ENVIVA PELLETS
P/N 10203
NORTHAMPTON COUNTY

2012

CENTRAL FILES

North Carolina Department of Environment and Natural Resources
Division of Air Quality

Beverly Eaves Perdue
Governor

Sheila C. Holman
Director

Dee Freeman
Secretary

March 9, 2012

Mr. Norb Hintz
Vice President, Engineering
Enviva Pellets, LLC
7200 Wisconsin Avenue, Suite 1100
Bethesda, Maryland 20814

Dear Mr. Hintz:

SUBJECT: Air Quality Permit No. 10203R00
Facility ID: 6600167.11A
Enviva Pellets, Northampton, LLC
Gaston, North Carolina
Northampton County
Fee Class: Title V

In accordance with your completed Air Quality Permit Application for a state-only construction and operating permit under 15A NCAC 02Q .0300 received August 26, 2011, we are forwarding herewith Air Quality Permit No. 10203R00 to Enviva Pellets, LLC, Lebanon Church Road, Gaston, North Carolina authorizing the construction and operation, of the emission source(s) and associated air pollution control device(s) specified herein. Additionally, any emissions activities determined from your Air Quality Permit Application as being insignificant per 15A North Carolina Administrative Code 2Q .0503(8) have been listed for informational purposes as an "ATTACHMENT." Please note the requirements for the annual compliance certification are contained in General Condition P in Section 3. The current owner is responsible for submitting a compliance certification for the entire year regardless of who owned the facility during the year.

The Permittee shall file a Title V Air Quality Permit Application pursuant to 15A NCAC 02Q .0504 for those air emission sources (ID Nos. ES-DRYER, ES-GN, ES-FWP, ES-HM-1 through ES-HM-4, ES-HMA, ES-PPS, and ES-CLR-1 through ES-CLR-6) on or before 12 months after commencing operation of the first unit.

As the designated responsible official it is your responsibility to review, understand, and abide by all of the terms and conditions of the attached permit. It is also your responsibility to ensure that any person who operates any emission source and associated air pollution control device subject to any term or condition of the attached permit reviews, understands, and abides by the condition(s) of the attached permit that are applicable to that particular emission source.

Permitting Section
1641 Mail Service Center, Raleigh, North Carolina 27699-1641
2728 Capital Blvd., Raleigh, North Carolina 27604
Phone: 919-715-6235 / FAX 919-733-5317 / Internet: www.ncair.org

If any parts, requirements, or limitations contained in this Air Quality Permit are unacceptable to you, you have the right to request a formal adjudicatory hearing within 30 days following receipt of this permit, identifying the specific issues to be contested. This hearing request must be in the form of a written petition, conforming to NCGS (North Carolina General Statutes) 150B-23, and filed with both the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, North Carolina 27699-6714 and the Division of Air Quality, Permitting Section, 1641 Mail Service Center, Raleigh, North Carolina 27699-1641. The form for requesting a formal adjudicatory hearing may be obtained upon request from the Office of Administrative Hearings. Please note that this permit will be stayed in its entirety upon receipt of the request for a hearing Unless a request for a hearing is made pursuant to NCGS 150B-23, this Air Quality Permit shall be final and binding 30 days after issuance.

You may request modification of your Air Quality Permit through informal means pursuant to NCGS 150B-22. This request must be submitted in writing to the Director and must identify the specific provisions or issues for which the modification is sought. Please note that this Air Quality Permit will become final and binding regardless of a request for informal modification unless a request for a hearing is also made under NCGS 150B-23.

The construction of new air pollution emission source(s) and associated air pollution control device(s), or modifications to the emission source(s) and air pollution control device(s) described in this permit must be covered under an Air Quality Permit issued by the Division of Air Quality prior to construction unless the Permittee has fulfilled the requirements of GS 143-215-108A(b) and received written approval from the Director of the Division of Air Quality to commence construction. Failure to receive an Air Quality Permit or written approval prior to commencing construction is a violation of GS 143-215.108A and may subject the Permittee to civil or criminal penalties as described in GS 143-215.114A and 143-215.114B.

This Air Quality Permit shall be effective from March 9, 2012 until February 28, 2017, is nontransferable to future owners and operators, and shall be subject to the conditions and limitations as specified therein. Should you have any questions concerning this matter, please contact Kevin Godwin at (919) 707-8480.

Sincerely yours,

Donald R. van der Vaart, Ph.D., P.E., J.D.
Chief

Enclosure

c: Patrick Butler, Supervisor, Raleigh Regional Office
Shannon Vogel, Stationary Source Compliance Branch
✓Central Files

State of North Carolina,
Department of Environment,
and Natural Resources

Division of Air Quality

AIR QUALITY PERMIT

Permit No.	Replaces Permit No.(s)	Effective Date	Expiration Date
10203R00	N/A	March 9, 2012	February 28, 2017

Until such time as this permit expires or is modified or revoked, the below named Permittee is permitted to construct and operate the emission source(s) and associated air pollution control device(s) specified herein, in accordance with the terms, conditions, and limitations within this permit. This permit is issued under the provisions of Article 21B of Chapter 143, General Statutes of North Carolina as amended, and Title 15A North Carolina Administrative Codes (15A NCAC), Subchapters 2D and 2Q, and other applicable Laws.

Pursuant to Title 15A NCAC, Subchapter 2Q, the Permittee shall not construct, operate, or modify any emission source(s) or air pollution control device(s) without having first submitted a complete Air Quality Permit Application to the permitting authority and received an Air Quality Permit, except as provided in this permit.

Permittee:	**Enviva Pellets, LLC**
Facility ID:	**4600107**
Facility Site Location:	**874 Lebanon Church Road**
City, County, State, Zip:	**Garysburg, Northampton County, North Carolina, 27831**
Mailing Address:	**7200 Wisconsin Avenue**
City, State, Zip:	**Bethesda, Maryland, 20814**
Application Number:	**6600167.11A**
Complete Application Date:	**August 26, 2011**
Primary SIC Code:	**2499**
Division of Air Quality, Regional Office Address:	**Raleigh Regional Office** **3800 Barrett Drive** **Raleigh, North Carolina, 27609**

ATTACHMENT to Permit No. 10203R00

Insignificant Activities under 15A NCAC 2Q .0503(8)

Emission Source ID No.	Emission Source Description
IES-DWH	Dried wood handling
IES-PP	Pellet press system
IES-FPH	Finished product handling
IS-TK1 and IS-TK2	Two diesel storage tanks (2,500 gallon and 500 gallon capacity)
IES-EPWC	Electric powered green wood chipper
IES-GWHS	Green wood handling and storage
IES-GWFB	Green wood fuel storage bin

1. Because an activity is insignificant does not mean that the activity is exempted from an applicable requirement or that the owner or operator of the source is exempted from demonstrating compliance with any applicable requirement.
2. When applicable, emissions from stationary source activities identified above shall be included in determining compliance with the permit requirements for toxic air pollutants under 15A NCAC 2D .1100 "Control of Toxic Air Pollutants" or 2Q .0711 "Emission Rates Requiring a Permit".
3. For additional information regarding the applicability of GACT see the DAQ page titled "The Regulatory Guide for Insignificant Activities/Permits Exempt Activities". The link to this site is as follows: http://daq.state.nc.us/permits/insig/

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SECTION 1- PERMITTED EMISSION SOURCE (S) AND ASSOCIATED AIR POLLUTION CONTROL DEVICE (S) AND APPURTENANCES

The following table contains a summary of all permitted emission sources and associated air pollution control devices and appurtenances:

Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-DRYER	Direct heat, wood-fired dryer (174 million Btu per hour heat input)	CD-DC and CD-WESP	One simple cyclone (149 inches in diameter) in series with one wet electrostatic precipitator (29,904 square feet of total collection plate area)
ES-HM-1, HM-2, HM-3, and HM-4	Four hammermills	CD-CHM-CYC-1, CYC-2, CYC-3, and CYC-4, and CD-HM-BF1 and BF2	Four simple cyclones (120 inches in diameter each) in series with two fabric filters (7,442 square feet of filter area each)
ES-HMA	Hammermill area	CD-HMA-BF	One fabric filter (7,442 square feet of filter area)
ES-PMFS	Pellet feed mill silo	CD-PMFS-BV	One bin vent filter (377 square feet of filter area)
ES-CLR1, CLR-2, CLR-3, CLR-4, CLR-5, and CLR-6	Pellet coolers	CD-CLR-1, CLR-2, and CLR-3	Three simple cyclones (50 inches in diameter each)
ES-GN and ES-FWP **NSPS MACT**	One emergency use generator (350 brake horsepower) and one fire water pump (300 brake horsepower)	N/A	N/A

SECTION 2 - SPECIFIC LIMITATIONS AND CONDITIONS

2.1- Emission Source(s) and Control Devices(s) Specific Limitations and Conditions

The emission source(s) and associated air pollution control device(s) and appurtenances listed below are subject to the following specific terms, conditions, and limitations, including the testing, monitoring, recordkeeping, and reporting requirements as specified herein:

A. Wood-fired dryer system (ID No. ES-DRYER), Hammermills (ID Nos. ES-HM-1, 2, 3, and 4), Hammermill area (ID No. ES-HMA), pellet mill feed silo (ID No. ES-PMFS), and pellet coolers (ID Nos. ES-CLR1, 2, 3, 4, 5, and 6)

The following table provides a summary of limits and standards for the emission source(s) described above:

Regulated Pollutant	Limits/Standards	Applicable Regulation
Particulate matter	$E = 4.10 \times P^{0.67}$ for process weight rate < 30 tph $E = 55 \times P^{0.11} - 40$ for process weigh rate ≥ 30 tph Where, E = allowable emission rate (lb/hr) P = process weight rate (tph)	15A NCAC 02D .0515
Sulfur dioxide	2.3 pounds per million Btu heat input	15A NCAC 02D .0516
Visible emissions	20 percent opacity when averaged over a six minute period	15A NCAC 02D .0521
Toxic air pollutants	See Section 2.2 A.	15A NCAC 02D .1100
Volatile organic compounds	Less than 250 tons per consecutive 12 month period, See Section 2.2 B.	15A NCAC 02Q .0317 for avoidance of 15A NCAC 02D .0530

1. 15A NCAC 02D .0515: PARTICULATES FROM MISCELLANEOUS INDUSTRIAL PROCESSES

a. Emissions of particulate matter from this source shall not exceed an allowable emission rate as calculated by the following equation: [15A NCAC 02D .0515(a)]

$E = 4.10 \times P^{0.67}$ for process weight rate < 30 tph
$E = 55 \times P^{0.11} - 40$ for process weight rate ≥ 30 tph

Where E = allowable emission rate in pounds per hour
P = process weight in tons per hour

Liquid and gaseous fuels and combustion air are not considered as part of the process weight.

Testing

b. Under the provisions of NCGS 143-215.108, the Permittee shall test the wet electrostatic precipitator (**ID No. CD-WESP**) for total suspended particulate (TSP) control efficiency in accordance with a testing protocol approved by the DAQ. Testing shall be completed and the results submitted within 180 days of commencement of operation unless an alternate date is approved by the DAQ.

Monitoring/Recordkeeping

c. Particulate matter emissions from the wood dryer system (**ID No. ES-DRYER**) shall be controlled by a simple cyclone (**ID No. CD-DC**) in series with a wet electrostatic precipitator (**ID No. CD-**

WESP). Particulate matter emissions from the four hammermills (**ID Nos. ES-HM-1, 2, 3, and 4**) shall be controlled by four simple cyclones (**ID Nos. CD-HM-CYC-1, 2, 3, and 4**) in series with two fabric filters (**ID Nos. CD-HM-BF1 and BF2**). Particulate matter emissions from the hammermill area (**ID No. ES-HMA**) shall be controlled by one fabric filter (**ID No. CD-HMA-BF**). Particulate matter emissions from the pellet mill feed silo (**ID No. ES-PMFS**) shall be controlled by a bin vent filter (**ID No. CD-PMFS-BV**). Particulate matter emissions from the pellet coolers (**ID Nos. ES-CLR-1, 2, 3, 4, 5 and 6**) shall be controlled by three simple cyclones (**ID Nos. CD-CLR-C1, 2, and 3**).

For bagfilters and cyclones:
To assure compliance, the Permittee shall perform inspections and maintenance as recommended by the manufacturer. In addition to the manufacturer's inspection and maintenance recommendations, or if there is no manufacturer's inspection and maintenance recommendations, as a minimum, the inspection and maintenance requirement shall include the following:

i. a monthly visual inspection of the system ductwork and material collection unit for leaks.
ii. an annual (for each 12 month period following the initial inspection) internal inspection of the bagfilters' structural integrity.

For WESP:
To assure compliance, the Permittee shall perform inspections and maintenance as recommended by the manufacturer. In addition to the manufacturer's inspection and maintenance recommendations, or if there is no manufacturer's inspection and maintenance recommendations, as a minimum, the inspection and maintenance requirement shall include the following:

> The Permittee shall establish the minimum primary voltage and minimum current within the first 30 days following operation of the dryer. To assure compliance and effective operation of the wet electrostatic precipitator, the Permittee shall monitor and record the primary voltage and current through the precipitator daily. The daily observation must be made for each day of the calendar year period. The Permittee shall be allowed three (3) days of absent observations per semi-annual period.

d. The results of inspection and maintenance shall be maintained in a log (written or electronic format) on-site and made available to an authorized representative upon request. The log shall record the following:
   i. the date and time of each recorded action;
   ii. the results of each inspection;
   iii. the results of any maintenance performed; and
   iv. any variance from manufacturer's recommendations, if any, and corrections made.

Reporting

e. The Permittee shall submit the results of any maintenance performed on the WESP, cyclones and bagfilters within 30 days of a written request by the DAQ.

2. 15A NCAC 02D .0516: SULFUR DIOXIDE EMISSIONS FROM COMBUSTION SOURCES

a. Emissions of sulfur dioxide from this source (**ID No. ES-DRYER**) shall not exceed 2.3 pounds per million Btu heat input. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard. [15A NCAC 02D .0516]

Testing

b. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 02D .2601.

Monitoring/Recordkeeping

c. No monitoring/recordkeeping is required for sulfur dioxide emissions from firing wood for these sources.

3. 15A NCAC 02D .0521: CONTROL OF VISIBLE EMISSIONS

a. Visible emissions from these sources shall not be more than 20 percent opacity when averaged over a six-minute period. However, six-minute averaging periods may exceed 20 percent not more than once in any hour and not more than four times in any 24-hour period. In no event shall the six-minute average exceed 87 percent opacity. [15A NCAC 02D .0521 (d)]

Testing

b. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 02D .2601.

Monitoring

c. To assure compliance, once a month the Permittee shall observe the emission points of this source for any visible emissions above normal. The monthly observation must be made for each month of the calendar year period to ensure compliance with this requirement. The Permittee shall establish "normal" for the source in the first 30 days following the effective date of the permit. If visible emissions from this source are observed to be above normal, the Permittee shall either:
   i. take appropriate action to correct the above-normal emissions as soon as practicable and within the monitoring period and record the action taken as provided in the recordkeeping requirements below, or
   ii. demonstrate that the percent opacity from the emission points of the emission source in accordance with 15A NCAC 02D .2601 (Method 9) for 12 minutes is below the limit given in Section 2.1 A.3. a. above.

Recordkeeping

d. The results of the monitoring shall be maintained in a log (written or electronic format) on-site and made available to an authorized representative upon request. The log shall record the following:
   i. the date and time of each recorded action;
   ii. the results of each observation and/or test noting those sources with emissions that were observed to be in noncompliance along with any corrective actions taken to reduce visible emissions; and
   iii. the results of any corrective actions performed.

B. Emergency Generator (ID No. ES-GN) and Fire Water Pump (ID No. ES-FWP)

The following table provides a summary of limits and/or standards for the emission source(s) described above.

Regulated Pollutant	Limits/Standards	Applicable Regulation
Sulfur dioxide	2.3 pounds per million Btu heat input	15A NCAC 2D .0516
Visible emissions	20 percent opacity	15A NCAC 2D .0521

Regulated Pollutant	Limits/Standards	Applicable Regulation
Toxic air pollutants	**State-enforceable only** See Section 2.2 A.1.	15A NCAC 2D .1100
Hazardous air pollutants (HAP)	National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) No additional requirements per 63.6590(c)	15A NCAC 2D .1111 (40 CFR 63, Subpart ZZZZ)
NMHC and NOx, CO, PM	0.20 g/kW for PM; 3.5 g/kW for CO; and 4 g/kW for NOx + NMHC	15A NCAC 2D .0524 (40 CFR 60, Subpart IIII)

1. **15A NCAC 2D .0516: SULFUR DIOXIDE EMISSIONS FROM COMBUSTION SOURCES**
   a. Emissions of sulfur dioxide from these sources shall not exceed 2.3 pounds per million Btu heat input. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard. [15A NCAC 2D .0516]

   Testing
   b. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0501(c)(4).

   Monitoring/Recordkeeping/Reporting
   c. No monitoring/recordkeeping/reporting is required for sulfur dioxide emissions from the firing of diesel fuel in these sources.

2. **15A NCAC 2D .0521: CONTROL OF VISIBLE EMISSIONS**
   a. Visible emissions from these sources shall not be more than 20 percent opacity when averaged over a six-minute period. However, six-minute averaging periods may exceed 20 percent not more than once in any hour and not more than four times in any 24-hour period. In no event shall the six-minute average exceed 87 percent opacity. [15A NCAC 2D .0521(d)]

   Testing
   b. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0501(c)(8).

   Monitoring
   c. To assure compliance, once a month the Permittee shall observe the emission points of these sources for any visible emissions above normal. The monthly observation must be made for each month of the calendar year period to ensure compliance with this requirement. The Permittee shall establish 'normal' for the sources in the first 30 days following operation. If visible emissions from these sources are observed to be above normal, the Permittee shall either:
      i. take appropriate action to correct the above-normal emissions as soon as practicable and within the monitoring period and record the action taken as provided in the recordkeeping requirements below, or
      ii. demonstrate that the percent opacity from the emission points of the emission source in accordance with 15A NCAC 02D .2601 (Method 9) for 12 minutes is below the limit given in Section 2.1 F.2. a. above.

   Recordkeeping
   d. The results of the monitoring shall be maintained in a log (written or electronic format) on-site and

made available to an authorized representative upon request. The log shall record the following:

i. the date and time of each recorded action;
ii. the results of each observation and/or test noting those sources with emissions that were observed to be in noncompliance along with any corrective actions taken to reduce visible emissions; and
iii. the results of any corrective actions performed.

3. 15A NCAC 2D .0524 NEW SOURCE PERFORMANCE STANDARDS [40 CFR Subpart IIII]

a. The provisions of this subpart are applicable to manufacturer, owners, and operators of stationary compression ignition (CI), reciprocating internal combustion engines (RICE). The Permittee shall comply with all applicable provisions, including the requirements for emission standards, notification, testing, reporting, recordkeeping, and monitoring, contained in Environmental Management Commission Standard 15A NCAC 2D .0524 "New Source Performance Standards (NSPS)" as promulgated in 40 CFR Part 60 Subpart IIII, including Subpart A "General Provisions."

Emission Standards for Manufacturers:

Emergency Engines

b. Pursuant to 40 CFR §60.4202 (a), stationary RICE engine manufacturers must certify their 2007 model year and later emergency stationary RICE. For engines greater than or equal to 50 hp, the certification emission standards for new non-road CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants.

Fire Pump Engines

c. Pursuant to 40 CFR §60.4202(d), beginning with the model years in table 3 to this subpart, stationary RICE manufacturers must certify their fire pump RICE to the emission standards in table 4 to this subpart, for all pollutants, for the same model year and NFPA nameplate power.

d. Pursuant to 40 CFR §60.4210, RICE manufacturers must certify the engine using the certification procedures required in 40 CFR Part 89, subpart b, or 40 CFR Part 1039, subpart c as applicable.

e. Pursuant to 40 CFR §60.4203, RICE must meet the emission standards during the useful life of the engine.

Emission Standards for Owners and Operators:

Emergency and Fire Pump Engines

f. Pursuant to 40 CFR §60.4205, owners and operators must comply with the following emission standards:

0.20 g/kW for PM
3.5 g/kW for CO
4 g/kW for NOx + NMHC

g. Pursuant to 40 CFR §60.4206, owners and operators must operate and maintain the stationary RICE according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine.

Fuel Requirements for Owners and Operators

h. Pursuant to 40 CFR §60.4207, owners and operators must use fuel with a maximum sulfur content of 15 ppmw and a cetane index of at least 40.

i. Pursuant to 40 CFR §60.4209(a), the owner or operator must install a non-resettable hour meter prior to start-up of the engines.

4. **15A NCAC 2D .1111: MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY (40 CFR 63 Subpart ZZZZ)**

a. Pursuant to §63.6580, Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

b. Pursuant to §63.6590(c), a new stationary RICE located at an area source must meet the requirements of 40 CFR Part 60, Subpart IIII, for compression ignition engines. No further requirements apply for such engines under this part.

2.2- Multiple Emission Source(s) Specific Limitations and Conditions

A. Facility-wide sources

STATE-ONLY REQUIREMENT:

1. **TOXIC AIR POLLUTANT EMISSIONS LIMITATION AND REQUIREMENT** - Pursuant to 15A NCAC 02D .1100 and in accordance with the approved application for an air toxic compliance demonstration, the following permit limit shall not be exceeded:

EMISSION SOURCE(S)	TOXIC AIR POLLUTANT(S)	EMISSION LIMIT(S)
Dryer system (**ID No. ES-DRYER**)	Acrolein	1.41 lb/hr
	Arsenic & compounds	2.43 lb/year
	Benzene	4,094.25 lb/year
	Benzo(a)pyrene	3.96 lb/year
	Cadmium	0.453 lb/year
	Chlorine	3.29 lb/day
	Formaldehyde	8.61 lb/hr
	Hexachlorodibenzo-p-dioxin	2.43 lb/year
	Hydrogen chloride	0.331 lb/hr
	Phenol	1.72 lb/hr
	Mercury	0.0146 lb/day
	Nickel	0.138 lb/day
	Vinyl chloride	27.43 lb/year
Fire Water Pump (**ID No. ES-FWP**)	Acrolein	1.94E-04 lb/hr
	Benzene	17.16 lb/year
	Benzo(a)pyrene	3.46E-03 lb/year
	Formaldehyde	2.48E-03 lb/hr

Emergency generator (**ID No. ES-GN**)	Acrolein Benzene Benzo(a)pyrene Formaldehyde	2.27E-04 lb/hr 20.02 lb/year 4.04E-03 lb/year 2.89E-03 lb/hr

a. No reporting is required.

STATE-ONLY REQUIREMENT:

2. **TOXIC AIR POLLUTANT EMISSION RATES REQUIRING A PERMIT** – Pursuant to 15A NCAC 02Q .0711, a permit to emit toxic air pollutants is required for any facility whose actual rate of emissions from all sources are greater than any one of the following rates:

Pollutant (CAS Number)	Carcinogens (lb/yr)	Chronic Toxicants (lb/day)	Acute Systemic Toxicants (lb/hr)	Acute Irritants (lb/hr)
1,3 Butadiene (106-99-0)	11			
Acetaldehyde (75-07-0)				6.8
Beryllium (7440-41-7)	0.28			
Carbon tetrachloride (56-23-5)	460			
Chlorobenzene (108-90-7)		46		
Chloroform (67-66-3)	290			
Di(2-ethylhexyl)phthalate (DEHP) (117-81-7		0.63		
Ethylene dichloride (1,2-dichloroethane) (107-06-2)	260			
Managanese & cmpds		0.63		
Methyl chloroform (1,1,1-trichloroethane) (71-55-6)		250		
Methyl ethyl ketone (78-93-3)		78		
Methyl isobutyl ketone (108-10-1)		52		7.6
Methylene chloride (75-09-2)	1600		0.39	
Pentachlorophenol (87-86-5)		0.063	0.0064	
Perchloroethylene (tetrachloroethylene) (127-18-4)	13000			
Polychlorinated biphenyls (1336-36-3)	5.6			
Styrene (100-42-5)			2.7	
Tetrachlorodibenzo-p-dioxin (1746-01-6)	0.00020			
Trichloroethylene (79-01-6)	4000			
Toluene (108-88-3)		98		14.4

Trichlorofluoromethane (CFC 111) (75-01-4)			140	
Xylene (1330-20-7)		57		16.4

B. 15A NCAC 2Q. 0317: AVOIDANCE CONDITIONS
15A NCAC 2D. 0530: PREVENTION OF SIGNIFICANT DETERIORATION

1. In order to avoid applicability of this regulation, the pellet dryer **(ID No. ES-DRYER)** shall discharge into the atmosphere less than 250 tons of VOCs and CO each per consecutive 12-month period. [15A NCAC 2D .0530]

Testing

2. Under the provisions of NCGS 143-215.108, the Permittee shall establish emission factors for calculating total VOC and CO used in compliance calculations under requirement 3. below by testing the wood dryer **(ID No. ES-DRYER)** in accordance with a testing protocol approved by the DAQ. Testing shall be completed and the results submitted within 180 days of commencement of operation unless an alternate date is approved by the DAQ.

Monitoring/Recordkeeping

3. Calculations of VOC and CO emissions per month shall be made at the end of each month. VOC and CO emissions shall be determined by multiplying the approved VOC and CO emission factor by the plant process rate.
4. The Permittee shall not process more than 10% softwood on an annual basis. The hardwood/softwood mix shall be recorded in a monthly log.
5. The product moisture content shall not be less than 13%. The Permittee shall monitor and record average moisture content on a 30 day rolling average. Calculations and the total amount of VOC and CO emissions shall be recorded monthly in a log (written or electronic format).

Reporting

6. The Permittee shall submit a semi-annual summary report, acceptable to the Regional Air Quality Supervisor, of monitoring and recordkeeping activities 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 following:
   a. The monthly hardwood/softwood mix for the previous 17 months.
   b. The 30 day rolling average product moisture content.
   c. The monthly VOC and CO emissions for the previous 17 months. The emissions must be calculated for each of the 12-month periods over the previous 17 months.

SECTION 3 - GENERAL CONDITIONS

1. REPORTS, TEST DATA, MONITORING DATA, NOTIFICATIONS, AND REQUESTS FOR RENEWAL shall be submitted to:

   Patrick Butler
   Regional Air Quality Supervisor
   North Carolina Division of Air Quality
   Raleigh Regional Office
   3800 Barrett Drive
   Raleigh, NC 27609
   (919) 791-4200

2. PERMIT RENEWAL REQUIREMENT - The Permittee, at least 90 days prior to the expiration date of this permit, shall request permit renewal by letter in accordance with 15A NCAC 2Q .0304(d) and (f). Pursuant to 15A NCAC 2Q .0203(i), no permit application fee is required for renewal of an existing air permit. The renewal request should be submitted to the Regional Supervisor, DAQ.

3. ANNUAL FEE PAYMENT - Pursuant to 15A NCAC 2Q .0203(a), the Permittee shall pay the annual permit fee within 30 days of being billed by the DAQ. Failure to pay the fee in a timely manner will cause the DAQ to initiate action to revoke the permit.

4. ANNUAL EMISSION INVENTORY REQUIREMENTS – The Permittee shall report by June 30 of each year the actual emissions of each air pollutant listed in 15A NCAC 02Q .0207(a) from each emission source within the facility during the previous calendar year. The report shall be in or on such form as may be established by the Director. The accuracy of the report shall be certified by the responsible official of the facility.

5. EQUIPMENT RELOCATION - A new air permit shall be obtained by the Permittee prior to establishing, building, erecting, using, or operating the emission sources or air cleaning equipment at a site or location not specified in this permit.

6. This permit is subject to revocation or modification by the DAQ upon a determination that information contained in the application or presented in the support thereof is incorrect, conditions under which this permit was granted have changed, or violations of conditions contained in this permit have occurred. The facility shall be properly operated and maintained at all times in a manner that will effect an overall reduction in air pollution. Unless otherwise specified by this permit, no emission source may be operated without the concurrent operation of its associated air cleaning device(s) and appurtenances.

7. REPORTING REQUIREMENT - Any of the following that would result in previously unpermitted, new, or increased emissions must be reported to the Regional Supervisor, DAQ:
   a. changes in the information submitted in the application regarding facility emissions;
   b. changes that modify equipment or processes of existing permitted facilities; or
   c. changes in the quantity or quality of materials processed.

   If appropriate, modifications to the permit may then be made by the DAQ to reflect any necessary

changes in the permit conditions. In no case are any new or increased emissions allowed that will cause a violation of the emission limitations specified herein.

8. This permit is nontransferable by the Permittee. Future owners and operators must obtain a new air permit from the DAQ.

9. This issuance of this permit in no way absolves the Permittee of liability for any potential civil penalties which may be assessed for violations of State law which have occurred prior to the effective date of this permit.

10. This permit does not relieve the Permittee of the responsibility of complying with all applicable requirements of any Federal, State, or Local water quality or land quality control authority.

11. Reports on the operation and maintenance of the facility shall be submitted by the Permittee to the Regional Supervisor, DAQ at such intervals and in such form and detail as may be required by the DAQ. Information required in such reports may include, but is not limited to, process weight rates, firing rates, hours of operation, and preventive maintenance schedules.

12. A violation of any term or condition of this permit shall subject the Permittee to enforcement pursuant to G.S. 143-215.114A, 143-215.114B, and 143-215.114C, including assessment of civil and/or criminal penalties.

13. Pursuant to North Carolina General Statute 143-215.3(a)(2), no person shall refuse entry or access to any authorized representative of the DAQ who requests entry or access for purposes of inspection, and who presents appropriate credentials, nor shall any person obstruct, hamper, or interfere with any such representative while in the process of carrying out his official duties. Refusal of entry or access may constitute grounds for permit revocation and assessment of civil penalties.

14. The Permittee must comply with any applicable Federal, State, or Local requirements governing the handling, disposal, or incineration of hazardous, solid, or medical wastes, including the Resource Conservation and Recovery Act (RCRA) administered by the Division of Waste Management.

15. PERMIT RETENTION REQUIREMENT - The Permittee shall retain a current copy of the air permit at the site. The Permittee must make available to personnel of the DAQ, upon request, the current copy of the air permit for the site.

