6. ADDITIONAL IMPACTS

In addition to the NAAQS and PSD Increment modeling analyses described previously in this report, applicants are required to perform additional impacts evaluations including: a growth analysis, a soil and vegetation analysis, and a plume visibility analysis.

6.1. PLUME VISIBILITY ANALYSIS

There are no airports or state parks located within the maximum daily SIA (2.3 km) and as such, no plume visibility analysis was required.

6.2. GROWTH ANALYSIS

The project will consist of the construction and operation of a new wood pellet facility. There will be temporary jobs associated with facility construction as well as the creation of approximately 80 permanent jobs to staff the site. It is anticipated that the large majority of the permanent jobs will be filled with residents that are already located in the area, and thus, no significant growth (in population or infrastructure) is expected in association with the new facility.

6.3. SOIL AND VEGETATION ANALYSIS

To assess soil and vegetation impacts, two comparisons were used. First, the NAAQS results (or significance results if SILs were not reached) were assessed against the secondary NAAQS standards, which provide protection for public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Second, the NAAQS results (or significance results if SILs were not reached) were compared to values from the EPA document, *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals* (EPA 450/2-81-078), 1981.[39]

The results for both comparisons are presented in Table 6-1 and show that no impacts exceed the secondary NAAQS or the EPA screening levels. Thus, there are no adverse impacts expected on soils or vegetation.

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[39] EPA, *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals* (EPA 450/2-81-078), 1981.

TABLE 6-1. SOIL AND VEGETATION IMPACTS

Pollutant	Averaging Period	Total Concentration[1] ($\mu g/m^3$)	Vegetation Sensitivity[2] Sensitive ($\mu g/m^3$)	Intermediate ($\mu g/m^3$)	Resistant ($\mu g/m^3$)	Secondary NAAQS ($\mu g/m^3$)	Minimum Threshold ($\mu g/m^3$)	Exceeds Threshold? (Yes/No)
NO_2[4]	4-Hour	127.8	3,760	6,400	16,920	-	3,760	No
	8-Hour	127.8	3,760	7,520	15,040	-	3,760	No
	1-Month	127.8	-	564	-	-	564	No
	Annual	11.0	-	94	-	100	94	No
PM_{10}[5]	24-Hour	46.6	-	-	-	150	150	No
	Annual	17.2	-	-	-	50	50	No
$PM_{2.5}$	24-Hour	20.9	-	-	-	35	35	No
	Annual	9.9	-	-	-	15	15	No

[1] Results from the Significance Analysis or NAAQS Analysis where modeled impacts exceeded the SIL.

[2] Screening Concentrations based on Table 3.1 *A Screening Procedure for Impact of Air Pollution Sources on Plants, Soil and Animals, USEPA, Dec. 12, 1980.*

[3] 1-Week Average is conservatively estimated by the 8-hour SIL modeling results.

[4] 4-Hour, 8-Hour and Monthly Averages are conservatively estimated by the 1-hour NAAQS modeling results.

[5] Annual results are based on the increment analysis (with background added), since no annual NAAQS exists.

APPENDIX A - NCDAQ APPLICATION FORMS

Facility Forms

Received
JAN 15 2014
Air Permits Section

FORM A1
FACILITY (General Information)

REVISED 11/01/02 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — A1

NOTE- APPLICATION WILL NOT BE PROCESSED WITHOUT THE FOLLOWING:

☑ Local Zoning Consistency Determination (if required) ☑ Facility Reduction & Recycling Survey Form (Form A4) ☑ Application Fee
☑ Responsible Official/Authorized Contact Signature ☑ Appropriate Number of Copies of Application ☑ P.E. Seal (if required)

GENERAL INFORMATION

Legal Corporate/Owner Name: Enviva Pellets Hamlet, LLC
Site Name: Enviva Pellets Hamlet, LLC
Site Address (911 Address) Line 1: Highway 117
Site Address Line 2:
City: Hamlet | State: North Carolina
Zip Code: 28345 | County: Richmond

CONTACT INFORMATION

Permit/Technical Contact:	*Facility/Inspection Contact:*
Name/Title: Joe Harrell	Name/Title: Joe Harrell
Mailing Address Line 1: 142 N.C. Route 561 East	Mailing Address Line 1: 142 N.C. Route 561 East
Mailing Address Line 2:	Mailing Address Line 2:
City: Ahoskie State: NC Zip Code: 27910	City: Ahoskie State: NC Zip Code: 27910
Phone No. (area code) (252) 209-6032 Fax No. (area code)	Phone No. (area code) (252) 209-6032 Fax No. (area code)
Email Addres: Joe.Harrell@envivabiomass.com	Email Addres: Joe.Harrell@envivabiomass.com
Responsible Official/Authorized Contact:	*Invoice Contact:*
Name/Title: Pete Najera	Name/Title: Same as permit/technical contact
Mailing Address Line 1: 7200 Wisconsin Avenue	Mailing Address Line 1:
Mailing Address Line 2: Suite 1100	Mailing Address Line 2:
City: Bethesda State: MD Zip Code: 20814	City: State: Zip Code:
Phone No. (area code) (703) 380-9957 Fax No. (area code)	Phone No. (area code) Fax No. (area code)
Email Addres: Pete.Najera@envivabiomass.com	Email Address:

APPLICATION IS BEING MADE FOR

☑ New Non-permitted Facility/Greenfield ☐ Modification of Facility (permitted) ☐ Renewal with Modification
☐ Renewal (TV Only)

FACILITY CLASSIFICATION AFTER APPLICATION (Check Only One)

☐ General ☐ Small ☐ Prohibitory Small ☐ Synthetic Minor ☑ Title V

FACILITY (Plant Site) INFORMATION

Describe nature of (plant site) operation(s): Facility ID No. : (to be assigned)
Wood pellet manufacturing facility

Primary SIC/NAICS Code: 2499 (Wood Products, Not Elsewhere Classified) | Current/Previous Air Permit N/A | Expiration Date:
Facility Coordinates: Latitude: 34 deg 56 min 2.4 seconds N | Longitude: 79 deg 38 min 3.3 seconds W
Does this application contain confidential data? ☐ YES ☑ NO

PERSON OR FIRM THAT PREPARED APPLICATION

Person Name: Dale Overcash | Firm Name: Trinity Consultants, Inc.
Mailing Address Line 1: One Copley Parkway | Mailing Address Line 2: Suite 310
City: Morrisville | State: North Carolina | Zip Code: 27560 | County: Wake
Phone No. (919) 462-9693 | Fax No. (919) 462-9694 | Email Address:

SIGNATURE OF RESPONSIBLE OFFICIAL/AUTHORIZED CONTACT

Name (typed): Pete Najera | Title: VICE PRESIDENT, OPERATIONS
X Signature(Blue Ink): Pete Najera | Date: 1/9/14

Attach Additional Sheets As Necessary

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-CHIP-1	Log Chipping	N/A	N/A
ES-GHM-1, 2	Green Wood Hammermills	CD-RCHP-CYC	Simple Cyclone
ES-CHIP-2	Portable Chipper	N/A	N/A
ES-BARKHOG	Bark Hog	N/A	N/A
ES-DRYER	Green Wood Direct-Fired Dryer System	CD-DC	Three (3) Simple Cyclones
		CD-WESP	Wet Electrostatic Precipitator
ES-HM-1 through 8	Eight (8) Hammermills	CD-HM-CYC-1 CD-HM-BF1	Simple Cyclone, Bagfilter
		CD-HM-CYC-2 CD-HM-BF1	Simple Cyclone, Bagfilter
		CD-HM-CYC-3 CD-HM-BF1	Simple Cyclone, Bagfilter
		CD-HM-CYC-4 CD-HM-BF2	Simple Cyclone, Bagfilter
		CD-HM-CYC-5 CD-HM-BF2	Simple Cyclone, Bagfilter
		CD-HM-CYC-6 CD-HM-BF2	Simple Cyclone, Bagfilter
		CD-HM-CYC-7 CD-HM-BF3	Simple Cyclone, Bagfilter
		CD-HM-CYC-8 CD-HM-BF3	Simple Cyclone, Bagfilter
ES-HMA	Hammermill Area Filter	CD-HMA-BF3	Bagfilter
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BV	Bin Vent Baghouse
ES-CLR-1 through 6	Six (6) Pellet Coolers	CD-CLR-1 through 6	Six (6) Pellet Cooler Cyclones
ES-PFB	Pellet Fines Bin	CD-PFB-BF	Bin Vent Baghouse
ES-FPH	Finished Product Handling	CD-FPH-BF	Finished Product Handling Bagfilter
ES-PB-1 and 2	Pellet Loadout Bins		
ES-PL	Pellet Mill Loadout		
ES-GN	Emergency Generator (250 bhp)	N/A	N/A
ES-FWP	Fire Water Pump (250 bhp)	N/A	N/A
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: 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 Hamlet, LLC		**Permit Number:**	N/A	
Facility ID:	to be assigned	**County:** Richmond	**Environmental Contact:**	Joe Harrell	
Mailing Address Line 1:	142 N.C. Route 561 East		**Phone No. ( )**	(252) 209-6032	**Fax No. ( )**
Mailing Address Line 2:			**Zip Code:**	28341	**County:** Sampson
City:	Ahoskie	**State:** North Carolina	**Email Address:**	Joe.Harrell@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.

REVISED 1/07

Attach Additional Sheets As Necessary

FORM D1

FACILITY-WIDE EMISSIONS SUMMARY

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)
AIR POLLUTANT EMITTED	tons/yr	tons/yr	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 - FACILITY-WIDE

		EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)
HAZARDOUS AIR POLLUTANT EMITTED	**CAS NO.**	tons/yr	tons/yr	tons/yr
		See Emission Calculations in Appendix B		

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 Emission Calculations in Appendix B				

COMMENTS:

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 IES-GWHS	N/A	15A NCAC 02Q .0102 (c)(2)(E) -low emissions, see Appendix B
2.	Dried Wood Handling and Sizing Operations IES-DWHS	N/A	15A NCAC 02Q .0102 (c)(2)(E) -negligible emissions, enclosed
3.	Emergency Generator Diesel Fuel Storage Tank TK-1	Up to 2,500 gallons	15A NCAC 02Q .0102 (c)(1)(D)
4.	Firewater Pump Diesel Fuel Storage Tank TK-2	Up to 1,000 gallons	15A NCAC 02Q .0102 (c)(1)(D)
5.	Green Wood Storage Piles IES-GWSP1 and IES-GWSP2	N/A	15A NCAC 02Q .0102 (c)(2)(E) -low emissions, see Appendix B
6.	Debarker IES-DEBARK-1	N/A	15A NCAC 02Q .0102 (c)(2)(E) -negligible emissions
7.	Green Wood Fuel Bin IES-GWFB	13.93 ODT/hr	15A NCAC 02Q .0102 (c)(2)(E) -no quantifiable emissions
8.	Mobile Fuel Diesel Tank TK-3	Up to 2,500 gallon	15A NCAC 02Q .0102 (c)(1)(D)
9.			
10.			

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.

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, M. Dale Overcash, attest that this application for Enviva Pellets Hamlet, 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.

(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)

NAME: M. Dale Overcash
DATE: 1/14/2014
COMPANY: Trinity Consultants of North Carolina P.C.
ADDRESS: One Copley Parkway, Suite 310, Morrisville, NC 27560
TELEPHONE: (919) 462-9693
SIGNATURE: M. Dale Overcash
PAGES CERTIFIED: Entire Application

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

PLACE NORTH CAROLINA SEAL HERE

Attach Additional Sheets As Necessary

FORM E1

TITLE V GENERAL INFORMATION

REVISED: 12/01/01

Division of Air Quality - Application for Air Permit to Construct/Operate

E1

IF YOUR FACILITY IS CLASSIFIED AS "MAJOR" FOR TITLE V YOU MUST COMPLETE THIS FORM AND ALL OTHER REQUIRED "E" FORMS (E2 THROUGH E5 AS APPLICABLE)

Indicate here if your facility is subject to Title V by: **X Emissions** ☐ Other

If subject to Title V by other, check or specify: ☐ NSPS ☐ NESHAPS (MACT) ☐ TITLE IV

Other, specify:

If you are or will be subject to any maximum achievable control technology standards (MACT) issued pursuant to section 112(d) of the Clean Air Act, specify below:

EMISSION SOURCE ID	***EMISSION SOURCE DESCRIPTION***	***MACT***
ES-EG, ES-FWP	Emergency Generator and Firepump	Subpart ZZZZ
ES-DRYER	Green Wood Direct-Fired Dryer Syst	40 CFR 63 Subpart B, [112(g)]

List any additional regulation which are requested to be included in the shield and provide a detailed explanation as to why the shield should be granted:

REGULATION	***EMISSION SOURCE (Include ID)***	***EXPLANATION***
15A NCAC 2D .1111 *(Subpart DDDD)*	All sources at site	A pellet manufacturing facility has operations similar to a PCWP fa as defined by the rule, but a pellet manufacturing facility and it's or are not included in this subpart.

Comments:

Attach Additional Sheets As Necessary

FORM E2
EMISSION SOURCE APPLICABLE REGULATION LISTING

REVISED 12/01/01

Division of Air Quality - Application for Air Permit to Construct/Operate

E2

EMISSION SOURCE ID NO.	EMISSION SOURCE DESCRIPTION	OPERATING SCENARIO INDICATE PRIMARY (P) OR ALTERNATIVE (A)	POLLUTANT	APPLICABLE REGULATION
See attached table following Form E3 for a summary of regulatory requirements and associated compliance requirements				

Attach Additional Sheets As Necessary

FORM E3
EMISSION SOURCE COMPLIANCE METHOD

REVISED 12/01/01 — **NCDENR/Division Of Air Quality - Application for Air Permit to Construct/Operate** — **E3**

Emission Source ID NO. **See attached table following Form E3 for a summary of regulatory requirements and associated compliance requirements**

Regulated Pollutant _____

Applicable Regulation

Alternative Operating Scenario (AOS) NO:

ATTACH A SEPARATE PAGE TO EXPAND ON ANY OF THE BELOW COMMENTS

MONITORING REQUIREMENTS

Is Compliance Assurance Monitoring (CAM) 40 CFR Part 64 Applicable? ☐ Yes ☐ No

If yes, is CAM Plan Attached (if applicable, CAM plan must be attached)? ☐ Yes ☐ No

Describe Monitoring Device Type:

Describe Monitoring Location:

Other Monitoring Methods (Describe In Detail):

Describe the frequency and duration of monitoring and how the data will be recorded (i.e., every 15 minutes, 1 minute instantaneous readings taken to produce an hourly average):

RECORDKEEPING REQUIREMENTS

Data (Parameter) being recording:

Frequency of recordkeeping (How often is data recorded?):

REPORTING REQUIREMENTS

Generally describe what is being reported:

Frequency: ☐ MONTHLY ☐ QUARTERL ☐ EVERY 6 MONTHS

OTHER (DESCRIBE):

TESTING

Specify proposed reference test method:

Specify reference test method rule and citation:

Specify testing frequency:

NOTE - Proposed test method subject to approval and possible change during the test protocol process

Attach Additional Sheets As Necessary

Summary of Title V Applicable Regulations and Compliance Demonstration Procedures
Enviva Pellets Hamlet, LLC

Emission Source Description and ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Wood-fired Dryer System (ES-DRYER)	PM/ PM10/PM2.5	15A NCAC 2D .0515	WESP	PM emissions shall be controlled by a an ESP. To ensure compliance, daily verification of power and rapper operations are functioning. Monthly visual inspection of the ductwork and material collection units. Every 24 months internal inspection of the structural integrity.	Written or electronic log of date and time of each inspection, results of inspection and maintenance, and variance from manufacturer's recommendation	Any maintenance performed on the scrubber within 30 days of a written request by DAQ. Semi-annual progress report and annual compliance certification
Hammermill Area (ES-HMA)						
Coarse Hammermills (ES-HM-1 through 7)						
Pellet Mill Feed Silo (ID No. ES-PMFS)			Fabric Filter	Inspections and maintenance, including monthly inspection of ductwork and annual internal inspection of bagfiller integrity	Written or electronic log of date and time of each inspection, results of inspection and maintenance, and variance from manufacturer's recommendation	Semi-annual progress report and annual compliance certification
Pellet Fines Bin (ES-PFB)						
Finished Product Handling (ES-FPH)						
Pellet Presses & Coolers (ES-CLR-1 through 6)			Cyclones	Inspections and maintenance, including monthly inspection of ductwork and annual internal inspection of cyclone	Written or electronic log of date and time of each inspection, results of inspection and maintenance, and variance from manufacturer's recommendation	Semi-annual progress report and annual compliance certification
Green Wood Hammermills (ES-GHM-1 & 2)						
Wood-fired Dryer System (ES-DRYER)	SO2	15A NCAC 2D .0516	WESP	None required because inherently low sulfur content of wood fuel achieves compliance		
Emergency Generator (ID No. ES-EG) and Fire Water Pump (ID No. ES-FWP)	SO2	15A NCAC 2D .0516	N/A	None required because inherently low sulfur content of fuel achieves compliance		
Wood-fired Dryer System (ES-DRYER)	Opacity	15A NCAC 2D. 0521	WESP	Monthly visible observation for "normal." If above normal, correct action or Method 9 observation required	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of the corrective action	Semi-annual progress report and annual compliance certification
Hammermill Area (ES-HMA)						
Coarse Hammermills (ES-HM-1 through 7)			Fabric Filter			
Pellet Mill Feed Silo (ID No. ES-PMFS)						
Pellet Fines Bin (ES-PFB)						
Finished Product Handling (ES-FPH)			Cyclones			
Pellet Presses & Coolers (ES-CLR-1 through 6)						
Green Wood Hammermills (ES-GHM-1 & 2)						
Emergency Generator (ID No. ES-EG) Fire Water Pump (ID No. ES-FWP)	Opacity	15A NCAC 2D. 0521	N/A	Monthly visible observation for "normal." If above normal, correct action or Method 9 observation required	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of the corrective action	Semi-annual progress report and annual compliance certification
Emergency Generator (ID No. ES-EG) Fire Water Pump (ID No. ES-FWP)	PM, CO, NOx, NMHC, SO2	40 CFR Part 60 Subpart IIII	N/A	All requirements as outlined in the regulation, including the following: use certified emergency engines, operate according to manufacturers procedures, use fuel oil with fuel content of no more than 15 ppmw sulfur and cetane index of at least 40, install non-resettable hours meter	Maintain records of engine certification, fuel certifications and hours/year of operation of each engine	N/A
Emergency Generator (ID No. ES-EG) Fire Water Pump (ID No. ES-FWP)	HAPs	40 CFR Part 63 Subpart ZZZZ	N/A	Comply with the NSPS requirements above and no other requirements apply	Comply with the NSPS requirements above and no other requirements apply	N/A
Wood-fired Dryer System (ES-DRYER)	PM/ PM10/PM2.5 NOx	PSD	Cyclones + WESP	See Proposed BACT Limit Table 4-2 of Application		
Hammermill Area (ES-HMA)	PM/ PM10/PM2.5					
Coarse Hammermills (ES-HM-1 through 7)	PM/ PM10/PM2.5		Fabric Filter			
Pellet Mill Feed Silo (ID No. ES-PMFS)	PM/ PM10/PM2.5					
Pellet Fines Bin (ES-PFB)	PM/ PM10/PM2.5					
Finished Product Handling (ES-FPH)	PM/ PM10/PM2.5					
Pellet Presses & Coolers (ES-CLR-1 through 6)	PM/ PM10/PM2.5		Cyclones			
Green Wood Hammermills (ES-GHM-1 & 2)	PM/ PM10/PM2.5					

FORM E4
EMISSION SOURCE COMPLIANCE SCHEDULE

COMPLIANCE STATUS WITH RESPECT TO ALL APPLICABLE REQUIREMENTS

Will each emission source at your facility be in compliance with all applicable requirements at the time of permit issuance and continue to comply with these requirements?

X Yes No **If NO**, complete **A** through **F** below for each requirement for which compliance is not achieved.

Will your facility be in compliance with all applicable requirements taking effect during the term of the permit and meet such requirements on a timely basis?

X Yes No **If NO**, complete **A** through **F** below for each requirement for which compliance is not achieved.

If this application is for a modification of existing emissions source(s), is each emission source currently in compliance with all applicable requirements?

X Yes No **If NO**, complete **A** through **F** below for each requirement for which compliance is not achieved.

A. Emission Source Description (Include ID NO.) _____

B. Identify applicable requirement for which compliance is not achieved:

_____

C. Narrative description of how compliance will be achieved with this applicable requirements:

_____

D. Detailed Schedule of Compliance:

Step(s)	Date Expected

E. Frequency for submittal of progress reports (6 month minimum): _____

F. Starting date of submittal of progress reports: _____

Attach Additional Sheets As Necessary

FORM E5

TITLE V COMPLIANCE CERTIFICATION (Required)

Revised 01/01/07

NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate

E5

In accordance with the provisions of Title 15A NCAC 2Q .0520 and .0515(b)(4) the responsible company official of:

SITE NAME: Enviva Pellets Hamlet, LLC

SITE ADDRESS: Highway 117 (Street Number TBD)

CITY, NC : Hamlet, NC

COUNTY: Richmond

PERMIT NUMBER : N/A

Received
JAN 15 2014
Air Permits Section

CERTIFIES THAT(Check the appropriate statement(s):

[X] The facility is in compliance with all applicable requirements

[ ] In accordance with the provisions of Title 15A NCAC 2Q .0515(b)(4) the responsible company official certifiies that the proposed minor modification meets the criteria for using the procedures set out in 2Q .0515 and requests that these procedures be used to process the permit application.

[ ] The facility is not currently in compliance with all applicable requirements
If this box is checked, you must also complete form E4 "Emission Source Compliance Schedule"

The undersigned certifies under the penalty of law, that all information and statements provided in the application, based on information and belief formed after reasonable inquiry, are true, accurate, and complete.

Pete Najera — Date: 1/9/14

Signature of responsible company official (REQUIRED, USE BLUE INK)

Pete Najera, Vice President of Operations

Name, Title of responsible company official (Type or print)

Attach Additional Sheets As Necessary

Source Specific Forms - Chipper

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: **Chipper**	EMISSION SOURCE ID NO: **ES-CHIP-1**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAIL THE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are screened and oversized chips will undergo additional chipping as required.

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: **Chipper**	EMISSION SOURCE ID NO: **ES-CHIP-1**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are screened and oversized chips will undergo additional chipping as required.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS			
TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
Green Wood	**ODT**	**71.71**	

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

Source Specific Forms - Green Wood Hammermills

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 Hammermills**	EMISSION SOURCE ID NO: **ES-GHM-1, 2**
	CONTROL DEVICE ID NO(S): **CD-GHM-CYC**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-6**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are screened and oversized chips will undergo additional chipping as required.

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: Green Wood Hammermills	EMISSION SOURCE ID NO: ES-GHM-1, 2
	CONTROL DEVICE ID NO(S): CD-GHM-CYC
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-6

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are screened and oversized chips will undergo additional chipping as required.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
Green Wood	ODT	71.71	

MATERIALS ENTERING PROCESS - BATCH OPERATION

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/BATCH)	REQUESTED CAPACITY 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-GHM-CYC	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-GHM-1,2
EMISSION POINT (STACK) ID NO(S): EP-6	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: Aircon [1]	MODEL NO: AC-96
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: 2Q2014
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 the combined stack for the two (2) Green Wood Hammermills to capture bulk PM emissions entrained in aspiration air.

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANT(S) COLLECTED:				
BEFORE CONTROL EMISSION RATE (LB/HR):	See calculations in Appendix B			
CAPTURE EFFICIENCY:	98.0 %	98.0 %	98.0 %	%
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 6.0"	WARNING ALARM? ○ YES ○ NO	
INLET TEMPERATURE (°F): MIN	MAX Ambient	OUTLET TEMPERATURE (°F): MIN	MAX Ambient
INLET AIR FLOW RATE (ACFM):	27,554	BULK PARTICLE DENSITY (LB/FT³):	3.57E-05
POLLUTANT LOADING RATE (GR/FT³):	0.250		

SETTLING CHAMBER	CYCLONE					MULTICYCLONE
LENGTH (INCHES):	INLET VELOCITY (FT/SEC):	114.65		(CIRCULAR) ○ RECTANGLE		NO. TUBES:
WIDTH (INCHES):	*DIMENSIONS (INCHES) See instructions*			*IF WET SPRAY UTILIZED*		DIAMETER OF TUBES:
HEIGHT (INCHES):	H:	60	Dd: 20	LIQUID USED:		HOPPER ASPIRATION SYSTEM?
VELOCITY (FT/SEC.):	W:	32.25	Lb: 60	FLOW RATE (GPM):		○ YES ○ NO
NO. TRAYS:	De:	45	Lc: 120	MAKE UP RATE (GPM):		LOUVERS?
NO. BAFFLES:	D:	96	S: 64.75			○ 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 discharge to the atmosphere.

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.

Source Specific Forms - Portable Chipper

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: **Portable Chipper (up to 1,300 bhp)**	EMISSION SOURCE ID NO: **ES-CHIP-2**
OPERATING SCENARIO **1** OF **1**	CONTROL DEVICE ID NO(S): **N/A**
	EMISSION POINT (STACK) ID NO(S): **EP-9**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Diesel-fired internal combustion chipper to provide additional chipping to the primary chipper.

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 **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: **Portable Chipper (up to 1,300 bhp)**	EMISSION SOURCE ID NO: **ES-CHIP-2**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-9**

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 (complete below) ☐ DUAL FUEL ENGINE ☐ OTHER (DESCRIBE):

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

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

OR ☐ STATIONARY GAS TURBINE (complete below)

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

CYCLE: ☐ COGENERATION ☐ SIMPLE ☐ REGENERATIVE ☐ COMBINED

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

☐ NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

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

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

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

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

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

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

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

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

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: Portable Chipper	EMISSION SOURCE ID NO: ES-CHIP-2
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-9

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are screened and oversized chips will undergo additional chipping as required.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Green Wood	ODT	71.71	

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

Source Specific Forms - Bark Hog

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: **Barkhog**	EMISSION SOURCE ID NO: **ES-BARKHOG**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood bark fuel is sent to the bark hog to break up bark into smaller pieces prior to the dryer.

