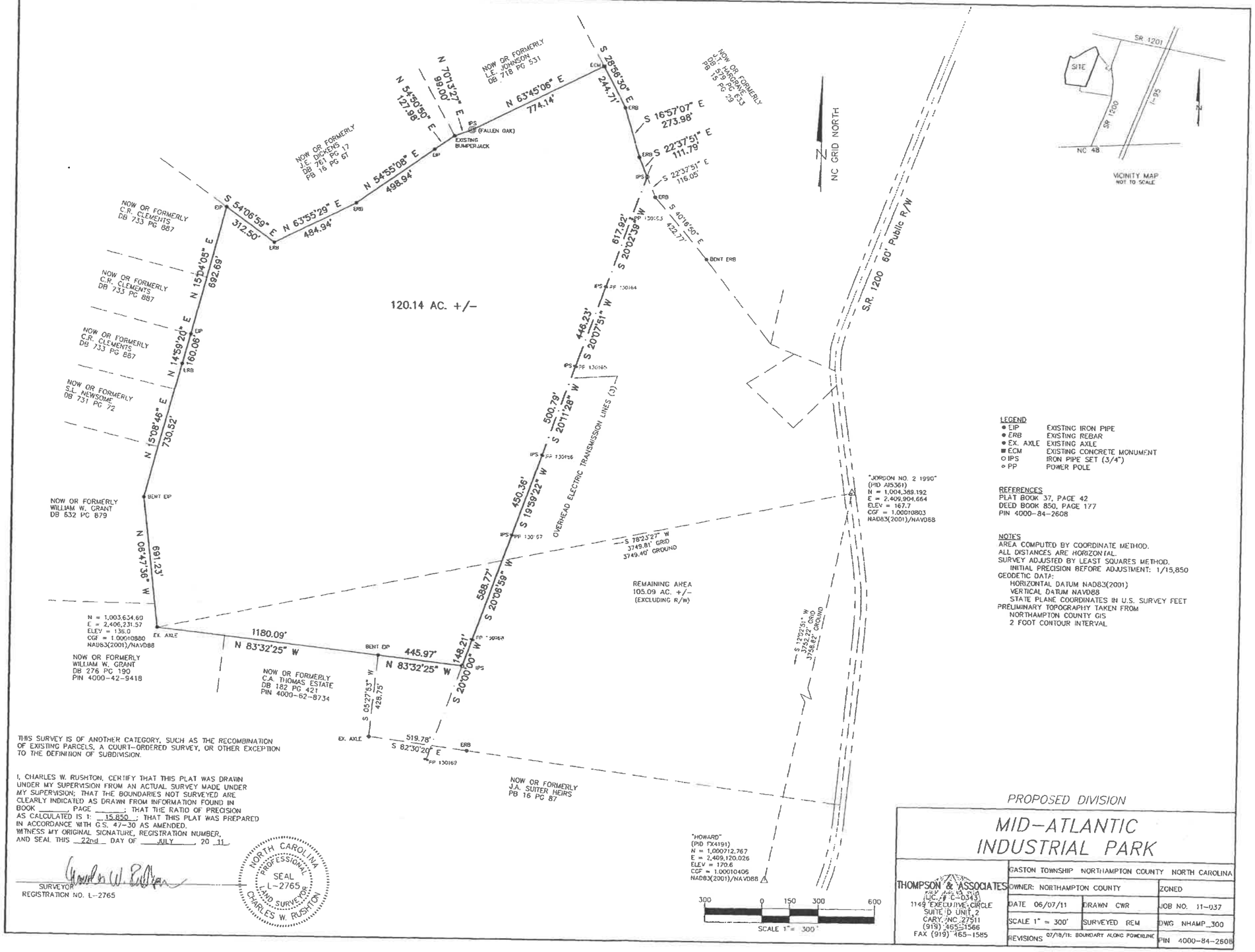
ENVIVA PELLETS 2012
P/N 10203
NORTHAMPTON COUNTY



LEGEND

● EIP	EXISTING IRON PIPE
● ERB	EXISTING REBAR
● EX. AXLE	EXISTING AXLE
■ ECM	EXISTING CONCRETE MONUMENT
○ IPS	IRON PIPE SET (3/4")
○ PP	POWER POLE

REFERENCES
PLAT BOOK 37, PAGE 42
DEED BOOK 850, PAGE 177
PIN 4000-84-2608

NOTES
AREA COMPUTED BY COORDINATE METHOD.
ALL DISTANCES ARE HORIZONTAL.
SURVEY ADJUSTED BY LEAST SQUARES METHOD.
INITIAL PRECISION BEFORE ADJUSTMENT: 1/15,850
GEODETIC DATA:
HORIZONTAL DATUM NAD83(2001)
VERTICAL DATUM NAVD88
STATE PLANE COORDINATES IN U.S. SURVEY FEET
PRELIMINARY TOPOGRAPHY TAKEN FROM
NORTHAMPTON COUNTY GIS
2 FOOT CONTOUR INTERVAL

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

I, CHARLES W. RUSHTON, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM INFORMATION FOUND IN BOOK _____, PAGE _____; THAT THE RATIO OF PRECISION AS CALCULATED IS 1: 15,850 ; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 22nd DAY OF JULY, 20 11

Charles W. Rushton
SURVEYOR
REGISTRATION NO. L-2765

NORTH CAROLINA PROFESSIONAL SEAL L-2765 LAND SURVEYOR CHARLES W. RUSHTON

PROPOSED DIVISION

MID-ATLANTIC INDUSTRIAL PARK

GASTON TOWNSHIP NORTHAMPTON COUNTY NORTH CAROLINA

OWNER: NORTHAMPTON COUNTY — ZONED

DATE 06/07/11 — DRAWN CWR — JOB NO. 11-037

SCALE 1" = 300' — SURVEYED REM — DWG NHAMP_300

REVISIONS 07/18/11: BOUNDARY ALONG POWERLINE — PIN 4000-84-2608

THOMPSON & ASSOCIATES
P.A.
(LIC. # C-0343)
1149 EXECUTIVE CIRCLE
SUITE D UNIT 2
CARY, NC 27511
(919) 465-1566
FAX (919) 465-1585

DIVISION OF AIR QUALITY
December 15, 2011

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 Revised Toxics Modeling Analysis – Enviva Pellets Northampton, LLC
Facility ID: 6600167
Gaston, NC Northampton County

I have reviewed the revised dispersion modeling analysis, received November 28, 2011, for the Enviva Pellets facility located in Northampton County, NC. The modeling was submitted as an addendum to a recent toxics analysis as part of the PSD permitting process and includes the evaluation of several toxics that were not previously included in EPA's emission factors for wood dryers. Those toxics whose rates are expected to exceed the levels outlined in NCAC 2Q .0700 were subsequently evaluated. The modeling adequately demonstrates compliance, on a source-by-source basis, for all toxics modeled.

Several toxics are emitted from the wood dryer, fire water pump, and emergency generator. Emission rates and stack parameters used in the modeling are provided in the attached tables.

AERMOD using the latest available year (1992) of meteorological data from Raleigh (surface) and Greensboro (upper air) was used to evaluate impacts in both simple and elevated terrain. 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's property line at 25-meter intervals and extended outward to a distance of approximately 2 kilometers at 100 meter spacing. The following table shows the maximum impact for each toxic:

Table 1.
Maximum Impacts
Enviva Pellets – Northampton County, NC

Pollutant	Averaging Period	% of AAL
Arsenic	Annual	4 %
Benzo(a) pyrene	Annual	<1 %
Cadmium	Annual	<1 %

…continued on following page…

Chlorine	24-hour	<1 %
Hexa.-p-dioxin	Annual	13 %
Hydrogen chloride	1-hour	<1 %
Mercury	24-hour	<1 %
Nickel	24-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

MODELING INPUTS

AERMOD ID	Stack Ht. (m)	Stack Temp. (K)	Stack Vel. (m/s)	Stack Diam. (m)
DRYER	30.48	349.82	20.58	2.26
FWPSTACK	2.13	785.37	109.18	0.08
EMERGEN	1.52	766.48	78.30	0.10

Pollutant	EG Emission Rate (g/s)	FWP Emission Rate (g/s)	Dryer Emission Rate (g/s)
Arsenic	0.000E+00	0.000E+00	4.164E-05
Benzo(a)pyrene	5.809E-08	4.979E-08	6.787E-05
Cadmium	0.000E+00	0.000E+00	7.760E-06
Chlorine	0.000E+00	0.000E+00	2.062E-02
Hexachlorodibenzo-p-dioxin	0.000E+00	0.000E+00	4.177E-05
Hydrogen Chloride	0.000E+00	0.000E+00	4.960E-02
Mercury	0.000E+00	0.000E+00	9.137E-05
Nickel	0.000E+00	0.000E+00	8.615E-04
Vinyl Chloride	0.000E+00	0.000E+00	4.699E-04

DIVISION OF AIR QUALITY
October 26, 2011

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 Modeling Analysis – Enviva Pellets Northampton, LLC
Gaston, NC Northampton County

Attached is a discussion of the modeling analysis for Enviva Pellets Northampton, LLC that was conducted in support of the construction and operation of a new facility near Gaston, NC. The modeling was conducted in accordance with current PSD directives and modeling guidance. A summary of the modeling results is presented in Table 7.

c: Jim Roller
Tom Anderson

ENVIVA PELLETS NORTHAMPTON LLC, PREVENTION OF SIGNIFICANT DETERIORATION (PSD) AIR DISPERSION MODELING ANALYSIS

Introduction

The PSD modeling analysis described in this section was conducted in accordance with current PSD directives and modeling guidance. Numerous references are made to the Draft October 1990 EPA New Source Review Workshop Manual, Prevention of Significant Deterioration and Nonattainment Area Permitting which will herein be referred to as the NSR Workshop Manual.

A summary of the modeling results is presented in the last topic, PSD Air Quality Modeling Results Summary. A detailed description of the modeling and modeling methodology is described below.

Project Description / Significant Emission Rate (SER) Analysis

Enviva Pellets Northampton, LLC (Enviva) plans to construct and operate a wood pellet manufacturing plant in Northampton County near Gaston, NC. Operations are expected to occur 24 hours per day, 7 days per week and 52 weeks per year. A facility-wide pollutant netting analysis was accomplished and documented in Table 3-1 of the Enviva permit application. Three pollutants were declared to exceed their PSD Significant Emission Rate (SER) and thus require a PSD analysis. These emission rates are provided in the table below.

Table 1 - Pollutant Netting Analysis

Pollutant	Annual Emission Rate tons/yr	Significant Emission Rate tons/yr
NO_x	**187.6**	40
PM_{10}	**36.8**	15
$PM_{2.5}$	**36.8**	15
TSP	**36.8**	15
SO_2	**22.7**	40
CO	**275.5**	100
VOC's	**261.3**	40

Preliminary Impact Air Quality Modeling Analysis

An air quality preliminary impact analysis was conducted for the pollutants exceeding the corresponding SER. The modeling results were then compared to applicable Significant Impact Levels (SILs) as defined in the NSR Workshop Manual to determine if a full impact air quality analysis would be required for that pollutant.

The Enviva facility will be located near Gaston, NC, in Northampton County. The facility area is in the northern coastal plain with terrain being predominantly flat and is generally agricultural, industrial, and forestland. For modeling purposes, the area, including and surrounding the site, is classified rural, based on the land use type scheme established by Auer 1978.

