$	$3.9 \times 10^{-6}$ $6.24 \times 10^{-7}$ B-4	Wet scrubber mean	$5.9 \times 10^{-6}$	$1.0 \times 10^{-6}$
Benzene	$4.2 \times 10^{-3}$	$2.7 \times 10^{-4}$	Median ( $4.2 \times 10^{-3}$ max)		
Beryllium	$1.1 \times 10^{-6}$	$9.10 \times 10^{-7}$	Wet scrubber mean	$1.9 \times 10^{-6}$	$1.9 \times 10^{-6}$
Cadmium	$4.1 \times 10^{-6}$	$5.2 \times 10^{-6}$ $8.32 \times 10^{-7}$ B-4	Wet scrubber mean	$4.0 \times 10^{-6}$	$1.9 \times 10^{-6}$
Chromium	$1.75 \times 10^{-5}$	$1.5 \times 10^{-5}$ $2.40 \times 10^{-6}$ B-4	Wet scrubber mean	$2.3 \times 10^{-5}$	$6.0 \times 10^{-7}$
Formaldehyde	$4.4 \times 10^{-3}$	$7.1 \times 10^{-4}$	Median ( $5.8 \times 10^{-3}$ max)		
Nickel	$3.3 \times 10^{-5}$	$1.8 \times 10^{-5}$ $2.88 \times 10^{-6}$ B-4	Wet scrubber mean	$3.9 \times 10^{-5}$	$2.9 \times 10^{-6}$
Phenol	$5.1 \times 10^{-5}$	$1.4 \times 10^{-5}$	Mean ( $4.0 \times 10^{-5}$ max)		

Preliminary modeling showed the facility would exceed at least one AAL (arsenic) if all four boilers were allowed to operate continuously. To ensure TAP concentrations remain below the AALs, New South Lumber has requested wood combustion limits as follows:

Boiler	Requested Wood Combustion Limits (tons/year)	Percentage of Total Wood Requested to be Combusted	Number of Annual Operating Hours for the Requested Limit at the Maximum Combustion Rate
1	1,067	1.2	500
2	23,758	27.5	7,450
3	13,967	16.1	4,380
4	47,654	55.1	7,450
All	86,446	100	varies

With the proposed combustion limitations, arsenic concentrations may reach as high as 96% of the annual AAL. Since all the arsenic originates from the boilers, the boiler emission factors for arsenic will be verified through stack testing to ensure they provide an accurate projection of the ambient concentration. Boilers 2 and 4 will be tested to derive the site specific emission factors for wood-fired boilers with multicyclones and for wood-fired boilers with multicyclones/ESP. The emission factor used in the compliance demonstration for the three boilers (B-1 to B-3) controlled by multicyclones was **3.9E-06 lb/10<sup>6</sup> Btu** and for the boiler (B-4) controlled by multicyclones/ESP was **6.24E-07 lb/10<sup>6</sup> Btu**. NCASI TB858 Appendix A-19a shows arsenic emissions range from 1.6E-9 to 2.1E-05 lb/10<sup>6</sup> Btu for boilers

controlled by mechanical collectors and range from 3.2E-07 to 1.6E-06 lb/10<sup>6</sup> Btu for boilers controlled by ESP.

As modeled, formaldehyde emissions are at 95% of the AAL. Because more than 90% of formaldehyde emissions originate from the lumber drying kilns, the kiln emission factor and the approach to modeling kiln emissions have been reviewed to ensure they are reasonable. Kilns 1-5 were modeled for maximum production as three identical volume sources with equal emissions from three vents while Kiln 6 was modeled at capacity as two identical volume sources with equal emissions from two vents. DAQ finds the modeling approach acceptable. The applicant used a formaldehyde emission factor of 0.034 lbs/1000 bd-ft based on NCASI TB845 data. The emission factor is twenty four times the factor listed in the DAQ Spreadsheet “Wood Kiln Emissions Calculator Revision C; July 2007” for steam heated kilns and almost twice the factor used for the facility’s annual emissions inventories. DAQ expects formaldehyde emissions to be below the modeled rate. Therefore, no stack testing is necessary. Compliance is indicated.

All other TAPs are less than 50% of the AALs. No stack testing for these TAPs will be required to support the compliance demonstration. Compliance is indicated.