16. CLEAN AIR ACT SECTION 112(r) REQUIREMENTS - Pursuant to 40 CFR Part 68 "Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act, Section 112(r)," if the Permittee is required to develop and register a risk management plan pursuant to Section 112(r) of the Federal Clean Air Act, then the Permittee is required to register this plan in accordance with 40 CFR Part 68.

17. PREVENTION OF ACCIDENTAL RELEASES - GENERAL DUTY - Pursuant to Title I Part A Section 112(r)(1) of the Clean Air Act "Hazardous Air Pollutants - Prevention of Accidental Releases - Purpose and General Duty," although a risk management plan may not be required, if the Permittee produces, processes, handles, or stores any amount of a listed hazardous substance, the Permittee has a

general duty to take such steps as are necessary to prevent the accidental release of such substance and to minimize the consequences of any release. This condition is federally-enforceable only.

Permit issued this the 9th day of March, 2012.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

Donald R. van der Vaart, PhD., P.E., J.D., Chief, Air Permits Section
Division of Air Quality
By Authority of the Environmental Management Commission

Air Permit No. 10203R00

CENTRAL OFFICE PERMIT TRACKING SLIP

Facility Name: Enviva Pellets Northampton
County/Regional Office: Northampton/RRO
Facility/Application ID: 6600167.11A
Engineer: Kevin Godwin

Send Regional Office Copy of Application: ☑ Yes ☐ No

PART I - ACCEPTANCE CHECKLIST

Acknowledgement Letter: ☐ Already Sent ☑ Please Send
Initial Event(s): ☑ TV-Ack./Complete ☐ State Ack. Letter due
☐ TV-Ack./Incomplete add info ☐ State App. not accepted – add info request

Fee Information:

Amount Due: (PSD or NSR/NAA $13,488
PSD and NSR/NAA $26,235
TV Greenfield $8,910
TV $867
Ownership Change $62
Renewal/Name Change – NA
Initial Amount Received: 13,488
Additional Amount Due: –

Acceptance Check List:

	Yes	No	NA
Appropriate Number of Apps Submitted (minimum of 2)	☑	☐	☐
Application Fee Submitted	☑	☐	☐
Zoning Addressed	☑	☐	☐
Source Recycling/Reduction Form Submitted	☑	☐	☐
Authorized Signature	☑	☐	☐
PE Seal	☑	☐	☐

PART II - IBEAM UPDATES

Application Type:

☐ Additional Permit
☐ Administrative Amendment
☐ Appeal
☑ Greenfield Facility
☐ Last GACT/Toxics
☐ Last MACT/Toxics
☐ Modification
☐ Name Change
☑ New Permit
☐ Ownership Change
☐ Renewal
☐ Renewal w/Modification

Permit Application Schedule:

☐ Appeal
☐ Expedited State
☑ PSD
☐ TV – State Only
☐ TV – Expedited
☐ TV – Greenfield
☐ TV – Reopen for Cause
☐ TV – Administrative
☐ TV – Ownership Change

☐ Director Administrative Amendment
☒ State changed 1/19/12
☐ TV – 502(b)(10)
☐ TV – Minor
☐ TV – Renewal
☐ TV – Significant (2Q .0501(c)(2))
☐ TV – Significant
☐ TV – 1st Time

PART III - COMPLETENESS CHECKLIST

☐ Required Application Forms Submitted and Completed
☐ Supporting Materials & Calculations Received
☐ PE Seal (If 15A NCAC 2Q .0112)
☐ Modeling Protocol Acceptance
☐ Confirmation of Pollutants Modeled
☐ E5 Form (Significant Modifications)

PART IV - GENERAL COMMENTS

Permit No. 10203

copy of modeling has been forwarded to Jim Rolfes

PART V - SUPERVISOR REVIEW CHECKLIST

TVEE Updated (by Engineer): KTG 12-5-11 TVEE Verified: 12/6/2011 Supervisor: Chief

PART VI - CLOSEOUT INFORMATION

Regulations Applicable to This Application (indicate all new regulations):

☑ NESHAPS/MACT
☐ NESHAPS/GACT
☑ NSPS
☑ 2D .1100
☑ 2Q .0711
☐ 2Q .0705 Last MACT/Toxics

☐ PSD/NSR
☑ PSD/NSR Avoidance
☐ Existing Source RACT/LAER
☐ New Source RACT/LAER
☐ RACT/LAER Added Fee
☐ RACT Avoidance

☐ Toxics/Combustion Sources After 7/10/10
☑ SIP Regulations (list all new):
2D .0515, .0516
.0521

Permit Class Information

Before: ☐ Small ☐ Syn. Minor ☐ Title V ☐ Prev. Small ☐ General ☐ Transportation
After: ☒ Title V

HAP Major Status (after) ☐ Major ☒ Minor ☐ Not Determined
PSD or NSR Status (after) ☐ Major ☒ Minor
Miscellaneous ☐ Multiple Permits at Facility ☐ Multi-Site Permit ☐ Recycled Oil Condition

Dates Issue 3-8-12 Effective 3-8-12 Expiration 2-28-17

IBEAM Closed Out By: Permit Number: 10203 Revision Number: R00

☐ Public Notice Published ☐ Public Notice Affidavit (if not noticed via DAQ Website)

Document Manager Updated by Engineer: KTG Date: 3-9-12

Kevin scanned.

Tracking Slip v36 - mjc L. Kuchnia

NORTH CAROLINA DIVISION OF AIR QUALITY

Air Permit Review

Permit Issue Date: 9 March 2012

Region: Raleigh Regional Office
County: Northampton
NC Facility ID: 6600167
Inspector's Name: N/A
Date of Last Inspection: N/A
Compliance Code:

Facility Data	Permit Applicability (this application only)
Applicant (Facility's Name): Enviva Pellets Northampton, LLC **Facility Address:** Enviva Pellets Northampton, LLC 874 Lebanon Church Road Garysburg, NC 27831 **SIC:** 2499 / Wood Products, Nec **NAICS:** 321999 / All Other Miscellaneous Wood Product Manufacturing **Facility Classification: Before:** N/A **After:** Title V **Fee Classification: Before:** N/A **After:** Title V	**SIP:** 02D .0515, .0516, .and 0521 **NSPS:** Subpart IIII **NESHAP:** Subpart ZZZZ **PSD:** **PSD Avoidance:** less than 250 tpy VOC and CO **NC Toxics:** 02D .1100 modeled limits **112(r):** **Other:**

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Glenn Gray Plant Manager (757) 274-8377 7200 Wisconsin Avenue Bethesda, MD 20814	Norb Hintz Vice President Engineering (301) 657-5567 7200 Wisconsin Avenue Bethesda, MD 20814	Glenn Gray Plant Manager (757) 274-8377 7200 Wisconsin Avenue Bethesda, MD 20814

Application Data

Application Number: 6600167.11A
Date Received: 08/26/2011
Application Type: Greenfield Facility
Application Schedule: State

Existing Permit Data
Existing Permit Number: N/A
Existing Permit Issue Date: N/A
Existing Permit Expiration Date: N/A

Review Engineer: Kevin Godwin

Review Engineer's Signature: **Date:** 3-9-12

Kevin T. Godwin

Comments / Recommendations:
Issue 10203R00
Permit Issue Date: 03/09/2012
Permit Expiration Date: 02/28/2017

I. Introduction and Purpose of Application

A. Enviva Pellets, LLC (Enviva) is proposing to construct and operate a new wood pellets manufacturing plant in the town of Gaston, NC. Enviva submitted a Prevention of Significant Deterioration (PSD) application on August 26, 2011. The application was deemed complete for processing on October 13, 2011. The application originally triggered PSD because GHG emissions were in excess of 100,000 tpy CO2e. However, subsequent to the application submittal, the NC Environmental Management Commmission revised the GHG PSD regulations at 15A NCAC 2D .0544 to exempt GHG emissions resulting from biomass. (See 15A NCAC 2D .0544 The temporary rule amendment was approved by the Rules Review Commission at its December 15, 2011 meeting and became effective December 23, 2011.)

After biomass GHGs were exempted the applicant resized its dryer and recalculated criteria pollutant emissions to be less than PSD major source thresholds. On January 6, 2012, DAQ received an addendum requesting a non-PSD permit.

B. The proposed plant is designed to produce wood pellets with no less than 13% moisture content. According to the application, pellets will typically consist of pressed hardwoods, but could contain up to 10% softwoods on an annual basis.

The pelletizing process is described in the application as follows:

1. Green wood will be delivered via trucks as whole logs or as chipped wood. Logs are chipped and debarked to specification for drying. Chipped wood is conveyed to wood storage and wood/bark is conveyed to green wood fuel dryer storage. Due to the high moisture content of green wood, negligible emissions from handling are expected. No air emissions from green wood handling and storage are reported in the application.
2. Wood dryer (**ID No. ES-Dryer**) – Green wood is conveyed to a rotary dryer system. Direct contact heat is provided to the system via a 174 million Btu/hr burner system. Moisture content is reduced to no less than 13%. Air emissions from the dryer system are controlled by a simple cyclone (**ID No. CD-DC**) in series with a wet electrostatic precipitator (**ID No. CD-WESP**). Emissions are calculated based on a combination of dryer vendor emission guarantees and AP-42 emission factors.
3. Dried wood handling (**ID No. ES-DWH**) – Dried materials are transferred from the dryer via conveyors to hammermills for further size reduction prior to pelletizing. Calculations included in the application indicate emissions from dried wood handling are less than 5 tpy and therefore insignificant.
4. Coarse Hammermills (**ID No. ES-HM-1, 2, 3, and 4**) – Dried materials are reduced to the appropriate size using four hammermills operating in parallel. Particulate emissions are controlled using four simple cyclones (**ID Nos. CD-HM-CYC1 through CYC4**) in series with two bagfilters (**ID Nos. CD-HM-BF1 and BF2**).
5. Hammermill Area Filter (**ID No. ES-HMA**) – A number of dried and sized wood transport emission sources are controlled by the Hammermill Area Filter bagfilter (**ID No. CD-HMA-BF**). Emissions from this bagfilter are calculated assuming an average grain loading factor and the maximum stack flow rate.
6. Pellet Mill Feed Silo (**ID No. ES-PMFS**) – Ground wood from the hammermills is conveyed to the infeed screw pellet mill feed silo prior to pelletization. Emissions are controlled using a bin vent filter (**ID No. CD-PMFS-BV**).
7. Pellet Press System (**ID No. ES-PP**) – Dried ground wood is compacted in the presence of water using several screw presses. Exhaust from the pellet press and associated conveyors are vented to the atmosphere with negligible particulate emissions. No chemical binding agents are used for pelletization.
8. Pellet Coolers (**ID Nos. ES-CLR**) – Wood pellets are conveyed to one of six pellet coolers. Cooling air is passed through the pellets. Particulate emissions are controlled using three simple cyclones operating in parallel (**ID Nos. CD-CLR-1, 2, and 3**).
9. Finished product handling (**ID No. ES-FPH**) – Pelletized product is conveyed to storage and load-out operations with no emissions expected.
10. Emergency Generator (**ID No. ES-EG**), Fire water pump (**ID No. ES-FWP**) and associated Fuel oil storage tanks – The facility will use a 350 bhp emergency generator and a 300 bhp fire water pump. Both engines operate on diesel fuel. Fuel for the emergency generator is stored in a 2,500 gallon tank and for the fire pump in a 500 gallon tank. Emissions from both tanks are insignificant.

C. Pursuant to 15A NCAC 02Q .0501(c)(2), Enviva is a new Title V facility that will be issued a state construction permit under 15A NCAC 02Q .0300 with a requirement to submit a Title V permit application within 12 months after commencing operation.

II. Regulatory Review – Specific Emission Source Limitations

A. 15A NCAC 02D .0515 "Particulates from Miscellaneous Industrial Processes" – This regulation establishes an allowable emission rate for particulate matter from any stack, vent, or outlet resulting from any industrial process for which no other emission control standards are applicable. This regulation applies to Total Suspended Particulate (TSP) or PM less than 100 micrometers (μm). The allowable emission rate is calculated using the following equation:

$E = 4.10 \times P^{0.67}$ for $P < 30$ tph
$E = 55 \times P^{0.11} - 40$ for $P \geq 30$ tph

where, E = allowable emission rate (lb/hr)

P = process weight rate (tph)

According to the application, the most significant source of PM emissions is the dryer system operating at 61.5 ODT/hr. The allowable emission rate is calculated to be 46.5 lb/hr. Maximum PM emissions are provided by the dryer vendor. The maximum hourly emission rate is 8.5 lb/hr. Therefore, compliance is indicated.

DAQ Bagfilter and Cyclone Design Evaluation spreadsheets are used to verify proper design to yield expected control device efficiencies.

The wet electrostatic precipitator (WESP) removes particles from a gas stream through the use of electrical forces. Discharge electrodes apply a negative charge to particles passing through a strong electrical field. These charged particles then migrate to a collecting electrode having an opposite, or positive, charge. Collected particles are removed from the collecting electrodes by washing using a mild hydroxide solution to prevent buildup of resinous materials present in the dryer exhaust. According to the application, the WESP possesses 29,904 square feet of collection plate area and can handle a maximum air flow of 190,000 acfm.

Control Device Monitoring

For cyclones and bagfilters:
To assure compliance, the Permittee shall perform inspections and maintenance as recommended by the manufacturer. In addition to the manufacturer's inspection and maintenance recommendations, or if there is no manufacturer's inspection and maintenance recommendations, as a minimum, the inspection and maintenance requirement shall include the following:

i. a monthly visual inspection of the system ductwork and material collection unit for leaks.
ii. an annual (for each 12 month period following the initial inspection) internal inspection of the bagfilters' structural integrity.

Reporting is required.

For WESP:
To assure compliance, the Permittee shall perform inspections and maintenance as recommended by the manufacturer. In addition to the manufacturer's inspection and maintenance recommendations, or if there is no manufacturer's inspection and maintenance recommendations, as a minimum, the inspection and maintenance requirement shall include the following:

> The Permittee shall establish the minimum primary voltage and minimum current within the first 30 days following operation of the dryer. To assure compliance and effective operation of the wet electrostatic precipitator, the Permittee shall monitor and record the primary voltage and current through the precipitator daily. The daily observation must be made for each day of the calendar year period. The Permittee shall be allowed three (3) days of absent observations per semi-annual period.

Because the application relies on vendor guaranteed emission factors and does not include estimated control efficiency, WESP performance testing will be required to establish control efficiency within 180 days of commencement of operation.

B. 15A NCAC 02D .0516 "Sulfur Dioxide Emissions from Combustion Sources" – Under this regulation, sulfur dioxide emissions from combustion sources cannot exceed 2.3 lb/million Btu heat input. No. 2 fuel oil is the worst case fuel. Firing No. 2 fuel oil (0.5% sulfur b.w.) will not cause this limit to be exceeded. Therefore, compliance is indicated.

C. 15A NCAC 02D .0521 "Control of Visible Emissions" – This regulation establishes a visible emission standard for sources based on the manufacture date. For sources manufactured after July 1, 1971, the

standard is 20% opacity when averaged over a 6-minute period. The Permittee will be required to establish 'normal' visible emissions from these sources within the first 30-days of the permit effective date. In order to demonstrate compliance, the Permittee will be required to observe actual visible emissions on a monthly basis for comparison to 'normal'. If emissions are observed outside of 'normal', the Permittee shall take corrective action. Recordkeeping and reporting are required. Because all emission sources are designed to be well controlled, compliance with this standard is expected.

III. Regulatory Review – Multiple Emission Source Limitations

A. 15A NCAC 02D .0524 "New Source Performance Standards (NSPS), Subpart IIII" – This regulation applies to owners or operators of compression ignition (CI) reciprocating internal combustion engines (RICE) manufactured after April 1, 2006 that are not fire pump engines, and fire pump engines manufactured after July 1, 2006. Both the 350 hp emergency generator and the 300 hp fire pump engine are subject to the requirements of this regulation.

Under NSPS Subpart IIII, owners or operators of emergency generators manufactured in 2007 or later with a maximum engine power greater than or equal to 50 hp are required to comply with the emission limits referenced in 40 CFR §60.4205(b). These limits are as follows: 0.20 g/kW for PM; 3.5 g/kW for CO; and 4 g/kW for NOx + nonmethane hydrocarbons (NMHC).

Under NSPS Subpart IIII, owners or operators of fire pump engines manufactured after July 1, 2006 must comply with the emission limits in Table 4 of the subpart. The limits are as follows: 0.20 g/kW for PM; 3.5 g/kW for CO; and 4 g/kW for NOx + NMHC.

As stated in the application, Enviva will comply with these limits by operating the engines as instructed in the manufacturer's operating manual in accordance with 40 CFR 60.4211(a), and purchasing an engine certified to meet the referenced emission limits in accordance with 40 CFR 60.4211(b). The engines will be equipped with a non-resettable hour meter in accordance with 40 CFR 60.4209(a). Emergency and readiness testing will be limited to 100 hours per year.

In addition, both engines are required to comply with fuel requirements in 40 CFR 60.4207, which limit sulfur content to a maximum of 15 ppm and a cetane index of at least 40.

B. 15A NCAC 02D .1111 "Maximum Achievable Control Technology, Subpart ZZZZ" – 40 CFR Part 63 applies to RICE located at a major or area source of hazardous air pollutants (HAP). Pursuant to 40 CFR §63.6590(c) (amended August 20, 2010), a new stationary RICE located at an area source must meet the requirements of this part by meeting the requirements of 40 CFR Part 60 Subpart IIII for compression ignition engines. No further requirements apply to such engines under this part.

As reported in Table 3-2 of the application, Enviva is an area source of HAP emissions with a facility-wide total of 17.28 tpy.

C. 15A NCAC 02D .1100 "Control of Toxic Air Pollutants" – This state-only section sets forth the rules for the control of facility-wide toxic air pollutants (TAP) to protect human health. Enviva emits thirteen (13) listed TAPs above the permit exemption rate; acrolein, arsenic & compounds, benzene, benzo(a)pyrene, cadmium, chlorine, formaldehyde, hexachlorodibenzo-p-dioxin, hydrogen chloride, mercury, nickel, phenol and vinyl chloride from the dryer, the fire water pump, and the emergency generator. Therefore, further evaluation using air dispersion modeling is required. Modeling, using AERMOD methodology, was included with the application. The modeling was reviewed by Mr. Tom Anderson, Air Quality Analysis Branch (AQAB). According to Mr. Anderson's memo received February 14, 2012, the modeling did demonstrate compliance on a source-by-source basis with North Carolina's Acceptable Ambient Levels (AAL) for the modeled TAP. Benzene had the highest impact at 29% of the AAL. The modeled emission rates are placed in the permit as limits for each source. Because the values modeled were based on maximum production, no restrictions are necessary. No reporting is required.

D. Prevention of Significant Deterioration (PSD) – This facility is classified in the 250 tpy major source threshold category. Calculations included in the application indicate facility-wide criteria pollutant emissions are less than the PSD major source threshold. Therefore, Enviva is minor with regards to PSD. The following table taken from the application provides a summary of criteria pollutants from the rotary dryer:

Pollutant	Emission Factor	Factor Source	Potential Emissions (tpy)
CO	0.81 lb/ODT	WESP specifications	193.1
NOx	0.53 lb/ODT	WESP specifications	124.7
TSP/PM-10/PM-2.5 (condensable fraction)	0.017 lb/MMBtu	AP-42, Section 1.6	13.0
TSP/PM-10/PM-2.5 (filterable)	0.062 lb/ODT	WESP specifications	14.8
*Total TSP/PM-10/PM-2.5 (filterable + condensable)			27.8
SO_2	0.025 lb/MMBtu	AP-42, Section 1.6	19.1
VOC	0.95 lb/ODT	WESP specifications	226.6

* The applicant assumes TSP = PM-10 = PM-2.5.

Because the VOC and CO emission factors relied upon in this application have not been validated, potential emissions could exceed the PSD major source threshold. DAQ feels that a PSD avoidance condition is necessary to ensure the major source threshold is not exceeded. The condition will limit total VOC and CO emissions to less than 250 tpy.

Testing of total VOC and CO will be required to establish emission factors used in compliance calculations within 180 days of commencement of operation.

Enviva has based the VOC emissions factor (0.95 lb/ODT) on using 10%/90% softwood/hardwood mix and drying pellets to no less than 13% moisture content. Drying 100% softwood would yield a greater emission factor.

As part of the avoidance condition, the facility will be limited to using no more than 10% softwood. Product moisture content shall not be less than 13%. Enviva will monitor and record the plant product rate, hardwood/softwood mix, and product moisture content. Reporting is required.

E. Nitrogen Dioxide Impact – Enviva modeled NO_2 emissions. When the modeled impact and background concentration are added, the total impact reached 54% of the 1-hour National Ambient Air Quality Standard (NAAQS).

F. PM-2.5 Impact – Enviva modeled PM-2.5 emissions. When the modeled impact and background concentration are added, the total impact reached 90% of the 24-hour NAAQS and 78% of the annual NAAQS.

VI. Other Regulatory Requirements

- An application fee of $867.00 is required and was included with the application.
- The appropriate number of application copies was received on August 26, 2011. The addendum was received on January 6, 2012.
- The application included the Reduction and Recycling Form (A4).

- A Professional Engineer's Seal was included in the application (ref. Joe Sullivan, P.E. Seal No. 023037).
- Receipt of the request for a zoning consistency determination was acknowledged by William Flynn, Jr., Northampton County Planning & Zoning Director on September 1, 2011.
- Public notice is not required for this state-only construction permit under 15A NCAC 02Q .0300.
- IBEAM Emission Source Module (ESM) update was verified on December 5, 2011.
- According to the application, the facility does not handle any of the substances subject to 112(r).
- The application was signed by Mr. Norb Hintz, Vice President Engineering, on August 18, 2011.

V. Recommendations

This permit application for a new permit has been reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined that this facility is expected to achieve compliance as specified in the permit with all applicable requirements. The applicant and Raleigh Regional Office (RRO) were provided a draft permit and review on February 16, 2012.

Issue Permit No. 10203R00.

Comprehensive Application Report for 6600167.11A

03/09/2012

Enviva Pellets Northampton, LLC - Gaston (6600167)

Northampton County

General Information: Permit/Latest Revision: 10203/ R00

Permit code:	State
Application type:	Greenfield Facility
Engineer/Rev. location:	Kevin Godwin/RCO
Regional Contact:	Charles McEachern
Facility location:	Raleigh Regional Office
Facility classification:	Small
Clock is ON	Application is COMPLETE
Status is :	Issued

Application Dates

Received	Completeness Due	Clock Start	Calculated Issue Due
08/26/2011	02/20/2012	01/06/2012	04/25/2012

Fee Information

Initial amount:	Date received:	Amount Due:	Add. Amt Rcv'd:	Date Rcv'd:
$13488.00	08/29/2011			

Fund type:	Deposit Slip #:	Location rec'd:	Location deposited:
2331			

Contact Information

Type	Name	Address	City State ZIP	Telephone
Technical/Permit	Glenn Gray, Plant Manager	7200 Wisconsin Avenue	Bethesda, MD 20814	(757) 274-8377
Authorized	Norb Hintz, Vice President Engineering	7200 Wisconsin Avenue	Bethesda, MD 20814	(301) 657-5567

Acceptance Criteria

Received?	Acceptance Criteria Description
Yes	Application fee
Yes	Appropriate number of apps submitted
Yes	Zoning Addressed
Yes	Source recycling/reduction form
Yes	Authorized signature
Yes	PE Seal

Completeness Criteria

Received?	Complete Item Description

Comprehensive Application Report for 6600167.11A 03/09/2012

Enviva Pellets Northampton, LLC - Gaston (6600167)

Northampton County

Application Events

Event	Start	Due	Complete	Comments	Staff
TV - Acknowledgment/Complete	08/26/2011	09/05/2011	08/29/2011	Originally to be processed as PSD	mjcuilla
Regional technical review completed/mailed	08/26/2011	09/25/2011	09/07/2011		mjcuilla
TV - Acknowledgment/Incomplete add info requested	11/21/2011	09/25/2011	01/06/2012	PSD no longer applies with submittal of addl app addend	mjcuilla
Technical Add Info - for Compliance Info	02/16/2012	03/17/2012	03/06/2012	draft to applicant and region	kgodwin
Permit issued	03/09/2012		03/09/2012		kmhash

Comprehensive Application Report for 6600167.11A

03/09/2012

Enviva Pellets Northampton, LLC - Gaston (6600167)

Northampton County

Outcome Information

Class before: Unknown Class after: Small

2Q .0711: Yes 2D .1100: Yes

NSPS: Yes NESHAPS/MACT: Yes PSD/NSR: No

PSD/NSR Avoid: Yes Prohibitory Small: No

PSD/NSR Status After: Minor General permit: No

Multi-site permit: No Multi. permits at facility: No

Quarry permit: No HAP Major (10/25 tpy): Minor

2Q .0705 Last MACT/Toxics: NO NESHAPS/GACT: NO

New Source RACT/LAER: NO Existing Source RACT: NO

RACT/LAER Added Fee: NO RACT Avoidance: NO

2Q .0702 (a)(18) - Toxics/Combustion Source(s) After 07/10/10: NO

Permit/Revision: 10203/R00

Revision Issue Date: 03/09/2012

Accumulated process days (includes public notice periods): 43

Public notice/hearing/add info after 80 days:

Manager's discretion: Appealed? No

Current Permit Information:

Issue	Effective	Expiration	Revision #
03/09/2012	03/09/2012	02/28/2017	R00

Regulations Pertaining to this Permit

Reference Rule		Regulation Description
2D	.0515	Particulates Miscellaneous Industrial Processes
2D	.0516	Sulfur Dioxide Emissions Combustion Sources
2D	.0521	Control of Visible Emissions

Audit Information Pertaining to this Application

Column Name	Date Changed	Old Value	New Value	Editor
perm_Code	08/29/2011	GRNTV (TV-Greenfield)	PSD (PSD)	Mark Cuilla
perm_Code	01/19/2012	PSD (PSD)	300 (State)	Mark Cuilla
permit_No	08/29/2011		10203	Charles McEachern
reg_Cont	08/29/2011		821 (Charles McEachern)	Mark Cuilla

DIVISION OF AIR QUALITY
February 13, 2012

MEMORANDUM

TO: Kevin Godwin, Environmental Engineer, Air Quality Permitting Section

FROM: Tom Anderson, Meteorologist II, Air Quality Analysis Branch (AQAB)

THROUGH: Jim Roller, Supervisor, AQAB

SUBJECT: Review of Dispersion Modeling Analysis – Enviva Pellets Northampton, LLC
Facility ID - 6600167
Gaston, NC Northampton County

I have reviewed the dispersion modeling analysis, received January 17, 2012, for the Enviva Pellets Northampton facility located in Gaston, NC. The facility was recently modeled as part of a PSD application, but has since withdrawn their application and has decided to undergo "minor" review instead. Upon direction of NCDAQ, a modeling analysis was conducted for NO_2 (1-hour only) and $PM_{2.5}$. Additionally, all NC regulated toxics whose emissions exceed the rates outlined in NCAC 2Q .0700 were evaluated in the modeling analysis. The modeling adequately demonstrates compliance, on a source-by-source basis, with the NAAQS for NO_2, $PM_{2.5}$, and all toxics modeled.

The Enviva Pellets facility will manufacture wood pellets and will consist of a wood drying system along with various material handling and emergency equipment. Source parameters for the sources included in the modeling are provided in attached Tables 4-1 and 4-2. Emission rates are provided in Table 4-3.

AERMOD, using five years (1988-1992) of meteorological data from Raleigh (surface) and Greensboro (upper air) was used to assess both simple and elevated terrain impacts from the facility. Direction-specific building dimensions, determined using EPA's BPIP program (95086), were used as input to the model for building wake effect determination. Receptors were placed around the facility fenceline at 25-meter intervals and extended outward to a distance of 3 kilometers at 100 meter spacing. Terrain elevations and hill height parameters were calculated for each receptor by the AERMAP preprocessor. The following table shows the maximum NO_2 and $PM_{2.5}$ impacts.

…Table on following page…

Table 1 - Class II Area NAAQS Modeling Results

Pollutant	Averaging Period	Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)[a]	Total Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	% NAAQS
NO_2	1-hour	66.54	35.8	102.34	188	54%
$PM_{2.5}$	24-hour	14.36	17.0	31.36	35	90 %
	Annual	3.15	8.6	11.75	15	78 %

[a] Provided by NCDAQ.

The following table shows the impacts for the N.C. regulated toxics.

Table 2.
NC Toxic Impacts

Pollutant	Averaging Period	% of AAL
Acrolein	1-hour	5 %
Arsenic	Annual	9 %
Benzene	Annual	29 %
Benzo(a)pyrene	Annual	<1 %
Cadmium	Annual	<1 %
Chlorine	1-hour	<1 %
	24-hour	<1 %
Formaldehyde	1-hour	18 %
Hexa.-p-dioxin	Annual	26 %
Hydrogen chloride	1-hour	<1 %
Mercury	24-hour	<1 %
Nickel	24-hour	<1 %
Phenol	1-hour	1 %
Vinyl chloride	Annual	<1 %

This compliance demonstration assumes the source parameters and pollutant emission rates used in the analysis are correct.

cc: Jim Roller
Tom Anderson
Lori Cherry, TPB

TABLE 4-3. MODELED EMISSION RATES

Pollutant	Modeled Emission Rates (g/s) EP1	EP2	EP3	EP4	EP5	EP6
Acrolein	-	-	-	2.855E-05	2.448E-05	1.782E-01
Arsenic	-	-	-	-	-	3.497E-05
Benzene	-	-	-	2.880E-04	2.469E-04	5.889E-02
Benzo(a)pyrene	-	-	-	5.804E-08	4.974E-08	5.700E-05
Cadmium	-	-	-	-	-	6.517E-06
Chlorine	-	-	-	-	-	1.732E-02
Formaldehyde	-	-	-	3.643E-04	3.122E-04	1.085E+00
Hexachlorodibenzo-p-dioxin	-	-	-	-	-	3.508E-05
Hydrogen Chloride	-	-	-	-	-	4.166E-02
Mercury	-	-	-	-	-	7.673E-05
Nickel	-	-	-	-	-	7.235E-04
Phenol	-	-	-	-	-	2.170E-01
Vinyl Chloride	-	-	-	-	-	3.946E-04
NO_x	-	-	-	1.450E-01	1.243E-01	4.070E+00
$PM_{2.5}$	9.801E-01	1.269E+00	2.700E-02	1.450E-02	1.243E-02	8.559E-01

Note that the NO_x rates for EP4 and EP5 are based on 30 minute readiness testing and are thus 50% of the total emission rate presented in the emission calculations.