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: **Barkhog**	EMISSION SOURCE ID NO: **ES-BARKHOG**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood bark fuel is sent to the bark hog to break up bark into smaller pieces prior to the dryer.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Green Wood	**ODT**	**8.02**	

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

Source Specific Forms - Dryer Source

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**
OPERATING SCENARIO **1** OF **1**	CONTROL DEVICE ID NO(S): **CD-DC, CD-WESP**
	EMISSION POINT (STACK) ID NO(S): **EP-1**

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 175.3 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-1**

DESCRIBE USE: ◉ PROCESS HEAT ○ SPACE HEAT ○ ELECTRICAL GENERATION
○ CONTINUOUS USE ○ STAND BY/EMERGENCY ○ OTHER (DESCRIBE): _____

HEATING MECHANISM: ○ INDIRECT ◉ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): **175.3**

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	MMBtu	175.3	

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-1**	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 :
Three identical simple cyclones are equipped to the discharge of the rotary dryer system to capture bulk PM emissions. Emissions from each the cyclones are combined into a common duct and are routed to the WESP. The parameters presented here are per each cyclone:

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

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

INLET TEMPERATURE (°F): MIN MAX **Nominal 400**	OUTLET TEMPERATURE (°F): MIN MAX **Nominal 400**
INLET AIR FLOW RATE (ACFM): **117,000**	BULK PARTICLE DENSITY (LB/FT³): **3.43E-05**
POLLUTANT LOADING RATE (GR/FT³ **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: 156"	FLOW RATE (GPM):	☐ YES ☐ NO
NO. TRAYS:	De: 79"	Lc: 312"	MAKE UP RATE (GPM):	LOUVERS?
NO. BAFFLES:	D: 156"	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-1**	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): **117,000**	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): **117,000**	INLET MOISTURE PERCENT: MIN **40%** MAX **50%**
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

Source Specific Forms - Hammermills & Hammermill Area

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:**8 Hammermills**	EMISSION SOURCE ID NO: **ES-HM-1 thru 8**
	CONTROL DEVICE ID NO(S): **CD-HM-CYC-1 through 8**, **CD-HM-BF1 through 3**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-2**

DESCRIBE IN DETAIL THE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dried materials are reduced to the appropriate size needed for pelletization using eight 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: **8 Hammermills**	EMISSION SOURCE ID NO: **ES-HM-1 thru 8**
	CONTROL DEVICE ID NO(S): **CD-HM-CYC-1 through 8**; **CD-HM-BF1 through 3**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-2 through 4**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Dried materials are reduced to the appropriate size needed for pelletization using eight hammermills.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Dried Wood	**ODT**	**71.71**	

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 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**	EMISSION SOURCE ID NO: **ES-HMA**
OPERATING SCENARIO 1 OF 1	CONTROL DEVICE ID NO(S): **CD-HM-BF-3**
	EMISSION POINT (STACK) ID NO(S): **EP-2**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Hammermill area dust from the hammermill and screening operations will be vented to the hammermill bagfilter No. 3 (CD-HM-BF-3) to control particulate matter emissions.

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: **1Q2014**	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: **Hamermill Area**	EMISSION SOURCE ID NO: **ES-HMA**
OPERATING SCENARIO: 1 OF 1	CONTROL DEVICE ID NO(S): **CD-HM-BF3**
	EMISSION POINT (STACK) ID NO(S): **EP-2**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Hammermill area dust from the hammermill and screening operations will be vented to the hammermill bagfilter No. 3 (CD-HM-BF-3) to control particulate matter emissions.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Dried Wood	**ODT**	**71.71**	

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 thru -8	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-HM-1 through-8
EMISSION POINT (STACK) ID NO(S): EP-2	POSITION IN SERIES OF CONTROLS NO. 1 OF 2 UNITS
MANUFACTURER: Aircon	MODEL NO: AC-96
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: 1Q2014
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION I TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? (YES) ○ NO

DESCRIBE CONTROL SYSTEM :
One cyclone is equipped for each hammermill to capture bulk PM emissions. The emissions from the cyclone are then routed to one of three bagfilters.

POLLUTANT(S) COLLECTED:	PM	PM_{10}	$PM_{2.5}$	
BEFORE CONTROL EMISSION RATE (LB/HR):	See calculations in Appendix B			
CAPTURE EFFICIENCY:	98.0%	98.0%	98.0%	%
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 6.0"	WARNING ALARM? ○ YES ○ NO	
INLET TEMPERATURE (°F): MIN	MAX Ambient	OUTLET TEMPERATURE (°F): MIN	MAX Ambient
INLET AIR FLOW RATE (ACFM):	15,000 each cyclone	BULK PARTICLE DENSITY (LB/FT³):	1.43E-03
POLLUTANT LOADING RATE (GR/FT³):	10 gr/cf inlet		

SETTLING CHAMBER	CYCLONE				MULTICYCLONE
LENGTH (INCHES):	INLET VELOCITY (FT/SEC):	114.65	(○ CIRCULAR) ○ RECTANGLE		NO. TUBES:
WIDTH (INCHES):	*DIMENSIONS (INCHES) See instructions*		*IF WET SPRAY UTILIZED*		DIAMETER OF TUBES:
HEIGHT (INCHES):	H: 60	Dd: 20	LIQUID USED:		HOPPER ASPIRATION SYSTEM?
VELOCITY (FT/SEC.):	W: 32.25	Lb: 60	FLOW RATE (GPM):		○ YES ○ NO
NO. TRAYS:	De: 45	Lc: 120	MAKE UP RATE (GPM):		LOUVERS?
NO. BAFFLES:	D: 96	S: 64.75			○ 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-BF-1 and 2	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-HM-1 through 6
EMISSION POINT (STACK) ID NO(S): EP-2	POSITION IN SERIES OF CONTROLS NO. 2 OF 2 UNITS
MANUFACTURER: Aircon	MODEL NO: 16 RAB 412-10
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: 1Q2014
OPERATING SCENARIO: 1 OF 1	PROPOSED START CONSTRUCTION DATE: TBD
	P.E. SEAL REQUIRED (PER 2Q .0112)? (YES) NO

DESCRIBE CONTROL SYSTEM:
Three (3) bagfilters will be utilized for emission control on seven of the hammermill cyclones. HMs 1 - 3 vent through bagfilter 1, HMs 4-6 vent through bagfilter 2 and the 7-8 cyclonse will be routed routed to the third bagfilter along with hammermill area emissions.

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

PRESSURE DROP (IN. H_2O): MIN: MAX: 6" GAUGE? (YES) NO WARNING ALARM? (YES) NO

BULK PARTICLE DENSITY (LB/FT^3): 1.43E-05	INLET TEMPERATURE (°F): 120
POLLUTANT LOADING RATE: 0.1 gr/cf inlet LB/HR (GR/FT^3)	OUTLET TEMPERATURE (°F): 100
INLET AIR FLOW RATE (ACFM): 45,000	FILTER MAX OPERATING TEMP. (°F): N/A
NO. OF COMPARTMENTS: 1	NO. OF BAGS PER COMPARTMENT: 412
DIAMETER OF BAG (IN.): 5.75	DRAFT: INDUCED/NEG. (FORCED/POS)
AIR TO CLOTH RATIO: 7.20	FILTER MATERIAL: Polyester or equivalent
	LENGTH OF BAG (IN.): 144
	FILTER SURFACE AREA (FT^2): 6,250
	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.

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-HM-BF-3	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-HM-7, 8 and ES-HMA
EMISSION POINT (STACK) ID NO(S): EP-2	POSITION IN SERIES OF CONTROLS NO. 2 OF 2 UNITS
MANUFACTURER: Aircon	MODEL NO: 16 RAB 412-10
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: 1Q2014
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? ◉ YES ○ NO

DESCRIBE CONTROL SYSTEM:
Three (3) bagfilters will be utilized for emission control on seven of the hammermill cyclones. HMs 1 - 3 vent through bagfilter 1, HMs 4-6 vent through bagfilter 2 and the 7-8 cyclones will be routed routed to the third bagfilter along with hammermill area emissions.

POLLUTANT(S) COLLECTED:	PM	PM-10	PM-2.5	
BEFORE CONTROL EMISSION RATE (LB/HR):	See calculations in Appendix B			
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):	1.43E-05	INLET TEMPERATURE (°F):	120
POLLUTANT LOADING RATE:	0.1 gr/cf inlet ○ LB/HR ◉ GR/FT³	OUTLET TEMPERATURE (°F):	100
INLET AIR FLOW RATE (ACFM):	45,000	FILTER MAX OPERATING TEMP. (°F):	N/A
NO. OF COMPARTMENTS:	1	NO. OF BAGS PER COMPARTMENT:	412
DIAMETER OF BAG (IN.):	5.75	DRAFT: ○ INDUCED/NEG. ◉ FORCED/POS	LENGTH OF BAG (IN.): 144
AIR TO CLOTH RATIO:	7.20	FILTER MATERIAL: Polyester or equivalent	FILTER SURFACE AREA (FT²): 6,250
			○ 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 control emissions from the seventh cyclone and hammermill area emisisons.

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.

Source Specific Forms - Pellet Presses & Coolers

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-CLR1 through 6**
OPERATING SCENARIO **1** OF **1**	CONTROL DEVICE ID NO(S): **CD-CLR-1 through 6**
	EMISSION POINT (STACK) ID NO(S): **EP-10 through 15**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Six (6) 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)
- ☐ 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: **2Q2014**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **TBD**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): ____	NESHAP (SUBPART?): ____	MACT (SUBPART?): ____
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%** SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **8,760**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

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

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

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

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: **Pellet Coolers**	EMISSION SOURCE ID NO: **ES-CLR1 through 6**
OPERATING SCENARIO: **1** OF **1**	CONTROL DEVICE ID NO(S): **CD-CLR-1 through 6**
	EMISSION POINT (STACK) ID NO(S): **EP-10 through 15**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Six (6) 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 CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Dried Wood	**ODT**	**76.07**	

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-CLR-1 through 6	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-CLR1 through 6
EMISSION POINT (STACK) ID NO(S): EP-10 through 15	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: TBD[1]	MODEL NO:
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: 2Q2014
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? ◉ YES ○ NO

DESCRIBE CONTROL SYSTEM:
Six (6) identical high efficiency cyclones are to be used to capture bulk PM emissions from six (6) pellet coolers. Each cooler vents to one dedicated cyclone. The cyclones will operate under negative pressure.

POLLUTANT(S) COLLECTED:	PM	PM_{10}	$PM_{2.5}$	
BEFORE CONTROL EMISSION RATE (LB/HR):	See Emissions Calculations in Appendix B			
CAPTURE EFFICIENCY:	90+ %	90+ %	90+ %	%
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): 21,000 each		BULK PARTICLE DENSITY (LB/FT³): 2.86E-05	
POLLUTANT LOADING RATE (GR/FT³): 0.2			

SETTLING CHAMBER	CYCLONE				MULTICYCLONE
LENGTH (INCHES):	INLET VELOCITY (FT/SEC): 94.75			○ CIRCULAR ○ RECTANGLE	NO. TUBES:
WIDTH (INCHES):	*DIMENSIONS (INCHES) See instructions*			*IF WET SPRAY UTILIZED*	DIAMETER OF TUBES:
HEIGHT (INCHES):	H: 38	Dd: 22		LIQUID USED:	HOPPER ASPIRATION SYSTEM? ○ YES ○ NO
VELOCITY (FT/SEC.):	W: 25	Lb: 74.25		FLOW RATE (GPM):	
NO. TRAYS:	De: 32	Lc: 84.5		MAKE UP RATE (GPM):	LOUVERS? ○ YES ○ NO
NO. BAFFLES:	D: 54	S: 44.38			
	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 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.

Source Specific Forms - Pellet Mill Feed Silo

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**
OPERATING SCENARIO **1** OF **1**	CONTROL DEVICE ID NO(S): **CD-PMFS-BV**
	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**
OPERATING SCENARIO: ____ OF ____	CONTROL DEVICE ID NO(S): **CD-PMFS-BV**
	EMISSION POINT(STACK) ID NO(S): **EP-3**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

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

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

PNEUMATICALLY FILLED	MECHANICALLY FILLED		FILLED FROM
☐ BLOWER	☐ SCREW CONVEYOR		☐ RAILCAR
☐ COMPRESSOR	☐ BELT CONVEYOR	MOTOR HP:	☐ TRUCK
☐ OTHER:	☐ BUCKET ELEVATOR		☐ STORAGE PILE
	☐ OTHER:		☐ OTHER: **Conveyor**
NO. FILL TUBES: **TBD**			
MAXIMUM ACFM: **TBD**			

MATERIAL IS FILLED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR):	**105**
MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR):	**105**

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-PMFS
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:	1 OF 1	PROPOSED START CONSTRUCTION DATE:	TBD
		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/FT^3):	1.43E-06	INLET TEMPERATURE (°F):	Ambient
POLLUTANT LOADING RATE:	0.1 ○ LB/HR ◉ GR/FT^3	OUTLET TEMPERATURE (°F):	Ambient
INLET AIR FLOW RATE (ACFM):		FILTER MAX OPERATING TEMP. (°F):	N/A
NO. OF COMPARTMENTS:	1	NO. OF BAGS PER COMPARTMENT: 1	LENGTH OF BAG (IN.): 120
DIAMETER OF BAG (IN.):	5.875	DRAFT: ◉ INDUCED/NEG. ○ FORCED/POS.	FILTER SURFACE AREA (FT^2): 377
AIR TO CLOTH RATIO:	6	FILTER MATERIAL:	○ 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 particulate emissions

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.

Source Specific Forms - Pellet Fines Bin

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 Fines Bin**	EMISSION SOURCE ID NO: **ES-PFB**
OPERATING SCENARIO **1** OF **1**	CONTROL DEVICE ID NO(S): **CD-PFB-BV**
	EMISSION POINT (STACK) ID NO(S): **EP-7**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Fine pellet material from hammermill pollution control system and screening operation is collected in the pellet fines bin which is controlled by a bin vent filter.

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: **2Q2014**	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 Fines Bin**	EMISSION SOURCE ID NO: **ES-PFB**
	CONTROL DEVICE ID NO(S): **CD-PFB-BV**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT(STACK) ID NO(S): **EP-7**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Fine pellet material from hammermill pollution control system and screening operation is collected in the pellet fines bin which is controlled by a bin vent filter.

MATERIAL STORED: **Fine pellet material** — DENSITY OF MATERIAL (LB/FT3): **40**

CAPACITY	CUBIC FEET: **2200**		TONS:			
DIMENSIONS (FEET)	HEIGHT:	DIAMETER: **12** ***(OR)***	LENGTH:	WIDTH:	HEIGHT:	
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:		MAXIMUM DESIGN CAPACITY: **6 tph**			

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: **TBD**

MAXIMUM ACFM: **TBD**

MATERIAL IS FILLED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

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-PFB-BV	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-PFB
EMISSION POINT (STACK) ID NO(S): EP-7	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: Aircon	MODEL NO: 36-6
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: 2Q2014
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 baghouse collects dust from when wood enters or exits the silo and displaces air.

POLLUTANT(S) COLLECTED:	PM	PM_{10}	$PM_{2.5}$	
BEFORE CONTROL EMISSION RATE (LB/HR):	See calculations in Appendix B			
CAPTURE EFFICIENCY:	~99 %	~99 %	~99 %	%
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-05

POLLUTANT LOADING RATE: 0.1 LB/HR (GR/FT^3)

INLET AIR FLOW RATE (ACFM): 3,600

INLET TEMPERATURE (°F): Ambient

OUTLET TEMPERATURE (°F): Ambient

FILTER MAX OPERATING TEMP. (°F): N/A

NO. OF COMPARTMENTS: TBD

NO. OF BAGS PER COMPARTMENT: TBD

DIAMETER OF BAG (IN.):

LENGTH OF BAG (IN.): TBD

DRAFT: (INDUCED/NEG.) FORCED/POS.

AIR TO CLOTH RATIO: 11.08

FILTER SURFACE AREA (FT^2): 325

FILTER MATERIAL: 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		
1-10		
10-25		
25-50		
50-100		
>100		
	TOTAL = 100	

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

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

Specific Forms - Final Product Handling

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: **Finished Product Handling/ Pellet Loadout Bins / Pellet Loadout**	EMISSION SOURCE ID NO: **ES-FPH, ES-PB1 & 2, ES-PL**
OPERATING SCENARIO **1** OF **1**	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
	EMISSION POINT (STACK) ID NO(S): **EP-8**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Pelletized product is conveyed to the pellet loadout bins (PB-1 & 2) that feed the pellet railcar operations (can also be used as truck loadout if needed) (ES-PL). Emissions from the Pellet Loadout Bins are controlled by a bagfilter. Pellet Loadout is accomplished by gravity feed of the pellets into trucks or railcars through a covered shoot to prevent emissions. Although emissions to the atmosphere from conveyance from the storage bins are minimal because dried wood fines have been removed in the pellet coolers, a slight negative pressure is maintained in the loadout building a fire prevention measure to prevent any buildup of dust on surfaces within the building. The slight negative pressure is produced via an induced draft fan that exhausts to the same bagfilter that controls minor dust emissions from loading of the pellet press bins. Trucks and railcars are covered immediately after loading.

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: **1Q2014**	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: **Finished Product Handling**	EMISSION SOURCE ID NO: **ES-FPH**
	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-8**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Collection of transfer points, pellet screening operations, and pellet conveying.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Dried Wood	**ODT**	**74.94**	

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 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 Loadout Bins**	EMISSION SOURCE ID NO: **ES-PB1 & 2**
	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): **EP-8**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Pellet loadout bins are used to store pellets for shipping. Pellets are then loaded from the bins into trucks/train in the three pellet loadout area. The bins will be used for storage of pellets for the truck or train loadout.

MATERIAL STORED: **Pellet Product**				DENSITY OF MATERIAL (LB/FT3): **40**		
CAPACITY	CUBIC FEET:			TONS:		
DIMENSIONS (FEET)	HEIGHT:	DIAMETER: **12**	***(OR)***	LENGTH:	WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY:	**71.19 ODT/hr**	

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

NO. FILL TUBES:

MAXIMUM ACFM: **750 each**

MATERIAL IS FILLED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: **Pellet Loadout**	EMISSION SOURCE ID NO: **ES-PL**
OPERATING SCENARIO: **1** OF **1**	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
	EMISSION POINT (STACK) ID NO(S): **EP-8**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Final product is loaded into railcar, or alteranately can also be loaded into trucks if needed..

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (ODT)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Dried Wood	**ODT**	**70.83**	

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 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-FBH-BF	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-FPH, ES-PB-1 & 2, ES-PL
EMISSION POINT (STACK) ID NO(S): EP-8	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: Aircon	MODEL NO: TBD
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: 2Q2014
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 to control particulate form the finished product handling pellet conveyers and screens, as well as the pellet load out operation consisting of loading finished product from the bins into the railcars or trucks.

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

PRESSURE DROP (IN. H_2O): MIN:	MAX: 6"	GAUGE? ◉ YES ○ NO	WARNING ALARM? ○ YES ◉ NO
BULK PARTICLE DENSITY (LB/FT^3):	1.43E-05	INLET TEMPERATURE (°F):	120
POLLUTANT LOADING RATE:	0.10 ○ LB/HR ◉ GR/FT^3	OUTLET TEMPERATURE (°F):	100
INLET AIR FLOW RATE (ACFM):	35,500	FILTER MAX OPERATING TEMP. (°F):	N/A
NO. OF COMPARTMENTS:	1	NO. OF BAGS PER COMPARTMENT:	
DIAMETER OF BAG (IN.):	5.75	DRAFT: ○ INDUCED/NEG. ◉ FORCED/POS	LENGTH OF BAG (IN.): 144
AIR TO CLOTH RATIO:	7.30	FILTER MATERIAL: Polyester or equivalent	FILTER SURFACE AREA (FT^2): 4,842
			○ 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.

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.

Source Specific Forms - Emergency Generator & Fire pump

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 (250 bhp)**	EMISSION SOURCE ID NO: **ES-EG**
OPERATING SCENARIO **1** OF **1**	CONTROL DEVICE ID NO(S): **N/A**
	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 bhp)**	EMISSION SOURCE ID NO: **ES-GN**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-4**

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

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

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

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

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

OR ☐ STATIONARY GAS TURBINE (complete below)

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

CYCLE: ☐ COGENERATION ☐ SIMPLE ☐ REGENERATIVE ☐ COMBINED

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

☐ NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

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

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

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

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

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

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

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

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

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Fire Water Pump (250 bhp)**	EMISSION SOURCE ID NO: **ES-FWP**
OPERATING SCENARIO 1 OF 1	CONTROL DEVICE ID NO(S): **N/A**
	EMISSION POINT (STACK) ID NO(S): **EP-5**

DESCRIBE IN DETAIL THE 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 (250 bhp)**

EMISSION SOURCE ID NO: **ES-FWP**
CONTROL DEVICE ID NO(S): **N/A**
EMISSION POINT (STACK) ID NO(S): **EP-5**

OPERATING SCENARIO: 1 OF 1

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

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 (complete below) ☐ DUAL FUEL ENGINE (complete below) ☐ OTHER (DESCRIBE):

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/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

TABLE B-1
PSD APPLICABILITY SUMMARY
ENVIVA PELLET HAMLET, LLC

Source Description	Unit ID	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	VOC (tpy)	Pb (tpy)	CO_{2e} (tpy)	$CO_{2e\ biomass\ deferral}$ [1] (tpy)
Dryer System	ES-DRYER	73.29	160.37	33.03	33.03	33.03	17.57	1,030.69	0.00	162,119	3,341
Emergency Generator	ES-EG	0.36	0.41	0.02	0.02	0.02	0.0002	0.41	-	67	67
Fire Water Pump	ES-FWP	0.36	0.41	0.02	0.02	0.02	0.0002	0.41	-	67	67
Backup Chipper	ES-CHIP-2	1.87	3.42	0.11	0.11	0.11	0.001	3.42	-	347	347
Hammermills/ Hammermill Area	ES-HM-1 thru 8/ ES-HMA	-	-	15.20	15.20	15.20	-	204.08	-	-	-
Pellet Mill Feed Silo	ES-PMFS	-	-	0.28	0.28	0.28	-	-	-	-	-
Pellet Mill Fines Bin	ES-PFB	-	-	0.41	0.41	0.41	-	-	-	-	-
Pellet Presses and Coolers	ES-CLR1 thru -6	-	-	94.61	16.56	1.89	-	660.57	-	-	-
Log Bark Hog	ES-BARKHOG							0.40			
Log Chipping	ES-CHIP-1	-	-	-	-	-	-	1.44	-	-	-
Green Wood Hammermills	ES-GHM-1, ES-GHM-2	-	-	25.86	1.81	0.21	-	316.25	-	-	-
Finished Product Handling/ Pellet Loadout Bins/ Pellet Loadout Area	ES-FPH/ ES-PL/ ES-PB-1 & 2	-	-	4.00	3.64	2.20	-	-	-	-	-
Paved Roads		-	-	1.38	0.28	0.07	-	-	-	-	-
Unpaved Roads		-	-	3.11	0.79	0.08	-	-	-	-	-
Green Wood Sizing & Handling	IES-GWH	-	-	0.016	0.008	0.001	-	-	-	-	-
Green Wood Storage Piles	IES-GWSP1 & 2	-	-	1.41	0.71	0.11	-	1.11	-	-	-
Diesel Storage Tanks	TK1, TK2, & TK3	-	-	-	-	-	-	7.57E-03	-	-	-
Project Emissions		**75.88**	**164.61**	**179.46**	**72.86**	**53.62**	**17.57**	**2,219**	**0.00**	**162,599**	**3,822**
PSD Significant Emission Rate		**100**	**40**	**25**	**15**	**10**	**40**	**40**	**0.60**	**75,000**	**75,000**
PSD Review Required		**No**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**

1. CO_{2e} does not include CO_2 from biomass combustion.

TABLE B-2
FACILITYWIDE HAP EMISSIONS SUMMARY
ENVIVA PELLETS HAMLET, LLC

Description	ES-DRYER (tpy)	ES-EG (tpy)	ES-FWP (tpy)	ES-HM-1 through 7 (tpy)	ES-CLR-1 through 6 (tpy)	ES-BARKHOG (tpy)	ES-CHIP-1 (tpy)	ES-GHM-1 & 2 (tpy)	Total (tpy)
1,3-Butadiene	-	1.71E-05	1.71E-05	-	-	-	-	-	0.00
Acetaldehyde	1.64E+01	3.36E-04	3.36E-04	2.71E+00	8.10E+00	-	-	-	27.26
Acetophenone	1.40E-08	-	-	-	-	-	-	-	0.00
Acrolein	5.04E+00	4.05E-05	4.05E-05	8.31E-01	2.48E+00	-	-	-	8.36
Antimony & Compounds	4.40E-04	-	-	-	-	-	-	-	0.00
Arsenic & Compounds	1.22E-03	-	-	-	-	-	-	-	0.00
Benzene	1.67E+00	4.08E-04	4.08E-04	2.75E-01	8.21E-03	-	-	-	1.95
Beryllium metal (un-reacted) (Also include in BEC)	6.12E-05	-	-	-	-	-	-	-	0.00
Cadmium Metal (elemental un-reacted) –(Add w/CDC)	2.28E-04	-	-	-	-	-	-	-	0.00
Carbon tetrachloride	3.46E-02	-	-	-	-	-	-	-	0.03
Chlorine	6.07E-01	-	-	-	-	-	-	-	0.61
Chlorobenzene	2.53E-02	-	-	-	-	-	-	-	0.03
Chromium-Other compds (add w/chrom acid to get CRC)	9.74E-04	-	-	-	-	-	-	-	0.00
Cobalt compounds	3.62E-04	-	-	-	-	-	-	-	0.00
Chloroform	2.19E-02	-	-	3.61E-03	1.08E-02	-	-	-	0.04
Cumene	4.39E-01	-	-	7.23E-02	2.16E-01	-	-	-	0.73
Dinitrophenol, 2,4-	1.38E-04	-	-	-	-	-	-	-	0.00
Di(2-ethylhexyl)phthalate (DEHP)	3.61E-05	-	-	-	-	-	-	-	0.00
Ethyl benzene	2.38E-02	-	-	-	-	-	-	-	0.02
Ethylene dichloride (1,2-dichloroethane)	2.23E-02	-	-	-	-	-	-	-	0.02
Formaldehyde	3.07E+01	5.16E-04	5.16E-04	5.06E+00	1.51E+01	-	-	-	50.89
Hydrogen chloride (hydrochloric acid)	1.46E+00	-	-	-	-	-	-	-	1.46
Lead and Lead compounds	2.67E-03	-	-	-	-	-	-	-	0.00
m,p-Xylene	1.05E+00	1.25E-04	1.25E-04	1.74E-01	5.19E-01	-	-	-	1.74
Manganese & compounds	8.91E-02	-	-	-	-	-	-	-	0.09
Mercury, vapor (Include in Mercury&Compds)	2.69E-03	-	-	-	-	-	-	-	0.00
Methanol	2.41E+01	-	-	3.98	11.88	0.08	0.29	2.10	42.45
Methyl bromide (bromomethane)	1.15E-02	-	-	-	-	-	-	-	0.01
Methyl chloride (chloromethane)	1.77E-02	-	-	-	-	-	-	-	0.02
Methyl chloroform (1,1,1 trichloroethane)	2.38E-02	-	-	-	-	-	-	-	0.02
Methyl ethyl ketone	4.15E-03	-	-	-	-	-	-	-	0.00
Methyl isobutyl ketone	1.51E+00	-	-	2.49E-01	7.45E-01	-	-	-	2.51
Methylene chloride	3.95E-01	-	-	6.51E-02	1.94E-01	-	-	-	0.65
Nickel metal (Component of Nickel & Compounds)	2.53E-02	-	-	-	-	-	-	-	0.03
Nitrophenol, 4-	8.45E-05	-	-	-	-	-	-	-	0.00
o-Xylene	9.87E-02	-	-	1.63E-02	4.86E-02	-	-	-	0.16
Pentachlorophenol	3.92E-05	-	-	-	-	-	-	-	0.00
Perchloroethylene (tetrachloroethylene)	2.92E-02	-	-	-	-	-	-	-	0.03
Phenol	6.14E+00	-	-	1.01E+00	3.03E+00	-	-	-	10.18
Phosphorus Metal, Yellow or White	2.07E-02	-	-	-	-	-	-	-	0.02
Polychlorinated biphenyls	6.26E-06	-	-	-	-	-	-	-	0.00
Propionaldehyde	2.85E+00	-	-	4.70E-01	1.40E+00	-	-	-	4.73
Propylene dichloride (1,2 dichloropropane)	2.53E-02	-	-	-	-	-	-	-	0.03
Selenium compounds	2.15E-03	-	-	-	-	-	-	-	0.00
Styrene	7.89E-02	-	-	1.30E-02	3.89E-02	-	-	-	0.13
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	6.60E-09	-	-	-	-	-	-	-	0.00
Toluene	2.85E+00	1.79E-04	1.79E-04	4.70E-01	1.40E+00	-	-	-	4.73
Total PAH (POM)	9.60E-02	7.35E-05	7.35E-05	-	-	-	-	-	0.10
Trichloroethylene	2.30E-02	-	-	-	-	-	-	-	0.02
Trichlorophenol, 2,4,6-	1.69E-05	-	-	-	-	-	-	-	0.00
Vinyl chloride	1.38E-02	-	-	-	-	-	-	-	0.01
TOTAL HAPs	**95.98**	**1.69E-03**	**1.69E-03**	**15.40**	**45.21**	**0.08**	**0.29**	**2.10**	**159.07**
MAX INDIVIDUAL HAP	**Formaldehyde**	**Formaldehyde**	**Formaldehyde**	**Methanol**	**Methanol**	**Methanol**	**Methanol**	**Methanol**	**Methanol**
MAX INDIVIDUAL HAP VALUE	**30.70**	**5.16E-04**	**5.16E-04**	**5.06**	**15.13**	**0.08**	**0.29**	**2.10**	**50.89**