Enviva evaluated the pollutants' significant emissions using the EPA AERMOD model and five years (1988-1992) of National Weather Service (NWS) surface (Raleigh) and upper air (Greensboro) meteorological data. Full terrain elevations were included, as were normal regulatory defaults. Sufficient receptors were placed in ambient air beginning at the fenceline to establish maximum impacts. Emission rates for this specific project were used and the maximum impacts were then compared to the SIL. Since the results showed impacts above one or more of the SILs for PM_{10}, $PM_{2.5}$, and NO_2, further modeling was required for those pollutants. The SIL results are shown in Table 2.

Table 2 - Class II Significant Impact Results (ug/m^3)

Pollutant	Averaging Period	Facility maximum Impact	Class II Significant Impact Level
PM_{10}	annual	**1.84**	1
	24-hour	**11.48**	5
$PM_{2.5}$	annual	**1.33**	.3
	24-hour	**7.66**	1.2
CO	1-hour	522.25	2,000
	8-hour	195.61	500
NO_2	annual	**6.81**	1
	1-hour	**235.88**	10

Class II Area Full Impact Air Quality Modeling Analysis

A Class II Area NAAQS and PSD increment analysis was performed for PM_{10} $PM_{2.5}$, and NO_2 to include offsite source emissions and background concentrations (NAAQS). Enviva used AERMOD with the modeling methodology as described above. Off-site source inventories for both increment and NAAQS modeling were obtained from NCDAQ and then refined by Enviva using the NCDAQ approved "Q/D=20" guideline. For the PM_{10} and $PM_{2.5}$ NAAQS analysis, four offsite sources were included. The same offsite sources were used for the PM_{10} increment analysis; however, no offsite sources were included for the $PM_{2.5}$ increment analysis since Enviva is the only facility to trigger review for $PM_{2.5}$ since the established baseline date (October 20, 2010). For the NO_2 NAAQS analysis, 5 offsite sources were used; 5 offsite sources were also used for the increment analysis. These sources, along with their emission rates, are provided in the attachments.

Enviva used an appropriate array of receptors beginning at the declared fenceline and extending outward to 5 kilometers. PM_{10} background concentrations were taken from the Raleigh PM_{10} monitoring station. The Edgecombe County monitor was used for $PM_{2.5}$ background concentrations. NO_2 background concentrations were taken from the Charlotte NO_2 monitoring station. The modeling results are shown in Table 3 and indicate compliance with the NAAQS for PM_{10}, $PM_{2.5}$, and NO_2.

Table 3 - Class II Area NAAQS Modeling Results

Pollutant	Averaging Period	Maximum Onsite & Offsite Source Impacts (ug/m^3)	Background Concentration (ug/m3)	Total Impact (ug/m3)	NAAQS (ug/m3)	% NAAQS
PM_{10}	24-hour	8.33	25	33.33	150	22
$PM_{2.5}$	24-hour	7.88	17	24.88	35	71
	annual	2.38	8.6	10.98	15	73
NO_2	1-hour	115.01	35.8	150.81	188	80
	annual	4.35	5.2	9.55	100	10

In the CLASS II increment analysis, Enviva used the same onsite sources, fenceline, and receptors as in the NAAQS analysis. The emission rates modeled are provided in the attachments. The Class II Area increment modeling results are shown in Table 4 and indicate compliance with the Class II Area increments.

Table 4 - Class II Area PSD Increment Modeling Results

Pollutant	Averaging Period	Maximum Onsite & Offsite Source Impacts (ug/m^3)	PSD Increment (ug/m3)	% Increment
PM_{10}	24-hour	8.33	30	28
	annual	2.23	17	14
$PM_{2.5}$	24-hour	8.12	9	90
	annual	1.39	4	35
NO_2	annual	4.35	25	17

Non Regulated Pollutant Impact Analysis (North Carolina Toxics)

Enviva also modeled TSP and four toxics using AERMOD with the same receptor array and meteorology as used in the NAAQS analysis. A list of the facility sources and emission rates used are attached to this document. All pollutants demonstrated compliance on a source-by-source basis with the NC's AAQS or Acceptable Ambient Level (AAL). The maximum concentrations as shown in Table 5 occurred along the fenceline.

Table 5 – Non-Regulated Pollutants Modeling Results

Pollutant	Averaging Period	Max Facility Impact (µg/m3)	AAQS (µg/m3)	AAL (µg/m3)	Percent of AAL
TSP	annual	1.84	75	n/a	2
	24-hr	11.48	150	n/a	8
Acrolein	1-hour	0.98	n/a	80	1
Benzene	annual	0.014	n/a	0.12	12
Formaldehyde	1-hour	5.96	n/a	150	4
Phenol	1-hour	1.19	n/a	950	< 1

Additional Impacts Analysis

Additional impact analyses were conducted for growth, soils and vegetation, and visibility impairment.

Growth Impacts

Enviva is expected to employ approximately 62 full-time people, most of which are expected to come from the existing local population. Therefore, this project is not expected to cause a significant increase in growth in the area.

Soils and Vegetation

The facility is located in the northern coastal plain of North Carolina. The local geography is flat with a mix of forests, agricultural crops, and herbaceous vegetation. By way of the NAAQS analyses of this submission, Enviva demonstrated that the impacts were below the established standards – both the primary and secondary NAAQS. The impacts were also below EPA established thresholds for soil and vegetation effects (described in detail in Table 5-4 of the modeling report). Thus, the Enviva project is not expected to cause any detrimental impacts to soils or vegetation in the area.

CLASS II Visibility Impairment Analysis

A Class II visibility impairment analysis was not conducted since there are not any visibility sensitive areas with the Class II Significant Impact Area.

Class I Area - Additional Requirements

There are three Federal Class I Areas within 300 km of the Enviva project – Swanquarter NWR, James River Face Wilderness, and Shenandoah National Park. The Federal Land Manager for each of those areas was contacted and none of them required any analysis; therefore, no analysis was conducted by the applicant.

CLASS 1 SIL Analysis

AERMOD was also used to estimate impacts for the Class 1 SIL analysis. Even though the distance to the closest Class 1 area, Swanquarter NWR, exceeds 50 km, the threshold distance at which a long-range transport model is typically used, receptors were conservatively placed at 50 km

from the Enviva facility. NO_2 and PM_{10} modeled below the EPA-established, CLASS 1 SILs, and thus no CLASS 1 increment modeling was required. Table 6 provides the results of SIL modeling.

Table 6 - Class 1 Significant Impact Results (ug/m^3)

Pollutant	Averaging Period	Max. Impact at 50 km	EPA SIL	% SIL
NO_2	Annual	0.011	0.1	11
PM_{10}	24-hr	0.224	0.32	70
	Annual	0.007	0.16	4

PSD Air Quality Modeling Result Summary

Based on the PSD air quality ambient impact analysis performed the proposed Hertford Renewable Energy, LLC project will not cause or contribute to any violation of the Class 1I NAAQS, PSD increments, Class 1 Increments, or any FLM AQRVs. A summary of the modeling results is presented in Table 7.

Note: Tables follow below.

TABLE 7 – Enviva Pellets Northampton, LLC PSD AIR QUALITY MODELING RESULTS

SER Evaluation

Pollutant	Annual E/R (Tons)	SER (Tons/yr)
NO_x	**187.6**	40
PM_{10}	**36.8**	15
$PM_{2.5}$	**36.8**	15
TSP	**36.8**	15
SO_2	**22.7**	40
CO	**275.5**	100
VOC's	**261.3**	40

Class II Area SIL Analysis

Pollutant	Averaging Period	Maximum Impact (ug/m^3)	SIL (ug/m^3)	SIL Exceeded
PM_{10}	annual	**1.84**	1	Yes
	24-hour	**11.48**	5	Yes
$PM_{2.5}$	annual	**1.33**	.3	Yes
	24-hour	**7.66**	1.2	Yes
CO	1-hour	522.25	2,000	No
	8-hour	195.61	500	No
NO_2	annual	**6.81**	1	Yes
	1-hour	**235.88**	10	Yes

Class II NAAQS Analysis

Pollutant	Averaging Period	Maximum Onsite & Offsite Source Impacts (ug/m^3)	Back Ground Conc (ug/m^3)	Total Impact (ug/m^3)	NAAQS (ug/m^3)	% NAAQS
PM_{10}	24-hour	8.33	25	33.33	150	22
$PM_{2.5}$	24-hour	7.88	17	24.88	35	71
	annual	2.38	8.6	10.98	15	73
NO_2	1-hour	115.01	35.8	150.81	188	80
	annual	4.35	5.2	9.55	100	10

Class II Increment Analysis						
Pollutant	**Averaging Period**	**Maximum Onsite & Offsite Source Impacts (µg/m3)**	**PSD Increment (µg/m3)**	**% Increment**		
PM_{10}	24-hour	8.33	30	28		
	annual	2.23	17	14		
$PM_{2.5}$	annual	8.12	9	90		
	24-hour	1.39	4	35		
NO_2	annual	4.35	25	17		

Class I Area SIL Analysis							
Pollutant	**Averaging Period**	**Max. Impact at 50 km**	**EPA SIL**	**% SIL**			
NO_2	annual	0.011	0.1	11			
PM_{10}	24-hr	0.224	0.32	70			
	annual	0.007	0.16	4			

Non-Regulated Pollutant Analysis					
Pollutant	**Averaging Period**	**Max Facility Impact (µg/m3)**	**AAQS (µg/m3)**	**AAL (µg/m3)**	**Percent of AAL**
TSP	annual	1.84	75	n/a	2
	24-hr	11.48	150	n/a	8
Acrolein	1-hour	0.98	n/a	80	1
Benzene	annual	0.014	n/a	0.12	12
Formaldehyde	1-hour	5.96	n/a	150	4
Phenol	1-hour	1.19	n/a	950	< 1

TABLE 4-2. MODELED STACK PARAMETERS

Source ID	Stack Height (m)	Stack Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
EP1	36.58	316.48	20.32	1.50
EP2	30.48	310.93	20.32	1.85
EP3	9.14	305.37	4.04	0.61
EP4	1.52	766.48	78.30	0.10
EP5	2.13	785.37	109.18	0.08
EP6	30.48	349.82	20.58	2.26

TABLE 4-1. MODELED SOURCE LOCATIONS AND EMISSION RATES

Model ID	Description	UTM-E (m)	UTM-N (m)	Elevation (m)	Modeled Emission Rates PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NO_x (g/s)	CO (g/s)
EP1	Pellet Cooler Cyclone Stack	265,626.6	4,042,938.7	45.9	1.78E+00	9.80E-01	0.00E+00	0.00E+00
EP2	Coarse Hammermill Area BH	265,715.6	4,042,945.9	45.5	6.35E-01	6.35E-01	0.00E+00	0.00E+00
EP3	Pellet Press Silo	265,650.4	4,042,914.8	46.1	1.35E-02	1.35E-02	0.00E+00	0.00E+00
EP4	EmGen	265,742.7	4,042,835.8	46.7	1.45E-02	1.45E-02	1.45E-01	2.54E-01
EP5	FirePump	265,641.7	4,042,821.7	46.4	1.24E-02	1.24E-02	1.24E-01	2.18E-01
EP6	Dryer WESP Stack	265,722.0	4,042,868.5	46.7	1.14E+00	1.14E+00	6.00E+00	8.99E+00

Cary Corporate Parkway | Suite 310 | Morrisville, NC 27560 | P (919) 462-9693 | F (919) 462-9694
trinityconsultants.com

Trinity Consultants

November 18, 2011

Mr. John Evans
North Carolina Division of Air Quality (NC DAQ)
217 West Jones Street
Raleigh, NC 27603

RE: Permit Application Addendum
Enviva Pellets Northampton, LLC

Dear Mr. Name:

Dear Mr. Evans:

Enviva Pellets Northampton, LLC (Enviva) submitted a construction and operating permit application on August 21, 2011. This letter provides revised toxic air pollutant (TAP) emission rate calculations for the wood dryer and corresponding air dispersion modeling, as well as an update to greenhouse gas (GHG) calculations for the wood dryer.