4.4 METEOROLOGICAL DATA

The AERMOD modeling results were based on sequential hourly surface observations from Raleigh/Durham, NC and upper air data from Greensboro, NC. These stations are recommended by NCDAQ for modeling facilities located in Northampton County. The base elevation for the surface station is 126.8 m.[6]

The five (5) most recent, model-ready years (1988-1992) were downloaded from the NCDAQ website.[7] As shown in Section 4.8, the TAP model impacts were all less than 50% of the AAL, so only the most recent year (1992) was input to AERMOD. For the 1-hour NO_2 and $PM_{2.5}$ NAAQS analysis, all 5 years were modeled in a concatenated file.

4.5 MODELED RECEPTORS

The receptors included in the modeling analysis consisted of property line receptors, spaced 25 meters (m) apart, and Cartesian receptor points spaced every 100 m, extending out 3 kilometers (km) from the facility. There are no public right-of-ways (e.g. roads, railways) traversing the property line, so the same receptor grid was modeled for the one-hour (1-hr) and annual TAP analyses, as well as for the 1-hour NO_2 NAAQS modeling. The impacts were reviewed to ensure

[6] http://www.ncair.org/permits/mets/ProfileBaseElevations.pdf
[7] http://www.ncair.org/permits/mets/metdata.shtml

Bagfilter Evaluation - Enviva Pellets - Northampton, ID No. CD-HM-BF1

User Input

User must supply information in blue (double outline).

Optional user information is single outlined.

Particulate Material: Wood	Estimated Efficiency (%): 99.9
Actual Air Flow Rate (acfm): 40,000	Cloth Area (sq ft): 7,442
Maximum Operating Temperature (F): 250	Proposed Cloth Material: Polyethylene
	Pulse Jet?: no
Uncontrolled Particulate Rate (lb/hr): 7,457.0	Process Rate (lb/hr): 300,000
Maximum Pressure Drop (in H2O): 6	No. of compartments: 1
Gas Stream Moisture (%): 23.00	Felted?: yes
Time Between Cleanings (min): 0.17	Cleaning Time (min): ?

Particle Size Distribution

Avg. Size (um)	Size Ranges (um)	Size (um)	Cumul. Mass (% < size)
1.25	0 - 2.5	0	0.0
3.75	2.5 - 5	2.5	16.5
7.5	5 - 10	5	40.3
12.5	10 - 15	10	51.6
17.5	15 - 20	15	57.0
20	> 20	20	100.0

Information Source(s)

6600167.11A

Program Output

Filtering Velocity Analysis

Typical Filtering Velocity (fpm): 12.0

Applicant Filtering Velocity (fpm): 5.4

Typical filtering velocity not exceeded.

Fabric Durability Analysis

	Chemical Resistance: Acid	Alkali	Organics
Fabric appropriate for max. oper. temp.	Fair	Fair	Fair

Particulate Emissions Analysis

Controlled Particulate Rate (lb/hr): 3.450

Gas Stream Particulate Loadings (gr/dscf)

Uncontrolled: 21.36

Controlled: 0.0099

Note: Correct gas stream temperature and moisture content must be entered!

The estimated collection efficiency is reasonable.

Allowable Emissions per 2D .0515 (lb/hr): 55.44

Maximum Areal Dust Loading (gr/sq ft): 19.1

Dust drag (K2) parameter ((inH2O/fpm)/(lb/sq ft)): 0.003049

Efficiency Calculations

Mass in Range (%)	Control Efficiency (%)	eta-m (%)
0.0	98.00	0.00
16.5	99.90	16.48
23.8	99.90	23.78
11.3	99.99	11.30
5.4	99.99	5.40
43.0	99.99	43.00
	Overall Control Efficiency =	99.95 %
	Penetration =	0.05 %

Bagfilter evaluation developed by:
William D. Willets, M.S., E.I.T.
North Carolina Division of Environmental Management
Air Quality Permitting
Version 3.3; September 23, 1999

Bagfilter Evaluation - Enviva Pellets - Northampton, ID No. CD-HMA-BF

User Input

User must supply information in blue (double outline).

Optional user information is single outlined.

Particulate Material: Wood	Estimated Efficiency (%): 99.9
Actual Air Flow Rate (acfm): 37,500	Cloth Area (sq ft): 7,442
Maximum Operating Temperature (F): 250	Proposed Cloth Material: Polyethylene
	Pulse Jet?: no
Uncontrolled Particulate Rate (lb/hr): 7,457.0	Process Rate (lb/hr): 300,000
Maximum Pressure Drop (in H2O): 6	No. of compartments: 1
Gas Stream Moisture (%): 23.00	Felted?: yes
Time Between Cleanings (min): 0.17	Cleaning Time (min): ?

Particle Size Distribution

Avg. Size (um)	Size Ranges (um)	Size (um)	Cumul. Mass (% < size)
1.25	0 - 2.5	0	0.0
3.75	2.5 - 5	2.5	16.5
7.5	5 - 10	5	40.3
12.5	10 - 15	10	51.6
17.5	15 - 20	15	57.0
20	> 20	20	100.0

Information Source(s)

6600167.11A

Program Output

Filtering Velocity Analysis

Typical Filtering Velocity (fpm): 12.0

Applicant Filtering Velocity (fpm): 5.0

Typical filtering velocity not exceeded.

Fabric Durability Analysis

	Chemical Resistance: Acid	Alkali	Organics
Fabric appropriate for max. oper. temp	Fair	Fair	Fair

Particulate Emissions Analysis

Controlled Particulate Rate (lb/hr): 3.450

Gas Stream Particulate Loadings (gr/dscf)

Uncontrolled: 22.79

Controlled: 0.0105

Note: Correct gas stream temperature and moisture content must be entered!

The estimated collection efficiency is reasonable.

Allowable Emissions per 2D .0515 (lb/hr): 55.44

Maximum Areal Dust Loading (gr/sq ft): 19.1

Dust drag (K2) parameter ((inH2O/fpm)/(lb/sq ft)): 0.003252

Efficiency Calculations

Mass in Range (%)	Control Efficiency (%)	eta-m (%)
0.0	98.00	0.00
16.5	99.90	16.48
23.8	99.90	23.78
11.3	99.99	11.30
5.4	99.99	5.40
43.0	99.99	43.00
	Overall Control Efficiency =	99.95 %
	Penetration =	0.05 %

Bagfilter evaluation developed by:
William D. Willets, M.S., E.I.T.
North Carolina Division of Environmental Management
Air Quality Permitting
Version 3.3; September 23, 1999

Cyclone Design and Evaluation **Version 2.5.2**

by D. R. van der Vaart and William D. Willets

User must supply information in blue (double outline). Units must be as specified.

The user may wish to overwrite data that is solid outlined.

Calculated information appears in black.

Facility Name:	**Enviva Pellets - Northampton**
Cyclone ID:	**CD-DC**

Cyclone Parameters

Diameter of exit (De)	6.0	ft	1.83	m		
Diameter (D)	12.4	ft	3.78	m		
# Body Height (Lb)	18.0	ft	5.49	m		
# Cone Height (Lc)	21.2	ft	6.46	m		
# Inlet Height (Dia.) (H)	8.0	ft	2.44	m		
# Inlet Width (W)	2.00	ft	0.61	m		
Inlet Type (C[irc.] or R[ect.])	R		R			
Exit throat length (S)	5.6	ft	1.71	m		
Collected solids exit diameter (Dd)	2	ft	0.61	m		
# Flow Rate (ACFM)	122,460	acfm	3467.7	m3/min		
Gas Temperature	80	F	299.7	K		
Pressure	1	atm	101.3	kPa		
# Particle Density	48	lb/ft3	770	kg/m3		
Molecular Wt. of gas (default is air)	28.8	lb/lb-mol	28.8	g/mol	Properties of air:	
# Gas Density (default is air)	0.0732	lb/ft3	1.17	kg/m3	Density (lb/ft3)	0.0732
# Gas Viscosity (default is air)	0.0448	lb/hr-ft	1.85E-05	kg/m-s	Viscosity (cp)	0.0185
Estimated Pressure Drop	6.0	in H2O	6314	Pa		

Particle Size Distribution

Size Ranges (µm)	Size Range (µm)	Average Diameter (µm)	Density Function (%wt)	Cumulative Mass (% < size)
0 - 1	0.00	0.5	0	0
1 - 10	1.00	5.5	20	20
10 - 25	10.00	17.5	20	40
25 - 50	25.00	37.5	30	70
50 - 100	50.00	75.0	20	90
> 100	100.00	100.0	10	100

Performance Analyses

Facility:	Enviva Pellets - Northampton
Cyclone:	CD-DC

Method of Lapple

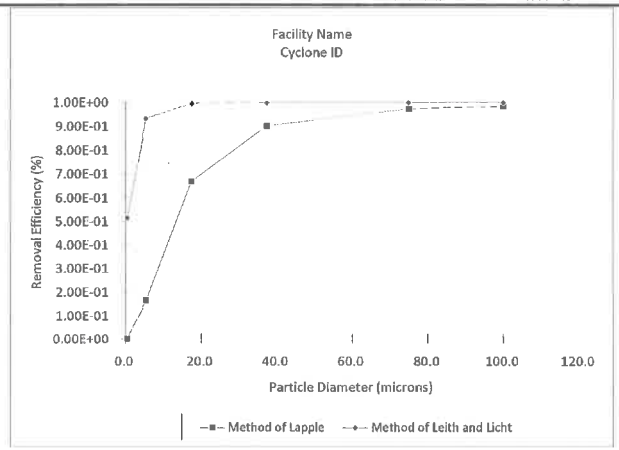
Inlet Area	16.00	ft2	1.49	m2	
Inlet Velocity	7654	ft/min	38.9	m/sec	127.6 fps
Effective Turns	3.6		3.6		
Particle Cut Diameter	12.3	µm	12.3	µm	

Size Ranges (µm)	Density Function (µm)	Mass in Fraction (%)	eta	etam
0 - 1	0.5	0	1.65E-03	0.000
1 - 10	5.5	20	1.67E-01	3.333
10 - 25	17.5	20	6.69E-01	13.39
25 - 50	37.5	30	9.03E-01	27.09
50 - 100	75.0	20	9.74E-01	19.48
> 100	100.0	10	9.85E-01	9.85
		Overall efficiency =		73.1 %
		Penetration =		26.86 %

Method of Leith-Licht

n=	0.60
l [=] natural length	8.94
This is Lc + Lb - S	10.24
Vs =	4.19
d =	1.25
Kc =	0.51
C =	39.21

Size Ranges (µm)	Avg. Size (m)	Psi	Mass in Range (%)	eta	etam (%)	New Mass in Range (%)
0 - 1	5.00E-07	0.00064	0	0.5138	0.00	0.00
1 - 10	5.50E-06	0.07783	20	0.9344	18.69	91.34
10 - 25	1.75E-05	0.78795	20	0.9944	19.89	7.87
25 - 50	3.75E-05	3.62	30	0.9998	29.98	7.76E-01
50 - 100	7.50E-05	14.47	20	1.0000	20.00	1.28E-02
> 100	1.00E-04	25.73	10	1.0000	10.00	8.60E-04
			Overall efficiency =		98.56 %	
			Penetration =		1.44 %	



Cyclone Design and Evaluation **Version 2.6.2**

by D. R. van der Vaart and William D. Willets

User must supply information in blue (double outline). Units must be as specified.

The user may wish to overwrite data that is solid outlined.

Calculated information appears in black.

Facility Name:	Enviva Pellets - Northampton
Cyclone ID:	CD-HM-CYC1

Cyclone Parameters

Diameter of exit (De)	4.8	ft	1.45	m
Diameter (D)	10.0	ft	3.05	m
# Body Height (Lb)	5.7	ft	1.74	m
# Cone Height (Lc)	16.0	ft	4.88	m
# Inlet Height (Dia.) (H)	4.0	ft	1.22	m
# Inlet Width (W)	2.00	ft	0.61	m
Inlet Type (C[irc.] or R[ect.])	R		R	
Exit throat length (S)	5.6	ft	1.71	m
Collected solids exit diameter (Dd)	2	ft	0.61	m
# Flow Rate (ACFM)	20,000	acfm	566.3	m3/min
Gas Temperature	80	F	299.7	K
Pressure	1	atm	101.3	kPa
# Particle Density	48	lb/ft3	770	kg/m3

Molecular Wt. of gas (default is air)	28.8	lb/lb-mol	28.8	g/mol	Properties of air:	
# Gas Density (default is air)	0.0732	lb/ft3	1.17	kg/m3	Density (lb/ft3)	0.0732
# Gas Viscosity (default is air)	0.0448	lb/hr-ft	1.85E-05	kg/m-s	Viscosity (cp)	0.0185
Estimated Pressure Drop	6.0	in H2O	537	Pa		

Particle Size Distribution

Size Ranges (µm)	Size Range (µm)	Average Diameter (µm)	Density Function (%wt)	Cumulative Mass (% < size)
0 - 1	0.00	0.5	0	0
1 - 10	1.00	5.5	20	20
10 - 25	10.00	17.5	20	40
25 - 50	25.00	37.5	30	70
50 - 100	50.00	75.0	20	90
> 100	100.00	100.0	10	100

Performance Analyses

Facility:	Enviva Pellets - Northampton
Cyclone:	CD-HM-CYC1

Method of Lapple

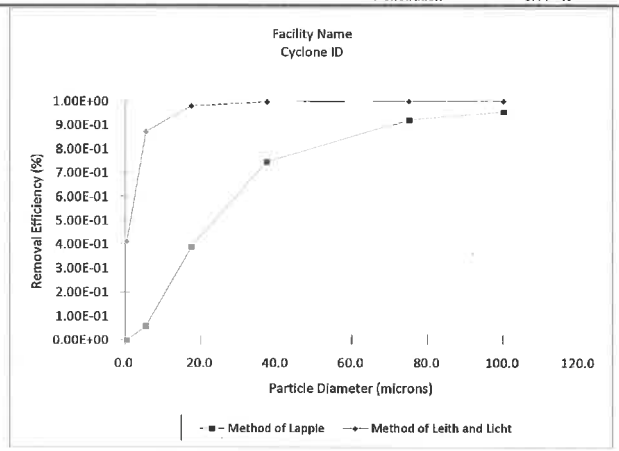
Inlet Area	8.00	ft2	0.74	m2	
Inlet Velocity	2500	ft/min	12.7	m/sec	41.7 fps
Effective Turns	3.4		3.4		
Particle Cut Diameter	22.0	µm	22.0	µm	

Size Ranges (µm)	Density Function (µm)	Mass in Fraction (%)	eta	etam	
0 - 1	0.5	0	5.17E-04	0.000	
1 - 10	5.5	20	5.89E-02	1.178	
10 - 25	17.5	20	3.88E-01	7.76	
25 - 50	37.5	30	7.44E-01	22.33	
50 - 100	75.0	20	9.21E-01	18.42	
> 100	100.0	10	9.54E-01	9.54	
		Overall efficiency =		59.2	%
		Penetration =		40.78	%

Method of Leith-Licht

n=	0.78
l [=] natural length	7.73
This is Lc + Lb - S	4.91
Vs =	6.20
d =	-0.80
Kc =	0.34
C =	33.99

Size Ranges (µm)	Avg. Size (m)	Psi	Mass in Range (%)	eta	etam (%)	New Mass in Range (%)
0 - 1	5.00E-07	0.00026	0	0.4102	0.00	0.00
1 - 10	5.50E-06	0.0311	20	0.8689	17.38	84.34
10 - 25	1.75E-05	0.31483	20	0.9796	19.59	13.11
25 - 50	3.75E-05	1.45	30	0.9975	29.92	2.45E+00
50 - 100	7.50E-05	5.78	20	0.9999	20.00	9.50E-02
> 100	1.00E-04	10.28	10	1.0000	10.00	1.01E-02
			Overall efficiency =		96.89	%
			Penetration =		3.11	%



Cyclone Design and Evaluation **Version 2.5.2**

by D. R. van der Vaart and William D. Willets

User must supply information in blue (double outline). Units must be as specified.

The user may wish to overwrite data that is solid outlined.

Calculated information appears in black.

Facility Name:	**Enviva Pellets - Northampton**
Cyclone ID:	**CD-CLR-1**

Cyclone Parameters

Diameter of exit (De)	2.5	ft	0.76	m		
Diameter (D)	4.2	ft	1.28	m		
# Body Height (Lb)	6.0	ft	1.83	m		
# Cone Height (Lc)	7.0	ft	2.13	m		
# Inlet Height (Dia.) (H)	3.0	ft	0.91	m		
# Inlet Width (W)	1.00	ft	0.30	m		
Inlet Type (C[irc.] or R[ect.])	R		R			
Exit throat length (S)	3.0	ft	0.91	m		
Collected solids exit diameter (Dd)	1	ft	0.30	m		
# Flow Rate (ACFM)	12,500	acfm	354.0	m3/min		
Gas Temperature	80	F	299.7	K		
Pressure	1	atm	101.3	kPa		
# Particle Density	48	lb/ft3	770	kg/m3		
Molecular Wt. of gas (default is air)	28.8	lb/lb-mol	28.8	g/mol	Properties of air:	
# Gas Density (default is air)	0.0732	lb/ft3	1.17	kg/m3	Density (lb/ft3)	0.0732
# Gas Viscosity (default is air)	0.0448	lb/hr-ft	1.85E-05	kg/m-s	Viscosity (cp)	0.0185
Estimated Pressure Drop	6.0	in H2O	2021	Pa		

Particle Size Distribution

Size Ranges (µm)	Size Range (µm)	Average Diameter (µm)	Density Function (%wt)	Cumulative Mass (% < size)
0 - 1	0.00	0.5	0	0
1 - 10	1.00	5.5	20	20
10 - 25	10.00	17.5	20	40
25 - 50	25.00	37.5	30	70
50 - 100	50.00	75.0	20	90
> 100	100.00	100.0	10	100

Performance Analyses

Facility: Enviva Pellets - Northampton
Cyclone: CD-CLR-1

Method of Lapple

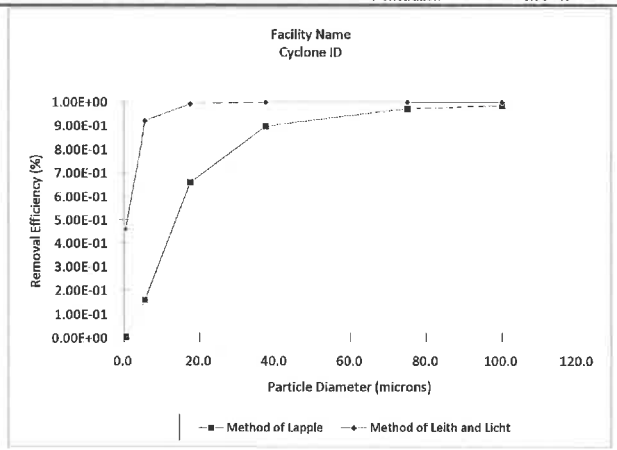
Inlet Area	3.00	ft2	0.28	m2	
Inlet Velocity	4187	ft/min	21.2	m/sec	69.4 fps
Effective Turns	3.2		3.2		
Particle Cut Diameter	12.5	µm	12.5	µm	

Size Ranges (µm)	Density Function (µm)	Mass in Fraction (%)	eta	etam	
0 - 1	0.5	0	1.59E-03	0.000	
1 - 10	5.5	20	1.62E-01	3.234	
10 - 25	17.5	20	6.61E-01	13.23	
25 - 50	37.5	30	9.00E-01	26.99	
50 - 100	75.0	20	9.73E-01	19.46	
> 100	100.0	10	9.85E-01	9.85	
		Overall efficiency =		72.8	%
		Penetration =		27.25	%

Method of Leith-Licht

n=	0.69
l [=] natural length	3.16
This is Lc + Lb - S	3.05
Vs =	0.38
d =	0.25
Kc =	0.41
C =	19.42

Size Ranges (µm)	Avg. Size (m)	Psi	Mass in Range (%)	eta	etam (%)	New Mass in Range (%)
0 - 1	5.00E-07	0.00097	0	0.4601	0.00	0.00
1 - 10	5.50E-06	0.11709	20	0.9220	18.44	91.92
10 - 25	1.75E-05	1.18537	20	0.9937	19.87	7.45
25 - 50	3.75E-05	5.44	30	0.9998	29.99	6.22E-01
50 - 100	7.50E-05	21.77	20	1.0000	20.00	7.32E-03
> 100	1.00E-04	38.71	10	1.0000	10.00	3.94E-04
			Overall efficiency =		98.30	%
			Penetration =		1.70	%



Godwin, Kevin

From: Mceachern, Charles
Sent: Tuesday, March 06, 2012 9:50 AM
To: Godwin, Kevin
Subject: RE: Enviva (6600167.11A)

That sounds good to me, the RRO recommends issuance of the revised air permit.

Thank you.

Charles M. McEachern, III, P.E.
Environmental Engineer/Permits Coordinator
NC DENR, Division of Air Quality
Raleigh Regional Office
3800 Barrett Drive, Raleigh, NC 27609
E-mail: charles.mceachern@ncdenr.gov
Phone: (919)791-4276
FAX: (919)881-2261
DAQ Web Site: www.ncair.org

From: Godwin, Kevin
Sent: Tuesday, March 06, 2012 7:42 AM
To: Mceachern, Charles
Subject: RE: Enviva (6600167.11A)

Charles,
Because the WESP control efficiency was not specified in the application, I decided to include a performance test requirement under 2D .0515. within 180 days. Thanks.

Kevin Godwin, Engineer
NC DENR, Division of Air Quality
Permits
1641 MSC, Raleigh, NC 27699-1641
(919) 707-8480
217 W. Jones St.
www.ncair.org

From: Mceachern, Charles
Sent: Monday, March 05, 2012 4:49 PM
To: Godwin, Kevin
Subject: RE: Enviva (6600167.11A)

Hi Kevin, I appreciate the updates you made to the review and permit, they answered most of my questions. The only remaining question I asked that you didn't answer is about the WESP performance. How do we know it is appropriate for this application and that its control efficiency estimate (not listed in the review) is appropriate?

Thank you.

Charles M. McEachern, III, P.E.
Environmental Engineer/Permits Coordinator
NC DENR, Division of Air Quality
Raleigh Regional Office
3800 Barrett Drive, Raleigh, NC 27609
E-mail: charles.mceachern@ncdenr.gov
Phone: (919)791-4276
FAX: (919)881-2261
DAQ Web Site: www.ncair.org

From: Godwin, Kevin
Sent: Friday, March 02, 2012 9:39 AM
To: Mceachern, Charles
Subject: RE: Enviva (6600167.11A)

Charles,
Attached, please find a revised draft which addresses your comments. Thanks.

Kevin Godwin, Engineer
NC DENR, Division of Air Quality
Permits
1641 MSC, Raleigh, NC 27699-1641
(919) 707-8480
217 W. Jones St.
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From: Mceachern, Charles
Sent: Monday, February 27, 2012 12:08 PM
To: Godwin, Kevin
Subject: RE: Enviva (6600167.11A)

Hi Kevin, in looking through the permit and review I have the following comments:

- Why is there a 250 ton VOC limit to avoid PSD when your review shows potential emissions to be 226 tons per year? I understand requiring a stack test to validate the 0.95 lb/ODT emission factor, but the PSD avoidance itself seems unsupported.

- In paragraph 2.1.A.1.c there doesn't seem to be any specific requirements for the wet ESP, is that an oversight? Also the wet ESP performance is not discussed in your review.
- In paragraph 2.2A.1.a you require quarterly reporting of air toxics even though no operating restrictions are required to demonstrate compliance. Why are we requiring this?
- In paragraph 2.2.B you have a PAD avoidance condition for VOC, which I mention above, and you require testing for VOC and CO. Why is CO mentioned in the PSD avoidance condition for VOC?
- Your review does not discuss why the softwood limitation of 10% is needed to keep VOC emissions less than 250 tpy, please add this discussion to your review.

Currently the RRO does not recommend issuance of the permit until the above issues are resolved. The RRO requests the opportunity to review the revised draft permit and review prior to their issuance.

Thank you.

Charles M. McEachern, III, P.E.
Environmental Engineer/Permits Coordinator
NC DENR, Division of Air Quality
Raleigh Regional Office
3800 Barrett Drive, Raleigh, NC 27609
E-mail: charles.mceachern@ncdenr.gov
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FAX: (919)881-2261
DAQ Web Site: www.ncair.org

From: Godwin, Kevin
Sent: Monday, February 27, 2012 6:38 AM
To: Mceachern, Charles
Cc: Pjetraj, Michael
Subject: Enviva (6600167.11A)

Charles,
Attached, please find a revised draft based on applicant comments. I've amended the following:

Pg. 9, 2.2 A.1. – revised TAP limits to 3 sig. figures for all pollutants
Pg. 11, 2.2.B. 2 and 3 – revised testing and monitoring language.

Also updated site location in permit cover page and review.

Kevin Godwin, Engineer
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AIR QUALITY CONSTRUCTION AND OPERATING PERMIT APPLICATION ADDENDUM
ENVIVA PELLETS NORTHAMPTON, LLC • GASTON, NORTH CAROLINA

orig

Prepared by:

ITY CONSULTANTS
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Prepared for:

ENVIVA PELLETS NORTHAMPTON, LLC
Lebanon Church Rd.
Gaston, NC 27832

January 2012

Project 113401.0047

Trinity Consultants

1.1 EXECUTIVE SUMMARY

Enviva Pellets, LLC (Enviva) is planning to construct and operate a wood pellets manufacturing plant in the town of Gaston, NC.

The proposed plant consists of the following:

- A raw material receiving and processing yard;
- Wood handling equipment;
- One 174 MMBtu/hr green wood direct-fired dryer system with pollution control equipment consisting of a cyclone dust collector and wet electrostatic precipitator (WESP) for particulate matter abatement;
- Four hammermills controlled by fabric filtration systems;
- Wood pellet coolers controlled via cyclones;
- A wood pellet storage silo;
- An emergency electric generator; and
- Fire water pump.

Air emission sources and associated pollution controls are described in detail in Section 2.

This document in its entirety comprises an addendum to the air quality construction and operating permit application previously submitted for the project. The project will result in air emissions of various compounds at rates that exceed the thresholds triggering the Title V permitting program, as well as certain state regulations. Emissions of all compounds will be limited to less than the PSD major source thresholds. This application fully conforms to all permitting requirements and demonstrates compliance in accordance with those requirements. To ensure compliance with the National Ambient Air Quality Standards for nitrogen dioxide (NO_2) and particulate matter less than 2.5 microns, Enviva has voluntarily included modeling for these compounds.

In addition to application report Sections 1 through 4, key elements of this application are provided as the following appendices to this report:

1. Permit application forms (Appendix A);
2. Emissions calculations (Appendix B); and
3. Air dispersion modeling support (Appendix C).

Four copies of this addendum have been provided and one electronic copy of the air dispersion modeling-related files have also been provided.

1.2 ORGANIZATION OF APPLICATION

This addendum is organized in the following fashion:

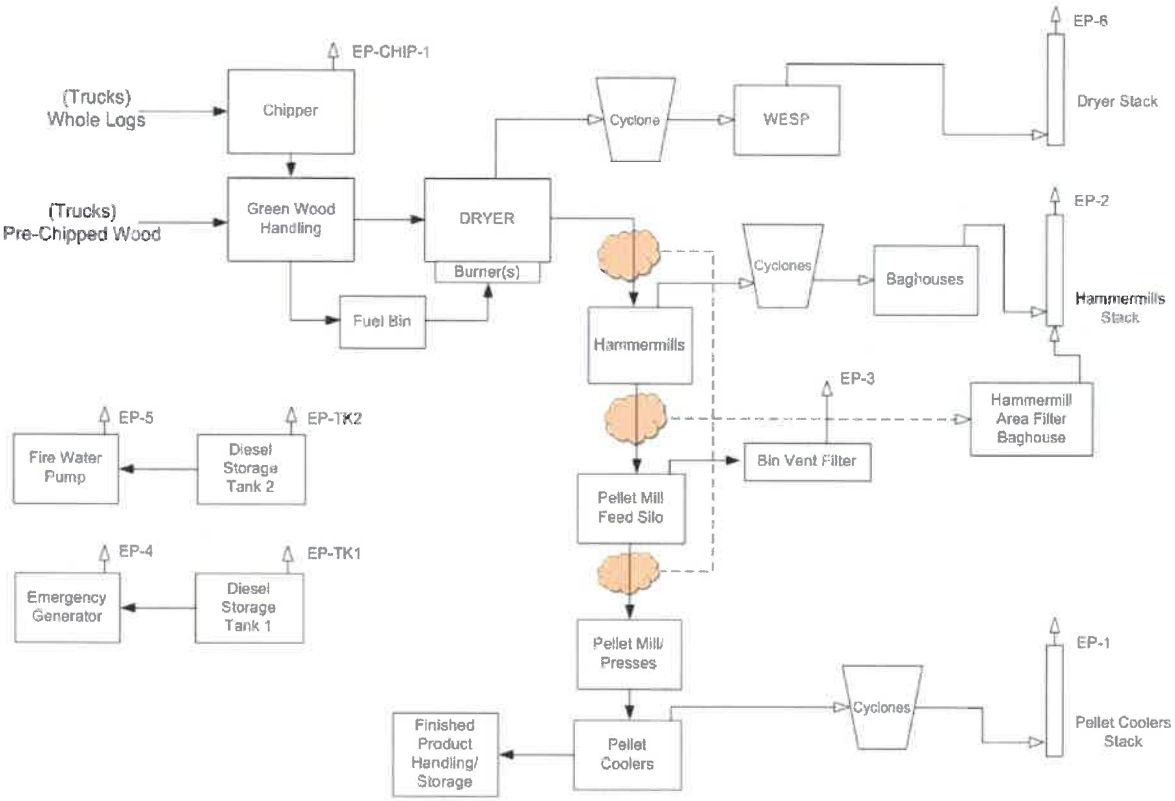
- Section 1 provides an Executive Summary,
- Section 2 provides a project description and discusses air emissions,
- Section 3 discusses regulatory applicability, and
- Section 4 reports results from air dispersion modeling.
- Appendix A contains air permit application forms,
- Appendix B presents air emissions calculations, and
- Appendix C contains support information for the air dispersion modeling.