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

TAP Emissions

Description		Dryer			Hammermills			Pellet Coolers			Portable Chipper			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)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)
1,3-Butadiene	106-99-0										3.56E-04	8.54E-03	1.78E-01	6.84E-05	1.64E-03	3.42E-02	6.84E-05	1.64E-03	3.42E-02	4.93E-04	1.18E-02	2.46E-01
Acetaldehyde	75-07-0	5.38E+00	1.29E+02	3.29E+04	8.87E-01	2.13E+01	5.42E+03	2.65E+00	6.36E+01	1.62E+04	6.98E-03	1.68E-01	3.49E+00	1.34E-03	3.22E-02	6.71E-01	1.34E-03	3.22E-02	6.71E-01	8.92E+00	2.14E+02	5.45E+04
Acrolein	107-02-8	1.65E+00	3.96E+01	1.01E+04	2.72E-01	6.52E+00	1.66E+03	8.13E-01	1.95E+01	4.97E+03	8.42E-04	2.02E-02	4.21E-01	1.62E-04	3.89E-03	8.09E-02	1.62E-04	3.89E-03	8.09E-02	2.73E+00	6.56E+01	1.67E+04
Arsenic		2.80E-04	6.71E-03	2.45E+00																2.80E-04	6.71E-03	2.45E+00
Benzene	71-43-2	5.45E-01	1.31E+01	3.33E+03	8.98E-02	2.16E+00	5.49E+02	2.69E-03	6.44E-02	1.64E+01	8.49E-03	2.04E-01	4.25E+00	1.63E-03	3.92E-02	8.16E-01	1.63E-03	3.92E-02	8.16E-01	6.49E-01	1.56E+01	3.91E+03
Benzo(a)pyrene	50-32-8	4.56E-04	1.09E-02	3.99E+00							1.71E-06	4.11E-05	8.55E-04	3.29E-07	7.90E-06	1.65E-04	3.29E-07	7.90E-06	1.65E-04	4.58E-04	1.10E-02	3.99E+00
Beryllium		1.40E-05	3.36E-04	1.22E-01																1.40E-05	3.36E-04	1.22E-01
Cadmium		5.21E-05	1.25E-03	4.56E-01																5.21E-05	1.25E-03	4.56E-01
Carbon Tetrachloride		7.89E-03	1.89E-01	6.91E+01																7.89E-03	1.89E-01	6.91E+01
Chlorine		1.38E-01	3.32E+00	1.21E+03																1.38E-01	3.32E+00	1.21E+03
Chlorobenzene		5.78E-03	1.39E-01	5.07E+01																5.78E-03	1.39E-01	5.07E+01
Chloroform	67-66-3	7.17E-03	1.72E-01	4.39E+01	2.36E-02	5.67E-01	1.45E+02	3.53E-03	8.48E-02	2.16E+01				0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E-02	8.24E-01	2.10E+02
Chromic acid (Chromium VI)	7738-94-5	4.45E-05	1.07E-03	3.90E-01																4.45E-05	1.07E-03	3.90E-01
Di(2-ethylhexyl)phthalate (DEHP)		8.24E-06	1.98E-04	7.22E-02																8.24E-06	1.98E-04	7.22E-02
Ethylene dichloride (1,2-dichloroethane)		5.08E-03	1.22E-01	4.45E+01																5.08E-03	1.22E-01	4.45E+01
Formaldehyde	50-00-0	1.00E+01	2.41E+02	6.14E+04	1.65E+00	3.97E+01	1.01E+04	4.95E+00	1.19E+02	3.03E+04	1.07E-02	2.58E-01	5.37E+00	2.07E-03	4.96E-02	1.03E+00	2.07E-03	4.96E-02	1.03E+00	1.67E+01	4.00E+02	1.02E+05
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8		2.80E-04	6.73E-03	2.46E+00																2.80E-04	6.73E-03	2.46E+00
Hydrogen chloride (hydrochloric acid)		3.33E-01	7.99E+00	2.92E+03																3.33E-01	7.99E+00	2.92E+03
Manganese & compounds		2.03E-02	4.88E-01	1.78E+02																2.03E-02	4.88E-01	1.78E+02
Mercury, vapor (Include in Mercury&Compds)		6.14E-04	1.47E-02	5.37E+00																6.14E-04	1.47E-02	5.37E+00
Methyl chloroform (1,1,1 trichloroethane)		5.43E-03	1.30E-01	4.76E+01																5.43E-03	1.30E-01	4.76E+01
Methyl ethyl ketone		9.47E-04	2.27E-02	8.29E+00																9.47E-04	2.27E-02	8.29E+00
Xylene	1330-20-7	3.44E-01	8.26E+00	2.11E+03	6.21E-02	1.49E+00	3.80E+02	1.85E-01	4.45E+00	1.13E+03	2.59E-03	6.22E-02	1.30E+00	4.99E-04	1.20E-02	2.49E-01	4.99E-04	1.20E-02	2.49E-01	5.95E-01	1.43E+01	3.62E+03
Methyl isobutyl ketone	108-10-1	4.95E-01	1.19E+01	3.03E+03	8.16E-02	1.96E+00	4.99E+02	2.44E-01	5.85E+00	1.49E+03				0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.20E-01	1.97E+01	5.02E+03
Methylene chloride	75-09-2	1.29E-01	3.10E+00	7.89E+02	2.13E-02	5.11E-01	1.30E+02	6.36E-02	1.53E+00	3.89E+02				0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.14E-01	5.13E+00	1.31E+03
Nickel metal (Component of Nickel & Compounds)		5.78E-03	1.39E-01	5.07E+01																5.78E-03	1.39E-01	5.07E+01
Pentachlorophenol		8.94E-06	2.15E-04	7.83E-02																8.94E-06	2.15E-04	7.83E-02
Perchloroethylene (tetrachloroethylene)		6.66E-03	1.60E-01	5.84E+01																6.66E-03	1.60E-01	5.84E+01
Phenol	108-95-2	2.01E+00	4.82E+01	1.23E+04	3.31E-01	7.94E+00	2.02E+03	9.89E-01	2.37E+01	6.05E+03				0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E+00	7.99E+01	2.04E+04
Polychlorinated biphenyls		1.43E-06	3.43E-05	1.25E-02																1.43E-06	3.43E-05	1.25E-02
Styrene	100-42-5	2.58E-02	6.20E-01	1.58E+02	4.26E-03	1.02E-01	2.60E+01	1.27E-02	3.05E-01	7.78E+01				0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.28E-02	1.03E+00	2.62E+02
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		1.51E-09	3.62E-08	1.32E-05																1.51E-09	3.62E-08	1.32E-05
Toluene	108-88-3	9.32E-01	2.24E+01	5.70E+03	1.54E-01	3.69E+00	9.40E+02	4.59E-01	1.10E+01	2.81E+03	2.59E-03	6.22E-02	1.30E+00	7.16E-04	1.72E-02	3.58E-01	7.16E-04	1.72E-02	3.58E-01	1.55E+00	3.72E+01	9.45E+03
Trichloroethylene		5.26E-03	1.26E-01	4.61E+01																5.26E-03	1.26E-01	4.61E+01
Trichlorofluoromethane (CFC 111)		7.19E-03	1.72E-01	6.30E+01																7.19E-03	1.72E-01	6.30E+01
Vinyl chloride		3.16E-03	7.57E-02	2.76E+01																3.16E-03	7.57E-02	2.76E+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			2.46E-01			1.10E+01	No
Acetaldehyde	75-07-0	8.92E+00			6.80E+00			Yes
Acrolein	107-02-8	2.73E+00			2.00E-02			Yes
Arsenic				2.45E+00			1.60E-02	Yes
Benzene	71-43-2			3.91E+03			8.10E+00	Yes
Benzo(a)pyrene	50-32-8			3.99E+00			2.20E+00	Yes
Beryllium				1.22E-01			2.80E-01	No
Cadmium				4.56E-01			3.70E-01	Yes
Carbon Tetrachloride				6.91E+01			4.60E+02	No
Chlorine		1.38E-01	3.32E+00		2.30E-01	7.90E-01		Yes
Chlorobenzene			1.39E-01			4.60E+01		No
Chloroform	67-66-3			2.10E+02			2.90E+02	No
Chromic acid (Chromium VI)	7738-94-5		1.07E-03			1.30E-02		No
Di(2-ethylhexyl)phthalate (DEHP)			1.98E-04			6.30E-01		No
Ethylene dichloride (1,2-dichloroethane)				4.45E+01			2.60E+02	No
Formaldehyde	50-00-0	1.67E+01			4.00E-02			Yes
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8				2.46E+00			5.10E-03	Yes
Hydrogen chloride (hydrochloric acid)		3.33E-01			1.80E-01			Yes
Manganese & compounds			4.88E-01			6.30E-01		No
Mercury, vapor (Include in Mercury&Compds)			1.47E-02			1.30E-02		Yes
Methyl chloroform (1,1,1 trichloroethane)		5.43E-03	1.30E-01		6.40E+01	2.50E+02		No
Methyl ethyl ketone		9.47E-04	2.27E-02		2.24E+01	7.80E+01		No
Xylene	1330-20-7	5.95E-01	1.43E+01		1.64E+01	5.70E+01		No
Methyl isobutyl ketone	108-10-1	8.20E-01	1.97E+01		7.60E+00	5.20E+01		No
Methylene chloride	75-09-2	2.14E-01		1.31E+03	3.90E-01		1.60E+03	No
Nickel metal (Component of Nickel & Compounds)			1.39E-01			1.30E-01		Yes
Pentachlorophenol		8.94E-06	2.15E-04		6.40E-03	6.30E-02		No
Perchloroethylene (tetrachloroethylene)				5.84E+01			1.30E+04	No
Phenol	108-95-2	3.33E+00			2.40E-01			Yes
Polychlorinated biphenyls				1.25E-02			5.60E+00	No
Styrene	100-42-5	4.28E-02			2.70E+00			No
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-				1.32E-05			2.00E-04	No
Toluene	108-88-3		3.72E+01			9.80E+01		No
Trichloroethylene				4.61E+01			4.00E+03	No
Trichlorofluoromethane (CFC 111)		7.19E-03			1.40E+02			No
Vinyl chloride				2.76E+01			2.60E+01	Yes

TABLE B-4
ROTARY DRYER -CRITERIA POLLUTANT EMISSIONS
ENVIVA PELLET HAMLET, LLC

Dryer Inputs

Dryer Throughput (@ Dryer Exit)	649,750	tons/year @ 13% moisture
Annual Dried Wood Throughput of Dryer	575,000	ODT/year
Max. Hourly Dried Wood Throughput of Dryer	71.71	ODT/hr
Flow rate =	120,000	ACFM
Annual Utilization Factor	92%	
Burner Heat Input	175.3	MMBtu/hr
Annual Burner Heat Input at Annual Utilization	1,405,626.8	MMBtu/yr
Percent Hardwood	25%	
Percent Softwood	75%	

Criteria Pollutant Calculations:

Pollutant	Baseline Emission Factors			Proposed BACT Emission Factor			Baseline Emissions		Total Controlled Potential Emissions	
	Uncontrolled Biomass Emission Factor	Units	Emission Factor Source	Controlled Biomass Emission Factor	Units	Emission Factor Source	(lb/hr)	(tpy)	(lb/hr)	(tpy)
CO	0.104	lb/MMBtu	Note 1	0.104	lb/MMBtu	Baseline	18.28	73.3	18.28	73.3
NO_X	0.228	lb/MMBtu	Calculated from Buettner 3-23-12 Dryer Guarantee [5]	0.228	lb/MMBtu	Calculated from Buettner 3-23-12 Dryer Guarantee [5]	40.00	160.4	40.00	160.4
$PM/PM_{10}/PM_{2.5}$ Condensible Fraction	0.017	lb/MMBtu	AP-42 Section 1.6	0.017	lb/MMBtu	AP-42 Section 1.6	2.98	11.9	2.98	11.9
TSP (Filterable)	2.092	lb/ODT	Calculated from Buettner 3-23-12 Dryer Guarantee [5]	0.030	lb/MMBtu	NSPS emission limit	150.00	601.4	5.26	21.1
Total TSP (Filterable + Condensible)							152.98	613.3	8.24	33.0
PM_{10} (Filterable)	2.092	lb/ODT	Calculated from Buettner 3-23-12 Dryer Guarantee [5]	0.030	lb/MMBtu	NSPS emission limit	150.00	601.4	5.26	21.1
Total PM_{10} (Filterable + Condensible)							152.98	613.3	8.24	33.0
$PM_{2.5}$ (Filterable)	2.092	lb/ODT	Calculated from Buettner 3-23-12 Dryer Guarantee [5]	0.030	lb/MMBtu	NSPS emission limit	150.00	601.4	5.26	21.1
Total $PM_{2.5}$ (Filterable + Condensible)							152.98	613.3	8.24	33.0
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6 [3]	0.025	lb/MMBtu	AP-42, Section 1.6 [3]	4.38	17.6	4.38	17.6
VOC	3.59	lb/ODT	Note 2	3.59	lb/ODT	Baseline	257.08	1030.7	257.08	1,031
Lead	0.00	N/A	N/A	0.00	N/A	N/A	0.00	0.0	0.00	0.0

Note:

[1] CO emissions are based on stack testing conducted at Ahsokie, NC facility on June 7, 2012 with 100% safety margin on CO due to the significant variability that is possible with this pollutant.

[2] VOC emissions emission factor based on AP-42, Table 10.6.2-3. Factor derived by multiplying direct-fired rotary dryer factors for softwoods and hardwoods by the fraction of each species on an annualized basis:
(4.7 lb/ODT * 75% SW) + (0.24 * 25% HW) = 3.59 lb/ODT.

[3] 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.

[4] 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.

[5] Controlled filterable particulate matter emissions based on NSPS Subpart Db limit of 0.03 lb/MMBtu.

[6] NO_x and filterable PM/PM_{10} emission factors after cyclone control were provided by the dryer system vendor. The $PM_{2.5}$ filterable emission factor is assumed to be the same as PM and PM10.

TABLE B-5
ROTARY DRYER -HAP AND TAP PROCESS EMISSIONS
ENVIVA PELLET HAMLET, LLC

Calculation Inputs:

Dryer Throughput (Ton/yr)	649,750
RTO VOC Control Efficiency	0%
ODT/yr	575,000
ODT/hr	71.71
Hardwood Composition	25%
Softwood Composition	75%

HAP & TAP Emission Calculations:

HAP/TAP Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Direct wood-fired, hardwood			Green, Direct wood-fired (inlet moisture content >50%, dry basis), softwood [1]			MAXIMUM UNCONTROLLED EMISSIONS		MAXIMUM CONTROLLED EMISSIONS	
					Emission Factor [2] (lb/ODT)	Emissions [3] (lb/hr)	(tpy)	Emission Factor (lb/ODT)	Emissions [3] (lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Acetaldehyde	75-07-0	Yes	Yes	Yes	3.83E-03	2.75E-01	2.75E-01	7.50E-02	5.38E+00	1.62E+01	5.38E+00	1.64E+01	5.38E+00	1.64E+01
Acrolein	107-02-8	Yes	Yes	Yes	1.17E-03	8.42E-02	8.44E-02	2.30E-02	1.65E+00	4.96E+00	1.65E+00	5.04E+00	1.65E+00	5.04E+00
Benzene	71-43-2	Yes	Yes	Yes	3.88E-04	2.78E-02	2.79E-02	7.60E-03	5.45E-01	1.64E+00	5.45E-01	1.67E+00	5.45E-01	1.67E+00
Chloroform	67-66-3	Yes	Yes	Yes	5.11E-06	3.66E-04	3.67E-04	1.00E-04	7.17E-03	2.16E-02	7.17E-03	2.19E-02	7.17E-03	2.19E-02
Cumene	98-82-8	Yes	No	Yes	1.02E-04	7.32E-03	7.34E-03	2.00E-03	1.43E-01	4.31E-01	1.43E-01	4.39E-01	1.43E-01	4.39E-01
Formaldehyde	50-00-0	Yes	Yes	Yes	7.15E-03	5.13E-01	5.14E-01	1.40E-01	1.00E+01	3.02E+01	1.00E+01	3.07E+01	1.00E+01	3.07E+01
m-,p-Xylene	1330-20-7	Yes	Yes	Yes	2.45E-04	1.76E-02	1.76E-02	4.80E-03	3.44E-01	1.04E+00	3.44E-01	1.05E+00	3.44E-01	1.05E+00
Methanol	67-56-1	Yes	No	Yes	5.62E-03	4.03E-01	4.04E-01	1.10E-01	7.89E+00	2.37E+01	7.89E+00	2.41E+01	7.89E+00	2.41E+01
Methyl isobutyl ketone	108-10-1	Yes	Yes	Yes	3.52E-04	2.53E-02	2.53E-02	6.90E-03	4.95E-01	1.49E+00	4.95E-01	1.51E+00	4.95E-01	1.51E+00
Methylene chloride	75-09-2	Yes	Yes	No	9.19E-05	6.59E-03	6.61E-03	1.80E-03	1.29E-01	3.88E-01	1.29E-01	3.95E-01	1.29E-01	3.95E-01
o-Xylene	95-47-6	Yes	No	Yes	2.30E-05	1.65E-03	1.65E-03	4.50E-04	3.23E-02	9.70E-02	3.23E-02	9.87E-02	3.23E-02	9.87E-02
Phenol	108-95-2	Yes	Yes	Yes	1.43E-03	1.03E-01	1.03E-01	2.80E-02	2.01E+00	6.04E+00	2.01E+00	6.14E+00	2.01E+00	6.14E+00
Propionaldehyde	123-38-6	Yes	No	Yes	6.64E-04	4.76E-02	4.77E-02	1.30E-02	9.32E-01	2.80E+00	9.32E-01	2.85E+00	9.32E-01	2.85E+00
Styrene	100-42-5	Yes	Yes	Yes	1.84E-05	1.32E-03	1.32E-03	3.60E-04	2.58E-02	7.76E-02	2.58E-02	7.89E-02	2.58E-02	7.89E-02
Toluene	108-88-3	Yes	Yes	Yes	6.64E-04	4.76E-02	4.77E-02	1.30E-02	9.32E-01	2.80E+00	9.32E-01	2.85E+00	9.32E-01	2.85E+00
										Total HAP	**3.05E+01**	**9.34E+01**	**3.05E+01**	**9.34E+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.

TABLE B-6
ROTARY DRYER -HAP AND TAP WOOD COMBUSTION EMISSIONS
ENVIVA PELLET HAMLET, LLC

Calculation Inputs:

Heat Input (MMBtu/hr)	175.30
Operating Schedule (hrs/yr)	8,760
Heat Input (MMBtu/yr)	1,535,628
RTO VOC Control Efficiency	0%
WESP Metal HAP Control Efficiency[2]	92.75%
HCl Control Efficiency[3]	90.00%

HAP & TAP Emission Calculations:

Pollutant	HAP/TAP?	VOC?	Emission Factors				Emissions							
			Biomass				Biomass		Maximum Uncontrolled Total			Maximum Controlled Total		
			lb/mmBtu Uncontrolled	Control Efficiency	lb/mmBtu Controlled	Ref.	lb/hr Uncontrolled	lb/hr Controlled	lb/hr	lb/yr	tpy	lb/hr	lb/yr	tpy
Acetophenone	HAP	VOC	3.20E-09	0%	3.20E-09	1	5.61E-07	3.20E-09	5.61E-07	4.91E-03	2.46E-06	3.20E-09	2.80E-05	1.40E-08
Antimony & Compounds	HAP		7.90E-06	92.75%	5.73E-07	1, 2	1.38E-03	1.00E-04	1.38E-03	1.21E+01	6.07E-03	1.00E-04	8.80E-01	4.40E-04
Arsenic	TAP/HAP		2.20E-05	92.75%	1.60E-06	1, 2	3.86E-03	2.80E-04	3.86E-03	3.38E+01	1.69E-02	2.80E-04	2.45E+00	1.22E-03
Benzo(a)pyrene	TAP/HAP	VOC	2.60E-06	0%	2.60E-06	1	4.56E-04	4.56E-04	4.56E-04	3.99E+00	2.00E-03	4.56E-04	3.99E+00	2.00E-03
Beryllium	TAP/HAP		1.10E-06	92.75%	7.98E-08	1, 2	1.93E-04	1.40E-05	1.93E-04	1.69E+00	8.45E-04	1.40E-05	1.22E-01	6.12E-05
Cadmium	TAP/HAP		4.10E-06	92.75%	2.97E-07	1, 2	7.19E-04	5.21E-05	7.19E-04	6.30E+00	3.15E-03	5.21E-05	4.56E-01	2.28E-04
Carbon tetrachloride	TAP/HAP	VOC	4.50E-05	0%	4.50E-05	1	7.89E-03	7.89E-03	7.89E-03	6.91E+01	3.46E-02	7.89E-03	6.91E+01	3.46E-02
Chlorine	TAP/HAP		7.90E-04		7.90E-04	1	1.38E-01	1.38E-01	1.38E-01	1.21E+03	6.07E-01	1.38E-01	1.21E+03	6.07E-01
Chlorobenzene	TAP/HAP	VOC	3.30E-05	0%	3.30E-05	1	5.78E-03	5.78E-03	5.78E-03	5.07E+01	2.53E-02	5.78E-03	5.07E+01	2.53E-02
Chromic acid (Chromium VI)	TAP[4]		3.50E-06	92.75%	2.54E-07	1, 2	6.14E-04	4.45E-05	6.14E-04	5.37E+00	2.69E-03	4.45E-05	3.90E-01	1.95E-04
Chromium–Other compds (add w/chrom acid to get CRC)	HAP		1.75E-05	92.75%	1.27E-06	1, 2	3.07E-03	2.22E-04	3.07E-03	2.69E+01	1.34E-02	2.22E-04	1.95E+00	9.74E-04
Cobalt compounds	HAP		6.50E-06	92.75%	4.71E-07	1, 2	1.14E-03	8.26E-05	1.14E-03	9.98E+00	4.99E-03	8.26E-05	7.24E-01	3.62E-04
Dinitrophenol, 2,4-	HAP	VOC	1.80E-07	0%	1.80E-07	1	3.16E-05	3.16E-05	3.16E-05	2.76E-01	1.38E-04	3.16E-05	2.76E-01	1.38E-04
Di(2-ethylhexyl)phthalate (DEHP)	TAP/HAP	VOC	4.70E-08	0%	4.70E-08	1	8.24E-06	8.24E-06	8.24E-06	7.22E-02	3.61E-05	8.24E-06	7.22E-02	3.61E-05
Ethyl benzene	HAP	VOC	3.10E-05	0%	3.10E-05	1	5.43E-03	5.43E-03	5.43E-03	4.76E+01	2.38E-02	5.43E-03	4.76E+01	2.38E-02
Ethylene dichloride (1,2-dichloroethane)	TAP/HAP	VOC	2.90E-05	0%	2.90E-05	1	5.08E-03	5.08E-03	5.08E-03	4.45E+01	2.23E-02	5.08E-03	4.45E+01	2.23E-02
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8	TAP	VOC	1.60E-06	0%	1.60E-06	1	2.80E-04	2.80E-04	2.80E-04	2.46E+00	1.23E-03	2.80E-04	2.46E+00	1.23E-03
Hydrogen chloride (hydrochloric acid)	TAP/HAP		1.90E-02	90.00%	1.90E-03	1, 3	3.33E+00	3.33E-01	3.33E+00	2.92E+04	1.46E+01	3.33E-01	2.92E+03	1.46E+00
Lead and Lead compounds	HAP		4.80E-05	92.75%	3.48E-06	1, 2	8.41E-03	6.10E-04	8.41E-03	7.37E+01	3.69E-02	6.10E-04	5.34E+00	2.67E-03
Manganese & compounds	TAP/HAP		1.60E-03	92.75%	1.16E-04	1, 2	2.80E-01	2.03E-02	2.80E-01	2.46E+03	1.23E+00	2.03E-02	1.78E+02	8.91E-02
Mercury, vapor (Include in Mercury&Compds)	TAP/HAP		3.50E-06	92.75%	2.54E-07	1, 2	6.14E-04	4.45E-05	6.14E-04	5.37E+00	2.69E-03	6.14E-04	5.37E+00	2.69E-03
Methyl bromide (bromomethane)	HAP	VOC	1.50E-05	0%	1.50E-05	1	2.63E-03	2.63E-03	2.63E-03	2.30E+01	1.15E-02	2.63E-03	2.30E+01	1.15E-02
Methyl chloride (chloromethane)	HAP	VOC	2.30E-05	0%	2.30E-05	1	4.03E-03	4.03E-03	4.03E-03	3.53E+01	1.77E-02	4.03E-03	3.53E+01	1.77E-02
Methyl chloroform (1,1,1 trichloroethane)	TAP/HAP		3.10E-05		3.10E-05	1	5.43E-03	5.43E-03	5.43E-03	4.76E+01	2.38E-02	5.43E-03	4.76E+01	2.38E-02
Methyl ethyl ketone	TAP/HAP	VOC	5.40E-06	0%	5.40E-06	1	9.47E-04	9.47E-04	9.47E-04	8.29E+00	4.15E-03	9.47E-04	8.29E+00	4.15E-03
Naphthalene	HAP	VOC	9.70E-05	0%	9.70E-05	1	1.70E-02	1.70E-02	1.70E-02	1.49E+02	7.45E-02	1.70E-02	1.49E+02	7.45E-02
Nickel metal (Component of Nickel & Compounds)	TAP/HAP		3.30E-05	92.75%	2.39E-06	1, 2	5.78E-03	4.19E-04	5.78E-03	5.07E+01	2.53E-02	5.78E-03	5.07E+01	2.53E-02
Nitrophenol, 4-	HAP	VOC	1.10E-07	0%	1.10E-07	1	1.93E-05	1.93E-05	1.93E-05	1.69E-01	8.45E-05	1.93E-05	1.69E-01	8.45E-05
Pentachlorophenol	TAP/HAP		5.10E-08		5.10E-08	1	8.94E-06	8.94E-06	8.94E-06	7.83E-02	3.92E-05	8.94E-06	7.83E-02	3.92E-05
Perchloroethylene (tetrachloroethylene)	TAP/HAP		3.80E-05		3.80E-05	1	6.66E-03	6.66E-03	6.66E-03	5.84E+01	2.92E-02	6.66E-03	5.84E+01	2.92E-02
Phosphorus Metal, Yellow or White	HAP		2.70E-05	92.75%	1.96E-06	1, 2	4.73E-03	3.43E-04	4.73E-03	4.15E+01	2.07E-02	4.73E-03	4.15E+01	2.07E-02
Polychlorinated biphenyls	TAP/HAP	VOC	8.15E-09	0%	8.15E-09	1	1.43E-06	1.43E-06	1.43E-06	1.25E-02	6.26E-06	1.43E-06	1.25E-02	6.26E-06
Polycyclic Organic Matter	HAP		1.25E-04		1.25E-04	1	2.19E-02	2.19E-02	2.19E-02	1.92E+02	9.60E-02	2.19E-02	1.92E+02	9.60E-02
Propylene dichloride (1,2 dichloropropane)	HAP	VOC	3.30E-05	0%	3.30E-05	1	5.78E-03	5.78E-03	5.78E-03	5.07E+01	2.53E-02	5.78E-03	5.07E+01	2.53E-02
Selenium compounds	HAP		2.80E-06	92.75%	2.03E-07	1, 2	4.91E-04	3.56E-05	4.91E-04	4.30E+00	2.15E-03	4.91E-04	4.30E+00	2.15E-03
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	TAP/HAP	VOC	8.60E-12	0%	8.60E-12	1	1.51E-09	1.51E-09	1.51E-09	1.32E-05	6.60E-09	1.51E-09	1.32E-05	6.60E-09
Trichloroethylene	TAP/HAP	VOC	3.00E-05	0%	3.00E-05	1	5.26E-03	5.26E-03	5.26E-03	4.61E+01	2.30E-02	5.26E-03	4.61E+01	2.30E-02
Trichlorofluoromethane (CFC 111)	TAP	VOC	4.10E-05	0%	4.10E-05	1	7.19E-03	7.19E-03	7.19E-03	6.30E+01	3.15E-02	7.19E-03	6.30E+01	3.15E-02
Trichlorophenol, 2,4,6-	HAP	VOC	2.20E-08	0%	2.20E-08	1	3.86E-06	3.86E-06	3.86E-06	3.38E-02	1.69E-05	3.86E-06	3.38E-02	1.69E-05
Vinyl chloride	TAP/HAP	VOC	1.80E-05	0%	1.80E-05	1	3.16E-03	3.16E-03	3.16E-03	2.76E+01	1.38E-02	3.16E-03	2.76E+01	1.38E-02
Total							**3.89E+00**	**5.99E-01**	**3.89E+00**	**3.40E+04**	**17.02**	**6.10E-01**	**5.34E+03**	**2.67**