REVISED EMISSIONS ESTIMATES

Originally, TAP and HAP emissions estimates for the direct-fired wood chip dryer were estimated using AP-42 emission factors for wood dryers that ostensibly should have included combustion by-products because the factors were identified as being applicable to direct contact, wood fired dryers. However during recent review of the calculations, we noticed that a number of TAPs and HAPs included in Section 1.6 of AP-42 (wood combustion) were not present in EPA's emission factors for wood dryers. Since it is reasonable to assume that these additional compounds would be present in the dryer exhaust, we have updated the emissions calculations for the dryer accordingly.

During a recent review of the calculation spreadsheets for the project, we discovered that a late change in dryer heat input to 207 MM Btu/hr was not updated in the GHG emissions calculations for the wood dryer.

Revised emission estimates are provided in Attachment 1. It should be noted that facility-wide emissions remain well below the HAP major source thresholds.

AIR DISPERSION MODELING

As presented in the updated emissions estimates in Attachment 1, the following additional TAPs were added to the calculations for the dryer and result in facility-wide emissions that

exceed the TPERs: arsenic, benzo(a)pyrene, cadmium, chlorine, hexachlorodibenzo-p-dioxin, hydrogen chloride, mercury, nickel, and vinyl chloride.

AERMOD air dispersion modeling for TAPs exceeding the TPERs were conducted in accordance with NCDAQ modeling guidelines. Please note that air dispersion modeling for TAPs provided in the initial permit application remain unchanged.

All TAPs were modeled using each source's respective emission rate.

Modeling results indicate ambient concentrations well below the AALs. Since all concentrations fall below 50 percent of the AAL, only a single year (1992) of meteorological data was used. A summary of modeling parameters, a summary of modeling results, and a completed copy of the air dispersion modeling checklist are provided in Attachment 2.

CLOSING

Enviva would greatly appreciate prompt processing of this application. Feel free to contact me at 919-462-9693 or Glenn Gray of Enviva at 804-412-0227 with any questions or comments.

Sincerely,

TRINITY CONSULTANTS

Joe W. Sullivan

Joe Sullivan, PE, CM
Managing Consultant

cc: Glenn Gray (Enviva)

Attachments

ATTACHMENT 1

Updated Emissions Calculations

TABLE 3-1
PSD APPLICABILITY SUMMARY
ENVIVA PELLETS NORTHAMPTON, LLC

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	275.50	187.63	36.79	36.79	36.79	22.67	356.25	187,561.92
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	-	-	15.02	15.02	15.02	-	-	-
Hammermills Area Filter	ES-HMA	-	-	7.04	7.04	7.04	-	-	-
Pellet Mill Feed Silo	ES-PMFS	-	-	0.47	0.47	0.47	-	-	-
Pellet Coolers	ES-CLR	-	-	61.95	61.95	61.95	-	-	-
Log Debarking/Chipping	ES-CHIP-1	-	-	-	-	-	-	1.25	-
Diesel Storage Tanks	TK1 & TK2	-	-	-	-	-	-	3.79E-03	-
	Total Project Emission Increases	**276.44**	**188.69**	**121.31**	**121.31**	**121.31**	**22.67**	**357.51**	**187,734.71**
	PSD Significant Emission Rates	**100**	**40**	**25**	**10**	**15**	**40**	**40**	**100,000**
	PSD Review Required?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**

TABLE 3-2
FACILITYWIDE HAP EMISSIONS SUMMARY
ENVIVA PELLETS NORTHAMPTON, LLC

Description	ES-DRYER (tpy)	ES-EG (tpy)	ES-FWP (tpy)	ES-CHIP-1 (tpy)	Total (tpy)
1,3-Butadiene	-	2.39E-05	2.05E-05	-	4.45E-05
Acetaldehyde	2.60E+00	4.70E-04	4.03E-04	-	2.60
Acetophenone	2.90E-06	-	-	-	0.00
Acrolein	7.97E-01	5.67E-05	4.86E-05	-	0.80
Antimony & Compounds	5.19E-04	-	-	-	0.00
Arsenic & Compounds	1.45E-03	-	-	-	0.00
Benzene	2.63E-01	5.71E-04	4.90E-04	-	0.26
Beryllium metal (un-reacted) (Also include in BEC)	7.23E-05	-	-	-	0.00
Cadmium Metal (elemental un-reacted) -(Add w/CDC)	2.70E-04	-	-	-	0.00
Carbon tetrachloride	4.08E-02	-	-	-	0.04
Chlorine	7.16E-01	-	-	-	0.72
Chlorobenzene	2.99E-02	-	-	-	0.03
Chromium-Other compds (add w/chrom acid to get CRC)	1.15E-03	-	-	-	0.00
Cobalt compounds	4.27E-04	-	-	-	0.00
Chloroform	3.47E-03	-	-	-	3.47E-03
Cumene	6.93E-02	-	-	-	0.07
Dinitrophenol, 2,4-	1.63E-04	-	-	-	0.00
Di(2-ethylhexyl)phthalate (DEHP)	4.26E-05	-	-	-	0.00
Ethyl benzene	2.81E-02	-	-	-	0.03
Ethylene dichloride (1,2-dichloroethane)	2.63E-02	-	-	-	0.03
Formaldehyde	4.85E+00	7.23E-04	6.20E-04	-	4.85
Hydrogen chloride (hydrochloric acid)	1.72E+00	-	-	-	1.72
Lead and Lead compounds	3.16E-03	-	-	-	0.00
m-,p-Xylene	1.66E-01	1.75E-04	1.50E-04	-	0.17
Manganese & compounds	1.05E-01	-	-	-	0.11
Mercury, vapor (Include in Mercury&Compds)	3.17E-03	-	-	-	0.00
Methanol	3.81E+00	-	-	0.24	3.81
Methyl bromide (bromomethane)	1.36E-02	-	-	-	0.01
Methyl chloride (chloromethane)	2.09E-02	-	-	-	0.02
Methyl chloroform (1,1,1 trichloroethane)	2.81E-02	-	-	-	0.03
Methyl isobutyl ketone	2.39E-01	-	-	-	0.24
Methylene chloride	6.24E-02	-	-	-	0.06
Nickel metal (Component of Nickel & Compounds)	2.99E-02	-	-	-	0.03
o-Xylene	1.56E-02	-	-	-	0.02
Pentachlorophenol	4.62E-05	-	-	-	0.00
Perchloroethylene (tetrachloroethylene)	3.45E-02	-	-	-	0.03
Phenol	9.71E-01	-	-	-	0.97
Phosphorus Metal, Yellow or White	2.45E-02	-	-	-	0.02
Polychlorinated biphenyls	7.39E-06	-	-	-	0.00
Propionaldehyde	4.51E-01	-	-	-	0.45
Propylene dichloride (1,2 dichloropropane)	2.99E-02	-	-	-	0.03
Selenium compounds	2.54E-03	-	-	-	0.00
Styrene	1.25E-02	-	-	-	0.01
Toluene	4.51E-01	2.51E-04	2.15E-04	-	0.45
Total PAH (POM)	1.13E-01	1.03E-04	8.82E-05	-	1.14E-01
Trichloroethylene	2.72E-02	-	-	-	0.03
Trichlorophenol, 2,4,6-	1.99E-05	-	-	-	0.00
Vinyl chloride	1.63E-02	-	-	-	0.02
TOTAL HAP	**17.74**	**2.37E-03**	**2.03E-03**	**0.24**	**17.75**

TABLE 3-3
DETERMINATION OF POLLUTANTS SUBJECT TO AIR TOXICS PERMITTING
ENVIVA PELLETS NORTHAMPTON, LLC

TAP Emissions

Description		Dryer			Emergency Generator			Fire Water Pump			Total		
Pollutant	CAS Number	(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	106-99-0			0.00E+00			4.79E-02			4.11E-02			8.90E-02
Acetaldehyde	75-07-0	4.61E+00			1.88E-03			1.61E-03			4.62E+00		
Acrolein	107-02-8	1.41E+00			2.27E-04			1.94E-04			1.41E+00		
Arsenic				2.89E+00									2.89E+00
Benzene	71-43-2			5.27E+02			1.14E+00			9.80E-01			5.29E+02
Benzo(a)pyrene	50-32-8			4.71E+00			2.30E-04			1.97E-04			4.72E+00
Beryllium				1.45E-01									1.45E-01
Cadmium				5.39E-01									5.39E-01
Carbon Tetrachloride				8.16E+01									8.16E+01
Chlorine		1.64E-01	3.92E+00								1.64E-01	3.92E+00	
Chlorobenzene			1.64E-01									1.64E-01	
Chloroform	67-66-3			6.93E+00									6.93E+00
Chromic acid (Chromium VI)	7738-94-5	5.25E-05	1.26E-03	4.60E-01								1.26E-03	
Di(2-ethylhexyl)phthalate (DEHP)			2.33E-04									2.33E-04	
Ethylene dichloride (1,2-dichloroethane)				5.26E+01									5.26E+01
Formaldehyde	50-00-0	8.61E+00			2.89E-03			2.48E-03			8.62E+00		
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8				2.90E+00									2.90E+00
Hydrogen chloride (hydrochloric acid)		3.93E-01									3.93E-01		
Manganese & compounds			5.76E-01									5.76E-01	
Mercury, vapor (Include in Mercury&Compds)			1.74E-02									1.74E-02	
Methyl chloroform (1,1,1 trichloroethane)		6.42E-03	1.54E-01								6.42E-03	1.54E-01	
Methyl ethyl ketone		1.12E-03	2.68E-02								1.12E-03	2.68E-02	
Xylene	1330-20-7	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	108-10-1	4.24E-01	1.02E+01								4.24E-01	1.02E+01	
Methylene chloride	75-09-2	1.11E-01		1.25E+02							1.11E-01		1.25E+02
Nickel metal (Component of Nickel & Compounds)			1.64E-01									1.64E-01	
Pentachlorophenol		1.06E-05	2.53E-04								1.06E-05	2.53E-04	
Perchloroethylene (tetrachloroethylene)				6.89E+01									6.89E+01
Phenol	108-95-2	1.72E+00									1.72E+00		
Polychlorinated biphenyls				1.48E-02									1.48E-02
Styrene	100-42-5	2.21E-02									2.21E-02		
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-				1.56E-05									1.56E-05
Toluene	108-88-3		1.92E+01			2.40E-02			2.06E-02			1.92E+01	
Trichloroethylene				5.44E+01									5.44E+01
Trichlorofluoromethane (CFC 111)		8.49E-03									8.49E-03		
Vinyl chloride				3.26E+01									3.26E+01