An updated local zoning consistency determination is not required because the only difference from the original application submitted for the project is that the plant will have a slightly smaller dryer than in the original application.

An updated A1 permit application form is not included nor required per guidance received from John Evans of NCDAQ's permitting department. Within one week of submittal of this application, Enviva will be providing a letter from the company's

The proposed wood pellets plant is designed to produce up to 500,000 tons per year of wood pellets, assuming a residual 5 percent weight (wt %) moisture content of the pellets. Pellets will typically consist of pressed hardwoods, but could contain up to 10 percent softwoods on an annual basis. This section discusses the Northampton Plant's pelletizing process and associated air emissions. Detailed air emissions calculations are presented for each source discussed in this section in Appendix B. A process flow diagram is presented in Figure 2-1.

FIGURE 2-1. PROCESS FLOW DIAGRAM



2.1 GREEN CHIPPED WOOD HANDLING AND SIZING (ES-GWHS), LOG DEBARKING AND CHIPPING (ES-CHIP-1) AND FUEL STORAGE BIN (ES-GWFB)

"Green" (i.e., wet) wood will be delivered to the facility via trucks as either pre-chipped wood or whole logs (for on-site chipping). Pre-chipped wood will be screened and oversized chips will undergo additional chipping. Whole logs will be chipped and debarked to specification for drying in the on-site electric-powered chipper (ES-CHIP-1). Chipped wood for drying is conveyed to wood storage while wood/bark is conveyed to a green wood dryer fuel storage bin (ES-GWFB).

Green wood contains a high moisture content approaching 50 percent by weight and handling operations for wet wood therefore has negligibly small emissions. The moisture content of wet wood is well above the applicability range of aggregate handling emissions estimation methodologies provided in AP-42, so no emission calculations are included for green wood transfer points.

Emissions estimates for ES-CHIP-1 are based on limited emission factors available for wood chipping. As shown in the attached emissions calculations (Appendix B), VOC emissions from the chipper are calculated using emission factors from NCASI technical bulletins.[1] Methanol emissions are also calculated using factors from AP-42 Sections 10.6.3 and 10.6.4. Particulate matter (PM) emissions will be negligible from the green wood chipper because the exhaust is directed downward towards the ground.

It should be noted that Enviva carefully tracks the percent of hardwoods and softwoods transported to the site and intends on minimizing the amount of softwood that is utilized due to the substantially higher cost of softwood. In reality, Enviva will attempt to run solely on hardwood, but is allowing for up to 10% softwood on an annual basis to maintain some operational flexibility.

2.2 Wood Dryer (ES-Dryer)

Green wood is conveyed to a single rotary dryer system in which wood moisture content will be reduced to approximately 15 percent (dryer burner capacity was conservatively based on 13 percent moisture drying). Since the moisture content of the wood pellets is critical to product quality, Enviva will continuously monitor moisture content of wood from the drying system. Although moisture content is directly measured, it should be noted that Enviva does not believe that for permitting purposes, tracking moisture to a certain moisture content is necessary because even if the plant were to operate at a lower moisture content (again, undesirable due to adverse impacts on product quality), this would result in a lower plant-wide production rate that would reduce emissions because the dryer system capacity can only achieve the requested 475,000 tpy permitting basis if the system dries product to no less than 13% moisture. Direct contact heat is provided to the system via a 174 MMBtu/hr total heat input burner system. Air emissions are controlled by a cyclone for bulk particulate removal and additional particulate is removed utilizing a wet electrostatic precipitator (WESP) operating after the cyclones.

Emissions are calculated using a combination of dryer vendor emission guarantees (criteria pollutants only) and AP-42 emissions factors.

2.3 Dried and Sized Wood Handling (ES-DWH)

Dried materials are transferred from the dryer via conveyors to hammermills for further size reduction prior to pelletization. In total there are four uncontrolled dried wood transfer points, two occurring prior to the hammermills and two after the hammermills.

The following dried wood transfer points are included in this emissions grouping:

[1] NCASI Technical Bulletins containing emission factors for wood-chipping were provided to Trinity Consultants by South Carolina Department of Health and Environmental Control (SC DHEC) in the course of developing emissions for an electric powered chipper.

- Drop Point 1 (DP1): Dryer discharger to dryer collection conveyor belt
- DP2: Pre-screen feeder fines overs to hammermills infeed and distribution
- DP3: Hammermills cyclone diverter gates to hammermills system discharge collection conveyor belt
- DP4: Hammermills system discharge collection conveyor belt to pellet mill feed silo infeed screw

As shown in the calculations in Appendix B, emissions from any source within the Dried and Sized Wood Handling emission grouping are insignificant.

2.4 HAMMERMILLS (ES-HM-1, -2, -3, -4)

Prior to pellitization, dried materials are reduced to the appropriate size needed for pelletization using four hammermills operating in parallel. A conveyor system receives the ground wood from the hammermills and sends the ground wood to the pellet mill feed silo.

Particulate emissions from the hammermills are controlled using four cyclones in series with two bagfilters. A third bagfilter located in the hammermills area controls fugitive dust emissions from a variety of sources (discussed in a separate section to follow). Appendix B summarizes the emissions from each hammermill bagfilter system.

2.5 HAMMERMILL AREA FILTER

A number of dried- and sized-wood transport and transfer point emissions sources are controlled by the Hammermill Area Filter baghouse. Sources controlled by this bagfilter include, but are not limited to, the following sources (indicated by alphabetical designations prescribed in Figure 2-1):

- A, B, C, & D: Emissions from the four dry hammermill metering bins
- E: Hammermills infeed and distribution transfer
- F: Pellet cooler transfer (particulate emissions from pellet cooler cyclones large enough to drop out of entrainment) & pellet screening
- G: Hammermill pre-screen feeder emissions
- H: Pellet screen fines cyclone

Emissions from this bagfilter are calculated assuming an average grain loading factor for the wood particulates and the maximum nominal stack flow rate.

2.6 PELLET MILL FEED SILO (ES-PMFS)

Sized wood from the hammermills is transported on a set of conveyors to the infeed screw for the pellet mill feed silo prior to pelletization. Emissions from the Pellet Mill Feed Silo are controlled using a separate bagfilter.

Godwin, Kevin

From: Joe Sullivan [jsullivan@trinityconsultants.com]
Sent: Monday, January 30, 2012 8:50 AM
To: Godwin, Kevin
Subject: RE: Enviva Northampton

Hey, Kevin. I am not sure the exact detail that you are referring to, but basically, the mfr has not yet been selected. The vendor will be required to provide an emission rate guarantee equal to what we put in the application, which was based on approx 0.008 gr/cf filterable and additional condensables that are due to wood combustion. We had a good bit of margin in the PM modeling, which was voluntarily conducted, so even if we have higher emissions we are still going to be well below PSD, NAAQS and other emissions standards.

I think we may have been talking about the VOC emission factors used in the application, which are based on the dryer mfr guarantees. The dryer mfr has been selected, so I can get you that information by hopefully tomorrow. Sorry if I forgot to provide something you had previously asked for. One thing I will note is that the factors used in the application for VOC are pre WESP, which will generally control 20% of the total VOC in the stream, so the factors I will be sending to you will have a built in layer of conservatism.

Joe Sullivan, PE, CM
Managing Consultant
Trinity Consultants
One Copley Parkway
Suite 310
Morrisville, NC 27560

Phone: (919) 462-9693
Fax: (919) 462-9694
Mobile: (919) 271-8805

From: "Godwin, Kevin" <kevin.godwin@ncdenr.gov>

To: Joe Sullivan <jsullivan@trinityconsultants.com>

Date: 01/30/2012 08:26 AM

Subject: RE: Enviva Northampton

Joe,
Aren't we still waiting on the WESP vendor guarantee for emission factors?

Kevin Godwin, Environmental Engineer
NC DENR, Division of Air Quality

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****
Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties unless the content is exempt by statute or other regulation.
****

-----Original Message-----
From: Joe Sullivan [mailto:jsullivan@trinityconsultants.com]
Sent: Monday, January 30, 2012 8:21 AM
To: Godwin, Kevin
Cc: Jonathan Hill
Subject: Fw: Enviva Northampton

Hey, Kevin. I hope you had a good weekend. Thanks for your response and have a great week.

Jon - can you touch base with Tom on Wed? Sounded like he was at least ankle deep in his modeling review a week ago, so hopefully is will be done by early next week.

Regards,
Joe

Joe Sullivan, PE, CM
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----- Forwarded by Joe Sullivan/Trinity Consultants on 01/30/2012 08:13 AM -----

From: "Godwin, Kevin" <kevin.godwin@ncdenr.gov>

To: Joe Sullivan <jsullivan@trinityconsultants.com>

Date: 01/30/2012 07:05 AM

Subject: Enviva Northampton

Joe,
In response to your phone call, I am focusing my attention on Enviva this week. Depending on modeling approval, I hope to have a draft in a couple of weeks at most.

Kevin Godwin, Environmental Engineer
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2.7 Pellet Press System and Conveyors (ES-PP)

Dried ground wood is mechanically compacted in the presence of water in several screw presses in the Pellet Press System. Exhaust from the Pellet Press and Pellet Presses conveyors are vented to the atmosphere with negligible particulate matter emissions, as shown in Appendix B. No chemical binding agents are needed for pelletization.

2.8 Pellet Coolers (ES-CLR)

Pellet Press conveyors discharge wood pellets through one of six Pellet Coolers. Cooling air is passed through the pellets. At this point, the Pellets contain a small amount of wood fines, which are swept out with the cooling air and are controlled utilizing three cyclones operating in parallel (one for each two coolers) prior to discharge to the atmosphere.

2.9 Finished Product Handling (ES-FPH)

Pelletized product is conveyed to storage and load-out operations with no air emissions to the atmosphere.

2.10 Emergency Generator (ES-EG), Fire Water Pump (ES-FWP) and Associated Fuel Oil Storage Tanks

The plant will utilize a 350 brake horsepower emergency generator for emergency operations and a 300 brake horsepower fire water pump engine. Both engines will combust diesel fuel. Aside from maintenance and readiness testing, these sources will only be utilized for emergency operations. Diesel for the emergency generator will be stored in up to a 2,500 gallon storage tank and diesel for the fire water pump will be stored in up to a 500 gallon storage tank. Emissions from both fuel oil storage tanks are insignificant.

This section summarizes the applicability and requirements of key federal and state regulations.

3.1 FEDERAL REGULATIONS

3.1.1 PREVENTION OF SIGNIFICANT DETERIORATION (PSD), 40 CFR PART 51.166

North Carolina has implemented most of the federal PSD requirements of 40 CFR 51.166 under North Carolina Regulation 15A NCAC 2D .0530. Under the PSD regulations, a major stationary source for PSD is defined as any source in one of the 28 named source categories with the potential to emit 100 tpy or more of any regulated pollutant, or any source not in one of the 28 named source categories with the potential to emit 250 tpy or more of any regulated pollutant other that GHGs.[2] Neither wood pellet production nor operation of associated combustion sources qualifies the facility for classification in one of the 28 listed source categories.

Federal PSD requirements for GHGs have been implemented in North Carolina under 15A NCAC 2D .0544, which essentially adopts the U.S. EPA's "GHG Tailoring Rule." The GHG Tailoring Rule establishes higher emission rates triggering PSD review for GHGs with the major source threshold being 100,000 tpy of CO_2 equivalent (CO_2e) and a significant emission rate of 75,000 tpy CO_2e.

On July 1, 2011, EPA signed the Deferral for CO_2 Emissions from Bioenergy and Other Biogenic Sources under the PSD and Title V programs. The rule allows a facility to defer biogenic CO_2 emissions for a period of three years for purposes of establishing PSD applicability. In North Carolina, the deferral was effective on December 23, 2011. The deferral will be incorporated into 15A NCAC 2D .0544, where the current GHG PSD requirements are published. Enviva has chosen to defer biogenic CO_2 emissions resulting from the Northampton facility, but will continue to account for other GHGs for purposes of PSD and Title V applicability.

As shown in Table 3-1, the proposed project is not a major stationary source for any pollutants. Therefore, Enviva is considered a minor source and will not be required to submit a PSD construction and operating permit application.

[2] 40 CFR §52.21(b)(1)(i)

TABLE 3-1. PSD APPLICABILITY SUMMARY

Source Description	Unit ID	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	VOC (tpy)	CO_{2e} (tpy)
Dryer System	ES-DRYER	193.09	124.74	27.77	27.77	27.77	19.05	226.64	60.82
Emergency Generator	ES-EG	0.50	0.58	0.03	0.03	0.03	0.00	0.00	93.04
Fire Water Pump	ES-FWP	0.43	0.49	0.02	0.02	0.02	0.00	0.00	79.75
Hammermills	ES-HM-1, -2, -3, -4	-	-	30.03	30.03	30.03	-	-	-
Hammermills Area Filter	ES-HMA	-	-	14.08	14.08	14.08	-	-	-
Pellet Mill Feed Silo	ES-PMFS	-	-	0.94	0.94	0.94	-	-	-
Pellet Coolers	ES-CLR	-	-	61.95	56.37	34.07	-	-	-
Log Debarking/Chipping	ES-CHIP-1	-	-	-	-	-	-	1.25	-
Diesel Storage Tanks	TK1 & TK2	-	-	-	-	-	-	3.79E-03	-
Total Project Emission Increases		**194.02**	**125.80**	**134.82**	**129.24**	**106.94**	**19.05**	**227.90**	**233.62**
PSD Major Source Threshold		**250**	**250**	**250**	**250**	**250**	**250**	**250**	**100,000**
PSD Review Required?		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

3.1.2 TITLE V OPERATING PERMIT PROGRAM, 40 CFR PART 70

40 CFR Part 70 establishes the federal Title V operating permit program. North Carolina has incorporated the provisions of this federal program in its Title V operating permit program under 15A NCAC 2Q .0500. The major source thresholds with respect to the North Carolina Title V operating permit program regulations are 10 tons per year of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of certain other regulated pollutants.

The site will be a major Title V source for only criteria pollutants. Enviva is requesting that the procedures of 15A NCAC 2Q .0504 be applied to this project allowing direct issuance of a construction and operating permit under 15A NCAC 2D .0300. Enviva will submit a permit application for a Title V permit within one year after commencement of operation.

3.1.3 NEW SOURCE PERFORMANCE STANDARDS, 40 CFR PART 60 (15A NCAC 2D .0524 NEW SOURCE PERFORMANCE STANDARDS)

New Source Performance Standards (NSPS), located in 40 CFR Part 60 and implemented in North Carolina Regulation 15A NCAC 2D .0524, require certain categories of new, modified, or reconstructed sources to control emissions to specified levels. Three potentially applicable NSPS are addressed below.

3.1.3.1 NSPS SUBPART IIII

NSPS Subpart IIII applies to owners or operators of compression ignition (CI) internal combustion engines (ICE) manufactured after April 1, 2006 that are not fire pump engines, and fire pump engines manufactured after July 1, 2006. As noted in Section 2, the plant will have a 350 hp emergency generator and a 300 hp fire pump. The emergency generator and fire pump will be manufactured after the dates specified above. Therefore, the emergency generator and fire pump are subject to the provisions of NSPS Subpart IIII.

Under NSPS Subpart IIII, owners and operators of emergency generators manufactured in CY 2007 or later with a maximum engine power greater than or equal to 50 hp are required to comply with the emission limits referenced in 40 CFR §60.4205(b). These limits are as follows: 0.20 g/kW for PM, 3.5 g/kW for CO, and 4 g/kW for NO_x + nonmethane hydrocarbons (NMHC).

Enviva will comply with the emission limits by operating the generator as instructed in the manufacturer's operating manual in accordance with 40 CFR §60.4211(a), and purchasing an engine certified to meet the referenced emission limits in accordance with 40 CFR §60.4211(c). The engine will be equipped with a non-resettable hour meter in accordance with 40 CFR §60.4209(a). Emergency and readiness testing of the unit will be limited to 100 hours per year.

In accordance with NSPS Subpart IIII, owners and operators of fire pump engines manufactured after July 1, 2006 must comply with the emission limits in Table 4 of NSPS Subpart IIII, which are organized based on the size of the unit. These limits are

as follows: 0.20 g/kW for PM, 3.5 g/kW for CO, and 4 g/kW for NO_x + nonmethane hydrocarbons (NMHC).

Enviva will comply with these emission limits by operating the fire pump as instructed in the manufacturer's operating manual in accordance with 40 CFR §60.4211(a), and purchasing an engine certified to meet the referenced emission limits in accordance with 40 CFR §60.4211(b). The engine will be equipped with a non-resettable hour meter in accordance with 40 CFR §60.4209(a). Emergency and readiness testing of the unit will be limited to 100 hours per year.

In addition, both the proposed emergency generator and fire pump will be required to comply with the fuel requirements in 40 CFR §60.4207, which limit sulfur to a maximum of 15 ppmw and a cetane index of at least 40.

3.1.3.2 NSPS Subparts Db and Kb

The proposed plant will utilize direct fired drying of chipped wood and, therefore, will not trigger the NSPS Subpart Db (Industrial-Commercial-Institutional Steam Generating Units) regulations. Diesel fuel oil storage tank capacities are well below the NSPS Subpart Kb (Volatile Organic Liquid Storage Vessels, for which construction, reconstruction, or modification commenced after 7/23/1984) applicability storage capacity threshold of approximately 20,000 gallons.

3.1.4 National Emission Standards for Hazardous Air Pollutants, 40 CFR Part 63 (15A NCAC 2D .1111 Maximum Achievable Control Technology)

The National Emission Standards for Hazardous Air Pollutants (NESHAP) listed in 40 CFR Part 63 and implementing North Carolina regulation 15A NCAC 2D .1111 are source category-specific regulations that limit emissions of HAPs. Two potentially applicable NESHAPs are addressed below.

3.1.4.1 40 CFR Part 63 Subpart ZZZZ

40 CFR 63 Subpart ZZZZ applies to reciprocating internal combustion engines (RICE) located at a major or area source of HAP emissions. An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions. Emergency power and limited use units are subject to limited requirements under 40 CFR 63.6590(b)(i) and 40 CFR 63.6590(b)(ii). Emergency stationary RICE are defined in 40 CFR 63.6675 as any stationary RICE that operates in an emergency situation. These situations include engines used for power generation when power from the local utility is interrupted, or engines used to pump water in the case of fire or flood.

The proposed emergency generator and the emergency fire pump at the site will be classified as emergency stationary RICE under the NESHAP and will comply with the requirements listed under this subpart.

3.1.4.2 40 CFR PART 63 SUBPART DDDD

40 CFR Subpart DDDD applies to Plywood and Composite Wood Products facilities classified as major sources of hazardous air pollutants (HAPs), having the potential to emit of 10 tons per year of a single HAP or 25 tons per year aggregate HAP. As indicated in Table 3-2, facility-wide potential HAP emissions are less than the major source threshold.

TABLE 3-2. FACILITYWIDE HAP EMISSIONS SUMMARY

Pollutant	ES-DRYER (tpy)	ES-EG (tpy)	ES-FWP (tpy)	ES-CHIP-1 (tpy)	Total (tpy)
1,3-Butadiene	-	2.39E-05	2.05E-05	-	0.00
Acetaldehyde	2.60E+00	4.70E-04	4.03E-04	-	2.60
Acetophenone	2.44E-06	-	-	-	0.00
Acrolein	7.97E-01	5.67E-05	4.86E-05	-	0.80
Antimony & Compounds	4.37E-04	-	-	-	0.00
Arsenic & Compounds	1.22E-03	-	-	-	0.00
Benzene	2.63E-01	5.71E-04	4.90E-04	-	0.26
Beryllium metal (un-reacted) (Also include in BEC)	6.08E-05	-	-	-	0.00
Cadmium Metal (elemental un-reacted) –(Add w/CDC)	2.27E-04	-	-	-	0.00
Carbon tetrachloride	3.43E-02	-	-	-	0.03
Chlorine	6.02E-01	-	-	-	0.60
Chlorobenzene	2.51E-02	-	-	-	0.03
Chromium–Other compds (add w/chrom acid to get CRC)	9.67E-04	-	-	-	0.00
Cobalt compounds	3.59E-04	-	-	-	0.00
Chloroform	3.47E-03	-	-	-	0.00
Cumene	6.93E-02	-	-	-	0.07
Dinitrophenol, 2,4-	1.37E-04	-	-	-	0.00
Di(2-ethylhexyl)phthalate (DEHP)	3.58E-05	-	-	-	0.00
Ethyl benzene	2.36E-02	-	-	-	0.02
Ethylene dichloride (1,2-dichloroethane)	2.21E-02	-	-	-	0.02
Formaldehyde	4.85E+00	7.23E-04	6.20E-04	-	4.85
Hydrogen chloride (hydrochloric acid)	1.45E+00	-	-	-	1.45
Lead and Lead compounds	2.65E-03	-	-	-	0.00
m-,p-Xylene	1.66E-01	1.75E-04	1.50E-04	-	0.17
Manganese & compounds	8.84E-02	-	-	-	0.09
Mercury, vapor (Include in Mercury&Compds)	2.67E-03	-	-	-	0.00
Methanol	3.81E+00	-	-	0.24	3.81
Methyl bromide (bromomethane)	1.14E-02	-	-	-	0.01
Methyl chloride (chloromethane)	1.75E-02	-	-	-	0.02
Methyl chloroform (1,1,1 trichloroethane)	2.36E-02	-	-	-	0.02
Methyl ethyl ketone	4.12E-03	-	-	-	0.00
Methyl isobutyl ketone	2.39E-01	-	-	-	0.24
Methylene chloride	6.24E-02	-	-	-	0.06
Nickel metal (Component of Nickel & Compounds)	2.51E-02	-	-	-	0.03
Nitrophenol, 4-	8.38E-05	-	-	-	0.00
o-Xylene	1.56E-02	-	-	-	0.02
Pentachlorophenol	3.89E-05	-	-	-	0.00
Perchloroethylene (tetrachloroethylene)	2.90E-02	-	-	-	0.03
Phenol	9.71E-01	-	-	-	0.97
Phosphorus Metal, Yellow or White	2.06E-02	-	-	-	0.02
Polychlorinated biphenyls	6.21E-06	-	-	-	0.00
Propionaldehyde	4.51E-01	-	-	-	0.45
Propylene dichloride (1,2 dichloropropane)	2.51E-02	-	-	-	0.03
Selenium compounds	2.13E-03	-	-	-	0.00
Styrene	1.25E-02	-	-	-	0.01
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	6.55E-09	-	-	-	0.00
Toluene	4.51E-01	2.51E-04	2.15E-04	-	0.45
Total PAH (POM)	9.53E-02	1.03E-04	8.82E-05	-	0.10
Trichloroethylene	2.29E-02	-	-	-	0.02
Trichlorophenol, 2,4,6-	1.68E-05	-	-	-	0.00
Vinyl chloride	1.37E-02	-	-	-	0.01
TOTAL HAP	**17.27**	**2.37E-03**	**2.03E-03**	**0.24**	**17.28**

3.2 North Carolina Regulations

For the sources that are included for review in this application package, the North Carolina State Implementation Plan (SIP) rules and regulations have been evaluated for applicability. Applicable rules are identified below.

3.2.1 15A NCAC 02D .0515 Particulates from Miscellaneous Industrial Processes

Particulate emissions from all emissions sources subject to permitting, including the wood pellet dryer are regulated under 15A NCAC 2D .0515. This regulation limits the particulate emissions based on total throughput. This regulation limits the particulate emissions based on process throughput using the equation $E = 4.10 \times P^{0.67}$, for process rates (P) less than 30 tons per hour (ton/hr) and $E=55 \times P^{0.11}$-40 for process rates greater than 30 tons per hour.

All emissions from particulate matter sources are either negligible or well-controlled. The most significant emission unit at the site, the process dryer operating a 61.5 ODT/hr, has an emission limit of 46.5 lb/hr. Maximum emissions from the dryer are approximately 8.5 lb/hr, well below the standard.

3.2.2 15A NCAC 02D .0516 Sulfur Dioxide Emissions from Combustion Sources

Under this regulation, emissions of sulfur dioxide from combustion sources cannot exceed 2.3 pounds of sulfur dioxide per million Btu input. Wood is fired in the dryer and low sulfur diesel is combusted in the two emergency engines, resulting in operation well below regulatory limits.

3.2.3 15A NCAC 02D .0521 Control of Visible Emissions

Under this regulation, for sources manufactured after July 1, 1971, visible emissions cannot be more than 20 percent opacity when averaged over a six-minute period. However, six-minute averaging periods may exceed 20 percent opacity under the following conditions:

- No six-minute period exceeds 87 percent opacity,
- No more than one six-minute period exceeds 20 percent opacity in any hour, and
- No more than four six-minute periods exceed 20 percent opacity in any 24-hour period.

This rule applies to all processes that may have a visible emission, including the dryer, other particulate matter emissions sources controlled by cyclone and/or baghouse, and the diesel-fired engines.

3.2.4 15A NCAC 02Q .0700 Toxic Air Pollutant Procedures

This regulation requires that new and modified sources of toxic air pollutants with emissions exceeding specified de minimis values apply for an air toxics permit. Facility-wide emissions of several compounds emitted from the site exceed the

permitting de minimis level. A comparison of emissions to de minimis values are summarized in Table 3-3. Modeling for compounds triggering permitting is discussed in Volume 2 of this application.