**State-Enforceable Only**

**15A NCAC 2Q .0711–Toxic Air Pollutants**

New South Lumber emits eighteen TAPs, which have maximum facility wide emissions below the level requiring a permit application. These include acetaldehyde, bis(2-ethylhexyl) phthalate, carbon disulfide, chlorine, Chlorobenzene, chloroform, hydrochloric acid, hexane, manganese, mercury, methylene chloride, methyl isobutyl ketone, pentachlorophenol, styrene, and toluene. The existing permit already requires a permit before acetaldehyde exceeds its TPER. The other seventeen TAPS emitted from the facility at rates below their TPER will be added to this requirement as follows:

Pollutant (CAS Number)	TPER(s) Limitations			
	Carcinogens (lbs/year)	Chronic Toxicants (lbs/day)	Acute Systemic Toxicants (lbs/hour)	Acute Irritants (lbs/hour)
acetaldehyde				6.8
bis(2-ethylhexyl) phthalate		0.63		
carbon disulfide		3.9		
chlorine		0.79		0.23
chlorobenzene		46		
chloroform	290			
hydrochloric acid				0.18
hexane		23		
manganese		0.63		
mercury		0.013		
methylene chloride	1600		0.39	
MIBK		52		7.6
pentachlorophenol		0.063	0.0064	
styrene				2.7
toluene		98		14.4
trichloroethylene	4000			
vinyl chloride	26			
xylene		57		16.4

## VI. NSPS, NESHAPS/MACT, PSD, 112(r), CAM

**NSPS** – The facility is subject to New Source Performance Standards (40 CFR 60, Subpart Dc) for three wood-fired boilers (**ID Nos. B-2, B-3, and B-4**). Boilers (**ID Nos. B-2 and B-3**) are only subject to daily fuel consumption record keeping requirements. Boiler (**ID No. B-4**) is subject to a particulate emission limit of less than 0.03 pounds per million Btu heat input OR less than 0.051 pounds per million Btu heat input while demonstrating a 99.8 percent reduction in particulate matter AND a visible emission limit of less than 20% opacity. This permit modification does not affect the NSPS requirements.

**NESHAPS/MACT** – The facility’s six lumber drying kilns (**ID Nos. K-1 through K-6**) currently operate under one Maximum Achievable Control Technology Standard. 40 CFR 63, Subpart DDDD “National Emission Standards for Hazardous Air Pollutants from Plywood and Composite Wood Products” applies to these sources. However per rule, these sources have no requirements other than initial notification. The Permittee has verified in the permit application that these initial notifications were submitted to DAQ on **April 26, 2006**. This permit modification does not affect this status.

**PSD** – The facility is classified as a PSD major source because potential emissions of VOCs exceed the 250-ton per year classification (~419 tons per year). This modification does not affect this status.

**112(r)** – The facility is not subject to 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 permit modification does not affect this status.

**CAM** – 40 CFR 64 requires that a continuous compliance assurance monitoring plan be developed for all equipment located at a major facility, that have pre-controlled emissions above the major source threshold, and use a control device to meet an applicable standard. None of the sources being controlled have pre-controlled emissions above 100 tons per year. Therefore, CAM is not applicable. This permit modification does not change the CAM status.

## VII. Facility Emissions Review

The following table represents the most recent emission inventory from the facility:

<b>Pollutant(s)</b>	<b>2008Actual Emissions (tpy)</b>
CO	56.77
NO <sub>x</sub>	69.79
PM <sub>10</sub>	43.24
SO <sub>2</sub>	7.94
VOC	286.55
Total HAPs	32.03

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

Pursuant to 15A NCAC 2Q .0521, a notice of the DRAFT Title V Permit shall be posted on the North Carolina Division of Air Quality web site. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 2Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA. Also pursuant to 2Q .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 2Q .0521 above. The State of Virginia and the Forsyth County Local Program are affected areas within 50 miles of the facility.

**IX. Recommendations**

This permit modification application for the New South Lumber Company located in Graham, Alamance County, North Carolina has been reviewed by NC DAQ to determine compliance with all procedures and requirements. NC DAQ has determined that this facility appears to be complying with all applicable requirements.

**Issue Permit No. 06740T15**