[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 is applied to all metal hazardous and toxic pollutants. Actual design filterable efficiency is estimated to 96.4%, but 92.75% is assumed for toxics permitting.

[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.

TABLE B-7
HAMMERMILLS - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLET HAMLET, LLC

Calculation Inputs:

Throughput ODT/yr	575,000
ODT/hr	71.71
Hardwood Composition	25%
Softwood Composition	75%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Direct wood-fired, hardwood			Green, Direct wood-fired (inlet moisture content >50%, dry basis), softwood [1]			MAXIMUM TOTAL EMISSIONS [3]	
					Emission Factor [2] (lb/ODT)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor (lb/ODT)	Emissions (lb/hr)	Emissions (tpy)	(lb/hr)	(tpy)
VOC [4]	N/A	N/A	N/A	N/A	4.75E-02	3.41E+00	3.42E+00	9.31E-01	6.67E+01	2.01E+02	6.67E+01	2.04E+02
Acetaldehyde	75-07-0	Yes	Yes	Yes	6.31E-04	4.53E-02	4.54E-02	1.24E-02	8.87E-01	2.67E+00	8.87E-01	2.71E+00
Acrolein	107-02-8	Yes	Yes	Yes	1.94E-04	1.39E-02	1.39E-02	3.79E-03	2.72E-01	8.17E-01	2.72E-01	8.31E-01
Benzene	71-43-2	Yes	Yes	Yes	6.40E-05	4.59E-03	4.60E-03	1.25E-03	8.98E-02	2.70E-01	8.98E-02	2.75E-01
Chloroform	67-66-3	Yes	Yes	Yes	8.42E-07	6.04E-05	6.05E-05	1.65E-05	1.18E-03	3.55E-03	1.18E-03	3.61E-03
Cumene	98-82-8	Yes	No	Yes	1.68E-05	1.21E-03	1.21E-03	3.30E-04	2.36E-02	7.11E-02	2.36E-02	7.23E-02
Formaldehyde	50-00-0	Yes	Yes	Yes	1.18E-03	8.45E-02	8.47E-02	2.31E-02	1.65E+00	4.98E+00	1.65E+00	5.06E+00
m-,p-Xylene	1330-20-7	Yes	Yes	Yes	4.04E-05	2.90E-03	2.90E-03	7.91E-04	5.67E-02	1.71E-01	5.67E-02	1.74E-01
Methanol	67-56-1	Yes	No	Yes	9.26E-04	6.64E-02	6.65E-02	1.81E-02	1.30E+00	3.91E+00	1.30E+00	3.98E+00
Methyl isobutyl ketone	108-10-1	Yes	Yes	Yes	5.81E-05	4.16E-03	4.17E-03	1.14E-03	8.16E-02	2.45E-01	8.16E-02	2.49E-01
Methylene chloride	75-09-2	Yes	Yes	No	1.52E-05	1.09E-03	1.09E-03	2.97E-04	2.13E-02	6.40E-02	2.13E-02	6.51E-02
o-Xylene	95-47-6	Yes	No	Yes	3.79E-06	2.72E-04	2.72E-04	7.42E-05	5.32E-03	1.60E-02	5.32E-03	1.63E-02
Phenol	108-95-2	Yes	Yes	Yes	2.36E-04	1.69E-02	1.69E-02	4.62E-03	3.31E-01	9.95E-01	3.31E-01	1.01E+00
Propionaldehyde	123-38-6	Yes	No	Yes	1.09E-04	8.21E-05	7.86E-03	2.14E-03	1.61E-03	4.62E-01	1.61E-03	4.70E-01
Styrene	100-42-5	Yes	Yes	Yes	3.03E-06	2.17E-04	2.18E-04	5.93E-05	4.26E-03	1.28E-02	4.26E-03	1.30E-02
Toluene	108-88-3	Yes	Yes	Yes	1.09E-04	7.85E-03	7.86E-03	2.14E-03	1.54E-01	4.62E-01	1.54E-01	4.70E-01
Total											**4.88**	**15.40**

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 emissions, factors were conservatively calculated by taking the ratio of AP-42 Section 10.6.2-3 HAP factors for hardwood to softwood drying (0.24/4.7). These factors were next adjusted by the ratio of the VOC from hammermills to dryers based on engineering testing conducted at the Enviva Wiggins facility (16.5%). This is considered conservative because the test values from engineering testing for HAPs/TAPs were actually less than the values presented above.

[3] Short-term 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). Annual emissions were calculated based on the Hardwood and Softwood Composition.

[4] VOC emissions emission factors based on average AP-42 factors for softwood and hardwood drying (4.7 and 0.24 lb/ODT, respectively) plus a margin of safety of 20%. These factors were next adjusted by the ratio of the VOC from hammermills to dryers based on engineering testing conducted at the Enviva Wiggins facility (16.5%).

TABLE B-8
BAGFILTER AND CYCLONE EMISSIONS
ENVIVA PELLET HAMLET, LLC

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)
Green Wood Hammermills Cyclone	ES-GHM-1, ES-GHM-2	CD-GHM-CY	27,554	0.025	8,760	7.00%	0.80%	5.90	25.86	0.41	1.81	0.047	0.21
Hammermills Bagfilter 1	ES-HM-1 through 3	CD-HM-BF1	45,000	0.003	8,760	100%	100%	1.16	5.07	1.16	5.07	1.157	5.07
Hammermills Bagfilter 2	ES-HM-4 through 6	CD-HM-BF2	45,000	0.003	8,760	100%	100%	1.16	5.07	1.16	5.07	1.157	5.07
Hammermills Bagfilter 3	ES-HM-7 and 8, ES-HMA	CD-HM-BF3	45,000	0.003	8,760	100%	100%	1.16	5.07	1.16	5.07	1.157	5.07
Pellet Mill Feed Silo Bin Vent Baghouse	ES-PMFS	CD-PMFS-BV	2,500	0.003	8,760	100%	100%	0.06	0.28	0.06	0.28	0.064	0.28
Pellet Mill Fines Bin Bin Vent Baghouse	ES-PFB	CD-PFB-BV	3,600	0.003	8,760	100%	100%	0.09	0.41	0.09	0.41	0.093	0.41
Pellet Coolers Cyclone 1	ES-CLR-1	CD-CLR-1	21,000	0.02	8,760	17.5%	2.0%	3.60	15.77	0.63	2.76	0.072	0.32
Pellet Coolers Cyclone 2	ES-CLR-2	CD-CLR-2	21,000	0.02	8,760	17.5%	2.0%	3.60	15.77	0.63	2.76	0.072	0.32
Pellet Coolers Cyclone 3	ES-CLR-3	CD-CLR-3	21,000	0.02	8,760	17.5%	2.0%	3.60	15.77	0.63	2.76	0.072	0.32
Pellet Coolers Cyclone 4	ES-CLR-4	CD-CLR-4	21,000	0.02	8,760	17.5%	2.0%	3.60	15.77	0.63	2.76	0.072	0.32
Pellet Coolers Cyclone 5	ES-CLR-5	CD-CLR-5	21,000	0.02	8,760	17.5%	2.0%	3.60	15.77	0.63	2.76	0.072	0.32
Pellet Coolers Cyclone 6	ES-CLR-6	CD-CLR-6	21,000	0.02	8,760	17.5%	2.0%	3.60	15.77	0.63	2.76	0.072	0.32
Finished Product Handling Bagfilter	ES-FPH, ES-PL, ES-PB-1 & 2	CD-FPH-BF	35,500	0.003	8,760	91%	55%	0.91	4.00	0.83	3.64	0.502	2.20
							TOTAL	**32.05**	**140.36**	**8.65**	**37.90**	**4.61**	**20.19**

Note:

[1] Filter, Vent, and Cyclone inlet flow rate (cfm) provided by design engineering firm (Mid-South Engineering Co.).

[2] Pollutant Loading (gr/cf) provided by Aircon, a control device vendor.

[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.

TABLE B-9
PELLET PRESSES AND COOLERS - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLET HAMLET, LLC

Calculation Inputs:

Throughput ODT/yr	575,000
ODT/hr	71.71
Hardwood Composition	25%
Softwood Composition	75%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Direct wood-fired, hardwood			Green, Direct wood-fired (inlet moisture content >50%, dry basis), softwood [1]			MAXIMUM TOTAL EMISSIONS [3]	
					Emission Factor [2] (lb/ODT)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor (lb/ODT)	Emissions (lb/hr)	Emissions (tpy)	(lb/hr)	(tpy)
VOC [4]	N/A	N/A	N/A	N/A	1.54E-01	7.76E-01	1.11E+01	3.01E+00	2.16E+02	6.50E+02	2.16E+02	6.61E+02
Acetaldehyde	75-07-0	Yes	Yes	Yes	1.89E-03	1.35E-01	1.36E-01	3.70E-02	2.65E+00	7.97E+00	2.65E+00	8.10E+00
Acrolein	107-02-8	Yes	Yes	Yes	5.79E-04	4.15E-02	4.16E-02	1.13E-02	8.13E-01	2.44E+00	8.13E-01	2.48E+00
Benzene	71-43-2	Yes	Yes	Yes	1.91E-06	1.37E-04	1.37E-04	3.74E-05	2.69E-03	8.07E-03	2.69E-03	8.21E-03
Chloroform	67-66-3	Yes	Yes	Yes	2.52E-06	1.80E-04	1.81E-04	4.93E-05	3.53E-03	1.06E-02	3.53E-03	1.08E-02
Cumene	98-82-8	Yes	No	Yes	5.03E-05	3.61E-03	3.62E-03	9.85E-04	7.07E-02	2.12E-01	7.07E-02	2.16E-01
Formaldehyde	50-00-0	Yes	Yes	Yes	3.52E-03	2.53E-01	2.53E-01	6.90E-02	4.95E+00	1.49E+01	4.95E+00	1.51E+01
m-,p-Xylene	1330-20-7	Yes	Yes	Yes	1.21E-04	8.66E-03	8.68E-03	2.36E-03	1.70E-01	5.10E-01	1.70E-01	5.19E-01
Methanol	67-56-1	Yes	No	Yes	2.77E-03	1.98E-01	1.99E-01	5.42E-02	3.89E+00	1.17E+01	3.89E+00	1.19E+01
Methyl isobutyl ketone	108-10-1	Yes	Yes	Yes	1.74E-04	1.24E-02	1.25E-02	3.40E-03	2.44E-01	7.33E-01	2.44E-01	7.45E-01
Methylene chloride	75-09-2	Yes	Yes	No	4.53E-05	3.25E-03	3.25E-03	8.87E-04	6.36E-02	1.91E-01	6.36E-02	1.94E-01
o-Xylene	95-47-6	Yes	No	Yes	1.13E-05	8.12E-04	8.14E-04	2.22E-04	1.59E-02	4.78E-02	1.59E-02	4.86E-02
Phenol	108-95-2	Yes	Yes	Yes	7.04E-04	5.05E-02	5.06E-02	1.38E-02	9.89E-01	2.97E+00	9.89E-01	3.03E+00
Propionaldehyde	123-38-6	Yes	No	Yes	3.27E-04	2.45E-04	2.35E-02	6.40E-03	4.80E-03	1.38E+00	4.80E-03	1.40E+00
Styrene	100-42-5	Yes	Yes	Yes	9.06E-06	6.49E-04	6.51E-04	1.77E-04	1.27E-02	3.82E-02	1.27E-02	3.89E-02
Toluene	108-88-3	Yes	Yes	Yes	3.27E-04	2.35E-02	2.35E-02	6.40E-03	4.59E-01	1.38E+00	4.59E-01	1.40E+00
Total											**14.33**	**45.21**

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 emissions, factors were conservatively calculated by taking the ratio of AP-42 Section 10.6.2-3 HAP factors for hardwood to softwood drying (0.24/4.7). These factors were next adjusted by the ratio of the VOC from Pellet Coolers to dryers based on engineering testing conducted at the Enviva Wiggins facility (49.3%). This is considered conservative because the test values from engineering testing for HAPs/TAPs were actually less than the values presented above.

[3] Short-term 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). Annual emissions were calculated based on the Hardwood and Softwood Composition.

[4] VOC emissions emission factors based on average AP-42 factors for softwood and hardwood drying (4.7 and 0.24 lb/ODT, respectively) plus a margin of safety of 30%. These factors were next adjusted by the ratio of the VOC from pellet cooler aspiration system to dryers based on engineering testing conducted at the Enviva Wiggins facility (49.3%).

TABLE B-10
ELECTRIC POWERED CHIPPER EMISSIONS
ENVIVA PELLET HAMLET, LLC

Chipper Throughput 575,000 tons dry wood

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[3] (lb/yr)	Emissions[3] (tpy)
PM[3]	N/A	0.00E+00	0.00
THC as Carbon[1]	0.0041	2.36E+03	1.18
THC as propane[2]	0.0050	2.89E+03	1.44
Methanol[1]	0.0010	5.75E+02	0.29

[1] 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.

[2] Emission factor converted from as carbon to as propane by multiplying by 1.225.

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

TABLE B-11
ELECTRIC POWERED BARKHOG EMISSIONS
ENVIVA PELLET HAMLET, LLC

Hog Throughput 157,680 tons dry wood

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[3] (lb/yr)	Emissions[3] (tpy)
PM[3]	N/A	0.00E+00	0.00
THC as Carbon[1]	0.0041	6.46E+02	0.32
THC as propane[2]	0.0050	7.92E+02	0.40
Methanol[1]	0.0010	1.58E+02	0.08

[1] 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.

[2] Emission factor converted from as carbon to as propane by multiplying by 1.225.

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

TABLE B-12
GREEN WOOD HAMMERMILLS EMISSIONS
ENVIVA PELLET HAMLET, LLC

Hammermill Throughput 575,000 tons dry softwood

Pollutant	Emission Factors (lb/dry wood tons)	Emissions (lb/yr)	Emissions (tpy)
THC as propane[1]	1.10	632,500	316
HAPs			
Methanol[1]	0.0073	4,198	2.10

[1] Emission factor obtained from available emissions factors AP-42 Section 10.6.2, Table 7.

TABLE B-13
EMERGENCY GENERATOR AND FIRE PUMP EMISSIONS
ENVIVA PELLET HAMLET, LLC

Emergency Generator Emissions (ES-EG)

Equipment and Fuel Characteristics

Engine Output	0.19	MW
Engine Power	250	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	0.20	g/KW-hr	0.08	0.02
PM_{10}	PSD	0.20	g/KW-hr	0.08	0.02
$PM_{2.5}$	PSD	0.20	g/KW-hr	0.08	0.02
NO_x	PSD	4.00	g/KW-hr	1.64	0.41
SO_2	PSD	15.00	ppmw (3)	9.89E-04	2.47E-04
CO	PSD	3.50	g/KW-hr	1.44E+00	3.59E-01
VOC (NMHC)	PSD	4.00	g/KW-hr	1.64E+00	4.11E-01
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.34E-03	3.36E-04
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	1.62E-04	4.05E-05
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	1.63E-03	4.08E-04
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	3.29E-07	8.23E-08
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	6.84E-05	1.71E-05
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.07E-03	5.16E-04
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	2.94E-04	7.35E-05
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	7.16E-04	1.79E-04
Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	4.99E-04	1.25E-04
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.07E-03	5.16E-04
Total HAPs				6.78E-03	1.69E-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-2010 construction.

[3] Sulfur content in accordance with Year 2013 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 and VOC.

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

TABLE B-13
EMERGENCY GENERATOR AND FIRE PUMP EMISSIONS
ENVIVA PELLET HAMLET, LLC

Firewater Pump Emissions (ES-FWP)

Equipment and Fuel Characteristics

Engine Output	0.19	MW
Engine Power	250	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	0.20	g/KW-hr	0.08	0.02
PM_{10}	PSD	0.20	g/KW-hr	0.08	0.02
$PM_{2.5}$	PSD	0.20	g/KW-hr	0.08	0.02
NO_x	PSD	4.00	g/KW-hr	1.64	0.41
SO_2	PSD	15.00	ppmw (3)	9.89E-04	2.47E-04
CO	PSD	3.50	g/KW-hr	1.44E+00	3.59E-01
VOC (NMHC)	PSD	4.00	g/KW-hr	1.64E+00	4.11E-01
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.34E-03	3.36E-04
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	1.62E-04	4.05E-05
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	1.63E-03	4.08E-04
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	3.29E-07	8.23E-08
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	6.84E-05	1.71E-05
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.07E-03	5.16E-04
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	2.94E-04	7.35E-05
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	7.16E-04	1.79E-04
Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	4.99E-04	1.25E-04
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.07E-03	5.16E-04
Total HAPs				6.78E-03	1.69E-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 and VOC.

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

TABLE B-14
PORTABLE CHIPPER ENGINE EMISSIONS
ENVIVA PELLET HAMLET, LLC

Portable Chipper (ES-CHIP-2)

Equipment and Fuel Characteristics

Engine Output	0.97	MW
Engine Power	1,300	hp
Hours of Operation	500	hr/yr
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	0.20	g/KW-hr	0.43	0.11
PM_{10}	PSD	0.20	g/KW-hr	0.43	0.11
$PM_{2.5}$	PSD	0.20	g/KW-hr	0.43	0.11
NO_x	PSD	6.4	g/KW-hr	13.67	3.42
SO_2	PSD	15	ppmw (3)	0.0051	1.29E-03
CO	PSD	3.50	g/KW-hr	7.47	1.87E+00
VOC (NMHC)	PSD	6.4	g/KW-hr	13.67	3.42E+00
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	6.98E-03	1.74E-03
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	8.42E-04	2.10E-04
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	8.49E-03	2.12E-03
Benzo(a)pyrene[5]	HAP/TAP	1.32E-09	lb/hp-hr (4)	1.71E-06	4.28E-07
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	3.56E-04	8.90E-05
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	1.07E-02	2.68E-03
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	1.53E-03	3.82E-04
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	3.72E-03	9.30E-04
Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	2.59E-03	6.48E-04
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	1.07E-02	2.68E-03
Total HAPs				3.52E-02	8.81E-03

Note:

[1] Emissions factors from NSPS Subpart IIII (or 40 CFR 89.112 where applicable) in compliance with post-2010 construction.

[2] Use of ultra low sulfur disel at 15 ppmw.

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

[4] 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 and VOC.

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

[6] Enviva has two options in backup Chippers either a 700HP Tier 3 Engine or a 1050hp Tier 2 engine. Since the 1050hp Tier 2 Engine will produce greater emissions, Enviva has used emissions for the 1050hp Tier 2 engine for the emission calculations for consevatism.

TABLE B-15
GREEN WOOD HANDLING DROP POINT EXAMPLE EMISSIONS
ENVIVA PELLET HAMLET, LLC

ID	Emission Source Group	Transfer Activity	Type of Operation	Number of Drop Points	PM Particle Size Multiplier (dimensionless)	PM_{10} Particle Size Multiplier (dimensionless)	$PM_{2.5}$ Particle Size Multiplier (dimensionless)	Mean Wind Speed (U) (mph)	Material Moisture Content (M)[1] (%)	PM Emission Factor[2] (lb/ton)	PM_{10} Emission Factor[2] (lb/ton)	$PM_{2.5}$ Emission Factor[2] (lb/ton)	Potential Throughput (tpy)	Potential PM Emissions (tpy)	Potential PM_{10} Emissions (tpy)	Potential $PM_{2.5}$ Emissions (tpy)
GDP1	ES-GWH	Purchased Bark Transfer to Outdoor Storage Area	Batch Drop	1	0.74	0.35	0.053	7.9	48%	4.97E-05	2.35E-05	3.56E-06	13,733	8.63E-05	4.08E-05	6.18E-06
GDP1	ES-GWH	Drop Points via Conveying from Bark Pile to Dryer	Batch Drop	4	0.74	0.35	0.053	7.9	42%	5.92E-05	2.80E-05	4.24E-06	13,733	4.11E-04	1.95E-04	2.95E-05
GDP2	ES-GWH	Transfer Purchased Wood Chips (Wet) to Outdoor Storage	Batch Drop	1	0.74	0.35	0.053	7.9	49%	4.78E-05	2.26E-05	3.42E-06	140,600	8.50E-04	4.02E-04	6.08E-05
GDP2	ES-GWH	Drop Points via Conveying from Chip Pile to Dryer	Batch Drop	5	0.74	0.35	0.053	6.0	41%	4.36E-05	2.06E-05	3.12E-06	530,451	1.46E-02	6.91E-03	1.05E-03
		Total Emissions												**1.60E-02**	**7.55E-03**	**1.14E-03**

1. Average moisture content for logs, bark, and wood chips (wet) based on material balance provided by design engineering firm (Mid-South Engineering).
2. Emission factor calculation based on formula from AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, Equation 13.2.1, (11/06).

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)	7.9
M = material moisture content (%)	

3. PM_{10} control efficiency of 74.7% applied for three-sided enclosed structure with 50% porosity per Sierra Research *"Final BACM Technological and Economic Feasibility Analysis"*, report prepared for the San Joaquin Valley Unified Air Pollution Control District (3/03). The control efficiency is assumed equivalent for PM_{10} and $PM_{2.5}$ emissions.
4. These green wood handling emissions are representative of the fugitive emissions at the site. Note there may be multiple drop points for each type but as shown these emissions will be negligible.