TABLE 3-3. DETERMINATION OF POLLUTANTS SUBJECT TO AIR TOXICS PERMITTING

Pollutant	Dryer			Emergency Generator			Fire Water Pump			Total		
	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)
1,3-Butadiene			0.00E+00			4.79E-02			4.11E-02			8.90E-02
Acetaldehyde	4.61E+00			1.88E-03			1.61E-03			4.62E+00		
Acrolein	1.41E+00			2.27E-04			1.94E-04			1.41E+00		
Arsenic			2.43E+00									2.43E+00
Benzene			5.27E+02			1.14E+00			9.80E-01			5.29E+02
Benzo(a)pyrene			3.96E+00			2.30E-04			1.97E-04			3.96E+00
Beryllium			1.22E-01									1.22E-01
Cadmium			4.53E-01									4.53E-01
Carbon Tetrachloride			6.86E+01									6.86E+01
Chlorine	1.37E-01	3.30E+00								1.37E-01	3.30E+00	
Chlorobenzene		1.38E-01									1.38E-01	
Chloroform			6.93E+00									6.93E+00
Chromic acid (Chromium VI)		1.06E-03									1.06E-03	
Di(2-ethylhexyl)phthalate (DEHP)		1.96E-04									1.96E-04	
Ethylene dichloride (1,2-dichloroethane)			4.42E+01									4.42E+01
Formaldehyde	8.61E+00			2.89E-03			2.48E-03			8.62E+00		
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8			2.44E+00									2.44E+00
Hydrogen chloride (hydrochloric acid)	3.31E-01									3.31E-01		
Manganese & compounds		4.84E-01									4.84E-01	
Mercury, vapor (Include in Mercury&Compds)		1.46E-02									1.46E-02	
Methyl chloroform (1,1,1 trichloroethane)	5.39E-03	1.29E-01								5.39E-03	1.29E-01	
Methyl ethyl ketone	9.40E-04	2.26E-02								9.40E-04	2.26E-02	
Xylene	3.23E-01	7.75E+00		6.98E-04	1.68E-02		5.99E-04	1.44E-02		3.24E-01	7.78E+00	
Methyl isobutyl ketone	4.24E-01	1.02E+01								4.24E-01	1.02E+01	
Methylene chloride	1.11E-01		1.25E+02							1.11E-01		1.25E+02
Nickel metal (Component of Nickel & Compounds)		1.38E-01									1.38E-01	
Pentachlorophenol	8.87E-06	2.13E-04								8.87E-06	2.13E-04	
Perchloroethylene (tetrachloroethylene)			5.79E+01									5.79E+01
Phenol	1.72E+00									1.72E+00		
Polychlorinated biphenyls			1.24E-02									1.24E-02
Styrene	2.21E-02									2.21E-02		
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-			1.31E-05									1.31E-05
Toluene		1.92E+01			2.40E-02			2.06E-02			1.92E+01	
Trichloroethylene			4.57E+01									4.57E+01
Trichlorofluoromethane (CFC 111)	7.13E-03									7.13E-03		
Vinyl chloride			2.74E+01									2.74E+01

TABLE 3-3. DETERMINATION OF POLLUTANTS SUBJECT TO AIR TOXICS PERMITTING (CONTINUED)

TPER Comparison Table

Pollutant	Total			TPER (2Q .0711)			Modeling Required?
	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	
1,3-Butadiene			8.90E-02			1.10E+01	No
Acetaldehyde	4.62E+00			6.80E+00			No
Acrolein	1.41E+00			2.00E-02			**Yes**
Arsenic			2.43E+00			1.60E-02	**Yes**
Benzene			5.29E+02			8.10E+00	**Yes**
Benzo(a)pyrene			3.96E+00			2.20E+00	**Yes**
Beryllium			1.22E-01			2.80E-01	No
Cadmium			4.53E-01			3.70E-01	**Yes**
Carbon Tetrachloride			6.86E+01			4.60E+02	No
Chlorine	1.37E-01	3.30E+00		2.30E-01	7.90E-01		**Yes**
Chlorobenzene		1.38E-01			4.60E+01		No
Chloroform			6.93E+00			2.90E+02	No
Chromic acid (Chromium VI)		1.06E-03			1.30E-02		No
Di(2-ethylhexyl)phthalate (DEHP)		1.96E-04			6.30E-01		No
Ethylene dichloride (1,2-dichloroethane)			4.42E+01			2.60E+02	No
Formaldehyde	8.62E+00			4.00E-02			**Yes**
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8			2.44E+00			5.10E-03	**Yes**
Hydrogen chloride (hydrochloric acid)	3.31E-01			1.80E-01			**Yes**
Manganese & compounds		4.84E-01			6.30E-01		No
Mercury, vapor (Include in Mercury&Compds)		1.46E-02			1.30E-02		**Yes**
Methyl chloroform (1,1,1 trichloroethane)	5.39E-03	1.29E-01		6.40E+01	2.50E+02		No
Methyl ethyl ketone	9.40E-04	2.26E-02		2.24E+01	7.80E+01		No
Xylene	3.24E-01	7.78E+00		1.64E+01	5.70E+01		No
Methyl isobutyl ketone	4.24E-01	1.02E+01		7.60E+00	5.20E+01		No
Methylene chloride	1.11E-01		1.25E+02	3.90E-01		1.60E+03	No
Nickel metal (Component of Nickel & Compounds)		1.38E-01			1.30E-01		**Yes**
Pentachlorophenol	8.87E-06	2.13E-04		6.40E-03	6.30E-02		No
Perchloroethylene (tetrachloroethylene)			5.79E+01			1.30E+04	No
Phenol	1.72E+00			2.40E-01			**Yes**
Polychlorinated biphenyls			1.24E-02			5.60E+00	No
Styrene	2.21E-02			2.70E+00			No
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-			1.31E-05			2.00E-04	No
Toluene		1.92E+01			9.80E+01		No
Trichloroethylene			4.57E+01			4.00E+03	No
Trichlorofluoromethane (CFC 111)	7.13E-03			1.40E+02			No
Vinyl chloride			2.74E+01			2.60E+01	**Yes**

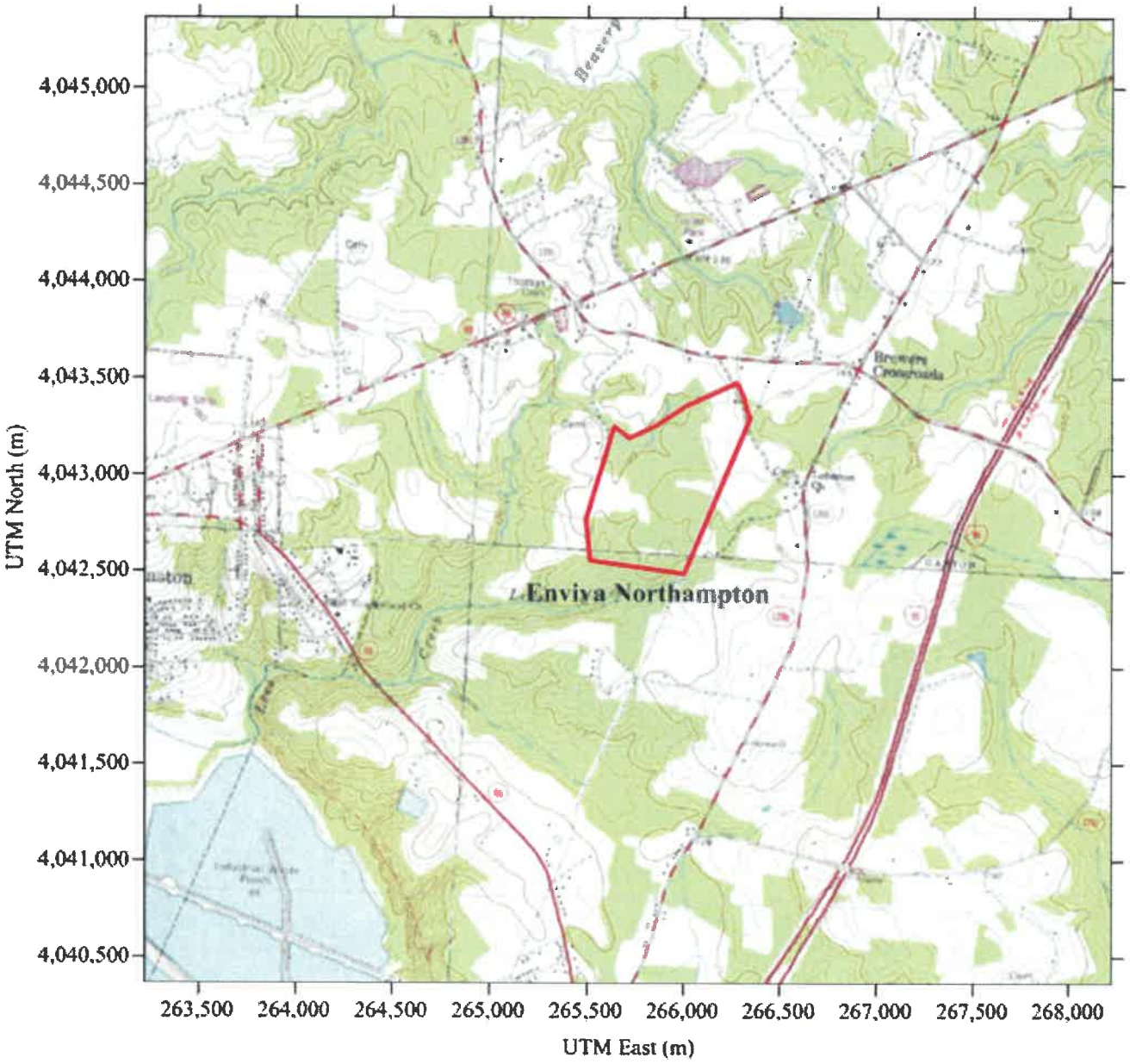
This section presents the methodology and results of the air quality dispersion modeling conducted for the proposed Enviva Wood Pellet Plant to be located near Gaston, NC (Northampton Plant). The modeling methodology used to demonstrate compliance with the NC air toxics acceptable ambient levels (AAL) conforms to the *Guidelines for Evaluating the Air Quality Impacts of Toxic Pollutants in North Carolina* (December 2009). Enviva has also performed a National Ambient Air Quality Standard (NAAQS) compliance demonstration for the new, 1-hour NO_2 and the PM2.5 standards. The NAAQS modeling methodology generally conforms to both the NC *Guidelines* and U.S. EPA *Guideline on Air Quality Models*. In lieu of a modeling protocol a protocol checklist is provided in Appendix C.

4.1 FACILITY AND PROJECT DESCRIPTION

Enviva plans to construct and operate a greenfield wood pellets manufacturing plant in Northampton County, near Gaston, NC. The Northampton plant will consist of a wood drying system along with various material handling and emergency equipment. The emission sources of regulated pollutants at the Northampton plant included in the modeling are summarized in Table 4-1.

Figure 4-1 provides a map of the area surrounding the Northampton property. The approximate central Universal Transverse Mercator (UTM) coordinates of the facility are 265.7 kilometers (km) east and 4,042.9 km north in Zone 18 (NAD 83). A signed survey of the property is included in Appendix C.

FIGURE 4-1. TOPOGRAPHIC MAP OF THE ENVIVA NORTHAMPTON AREA



For modeling purposes, the appropriate urban/rural land use classification for the area was determined using the Auer technique, which is recommended in the *Guideline on Air Quality Models*. In accordance with this technique, the area within a 3-km radius of the facility was identified on US Geological Survey (USGS) topographic maps (and was delineated by land use type. More than 50 percent of the surrounding land use can be classified as undeveloped rural (i.e., Auer's A4 classification), therefore the area is classified as rural.

As previously described, the project will result in air quality emissions below levels triggering the Prevention of Significant Deterioration (PSD) preconstruction permit program and the Plywood

and Composite Wood Products (PCWP) National Emissions Standards for Hazardous Air Pollutants (NESHAP). Potential emissions of several compounds regulated under 15A NCAC 2Q .0700 (NC Air Toxics) exceed de minimis values requiring permitting and this air dispersion modeling evaluation has been conducted to demonstrate compliance with the AAL. In addition, analyses were voluntarily conducted to demonstrate compliance with the recently promulgated and more more stringent NAAQS for $PM_{2.5}$ and 1-hour NO_2.

4.2 Model Selection

The latest version (11353) of the AERMOD modeling system was used to estimate maximum ground-level concentrations in all Class II Area analyses conducted for this application. AERMOD is a refined, steady-state, multiple source, Gaussian dispersion model and was promulgated in December 2005 as the preferred model for use by industrial sources in this type of air quality analysis.[3] The AERMOD model has the Plume Rise Modeling Enhancements (PRIME) incorporated in the regulatory version, so the direction-specific building downwash dimensions used as inputs are determined by the Building Profile Input Program, PRIME version (BPIP PRIME), version 04274.[4] BPIP PRIME is designed to incorporate the concepts and procedures expressed in the GEP Technical Support document, the Building Downwash Guidance document, and other related documents, while incorporating the PRIME enhancements to improve prediction of ambient impacts in building cavities and wake regions.[5]

The AERMOD modeling system is composed of three modular components: AERMAP, the terrain preprocessor; AERMET, the meteorological preprocessor; and AERMOD, the control module and modeling processor. AERMAP is the terrain pre-processor that is used to import terrain elevations for selected model objects and to generate the receptor hill height scale data that are used by AERMOD to drive advanced terrain processing algorithms. National Elevation Dataset (NED) data available from the United States Geological Survey (USGS) were utilized to interpolate surveyed elevations onto user specified receptor grids and buildings and sources in the absence of more accurate site-specific (i.e., site surveys, GPS analyses, etc.) elevation data.

AERMET generates a separate surface file and vertical profile file to pass meteorological observations and turbulence parameters to AERMOD. AERMET meteorological data are refined for a particular analysis based on the choice of micrometeorological parameters that are linked to the land use and land cover (LULC) around the meteorological site shown to be representative of the application site.

Enviva used the most recent versions of AERMOD and AERMAP (version 11103) to estimate ambient impacts from the modeled sources in the Class II area. Per NCDAQ guidelines, AERMOD will be run using all regulatory default options.

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[3] 40 CFR Part 51, Appendix W–*Guideline on Air Quality Models*, Appendix A.1– AMS/EPA Regulatory Model (AERMOD).

[4] Earth Tech, Inc., *Addendum to the ISC3 User's Guide, The PRIME Plume Rise and Building Downwash Model,* Concord, MA.

[5] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, *Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) (Revised),* Research Triangle Park, North Carolina, EPA 450/4-80-023R, June 1985.

4.3 SOURCE DESCRIPTION

Table 4-1 presents a table of the modeled sources and their locations at the Northampton plant. All locations are expressed in UTM Zone 18 (NAD83) coordinates.

TABLE 4-1. MODELED SOURCE LOCATIONS

Model ID	Description	UTM-E (m)	UTM-N (m)	Elevation (m)
EP1	Pellet Cooler Cyclone Stack	265,626.6	4,042,938.7	45.9
EP2	Coarse Hammermill Area BH	265,715.6	4,042,945.9	45.5
EP3	Pellet Press Silo	265,650.4	4,042,914.8	46.1
EP4	EmGen	265,742.7	4,042,835.8	46.7
EP5	FirePump	265,641.7	4,042,821.7	46.4
EP6	Dryer WESP Stack	265,722.0	4,042,868.5	46.7

Tables 4-2 and 4-3 present the stack parameters and emission rates input to the model for each of the sources.

TABLE 4-2. MODELED SOURCE PARAMETERS

Model ID	Stack Height (m)	Stack Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
EP1	24.38	316.48	20.32	1.50
EP2	24.38	310.93	20.32	1.85
EP3	9.14	305.37	4.04	0.61
EP4	4.57	766.48	78.30	0.10
EP5	4.57	785.37	109.18	0.08
EP6	18.29	355.37	14.92	2.13

TABLE 4-3. MODELED EMISSION RATES

Pollutant	Modeled Emission Rates (g/s)					
	EP1	EP2	EP3	EP4	EP5	EP6
Acrolein	-	-	-	2.855E-05	2.448E-05	1.782E-01
Arsenic	-	-	-	-	-	3.497E-05
Benzene	-	-	-	2.880E-04	2.469E-04	5.889E-02
Benzo(a)pyrene	-	-	-	5.804E-08	4.974E-08	5.700E-05
Cadmium	-	-	-	-	-	6.517E-06
Chlorine	-	-	-	-	-	1.732E-02
Formaldehyde	-	-	-	3.643E-04	3.122E-04	1.085E+00
Hexachlorodibenzo-p-dioxin	-	-	-	-	-	3.508E-05
Hydrogen Chloride	-	-	-	-	-	4.166E-02
Mercury	-	-	-	-	-	7.673E-05
Nickel	-	-	-	-	-	7.235E-04
Phenol	-	-	-	-	-	2.170E-01
Vinyl Chloride	-	-	-	-	-	3.946E-04
NO_x	-	-	-	1.450E-01	1.243E-01	4.070E+00
$PM_{2.5}$	9.801E-01	1.269E+00	2.700E-02	1.450E-02	1.243E-02	8.559E-01

Note that the NO_x rates for EP4 and EP5 are based on 30 minute readiness testing and are thus 50% of the total emission rate presented in the emission calculations.

4.4 METEOROLOGICAL DATA

The AERMOD modeling results were based on sequential hourly surface observations from Raleigh/Durham, NC and upper air data from Greensboro, NC. These stations are recommended by NCDAQ for modeling facilities located in Northampton County. The base elevation for the surface station is 126.8 m.[6]

The five (5) most recent, model-ready years (1988-1992) were downloaded from the NCDAQ website.[7] As shown in Section 4.8, the TAP model impacts were all less than 50% of the AAL, so only the most recent year (1992) was input to AERMOD. For the 1-hour NO_2 and $PM_{2.5}$ NAAQS analysis, all 5 years were modeled in a concatenated file.

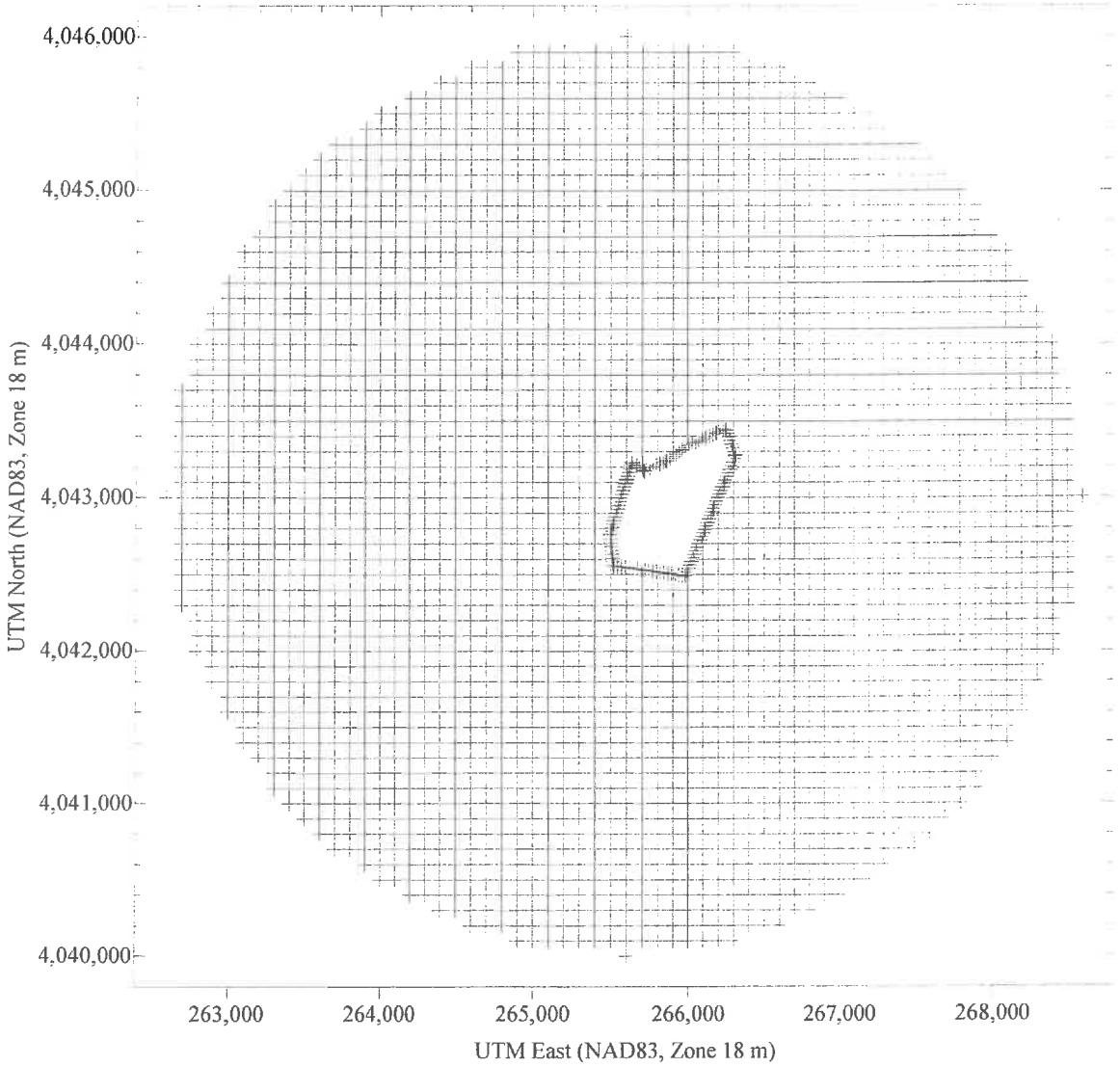
4.5 MODELED RECEPTORS

The receptors included in the modeling analysis consisted of property line receptors, spaced 25 meters (m) apart, and Cartesian receptor points spaced every 100 m, extending out 3 kilometers (km) from the facility. There are no public right-of-ways (e.g. roads, railways) traversing the property line, so the same receptor grid was modeled for the one-hour (1-hr) and annual TAP analyses, as well as for the 1-hour NO_2 NAAQS modeling. The impacts were reviewed to ensure

[6] http://www.ncair.org/permits/mets/ProfileBaseElevations.pdf
[7] http://www.ncair.org/permits/mets/metdata.shtml

that the maximum impacts were captured within the 100 m spaced grid. Figure 4-2 shows the receptors included in the modeling analysis.

FIGURE 4-2. MODELED RECEPTOR GRID



The AERMOD model is capable of handling both simple and complex terrain. Through the use of the AERMOD terrain preprocessor (AERMAP), AERMOD incorporates not only the receptor heights, but also an effective height (hill height scale) that represents the significant terrain features surrounding a given receptor that could lead to plume recirculation and other terrain interaction.[8]

Receptor terrain elevations input to the model were interpolated from National Elevation Database (NED) data obtained from the USGS. NED data consist of arrays of regularly spaced elevations. The array elevations are at a resolution of 1 arcsecond (approximately 30 m intervals)

8 US EPA. *Users Guide for the AERMOD Terrain Preprocessor (AERMAP)*, EPA-454/B-03-003, Research Triangle Park, NC.

and were interpolated using the latest version of AERMAP (version 11103) to determine elevations at the defined receptor intervals. The data obtained from the NED files were checked for completeness and spot-checked for accuracy against elevations on corresponding USGS 1:24,000 scale topographical quadrangle maps. AERMAP was also used to establish the base elevation of all Enviva structures and emission sources.

4.6 BUILDING DOWNWASH

AERMOD incorporates the Plume Rise Model Enhancements (PRIME) downwash algorithms. Direction specific building parameters required by AERMOD are calculated using the BPIP-PRIME preprocessor (version 04274).

EPA has promulgated stack height regulations that restrict the use of stack heights in excess of "Good Engineering Practice" (GEP) in air dispersion modeling analyses. Under these regulations, that portion of a stack in excess of the GEP height is generally not creditable when modeling to determine source impacts. This essentially prevents the use of excessively tall stacks to reduce ground-level pollutant concentrations. The minimum stack height not subject to the effects of downwash, called the GEP stack height, is defined by the following formula:

$H_{GEP} = H + 1.5L$, where:

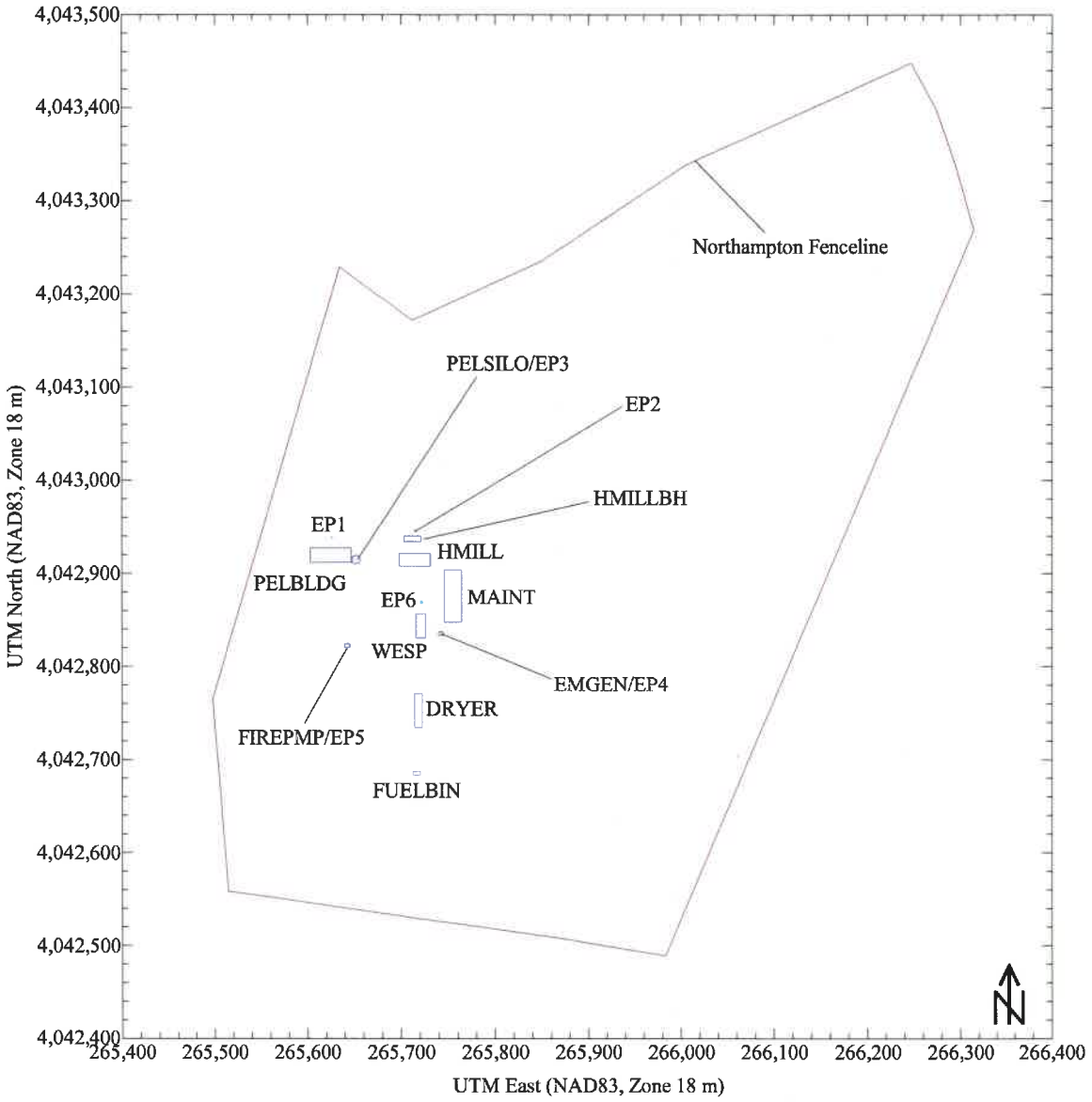
H_{GEP} = minimum GEP stack height,
H = structure height, and
L = lesser dimension of the structure (height or projected width).

This equation is limited to stacks located within 5L of a structure. Stacks located at a distance greater than 5L are not subject to the wake effects of the structure. The wind direction-specific downwash dimensions and the dominant downwash structures used in this analysis are determined using BPIP. In general, the lowest GEP stack height for any source is 65 meters by default.[9] None of the proposed emission units at the Northampton will exceed GEP height.

Figure 4-3 presents a site layout for the facility that shows the source and building arrangement as modeled.

[9] 40 CFR §51.100(ii)

FIGURE 4-3. ENVIVA NORTHAMPTON MODELED SITE LAYOUT



4.7 1-HOUR NO_2 NAAQS MODELING APPROACH

EPA's *Guideline on Air Quality Models (Guideline)*, in 40 CFR Part 51, Appendix W, recommends a tiered approach for modeling annual average NO_2 from point sources. The tiers are described in Section 6.2.3 of EPA's the *Guideline*:

a) *A tiered screening approach is recommended to obtain annual average estimates of NO_2 from point sources for New Source Review analysis, including PSD... For Tier 1 ... use an appropriate Gaussian model to estimate the maximum annual average concentration and assume a total conversion of NO to NO_2. If the concentration exceeds the NAAQS and/or PSD Increments for NO_2, proceed to the 2nd level screen.*

b) *For Tier 2 (2nd level) screening analysis, multiply the Tier 1 estimate(s) by an empirically derived NO_2/NO_X value of 0.75 (annual national default).*

c) *For Tier 3 (3rd level) analyses, a detailed screening method may be selected on a case-by-case basis. For point source modeling, detailed screening techniques such as the Ozone Limiting Method may also be considered.*

Enviva utilized the Ambient Ratio Method (ARM), or Tier 2 approach, which has evolved from previous representations of the oxidation of nitric oxide (NO) by ambient ozone and other photochemical oxidants to form nitrogen dioxide (NO_2 – the regulated ambient pollutant). EPA issued a memo on March 1, 2011 providing additional clarifications regarding application of Appendix W modeling guidance for the 1-hr NO_2 NAAQS.[10] Per the memo, EPA recommends the use of 0.80 as a default ambient ratio for the 1-hour NO_2 standard under the Tier 2 approach. Based on this updated EPA guidance, Enviva utilized 0.80 as the ambient NO_2:NO_X ratio NAAQS modeling analyses.

4.8 $PM_{2.5}$ NAAQS Modeling Approach

As previously described, Enviva voluntarily conducted a $PM_{2.5}$ NAAQS modeling analysis for the facility to demonstrate that the facility impacts (including background) where in compliance with the 24-hour and annual NAAQS. Per the form of the standard and NCDAQ guidance, the 24-hour impacts were estimated based on the 5-year average of the highest-8th-high (H8H) modeled concentration.[11]

4.9 Modeling Results

This section presents the results for the modeling analyses conducted in support of Enviva Northampton's proposed wood pellet mill. Table 4-4 presents the results for the NC TAP modeling analysis. As shown the impacts for all modeled TAP are below their respective AAL.

[10] U.S. EPA, Region 4, Memorandum from Mr. Tyler Fox to Regional Air Division Directors. Research Triangle Park, North Carolina. March 1, 2011.

[11] http://www.ncair.org/permits/mets/psd_guidance.pdf

TABLE 4-4. TAP MODELING RESULTS

Pollutant	Averaging Period	Max. Modeled[1] Impact ($\mu g/m^3$)	Date/Time of Impact (YYMMDDHH)	Location of Maximum UTM-E (m)	Location of Maximum UTM-N (m)	AAL ($\mu g/m^3$)	% of AAL (%)
Acrolein	1-Hour	4.37E+00	92070502	265,800.0	4,043,300.0	8.00E+01	5.46%
Arsenic	Annual	2.00E-05	1992	265,510.5	4,042,608.2	2.30E-04	8.70%
Benzene	Annual	3.53E-02	1992	265,510.5	4,042,608.2	1.20E-01	29.41%
Benzo(a)pyrene	Annual	3.00E-05	1992	265,510.5	4,042,608.2	3.30E-02	0.09%
Cadmium[2]	Annual	3.60E-06	1992	265,510.5	4,042,608.2	5.50E-03	0.07%
Chlorine	1-Hour	4.24E-01	92070502	265,800.0	4,043,300.0	9.00E+02	0.05%
	24-Hour	1.19E-01	92112024	265,500.0	4,042,700.0	3.75E+01	0.32%
Formaldehyde	1-Hour	2.66E+01	92070502	265,800.0	4,043,300.0	1.50E+02	17.76%
Hexachlorodibenzo-p-dioxin	Annual	2.00E-05	1992	265,510.5	4,042,608.2	7.60E-05	26.32%
Hydrogen chloride	1-Hour	1.02E+00	92070502	265,800.0	4,043,300.0	7.00E+02	0.15%
Mercury, vapor	24-Hour	5.30E-04	92112024	265,500.0	4,042,700.0	6.00E-01	0.09%
Nickel metal	24-Hour	4.95E-03	92112024	265,500.0	4,042,700.0	6.00E+00	0.08%
Phenol	1-Hour	5.31E+00	92070502	265,800.0	4,043,300.0	9.50E+02	0.56%
Vinyl chloride	Annual	2.20E-04	1992	265,510.5	4,042,608.2	3.80E-01	0.06%

[1] The maximum modeled impacts are based on the 1992 meterological data year only as impacts for all modeled TAP were less than 50% of their respective AAL.

[2] The cadmium model output file contains impacts in nanograms per cubic meter to capture the model concentration with more precision.

Table 4-5 presents the modeling results from the 1-hour NO_2 and $PM_{2.5}$ NAAQS modeling analyses. As shown, all impacts (including background) are below their respective NAAQS.