TPER Comparison Table

Pollutant	CAS Number	Total			TPER (2Q .0711)			Modeling Required?
		(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	
1,3-Butadiene	106-99-0			8.90E-02			1.10E+01	No
Acetaldehyde	75-07-0	4.62E+00			6.80E+00			No
Acrolein	107-02-8	1.41E+00			2.00E-02			Yes
Arsenic				2.89E+00			1.60E-02	Yes
Benzene	71-43-2			5.29E+02			8.10E+00	Yes
Benzo(a)pyrene	50-32-8			4.72E+00			2.20E+00	Yes
Beryllium				1.45E-01			2.80E-01	No
Cadmium				5.39E-01			3.70E-01	Yes
Carbon Tetrachloride				8.16E+01			4.60E+02	No
Chlorine		1.64E-01	3.92E+00		2.30E-01	7.90E-01		Yes
Chlorobenzene			1.64E-01			4.60E+01		No
Chloroform	67-66-3			6.93E+00			2.90E+02	No
Chromic acid (Chromium VI)	7738-94-5		1.26E-03			1.30E-02		No
Di(2-ethylhexyl)phthalate (DEHP)			2.33E-04			6.30E-01		No
Ethylene dichloride (1,2-dichloroethane)				5.26E+01			2.60E+02	No
Formaldehyde	50-00-0	8.62E+00			4.00E-02			Yes
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8				2.90E+00			5.10E-03	Yes
Hydrogen chloride (hydrochloric acid)		3.93E-01			1.80E-01			Yes
Manganese & compounds			5.76E-01			6.30E-01		No
Mercury, vapor (Include in Mercury&Compds)			1.74E-02			1.30E-02		Yes
Methyl chloroform (1,1,1 trichloroethane)		6.42E-03	1.54E-01		6.40E+01	2.50E+02		No
Methyl ethyl ketone		1.12E-03	2.68E-02		2.24E+01	7.80E+01		No
Xylene	1330-20-7	3.24E-01	7.78E+00		1.64E+01	5.70E+01		No
Methyl isobutyl ketone	108-10-1	4.24E-01	1.02E+01		7.60E+00	5.20E+01		No
Methylene chloride	75-09-2	1.11E-01		1.25E+02	3.90E-01		1.60E+03	No
Nickel metal (Component of Nickel & Compounds)			1.64E-01			1.30E-01		Yes
Pentachlorophenol		1.06E-05	2.53E-04		6.40E-03	6.30E-02		No
Perchloroethylene (tetrachloroethylene)				6.89E+01			1.30E+04	No
Phenol	108-95-2	1.72E+00			2.40E-01			Yes
Polychlorinated biphenyls				1.48E-02			5.60E+00	No
Styrene	100-42-5	2.21E-02			2.70E+00			No
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-				1.56E-05			2.00E-04	No
Toluene	108-88-3		1.92E+01			9.80E+01		No
Trichloroethylene				5.44E+01			4.00E+03	No
Trichlorofluoromethane (CFC 111)		8.49E-03			1.40E+02			No
Vinyl chloride				3.26E+01			2.60E+01	Yes

Rotary Dryer - Criteria Pollutant Emissions

Dryer Inputs

Dryer Throughput (@ Dryer Exit)	527,778	tons/year @ 10% 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	207.0	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	1.16	lb/ODT	Calculated from Guaranteed WESP Specifications[1]	71.34	275.5
NO_X	0.79	lb/ODT	Calculated from Guaranteed WESP Specifications[1]	48.59	187.6
$PM/PM_{10}/PM_{2.5}$ Condensible Fraction	0.017	lb/MMBtu	AP-42, Section 1.6[2]	3.52	15.4
TSP (Filterable)	0.090	lb/ODT	Calculated from Guaranteed WESP Specifications[1]	5.54	21.4
Total TSP (Filterable + Condensible)				9.05	36.8
PM_{10} (Filterable)	0.090	lb/ODT	Calculated from Guaranteed WESP Specifications[1]	5.54	21.4
Total PM_{10} (Filterable + Condensible)				9.05	36.8
$PM_{2.5}$ (Filterable)	0.090	lb/ODT	Calculated from Guaranteed WESP Specifications[1]	5.54	21.4
Total $PM_{2.5}$ (Filterable + Condensible)				9.05	36.8
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6[3]	5.18	22.7
VOC	1.50	lb/ODT	Calculated from Guaranteed WESP Specifications[1]	92.25	356.3
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] The vendor only provided the filterable fraction of particulate matter in the emission factors. The condensible fraction of particulate matter from a rotary dryer controlled by a WESP is not provided in AP-42, Section 10.6.2. 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.

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

Calculation Inputs:

Dryer Throughput (Ton/yr)	527,778
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
Chromic Acid (Chromium VI)	7738-94-5	Yes	Yes								
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)	207.00
Operating Schedule (hrs/yr)	8,760
Heat Input (MMBtu/yr)	1,813,320
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	6.62E-07	6.62E-07	6.62E-07	5.80E-03	0.00	6.62E-07	5.80E-03	0.00
Antimony & Compounds	HAP	7.90E-06	5.73E-07	1, 2	1.64E-03	1.19E-04	1.64E-03	1.43E+01	0.01	1.19E-04	1.04E+00	0.00
Arsenic & Compounds	TAP/HAP	2.20E-05	1.60E-06	1, 2	4.55E-03	3.30E-04	4.55E-03	3.99E+01	0.02	3.30E-04	2.89E+00	0.00
Benzo(a)pyrene	TAP/HAP	2.60E-06	2.60E-06	1	5.38E-04	5.38E-04	5.38E-04	4.71E+00	0.00	5.38E-04	4.71E+00	0.00
Beryllium metal (un-reacted) (Also include in BEC)	TAP/HAP	1.10E-06	7.98E-08	1, 2	2.28E-04	1.65E-05	2.28E-04	1.99E+00	0.00	1.65E-05	1.45E-01	0.00
Cadmium Metal (elemental un-reacted) –(Add w/CDC)	TAP/HAP	4.10E-06	2.97E-07	1, 2	8.49E-04	6.15E-05	8.49E-04	7.43E+00	0.00	6.15E-05	5.39E-01	0.00
Carbon tetrachloride	TAP/HAP	4.50E-05	4.50E-05	1	9.32E-03	9.32E-03	9.32E-03	8.16E+01	0.04	9.32E-03	8.16E+01	0.04
Chlorine	TAP/HAP	7.90E-04	7.90E-04	1	1.64E-01	1.64E-01	1.64E-01	1.43E+03	0.72	1.64E-01	1.43E+03	0.72
Chlorobenzene	TAP/HAP	3.30E-05	3.30E-05	1	6.83E-03	6.83E-03	6.83E-03	5.98E+01	0.03	6.83E-03	5.98E+01	0.03
Chromic acid (Chromium VI)	TAP[4]	3.50E-06	2.54E-07	1, 2	7.25E-04	5.25E-05	7.25E-04	6.35E+00	0.00	5.25E-05	4.60E-01	0.00
Chromium-Other compds (add w/chrom acid to get CRC)	HAP	1.75E-05	1.27E-06	1, 2	3.62E-03	2.63E-04	3.62E-03	3.17E+01	0.02	2.63E-04	2.30E+00	0.00
Cobalt compounds	HAP	6.50E-06	4.71E-07	1, 2	1.35E-03	9.75E-05	1.35E-03	1.18E+01	0.01	9.75E-05	8.55E-01	0.00
Dinitrophenol, 2,4-	HAP	1.80E-07	1.80E-07	1	3.73E-05	3.73E-05	3.73E-05	3.26E-01	0.00	3.73E-05	3.26E-01	0.00
Di(2-ethylhexyl)phthalate (DEHP)	TAP/HAP	4.70E-08	4.70E-08	1	9.73E-06	9.73E-06	9.73E-06	8.52E-02	0.00	9.73E-06	8.52E-02	0.00
Ethyl benzene	HAP	3.10E-05	3.10E-05	1	6.42E-03	6.42E-03	6.42E-03	5.62E+01	0.03	6.42E-03	5.62E+01	0.03
Ethylene dichloride (1,2-dichloroethane)	TAP/HAP	2.90E-05	2.90E-05	1	6.00E-03	6.00E-03	6.00E-03	5.26E+01	0.03	6.00E-03	5.26E+01	0.03
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8	TAP	1.60E-06	1.60E-06	1	3.31E-04	3.31E-04	3.31E-04	2.90E+00	0.00	3.31E-04	2.90E+00	0.00
Hydrogen chloride (hydrochloric acid)	TAP/HAP	1.90E-02	1.90E-03	1, 3	3.93E+00	3.93E-01	3.93E+00	3.45E+04	17.23	3.93E-01	3.45E+03	1.72
Lead and Lead compounds	HAP	4.80E-05	3.48E-06	1, 2	9.94E-03	7.20E-04	9.94E-03	8.70E+01	0.04	7.20E-04	6.31E+00	0.00
Manganese & compounds	TAP/HAP	1.60E-03	1.16E-04	1, 2	3.31E-01	2.40E-02	3.31E-01	2.90E+03	1.45	2.40E-02	2.10E+02	0.11
Mercury, vapor (Include in Mercury&Compds)	TAP/HAP	3.50E-06	2.54E-07	1, 2	7.25E-04	5.25E-05	7.25E-04	6.35E+00	0.00	7.25E-04	6.35E+00	0.00
Methyl bromide (bromomethane)	HAP	1.50E-05	1.50E-05	1	3.11E-03	3.11E-03	3.11E-03	2.72E+01	0.01	3.11E-03	2.72E+01	0.01
Methyl chloride (chloromethane)	HAP	2.30E-05	2.30E-05	1	4.76E-03	4.76E-03	4.76E-03	4.17E+01	0.02	4.76E-03	4.17E+01	0.02
Methyl chloroform (1,1,1 trichloroethane)	TAP/HAP	3.10E-05	3.10E-05	1	6.42E-03	6.42E-03	6.42E-03	5.62E+01	0.03	6.42E-03	5.62E+01	0.03
Methyl ethyl ketone	TAP/HAP	5.40E-06	5.40E-06	1	1.12E-03	1.12E-03	1.12E-03	9.79E+00	0.00	1.12E-03	9.79E+00	0.00
Naphthalene	HAP	9.70E-05	9.70E-05	1	2.01E-02	2.01E-02	2.01E-02	1.76E+02	0.09	2.01E-02	1.76E+02	0.09
Nickel metal (Component of Nickel & Compounds)	TAP/HAP	3.30E-05	2.39E-06	1, 2	6.83E-03	4.95E-04	6.83E-03	5.98E+01	0.03	6.83E-03	5.98E+01	0.03
Nitrophenol, 4-	HAP	1.10E-07	1.10E-07	1	2.28E-05	2.28E-05	2.28E-05	1.99E-01	0.00	2.28E-05	1.99E-01	0.00
Pentachlorophenol	TAP/HAP	5.10E-08	5.10E-08	1	1.06E-05	1.06E-05	1.06E-05	9.25E-02	0.00	1.06E-05	9.25E-02	0.00
Perchloroethylene (tetrachloroethylene)	TAP/HAP	3.80E-05	3.80E-05	1	7.87E-03	7.87E-03	7.87E-03	6.89E+01	0.03	7.87E-03	6.89E+01	0.03
Phosphorus Metal, Yellow or White	HAP	2.70E-05	1.96E-06	1, 2	5.59E-03	4.05E-04	5.59E-03	4.90E+01	0.02	5.59E-03	4.90E+01	0.02
Polychlorinated biphenyls	TAP/HAP	8.15E-09	8.15E-09	1	1.69E-06	1.69E-06	1.69E-06	1.48E-02	0.00	1.69E-06	1.48E-02	0.00
Polycyclic Organic Matter	HAP	1.25E-04	1.25E-04	1	2.59E-02	2.59E-02	2.59E-02	2.27E+02	0.11	2.59E-02	2.27E+02	0.11
Propylene dichloride (1,2 dichloropropane)	HAP	3.30E-05	3.30E-05	1	6.83E-03	6.83E-03	6.83E-03	5.98E+01	0.03	6.83E-03	5.98E+01	0.03
Selenium compounds	HAP	2.80E-06	2.03E-07	1, 2	5.80E-04	4.20E-05	5.80E-04	5.08E+00	0.00	5.80E-04	5.08E+00	0.00
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	TAP/HAP	8.60E-12	8.60E-12	1	1.78E-09	1.78E-09	1.78E-09	1.56E-05	0.00	1.78E-09	1.56E-05	0.00
Trichloroethylene	TAP/HAP	3.00E-05	3.00E-05	1	6.21E-03	6.21E-03	6.21E-03	5.44E+01	0.03	6.21E-03	5.44E+01	0.03
Trichlorofluoromethane (CFC 111)	TAP	4.10E-05	4.10E-05	1	8.49E-03	8.49E-03	8.49E-03	7.43E+01	0.04	8.49E-03	7.43E+01	0.04
Trichlorophenol, 2,4,6-	HAP	2.20E-08	2.20E-08	1	4.55E-06	4.55E-06	4.55E-06	3.99E-02	0.00	4.55E-06	3.99E-02	0.00
Vinyl chloride	TAP/HAP	1.80E-05	1.80E-05	1	3.73E-03	3.73E-03	3.73E-03	3.26E+01	0.02	3.73E-03	3.26E+01	0.02

[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.