TABL.
GREEN WOOD STORAGE PILES FUGITIVE EMISSIONS
ENVIVA PELLET HAMLET, LLC

Emission Unit ID	Description	TSP Emission Factor [1] (lb/day/acre)	TSP Emission Factor [1] (lb/hr/ft²)	VOC Emission Factor [2] (lb/day/acre)	VOC Emission Factor [2] (lb/hr/ft²)	Width (ft)	Length (ft)	Height (ft)	Outer Surface Area of Storage Pile (ft²)	PM Emissions (lb/hr)	PM Emissions (tpy)	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (lb/hr)	$PM_{2.5}$ Emissions (tpy)	VOC as Carbon Emissions (lb/hr)	VOC as Carbon Emissions (tpy)	VOC as Propane Emissions [4] (lb/hr)	VOC as Propane Emissions [4] (tpy)
GWSP1	Green Wood Pile No. 1	5.61	5.37E-06	3.60	3.44E-06	100	400	10	60,000	0.322	1.410	0.161	0.705	0.0242	0.106	0.21	0.90	0.25	1.11
GWSP2	Green Wood Pile No. 2	5.61	5.37E-06	3.60	3.44E-06	200	400	10	110,400	0.593	2.595	0.296	1.298	0.0444	0.195	0.38	1.67	0.47	2.04
Total										**0.322**	**1.410**	**0.161**	**0.705**	**0.0242**	**0.106**	**0.21**	**0.90**	**0.25**	**1.11**

1. TSP $E = 1.7\left(\frac{s}{1.5}\right)\left(\frac{(365-p)}{235}\right)\left(\frac{f}{15}\right)$ (lb/day/acre) *Fugitive Dust Sources*. Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988. Page 4-17.

where:		
s, silt content of wood chips (%):	4.8	s - silt content(%) for lumber sawmills (minimum), from AP-42 Table 13.2.2-1
p, number of days with rainfall greater than 0.01 inch:	120	Based on AP-42, Section 13.2.2, Figure 13.2.1-2.
f (time that wind exceeds 5.36 m/s - 12 mph) (%):	14.8	Based on meteorological data averaged for 2007-2011 for Sampson, NC.
PM_{10}/TSP ratio:	50%	PM_{10} is assumed to equal 50% of TSP based on U.S. EPA *Control of Open Fugitive Dust Sources*, Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988.
$PM_{2.5}$/TSP ratio:	7.5%	$PM_{2.5}$ is assumed to equal 7.5 % of TSP U.S. EPA Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors. November 2006.

2. The surface area is calculated as [2*H*L+2*W*H+L*W] + 20% to consider the sloping pile edges. Length and width based on proposed site design with a conservative height.

3. Emission factors obtained from NCASI document provided by SC DHEC for the calculation of fugitive VOC emissions from Douglas Fir wood storage piles. Emission factors ranged from 1.6 to 3.6 lb C/acre-day. Enviva chose to employ the maximum emission factor for purposes of conservatism.

4. Emissions are calculated in tons of carbon per year by the following formula:

*tons C/year = 5 acres * 365 days * 1.6 lb C/acre-day / 2000 lb/ton*

Emission factor converted from as carbon to as propane by multiplying by 1.225.

TABLE B-17
TANKS EMISSIONS
ENVIVA PELLET HAMLET, LLC

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]	1,000	5	9	Horizontal	10,300	10.30	0.86	4.30E-04
TK03	Mobile Equipment Fuel Oil Tank[2]	2,500	6	12	Vertical	12,000	4.80	0.37	3.57E-03
							TOTAL	**1.60**	**7.57E-03**

Note:

[1] Conservative design specifications.

[2] Throughput based on fuel consumption and 500 hours of operation per year.

TABLE B-18
UNPAVED ROAD POTENTIAL FUGITIVE PM EMISSIONS
ENVIVA PELLET HAMLET, LLC

Transfer Activity	Distance Traveled per Round Trip[1] (ft)	Trips Per Day	Miles Traveled per Day (VMT/day)	Events Per Year (Days)	Truck Weight (Empty) lbs	Truck Weight (Loaded) lbs	Average Weight (W) (tons)	Vehicle Miles Traveled (VMT/yr)	Emission Factor[2] (lb/VMT) PM	PM_{10}	$PM_{2.5}$	Potential Emissions[3] PM (lb/hr)	(lb/day)	(tpy)	Potential Emissions[3] PM_{10} (lb/hr)	(lb/day)	(tpy)	Potential Emissions[3] $PM_{2.5}$ (lb/hr)	(lb/day)	(tpy)
Logs Delivery to South Log Storage Area	2,700	31	15.86	365	40480	102540	35.8	5,790	5.28	1.35	0.135	0.70	16.76	3.06	0.18	4.27	0.78	0.02	0.43	0.08
Pellet Truck Delivery to Pellet Loadout Area	900	2	0.34	300	40480	102540	35.8	102	5.28	1.35	0.135	0.02	0.36	0.05	0.004	0.092	0.014	0.0004	0.009	0.001
Total Unpaved Road Emissions												**0.71**	**17.12**	**3.11**	**0.18**	**4.36**	**0.79**	**0.018**	**0.44**	**0.08**

1. Distance traveled per round trip was estimated based on truck route and site layout.

2. Unpaved road emission factors based on emission estimation equation from AP-42, Fifth Edition, Section 13.2.2 for industrial unpaved roads.

Where:

$$E = \left[k\left(\frac{s}{12}\right)^{a}\left(\frac{W}{3}\right)^{b}\right]\left[\frac{365 - P}{365}\right] \quad \text{(lb/VMT)}$$

	TSP	PM_{10}	$PM_{2.5}$
E = particulate emission factor (lb/VMT)			
a - empirical constants from AP-42 Table 13.2.2-2	0.7	0.9	0.9
b - empirical constants from AP-42 Table 13.2.2-2	0.45	0.45	0.45
k - empirical constants from AP-42 Table 13.2.2-2	4.9	1.5	0.15
s - silt content(%) for lumber sawmills (minimum), from AP-42 Table 13.2.2-1	4.8		

W = mean vehicle weight (ton)

P - No. days with rainfall greater than 0.01 inch, Per AP-42, Section 13.2.2, Figure 13.2.2-1 (Richmond County, NC). 120

3. Potential emissions calculated from appropriate emission factor times vehicle miles traveled with control efficiency of 80% for water / dust suppression activities. Per AP-42 Section 13.2.2, field testing shows control efficiency of approximately 80% for unpaved roads when dust suppressant is applied at regular intervals of 2 weeks to 1 month.

TABLE B-19
PAVED ROAD POTENTIAL FUGITIVE PM EMISSIONS
ENVIVA PELLET HAMLET, LLC

Transfer Activity	Distance Traveled per Round Trip[1] (ft)	Trips Per Day	Miles Traveled per Day)	Events Per Year (Days)	Truck Weight (Empty) lbs	Truck Weight (Loaded) lbs	Average Weight (W) (tons)	Vehicle Miles Traveled (VMT/yr)	Emission Factor[2] (lb/VMT) PM	PM_{10}	$PM_{2.5}$	Potential Emissions[3] PM (lb/hr)	(tpy)	Potential Emissions[3] PM_{10} (lb/hr)	(tpy)	Potential Emissions[3] $PM_{2.5}$ (lb/hr)	(tpy)
Logs Delivery to South Log Storage Area	9,000	31	52.88	365	40480	102540	35.8	19,299	0.24	0.05	0.012	0.05	0.24	0.01	0.05	2.6E-03	1.2E-02
Logs Delivery to Crane Storage Area	9,000	47	80.11	365	40480	102540	35.8	29,241	0.24	0.05	0.012	0.08	0.36	0.02	0.07	4.0E-03	1.7E-02
Logs Delivery to North Log Storage Area	8,475	14	22.63	365	40480	102540	35.8	8,261	0.24	0.05	0.012	0.02	0.10	0.00	0.02	1.1E-03	4.9E-03
Chips/Hogfuel Delivery	8,475	94	150.88	365	40960	101440	35.6	55,071	0.24	0.05	0.012	0.15	0.67	3.0E-02	1.3E-01	7.5E-03	3.3E-02
Pellet Truck Delivery to Pellet Loadout Area	9,075	60	103.13	10	40480	102540	35.8	1,031	0.24	0.05	0.012	0.10	0.01	0.02	0.00	5.1E-03	6.2E-04
Employee Car Parking	2,250	75	32.0	365	4000	4000	2.0	11,665	0.01	0.00	0.001	0.00	0.01	0.00	0.00	8.4E-05	3.7E-04
Total Paved Road Emissions												**0.42**	**1.38**	**0.08**	**0.28**	**0.02**	**0.07**

1. Distance traveled per round trip was estimated based on truck route and site layout.

2. Paved road emission factors based on emission estimation Equation 2 from AP-42, Section 13.2.1 (1/11) for paved roads.

Where:

$$E = \left[k(sL)^{0.91}(W)^{1.02}\right]\left[1 - \frac{P}{4*365}\right] \quad (lb/VMT)$$

	TSP	PM_{10}	$PM_{2.5}$
E = particulate emission factor (lb/VMT)			
k - particle size multiplier from AP-42 Table 13.2.1-1	0.011	0.0022	0.00054
sL - road surface silt loading from AP-42 Table 13.2.1-2 for ADT <500	0.6		
W = mean vehicle weight (ton)			
P - No. days with rainfall greater than 0.01 inch, Per AP-42, Section 13.2.1, Figure 13.2.1-2 (Richmond County, NC).	120		

3. Potential emissions calculated from appropriate emission factor times vehicle miles traveled with control efficiency of 90% for water / dust suppression activities followed by sweeping.
Per Table 5 in Chapter 4 of the Air Pollution Engineering Manual, Air and Waste Management Association, page 141.
Control efficiency (%) = 96-0.263*V, where V is the number of vehicle passes since application of water.

TABLE B-20
POTENTIAL GHG EMISSIONS FROM COMBUSTION SOURCES
ENVIVA PELLET HAMLET, LLC

Potential GHG Emissions

Operating Data:

Dryer Heat Input	175.30 MMBtu/hr
Operating Schedule	8,760 hrs/yr
Emergency Generator Output	250 bhp
Operating Schedule	500 hrs/yr
No. 2 Fuel Input	11.9 gal/hr[1]
Energy Input	1.630 MMBtu/hr[2]
Fire Water Pump Output	250 bhp
Operating Schedule	500 hrs/yr
No. 2 Fuel Input	11.9 gal/hr[1]
Energy Input	1.630 MMBtu/hr[2]
Backup Chipper Pump Output	1,300 bhp
Operating Schedule	500 hrs/yr
No. 2 Fuel Input	61.9 gal/hr[1]
Energy Input	8.478 MMBtu/hr[2]

Emission Unit ID	Fuel Type	Emission Factors from Table C-1 (kg/MMBtu)[3]			Emissions (metric tons)				
		CO2	CH4	N2O	CO2	CH4	N2O	Total CO2e	Total CO2e[5]
ES-DRYER	Wood and Wood Residuals	9.38E+01	3.20E-02	4.20E-03	158777.3934	54	7	162,119	3,341
ES-GN	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	66	2.70E-03	5.39E-04	67	67
ES-FWP	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	66	2.70E-03	5.39E-04	67	67
ES-CHIP-2	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	346	1.40E-02	2.80E-03	347	347

[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.

[5] CO_{2e} reflects the biomass defferral which does not add in CO_2 from biomass combustion.

APPENDIX C - LOCAL ZONING CONSISTENCY DETERMINATION

Zoning Consistency Determination

Facility Name: Enviva Pellets Hamlet, LLC

Facility Street Address: US Highway 117 (Street Number TBD)

Facility City: Hamlet

Description of Process: Wood pellet manufacturing facility

SIC Code/NAICS: SIC – 2499 ; NAICS - 321999

Facility Contact: Joe Harrell

Phone Number: (252) 209-6032

Mailing Address: 142 NC Route 561 East

Mailing City, State Zip: Ahoskie, NC 27910

Based on the information given above:

- ☑ I have received a copy of the air permit application (draft or final) AND...
- ☐ There are no applicable zoning and subdivision ordinances for this facility at this time
- ☒ The proposed operation IS consistent with applicable zoning and subdivision ordinances
- ☐ The proposed operation IS NOT consistent with applicable zoning and subdivision ordinances (please include a copy of the rules in the package sent to the air quality office)
- ☐ The determination is pending further information and can not be made at this time
- ☐ Other: _____

Agency: Richmond County Planning

Name of Designated Official: James Armstrong

Title of Designated Official: Director of Planning & GIS Services.

Signature: James Armstrong

Date: 1/7/14

Please forward to the mailing address listed above and the air quality office at the appropriate address as checked on the back of this form.

Courtesy of the Small Business Assistance Program
toll free at 1-877-623-6748 or on the web at www.envhelp.org/sb

APPENDIX D - BACT TABLES

TABLE D-1
REGENERATIVE SELECTIVE CATALYTIC REDUCTION COST ANALYSIS
ENVIVA PELLETS HAMLET, LLC

Capital Cost		Notes	References
Direct Capital Costs			
Total Equipment Cost + Freight	$3,381,348		2(a), 8
Sales Taxes	$101,440	0.03 EC	3(a)
Total Direct Capital Costs	$3,482,788	A	
Indirect Installation Costs			
General Facilities	$174,139	0.05A	1(a)
Engineering and Home Office Fees	$348,279	0.10A	1(a)
Process Contingencies	$174,139	0.05A	1(a)
Start-Up	$69,656	0.02A	6
Performance Testing	$34,828	0.01A	6
Total Indirect Installation Costs	$801,041	B	1(a)
Project Contingency	$642,574	C = 0.15 × (A + B)	1(a)
Total Plant Cost	$4,926,404	D = A + B + C	1(a)
Other Costs			
Preproduction Costs	$98,528	E = 0.02 × (D)	1(a)
Inventory Capital*	$3,579	$F=Vol_{reag}(gal)*Cost_{reag}(\$/gal)$	1(a), 2 (d)
Initial Catalyst and Chemicals	0	G	1(a)
Total Capital Investment	**$5,028,510**	**TCI = D + E + F + G**	1(a)
Operating Cost			
Operation and Maintenance Costs			
Operating and Maintenance Cost	$75,428	**0.015TCI**	1(b)
Total	$75,428		
Reagent Costs (19% Aqueous Ammonia)			
Reagent Consumption	11.36	gal/hr	**2(c), 2(d), 10**
Unit cost	1.50	$/gal	**2(d)**
Total	$149,269		
Electricity			
Combustion Air Fan	14.10	HP	2(a), 9
Hydraulic Power unit	2.51	HP	2(a), 10
Ammonia Pumps	0.19	HP	2(a), 10
Misc./Instruments, Hydraulic Heaters	3.87	KW	2(a), 10
Fan Power to Overcome Catalyst Pressure	407	HP (14 iwc), Assumed 65% Efficiency	2(c), 5(a)
Total Power Requirement	320	KW	7
Unit cost	$0.070	$/kW-hr	4(b)
Total	$196,000		
Fuel			
Natural Gas or fuel	0.46	MMBTU/hr	**2(a), 9**
Cost	$6.88	$/1000 ft^3	**7**
Conversion	1020	Btu/ft^3	
Total	$26,912		

Compressed Air			
Requirement	15.28	SCFM	2(a), 10
Cost	$0.31	$/1000 ft^3 air	4(a)
Total	$2,490		
Catalyst Costs			
Catalyst Cost (Present Value)	$335,064		2(b), 9
Catalyst Life	2.00		2(b)
Catalyst Cost (Future Value)	$358,853	F/P, 3.5%, 2 years	
Catalyst Cost (Annualized) Total	$170,886	A/F, 10%, 2 years	
Total Direct Annual Costs	*$620.984*	***DAC***	
Indirect Annual Costs			
Administrative Charges	$100,570	2% of TCI	1(c)
Property tax	$50,285	1% of TCI	1(c)
Insurance	$50,285	1% of TCI	1(c)
Annual Interest Rate	10%		
Economic life of RSCR	20		
Capital Recovery Factor	0.117		
Total Capital Recovery Cost	$590,647		
Total Indirect Annual Costs	$791,787		
Total Annual Cost	**$1,412,772**	*TAC = DAC + IDAC*	

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, October 2000, Section 4.2, Chapter 2.
   - [a] Table 2.5: Capital Cost Factors for an SCR Application (OAQPS 2-44)
   - [b] Equation 2.46 for maintenance (OAQPS 2-45)
   - [c] Taxes, Insurance, Admin applies (OAQPS 2-48)
2. Hertford Renewable Energy PSD Application (Hertford, North Carolina). Submitted 2008, Approved 2009.
   - a RSCR Price/Quote of $6,226,436 scaled from Hertford August 2008 Permit Application
   - b Hertford Application detailing catalyst costs and life
   - c Ammonia consumption of 58.72 gal/hr and 14 iwc for pressure drop across catalyst
   - d Volume of initial ammonia fill, price per gallon, and density of ammonia (7.83 lb/gal) $1.50/gallon for ammonia provided from vendor.
3. U.S. EPA and Office of Air Quality Planning and Standards (OAQPS), EPA Air Pollution Control Cost Manual, 6th Ed. (EPA 452/B-02-001), Research Triangle Park, NC, Jan 2002. *Section 1, Chapter 2, Cost Estimation: Concepts and Methodology*
   - a Table 2.4: Cost Ranges for Freight, Sales Tax, and Instrumentation; no sales tax and low end of range for freight (OAQPS 2-27)
4. Taken from *Methodology for Estimating Control Costs for Industrial, Commercial, Institutional Boilers and Process Heaters Nation Emissions Standards for Hazardous Air Pollutants* -- Major Source ERG Memo April 2010.
   - a Electricity and Compressed Air Cost from Memo
5. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, July 2002, Section 6, Chapter 2.
   - a Equation 2.40 for fan HP (OAQPS 2-42)
6. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, September 2000, Section 3, Chapter 2. Table 2.8: Capital Cost Factors for Thermal and Catalytic Incinerators (OAQPS 2-42) were used because factors were not in SCR section
7. Energy Information Administration highest price for industrial natural gas between November 09 through April 10. http://www.eia.gov/dnav/ng/ng_pri_sun
8. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 ($C1*(S2/S1)^{0.6}$) where S1 is Hertford Biomass Boiler (Wood Chips) flow rate of 331,969 acfin from Hertford August 2008 Application and S2 is Enviva dryer flow rate of 120,000 ACFM.
9. Scaled Direct Annual Costs linearly based on Hertford flow rate of 331,969 ACFM and Enviva flow rate of of 120,000 ACFM. The resulting Qnew/Qinitial = 0.361
10. Scaled Hertford August 2008 reagent consumption, electricity, and compressed air based on NOx emissions reduction at 715.2 MMBTU/hr versus the Enviva basis of 175.3 MMBtu/hr. Hertford Application specified NOx reduction from 0.25 lb/MMBTU to 0.075 lb/MMBTU with heat input of 715.2 MMBTU/hr or 125.1 lb/hr reduction. Enviva is assuming reduction from 0.228 lb/MMBtu to 0.077 lb/MMBtu or lb/hr reduction of = 24.2
    Thus, multiply Hertford cost by 23.1/125.1 = 0.193

TABLE D-2
CONVENTIONAL SELECTIVE CATALYTIC REDUCTION COST ANALYSIS
ENVIVA PELLETS HAMLET, LLC

Capital Cost	Boiler	OAQPS Notation[1]
Purchased Equipment Costs		
Total Equipment Cost[2,3]	3,103,027	A
Instrumentation[4]	310,303	0.10 × A
Sales Tax[4]	93,091	0.03 × A
Freight[4]	155,151	0.05 × A
Total Purchased Equipment Costs	*3,661,572*	*B = 1.18 × A*
Direct Installation Costs[6]		
Foundations and Supports	366,157	0.10 × B
Handling and Erection	1,464,629	0.40 × B
Electrical	146,463	0.04 × B
Piping	73,231	0.02 × B
Insulation	36,616	0.01 × B
Painting	36,616	0.01 × B
Site Preparation (Site Specific)	219,694	0.06 × B
Total Direct Installation Costs	*2,343,406*	*C = 0.64 × B*
Indirect Installation Costs		
General Facilities[6]	1,200,996	0.20 × (B + C)
Engineering and Home Office Fees	600,498	0.10 × (B + C)
Process Contingencies	300,249	0.05 × (B + C)
Construction Management[6]	900,747	0.15 × (B + C)
Owner's Cost[6]	300,249	0.05 × (B + C)
Total Indirect Installation Costs	*3,302,738*	*D = 0.55 × (B + C)*
Project Contingency[6]	1,861,543	E = 0.20 × (B + C + D)
Total Plant Cost	11,169,260	F = B + C + D + E
Allowance for Funds During Construction[5]	781,848	G = 0.07 × F
Royalty Allowance	0	H
Preproduction Costs	239,022	I = 0.02 × (F + G)
Inventory Capital[7,3]	3,838	J
Initial Catalyst and Chemicals	0	K
Total Capital Investment	**12,193,968**	**TCI = F + G + H + I + J + K**

Operating Cost	Boiler	OAQPS Notation
Direct Annual Costs		
Operating and Supervisory Labor	64,549	L
Maintenance Cost	182,910	M = 0.015 × TCI
Reagent Consumption[10]	51,421	N
Electricity[10]	105,007	O
Catalyst Replacement[8, 10]	162,819	P
Catalyst Regeneration[6, 10]	78,754	Q
Total Direct Annual Costs	*645,460*	*DAC = L + M + N + O + P + Q*

Indirect Annual Costs			
	Overhead, Taxes, Insurance, Administration	487,759	R
	Annual Interest Rate	10%	
	Economic life of "Hot" SCR	20	
	Capital Recovery[9]	1,432,299	S
Total Indirect Annual Costs		*1,920,078*	*IDAC = R + S*
Total Annual Cost		**2,077,759**	*TAC = DAC + IDAC*

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, January 2002, Section 4.2, Chapter 2. Adjustments to lettering made as PEC and direct installation costs were broken out for this analysis.

2. Direct Capital Costs are based on an Oglethorpe Power Corporation (Baxley, Georgia) PSD Application Submitted 2009, which includes High Dust SCR, Ammonia Unloading and Storage, ID Fans, Flue Gas Handling System, Ash Handling System, and Extra Charge of Catalyst.

3. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 (C1*(S2/S1) 0.6) where S1 is Olgethorpe Biomass Boiler (Wood Chips) Capacity of 1,282 MMBtu/hr, S2 is Enviva dryer heat input of 175.3 MMBtu/hr, and C1 is $10,238,805.

4. Based on general OAQPS costs as presented on page 2-27 of Section 1, Chapter 2 of OAQPS Manual.

5. Estimates based on engineering knowledge and evaluation of costs for other equipment as specified in OAQPS Manual.

6. Costs were not included in OAQPS calculation or underestimated by OAQPS based on vendor data and experience. Costs have been included or adjusted.

7. Inventory capital is the cost to fill the reagent tank(s) for the first time, OAQPS Manual, Section 4.2, Chapter 2, page 2-44.

8. Catalyst replacement is calculated based on Future Worth Factor in Equations 2.51 and 2.52 of OAQPS Manual, Section 4.2, Chapter 2, page 2-47.

9. Capital Recovery calculated based on Equations 2.54 and 2.55 of OAQPS Manual, Section 4.2, Chapter 2, pages 2-48 and 2-49.

10. Scaled Olgethorpe reagent consumption, electricity, and catalyst based on NOx emissions reduction at 1282 MMBTU/hr versus the Enviva basis of 175.3 MMBtu/hr. Oglethorpe Application specified NOx reduction from 0.18 lb/MMBTU to 0.07 lb/MMBTU with heat input of 1,282 MMBTU/hr or 140.9 lb/hr reduction. Enviva is assuming reduction from 0.228 lb/MMBtu to 0.077 lb/MMBtu or lb/hr reduction =

24.20 lbs/hr Thus, multiply Olgethorpe cost by the ratio of NOx reduction = 0.172

TABLE D-3
SELECTIVE NON-CATALYTIC REACTOR COST ANALYSIS
ENVIVA PELLETS HAMLET, LLC

Cost Item		Notes	Reference
Direct Capital Costs			
Installed Capital Cost	$162,919		2(a), 4
Total Capital Investment	**$162,919**		
Operating Cost			
Direct Annual Costs			
Capacity Factor For Direct Annual Costs	100.0%		3(a)
Operation and Maintenance Costs	$25,000		2(c)
Reagent Costs (50% Urea Solution)			
Reagent Consumption	9.01	gph	2(d), 5
Reagent Cost	$2.00	($/gal)	2(d)
Total	$157,845		
Compressed Air			
Compressed Air	46	scfm	2(e), 5
Air Price	$0.15	$/1000 ft^3 air	
Total	$3,596		
Water Consumption			
Water	179	gph	2(f), 5
Water Price	$1.65	$/1000 gallons	3(b)
Total	$2,581		
Electricity			
Power	3.20	kW	3(c), 5
Unit Cost	$0.070	$/kWh	
Total	$1,963		
Total Direct Annual Costs	*$190,984*		
Indirect Annual Costs			
Administrative Charges	$3,258	2% of TCI	
Property tax	$1,629	1% of TCI	
Insurance	$1,629	1% of TCI	
Annual Interest Rate	10%		
Economic life of SNCR	15		
Capital Recovery Factor	0.131		1(b)
Total Capital Recovery Cost	$21,420		
Total Indirect Annual Costs	$27,936		
Total Annual Cost	**$218,921**		

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, March 2003, Section 4.2, Chapter 2.
   [a] No taxes, Insurance, Admin applies (OAQPS 1-37)
   [b] Equation 1.34 for CFI (OAQPS 1-38)
2. Verbal quote provided by Chris Culpepper for Factory sales on 3-27-2012 for Capital cost. Other costs provided from Hertford Renewable Energy PSD Application (Hertford, North Carolina). Submitted 2008, Approved 2009.
   a Cost of SNCR System $300,000
   b BOP Interface Design Engineering and Erection - Assumes Install = 1.25 x Mat'l & Engineering
   c Estimated Value, Parts and Labor
   d Reagent Consumption (gph) and Cost ($/gal) from vendor-90% Capacity
   e Plant air + instrument air, based on $0.15 per 1000 cubic feet of air
   f Assumes 1 gpm per injector total flow and $2.50 per 1000 gallons filtered water
3 Sources as follows:
   a Capacity factor calculated as 8760 times the average hourly annual throughput divided by maximum hourly throughput (71.71 ODT/hr / 71.71 ODT/hr)
   b Base water price from Hertford Renewable Energy PSD Application (Hertford, North Carolina). Submitted 2008, Approved 2009.
   c Base electricity price from Hertford Renewable Energy PSD Application (Hertford, North Carolina). Submitted 2008, Approved 2009.
4. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 $(C1*(S2/S1)^{0.6})$ where S1 is Hertford Biomass Boiler (Wood Chips) flow rate of 331,969 ACFM and S2 is the flow rate of 120000 ACFM 0.361
5. Scaled original quoted reagent consumption based on the Herford NOx emissions reduction at 762.5 MMBTU/hr versus the Enviva dryer heat input rating of 175 MMBtu/hr. Herford had a reduction from a NOx reduction from 0.30 lb/MMBTU to 0.15 lb/MMBTU at 762.5 MMBTU/hr or 114.4 lb/hr reduction. The dryer will have a NOx reduction of 0.22 lb/mmBtu to 0.114 lb/mmBtu or 18.31 lbs/hr reduction. Thus, multiply the Hertford quote by 18.31/114.4, which is equal to 0.160
Electricity, Water, and Compressed air were also scaled accordingly