TABLE 4-5. NAAQS MODELING RESULTS

Pollutant	Averaging Period	UTM-E (m)	UTM-N (m)	Date/Time	Modeled Concentration ($\mu g/m^3$)	Background Concentration[1] ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Exceeds NAAQS? (Yes/No)
NO_2	1-Hour	265,509.7	4,042,805.9	1988-1992	66.54	35.80	102.34	188	No
$PM_{2.5}$	24-Hour	265,509.7	4,042,805.9	1988-1992	14.36	17.00	31.36	35	No
	Annual	265,814.5	4,043,219.3	1988-1992	3.15	8.60	11.75	15	No

[1] Background Concentrations provided in email from Charles Buckler (NCDAQ) to Jon Hill (Trinity) on August 1, 2011

APPENDIX A – NCDAQ APPLICATION FORMS

FORMs A2, A3

EMISSION SOURCE LISTING FOR THIS APPLICATION - A2

112r APPLICABILITY INFORMATION - A3

REVISED 04/10/07 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — A2

EMISSION SOURCE LISTING: New, Modified, Previously Unpermitted, Replaced, Deleted

EMISSION SOURCE ID NO.	EMISSION SOURCE DESCRIPTION	CONTROL DEVICE ID NO.	CONTROL DEVICE DESCRIPTION
Equipment To Be ADDED By This Application (New, Previously Unpermitted, or Replacement)			
ES-DRYER	Green Wood Direct-Fired Dryer System	CD-DC	Single Cyclone
		CD-WESP	Wet Electrostatic Precipitator
ES-GN	Emergency Generator (250 kw, 350 bhp)	N/A	N/A
ES-FWP	Fire Water Pump (300 bhp)	N/A	N/A
ES-HM-1,-2,-3,-4	Four (4) Hammermills	CD-HM-CYC-1	Single Cyclone
		CD-HM-CYC-2	Single Cyclone
		CD-HM-CYC-3	Single Cyclone
		CD-HM-CYC-4	Single Cyclone
		CD-HM-BF1	Bagfilter
		CD-HM-BF2	Bagfilter
ES-HMA	Hammermill Area Filter	CD-HMA-BF	Bagfilter
ES-PPS	Pellet Mill Feed Silo	CD-PPS-BV	Bin vent filter
ES-CLR-1,2,3,4,5, 6	Six (6) Pellet Coolers	CD-CLR-1	Pellet Cooler Cyclone
		CD-CLR-2	Pellet Cooler Cyclone
		CD-CLR-3	Pellet Cooler Cyclone
Existing Permitted Equipment To Be MODIFIED By This Application			
Equipment To Be DELETED By This Application			

112(r) APPLICABILITY INFORMATION — A 3

Is your facility subject to 40 CFR Part 68 "Prevention of Accidental Releases" - Section 112(r) of the Federal Clean Air Act? Yes / No

If No, please specify in detail how your facility avoided applicability: _____

If your facility is Subject to 112(r), please complete the following:

A. Have you already submitted a Risk Management Plan (RMP) to EPA Pursuant to 40 CFR Part 68.10 or Part 68.150?

Yes ☐ No ☐ Specify required RMP submittal date: _____ If submitted, RMP submittal date: _____

B. Are you using administrative controls to subject your facility to a lesser 112(r) program standard?

Yes ☐ No ☐ If yes, please specify: _____

Attach Additional Sheets As Necessary

FORM A4

SURVEY OF AIR EMISSIONS AND FACILITY - WIDE REDUCTION & RECYCLING ACTIVITIES

DATE: 1/5/2012

Does facility have an environmental mangement system in place? ( ) YES (X) NO If so, is facility ISO 14000 Certified? ( ) YES (X) NO

Facility Name:	Enviva Pellets Northampton, LLC			Permit Number:	N/A		
Facility ID:	N/A (to be assigned)	County:	Northampton	Environmental Contact:	Glenn Gray / Plant Manager		
Mailing Address Line 1:	Lebanon Church Road			Phone No. ( )	(804) 412-0227	Fax No. ( )	(804) 412-0229
Mailing Address Line 2:				Zip Code:	27866	County:	Northampton
City:	Gaston	State:	North Carolina	Email Address:	Glenn.Gray@envivabiomass.com		

AIR EMISSIONS SOURCE REDUCTIONS

Any Air Emissions Source Reductions in the past year? ( ) YES (X) NO

Source Description and ID	Air Pollutant	Enter Code for Emission Reduction Option (See Codes)	Date Reduction Option Implemented (mo/yr)	Quantity Emitted from prior annual report to DAQ (lb/yr)	Quantity Emitted from current annual report to DAQ (lb/yr)	Has reduction activity been discontinued? If so, when was it discontinued? (mo/yr)	Addition detail about source
N/A							

Comments:

FACILITY - WIDE REDUCTIONS & RECYCLING ACTIVITIES

Any Reductions or Recycling Activities in the past year? ( ) YES (X) NO

Source Description or Activity	Pollutant or Recycled or Reduced Materials	Enter Code for Emission Reduction Option (See Codes)	Date Reduction Option Implemented (mo/yr)	Quantity Emitted from prior annual report	Quantity Emitted from current annual report	Has reduction activity been discontinued? If so, when was it discontinued? (mo/yr)	Addition detail about source
N/A							

Comments:

The requested information above shall be used for fulfilling the requirements of North Carolina General Statute 143-215.108(g). The permit holder shall submit to the Department a written description of current and projected plans to reduce the emissions of air pollutants by source reduction or recycling. The written description shall accompany any application for a new permit, modification of an existing permit and for each annual air quality permit fee payment. Source reduction is defined as reducing the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal. If no activity has taken place since the previous report, simply indicate so by checking the no box in that section. Once completed, this form should be submitted along with your fee payment. Examples are listed on the first line of each section of the form for your benefit.

N.C. Division of Pollution Prevention and Environmental Assistance

POLLUTION PREVENTION PAYS

REVISED 1/07

Attach Additional Sheets As Necessary

FORM D1

FACILITY-WIDE EMISSIONS SUMMARY

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — D1

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

AIR POLLUTANT EMITTED	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSION BEFORE CONTROLS LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr
PARTICULATE MATTER (PM)	See Table 3-1 in the accompanying application document		
PARTICULATE MATTER < 10 MICRONS (PM_{10})			
PARTICULATE MATTER < 2.5 MICRONS ($PM_{2.5}$)			
SULFUR DIOXIDE (SO2)			
NITROGEN OXIDES (NOx)			
CARBON MONOXIDE (CO)			
VOLATILE ORGANIC COMPOUNDS (VOC)			
LEAD			
OTHER			

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

HAZARDOUS AIR POLLUTANT EMITTED	CAS NO.	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSION BEFORE CONTROLS LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr
		See Table 3-2 in the accompanying application document		

TOXIC AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

INDICATE REQUESTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS. EMISSIONS ABOVE THE TOXIC PERMIT EMISSION RATE (TPER) IN 15A NCAC 2Q .0711 MAY REQUIRE AIR DISPERSION MODELING. USE NETTING FORM D2 IF NECESSARY.

TOXIC AIR POLLUTANT EMITTED	CAS NO.	lb/hr	lb/day	lb/year	Modeling Required ? Yes	No
		See Table 3-3 in the accompanying application document				

COMMENTS:

Attach Additional Sheets As Necessary

FORM D

TECHNICAL ANALYSIS TO SUPPORT PERMIT APPLICATION

REVISED: 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate D5

PROVIDE DETAILED TECHNICAL CALCULATIONS TO SUPPORT ALL EMISSION, CONTROL, AND REGULATORY DEMONSTRATIONS MADE IN THIS APPLICATION. INCLUDE A COMPREHENSIVE PROCESS FLOW DIAGRAM AS NECESSARY TO SUPPORT AND CLARIFY CALCULATIONS AND ASSUMPTIONS. ADDRESS THE FOLLOWING SPECIFIC ISSUES ON SEPARATE PAGES:

A **SPECIFIC EMISSIONS SOURCE (EMISSION INFORMATION) (FORM B) -** SHOW CALCULATIONS USED, INCLUDING EMISSION FACTORS, MATERIAL BALANCES, AND/OR OTHER METHODS FROM WHICH THE POLLUTANT EMISSION RATES IN THIS APPLICATION WERE DERIVED. INCLUDE CALCULATION OF POTENTIAL BEFORE AND, WHERE APPLICABLE, AFTER CONTROLS. CLEARLY STATE ANY ASSUMPTIONS MADE AND PROVIDE ANY REFERENCES AS NEEDED TO SUPPORT MATERIAL BALANCE CALCULATIONS.

B **SPECIFIC EMISSION SOURCE (REGULATORY INFORMATION)(FORM E2 - TITLE V ONLY) -** PROVIDE AN ANALYSIS OF ANY REGULATIONS APPLICABLE TO INDIVIDUAL SOURCES AND THE FACILITY AS A WHOLE. INCLUDE A DISCUSSION OUTING METHODS (e.g. FOR TESTING AND/OR MONITORING REQUIREMENTS) FOR COMPLYING WITH APPLICABLE REGULATIONS, PARTICULARLY THOSE REGULATIONS LIMITING EMISSIONS BASED ON PROCESS RATES OR OTHER OPERATIONAL PARAMETERS. PROVIDE JUSTIFICATION FOR AVOIDANCE OF ANY FEDERAL REGULATIONS (PREVENTION OF SIGNIFICANT DETERIORATION (PSD), NEW SOURCE PERFORMANCE STANDARDS (NSPS), NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS), TITLE V), INCLUDING EXEMPTIONS FROM THE FEDERAL REGULATIONS WHICH WOULD OTHERWISE BE APPLICABLE TO THIS FACILITY. SUBMIT ANY REQUIRED TO DOCUMENT COMPLIANCE WITH ANY REGULATIONS. INCLUDE EMISSION RATES CALCULATED IN ITEM "A" ABOVE, DATES OF MANUFACTURE, CONTROL EQUIPMENT, ETC. TO SUPPORT THESE CALCULATIONS.

C **CONTROL DEVICE ANALYSIS (FORM C) -** PROVIDE A TECHNICAL EVALUATION WITH SUPPORTING REFERENCES FOR ANY CONTROL EFFICIENCIES LISTED ON SECTION C FORMS, OR USED TO REDUCE EMISSION RATES IN CALCULATIONS UNDER ITEM "A" ABOVE. INCLUDE PERTINENT OPERATING PARAMETERS (e.g. OPERATING CONDITIONS, MANUFACTURING RECOMMENDATIONS, AND PARAMETERS AS APPLIED FOR IN THIS APPLICATION) CRITICAL TO ENSURING PROPER PERFORMANCE OF THE CONTROL DEVICES). INCLUDE AND LIMITATIONS OR MALFUNCTION POTENTIAL FOR THE PARTICULAR CONTROL DEVICES AS EMPLOYED AT THIS FACILITY. DETAIL PROCEDURES FOR ASSURING PROPER OPERATION OF THE CONTROL DEVICE INCLUDING MONITORING SYSTEMS AND MAINTENANCE TO BE PERFORMED.

D **PROCESS AND OPERATIONAL COMPLIANCE ANALYSIS - (FORM E3 - TITLE V ONLY)** - SHOWING HOW COMPLIANCE WILL BE ACHIEVED WHEN USING PROCESS, OPERATIONAL, OR OTHER DATA TO DEMONSTRATE COMPLIANCE. REFER TO COMPLIANCE REQUIREMENTS IN THE REGULATORY ANALYSIS IN ITEM "B" WHERE APPROPRIATE. LIST ANY CONDITIONS OR PARAMETERS THAT CAN BE MONITORED AND REPORTED TO DEMONSTRATE COMPLIANCE WITH THE APPLICABLE REGULATIONS.

E **PROFESSIONAL ENGINEERING SEAL -** PURSUANT TO 15A NCAC 2Q .0112 "APPLICATION REQUIRING A PROFESSIONAL ENGINEERING SEAL," A PROFESSIONAL ENGINEER REGISTERED IN NORTH CAROLINA SHALL BE REQUIRED TO SEAL TECHNICAL PORTIONS OF THIS APPLICATION FOR NEW SOURCES AND MODIFICATIONS OF EXISTING SOURCES. (SEE INSTRUCTIONS FOR FURTHER APPLICABILITY).

I, Joe Sullivan, attest that this application for Enviva Pellets Northampton, LLC has been reviewed by me and is accurate, complete and consistent with the information supplied in the engineering plans, calculations, and all other supporting documentation to the best of my knowledge. I further attest that to the best of my knowledge the proposed design has been prepared in accordance with the applicable regulations. Although certain portions of this submittal package may have been developed by other professionals, inclusion of these materials under my seal signifies that I have reviewed this material and have judged it to be consistent with the proposed design. Note: In accordance with NC General Statutes 143-215.6A and 143-215.6B, any person who knowingly makes any false statement, representation, or certification in any application shall be guilty of a Class 2 misdemeanor which may include a fine not to exceed $10,000 as well as civil penalties up to $25,000 per violation.

Received JAN 06 2012 Air Permits Section

(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)

NAME: Joe Sullivan

DATE:

COMPANY: Trinity Consultants, Inc.

ADDRESS: One Copley Parkway, Suite 310
Morrisville, NC 27560

TELEPHONE: (919) 462-9693

SIGNATURE: Joe Sullivan

PAGES CERTIFIED: All control device application forms ("C Forms")

(IDENTIFY ABOVE EACH PERMIT FORM AND ATTACHMENT THAT IS BEING CERTIFIED BY THIS SEAL)

PLACE NORTH CAROLINA SEAL HERE

Attach Additional Sheets As Necessary

FORM D4

EXEMPT AND INSIGNIFICANT ACTIVITIES SUMMARY

REVISED: 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate D4

ACTIVITIES EXEMPTED PER 2Q .0102 OR INSIGNIFICANT ACTIVITIES PER 2Q .0503 FOR TITLE V SOURCES

DESCRIPTION OF EMISSION SOURCE	SIZE OR PRODUCTION RATE	BASIS FOR EXEMPTION OR INSIGNIFICANT ACTIVITY
1. Green Wood Handling and Sizing Operations ES-GWHS	~950,000 tpy	15A NCAC 02Q .0102 (c)(2)(E) - no quantifiable emissions
2. Green Wood Fuel Bin ES-GWFB	~150,000 tpy	15A NCAC 02Q .0102 (c)(2)(E) - no quantifiable emissions
3. Dried Wood Handling ES-DWH	545,977 tpy	15A NCAC 02Q .0102 (c)(2)(E) - no quantifiable emissions
4. Pellet Presses ES-PP	545,977 tpy	15A NCAC 02Q .0102 (c)(2)(E) - no quantifiable emissions
5. Final Product Handling ES-FPH	531,482 tpy	15A NCAC 02Q .0102 (c)(2)(E) - no quantifiable emissions
6. Emergency Generator Diesel Fuel Tank TK1	2,500 gallons	15A NCAC 02Q .0102 (c)(1)(D)
7. Fire Water Pump Diesel Fuel Tank TK2	500 gallons	15A NCAC 02Q .0102 (c)(1)(D)
8. Electric Powered Wood Chipper - EPWC	~950,000 wet wood	15A NCAC 02Q .0102 (c)(2)(E) - low emissions, see Appendix B
9.		
10.		

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate **B**

EMISSION SOURCE DESCRIPTION: **Green Wood Direct-Fired Dryer System**	EMISSION SOURCE ID NO: **ES-DRYER**
	CONTROL DEVICE ID NO(S): **CD-DC, CD-WESP**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-6**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood is conveyed to either a rotary dryer system. Direct contact heat is provided to the system via a 174 mmBtu/hr burner system. Air emissions are controlled by cyclones for bulk particulate removal and additional particulate is removed utilitizing a wet electrostatic precipitator (WESP) operating after the cyclones.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ■ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	OPERATION DATE: **TBD**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **TBD**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%** SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **8,760**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix B**						
PARTICULATE MATTER<10 MICRONS (PM_{10})							
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)							
SULFUR DIOXIDE (SO2)							
NITROGEN OXIDES (NOx)							
CARBON MONOXIDE (CO)							
VOLATILE ORGANIC COMPOUNDS (VOC)							
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
	See Emission Calculations in Appendix B						

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
	See Emission Calculations in Appendix B			

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B1

EMISSION SOURCE (WOOD, COAL, OIL, GAS, OTHER FUEL-FIRED BURNER)

REVISED 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate **B1**

EMISSION SOURCE DESCRIPTION: Green Wood Direct-Fired Dryer System	EMISSION SOURCE ID NO: ES-DRYER
	CONTROL DEVICE ID NO(S): CD-DC, CD-WESP
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-6

DESCRIBE USE: (●) PROCESS HEAT ( ) SPACE HEAT ( ) ELECTRICAL GENERATION

( ) CONTINUOUS USE ( ) STAND BY/EMERGENCY ( ) OTHER (DESCRIBE): _____

HEATING MECHANISM: ( ) INDIRECT (●) DIRECT

MAX. FIRING RATE (MMBTU/HOUR): 174

WOOD-FIRED BURNER

WOOD TYPE: ( ) BARK (●) WOOD/BARK ( ) WET WOOD ( ) DRY WOOD ( ) OTHER (DESCRIBE): _____

PERCENT MOISTURE OF FUEL: 20 to 50%

( ) UNCONTROLLED ( ) CONTROLLED WITH FLYASH REINJECTION (●) CONTROLLED W/O REINJECTION

FUEL FEED METHOD:

HEAT TRANSFER MEDIA: ( ) STEAM (●) AIR ( ) OTHER

METHOD OF TUBE CLEANING: N/A

COAL-FIRED BURNER

TYPE OF BOILER IF OTHER DESCRIBE:

PULVERIZED	OVERFEED STOKER	UNDERFEED STOKER	SPREADER STOKER	FLUIDIZED BED
☐ WET BED	( ) UNCONTROLLED	( ) UNCONTROLLED	( ) UNCONTROLLED	( ) CIRCULATING
☐ DRY BED	( ) CONTROLLED	( ) CONTROLLED	( ) FLYASH REINJECTION	( ) RECIRCULATING
			( ) NO FLYASH REINJECTION	

METHOD OF LOADING: ( ) CYCLONE ( ) HANDFIRED ( ) TRAVELING GRATE ( ) OTHER (DESCRIBE): _____

METHOD OF TUBE CLEANING: CLEANING SCHEDULE:

OIL/GAS-FIRED BURNER

TYPE OF BOILER: ☐ UTILITY ☐ INDUSTRIAL ☐ COMMERCIAL ☐ RESIDENTIAL

TYPE OF FIRING: ☐ NORMAL ☐ TANGENTIAL ☐ LOW NOX BURNERS ☐ NO LOW NOX BURNER

METHOD OF TUBE CLEANING: CLEANING SCHEDULE:

OTHER FUEL-FIRED BURNER

TYPE OF FUEL: _____ PERCENT MOISTURE: _____

TYPE OF BOILER: ☐ UTILITY ☐ INDUSTRIAL ☐ COMMERCIAL ☐ RESIDENTIAL

TYPE OF FIRING: _____ TYPE OF CONTROL (IF ANY): _____ FUEL FEED METHOD: _____

METHOD OF TUBE CLEANING: CLEANING SCHEDULE:

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Bark/Wet Wood	Tons	Nominal 10.9 (bark basis)	

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	SPECIFIC BTU CONTENT	SULFUR CONTENT (% BY WEIGHT)	ASH CONTENT (% BY WEIGHT)
Bark/Wet Wood	Nominal 4,200 BTU/lb	0.011	

SAMPLING PORTS, COMPLIANT WITH EPA METHOD 1 WILL BE INSTALLED ON THE STACKS: (●) YES ( ) NO

COMMENTS:

Attach Additional Sheets As Necessary

FORM C4

CONTROL DEVICE (CYCLONE, MULTICYCLONE, OR OTHER MECHANICAL)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C4

CONTROL DEVICE ID NO: CD-DC	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-DRYER
EMISSION POINT (STACK) ID NO(S): EP-6	POSITION IN SERIES OF CONTROLS NO. 1 OF 2 UNITS
MANUFACTURER: TBD[1]	MODEL NO:
DATE MANUFACTURE TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? ○ YES ○ NO

DESCRIBE CONTROL SYSTEM :

Three identical convential efficiency cyclones are equipped to the discharge of the rotary dryer system to capture bulk PM emissions. Emissions from each the cyclones are combined into a common duct and are routed to the WESP. The parameters presented here are per each cyclone:

POLLUTANT(S) COLLECTED:	PM	PM_{10}	$PM_{2.5}$	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	98.5 %	98.5 %	98.5 %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):				

PRESSURE DROP (IN. H_2O): MIN MAX 6.0" WARNING ALARM? ○ YES ○ NO

INLET TEMPERATURE (°F): MIN MAX Nominal 400	OUTLET TEMPERATURE (°F): MIN MAX Nominal 400
INLET AIR FLOW RATE (ACFM): 122,460	BULK PARTICLE DENSITY (LB/FT^3): 3.43E-05
POLLUTANT LOADING RATE (GR/FT^3 0.24	

SETTLING CHAMBER	CYCLONE			MULTICYCLONE
LENGTH (INCHES):	INLET VELOCITY (FT/SEC): 95		○ CIRCULAR ○ RECTANGLE	NO. TUBES:
WIDTH (INCHES):	*DIMENSIONS (INCHES) See instructions*		*IF WET SPRAY UTILIZED*	DIAMETER OF TUBES:
HEIGHT (INCHES):	H:	Dd:	LIQUID USED:	HOPPER ASPIRATION SYSTEM?
VELOCITY (FT/SEC.):	W:	Lb: 217"	FLOW RATE (GPM):	○ YES ○ NO
NO. TRAYS:	De: 74"	Lc: 254"	MAKE UP RATE (GPM):	LOUVERS?
NO. BAFFLES:	D: 149"	S:		○ YES ○ NO
	TYPE OF CYCLONE ○ CONVENTIONAL		○ HIGH EFFICIENCY	○ OTHER

DESCRIBE MAINTENANCE PROCEDURES:

Periodic inspection of mechanical integrity during plant outages as specified by manufacturer

DESCRIBE INCOMING AIR STREAM:

The flue gas from the dryer will be split and distributed through a set of three cyclones before entering the WESP. After the cyclones, the gas stream will be combined into a single duct and directed to the WESP inlet point.

PARTICLE SIZE DISTRIBUTION		
SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1	Unknown	
1-10		
10-25		
25-50		
50-100		
>100		
		TOTAL = 100

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

None

ON A SEPARATE PAGE, ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

FORM C2

CONTROL DEVICE (Electrostatic Precipitator)

REVISED 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate **C2**

CONTROL DEVICE ID NO: CD-WESP	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO: ES-DRYER
EMISSION POINT (STACK) ID NO(S): EP-6	POSITION IN SERIES OF CONTROLS: NO. 2 OF 2 UNITS
MANUFACTURER: SonicKleen	MODEL NO. SonicKleen WESP-304L-567-12H19
MANUFACTURE DATE: TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
_____ OF _____	P.E. SEAL REQUIRED (PER 2Q .0112)? (YES) NO
EQUIPMENT SPECIFICATIONS	GAS DISTRIBUTION GRIDS: (YES) NO
TYPE: (WET) DRY	(SINGLE-STAGE) TWO-STAGE
TOTAL COLLECTION PLATE AREA (FT ^{2}): 29,904	NO. FIELDS 2 NO. COLLECTOR PLATE PER FIELD: 567 tubes
COLLECTOR PLATES SIZE (FT): LENGTH: WIDTH:	SPACING BETWEEN COLLECTOR PLATES (INCHES): 12" hextube
TOTAL DISCHARGE ELECTRODE LENGTH(FT): 19"-0"	GAS VISCOSITY (POISE): 2.054E-04 Poise
NUMBER OF DISCHARGE ELECTRODES: 567	NUMBER OF COLLECTING ELECTRODE RAPPERS: none
MAXIMUM INLET AIR FLOW RATE (ACFM): 190,000	PARTICLE MIGRATION VELOCITY (FT/SEC): 0.234
MINIMUM GAS TREATMENT TIME (SEC): 2.3	BULK PARTICLE DENSITY (LB/FT ^{3}): 45 lb/cu. ft.
FIELD STRENGTH (VOLTS) CHARGING: 83 kVA COLLECTING: N/A	CORONA POWER (WATTS/1000 CFM): 4000
ELECTRICAL USAGE (kw/HOUR): 141.5	
CLEANING PROCEDURES: RAPPING PLATE VIBRATING (WASHING) OTHER_____	
OPERATING PARAMETERS PRESSURE DROP (IN. H20): MIN 2" MAX 2"	WARNING ALARM? YES (NO)
RESISTIVITY OF POLLUTANT (OHM-CM): N/A	GAS CONDITIONING (YES) NO TYPE OF AGENT (IF YES):
INLET GAS TEMPERATURE (°F): 240 °F nominal	OUTLET GAS TEMPERATURE (°F): 180 °F nominal
VOLUME OF GAS HANDLED (ACFM): 122,460	INLET MOISTURE PERCENT: MIN 43% MAX 49%
POWER REQUIREMENTS	IS AN ENERGY MANAGEMENT SYSTEM USED? YES NO

FIELD NO.	*NO. OF SETS*	*CHARGING*	*EACH TRANSFORMER (kVA)*	*EACH RECTIFIER Kv Ave/Peak Ma Dc*
1	1		118	83 / 1265
2	1		118	83 / 1265

POLLUTANT(S) COLLECTED:	$PM / PM_{10} / PM_{2.5}$			
BEFORE CONTROL EMISSION RATE (LB/HR):	150.00			
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PARTICLE SIZE DISTRIBUTION

SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1	Unknown	
1-10		
10-25		
25-50		
50-100		
>100		
TOTAL = 100		

DESCRIBE STARTUP PROCEDURES:
See attached

DESCRIBE MAINTENANCE PROCEDURES:
See attached

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM:
NOAH

DESCRIBE ANY MONITORING DEVICES, GAUGES, OR TEST PORTS AS ATTACHMENTS:
PLC

ATTACH A DIAGRAM OF THE TOP VIEW OF THE ESP WITH DIMENSIONS (include at a minimum the plate spacing and wire spacing and indicate the electrode type), AND THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate **B**

EMISSION SOURCE DESCRIPTION: **Four (4) Hammermills**	EMISSION SOURCE ID NO: **ES-HM-1,-2,-3,-4**
	CONTROL DEVICE ID NO(S): **CD-HM-BV1,-BV2**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-2**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dried materials are reduced to the appropriate size needed for pelletization using four hammermills

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ■ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	OPERATION DATE: **TBD**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **TBD**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):_____	NESHAP (SUBPART?):_____	MACT (SUBPART?):_____
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%** SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **8,760**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix B**						
PARTICULATE MATTER<10 MICRONS (PM_{10})							
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)							
SULFUR DIOXIDE (SO2)							
NITROGEN OXIDES (NOx)							
CARBON MONOXIDE (CO)							
VOLATILE ORGANIC COMPOUNDS (VOC)							
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

REVISED: 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate **B9**

EMISSION SOURCE DESCRIPTION: **Four (4) Hammermills**	EMISSION SOURCE ID NO: **ES-HM-1,-2,-3,-4**
	CONTROL DEVICE ID NO(S): **CD-HM-BV1,-BV2**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-2**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Dried materials are reduced to the appropriate size needed for pelletization using four hammermills.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**Tons**	**70.65**	

MATERIALS ENTERING PROCESS - BATCH OPERATION		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/BATCH)	LIMITATION (UNIT/BATCH)

MAXIMUM DESIGN (BATCHES / HOUR):	
REQUESTED LIMITATION (BATCHES / HOUR):	(BATCHES/YR):
FUEL USED: **N/A**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **N/A**
MAX. CAPACITY HOURLY FUEL USE: **N/A**	REQUESTED CAPACITY ANNUAL FUEL USE: **N/A**

COMMENTS:

Attach Additional Sheets as Necessary

FORM C4

CONTROL DEVICE (CYCLONE, MULTICYCLONE, OR OTHER MECHANICAL)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C4

CONTROL DEVICE ID NO: CD-HM-CYC-1,-2,-3,-4	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-HM-1,-2,-3,-4
EMISSION POINT (STACK) ID NO(S): EP-2	POSITION IN SERIES OF CONTROLS NO. 1 OF 2 UNITS
MANUFACTURER: TBD[1]	MODEL NO:
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? ¢ YES ¢ NO

DESCRIBE CONTROL SYSTEM :

One cyclone is equipped for each coarse hammermills to capture bulk PM emissions. The emissions from the cyclone are routed to a bagfilter. Each bagfilter handles the air flow of two cyclones.
The parameters presented here are per each cyclone.

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANT(S) COLLECTED:				
BEFORE CONTROL EMISSION RATE (LB/HR):	34,000	34,000	34,000	
CAPTURE EFFICIENCY:	98.0% %	98.0% %	98.0% %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	680	680	680	

PRESSURE DROP (IN. H_2O): MIN MAX 6.0" WARNING ALARM? ¢ YES ¢ NO

INLET TEMPERATURE (°F): MIN 160 Ambient	OUTLET TEMPERATURE (°F): MIN MAX Ambient
INLET AIR FLOW RATE (ACFM): 20,000	BULK PARTICLE DENSITY (LB/FT^3): 2.83E-02
POLLUTANT LOADING RATE (GR/FT^3): 198.33	

SETTLING CHAMBER	CYCLONE			MULTICYCLONE
LENGTH (INCHES):	INLET VELOCITY (FT/SEC): 90.4		¢ CIRCULAR ¢ RECTANGLE	NO. TUBES:
WIDTH (INCHES):	*DIMENSIONS (INCHES) See instructions*		*IF WET SPRAY UTILIZED*	DIAMETER OF TUBES:
HEIGHT (INCHES):	H: 48"	Dd: 24"	LIQUID USED:	HOPPER ASPIRATION SYSTEM?
VELOCITY (FT/SEC.):	W: 22"	Lb: 68"	FLOW RATE (GPM):	¢ YES ¢ NO
NO. TRAYS:	De: 57"	Lc: 192"	MAKE UP RATE (GPM):	LOUVERS?
NO. BAFFLES:	D: 120"	S: 67"		¢ YES ¢ NO
	TYPE OF CYCLONE: ¢ CONVENTIONAL		¢ HIGH EFFICIENCY	¢ OTHER

DESCRIBE MAINTENANCE PROCEDURES:

Periodic inspection of mechanical integrity during plant outages as specified by manufacturer

DESCRIBE INCOMING AIR STREAM:

The material will be pulled through the cyclone under negative pressure. The cyclone will separate the material from the air stream and the air will discharge to an associated bag filter prior to being discharge to atmosphere via a discharge stack common to all fitlers in this area.