Potential GHG Emissions

Operating Data:

Dryer Heat Input	207.00 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	9.38E+01	3.20E-02	4.20E-03	187,490	64	8	187,562
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.

ATTACHMENT 2

Air Dispersion Modeling

North Carolina Modeling Protocol Checklist

The North Carolina Modeling Protocol Checklist may be used in lieu of developing the traditional written modeling plan for North Carolina toxics and criteria pollutant modeling. The protocol checklist is designed to provide the same level of information as requested in a modeling protocol as discussed in Chapter 2 of the ***Guideline for Evaluating the Air Quality Impacts of Toxic Pollutants in North Carolina.*** The modeling protocol checklist is submitted with the modeling analysis.

Although most of the information requested in the modeling protocol checklist is self explanatory, additional comments are provided, where applicable, and are discussed in greater detail in the toxics modeling guidelines referenced above. References to sections, tables, figures, appendices, etc., in the protocol checklist are found in the toxics modeling guidelines.

INSTRUCTIONS: The modeling report supporting the compliance demonstration should include most of the information listed below. As appropriate, answer the following questions or indicate by check mark the information provided or action taken is reflected in your report.

FACILITY INFORMATION	
Name: Enviva Pellets Northampton, LLC **Facility ID:** New Facility - TBD **Address:** Lebanon Church Road (Street Number TBD)	**Consultant (if applicable):** Trinity Consultants One Copley Parkway Suite 310 Morrisville, NC 27560
Contact Name: Glenn Gray	**Contact Name:** Joe Sullivan
Phone Number: (804) 412-0227 **Email:** Glenn.Gray@intrinergy.com	**Phone Number:** (919) 462-9693 **Email:** jhill@trinityconsultants.com

GENERAL	
Description of New Source or Source / Process Modification: provide a short description of the new or modified source(s) and a brief discussion of how this change affects facility production or process operation.	X
Source / Pollutant Identification: provide a table of the affected pollutants, by source, which identifies the source type (point, area, or volume), maximum pollutant emission rates over the applicable averaging period(s), and, for point sources, indicate if the stack is capped or non-vertical (C/N).	X
Pollutant Emission Rate Calculations: indicate how the pollutant emission rates were derived (e.g., AP-42, mass balance, etc.) and where applicable, provide the calculations.	X
Site / Facility Diagram: provide a diagram or drawing showing the location of all existing and proposed emission sources, buildings or structures, public right-of-ways, and the facility property (toxics) / fence line (criteria pollutants) boundaries. The diagram should also include a scale, true north indicator, and the UTM or latitude/longitude of at least one point.	X
Certified Plat or Signed Survey: a certified plat (map) from the County Register of Deeds or a signed survey must be submitted to validate property boundaries modeled.	SS
Topographic Map: A topographic map covering approximately 5km around the facility must be submitted. The facility boundaries should be annotated on the map as accurately as possible.	X
Cavity Impact Analysis: If using SCREEN3, a cavity impact analysis must be conducted for all structures with a region of influence extending to one or more sources modeled to determine if cavity regions extend off property (toxics) or beyond the fence line (criteria pollutants). No separate cavity analysis is required if using AERMOD. *See Section 4.2*	N/A

GENERAL (continued)	
Background Concentrations (criteria pollutant analyses only): Background concentrations must be determined for each pollutant for each averaging period evaluated. The averaged background value used (e.g., high, high-second-high, high-third-high, etc.) is based on the pollutant and averaging period evaluated. The background concentrations are added to the modeled concentrations, which are then compared to the applicable air quality standard to determine compliance.	N/A
Offsite Source Inventories (criteria pollutant analyses only): Offsite source inventories must be developed and modeled for all pollutants for which onsite sources emissions are modeled in excess of the specific pollutant significant impact levels (SILs) as defined in the PSD New Source Review Workshop Manual. The DAQ AQAB must approve the inventories. An initial working inventory can be requested from the AQAB.	N/A

SCREEN LEVEL MODELING	
Model: The latest version of the SCREEN3 model must be used until AERSCREEN is developed and approved. The use of other screening models should be approved by NCDAQ prior to submitting the modeling report.	N/A
Source / Source emission parameters: Provide a table listing the sources modeled and the applicable source emission parameters. *See NC Form 3 – Appendix A.*	N/A
Merged Sources: Identify merged sources and show all appropriate calculations. *See Section 3.3*	N/A
GEP Analysis: SCREEN3 – for each source modeled, show all calculations identifying the critical structure used in the model run. *See section 3.2 and NC Form 1 - Appendix A.*	N/A
Cavity Impact Analysis: A cavity impact analysis using SCREEN3 must be conducted for all structures with a region of influence extending to one or more sources modeled to determine if cavity regions extend off property (toxics) or beyond the fence line (criteria pollutants). *See Section 4.2*	N/A
Terrain: Indicate the terrain modeled: simple *(Section 4.4)*, and complex *(Section 4.5 and NC Form 4 – Appendix A).* If complex terrain is within 5 kilometers of the facility, complex terrain must be evaluated. Simple terrain must include terrain elevations if any terrain is greater than the stack base of any source modeled. Simple: _____ Complex: _____	N/A
Meteorology: In SCREEN3, select full meteorology.	N/A
Receptors: SCREEN3 – use shortest distance to property boundary for each source modeled and use sufficient range to find maximum (*See Section 4.1 (i) and (j)*). Terrain above stack base must be evaluated.	N/A
Modeling Results: For each affected pollutant, modeling results should be summarized, converted to the applicable averaging period *(See Table 3)*, and presented in tabular format indicating compliance status with the applicable AAL, SIL or NAAQS. *See NC Form S5 – Appendix A.*	N/A
Modeling Files: Either electronic or hard copies of SCREEN3 output must be submitted.	N/A

REFINED LEVEL MODELING	
Model: The latest version of AERMOD should be used, and may be found at http://www.epa.gov/scram001/dispersion_prefrec.htm. The use of other refined models must be approved by NCDAQ prior to submitting the modeling report.	X
Source / Source emission parameters: Provide a table listing the sources modeled and the applicable source emission parameters. *See NC Form 3 - Appendix A.*	X
GEP Analysis: Use BPIP-Prime with AERMOD.	X
Cavity Impact Analysis: No separate cavity analysis is required when using AERMOD as long as receptors are placed in cavity susceptible areas. *See Section 4.2 and 5.2.*	N/A
Terrain: Use digital elevation data from the USGS NED database (http://seamless.usgs.gov/index.php). Use of other sources of terrain elevations or the non-regulatory Flat Terrain option will require prior approval from DAQ AQAB.	X
Coordinate System: Specify the coordinate system used (e.g., NAD27, NAD83, etc.) to identify the source, building, and receptor locations. Note: Be sure to specify in the AERMAP input file the correct base datum (NADA) to be used for identifying source input data locations. Clearly note in both the protocol checklist and the modeling report which datum was used.	X
Receptors: The receptor grid should be of sufficient size and resolution to identify the maximum pollutant impact. *See Section 5.3.*	X
Meteorology: Indicate the AQAB, pre-processed, 5-year data set used in the modeling demonstration: (*See Section 5.5 and Appendix B)* AERMOD 1988-1992 Raleigh-Durham / Greensboro If processing your own raw meteorology, then pre-approval from AQAB is required. Additional documentation files (e.g. AERMET stage processing files) will also be necessary. For NC toxics, the modeling demonstration requires only the last year of the standard 5 year data set (e.g., 2005) provided the maximum impacts are less than 50% of the applicable AAL(s).	X
Modeling Results: For each affected pollutant and averaging period, modeling results should be summarized and presented in tabular format indicating compliance status with the applicable AAL, SIL or NAAQS. *See NC Form R5 - Appendix A.*	X
Modeling Files: Submit input and output files for AERMOD. Also include BPIP-Prime files, AERMAP files, DEM files, and any AERMET input and output files, including raw meteorological data.	X

MODELING INPUTS

AERMOD ID	Stack Ht. (m)	Stack Temp. (K)	Stack Vel. (m/s)	Stack Diam. (m)
DRYER	30.48	349.82	20.58	2.26
FWPSTACK	2.13	785.37	109.18	0.08
EMERGEN	1.52	766.48	78.30	0.10

Pollutant	EG Emission Rate (g/s)	FWP Emission Rate (g/s)	Dryer Emission Rate (g/s)
Arsenic	0.000E+00	0.000E+00	4.164E-05
Benzo(a)pyrene	5.809E-08	4.979E-08	6.787E-05
Cadmium	0.000E+00	0.000E+00	7.760E-06
Chlorine	0.000E+00	0.000E+00	2.062E-02
Hexachlorodibenzo-p-dioxin	0.000E+00	0.000E+00	4.177E-05
Hydrogen Chloride	0.000E+00	0.000E+00	4.960E-02
Mercury	0.000E+00	0.000E+00	9.137E-05
Nickel	0.000E+00	0.000E+00	8.615E-04
Vinyl Chloride	0.000E+00	0.000E+00	4.699E-04

FINAL MODELING RESULTS

Pollutant	Averaging Period	Max. Modeled 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 (%)
Arsenic	Annual	1.00E-05	1992	266,073.2	4,043,369.4	2.30E-04	4.35%
Benzo(a)pyrene	Annual	1.00E-05	1992	266,073.2	4,043,369.4	3.30E-02	0.03%
Cadmium	Annual	0.00E+00	1992	266,073.2	4,043,369.4	5.50E-03	0.00%
Chlorine	24-Hour	5.85E-02	92050724	265,518.8	4,042,557.8	3.75E+01	0.16%
Hexachlorodibenzo-p-dioxin	Annual	1.00E-05	1992	266,073.2	4,043,369.4	7.60E-05	13.16%
Hydrogen Chloride	1-Hour	2.72E-01	92080420	265,791.0	4,042,519.1	7.00E+02	0.04%
Mercury	24-Hour	2.60E-04	92050724	265,518.8	4,042,557.8	6.00E-01	0.04%
Nickel	1-Hour	4.73E-03	92080420	265,791.0	4,042,519.1	6.00E+00	0.08%
Vinyl Chloride	Annual	1.00E-04	1992	266,073.2	4,043,369.4	3.80E-01	0.03%

COTTON GINS PM2.5

Godwin, Kevin

From: Joe Sullivan [jsullivan@trinityconsultants.com]
Sent: Friday, September 09, 2011 10:45 AM
To: Mceachern, Charles
Cc: Godwin, Kevin
Subject: Re: FW: P&O for Enviva Pellets 6600167.11A

Hello, Charles. I hope things are going well.

As indicated in the application, thermophilic bacteria has not yet been demonstrated on a full scale wood products dryer installation. Thus, we would have to cool the stream to no more than 110 - 120 deg. F. to operate with mesophilic bacteria.