TABLE D-4
NOx BACT IMPACTS SUMMARY
ENVIVA PELLETS RICHMOND, LLC

Control Options (lb/MMBTU)	Baseline Emissions (tons/yr)	Control Efficiency	Emissions Reduction (tons/year)	Economic Impacts			Energy Impacts	Environmental Impacts
				Total Capital Cost ($)	Annual Cost ($/year)	Cost Effectiveness ($/ton)	Increase Over Baseline (kW*hr/yr)	Adverse Environmental Impacts? (Yes/No)
0.077 (RSCR)	160.37	66.1%	106.0	$5,028,510	$1,412,772	$13,328	2.80E+06	No
0.077 (HD SCR)	160.37	66.1%	106.0	$12,193,968	$2,077,759	$19,601	1.61E+07	No
0.114 (SNCR)	160.37	50.0%	80.2	$162,919	$218,921	$2,730	2.80E+04	No
0.228 (Baseline)	160.37	N/A	N/A	N/A	N/A	N/A	N/A	No

TABLE D-5
WET ESP ECONOMICS IMPACTS EVALUATION
ENVIVA PELLETS HAMLET, LLC

Capital Cost		Notes	Ref.
Total Capital Investment			
Direct Costs			
Purchased Equipment Costs			
WESP	$2,451,446	A	1, 11
Freight Estimate	$89,143		1(a), 11
Instrumentation	$245,145	0.10A	2
Sales Tax	$73,543	0.03A	2
Purchased Equipment Cost, PEC	**$2,859,277**	B	
Direct Installation Costs			
Foundations and Support	$114,371	0.04B	2
Handling & Erection	$1,429,639	0.50B	2
Electrical	$228,742	0.08B	2
Piping	$28,593	0.01B	2
Insulation for ductwork	$57,186	0.02B	2
Painting	$57,186	0.02B	2
Total	**$1,915,716**		
Total Direct Costs, DC	**$4,774,993**	*DC = B + 0.67 * B*	
Indirect Costs (Installation)			
Engineering	$571,855	0.20B	2
Construction and field expenses	$571,855	0.20B	2
Contractor Fees	$285,928	0.10B	2
Start-up	$28,593	0.01B	2
Performance test	$28,593	0.01B	2
Model study	$57,186	0.02B	2
Contingencies	$85,778	0.03B	2
Total Indirect Costs, IC	**$1,629,788**	*IC = 0.57 * B*	
Total Capital Investment	**$6,404,781**	**TCI = DC + IC**	
Operating Cost			
Direct Annual Costs			
Operating Labor			
Operator	$56,130	3 hr/d * d/y * $51.26/hr	3(a), 5
Supervisor	$8,419	15% of operator	3(b)
Coordinator	$18,710	1/3 of operator	3(c)
Total	**$83,259**		
Maintenance			
Labor	$1,675	0.825*ESP Plate Area (ft^2)	4, 11
Material	$28,593		3(d)
Total	**$30,268**		
Electricity Costs			
Requirement	152	kw/HR	6(a), 9, 11
Unit cost	$0.070	$/kW-hr	9
Total	**$93,409**		
Water Costs			
Wastewater Disposal	$1,703		6(b), 7
Municipal Water Usage	$284		6(b), 8
	$1,987		
Total Direct Annual Costs	***$208,923***		

Indirect Annual Costs			
Overhead	$68,116	60% * (operating labor + maintenance)	3(e)
Administrative Charges	$128,096	2% of TCI	3(e)
Property tax	$64,048	1% of TCI	3(e)
Insurance	$64,048	1% of TCI	3(e)
Annual Interest Rate	10.0%		10
Economic life of ESP	15		10
Capital Recovery Factor	0.131		10
Total Capital Recovery Cost	$842,061		10
Total Indirect Annual Costs	***$1,166,368***		
Total Annual Cost	**$1,375,291**	*TAC = DAC + IDAC*	

1. Quote of $3,300,000 provided by TurboSonic (6/22/2010) for a 130 MMBtu/hr Wood-fired Boiler achieving similar performance levels. a Email from Rod Pennington (TurboSonic) to Joe Sullivan (Trinity) June 26, 2010 that stated additional freight costs no included. Freight cost $120,000.
2. Direct and Indirect capital costs associated with the purchase of the ESP determined in accordance with EPA OAQPS APCCM Sec.6, Ch.3, Table 3.16
3. EPA OAQPS APCCM Sec.6, Ch.3, Table 3.21
   (a) Operator costs calculated @ 3 hr per day and 175.30 days of operation
   (b) Supervisor labor costs calculated @ 15% of operator cost as per APCCM guidance
   (c) Coordinator costs calculated @ 1/3 of operator costs as per APCCM guidance
   (d) Maintenance material(s) calculated @ 1% of purchased equipment cost as per APCCM guidance
   (e) Indirect annual costs calculated in accordance with APCCM guidance
4. EPA OAQPS APCCM Sec.6, Ch.3, Equation 3.45 for Maintenance Materials
5. US Dept. of Labor - Bureau of Labor Statistics - $51.26/hr (Stationary Engineers and Boiler Operators, 2008 dollars)
6. Provided by TurboSonic, ESP supplier/vendor
   (a) Electrical power requirements
   (b) Wastewater blowdown rate (0.6 gallons / minute); assumes water usage (blowdown rate + 50% sump vol)
7. Waste water disposal cost - $0.0054/gal - provided by Air Compliance Advisor User Guide - Version 7.5
8. Municipal water usage cost - $0.0006 /gal - provided by Electric Power Research Institute
9. Electricity unit cost provided by the Energy Information Administration
10. Capital recovery calculated assuming 15 years of equipment life @ a recovery rate of 10% Capital Recovery Factor (CRF) = (IR*(1+IR)^n)/((1+IR)^n - 1)
11. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 ($C1*(S2/S1)^{0.6}$) where S1 is basis flow rate of 196,940 ACFM from a NC wood products facility and S2 is Enviva dryer flow rate of 120,000 ACFM. 0.61

TABLE D-6
PM BACT IMPACTS SUMMARY FOR ROTARY DRYER
ENVIVA PELLETS RICHMOND, LLC

Control Options (lb/ODT)	Baseline Emissions (tons/yr)	Control Efficiency	Emissions Reduction (tons/year)	Economic Impacts			Energy Impacts	Environmental Impacts
				Total Capital Cost ($)	Annual Cost ($/year)	Cost Effectiveness ($/ton)	Increase Over Baseline (kW*hr/yr)	Adverse Environmental Impacts? (Yes/No)
0.073 (WESP)	601.38	96%	580.3	$6,404,781	$1,375,291	$2,370	1.33E+06	No
2.092 (Baseline, Cyclone)	601.38	N/A	N/A	N/A	N/A	N/A	N/A	No

[1] Filterable reduction of PM to 0.073 lb/ODT equates to a limit of 0.03 lb/MMBtu filterable PM. Condensible portion is 0.017 lb/MMBtu as shown in the emission calculations.

TABLE D-7
REGENERATIVE THERMAL OXIDATION COST ANALYSIS FOR ROTARY DRYER
ENVIVA PELLETS HAMLET, LLC

Capital Cost		Notes	Reference
Direct Costs			
Purchased Equipment Costs			
RTO Price+ Freight+Instrumentation	$2,700,000	A	2(a)
95% Sales Tax	$81,000	0.03A	1(a)
Purchased Equipment Cost, PEC	$2,781,000	B	
Direct Installation Costs			
Foundations and Support	$222,480	0.08B	1(a)
Handling & Erection	$389,340	0.14B	1(a)
Electrical	$111,240	0.04B	1(a)
Piping	$55,620	0.02B	1(a)
Insulation for ductwork	$27,810	0.01B	1(a)
Painting	$27,810	0.01B	1(a)
Direct Installation Costs	$834,300		
Total Direct Costs, DC	$3,615,300		
Indirect Costs (Installation)			
Engineering	$278,100	0.10B	1(a)
Construction and field expenses	$139,050	0.05B	1(a)
Contractor Fees	$278,100	0.10B	1(a)
Start-up	$55,620	0.02B	1(a)
Performance test	$27,810	0.01B	1(a)
Contingencies	$83,430	0.03B	1(a)
Total I 1.64	$862,110		
Total Capital Investment	$4,477,410	TCI = DC + IC	
Operating Cost			
Capacity Factor For Direct Annual Costs	88.2%	used to establish hours/yr of operation	
Operating Labor			
Operator	$24,753	0.5 hr/s, 3 s/d, d/yr, $51.26/hr, CF	1(b), 3(a)
Supervisor	$3,713	15% of operator	1(b)
Total	$28,466		
Maintenance			
Labor	$24,753	0.5 hr/s, 3 s/d, d/yr, $51.26/hr, CF	1(b), 3(a)
Material	$24,753	100% of maintenance labor	1(b)
Total	$49,506		
Electricity			
Total Requirement	595	KW	2(c)
Unit cost	$0.070	$/kW-hr	2(c)
Total	$321,930		
Fuel			
Natural Gas	9.99	MMBTU/hr	3(a)
Cost	$6.00	$/MMBtu	2(b)
Total	$525,000		

Total Direct Annual Costs	*$924,903*		
Indirect Annual Costs			
Overhead	$46,784	60% of operating labor + maintenance	1(b)
Administrative Charges	$89,548	2% of TCI	1(b)
Property tax	$44,774	1% of TCI	1(b)
Insurance	$44,774	1% of TCI	1(b)
Annual Interest Rate	10%		
Economic life of RTO	10		
Capital Recovery Factor	0.163		
Total Capital Recovery Cost	$728,678		
Total Indirect Annual Costs	*$954,558*		
Total Annual Cost	**$1,879,460**	*TAC = DAC + IDAC*	

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, September 2000, Section 3, Chapter 2.
   [a] Table 2.8: Capital Cost Factors for Thermal and Catalytic Incinerators (OAQPS 2-42); Vendor quote usually includes instrumentation
   [b] Table 2.10: Annual Costs for Thermal and Catalytic Incinerators Example Problem (OAQPS 2-45)
2. Provided to Wallace Lasonde of Enviva by Steve Jaasund from GEOENERGY Division of A.H. Lundberg Associates, Inc on March 21, 2011.
   a RTO Price/Quote
   b Natural Gas Cost and usage.
   c Electricity cost and power requirement.
3. Taken from *Methodology for Estimating Control Costs for Industrial, Commercial, Institutional Boilers and Process Heaters Nation Emissions Standards for Hazardous Air Pollutants* -- Major Source ERG Memo April 2010.
   a Conservative estimate of loaded hourly wage
   b Compressed Air Cost from Memo
4. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, July 2002, Section 6, Chapter 2.
   a Equation 2.40 for fan HP (OAQPS 2-42)

TABLE D-8
VOC BACT IMPACTS SUMMARY FOR ROTARY DRYER
ENVIVA PELLETS RICHMOND, LLC

Control Options (lb/ODT)	Uncontrolled Emissions (tons/yr)	Control Efficiency	Emissions Reduction (tons/year)	Economic Impacts			Energy Impacts	Environmental Impacts
				Total Capital Cost ($)	Annual Cost ($/year)	Cost Effectiveness ($/ton)	Increase Over Baseline (kW*hr/yr)	Adverse Environmental Impacts? (Yes/No)
0.359 (RTO)	1030.7	90%	927.6	$4,477,410	$1,879,460	$2,026	5.21E+06	No
3.59 (Baseline)	1030.7	N/A	N/A	N/A	N/A	N/A	N/A	No

TABLE D-9
BACT INPUT PARAMETERS AND EMISSIONS ESTIMATES FOR GREEN WOOD HAMMERMILLS
ENVIVA PELLETS HAMLET, LLC

Operating Assumptions:

Green Hammermill Stack Velocity =	65	ft/sec
Stack Diameter =	3	feet
Stack Flow Rate =	27,554	ACFM; =Pi*D^2/4*Stack Velocity (ft/s)*60 (sec/min)
Exit Temperature =	332.59	deg K
Standard flow rate =	24,285.79	SCFM
lb/ODT Factor =	1.10	Enviva test data+ 40% safety factor
Production Rate =	575,000	ODT/yr
Operating hours and days =	8,760	hrs/yr

RTO Capital Cost =	$ 683,112	Estimated from RTO manufacturer using scfm
Estimated RTO Operating Cost (fuel and electricity) =	$ 197,950	Estimated from RTO manufacturer using scfm

VOC Emissions Summary:

Pollutant	GREEN HAMMERMILL (tpy)
VOC	316.25

TABLE D-10
FABRIC FILTER ECONOMICS IMPACTS EVALUATION FOR GREEN WOOD HAMMERMILLS
ENVIVA PELLETS HAMLET, LLC

Capital Cost		Notes	Ref.
Total Capital Investment			
Direct Costs			
Purchased Equipment Costs			
Bagfilter with Ductwork	$80,337	A	1, 8
Freight Estimate	$4,017	0.05A	2
Instrumentation	$8,034	0.10A	2
Sales Tax	$2,410	0.03A	2
Purchased Equipment Cost, PEC	**$94,797**	B	
Direct Installation Costs			
Foundations and Support	$3,792	0.04B	2
Handling & Erection	$47,399	0.50B	2
Electrical	$7,584	0.08B	2
Piping	$0	0.01B	1
Insulation for ductwork	$1,896	0.02B	1
Painting	$1,896	0.02B	2
Total	**$62,566**		
Total Direct Costs, DC	**$157,363**	*DC = B + 0.67 * B*	
Indirect Costs (Installation)			
Engineering	$9,480	0.10B	2
Construction and field expenses	$18,959	0.20B	2
Contractor Fees	$9,480	0.10B	2
Start-up	$948	0.01B	2
Performance test	$948	0.01B	2
Contingencies	$2,844	0.03B	2
Total Indirect Costs, IC	**$42,659**	*IC = 0.57 * B*	
Total Capital Investment	**$200,022**	**TCI = DC + IC**	
Operating Cost			
Direct Annual Costs			
Operating Labor			
Operator	$112,259	6 hr/d * 365 d/y * $51.26/hr	3(a), 5
Supervisor	$16,839	15% of operator	3(b)
Total	**$129,098**		
Maintenance			
Labor	$56,130	3 hr/d * 365 d/y * $51.26/hr	3(c)
Material	$56,130		3(d)
Total	**$112,259**		
Replacement parts (bag replacement, $390,673, every 3 years per GE, 3% interest)	**$138,103**		3
Electricity Costs			
Requirement	262,000	kw/yR	3(e)
Unit cost	$0.070	$/kW-hr	6
Total	**$18,340**		
Compressed Air	7,000		3(e)
	$7,000		
Total Direct Annual Costs	***$404,800***		

Indirect Annual Costs			
Overhead	$144,814.63	60% * (operating labor + maintenance)	3(e)
Administrative Charges	$4,000	2% of TCI	3(e)
Property tax	$2,000	1% of TCI	3(e)
Insurance	$2,000	1% of TCI	3(e)
Annual Interest Rate	10.0%		
Economic life of Bagfilter	15		
Capital Recovery Factor	0.131		
Total Capital Recovery Cost	$26,298		
Total Indirect Annual Costs	***$179,113***		
Total Annual Cost	**$583,914**	*TAC = DAC + IDAC*	

1. Quote provided by Bruce Westerman on 8/12/2013 estimate for bagfilter including ductwork.
2. Direct and Indirect capital costs associated with the purchase of the Fabric filter determined in accordance with EPA OAQPS APCCM Sec.6, Ch.1, Table 1.9
3. EPA OAQPS APCCM Sec.6, Ch.1, Table 1.11
   (a) Operator costs calculated @ 2 hr per shift 3 shifts per day day and 365 days of operation
   (b) Supervisor labor costs calculated @ 15% of operator cost as per APCCM guidance
   (c) Maintenance labor of 1 hour per shift 3 shifts per day
   (d) Maintenance material(s) calculated @ 100% of labor
   (e) Indirect annual costs calculated in accordance with APCCM guidance
4. EPA OAQPS APCCM Sec.6, Ch.1, Table 1.11
5. US Dept. of Labor - Bureau of Labor Statistics - $51.26/hr (Stationary Engineers and Boiler Operators, 2008 dollars)
6. Electricity unit cost provided by the Energy Information Administration
7. Capital recovery calculated assuming 15 years of equipment life @ a recovery rate of 10%
   Capital Recovery Factor (CRF)
   = (IR*(1+IR)^n)/((1+IR)^n - 1)
8. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 ($C1*(S2/S1)^{0.6}$) where S1 is Pellet coolers flow rate of S2 is the Enviva green hammermill flow rate
   The resulting Qnew/Qinitial = 0.22

TABLE D-11
CYCLONE ECONOMICS IMPACTS EVALUATION FOR GREEN WOOD HAMMERMILLS
ENVIVA PELLETS HAMLET, LLC

Capital Cost		Notes	Ref.
Total Capital Investment			
Direct Costs			
Purchased Equipment Costs			
Cyclone	$4,419	A	1
Freight Estimate	$221	0.05A	2
Instrumentation	$442	0.10A	2
Sales Tax	$133	0.03A	2
Purchased Equipment Cost, PEC	**$5,214**	B	
Direct Installation Costs			
Foundations and Support	$209	0.04B	2
Handling & Erection	$2,607	0.50B	2
Electrical	$417	0.08B	2
Piping	$52	0.01B	1
Insulation for ductwork	$104	0.02B	1
Painting	$104	0.02B	2
Total	**$3,493**		
Total Direct Costs, DC	**$8,707**	*DC = B + 0.67 * B*	
Indirect Costs (Installation)			
Engineering	$521	0.10B	2
Construction and field expenses	$1,043	0.20B	2
Contractor Fees	$521	0.10B	2
Start-up	$52	0.01B	2
Performance test	$52	0.01B	2
Contingencies	$156	0.03B	2
Total Indirect Costs, IC	**$2,346**	*IC = 0.57 * B*	
Total Capital Investment	**$11,053**	TCI = DC + IC	
Operating Cost			
Direct Annual Costs			
Operating Labor			
Operator	$0	0 hr/d * 365 d/y * $51.26/hr	3(a), 5
Supervisor	$0	15% of operator	3(b)
Total	**$0**		
Maintenance			
Labor	$0	3 hr/d * 365 d/y * $51.26/hr	3(c)
Material	$0		3(d)
Total	**$0**		
Electricity Costs			
Requirement	262,000	kw/yR	3(e)
Unit cost	$0.070	$/kW-hr	6
Total	**$18,340**		
Compressed Air	7,000		3(e)
	$7,000		
Total Direct Annual Costs	***$25,340***		

Indirect Annual Costs			
Overhead	$0.00	60% * (operating labor + maintenance)	3(e)
Administrative Charges	$221	2% of TCI	3(e)
Property tax	$111	1% of TCI	3(e)
Insurance	$111	1% of TCI	3(e)
Annual Interest Rate	10.0%		
Economic life of Cyclone	10		
Capital Recovery Factor	0.163		
Total Capital Recovery Cost	$1,799		
Total Indirect Annual Costs	***$2,241***		
Total Annual Cost	**$27,581**	*TAC = DAC + IDAC*	

1. Quote provided by Bruce Westerman on 8/12/2013 estimate from Aircon Corporation.
2. Direct and Indirect capital costs associated with the purchase of the cyclone determined in accordance with EPA OAQPS APCCM Sec.6, Ch.1, Table 1.9
3. EPA OAQPS APCCM Sec.6, Ch.1, Table 1.11
   (a) Assumed no operator cost required for simple cyclone.
   (b) Assumed no supervisor cost required for simple cyclone.
   (c) Maintenance labor of 1 hour per shift 3 shifts per day
   (d) Maintenance material(s) calculated @ 100% of labor
   (e) Indirect annual costs calculated in accordance with APCCM guidance.
4. EPA OAQPS APCCM Sec.6, Ch.1, Table 1.11
5. US Dept. of Labor - Bureau of Labor Statistics - $51.26/hr (Stationary Engineers and Boiler Operators, 2008 dollars)
6. Electricity unit cost provided by the Energy Information Administration
7. Capital recovery calculated assuming 15 years of equipment life @ a recovery rate of 10%
   Capital Recovery Factor (CRF)
   = (IR*(1+IR)^n)/((1+IR)^n - 1)
8. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 ($C1*(S2/S1)^{0.6}$) where S1 is Pellet coolers flow rate of S2 is the Enviva green hammermill flow rate
   The resulting Qnew/Qinitial = 0.22

TABLE D-12a
PM BACT IMPACTS SUMMARY FOR GREEN WOOD HAMMERMILLS
ENVIVA PELLETS RICHMOND, LLC

Control Options (gr/scf)	Baseline Emissions (tons/yr)	Control Efficiency	Emissions Reduction (tons/year)	Economic Impacts				Energy Impacts	Environmental Impacts
				Total Capital Cost ($)	Annual Cost CD-GHM-CYC	Cost Effectiveness ($/ton)	Incremental Cost Effectiveness ($/ton)	Increase Over Baseline (kW*hr/yr)	Adverse Environmental Impacts? (Yes/No)
0.0075 (Bagfilter)	258.61	97%	250.9	$200,022	$583,914	$2,328	$30,732	2.62E+05	No
0.025 (Cyclone)	258.61	90%	232.7	$11,053	$27,581	$119	$119	2.62E+05	No
0.25 (Baseline)	258.61	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No

TABLE D-12b
PM10 BACT IMPACTS SUMMARY FOR GREEN HAMMERMILL
ENVIVA PELLETS RICHMOND, LLC

Control Options (gr/scf)	Baseline Emissions (tons/yr)	Control Efficiency	Emissions Reduction (tons/year)	Economic Impacts				Energy Impacts	Environmental Impacts
				Total Capital Cost ($)	Annual Cost ($/year)	Cost Effectiveness ($/ton)	Incremental Cost Effectiveness ($/ton)	Increase Over Baseline (kW*hr/yr)	Adverse Environmental Impacts? (Yes/No)
0.00053 (Bagfilter)	18.62	97%	18.1	$200,022	$583,914	$32,311	$423,474	2.62E+05	No
0.0018 (Cyclone)	18.62	90%	16.8	$11,053	$27,581	$1,646	$1,646	2.62E+05	No
0.018 (Baseline)	18.62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No

TABLE D-12c
PM2.5 BACT IMPACTS SUMMARY FOR GREEN HAMMERMILL
ENVIVA PELLETS RICHMOND, LLC

Control Options (gr/scf)	Baseline Emissions (tons/yr)	Control Efficiency	Emissions Reduction (tons/year)	Economic Impacts				Energy Impacts	Environmental Impacts
				Total Capital Cost ($)	Annual Cost ($/year)	Cost Effectiveness ($/ton)	Incremental Cost Effectiveness ($/ton)	Increase Over Baseline (kW*hr/yr)	Adverse Environmental Impacts? (Yes/No)
0.00006 (Bagfilter)	2.07	97%	2.0	$200,022	$583,914	$290,966	$3,841,514	2.62E+05	No
0.0002 (Cyclone)	2.07	90%	1.9	$11,053	$27,581	$14,813	$14,813	2.62E+05	No
0.0020 (Baseline)	2.07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No

[1] Assuming overall reduction of Total PM. Speciation from engineering tests: PM =100% and PM-10= 7% PM2.5 = 0.8%.