PARTICLE SIZE DISTRIBUTION		
SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1	Unknown	
1-10		
10-25		
25-50		
50-100		
>100		
		TOTAL = 100

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

None

ON A SEPARATE PAGE, ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

FORM C1

CONTROL DEVICE (FABRIC FILTER)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C1

CONTROL DEVICE ID NO: CD-HM-BF1 & CD-HM-BF2	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-HM-1,-2,-3,-4
EMISSION POINT (STACK) ID NO(S): EP-2	POSITION IN SERIES OF CONTROLS NO. 2 OF 2 UNITS
MANUFACTURER: TBD[1]	MODEL NO: TBD
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? (YES) NO

DESCRIBE CONTROL SYSTEM:

Two (2) bagfilters will be utilized for emission control on four of the hammermill cyclones. Two hammermill cylcones will be routed to a single baghouse.

POLLUTANT(S) COLLECTED:	PM	PM-10	PM-2.5	
BEFORE CONTROL EMISSION RATE (LB/HR):	1,750	1,750	1,750	
CAPTURE EFFICIENCY:	~99.9 %	~99.9 %	~99.9 %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PRESSURE DROP (IN. H_2O): MIN: MAX: 6" GAUGE? (YES) NO	WARNING ALARM? (YES) NO
BULK PARTICLE DENSITY (LB/FT^3): 7.29E-04	INLET TEMPERATURE (°F): 120
POLLUTANT LOADING RATE: 5.10 LB/HR (GR/FT^3)	OUTLET TEMPERATURE (°F): 100
INLET AIR FLOW RATE (ACFM): 40,000	FILTER MAX OPERATING TEMP. (°F): N/A

NO. OF COMPARTMENTS: 1	NO. OF BAGS PER COMPARTMENT: 412	LENGTH OF BAG (IN.): 144
DIAMETER OF BAG (IN.): 5.75	DRAFT: INDUCED/NEG. (FORCED/POS.)	FILTER SURFACE AREA (FT^2): 7,442
AIR TO CLOTH RATIO: 6.00	FILTER MATERIAL: Polyester or equivalent	WOVEN (FELTED)

DESCRIBE CLEANING PROCEDURES:

- AIR PULSE
- (REVERSE FLOW)
- MECHANICAL/SHAKER
- OTHER
- SONIC
- SIMPLE BAG COLLAPSE
- RING BAG COLLAPSE

PARTICLE SIZE DISTRIBUTION

SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1	Unknown	
1-10		
10-25		
25-50		
50-100		
>100		
	TOTAL = 100	

DESCRIBE INCOMING AIR STREAM:

The air stream will contain wood dust particles. Larger particles will have been removed by the upstream cyclone. The filters will discharge to a common stack. This stack will also accept the discharge air flow from a third bag filter (CD-HMA-BF) (located in this area.)

METHOD FOR DETERMINING WHEN TO CLEAN:

(AUTOMATIC) TIMED MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:

ALARM (INTERNAL INSPECTION) VISIBLE EMISSION OTHER

SPECIAL CONDITIONS: None

MOISTURE BLINDING CHEMICAL RESISTIVITY OTHER

EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES: **Per manufacturer recommendations**

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate **B**

EMISSION SOURCE DESCRIPTION: **Hammermill Area Filter**	EMISSION SOURCE ID NO: **ES-HMA**
	CONTROL DEVICE ID NO(S): **CD-HMA-BV**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-2**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):

One set of conveyors after the hammermills transports material to the pellet press silo. A second set of conveyors transports the material from the pellet press silo to the pellet presses. Particulate emissions are routed to a common dust collection system. See main report for full description.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

☐ Coal,wood,oil, gas, other burner (Form B1) ☐ Woodworking (Form B4) ☐ Manufact. of chemicals/coatings/inks (Form B7)
☐ Int.combustion engine/generator (Form B2) ☐ Coating/finishing/printing (Form B5) ☐ Incineration (Form B8)
☐ Liquid storage tanks (Form B3) ☐ Storage silos/bins (Form B6) ■ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	OPERATION DATE: **TBD**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **TBD**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):_____	NESHAP (SUBPART?):_____	MACT (SUBPART?):_____
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%** SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **8,760**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix B**						
PARTICULATE MATTER<10 MICRONS (PM_{10})							
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)							
SULFUR DIOXIDE (SO2)							
NITROGEN OXIDES (NOx)							
CARBON MONOXIDE (CO)							
VOLATILE ORGANIC COMPOUNDS (VOC)							
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

REVISED: 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate **B9**

EMISSION SOURCE DESCRIPTION: **Hammermill Area Filter**	EMISSION SOURCE ID NO: **ES-HMA**
	CONTROL DEVICE ID NO(S): **CD-HMA-BF**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-2**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

One set of conveyors after the hammermills transports material to the pellet press silo. A second set of conveyors transports the material from the pellet press silo to the pellet presses. Particulate emissions are routed to a common dust collection system. See main report for full description.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**Tons**	**70.65**	

MATERIALS ENTERING PROCESS - BATCH OPERATION		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/BATCH)	LIMITATION (UNIT/BATCH)

MAXIMUM DESIGN (BATCHES / HOUR):	
REQUESTED LIMITATION (BATCHES / HOUR):	(BATCHES/YR):
FUEL USED: **N/A**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **N/A**
MAX. CAPACITY HOURLY FUEL USE: **N/A**	REQUESTED CAPACITY ANNUAL FUEL USE: **N/A**

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C1

CONTROL DEVICE ID NO: CD-HMA-BF	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-HMA
EMISSION POINT (STACK) ID NO(S): EP-2	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: TBD[1]	MODEL NO: TBD
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? (YES) NO

DESCRIBE CONTROL SYSTEM:

This bagfilter will be utilized for emission control of sources described in B forms.

POLLUTANT(S) COLLECTED:	PM	PM_{10}	$PM_{2.5}$	
BEFORE CONTROL EMISSION RATE (LB/HR):	1,500	1,500	1,500	
CAPTURE EFFICIENCY:	~99.9 %	~99.9 %	~99.9 %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PRESSURE DROP (IN. H_20): MIN: MAX: 6" GAUGE? (YES) NO WARNING ALARM? (YES) NO

BULK PARTICLE DENSITY (LB/FT^3): 6.67E-04	INLET TEMPERATURE (°F): 120
POLLUTANT LOADING RATE: 4.67 LB/HR (GR/FT^3)	OUTLET TEMPERATURE (°F): 100
INLET AIR FLOW RATE (ACFM): 37,500	FILTER MAX OPERATING TEMP. (°F): N/A

NO. OF COMPARTMENTS: 1	NO. OF BAGS PER COMPARTMENT: 412	LENGTH OF BAG (IN.): 144
DIAMETER OF BAG (IN.): 5.75	DRAFT: INDUCED/NEG. (FORCED/POS.)	FILTER SURFACE AREA (FT^2): 7,442
AIR TO CLOTH RATIO: 6.00	FILTER MATERIAL: Polyester or equivalent	WOVEN (FELTED)

DESCRIBE CLEANING PROCEDURES:

- AIR PULSE
- (REVERSE FLOW)
- MECHANICAL/SHAKER
- OTHER
- SONIC
- SIMPLE BAG COLLAPSE
- RING BAG COLLAPSE

PARTICLE SIZE DISTRIBUTION

SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1	Unknown	
1-10		
10-25		
25-50		
50-100		
>100		
	TOTAL = 100	

DESCRIBE INCOMING AIR STREAM:

The air stream will contain wood dust particles. Larger particles will have been removed by the upstream cyclone. This filter will discharge to a common stack (same stack as CD-HM-BF1 & BF2).

METHOD FOR DETERMINING WHEN TO CLEAN:

(AUTOMATIC) TIMED MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:

ALARM (INTERNAL INSPECTION) VISIBLE EMISSION OTHER

SPECIAL CONDITIONS: None

MOISTURE BLINDING CHEMICAL RESISTIVITY OTHER

EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES: Per manufacturer recommendations

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

EMISSION SOURCE DESCRIPTION: **Pellet Mill Feed Silo**	EMISSION SOURCE ID NO: **ES-PMFS**
	CONTROL DEVICE ID NO(S): **CD-PMFS-BV**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-3**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
A pellet press silo stores dried ground wood prior to transport to the pellet presses.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ■ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	OPERATION DATE: **TBD**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **TBD**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%** SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **8,760**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix B**						
PARTICULATE MATTER<10 MICRONS (PM_{10})							
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)							
SULFUR DIOXIDE (SO2)							
NITROGEN OXIDES (NOx)							
CARBON MONOXIDE (CO)							
VOLATILE ORGANIC COMPOUNDS (VOC)							
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B6

EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B6

EMISSION SOURCE DESCRIPTION: **Pellet Mill Feed Silo**	EMISSION SOURCE ID NO: **ES-PMFS**
	CONTROL DEVICE ID NO(S): **CD-PMFS-BV**
OPERATING SCENARIO: _____ OF _____	EMISSION POINT(STACK) ID NO(S): **EP-3**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

A pellet press silo stores dried ground wood prior to transport to the pellet presses.

MATERIAL STORED:				DENSITY OF MATERIAL (LB/FT3):	**40**	
CAPACITY	CUBIC FEET:	**TBD**		TONS:	**TBD**	
DIMENSIONS (FEET)	HEIGHT:	DIAMETER:	***(OR)***	LENGTH:	WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY:		

PNEUMATICALLY FILLED	MECHANICALLY FILLED		FILLED FROM
☐ BLOWER	☐ SCREW CONVEYOR		☐ RAILCAR
☐ COMPRESSOR	☐ BELT CONVEYOR	MOTOR HP:	☐ TRUCK
☐ OTHER:	☐ BUCKET ELEVATOR		☐ STORAGE PILE
	☐ OTHER:		☐ OTHER: **Conveyor**

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS FILLED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): **~75**

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): **~75**

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C1

CONTROL DEVICE ID NO: CD-PMFS-BV	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-PPS
EMISSION POINT (STACK) ID NO(S): EP-3	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: TBD[1]	MODEL NO: TBD
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? ○ YES ○ NO

DESCRIBE CONTROL SYSTEM:
A bin vent filter is used to create a slight negative pressure on the Pellet Mill Feed Silo. The bin vent collects dust from the air volume present in the silo. The bin vent is sized to offset the air displacement created by the material feed to the silo.

POLLUTANT(S) COLLECTED:	PM	PM-10	PM-2.5	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	~99.9 %	~99.9 %	~99.9 %	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PRESSURE DROP (IN. H_2O): MIN:	MAX: 4"	GAUGE? ● YES ○ NO	WARNING ALARM? ● YES ○ NO
BULK PARTICLE DENSITY (LB/FT³):	1.43E-06	INLET TEMPERATURE (°F):	Ambient
POLLUTANT LOADING RATE:	0.01 ○ LB/HR ● GR/FT³	OUTLET TEMPERATURE (°F):	Ambient
INLET AIR FLOW RATE (ACFM):		FILTER MAX OPERATING TEMP. (°F):	N/A
NO. OF COMPARTMENTS:	1	NO. OF BAGS PER COMPARTMENT: 1	LENGTH OF BAG (IN.): 120
DIAMETER OF BAG (IN.):	5.875	DRAFT: ○ INDUCED/NEG. ● FORCED/POS	FILTER SURFACE AREA (FT²): 377
AIR TO CLOTH RATIO:	6	FILTER MATERIAL:	○ WOVEN ● FELTED

DESCRIBE CLEANING PROCEDURES:

● AIR PULSE ○ SONIC
○ REVERSE FLOW ○ SIMPLE BAG COLLAPSE
○ MECHANICAL/SHAKER ○ RING BAG COLLAPSE
○ OTHER

DESCRIBE INCOMING AIR STREAM:
The air stream will contain wood dust particulate emissions

PARTICLE SIZE DISTRIBUTION

SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1	Unknown	
1-10		
10-25		
25-50		
50-100		
>100		
	TOTAL = 100	

METHOD FOR DETERMINING WHEN TO CLEAN:
○ AUTOMATIC ● TIMED ○ MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:
○ ALARM ● INTERNAL INSPECTION ○ VISIBLE EMISSION ○ OTHER

SPECIAL CONDITIONS: None
○ MOISTURE BLINDING ○ CHEMICAL RESISTIVITY ○ OTHER
EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES: **Per manufacturer recommendations**

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

FORM C1

CONTROL DEVICE (FABRIC FILTER)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **C1**

CONTROL DEVICE ID NO:	CD-PPS-BV	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S):	ES-PPS
EMISSION POINT (STACK) ID NO(S):	EP-7	POSITION IN SERIES OF CONTROLS	NO. 1 OF 1 UNITS
MANUFACTURER:	TBD	MODEL NO:	TBD
DATE MANUFACTURED:	TBD	PROPOSED OPERATION DATE:	TBD
OPERATING SCENARIO:		PROPOSED START CONSTRUCTION DATE:	TBD
1 OF 1		P.E. SEAL REQUIRED (PER 2Q .0112)?	(YES) NO

DESCRIBE CONTROL SYSTEM:

A bin vent filter collects dust from when wood enters or exits the silo and displaces air.

POLLUTANT(S) COLLECTED:	PM	PM_{10}	$PM_{2.5}$	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	~99.9 %	~99.9 %	~99.9 %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PRESSURE DROP (IN. H_20): MIN: TBD MAX: TBD	GAUGE? (YES) NO	WARNING ALARM? (YES) NO	
BULK PARTICLE DENSITY (LB/FT^3):	1.43E-06	INLET TEMPERATURE (°F):	Ambient
POLLUTANT LOADING RATE:	0.02 LB/HR (GR/FT^3)	OUTLET TEMPERATURE (°F):	Ambient
INLET AIR FLOW RATE (ACFM):	2,500	FILTER MAX OPERATING TEMP. (°F):	N/A
NO. OF COMPARTMENT: TBD	NO. OF BAGS PER COMPARTMENT: TBD	LENGTH OF BAG (IN.):	TBD
DIAMETER OF BAG (IN.):	DRAFT: (INDUCED/NEG.) FORCED/POS.	FILTER SURFACE AREA (FT^2):	TBD
AIR TO CLOTH RATIO: TBD	FILTER MATERIAL:	WOVEN FELTED	

DESCRIBE CLEANING PROCEDURES:

- AIR PULSE
- SONIC
- REVERSE FLOW
- SIMPLE BAG COLLAPSE
- MECHANICAL/SHAKER
- RING BAG COLLAPSE
- (OTHER)

DESCRIBE INCOMING AIR STREAM:

The air stream will contain wood dust particles

PARTICLE SIZE DISTRIBUTION

SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1		
1-10		
10-25		
25-50		
50-100		
>100		
	TOTAL = 100	

METHOD FOR DETERMINING WHEN TO CLEAN:

(AUTOMATIC) TIMED MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:

ALARM (INTERNAL INSPECTION) VISIBLE EMISSION OTHER

SPECIAL CONDITIONS:

MOISTURE BLINDING CHEMICAL RESISTIVITY OTHER

EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES:

Per manufacturer recommendations or common industry practices.

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S).

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

EMISSION SOURCE DESCRIPTION: **Pellet Coolers**	EMISSION SOURCE ID NO: **ES-CLR-1,2,3,4,5, 6**
	CONTROL DEVICE ID NO(S): **CD-CLR-1,-2,-3**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Three Pellet Coolers follow the pellet presses to cool the newly formed pellets down to an acceptable storage temperature.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ■ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	OPERATION DATE: **TBD**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **TBD**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):_____	NESHAP (SUBPART?):_____	MACT (SUBPART?):_____
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%** SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **8,760**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix B**						
PARTICULATE MATTER<10 MICRONS (PM_{10})							
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)							
SULFUR DIOXIDE (SO2)							
NITROGEN OXIDES (NOx)							
CARBON MONOXIDE (CO)							
VOLATILE ORGANIC COMPOUNDS (VOC)							
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

REVISED: 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate **B9**

EMISSION SOURCE DESCRIPTION: **Pellet Coolers**	EMISSION SOURCE ID NO: **ES-CLR-1,2,3,4,5, 6**
	CONTROL DEVICE ID NO(S): **CD-CLR-1,-2,-3**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-1**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Three Pellet Coolers follow the pellet presses to cool the newly formed pellets down to an acceptable storage temperature.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**Tons**	**70.65**	

MATERIALS ENTERING PROCESS - BATCH OPERATION		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/BATCH)	LIMITATION (UNIT/BATCH)

MAXIMUM DESIGN (BATCHES / HOUR):

REQUESTED LIMITATION (BATCHES / HOUR): (BATCHES/YR):

FUEL USED: **N/A**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **N/A**
MAX. CAPACITY HOURLY FUEL USE: **N/A**	REQUESTED CAPACITY ANNUAL FUEL USE: **N/A**

COMMENTS:

Attach Additional Sheets as Necessary

FORM C4

CONTROL DEVICE (CYCLONE, MULTICYCLONE, OR OTHER MECHANICAL)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C4

CONTROL DEVICE ID NO: CD-CLR-1,-2,-3	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-CLR-1,2,3,4,5, 6
EMISSION POINT (STACK) ID NO(S): EP-1	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: TBD[1]	MODEL NO:
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? ◉ YES ○ NO

DESCRIBE CONTROL SYSTEM :
Three identical dual high efficiency cyclones are to be used to capture bulk PM emissions from six (6) pellet coolers. Two coolers vent to each of the three cyclones. The cyclones will operate under negative pressure. The parameters presented here are per each dual high efficiency cyclone.

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANT(S) COLLECTED:				
BEFORE CONTROL EMISSION RATE (LB/HR):	300	300	300	
CAPTURE EFFICIENCY:	98-99 %	98-99 %	98-99 %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See Emissions Calculations in Appendix B			

PRESSURE DROP (IN. H_2O): MIN MAX 6.0" WARNING ALARM? ○ YES ○ NO

INLET TEMPERATURE (°F): MIN MAX Ambient	OUTLET TEMPERATURE (°F): MIN MAX Ambient
INLET AIR FLOW RATE (ACFM): 12,500 per Cyclone/25,000 per Dual Cycl. Sys.	BULK PARTICLE DENSITY (LB/FT^3): 0.0002
POLLUTANT LOADING RATE (GR/FT^3): 1.40	

SETTLING CHAMBER	CYCLONE				MULTICYCLONE
LENGTH (INCHES):	INLET VELOCITY (FT/SEC 58		○ CIRCULAR ○ RECTANGLE		NO. TUBES:
WIDTH (INCHES):	*DIMENSIONS (INCHES) See instructions*		*IF WET SPRAY UTILIZED*		DIAMETER OF TUBES:
HEIGHT (INCHES):	H: 36"	Dd: 12"	LIQUID USED:		HOPPER ASPIRATION SYSTEM?
VELOCITY (FT/SEC.):	W: 14.25"	Lb: 72"	FLOW RATE (GPM):		○ YES ○ NO
NO. TRAYS:	De: 30"	Lc: 84"	MAKE UP RATE (GPM):		LOUVERS?
NO. BAFFLES:	D: 50"	S: 39"			○ YES ○ NO
	TYPE OF CYCLONE:	○ CONVENTIONAL	◉ HIGH EFFICIENCY	○ OTHER	

DESCRIBE MAINTENANCE PROCEDURES:
Periodic inspection of mechanical integrity during plant outages as specified by manufacturer

DESCRIBE INCOMING AIR STREAM:
The dual cyclones used for particulate capture the pellet coolers will be ducted to a discharge stack. The stack will be common to all cooler aspiration systems.

PARTICLE SIZE DISTRIBUTION

SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1	Unknown	
1-10		
10-25		
25-50		
50-100		
>100		
	TOTAL = 100	

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:
None

ON A SEPARATE PAGE, ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate **B**

EMISSION SOURCE DESCRIPTION: **Emergency Generator (250kw, 350 bhp)**	EMISSION SOURCE ID NO: **ES-EG**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-4**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Diesel-fired internal combustion generator to provide power in the case of an emergency.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ■ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	OPERATION DATE: **TBD**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **TBD**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): **IIII**	NESHAP (SUBPART?):	MACT (SUBPART?): **ZZZZ**
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%** SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **500**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix B**						
PARTICULATE MATTER<10 MICRONS (PM_{10})							
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)							
SULFUR DIOXIDE (SO2)							
NITROGEN OXIDES (NOx)							
CARBON MONOXIDE (CO)							
VOLATILE ORGANIC COMPOUNDS (VOC)							
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
	See Emission Calculations in Appendix B						

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
	See Emission Calculations in Appendix B			

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B2

EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/GENERATORS)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B2**

EMISSION SOURCE DESCRIPTION: Emergency Generator (250 kw, 350 bhp)	EMISSION SOURCE ID NO: ES-GN
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-4

CHECK ALL THAT APPLY: ☝ EMERGENCY ☝ SPACE HEAT ☝ ELECTRICAL GENERATION ☝ PEAK SHAVER ☝ OTHER (DESCRIBE): _____

GENERATOR OUTPUT (KW): | ANTICIPATED ACTUAL HOURS OF OPERATION AS PEAK SHAVER (HRS/YR):

ENGINE OUTPUT (HP):

TYPE ICE: ☝ GASOLINE ENGINE ☝ DIESEL ENGINE UP TO 600 HP ☝ DIESEL ENGINE GREATER THAN 600 HP ☝ DUAL FUEL ENGINE ☝ OTHER (DESCRIBE): _____ (complete below)

ENGINE TYPE ☝ RICH BURN ☝ LEAN BURN N/A

EMISSION REDUCTION MODIFICATIONS ☝ INJECTION TIMING RETARD ☝ PREIGNITION CHAMBER COMBUSTION ☝ OTHER _____

OR ☝ STATIONARY GAS TURBINE (complete below)

FUEL ☝ NATURAL GAS ☝ OIL ☝ OTHER (DESCRIBE): _____

CYCLE: ☝ COGENERATION ☝ SIMPLE ☝ REGENERATIVE ☝ COMBINED

CONTROLS: ☝ WATER-STEAM INJECTION ☝ UNCONTROLLED ☝ LEAN-PREMIX

☝ NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

ENGINE TYPE: ☝ 2-CYCLE LEAN BURN ☝ 4-CYCLE LEAN ☝ TURBINE ☝ 4-CYCLE RICH BURN ☝ OTHER (DESCRIBE): _____

CONTROLS: ☝ COMBUSTION MODIFICATIONS (DESCRIBE): _____ ☝ NONSELECTIVE CATALYTIC REDUCTION ☝ SELECTIVE CATALYTIC REDUCTION ☝ CLEAN BURN AND PRECOMBUSTION CHAMBER ☝ UNCONTROLLED

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
No. 2 Fuel Oil	gal	6.55	6.55

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	BTU/UNIT	UNITS	SULFUR CONTENT (% BY WEIGHT)
No. 2 Fuel Oil	19,300	lb	<15 ppmw

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

POLLUTANT	NOX	CO	PM	PM10	VOC	OTHER
EMISSION FACTOR LB/UNIT						
UNIT						

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:

Periodic equipment maintenance will minimize opacity by following manufacturers specification or common industry practices.

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

EMISSION SOURCE DESCRIPTION: **Fire Water Pump (300 bhp)**	EMISSION SOURCE ID NO: **ES-FWP**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-5**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Diesel-fired internal combustion pump to provide water in the case of a fire emergency.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ■ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	OPERATION DATE: **TBD**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **TBD**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): **IIII**	NESHAP (SUBPART?): _____	MACT (SUBPART?): **ZZZZ**
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%** SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **100**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix B**						
PARTICULATE MATTER<10 MICRONS (PM_{10})							
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)							
SULFUR DIOXIDE (SO2)							
NITROGEN OXIDES (NOx)							
CARBON MONOXIDE (CO)							
VOLATILE ORGANIC COMPOUNDS (VOC)							
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
	See Emission Calculations in Appendix B						

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
	See Emission Calculations in Appendix B			

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B2

EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/GENERATORS)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B2**

EMISSION SOURCE DESCRIPTION: Fire Water Pump (300 bhp)	EMISSION SOURCE ID NO: ES-FWP
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-5

CHECK ALL THAT APPLY: ☝ EMERGENCY ☝ SPACE HEAT ☝ ELECTRICAL GENERATION ☝ PEAK SHAVER ☝ OTHER (DESCRIBE): _____

GENERATOR OUTPUT (KW): | ANTICIPATED ACTUAL HOURS OF OPERATION AS PEAK SHAVER (HRS/YR):

ENGINE OUTPUT (HP):

TYPE ICE: ☝ GASOLINE ENGINE ☝ DIESEL ENGINE UP TO 600 HP ☝ DIESEL ENGINE GREATER THAN 600 HP ☝ DUAL FUEL ENGINE ☝ OTHER (DESCRIBE): _____ (complete below)

ENGINE TYPE ☝ RICH BURN ☝ LEAN BURN (N/A)

EMISSION REDUCTION MODIFICATIONS ☝ INJECTION TIMING RETARD ☝ PREIGNITION CHAMBER COMBUSTION ☝ OTHER _____

OR ☝ STATIONARY GAS TURBINE (complete below)

FUEL ☝ NATURAL GAS ☝ OIL ☝ OTHER (DESCRIBE): _____

CYCLE: ☝ COGENERATION ☝ SIMPLE ☝ REGENERATIVE ☝ COMBINED

CONTROLS: ☝ WATER-STEAM INJECTION ☝ UNCONTROLLED ☝ LEAN-PREMIX

☝ NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

ENGINE TYPE: ☝ 2-CYCLE LEAN BURN ☝ 4-CYCLE LEAN ☝ TURBINE ☝ 4-CYCLE RICH BURN ☝ OTHER (DESCRIBE): _____

CONTROLS: ☝ COMBUSTION MODIFICATIONS (DESCRIBE): _____ ☝ NONSELECTIVE CATALYTIC REDUCTION ☝ SELECTIVE CATALYTIC REDUCTION ☝ CLEAN BURN AND PRECOMBUSTION CHAMBER ☝ UNCONTROLLED

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
No. 2 Fuel Oil	gal	6.55	6.55

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	BTU/UNIT	UNITS	SULFUR CONTENT (% BY WEIGHT)
No. 2 Fuel Oil	19,300	lb	<15 ppmw

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

POLLUTANT	NOX	CO	PM	PM10	VOC	OTHER
EMISSION FACTOR LB/UNIT						
UNIT						

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:

Periodic equipment maintenance will minimize opacity by following manufacturers specification or common industry practices.

COMMENTS:

Attach Additional Sheets As Necessary

APPENDIX B – EMISSIONS CALCULATIONS

Rotary Dryer - Criteria Pollutant Emissions

Dryer Inputs

Dryer Throughput (@ Dryer Exit)	545,977	tons/year @ 13% moisture
Annual Dried Wood Throughput of Dryer	475,000	ODT/year
Max. Hourly Dried Wood Throughput of Dryer	61.50	ODT/hr
Burner Heat Input	174.0	MMBtu/hr
Percent Hardwood	90%	
Percent Softwood	10%	
Potential Operation	8,760	hr/yr

Criteria Pollutant Calculations:

Pollutant	Biomass Emission Factor (lb/ODT)	Units	Emission Factor Source	Total Potential Emissions	
				(lb/hr)	(tpy)
CO	0.81	lb/ODT	Calculated from Guaranteed WESP Specifications [1]	50.00	193.1
NO_X	0.53	lb/ODT	Calculated from Guaranteed WESP Specifications [1]	32.30	124.7
$PM/PM_{10}/PM_{2.5}$ Condensible Fraction	0.017	lb/MMBtu	AP-42, Section 1.6 [2]	2.96	13.0
TSP (Filterable)	0.062	lb/ODT	Calculated from Guaranteed WESP Specifications [1]	3.84	14.8
Total TSP (Filterable + Condensible)				6.79	27.8
PM_{10} (Filterable)	0.062	lb/ODT	Calculated from Guaranteed WESP Specifications [1]	3.84	14.8
Total PM_{10} (Filterable + Condensible)				6.79	27.8
$PM_{2.5}$ (Filterable)	0.062	lb/ODT	Calculated from Guaranteed WESP Specifications [1]	3.84	14.8
Total $PM_{2.5}$ (Filterable + Condensible)				6.79	27.8
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6 [3]	4.35	19.1
VOC	0.95	lb/ODT	Calculated from Guaranteed WESP Specifications [1]	58.69	226.6
Lead	0.00	N/A	N/A	0.00	0.0

Note:

[1] CO, NO_x, VOC, and filterable PM/PM_{10} emission factors were provided by the dryer system vendor. The $PM_{2.5}$ filterable emission factor is assumed to be the same as PM and PM_{10}.

[2] Although the vendor estimated emissions to include condensibles, additional condensibles from wood combustion AP-42, Section 1.6 were included. The vendor only provided the filterable fraction of particulate matter in the emission factors. Enviva has conservatively calculated the condensible fraction based upon the heat input of the dryer burners using an emission factor for wood combustion from AP-42, Section 1.6.

[3] No emission factor is provided in AP-42, Section 10.6.2 for SO_2 for rotary dryers. Enviva has conservatively calculated SO2 emissions based upon the heat input of the dryer burners using an emission factor for wood combustion from AP-42, Section 1.6.