To my knowledge, no one has successfully implemented biofiltration technology on a full-scale size on a similar dryer exhaust. The biggest challenge is that after the WESP, the exhaust stream is saturated at 170 degrees to 190 degrees in the summer time. While it obvious that it is theoretically possible to cool such a stream to the maximum mesophilic bacteria operating range, no one has attempted it due to the difficulties of dealing with the technical challenges of dealing with such a stream in an economic fashion. Practically speaking, the best way to deal with this issue would be to have an indirect contact heat exchanger with recirculating water. The recirculating water itself needs to be cooled, which also requires a cooling tower.
Attempting to effect this type of cooling during the summer months would require an enormous heat exchange system that becomes astronomically expensive due to the very small temperature differential of the recirculating water and the final endpoint temperature of the exhaust stream.

In addition to the aforementioned challenges with cooling is dealing with the large quantities of condensate off of the heat exchange system. As mentioned above, the already wet exhaust has been cooled to saturation in the WESP, so the stream continuously condenses water as it tracks with dew point during cooling.

I hope this provides a satisfactory explanation. Please feel free to call me if you require more information.
Regards,
Joe

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: 09/09/2011 08:55 AM

Subject: FW: P&O for Enviva Pellets 6600167.11A

Per our phone conversation.

Kevin Godwin, Environmental Engineer
NC DENR, Division of Air Quality
Permits
1641 MSC, Raleigh, NC 27699-1641
(919) 715-6255
www.ncair.org

From: Mceachern, Charles
Sent: Wednesday, September 07, 2011 2:29 PM
To: Godwin, Kevin
Subject: P&O for Enviva Pellets 6600167.11A

Hi Kevin, I have looked over the application submitted by Enviva Pellets Northampton LLC (app.
ID No. 6600167.11A). My only question relates to the BACT analysis where they state bio-filtration is not technically feasible for VOC control due to them not being able to cool a 170 F air steam during the summer, and how to feed the "bugs" during plant shutdowns. I find it hard to believe these questions have not been resolved and would like to see the applicant provide a more robust explanation of why bio-filtartion is technically infeasible. Otherwise I have no other comments at this time.

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

Trinity Consultants

One Copley Parkway, Suite 310, Morrisville, North Carolina 27560 U.S.A. ■ (919) 462-9693 ■ Fax (919) 462-9694

August X, 2011

William Flynn
Planning and Zoning Director
Northampton County Planning and Zoning
102 West Jefferson Street
Jackson, NC 27845

Subject: Air Permit Application Zoning Consistency Determination Request
Enviva Pellets Northampton, LLC

Dear Mr. William Flynn,

This letter is a request for a determination of whether planned construction project of a wood pellet manufacturing facility located at Lebanon Church Road in Gaston, NC is consistent with current local zoning requirements. A copy of the air permit application being submitted to the North Carolina Division of Air Quality (NCDAQ) is attached.

Your confirmation of zoning consistency is needed by the NCDAQ prior to issuance of the air quality construction permit. Please complete the attached form and send to the address shown on the form as soon as possible. In the interim, we would appreciate it if you would stamp this cover letter with your department's seal, sign and date next to your seal and return the sealed cover letter via FAX to my attention at (919) 462-9694. This stamp is needed to be considered administratively complete by the NC Division of Air Quality. Should you require additional information to complete your review, please do not hesitate to contact me at (919) 462-9693.

Sincerely,

Joe H. Sullivan

Joe Sullivan, PE, CM
Managing Consultant

Attachment

RCVD SEPT. 1, 2011
William E. Flynn Jr.
WILLIAM E. FLYNN, JR.
NORTHAMPTON COUNTY
PLANNING & ZONING DIRECTOR

KEVIN GODWIN

NCDENR

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

Beverly Eaves Perdue
Governor

Sheila C. Holman
Director

Dee Freeman
Secretary

October 13, 2011

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

Dear Mr. Hintz:

Subject: PSD Completeness Review
Enviva Pellets Northampton, LLC
Gaston, Northampton County, North Carolina

Reference is made to your Prevention of Significant Deterioration (PSD) preconstruction air permit application received August 26, 2011 (6600167.11A) for proposed construction of a wood pellet manufacturing facility.

In accordance with the procedures required pursuant to 15A NCAC 2D .0530(o) and 40 CFR 51.166(q), this office considers your application complete for PSD review purposes. This determination does not prevent the NCDAQ from requesting additional information regarding previously submitted materials and technical issues involved in the application.

The application has been assigned to Kevin Godwin for review. If you have any questions regarding this matter please contact Kevin at (919) 715-6255.

Sincerely,

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

c: Patrick Butler, Supervisor, Raleigh Regional Office

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

One NorthCarolina *Naturally*

Comprehensive Application Report for 6600167.11A

08/29/2011

Enviva Pellets Northampton, LLC - Gaston (6600167)

Northampton County

General Information: Permit/Latest Revision: 10203/

Permit code:	PSD
Application type:	Greenfield Facility
Engineer/Rev. location:	Kevin Godwin/RCO
Regional Contact:	Charles McEachern
Facility location:	Raleigh Regional Office
Facility classification:	Unknown
Clock is ON	Application is COMPLETE
Status is :	In progress

Application Dates

Received	Completeness Due	Clock Start	Calculated Issue Due
08/26/2011	10/25/2011		

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

Application Events

Event	Start	Due	Complete	Comments	Staff

Regulations Pertaining to this Permit

Reference Rule	Regulation Description

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
permit_No	08/29/2011		10203	Charles McEachern
reg_Cont	08/29/2011		821 (Charles McEachern)	Mark Cuilla

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

Beverly Eaves Perdue
Governor

Sheila C. Holman
Director

Dee Freeman
Secretary

August 29, 2011

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

SUBJECT: Receipt of Permit Application
Greenfield Facility
Application No. 6600167.11A
Enviva Pellets Northampton, LLC
Facility ID: 6600167, Gaston, Northampton County

Dear Mr. Hintz:

Your air permit application (6600167.11A) for Enviva Pellets Northampton, LLC, located in Northampton County, North Carolina was received by this Division on August 26, 2011.

This application submittal **did** contain all the required elements as indicated and has been accepted for processing. Your application will be considered complete as of August 26, 2011, unless informed otherwise by this office within 60 days.

Should you have any questions concerning this matter, please contact Kevin Godwin at (919) 715-6255.

Sincerely,

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

cc: Raleigh Regional Office Files

Permitting Section
1641 Mail Service Center, Raleigh, North Carolina 27699-1641
2728 Capital Blvd., Raleigh, North Carolina 27604
Phone: (919) 715-6237 \ FAX: (919) 733-5317 \ Internet: www.ncair.org/

Enviva, L.P.
7200 Wisconsin Ave
Suite 1100
Bethesda, MD 20814
USA

Wachovia
1021 East Cary Street
Richmond, VA 23219

68-54/514

No. 0000001315

CHECK DATE
7/28/2011

PAY THIS AMOUNT
**********13,488.00

PAY Thirteen thousand four hundred eighty-eight and xx / 100 Dollars

TO THE ORDER OF
NC Air Quality Division
,
USA

AUTHORIZED SIGNATURE

Details on Back. Security Features Included

⑈0000001315⑈ ⑆051400549⑆ 2000048297721⑈

VENDOR: NCDIVI Enviva, L.P.
REMIT TO: NC Air Quality Division

CHECK: 0000001315
COMMENT:

DATE: 7/28/2011

INVOICE	DATE	VOUCHER	COMMENT	AMOUNT	DISCOUNT	NET AMOUNT
07282011	7/28/2011	0000002036	Title V Application-Northhampton	13,488.00	0.00	13,488.00
			TOTALS:	13,488.00	0.00	13,488.00

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.

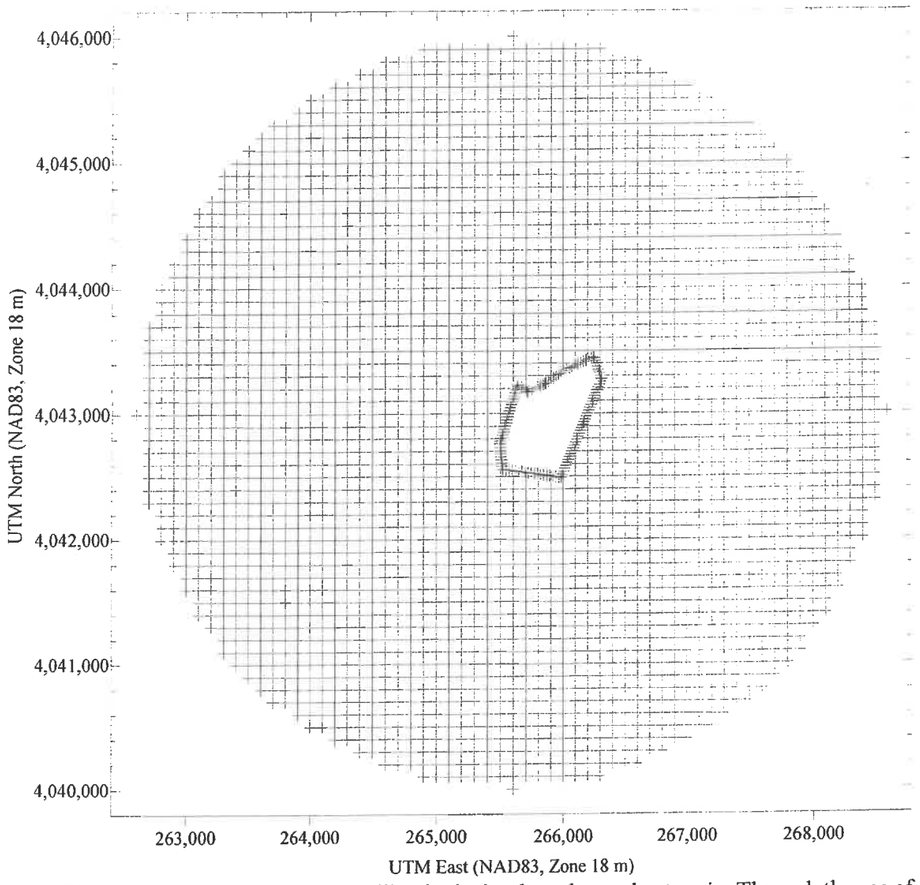
4.5 MODELED RECEPTORS

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:

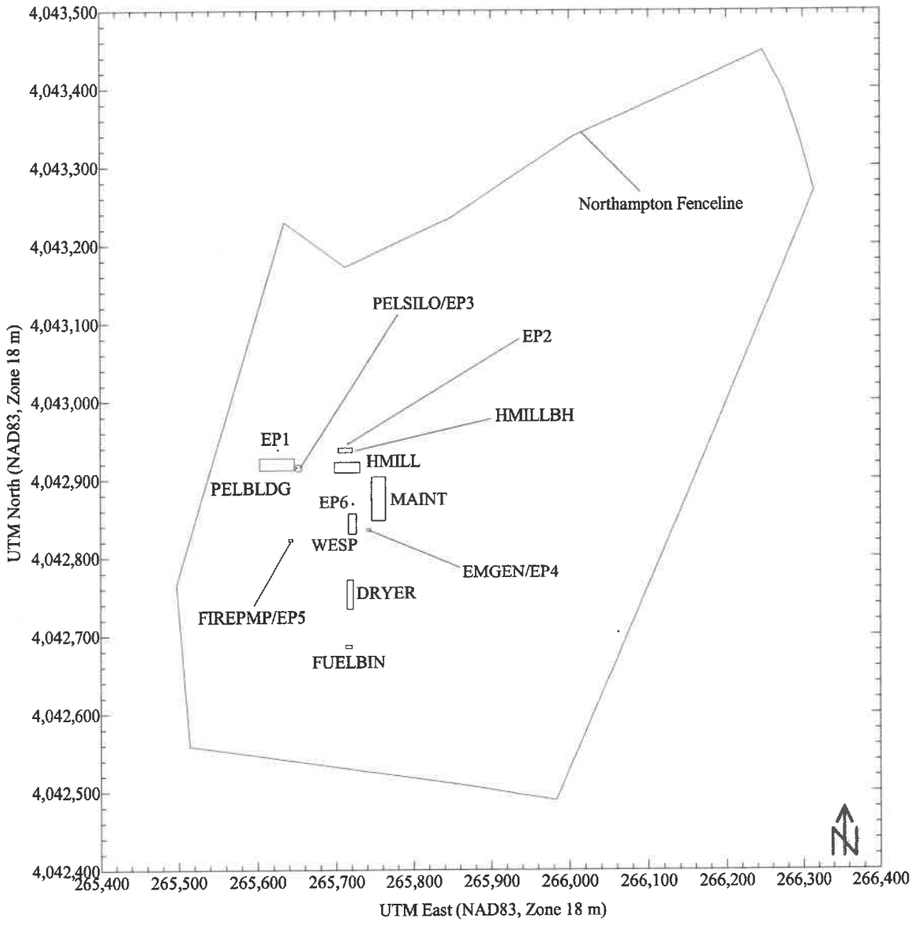
H_{GEP} = minimum GEP stack height,
H = structure height, and
L = lesser dimension of the structure (height or projected width).