TABLE D-13
REGENERATIVE THERMAL OXIDATION COST ANALYSIS - GREEN WOOD HAMMERMILLS
ENVIVA PELLETS HAMLET, LLC

Capital Cost		Notes	Reference
Direct Costs			
Purchased Equipment Costs			
RTO Price+ Freight+Instrumentation	$683,112	A	2(a)
Sales Tax	$20,493	0.03A	1(a)
Purchased Equipment Cost, PEC	$703,605	B	
Direct Installation Costs			
Foundations and Support	$56,288	0.08B	1(a)
Handling & Erection	$98,505	0.14B	1(a)
Electrical	$28,144	0.04B	1(a)
Piping	$14,072	0.02B	1(a)
Insulation for ductwork	$7,036	0.01B	1(a)
Painting	$7,036	0.01B	1(a)
Direct Installation Costs	$211,081		
Total Direct Costs, DC	$914,686		
Indirect Costs (Installation)			
Engineering	$70,360	0.10B	1(a)
Construction and field expenses	$35,180	0.05B	1(a)
Contractor Fees	$70,360	0.10B	1(a)
Start-up	$14,072	0.02B	1(a)
Performance test	$7,036	0.01B	1(a)
Contingencies	$21,108	0.03B	1(a)
Total Indirect Costs, IC	$218,118		
Total Capital Investment	$1,132,804	TCI = DC + IC	
Operating Cost			
Operating Labor			
Operator	$28,065	0.5 hr/s, 3 s/d, d/yr, $51.26/hr, CF	1(b), 3(a)
Supervisor	$4,210	15% of operator	1(b)
Total	$32,275		
Maintenance			
Labor	$28,065	0.5 hr/s, 3 s/d, d/yr, $51.26/hr, CF	1(b), 3(a)
Material	$28,065	100% of maintenance labor	1(b)
Total	$56,130		
Electricity			
Total Requirement	129.13	KW	2(c)
Unit cost	$0.070	$/kW-hr	2(c)
Total	$79,180		
Fuel			
Natural Gas	2.26	MMBTU/hr	3(a)
Cost	$6.00	$/MMBtu	2(b)
Total	$118,770		

Total Direct Annual Costs	*$286,354*		
Indirect Annual Costs			
Overhead	$53,043	60% of operating labor + maintenance	1(b)
Administrative Charges	$22,656	2% of TCI	1(b)
Property tax	$11,328	1% of TCI	1(b)
Insurance	$11,328	1% of TCI	1(b)
Annual Interest Rate	7%		
Economic life of RTO	15		
Capital Recovery Factor	0.110		
Total Capital Recovery Cost	$124,376		
Total Indirect Annual Costs	*$222,730*		
Total Annual Cost	**$509,085**	*TAC = DAC + IDAC*	

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)* , September 2000, Section 3, Chapter 2.
   [a] Table 2.8: Capital Cost Factors for Thermal and Catalytic Incinerators (OAQPS 2-42); Vendor quote usually includes instrumentation
   [b] Table 2.10: Annual Costs for Thermal and Catalytic Incinerators Example Problem (OAQPS 2-45)
2. Provided toWaalace Lasonde of Enviva by Steve Jaasund from GEOENERGY Division of A.H. Lundberg Assoicates, Inc on March 21, 2011.
   a RTO Price/Quote
   b Natural Gas Cost and usage
   c Electricity cost and power requirement.
3. Taken from *Methodology for Estimating Control Costs for Industrial, Commercial, Institutional Boilers and Process Heaters Nation Emissions Standards for Hazardous Air Pollutants* -- Major Source ERG Memo April 2010.
   a Conservative estimate of loaded hourly wage
   b Compressed Air Cost from Memo
4. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)* , July 2002, Section 6, Chapter 2.
   a Equation 2.40 for fan HP (OAQPS 2-42)

TABLE D-14
PELLET COOLER ASPIRATION SYSTEM - GREEN WOOD HAMMERMILLS
ENVIVA PELLETS HAMLET, LLC

Capital Cost		Notes	Reference
Direct Costs			
Purchased Equipment Costs			
RCO Price + auxiliary equipment + freight	$1,280,331	A	2(a), 6
Sales Tax	$38,410	0.03A	1(a)
Purchased Equipment Cost, PEC	$1,318,741	B	
Direct Installation Costs			
Foundations and Support	$105,499	0.08B	1(a)
Handling & Erection	$184,624	0.14B	1(a)
Electrical	$52,750	0.04B	1(a)
Piping	$26,375	0.02B	1(a)
Insulation for ductwork	$13,187	0.01B	1(a)
Painting	$13,187	0.01B	1(a)
Direct Installation Costs	$395,622		
Total Direct Costs, DC	$1,714,364		
Indirect Costs (Installation)			
Engineering	$131,874	0.10B	1(a)
Construction and field expenses	$65,937	0.05B	1(a)
Contractor Fees	$131,874	0.10B	1(a)
Start-up	$26,375	0.02B	1(a)
Performance test	$13,187	0.01B	1(a)
Contingencies	$39,562	0.03B	1(a)
Total Indirect Costs, IC	$408,810		
Total Capital Investment	$2,123,173	TCI = DC + IC	
Operating Cost			
Operating Labor			
Operator	$28,065	0.5 hr/s, 3 s/d, d/yr, $51.26/hr, CF	1(b), 4(a)
Supervisor	$4,210	15% of operator	1(b)
Total	$32,275		
Maintenance			
Labor	$28,065	0.5 hr/s, 3 s/d, d/yr, $51.26/hr, CF	1(b), 4(a)
Material	$28,065	100% of maintenance labor	1(b)
Total	$56,130		
Electricity			
Total Requirement	37	KW	Lundberg
Unit cost	$0.070	$/kW-hr	3(b)
Total	$22,650		
Fuel			
Natural Gas or fuel	0.1	MBTU/hr	3(a), 7
Cost	$6.00	$/MMBtu	6
Conversion	1020	Btu/ft^3	
Total	$6,091		
Compressed Air			
Requirement	6	SCFM	2(a), 4(b), 7
Cost	$0.31	$/1000 ft^3 air	4(b)
Total	$963		

Catalyst Costs			
Catalyst Cost (Present Value)	$66,400		2(b), 7
Catalyst Life	2		2(b)
Catalyst Cost (Future Value)	$71,115	F/P, 3.5%, 2 years	
Catalyst Cost (Annualized) Total	$33,865	A/F, 10%, 2 years	
Total Direct Annual Costs	*$151,972*		
Indirect Annual Costs			
Overhead	$53,043	60% of operating labor + maintenance	1(b)
Administrative Charges	$42,463	2% of TCI	1(b)
Property tax	$21,232	1% of TCI	1(b)
Insurance	$21,232	1% of TCI	1(b)
Annual Interest Rate	10%		
Economic life of RCO	15		
Capital Recovery Factor	0.131		
Total Capital Recovery Cost	$279,142		
Total Indirect Annual Costs	*$417,111*		
Total Annual Cost	**$569,083**	*TAC = DAC + IDAC*	

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, September 2000, Section 3, Chapter 2.
   [a] Table 2.8: Capital Cost Factors for Thermal and Catalytic Incinerators (OAQPS 2-42); Vendor quote usually includes instrumentation
   [b] Table 2.10: Annual Costs for Thermal and Catalytic Incinerators Example Problem (OAQPS 2-45)
2. Hertford Renewable Energy PSD Application (Hertford, North Carolina). Submitted 2008, Approved 2009.
   a RCO Price/Quote $5,143,578
   b Catalyst costs and life
   c Fuel Requirement was 2.5 MBTU/hr
   d 14 iwc for pressure drop and RCO electricity and utility usage were similar to RSCR
3. Enviva Vendor
   a Natural Gas Cost
   b Electricity cost
4. Taken from *Methodology for Estimating Control Costs for Industrial, Commercial, Institutional Boilers and Process Heaters Nation Emissions Standards for Hazardous Air Pollutants* -- Major Source ERG Memo April 2010.
   a Conservative estimate of loaded hourly wage
   b Electricity and Compressed Air Cost from Memo
5. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, July 2002, Section 6, Chapter 2.
   a Equation 2.40 for fan HP (OAQPS 2-42)
6. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 ($C1*(S2/S1)^{0.6}$) where S1 is Hertford boiler flow rate of 279,736ACFM and S2 is the Enviva green hammermill flow rate of 102,600 ACFM
7. Scaled up Direct Annual Costs linearly based on Hertford Application boiler flow rate of 279,736 ACFM and Enviva flow rate of of 27,553 ACFM. The resulting Qnew/Qinitial = 0.10

TABLE D-15
VOC BACT IMPACTS SUMMARY - GREEN WOOD HAMMERMILLS
ENVIVA PELLETS RICHMOND, LLC

Control Options (lb/ODT)	Uncontrolled Emissions (tons/yr)	Control Efficiency	Emissions Reduction (tons/year)	Economic Impacts			Energy Impacts	Environmental Impacts
				Total Capital Cost ($)	Annual Cost ($/year)	Cost Effectiveness ($/ton)	Increase Over Baseline (kW*hr/yr)	Adverse Environmental Impacts? (Yes/No)
0.110 (RTO)	316.25	90%	284.6	$1,132,804	$509,085	$1,789	1.13E+06	No
0.110 (RCO)	316.25	90%	284.6	$2,123,173	$569,083	$1,999	3.24E+05	No
1.10 (Baseline)	316.25	N/A	N/A	N/A	N/A	N/A	N/A	No

TABLE D-16
BACT INPUT PARAMETERS AND EMISSIONS ESTIMATES FOR HAMMERMILLS
ENVIVA PELLETS HAMLET, LLC

Hammermill Operating Assumptions:

Hammermill Stack Velocity =		20.32	meters/sec
Hammermill Stack Diameter =		1.85	meters
Hammermill Stack Flow Rate =		125,000.00	ACFM; =Pi*D^2/4*Stack Velocity (m/s)*35.3147 (ft^3/ m^3)*60 (sec/min) Estimated from Enviva Northhampton Stack Parameters
Pellet Cooler Exit Temperature =		311.00	deg K
Standard flow rate =		117,825.56	SCFM
lb/ODT Factor =		0.710	average annual emission factor
Production Rate =		575,000	ODT/yr
Operating hours and days =		8,760	hrs/yr
RTO Capital Cost =	$	2,574,594	Estimated from RTO manufacturer using scfm
Estimated RTO Operating Cost (fuel and electricity) =	$	804,766	

VOC Emissions Summary:

Pollutant	Hammermill VOC (tpy)
VOC	204.1

TABLE D-17
REGENERATIVE THERMAL OXIDATION COST ANALYSIS - HAMMERMILL
ENVIVA PELLETS HAMLET, LLC

Capital Cost		Notes	Reference
Direct Costs			
Purchased Equipment Costs			
RTO Price+ Freight+Instrumentation	$2,574,594	A	2(a)
Sales Tax	$77,238	0.03A	1(a)
Purchased Equipment Cost, PEC	$2,651,832	B	
Direct Installation Costs			
Foundations and Support	$212,147	0.08B	1(a)
Handling & Erection	$371,256	0.14B	1(a)
Electrical	$106,073	0.04B	1(a)
Piping	$53,037	0.02B	1(a)
Insulation for ductwork	$26,518	0.01B	1(a)
Painting	$26,518	0.01B	1(a)
Direct Installation Costs	$795,549		
Total Direct Costs, DC	$3,447,381		
Indirect Costs (Installation)			
Engineering	$265,183	0.10B	1(a)
Construction and field expenses	$132,592	0.05B	1(a)
Contractor Fees	$265,183	0.10B	1(a)
Start-up	$53,037	0.02B	1(a)
Performance test	$26,518	0.01B	1(a)
Contingencies	$79,555	0.03B	1(a)
Total Indirect Costs, IC	$822,068		
Total Capital Investment	$4,269,449	TCI = DC + IC	
Operating Cost			
Operating Labor			
Operator	$28,065	0.5 hr/s, 3 s/d, d/yr, $51.26/hr, CF	1(b), 3(a)
Supervisor	$4,210	15% of operator	1(b)
Total	$32,275		
Maintenance			
Labor	$28,065	0.5 hr/s, 3 s/d, d/yr, $51.26/hr, CF	1(b), 3(a)
Material	$28,065	100% of maintenance labor	1(b)
Total	$56,130		
Electricity			
Total Requirement	524.96	KW	2(c)
Unit cost	$0.070	$/kW-hr	2(c)
Total	$321,906		
Fuel			
Natural Gas	9.19	MMBTU/hr	3(a)
Cost	$6.00	$/MMBtu	2(b)
Total	$482,859		

Total Direct Annual Costs	*$893,170*		
Indirect Annual Costs			
Overhead	$53,043	60% of operating labor + maintenance	1(b)
Administrative Charges	$85,389	2% of TCI	1(b)
Property tax	$42,694	1% of TCI	1(b)
Insurance	$42,694	1% of TCI	1(b)
Annual Interest Rate	7%		
Economic life of RTO	15		
Capital Recovery Factor	0.110		
Total Capital Recovery Cost	$468,763		
Total Indirect Annual Costs	*$692,583*		
Total Annual Cost	**$1,585,753**	*TAC = DAC + IDAC*	

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, September 2000, Section 3, Chapter 2.
   [a] Table 2.8: Capital Cost Factors for Thermal and Catalytic Incinerators (OAQPS 2-42); Vendor quote usually includes instrumentation
   [b] Table 2.10: Annual Costs for Thermal and Catalytic Incinerators Example Problem (OAQPS 2-45)
2. Provided toWaalace Lasonde of Enviva by Steve Jaasund from GEOENERGY Division of A.H. Lundberg Assoicates, Inc on March 21, 2011.
   a RTO Price/Quote
   b Natural Gas Cost and usage.
   c Electricity cost and power requirement.
3. Taken from *Methodology for Estimating Control Costs for Industrial, Commercial, Institutional Boilers and Process Heaters Nation Emissions Standards for Hazardous Air Pollutants* -- Major Source ERG Memo April 2010.
   a Conservative estimate of loaded hourly wage
   b Compressed Air Cost from Memo
4. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, July 2002, Section 6, Chapter 2.
   a Equation 2.40 for fan HP (OAQPS 2-42)

TABLE D-18
HAMMERMILL - REGENERATIVE CATALYTIC OXIDATION COST ANALYSIS
ENVIVA PELLETS HAMLET, LLC

Capital Cost		Notes	Reference
Direct Costs			
Purchased Equipment Costs			
RCO Price + auxiliary equipment + freight	$3,172,213	A	2(a), 6
Sales Tax	$95,166	0.03A	1(a)
Purchased Equipment Cost, PEC	$3,267,379	B	
Direct Installation Costs			
Foundations and Support	$261,390	0.08B	1(a)
Handling & Erection	$457,433	0.14B	1(a)
Electrical	$130,695	0.04B	1(a)
Piping	$65,348	0.02B	1(a)
Insulation for ductwork	$32,674	0.01B	1(a)
Painting	$32,674	0.01B	1(a)
Direct Installation Costs	$980,214		
Total Direct Costs, DC	$4,247,593		
Indirect Costs (Installation)			
Engineering	$326,738	0.10B	1(a)
Construction and field expenses	$163,369	0.05B	1(a)
Contractor Fees	$326,738	0.10B	1(a)
Start-up	$65,348	0.02B	1(a)
Performance test	$32,674	0.01B	1(a)
Contingencies	$98,021	0.03B	1(a)
Total Indirect Costs, IC	$1,012,888		
Total Capital Investment	$5,260,481	**TCI = DC + IC**	
Operating Cost			
Operating Labor			
Operator	$28,065	0.5 hr/s, 3 s/d, d/yr, $51.26/hr, CF	1(b), 4(a)
Supervisor	$4,210	15% of operator	1(b)
Total	$32,275		
Maintenance			
Labor	$28,065	0.5 hr/s, 3 s/d, d/yr, $51.26/hr, CF	1(b), 4(a)
Material	$28,065	100% of maintenance labor	1(b)
Total	$56,130		
Electricity			
Total Requirement	168	KW	Lundberg
Unit cost	$0.070	$/kW-hr	3(b)
Total	$102,753		
Fuel			
Natural Gas or fuel	0.5	MBTU/hr	3(a), 7
Cost	$6.00	$/MMBtu	6
Conversion	1020	Btu/ft^3	
Total	$27,631		
Compressed Air			
Requirement	27	SCFM	2(a), 4(b), 7
Cost	$0.31	$/1000 ft^3 air	4(b)
Total	$4,368		

Catalyst Costs			
Catalyst Cost (Present Value)	$301,233		2(b), 7
Catalyst Life	2		2(b)
Catalyst Cost (Future Value)	$322,621	F/P, 3.5%, 2 years	
Catalyst Cost (Annualized) Total	$153,632	A/F, 10%, 2 years	
Total Direct Annual Costs	*$376,789*		
Indirect Annual Costs			
Overhead	$53,043	60% of operating labor + maintenance	1(b)
Administrative Charges	$105,210	2% of TCI	1(b)
Property tax	$52,605	1% of TCI	1(b)
Insurance	$52,605	1% of TCI	1(b)
Annual Interest Rate	10%		
Economic life of RCO	15		
Capital Recovery Factor	0.131		
Total Capital Recovery Cost	$691,615		
Total Indirect Annual Costs	*$955,077*		
Total Annual Cost	**$1,331,866**	*TAC = DAC + IDAC*	

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, September 2000, Section 3, Chapter 2.
   [a] Table 2.8: Capital Cost Factors for Thermal and Catalytic Incinerators (OAQPS 2-42); Vendor quote usually includes instrumentation
   [b] Table 2.10: Annual Costs for Thermal and Catalytic Incinerators Example Problem (OAQPS 2-45)
2. Hertford Renewable Energy PSD Application (Hertford, North Carolina). Submitted 2008, Approved 2009.
   a RCO Price/Quote $5,143,578
   b Catalyst costs and life
   c Fuel Requirement was 2.5 MBTU/hr
   d 14 iwc for pressure drop and RCO electricity and utility usage were similar to RSCR
3. Enviva Vendor
   a Natural Gas Cost
   b Electricity cost
4. Taken from *Methodology for Estimating Control Costs for Industrial, Commercial, Institutional Boilers and Process Heaters Nation Emissions Standards for Hazardous Air Pollutants* – Major Source ERG Memo April 2010.
   a Conservative estimate of loaded hourly wage
   b Electricity and Compressed Air Cost from Memo
5. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, July 2002, Section 6, Chapter 2.
   a Equation 2.40 for fan HP (OAQPS 2-42)
6. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 ($C1*(S2/S1)^{0.6}$) where S1 is Hertford boiler flow rate of 279,736ACFM and S2 is the Enviva hammermill flow rate of 120,000 ACFM
7. Scaled up Direct Annual Costs linearly based on Hertford Application boiler flow rate of 279,736 ACFM and Enviva flow rate of of 120,000 ACFM. The resulting Qnew/Qinitial = 0.45

TABLE D-19
VOC BACT IMPACTS SUMMARY - HAMMERMILL
ENVIVA PELLETS RICHMOND, LLC

Control Options (lb/ODT)	Uncontrolled Emissions (tons/yr)	Control Efficiency	Emissions Reduction (tons/year)	Economic Impacts			Energy Impacts	Environmental Impacts
				Total Capital Cost ($)	Annual Cost ($/year)	Cost Effectiveness ($/ton)	Increase Over Baseline (kW*hr/yr)	Adverse Environmental Impacts? (Yes/No)
0.0710 (RTO)	204.08	90%	183.7	$4,269,449	$1,585,753	$8,634	4.60E+06	No
0.0710 (RCO)	204.08	90%	183.7	$5,260,481	$1,331,866	$7,251	1.47E+06	No
0.710 (Baseline)	204.08	N/A	N/A	N/A	N/A	N/A	N/A	No