[4] WESP Outlet Air Flowrate 93,215 SCFM (dSCFM based ACFM rate of 113,000 at 180 °F, conservatively assuming 40% moisture.)
55,929 dSCF

PM Grain Loading 0.008 gr/dSCF

Emissions 447.43 gr/min
0.064 lb/min
3.84 lb/hr

Rotary Dryer - Federal Hazardous Air Pollutant (HAP) and North Carolina Toxic Air Pollutant (TAP) Emissions

Calculation Inputs:

Dryer Throughput (Ton/yr)	545,977
ODT/yr	475,000
ODT/hr	61.50
Hardwood Composition	90%
Softwood Composition	10%

HAP & TAP Emission Calculations:

HAP/TAP Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	Direct wood-fired, hardwood			Green, Direct wood-fired (inlet moisture content >50%, dry basis), softwood[1]			MAXIMUM TOTAL EMISSIONS	
				Emission Factor[2] (lb/ODT)	Emissions[3] (lb/hr)	(tpy)	Emission Factor (lb/ODT)	Emissions[3] (lb/hr)	(tpy)	(lb/hr)	(tpy)
Acetaldehyde	75-07-0	Yes	Yes	3.83E-03	2.36E-01	8.19E-01	7.50E-02	4.61E+00	1.78E+00	4.61E+00	2.60E+00
Acrolein	107-02-8	Yes	Yes	1.17E-03	7.22E-02	2.51E-01	2.30E-02	1.41E+00	5.46E-01	1.41E+00	7.97E-01
Benzene	71-43-2	Yes	Yes	3.88E-04	2.39E-02	8.30E-02	7.60E-03	4.67E-01	1.81E-01	4.67E-01	2.63E-01
Chloroform	67-66-3	Yes	Yes	5.11E-06	3.14E-04	1.09E-03	1.00E-04	6.15E-03	2.38E-03	6.15E-03	3.47E-03
Cumene	98-82-8	Yes	No	1.02E-04	6.28E-03	2.18E-02	2.00E-03	1.23E-01	4.75E-02	1.23E-01	6.93E-02
Formaldehyde	50-00-0	Yes	Yes	7.15E-03	4.40E-01	1.53E+00	1.40E-01	8.61E+00	3.33E+00	8.61E+00	4.85E+00
m-,p-Xylene	1330-20-7	Yes	Yes	2.45E-04	1.51E-02	5.24E-02	4.80E-03	2.95E-01	1.14E-01	2.95E-01	1.66E-01
Methanol	67-56-1	Yes	No	5.62E-03	3.45E-01	1.20E+00	1.10E-01	6.77E+00	2.61E+00	6.77E+00	3.81E+00
Methyl isobutyl ketone	108-10-1	Yes	Yes	3.52E-04	2.17E-02	7.53E-02	6.90E-03	4.24E-01	1.64E-01	4.24E-01	2.39E-01
Methylene chloride	75-09-2	Yes	Yes	9.19E-05	5.65E-03	1.96E-02	1.80E-03	1.11E-01	4.28E-02	1.11E-01	6.24E-02
o-Xylene	95-47-6	Yes	No	2.30E-05	1.41E-03	4.91E-03	4.50E-04	2.77E-02	1.07E-02	2.77E-02	1.56E-02
Phenol	108-95-2	Yes	Yes	1.43E-03	8.79E-02	3.06E-01	2.80E-02	1.72E+00	6.65E-01	1.72E+00	9.71E-01
Propionaldehyde	123-38-6	Yes	No	6.64E-04	4.08E-02	1.42E-01	1.30E-02	8.00E-01	3.09E-01	8.00E-01	4.51E-01
Styrene	100-42-5	Yes	Yes	1.84E-05	1.13E-03	3.93E-03	3.60E-04	2.21E-02	8.55E-03	2.21E-02	1.25E-02
Toluene	108-88-3	Yes	Yes	6.64E-04	4.08E-02	1.42E-01	1.30E-02	8.00E-01	3.09E-01	8.00E-01	4.51E-01
									Total HAP	**2.62E+01**	**1.48E+01**

Note:

[1] HAP & TAP emission factors for "green, direct wood-fired (inlet moisture content >50%, dry basis" softwood were obtained from AP-42, Section 10.6.2, Table 10.6.2-3.

[2] To account for hardwood HAP & TAP emissions, factors were conservatively calculated by taking the AP-42 HAP factors for 100% softwood (green) and multiplying by the ratio of the total listed VOC emission factors for hardwood and softwood (0.24 / 4.7).

[3] Short-term HAP & TAP emissions were calculated based upon a worst-case scenario of 100% hardwood or softwood firing (in which case, softwood is always the overall worst case).

Rotary Dryer - Federal Hazardous Air Pollutant (HAP) and North Carolina Toxic Air Pollutant (TAP) Emissions from Combustion of Wood

Calculation Inputs:

Heat Input (MMBtu/hr)	174.00
Operating Schedule (hrs/yr)	8,760
Heat Input (MMBtu/yr)	1,524,240
WESP Metal HAP Control Efficiency[2]	92.75%
HCl Control Efficiency[3]	90.00%

HAP & TAP Emission Calculations:

Pollutant	Pollutant Type	Emission Factors			Emissions							
		Biomass			Biomass		Maximum Uncontrolled Total (per boiler)			Maximum Controlled Total (per boiler)		
		lb/mmBtu Uncontrolled	lb/mmBtu Controlled	Ref.	lb/hr Uncontrolled	lb/hr Controlled	lb/hr	lb/yr	tpy	lb/hr	lb/yr	tpy
Acetophenone	HAP	3.20E-09	3.20E-09	1	5.57E-07	5.57E-07	5.57E-07	4.88E-03	0.00	5.57E-07	4.88E-03	0.00
Antimony & Compounds	HAP	7.90E-06	5.73E-07	1, 2	1.37E-03	9.97E-05	1.37E-03	1.20E+01	0.01	9.97E-05	8.73E-01	0.00
Arsenic & Compounds	TAP/HAP	2.20E-05	1.60E-06	1, 2	3.83E-03	2.78E-04	3.83E-03	3.35E+01	0.02	2.78E-04	2.43E+00	0.00
Benzo(a)pyrene	TAP/HAP	2.60E-06	2.60E-06	1	4.52E-04	4.52E-04	4.52E-04	3.96E+00	0.00	4.52E-04	3.96E+00	0.00
Beryllium metal (un-reacted) (Also include in BEC)	TAP/HAP	1.10E-06	7.98E-08	1, 2	1.91E-04	1.39E-05	1.91E-04	1.68E+00	0.00	1.39E-05	1.22E-01	0.00
Cadmium Metal (elemental un-reacted)-(Add w/CDC)	TAP/HAP	4.10E-06	2.97E-07	1, 2	7.13E-04	5.17E-05	7.13E-04	6.25E+00	0.00	5.17E-05	4.53E-01	0.00
Carbon tetrachloride	TAP/HAP	4.50E-05	4.50E-05	1	7.83E-03	7.83E-03	7.83E-03	6.86E+01	0.03	7.83E-03	6.86E+01	0.03
Chlorine	TAP/HAP	7.90E-04	7.90E-04	1	1.37E-01	1.37E-01	1.37E-01	1.20E+03	0.60	1.37E-01	1.20E+03	0.60
Chlorobenzene	TAP/HAP	3.30E-05	3.30E-05	1	5.74E-03	5.74E-03	5.74E-03	5.03E+01	0.03	5.74E-03	5.03E+01	0.03
Chromic acid (Chromium VI)	TAP[4]	3.50E-06	2.54E-07	1, 2	6.09E-04	4.42E-05	6.09E-04	5.33E+00	0.00	4.42E-05	3.87E-01	0.00
Chromium-Other compds (add w/chrom acid to get CRC)	HAP	1.75E-05	1.27E-06	1, 2	3.05E-03	2.21E-04	3.05E-03	2.67E+01	0.01	2.21E-04	1.93E+00	0.00
Cobalt compounds	HAP	6.50E-06	4.71E-07	1, 2	1.13E-03	8.20E-05	1.13E-03	9.91E+00	0.00	8.20E-05	7.18E-01	0.00
Dinitrophenol, 2,4-	HAP	1.80E-07	1.80E-07	1	3.13E-05	3.13E-05	3.13E-05	2.74E-01	0.00	3.13E-05	2.74E-01	0.00
Di(2-ethylhexyl)phthalate (DEHP)	TAP/HAP	4.70E-08	4.70E-08	1	8.18E-06	8.18E-06	8.18E-06	7.16E-02	0.00	8.18E-06	7.16E-02	0.00
Ethyl benzene	HAP	3.10E-05	3.10E-05	1	5.39E-03	5.39E-03	5.39E-03	4.73E+01	0.02	5.39E-03	4.73E+01	0.02
Ethylene dichloride (1,2-dichloroethane)	TAP/HAP	2.90E-05	2.90E-05	1	5.05E-03	5.05E-03	5.05E-03	4.42E+01	0.02	5.05E-03	4.42E+01	0.02
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8	TAP	1.60E-06	1.60E-06	1	2.78E-04	2.78E-04	2.78E-04	2.44E+00	0.00	2.78E-04	2.44E+00	0.00
Hydrogen chloride (hydrochloric acid)	TAP/HAP	1.90E-02	1.90E-03	1, 3	3.31E+00	3.31E-01	3.31E+00	2.90E+04	14.48	3.31E-01	2.90E+03	1.45
Lead and Lead compounds	HAP	4.80E-05	3.48E-06	1, 2	8.35E-03	6.06E-04	8.35E-03	7.32E+01	0.04	6.06E-04	5.30E+00	0.00
Manganese & compounds	TAP/HAP	1.60E-03	1.16E-04	1, 2	2.78E-01	2.02E-02	2.78E-01	2.44E+03	1.22	2.02E-02	1.77E+02	0.09
Mercury, vapor (Include in Mercury&Compds)	TAP/HAP	3.50E-06	2.54E-07	1, 2	6.09E-04	4.42E-05	6.09E-04	5.33E+00	0.00	6.09E-04	5.33E+00	0.00
Methyl bromide (bromomethane)	HAP	1.50E-05	1.50E-05	1	2.61E-03	2.61E-03	2.61E-03	2.29E+01	0.01	2.61E-03	2.29E+01	0.01
Methyl chloride (chloromethane)	HAP	2.30E-05	2.30E-05	1	4.00E-03	4.00E-03	4.00E-03	3.51E+01	0.02	4.00E-03	3.51E+01	0.02
Methyl chloroform (1,1,1 trichloroethane)	TAP/HAP	3.10E-05	3.10E-05	1	5.39E-03	5.39E-03	5.39E-03	4.73E+01	0.02	5.39E-03	4.73E+01	0.02
Methyl ethyl ketone	TAP/HAP	5.40E-06	5.40E-06	1	9.40E-04	9.40E-04	9.40E-04	8.23E+00	0.00	9.40E-04	8.23E+00	0.00
Naphthalene	HAP	9.70E-05	9.70E-05	1	1.69E-02	1.69E-02	1.69E-02	1.48E+02	0.07	1.69E-02	1.48E+02	0.07
Nickel metal (Component of Nickel & Compounds)	TAP/HAP	3.30E-05	2.39E-06	1, 2	5.74E-03	4.16E-04	5.74E-03	5.03E+01	0.03	5.74E-03	5.03E+01	0.03
Nitrophenol, 4-	HAP	1.10E-07	1.10E-07	1	1.91E-05	1.91E-05	1.91E-05	1.68E-01	0.00	1.91E-05	1.68E-01	0.00
Pentachlorophenol	TAP/HAP	5.10E-08	5.10E-08	1	8.87E-06	8.87E-06	8.87E-06	7.77E-02	0.00	8.87E-06	7.77E-02	0.00
Perchloroethylene (tetrachloroethylene)	TAP/HAP	3.80E-05	3.80E-05	1	6.61E-03	6.61E-03	6.61E-03	5.79E+01	0.03	6.61E-03	5.79E+01	0.03
Phosphorus Metal, Yellow or White	HAP	2.70E-05	1.96E-06	1, 2	4.70E-03	3.41E-04	4.70E-03	4.12E+01	0.02	4.70E-03	4.12E+01	0.02
Polychlorinated biphenyls	TAP/HAP	8.15E-09	8.15E-09	1	1.42E-06	1.42E-06	1.42E-06	1.24E-02	0.00	1.42E-06	1.24E-02	0.00
Polycyclic Organic Matter	HAP	1.25E-04	1.25E-04	1	2.18E-02	2.18E-02	2.18E-02	1.91E+02	0.10	2.18E-02	1.91E+02	0.10
Propylene dichloride (1,2 dichloropropane)	HAP	3.30E-05	3.30E-05	1	5.74E-03	5.74E-03	5.74E-03	5.03E+01	0.03	5.74E-03	5.03E+01	0.03
Selenium compounds	HAP	2.80E-06	2.03E-07	1, 2	4.87E-04	3.53E-05	4.87E-04	4.27E+00	0.00	4.87E-04	4.27E+00	0.00
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	TAP/HAP	8.60E-12	8.60E-12	1	1.50E-09	1.50E-09	1.50E-09	1.31E-05	0.00	1.50E-09	1.31E-05	0.00
Trichloroethylene	TAP/HAP	3.00E-05	3.00E-05	1	5.22E-03	5.22E-03	5.22E-03	4.57E+01	0.02	5.22E-03	4.57E+01	0.02
Trichlorofluoromethane (CFC 111)	TAP	4.10E-05	4.10E-05	1	7.13E-03	7.13E-03	7.13E-03	6.25E+01	0.03	7.13E-03	6.25E+01	0.03
Trichlorophenol, 2,4,6-	HAP	2.20E-08	2.20E-08	1	3.83E-06	3.83E-06	3.83E-06	3.35E-02	0.00	3.83E-06	3.35E-02	0.00
Vinyl chloride	TAP/HAP	1.80E-05	1.80E-05	1	3.13E-03	3.13E-03	3.13E-03	2.74E+01	0.01	3.13E-03	2.74E+01	0.01
Total					**3.86E+00**	**5.95E-01**	**3.86E+00**	**3.38E+04**	**16.89**	**6.05E-01**	**5.30E+03**	**2.65**

[1] Uncontrolled and controlled emission factors (criteria and HAP/TAP) for wood combustion in a stoker boiler from NCDAQ Wood waste Combustion Spreadsheet/AP-42; Compilation of Air Pollutant Emission Factors Vol. 1 - Stationary Sources USEPA, 5th ed. Section 1.6, 9/03

[2] The control efficiency of the wet electrostatic precipitator (WESP) for filterable particulate matter (88.9%) is applied to all metal hazardous and toxic pollutants.

[3] The WESP employs a caustic solution in its operation in which hydrochloric acid will have high water solubility. This caustic solution will neutralize the acid and effectively control it by 90%, per conversation on 10/18/2011 with Steven A. Jaasund, P.E. of Lundberg Associates, a manufacturer of WESPs.

[4] Chromic acid is a subset of chrome compounds, which is accounted for seperately as a HAP. As such, chromic acid is only calculated as a TAP.

Emergency Generator Emissions (ES-EG)

Equipment and Fuel Characteristics

Engine Output	0.26	MW
Engine Power	350	hp (brake)
Hours of Operation	500	hr/yr[1]
Heating Value of Diesel	19,300	Btu/lb
Power Conversion	2,545	Btu/hr/hp

Criteria Pollutant Emissions

Pollutant	Category	Emission Factor	Units	Potential Emissions	
				lb/hr	tpy
TSP	PSD	4.41E-04	lb/kW-hr (2)	0.12	2.88E-02
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	0.12	2.88E-02
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	0.12	2.88E-02
NO_x	PSD	8.82E-03	lb/kW-hr (5)	2.30	5.75E-01
SO_2	PSD	15	ppmw (3)	1.38E-03	3.46E-04
CO	PSD	7.72E-03	lb/kW-hr (2)	2.01	5.03E-01
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	2.24E-03	5.59E-04
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.88E-03	4.70E-04
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	2.27E-04	5.67E-05
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	2.29E-03	5.71E-04
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	4.61E-07	1.15E-07
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	9.58E-05	2.39E-05
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.89E-03	7.23E-04
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	4.12E-04	1.03E-04
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	1.00E-03	2.51E-04
Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	6.98E-04	1.75E-04
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.89E-03	7.23E-04
Total HAPs				9.49E-03	2.37E-03

Note:

[1] NSPS allows for only 100 hrs/yr of non-emergency operation of these engines (not the 500 hours shown). The PTE for the emergency generator is based on 500 hr/yr, though, because the regs allow non-emergency operation and EPA guidance is 500 hr/yr for emergency generators.

[2] Emissions factors from NSPS Subpart IIII (or 40 CFR 89.112 where applicable) in compliance with post-2009 construction.

[3] Sulfur content in accordance with Year 2010 standards of 40 CFR 80.510(a) as required by NSPS Subpart IIII.

[4] Emission factor obtained from AP-42 Section 3.3, Tables 3.3-1 Table 3.3-2.

[5] Emission factor for NOx is listed as NOx and NMHC (Non-Methane Hydrocarbons or VOC) in Table 4 of NSPS Subpart IIII. Conservatively assumed entire limit attributable to NOx.

[6] Benzo(a)pyrene is included as a HAP in Total PAH.

Firewater Pump Emissions (ES-FWP)

Equipment and Fuel Characteristics

Engine Output	0.22	MW
Engine Power	300	hp
Hours of Operation	500	hr/yr[1]
Heating Value of Diesel	19,300	Btu/lb
Power Conversion	2,545	Btu/hr/hp

Criteria Pollutant Emissions

Pollutant	Category	Emission Factor	Units	Potential Emissions	
				lb/hr	tpy
TSP	PSD	4.41E-04	lb/kW-hr (2)	0.10	2.47E-02
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	0.10	2.47E-02
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	0.10	2.47E-02
NO_x	PSD	8.82E-03	lb/kW-hr (5)	1.97	4.93E-01
SO_2	PSD	15	ppmw (3)	1.19E-03	2.97E-04
CO	PSD	7.72E-03	lb/kW-hr (2)	1.73	4.32E-01
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	1.92E-03	4.79E-04
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.61E-03	4.03E-04
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	1.94E-04	4.86E-05
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	1.96E-03	4.90E-04
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	3.95E-07	9.87E-08
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	8.21E-05	2.05E-05
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.48E-03	6.20E-04
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	3.53E-04	8.82E-05
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	8.59E-04	2.15E-04
Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	5.99E-04	1.50E-04
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.48E-03	6.20E-04
Total HAPs				8.13E-03	2.03E-03

Note:

[1] NSPS allows for only 100 hrs/yr of non-emergency operation of these engines (not the 500 hours shown). The PTE for the emergency generator is based on 500 hr/yr, though, because the regs allow non-emergency operation and EPA guidance is 500 hr/yr for emergency generators.

[2] Emissions factors from NSPS Subpart IIII (or 40 CFR 89.112 where applicable) in compliance with post-2009 construction.

[3] Sulfur content in accordance with Year 2010 standards of 40 CFR 80.510(a) as required by NSPS Subpart IIII.

[4] Emission factor obtained from AP-42 Section 3.3, Tables 3.3-1 Table 3.3-2.

[5] Emission factor for NOx is listed as NOx and NMHC (Non-Methane Hydrocarbons or VOC) in Table 4 of NSPS Subpart IIII. Conservatively assumed entire limit attributable to NOx.

[6] Benzo(a)pyrene is included as a HAP in Total PAH.

Dust Control Systems PM Emissions

Emission Unit	Emission Source ID	Filter, Vent -or- Cyclone ID	Flowrate[1] (cfm)	Pollutant Loading[2] (gr/cf)	Annual Operation (hours)	% PM that is PM_{10}	% PM that is $PM_{2.5}$	Potential Emissions PM (lb/hr)	PM (tpy)	PM_{10}[3] (lb/hr)	PM_{10}[3] (tpy)	$PM_{2.5}$[3] (lb/hr)	$PM_{2.5}$[3] (tpy)
Hammermills Bagfilter 1	ES-HM-1, -2, -3, -4	CD-HM-BF1	40,000	0.01	8,760	100%	100%	3.43	15.02	3.43	15.02	3.43	15.02
Hammermills Bagfilter 2	ES-HM-1, -2, -3, -4	CD-HM-BF2	40,000	0.01	8,760	100%	100%	3.43	15.02	3.43	15.02	3.43	15.02
Hammermill Area Filter	ES-HMA	CD-HMA-BF	37,500	0.01	8,760	100%	100%	3.21	14.08	3.21	14.08	3.21	14.08
Pellet Mill Feed Silo Bin Vent Filter	ES-PMFS	CD-PMFS-BV	2,500	0.01	8,760	100%	100%	0.21	0.94	0.21	0.94	0.21	0.94
Pellet Coolers Cyclone 1	ES-CLR	CD-CLR-1	25,000	0.022	8,760	91%	55%	4.71	20.65	4.29	18.79	2.59	11.36
Pellet Coolers Cyclone 2	ES-CLR	CD-CLR-2	25,000	0.022	8,760	91%	55%	4.71	20.65	4.29	18.79	2.59	11.36
Pellet Coolers Cyclone 3	ES-CLR	CD-CLR-3	25,000	0.022	8,760	91%	55%	4.71	20.65	4.29	18.79	2.59	11.36
							TOTAL	**24.43**	**107.00**	**23.16**	**101.42**	**18.06**	**79.12**

Note:

[1] Filter, Vent, and Cyclone inlet flow rate (cfm) provided by design engineering firm (Mid-South Engineering Co.). The exit flowrate was conservatively assumed to be the same as the inlet flowrate.

[2] Unless otherwise specified, pollutant (PM) loading conservatively assumed to be 0.01 gr/dscf

[3] Pellet cooler cyclone speciation based on AP-42 factors for wet wood combustion (Section 1.6) controlled by a mechanical separator. Since the particle size of particle size of particulate matter from a pellet cooler is anticipated to be larger than flyash, this factor is believed to be a conservative indicator of speciation.

Fugitive PM Emissions [1]

ID	Emission Source Group	Description	Control	Control Description	Throughput		Potential Uncontrolled Emissions for PM [3]		Potential Uncontrolled Emissions for PM_{10} [3]		Potential Uncontrolled Emissions for $PM_{2.5}$ [3]	
					Max. Hourly [2] (tph)	Max. Annual (tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
DP1	ES-DWH	Dryer Discharger to Dryer Collection Conveyor Belt	Enclosed	Reduction to 2 mph mean wind speed	70.65	545,977	5.3E-03	2.1E-02	2.5E-03	9.8E-03	3.8E-04	1.5E-03
DP2	ES-DWH	Pre-screen Feeder Fines Overs to Hammermills Infeed and Distribution	Enclosed	Reduction to 2 mph mean wind speed	6.68	51,649	5.1E-04	2.0E-03	2.4E-04	9.2E-04	3.6E-05	1.4E-04
DP3	ES-DWH	Hammermills Cyclone Diverter Gates to Hammermills System Discharge Collection Conveyor Belt	Enclosed	Reduction to 2 mph mean wind speed	63.97	494,328	4.8E-03	1.9E-02	2.3E-03	8.8E-03	3.5E-04	1.3E-03
DP4	ES-DWH	Hammermills System Discharge Collection Conveyor Belt to Pellet Mill Feed Silo Infeed Screw	Enclosed	Reduction to 2 mph mean wind speed	70.65	545,977	5.3E-03	2.1E-02	2.5E-03	9.8E-03	3.8E-04	1.5E-03
						TOTAL	1.6E-02	6.2E-02	7.6E-03	2.9E-02	1.1E-03	4.4E-03

Note:

[1] Fugitive emissions are not included in facility-wide PTE because the Northampton Pellet Mill does not belong to one of the listed 28 source categories.

[2] Max hourly rates based upon maximum calculated throughput rates provided in mass balance provided by Mid-South Engineering Company, June 17, 2011; updated for 13% moisture content on December 29, 2011

[3] Based emission factors calculated per AP-42 Section 13.2.4, September 2006.

where: E = emission factor (lb/ton)

k = particle size multiplier (dimensionless) for PM 0.74

k = particle size multiplier (dimensionless) for PM_{10} 0.35

k = particle size multiplier (dimensionless) for $PM_{2.5}$ 0.053

U = mean wind speed (mph) 2.00

M = material moisture content (%) 10

E for PM (lb/ton) = 7.6E-05

E for PM_{10} (lb/ton) = 3.6E-05

E for $PM_{2.5}$ (lb/ton) = 5.4E-06

Tank VOC Emissions

Tank ID	Tank Description	Volume[1] (gal)	Tank Dimensions		Orientation	Throughput (gal/yr)	Turnovers	TANKS 4.0 VOC Emissions	
			Diameter (ft)	Height/Length (ft)				(lb/yr)	(tpy)
TK01	Emergency Generator Fuel Oil Tank[2]	2,500	6	12	Vertical	12,000	4.80	0.37	3.57E-03
TK02	Fire Water Pump Fuel Oil Tank[2]	500	3	10	Horizontal	10,300	20.60	0.43	2.15E-04
							TOTAL	**0.80**	**3.79E-03**

Note:

[1] Conservative design specifications.

[2] Throughput based on fuel consumption and 500 hours of operation per year. Fuel consumption data provided by pump engine vendors.

Electric Powered Chipper (ES-CHIP-1) Emissions

Annual Throughput of Chipper	475,000	tons/year (dry wood)[1]
Short-term Throughput of Chipper	61.50	tons/hr (dry wood)[1]
Maximum Annual Operation	8,760	hours

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[6]	
		(lb/hr)	(tpy)
THC as Carbon[2]	0.0041	2.522E-01	1.10
THC as alpha-Pinene[3]	0.0047	**2.862E-01**	**1.25**
PM[4]	N/A	**N/A**	**N/A**
Methanol[2]	0.0010	**6.150E-02**	**0.24**

[1] It is assumed that the wood received at the facility has a nominal water content of 50%. The annual throughput used for the chipper is the same as the annual throughput of the dryer; while the short-term throughput is based upon the maximum hourly throughput of the dryer.

[2] Emission factor obtained from available emissions factors for chippers in AP-42 Section 10.6.3, Table 7 and Section 10.6.4, Tables 7 and 9. Emission factors for THC and Methanol are the same across all three tables.

[3] The THC/VOC makeup of wood is primarily composed of terpenes $(C_5H_8)_n$ [where n = 2, 3, or 4 typically] but to convert from carbon to the equivalent weight in THC/VOC, the assumption was that alpha-pinene (AP) would be the representative THC/VOC (molecular weight = 136.2 lb/lb-mol). The following equation shows the conversion:
*lb VOC/ODT = lb C/ODT * (136.2 lb/mol AP / 12 lb/mol C) * (1 mol AP / 10 mol C)*

[4] PM emission factor is not applicable as the chipper emissions are routed downward to the ground.

[5] Short term emissions were based upon the annual throughput of the chipper (dry wood) divided by the total hours of operation.

Potential GHG Emissions

Operating Data:

Dryer Heat Input	174.00 MMBtu/hr
Operating Schedule	8,760 hrs/yr
Emergency Generator Output	350 bhp
Operating Schedule	500 hrs/yr
No. 2 Fuel Input	16.7 gal/hr[1]
Energy Input	2.282 MMBtu/hr[2]
Fire Water Pump Output	300 bhp
Operating Schedule	500 hrs/yr
No. 2 Fuel Input	14.3 gal/hr[1]
Energy Input	1.956 MMBtu/hr[2]

Emission Unit ID	Fuel Type	Emission Factors from Table C-1 (kg/MMBtu)[3]			Tier 1 Emissions (metric tons)			
		CO2	CH4	N2O	CO2	CH4	N2O	Total CO2e
ES-DRYER	Wood and Wood Residuals	0.00E+00	3.20E-02	4.20E-03	0	54	7	61
ES-GN	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	93	3.77E-03	7.55E-04	93
ES-FWP	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	80	3.23E-03	6.47E-04	80

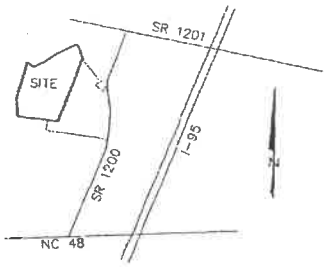
[1] Fuel consumption calculated using a factor of 0.0476 gal/hr-hp. Advanced Environmental Interface, Inc. (1998). General Permits for Emergency Engines. INSIGHTS, 98-2, 3.

[2] Energy calculated on a fuel consumption basis, using an energy factor of 0.137 MMBtu/gal.

[3] Emission factors from Table C-1 and C-2 of GHG Reporting Rule. Emission factors for methane and N2O already multiplied by their respective GWPs of 21 and 310.

[4] As per NC DAQ Biomass Deferral Rule 15A NCAC 02D .0544, CO2 emissions from bioenergy and other biogeneic sources are not applicable towards PSD and Title V permitting.

APPENDIX C – DISPERSION MODELING SUPPORT



VICINITY MAP
NOT TO SCALE

NOW OR FORMERLY
C.R. CLEMENTS
DB 733 PG 887

NOW OR FORMERLY
C.R. CLEMENTS
DB 733 PG 887

NOW OR FORMERLY
C.R. CLEMENTS
DB 733 PG 887

NOW OR FORMERLY
S.L. NEWSOME
DB 73? PG 72

N 14°59'20" E

N 15°08'46" E
730.52'

ERB

XISTING IRON PIPE
XISTING REBAR
XISTING AXLE
XISTING CONCRETE MONUMENT
RON PIPE SET (3/4")
OWER POLE

BENT EP

NOW OR FORMERLY
WILLIAM W. GRANT
DB 632 PG 879

, PAGE 42
0, PAGE 177
2608

N 08°47'36" W
691.23'

D BY COORDINATE METHOD.
ARE HORIZONTAL.
TED BY LEAST SQUARES METHOD.
CISION BEFORE ADJUSTMENT: 1/15,850
DATUM NAD83(2001)
ATUM NAVD88
E COORDINATES IN U.S. SURVEY FEET
OPOGRAPHY TAKEN FROM
ON COUNTY GIS
ITOUR INTERVAL

N = 1,003,634.60
E = 2,406,231.57
ELEV = 136.0
CGF = 1.00010880
NAD83(2001)/NAVD88

EX. AXLE

NOW OR FORMERLY
WILLIAM W. GRANT
DB 276 PG 190
PIN 4000-42-9418

THIS SURVEY IS OF ANOTHER CATEGORY, SUCH AS
OF EXISTING PARCELS, A COURT-ORDERED SURVEY
TO THE DEFINITION OF SUBDIVISION.

I, CHARLES W. RUSHTON, CERTIFY THAT THIS PLAT
UNDER MY SUPERVISION FROM AN ACTUAL SURVEY
MY SUPERVISION; THAT THE BOUNDARIES NOT SUR
CLEARLY INDICATED AS DRAWN FROM INFORMATION
BOOK _____, PAGE _____; THAT THE RATIO
AS CALCULATED IS 1: 15,850 ; THAT THIS PLA
IN ACCORDANCE WITH G.S. 47-30 AS AMENDED.
WITNESS MY ORIGINAL SIGNATURE, REGISTRATION N
AND SEAL THIS 22nd DAY OF JULY

SURVEYOR
REGISTRATION NO. L-2765

ED DIVISION

ATLANTIC

RIAL PARK

WNSHIP NORTHAMPTON COUNTY NORTH CAROLINA		
RTHAMPTON COUNTY		ZONED
7/11	DRAWN CWR	JOB NO. 11-037
300'	SURVEYED REM	DWG NHAMP_300
/18/11: BOUNDARY ALONG POWERLINE		PIN 4000-84-2608