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

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

	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)	OTENTIAL EMISSION BEFORE CONTROLS LIMITATIONS)	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)
AIR POLLUTANT EMITTED	tons/yr	tons/yr	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

		EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)	OTENTIAL EMISSION BEFORE CONTROLS LIMITATIONS)	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)
HAZARDOUS AIR POLLUTANT EMITTED	CAS NO.	tons/yr	tons/yr	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.

					Modeling Required ?	
TOXIC AIR POLLUTANT EMITTED	CAS NO.	lb/hr	lb/day	lb/year	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 0 6 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:
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

NORTH CAROLINA PROFESSIONAL SEAL 023037 ENGINEER JOE W. SULLIVAN

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)
- ☐ 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
	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:

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANT(S) COLLECTED:				
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 CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Dried Wood	**Tons**	**70.65**	

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

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.

POLLUTANT(S) COLLECTED:	PM	PM_{10}	$PM_{2.5}$	
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: **57"**		¢ 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/FT³): **7.29E-04**	INLET TEMPERATURE (°F): **120**
POLLUTANT LOADING RATE: **5.10** LB/HR (GR/FT³)	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 (FT²): **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)
- ☐ 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 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.

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANT(S) COLLECTED:				
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_2O): MIN: MAX: 6" GAUGE? ◉ YES ○ NO WARNING ALARM? ◉ YES ○ NO

BULK PARTICLE DENSITY (LB/FT³): 6.67E-04	INLET TEMPERATURE (°F): 120
POLLUTANT LOADING RATE: 4.67 ○ LB/HR ◉ GR/FT³	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 (FT²): 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	MOTOR HP:	☐ RAILCAR
☐ COMPRESSOR	☐ BELT CONVEYOR		☐ 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**
DIAMETER OF BAG (IN.): **5.875**	DRAFT: ○ INDUCED/NEG. ● FORCED/POS
AIR TO CLOTH RATIO: **6**	FILTER MATERIAL:
	LENGTH OF BAG (IN.): **120**
	FILTER SURFACE AREA (FT²): **377**
	○ WOVEN ● FELTED

DESCRIBE CLEANING PROCEDURES:
● AIR PULSE ○ REVERSE FLOW ○ MECHANICAL/SHAKER ○ OTHER ○ SONIC ○ SIMPLE BAG COLLAPSE ○ RING BAG COLLAPSE

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.

	PM	PM_{10}	$PM_{2.5}$	
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:	EMISSION SOURCE ID NO:	ES-CLR-1,2,3,4,5, 6
Pellet Coolers	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/FT³): **0.0002**
POLLUTANT LOADING RATE (GR/FT³): **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? ○ YES ○ NO
VELOCITY (FT/SEC.):	W: **14.25"**	Lb: **72"**	FLOW RATE (GPM):		
NO. TRAYS:	De: **30"**	Lc: **84"**	MAKE UP RATE (GPM):		LOUVERS? ○ YES ○ NO
NO. BAFFLES:	D: **50"**	S: **39"**			
	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)
- ■ 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 **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**

EMISSION POINT (STACK) ID NO(S): **EP-4**

OPERATING SCENARIO: 1 OF 1

CHECK ALL THAT APPLY: ☝ EMERGENCY (circled) ☝ 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 (circled) ☝ DIESEL ENGINE GREATER THAN 600 HP ☝ DUAL FUEL ENGINE ☝ OTHER (DESCRIBE): _____ (complete below)

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

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)
- ☐ 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 **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)	Total Potential Emissions (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]	Max. Annual						
					(tph)	(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

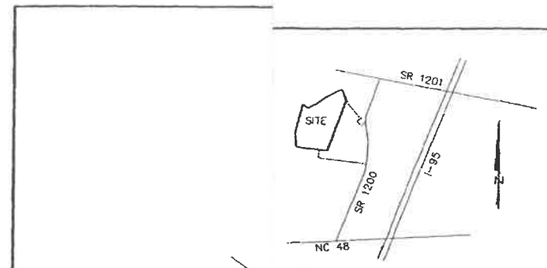
[1] Fuel consumption calculated using a factor of 0.0476 gal/hr-hp. Advanced Environmental Interface, Inc. (1998). General Permits for Emergency Engines. INSIGHTS, 98-2, 3.

[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
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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 731 PG 72

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XISTING REBAR
XISTING AXLE
XISTING CONCRETE MONUMENT
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NOW OR FORMERLY
WILLIAM W. GRANT
DB 632 PG 879

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2608

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CISION BEFORE ADJUSTMENT: 1/15,850

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N = 1,003,634.69
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ELEV = 136.0
CGF = 1.00010880
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EX. AXLE

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

THIS SURVEY IS OF ANOTHER CATEGORY, SUCH A
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TO THE DEFINITION OF SUBDIVISION.

I, CHARLES W. RUSHTON, CERTIFY THAT THIS PLA
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BOOK _____, PAGE _____; THAT THE RATIO
AS CALCULATED IS 1: 15,850 ; THAT THIS PL
IN ACCORDANCE WITH G.S. 47-30 AS AMENDED.
WITNESS MY ORIGINAL SIGNATURE, REGISTRATION
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
7/18/11: BOUNDARY ALONG POWERLINE		PIN 4000-84-2808

DIVISION OF AIR QUALITY
December 15, 2011

Received
DEC 19 2011
Air Permits Section

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 Revised Toxics Modeling Analysis – Enviva Pellets Northampton, LLC
Facility ID: 6600167
Gaston, NC Northampton County

I have reviewed the revised dispersion modeling analysis, received November 28, 2011, for the Enviva Pellets facility located in Northampton County, NC. The modeling was submitted as an addendum to a recent toxics analysis as part of the PSD permitting process and includes the evaluation of several toxics that were not previously included in EPA's emission factors for wood dryers. Those toxics whose rates are expected to exceed the levels outlined in NCAC 2Q .0700 were subsequently evaluated. The modeling adequately demonstrates compliance, on a source-by-source basis, for all toxics modeled.

Several toxics are emitted from the wood dryer, fire water pump, and emergency generator. Emission rates and stack parameters used in the modeling are provided in the attached tables.

AERMOD using the latest available year (1992) of meteorological data from Raleigh (surface) and Greensboro (upper air) was used to evaluate impacts in both simple and elevated terrain. 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's property line at 25-meter intervals and extended outward to a distance of approximately 2 kilometers at 100 meter spacing. The following table shows the maximum impact for each toxic:

Table 1.
Maximum Impacts
Enviva Pellets – Northampton County, NC

Pollutant	Averaging Period	% of AAL
Arsenic	Annual	4 %
Benzo(a) pyrene	Annual	<1 %
Cadmium	Annual	<1 %

…continued on following page…

Chlorine	24-hour	<1 %
Hexa.-p-dioxin	Annual	13 %
Hydrogen chloride	1-hour	<1 %
Mercury	24-hour	<1 %
Nickel	24-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

MODELING INPUTS

AERMOD ID	Stack Ht. (m)	Stack Temp. (K)	Stack Vel. (m/s)	Stack Diam. (m)
DRYER	30.48	349.82	20.58	2.26
FWPSTACK	2.13	785.37	109.18	0.08
EMERGEN	1.52	766.48	78.30	0.10

Pollutant	EG Emission Rate (g/s)	FWP Emission Rate (g/s)	Dryer Emission Rate (g/s)
Arsenic	0.000E+00	0.000E+00	4.164E-05
Benzo(a)pyrene	5.809E-08	4.979E-08	6.787E-05
Cadmium	0.000E+00	0.000E+00	7.760E-06
Chlorine	0.000E+00	0.000E+00	2.062E-02
Hexachlorodibenzo-p-dioxin	0.000E+00	0.000E+00	4.177E-05
Hydrogen Chloride	0.000E+00	0.000E+00	4.960E-02
Mercury	0.000E+00	0.000E+00	9.137E-05
Nickel	0.000E+00	0.000E+00	8.615E-04
Vinyl Chloride	0.000E+00	0.000E+00	4.699E-04

DIVISION OF AIR QUALITY
October 26, 2011

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 Modeling Analysis – Enviva Pellets Northampton, LLC
Gaston, NC Northampton County

Attached is a discussion of the modeling analysis for Enviva Pellets Northampton, LLC that was conducted in support of the construction and operation of a new facility near Gaston, NC. The modeling was conducted in accordance with current PSD directives and modeling guidance. A summary of the modeling results is presented in Table 7.

c: Jim Roller
Tom Anderson

ENVIVA PELLETS NORTHAMPTON LLC, PREVENTION OF SIGNIFICANT DETERIORATION (PSD) AIR DISPERSION MODELING ANALYSIS

Introduction

The PSD modeling analysis described in this section was conducted in accordance with current PSD directives and modeling guidance. Numerous references are made to the Draft October 1990 EPA New Source Review Workshop Manual, Prevention of Significant Deterioration and Nonattainment Area Permitting which will herein be referred to as the NSR Workshop Manual.

A summary of the modeling results is presented in the last topic, PSD Air Quality Modeling Results Summary. A detailed description of the modeling and modeling methodology is described below.

Project Description / Significant Emission Rate (SER) Analysis

Enviva Pellets Northampton, LLC (Enviva) plans to construct and operate a wood pellet manufacturing plant in Northampton County near Gaston, NC. Operations are expected to occur 24 hours per day, 7 days per week and 52 weeks per year. A facility-wide pollutant netting analysis was accomplished and documented in Table 3-1 of the Enviva permit application. Three pollutants were declared to exceed their PSD Significant Emission Rate (SER) and thus require a PSD analysis. These emission rates are provided in the table below.

Table 1 - Pollutant Netting Analysis

Pollutant	Annual Emission Rate tons/yr	Significant Emission Rate tons/yr
NO_x	**187.6**	40
PM_{10}	**36.8**	15
$PM_{2.5}$	**36.8**	15
TSP	**36.8**	15
SO_2	**22.7**	40
CO	**275.5**	100
VOC's	**261.3**	40

Preliminary Impact Air Quality Modeling Analysis

An air quality preliminary impact analysis was conducted for the pollutants exceeding the corresponding SER. The modeling results were then compared to applicable Significant Impact Levels (SILs) as defined in the NSR Workshop Manual to determine if a full impact air quality analysis would be required for that pollutant.

The Enviva facility will be located near Gaston, NC, in Northampton County. The facility area is in the northern coastal plain with terrain being predominantly flat and is generally agricultural, industrial, and forestland. For modeling purposes, the area, including and surrounding the site, is classified rural, based on the land use type scheme established by Auer 1978.

Enviva evaluated the pollutants' significant emissions using the EPA AERMOD model and five years (1988-1992) of National Weather Service (NWS) surface (Raleigh) and upper air (Greensboro) meteorological data. Full terrain elevations were included, as were normal regulatory defaults. Sufficient receptors were placed in ambient air beginning at the fenceline to establish maximum impacts. Emission rates for this specific project were used and the maximum impacts were then compared to the SIL. Since the results showed impacts above one or more of the SILs for PM_{10}, $PM_{2.5}$, and NO_2, further modeling was required for those pollutants. The SIL results are shown in Table 2.

Table 2 - Class II Significant Impact Results (ug/m^3)

Pollutant	Averaging Period	Facility maximum Impact	Class II Significant Impact Level
PM_{10}	annual	**1.84**	1
	24-hour	**11.48**	5
$PM_{2.5}$	annual	**1.33**	.3
	24-hour	**7.66**	1.2
CO	1-hour	522.25	2,000
	8-hour	195.61	500
NO_2	annual	**6.81**	1
	1-hour	**235.88**	10

Class II Area Full Impact Air Quality Modeling Analysis

A Class II Area NAAQS and PSD increment analysis was performed for PM_{10} $PM_{2.5}$, and NO_2 to include offsite source emissions and background concentrations (NAAQS). Enviva used AERMOD with the modeling methodology as described above. Off-site source inventories for both increment and NAAQS modeling were obtained from NCDAQ and then refined by Enviva using the NCDAQ approved "Q/D=20" guideline. For the PM_{10} and $PM_{2.5}$ NAAQS analysis, four offsite sources were included. The same offsite sources were used for the PM_{10} increment analysis; however, no offsite sources were included for the $PM_{2.5}$ increment analysis since Enviva is the only facility to trigger review for $PM_{2.5}$ since the established baseline date (October 20, 2010). For the NO_2 NAAQS analysis, 5 offsite sources were used; 5 offsite sources were also used for the increment analysis. These sources, along with their emission rates, are provided in the attachments.

Enviva used an appropriate array of receptors beginning at the declared fenceline and extending outward to 5 kilometers. PM_{10} background concentrations were taken from the Raleigh PM_{10} monitoring station. The Edgecombe County monitor was used for $PM_{2.5}$ background concentrations. NO_2 background concentrations were taken from the Charlotte NO_2 monitoring station. The modeling results are shown in Table 3 and indicate compliance with the NAAQS for PM_{10}, $PM_{2.5}$, and NO_2.

Table 3 - Class II Area NAAQS Modeling Results

Pollutant	Averaging Period	Maximum Onsite & Offsite Source Impacts (ug/m^3)	Background Concentration (ug/m3)	Total Impact (ug/m3)	NAAQS (ug/m3)	% NAAQS
PM_{10}	24-hour	8.33	25	33.33	150	22
$PM_{2.5}$	24-hour	7.88	17	24.88	35	71
	annual	2.38	8.6	10.98	15	73
NO_2	1-hour	115.01	35.8	150.81	188	80
	annual	4.35	5.2	9.55	100	10

In the CLASS II increment analysis, Enviva used the same onsite sources, fenceline, and receptors as in the NAAQS analysis. The emission rates modeled are provided in the attachments. The Class II Area increment modeling results are shown in Table 4 and indicate compliance with the Class II Area increments.

Table 4 - Class II Area PSD Increment Modeling Results

Pollutant	Averaging Period	Maximum Onsite & Offsite Source Impacts (ug/m^3)	PSD Increment (ug/m3)	% Increment
PM_{10}	24-hour	8.33	30	28
	annual	2.23	17	14
$PM_{2.5}$	24-hour	8.12	9	90
	annual	1.39	4	35
NO_2	annual	4.35	25	17

Non Regulated Pollutant Impact Analysis (North Carolina Toxics)

Enviva also modeled TSP and four toxics using AERMOD with the same receptor array and meteorology as used in the NAAQS analysis. A list of the facility sources and emission rates used are attached to this document. All pollutants demonstrated compliance on a source-by-source basis with the NC's AAQS or Acceptable Ambient Level (AAL). The maximum concentrations as shown in Table 5 occurred along the fenceline.

Table 5 – Non-Regulated Pollutants Modeling Results

Pollutant	Averaging Period	Max Facility Impact (µg/m3)	AAQS (µg/m3)	AAL (µg/m3)	Percent of AAL
TSP	annual	1.84	75	n/a	2
	24-hr	11.48	150	n/a	8
Acrolein	1-hour	0.98	n/a	80	1
Benzene	annual	0.014	n/a	0.12	12
Formaldehyde	1-hour	5.96	n/a	150	4
Phenol	1-hour	1.19	n/a	950	< 1

Additional Impacts Analysis

Additional impact analyses were conducted for growth, soils and vegetation, and visibility impairment.

Growth Impacts

Enviva is expected to employ approximately 62 full-time people, most of which are expected to come from the existing local population. Therefore, this project is not expected to cause a significant increase in growth in the area.

Soils and Vegetation

The facility is located in the northern coastal plain of North Carolina. The local geography is flat with a mix of forests, agricultural crops, and herbaceous vegetation. By way of the NAAQS analyses of this submission, Enviva demonstrated that the impacts were below the established standards – both the primary and secondary NAAQS. The impacts were also below EPA established thresholds for soil and vegetation effects (described in detail in Table 5-4 of the modeling report). Thus, the Enviva project is not expected to cause any detrimental impacts to soils or vegetation in the area.

CLASS II Visibility Impairment Analysis

A Class II visibility impairment analysis was not conducted since there are not any visibility sensitive areas with the Class II Significant Impact Area.

Class I Area - Additional Requirements

There are three Federal Class I Areas within 300 km of the Enviva project – Swanquarter NWR, James River Face Wilderness, and Shenandoah National Park. The Federal Land Manager for each of those areas was contacted and none of them required any analysis; therefore, no analysis was conducted by the applicant.

CLASS 1 SIL Analysis

AERMOD was also used to estimate impacts for the Class 1 SIL analysis. Even though the distance to the closest Class 1 area, Swanquarter NWR, exceeds 50 km, the threshold distance at which a long-range transport model is typically used, receptors were conservatively placed at 50 km

from the Enviva facility. NO_2 and PM_{10} modeled below the EPA-established, CLASS 1 SILs, and thus no CLASS 1 increment modeling was required. Table 6 provides the results of SIL modeling.

Table 6 - Class 1 Significant Impact Results (ug/m^3)

Pollutant	Averaging Period	Max. Impact at 50 km	EPA SIL	% SIL
NO_2	Annual	0.011	0.1	11
PM_{10}	24-hr	0.224	0.32	70
	Annual	0.007	0.16	4

PSD Air Quality Modeling Result Summary

Based on the PSD air quality ambient impact analysis performed the proposed Hertford Renewable Energy, LLC project will not cause or contribute to any violation of the Class 1I NAAQS, PSD increments, Class 1 Increments, or any FLM AQRVs. A summary of the modeling results is presented in Table 7.

Note: Tables follow below.

TABLE 7 – Enviva Pellets Northampton, LLC PSD AIR QUALITY MODELING RESULTS

SER Evaluation

Pollutant	Annual E/R (Tons)	SER (Tons/yr)
NO_x	**187.6**	40
PM_{10}	**36.8**	15
$PM_{2.5}$	**36.8**	15
TSP	**36.8**	15
SO_2	**22.7**	40
CO	**275.5**	100
VOC's	**261.3**	40

Class II Area SIL Analysis

Pollutant	Averaging Period	Maximum Impact (ug/m^3)	SIL (ug/m^3)	SIL Exceeded
PM_{10}	annual	**1.84**	1	Yes
	24-hour	**11.48**	5	Yes
$PM_{2.5}$	annual	**1.33**	.3	Yes
	24-hour	**7.66**	1.2	Yes
CO	1-hour	522.25	2,000	No
	8-hour	195.61	500	No
NO_2	annual	**6.81**	1	Yes
	1-hour	**235.88**	10	Yes

Class II NAAQS Analysis

Pollutant	Averaging Period	Maximum Onsite & Offsite Source Impacts (ug/m^3)	Back Ground Conc (ug/m^3)	Total Impact (ug/m^3)	NAAQS (ug/m^3)	% NAAQS
PM_{10}	24-hour	8.33	25	33.33	150	22
$PM_{2.5}$	24-hour	7.88	17	24.88	35	71
	annual	2.38	8.6	10.98	15	73
NO_2	1-hour	115.01	35.8	150.81	188	80
	annual	4.35	5.2	9.55	100	10

Class II Increment Analysis

Pollutant	Averaging Period	Maximum Onsite & Offsite Source Impacts (µg/m3)	PSD Increment (µg/m3)	% Increment		
PM_{10}	24-hour	8.33	30	28		
	annual	2.23	17	14		
$PM_{2.5}$	annual	8.12	9	90		
	24-hour	1.39	4	35		
NO_2	annual	4.35	25	17		

Class I Area SIL Analysis

Pollutant	Averaging Period	Max. Impact at 50 km	EPA SIL	% SIL			
NO_2	annual	0.011	0.1	11			
PM_{10}	24-hr	0.224	0.32	70			
	annual	0.007	0.16	4			

Non-Regulated Pollutant Analysis

Pollutant	Averaging Period	Max Facility Impact (µg/m3)	AAQS (µg/m3)	AAL (µg/m3)	Percent of AAL
TSP	annual	1.84	75	n/a	2
	24-hr	11.48	150	n/a	8
Acrolein	1-hour	0.98	n/a	80	1
Benzene	annual	0.014	n/a	0.12	12
Formaldehyde	1-hour	5.96	n/a	150	4
Phenol	1-hour	1.19	n/a	950	< 1

TABLE 4-2. MODELED STACK PARAMETERS

Source ID	Stack Height (m)	Stack Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
EP1	36.58	316.48	20.32	1.50
EP2	30.48	310.93	20.32	1.85
EP3	9.14	305.37	4.04	0.61
EP4	1.52	766.48	78.30	0.10
EP5	2.13	785.37	109.18	0.08
EP6	30.48	349.82	20.58	2.26

TABLE 4-1. MODELED SOURCE LOCATIONS AND EMISSION RATES

Model ID	Description	UTM-E (m)	UTM-N (m)	Elevation (m)	Modeled Emission Rates PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NO_x (g/s)	CO (g/s)
EP1	Pellet Cooler Cyclone Stack	265,626.6	4,042,938.7	45.9	1.78E+00	9.80E-01	0.00E+00	0.00E+00
EP2	Coarse Hammermill Area BH	265,715.6	4,042,945.9	45.5	6.35E-01	6.35E-01	0.00E+00	0.00E+00
EP3	Pellet Press Silo	265,650.4	4,042,914.8	46.1	1.35E-02	1.35E-02	0.00E+00	0.00E+00
EP4	EmGen	265,742.7	4,042,835.8	46.7	1.45E-02	1.45E-02	1.45E-01	2.54E-01
EP5	FirePump	265,641.7	4,042,821.7	46.4	1.24E-02	1.24E-02	1.24E-01	2.18E-01
EP6	Dryer WESP Stack	265,722.0	4,042,868.5	46.7	1.14E+00	1.14E+00	6.00E+00	8.99E+00

11/21/11

Kevin;

This came in today. It appears to be an addendum to your app.

I did not make any notes in IBEAM.

I assume you need to give a copy/disk to both Jim Rollers & the Region. (We don't have a copy to supplement EPA... don't know if that is necessary).

Mark