APPENDIX E - MODELING PLOTS

Figure E-1. Topographic Map of Enviva Hamlet Area

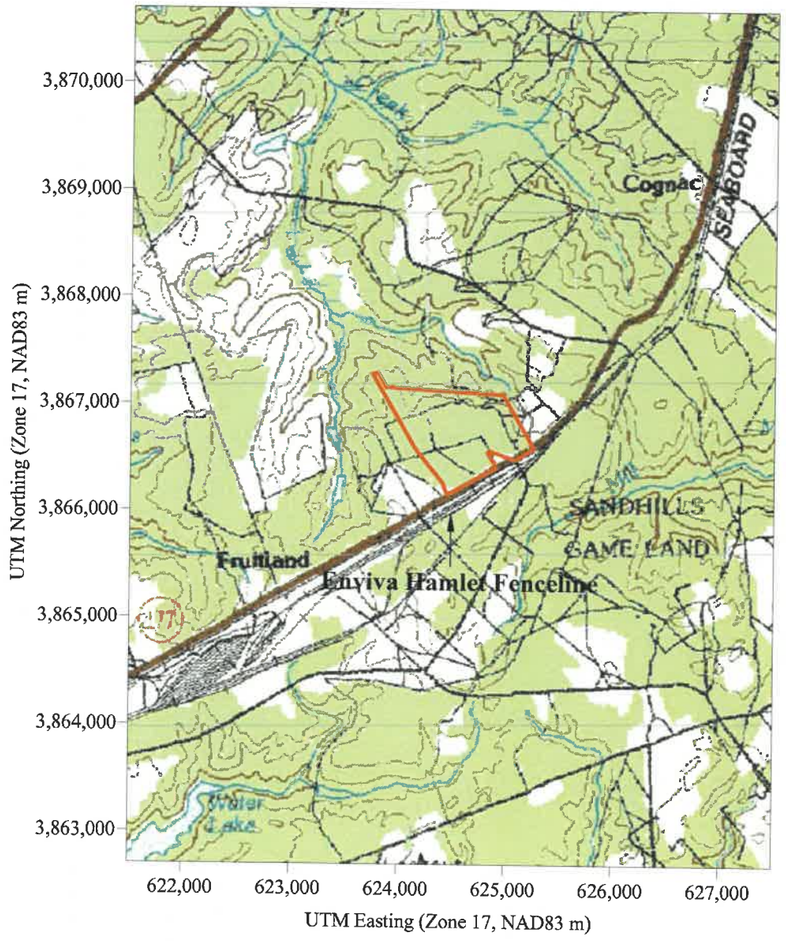


Figure E-2. Enviva Hamlet Site Layout

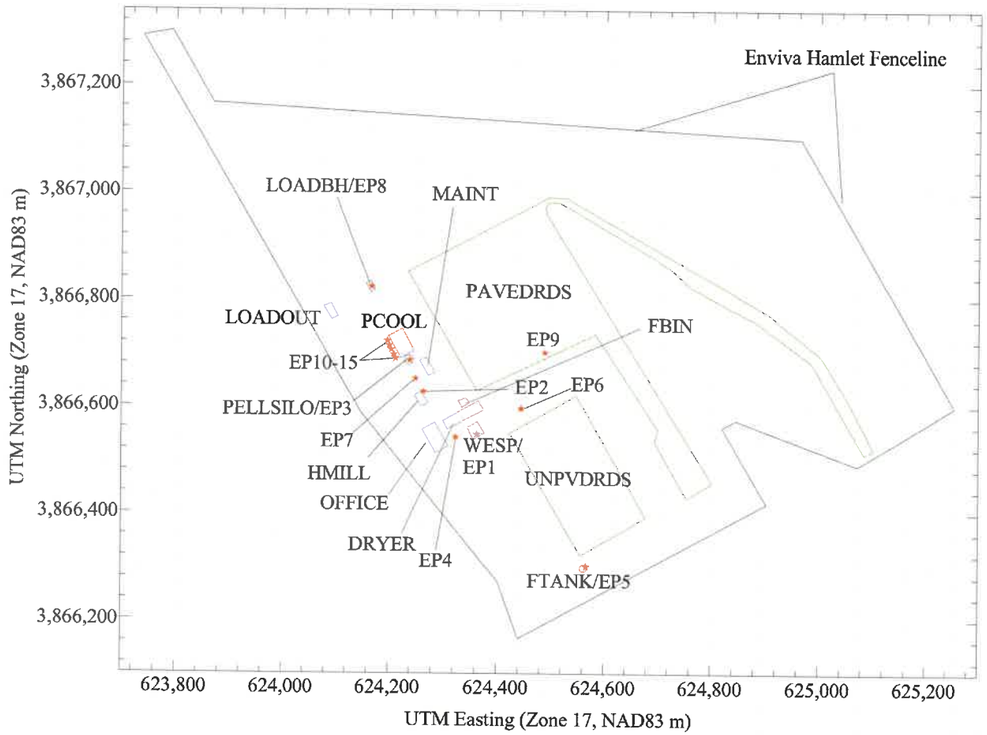


Figure E-3. Class I SIL Receptors

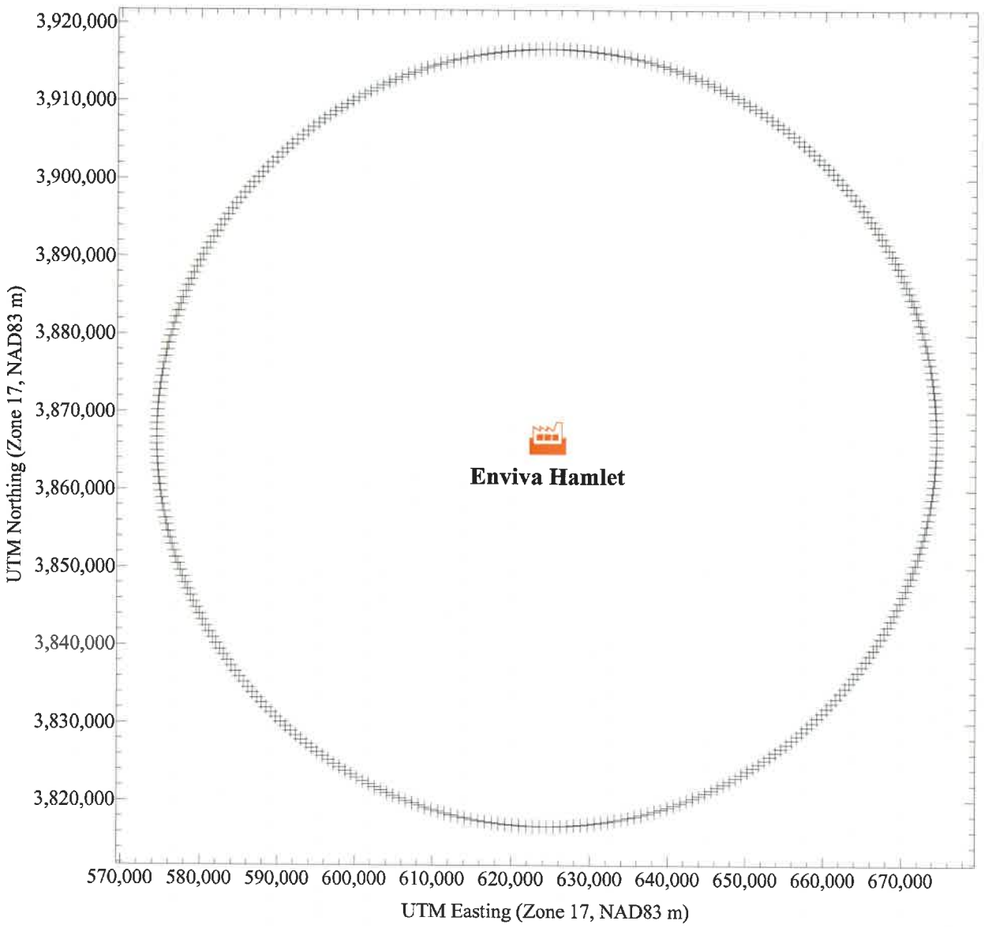


Figure E-4. Class II SIL Receptors

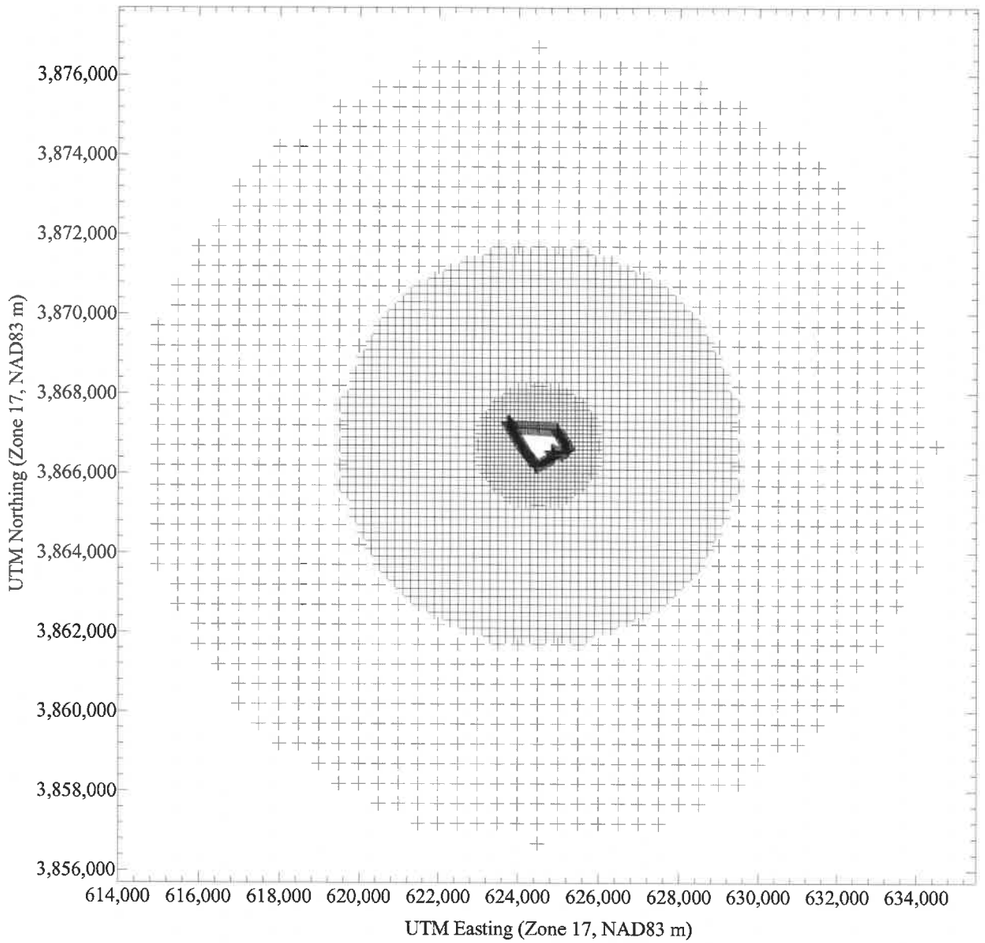


Figure E-5. 1-Hour NO2 SIL Receptors

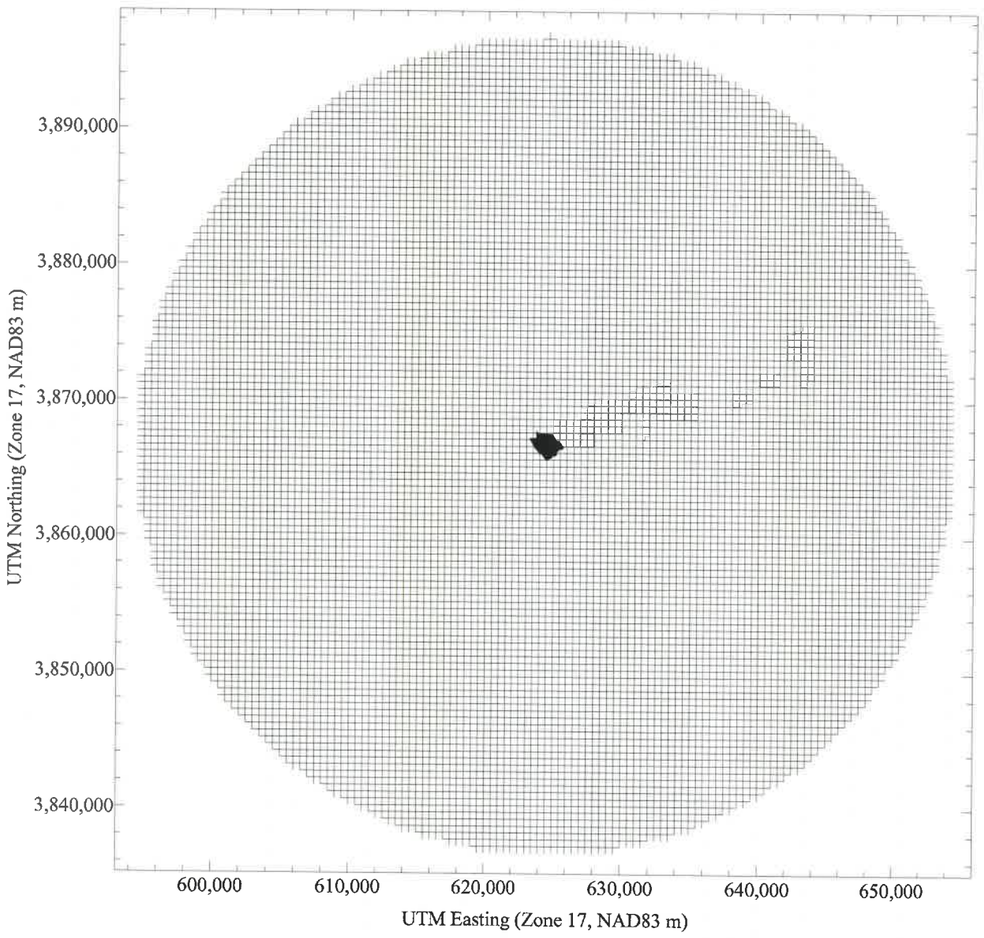


Figure E-6. NAAQS Modeling Grid

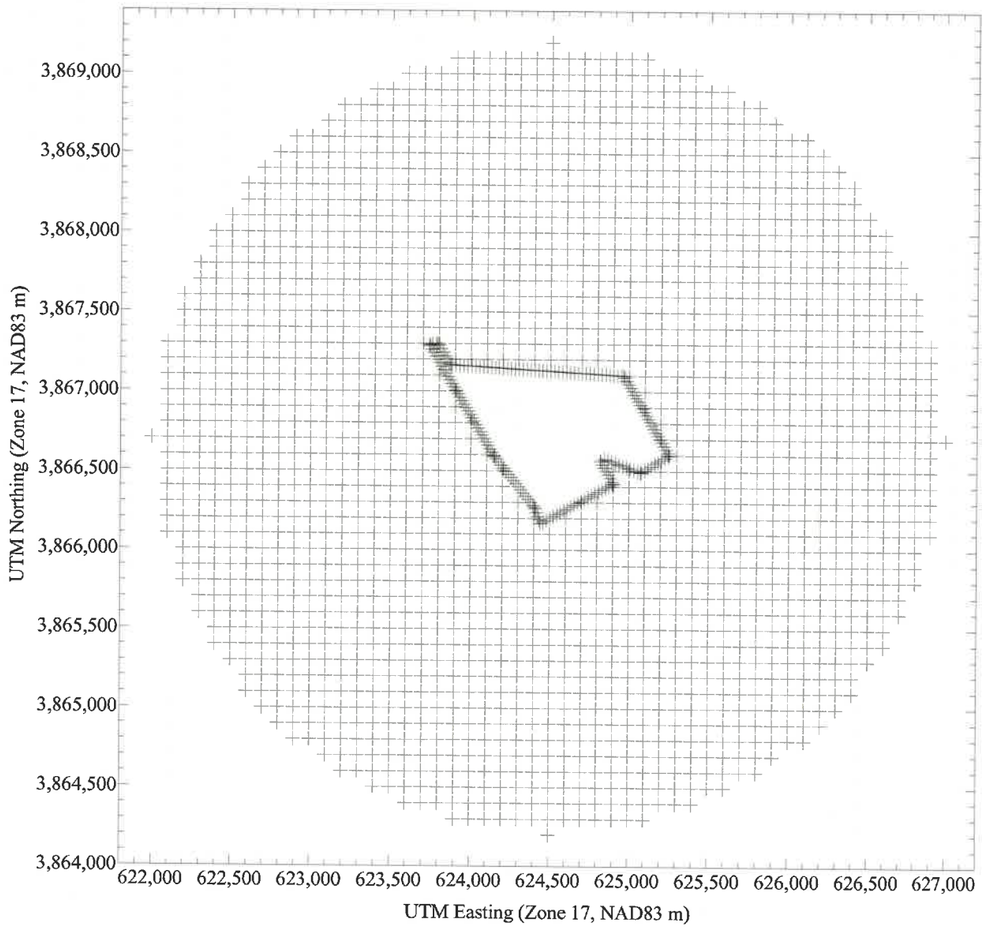


Figure E-7. 1-Hour NO2 NAAQS Modeling Grid

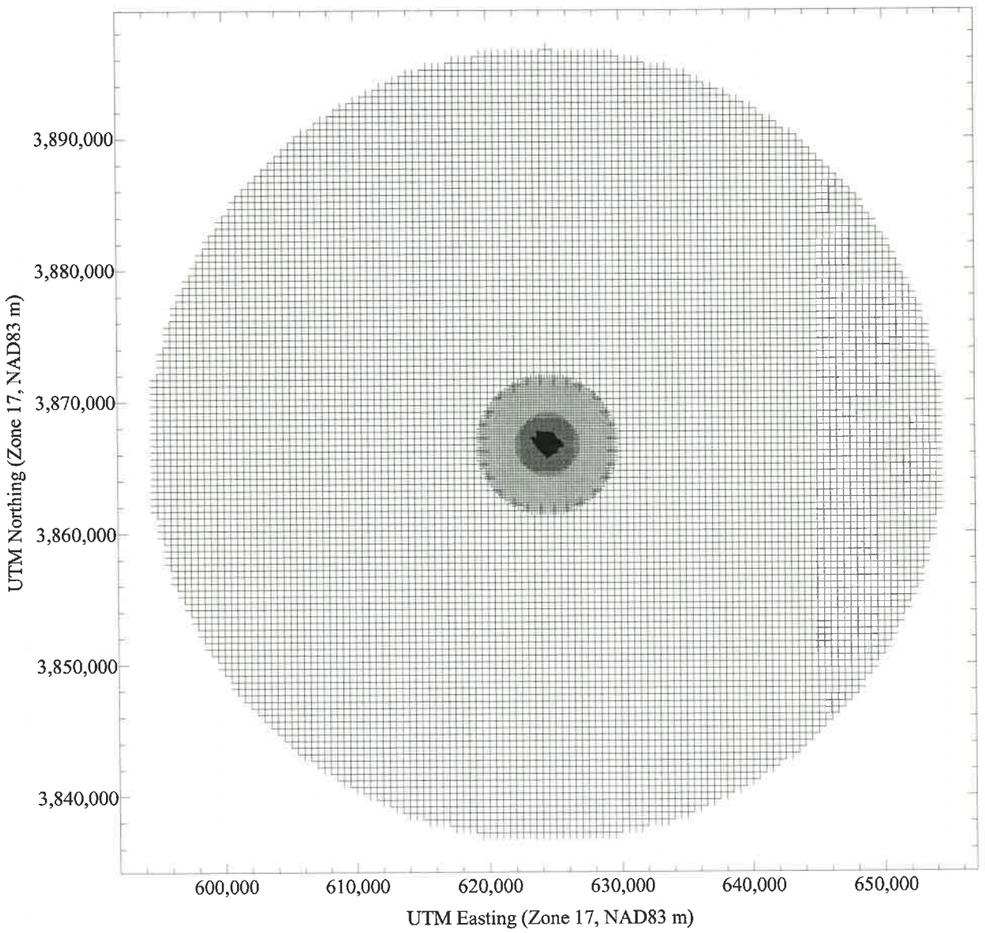


Figure E-8. TAP Modeling Grid

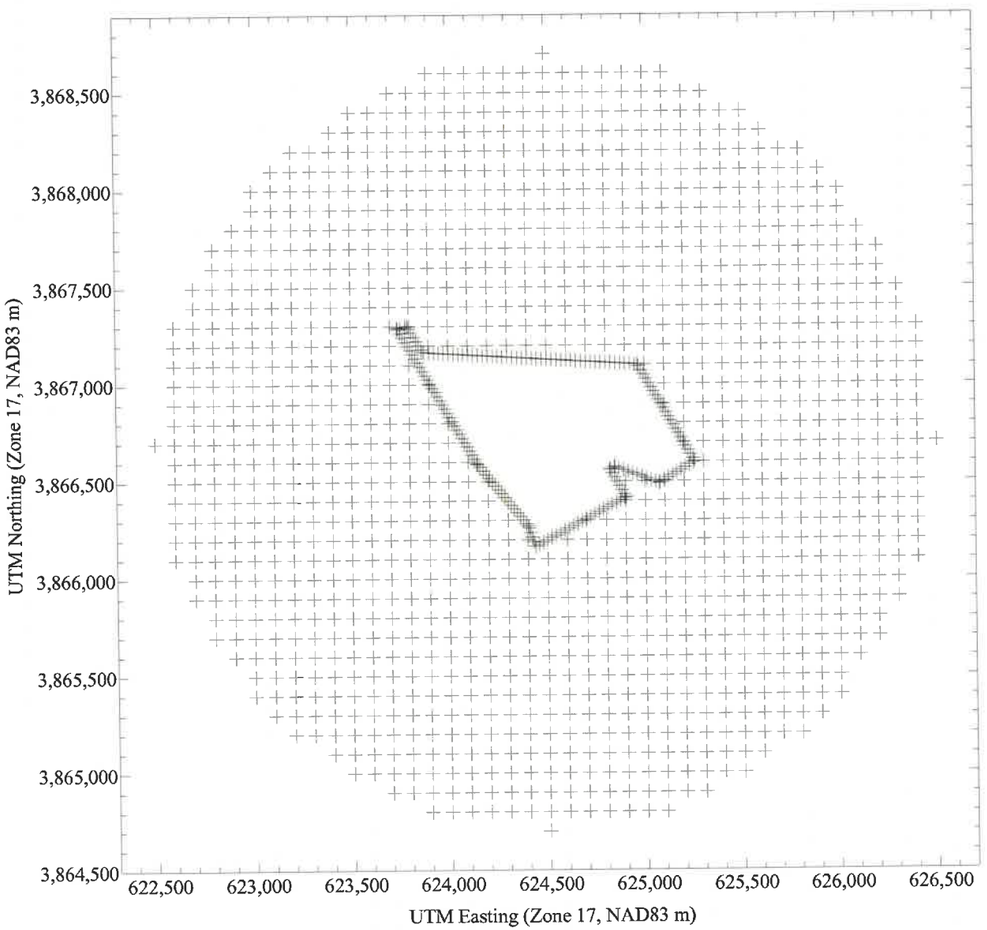


Figure E-9. 1-Hour NO2 SIL Results
(SIL = 10 ug/m3)

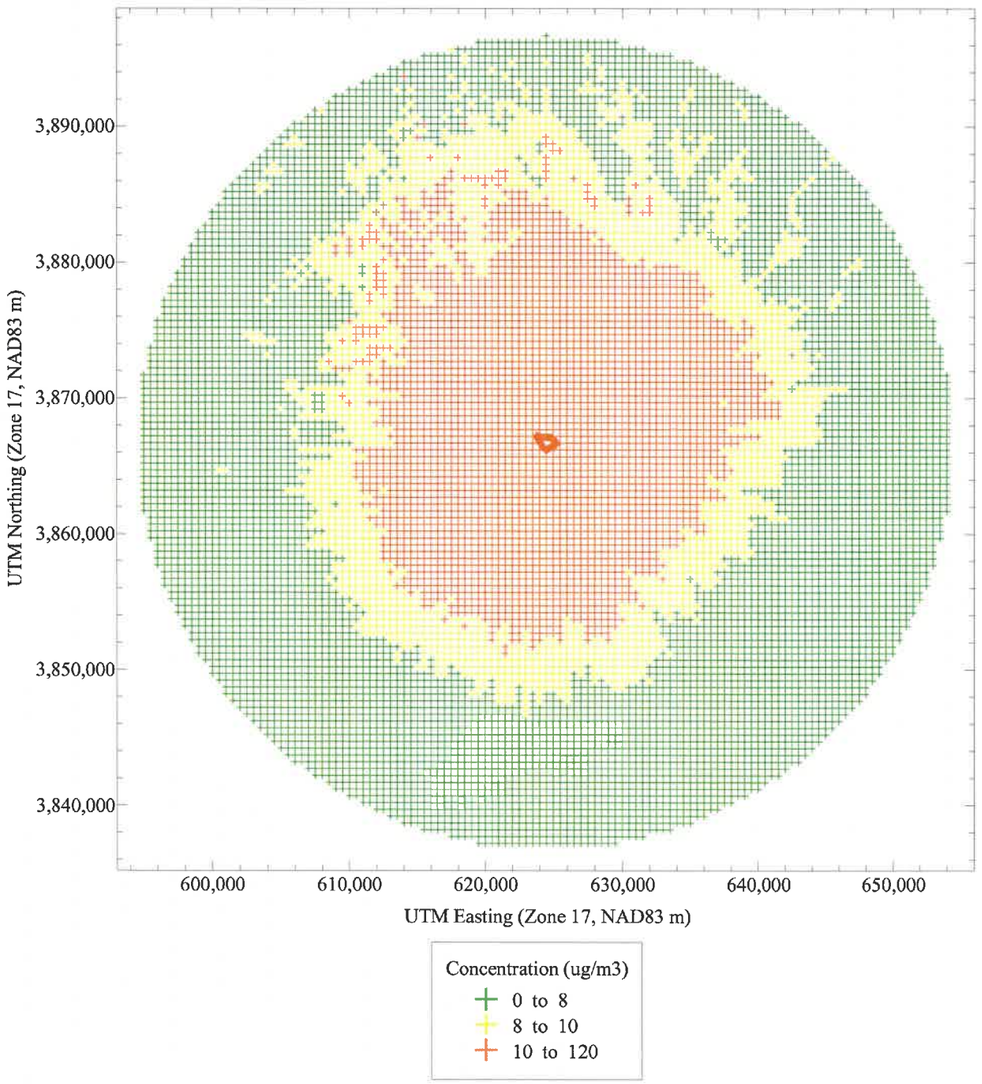


Figure E-10. Annual NO2 SIL Results
(SIL = 1 ug/m3)

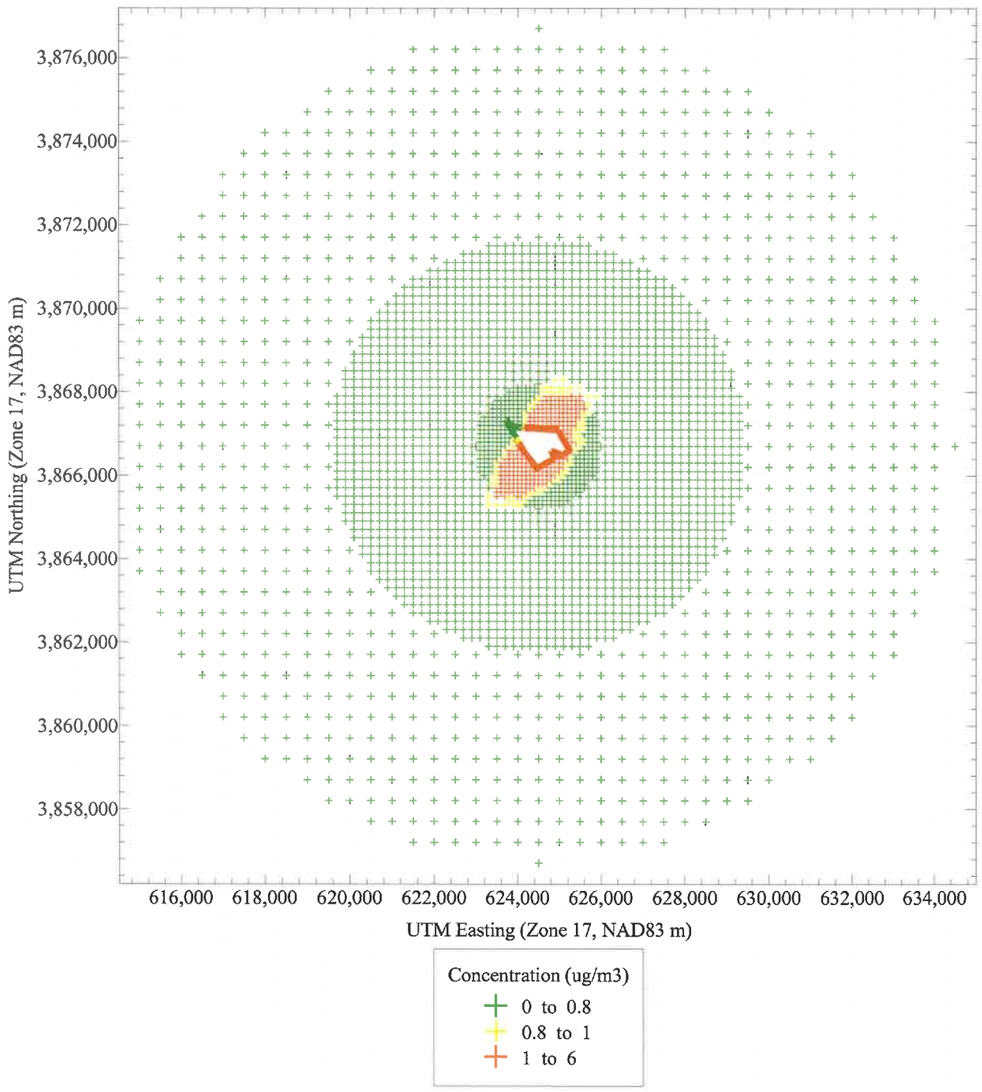


Figure E-11. 24-Hour PM10 SIL Results
(SIL = 5 ug/m3)

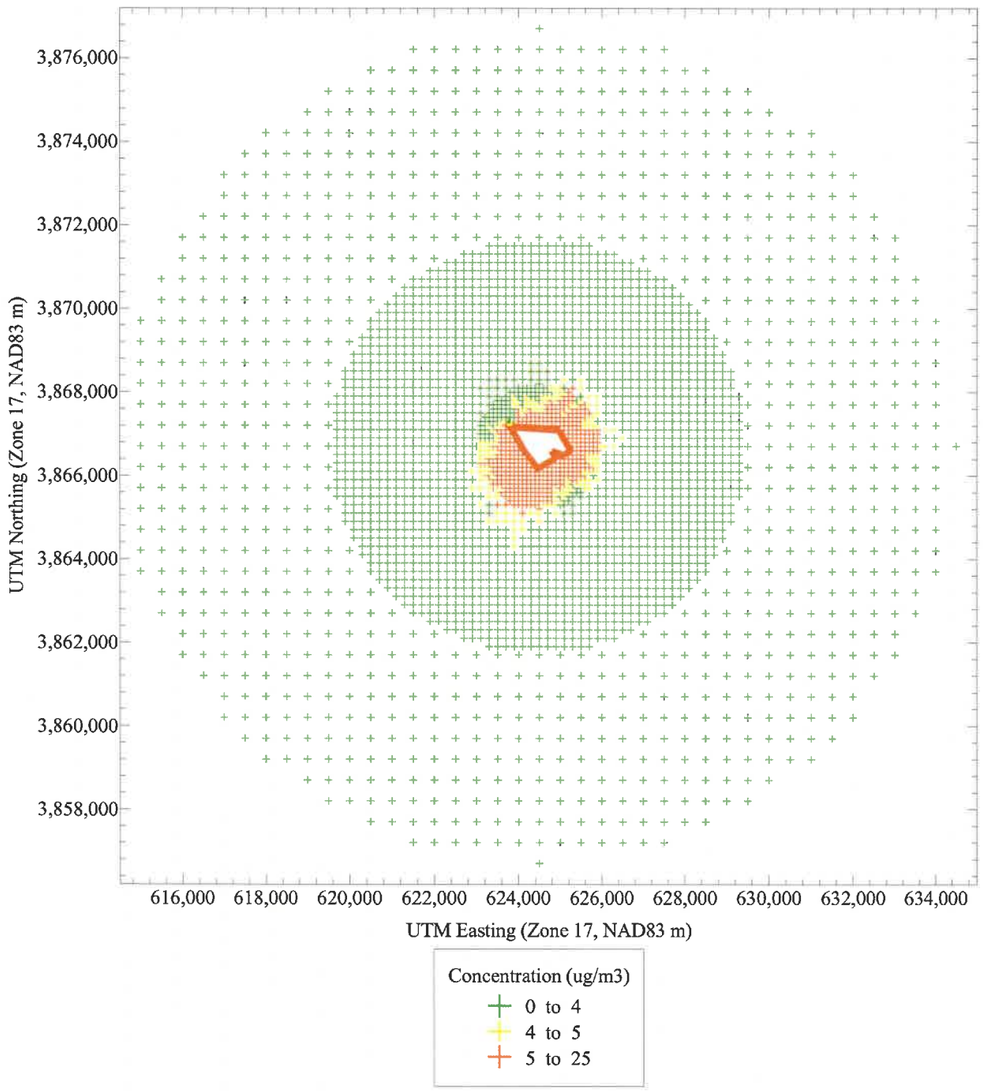


Figure E-12. Annual PM10 SIL Results
(SIL = 1 ug/m3)

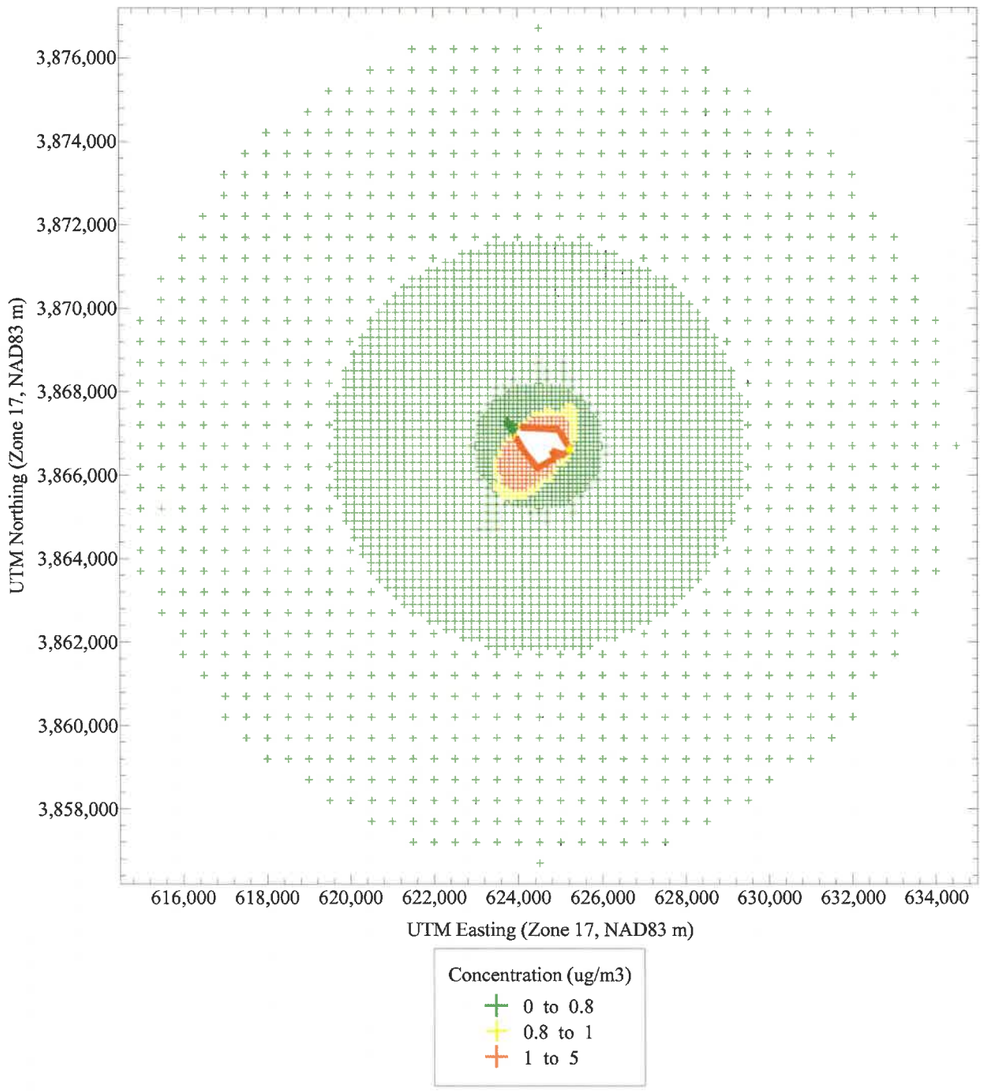


Figure E-13. 24-Hour PM2.5 SIL Results
(SIL = 1.2 ug/m3)

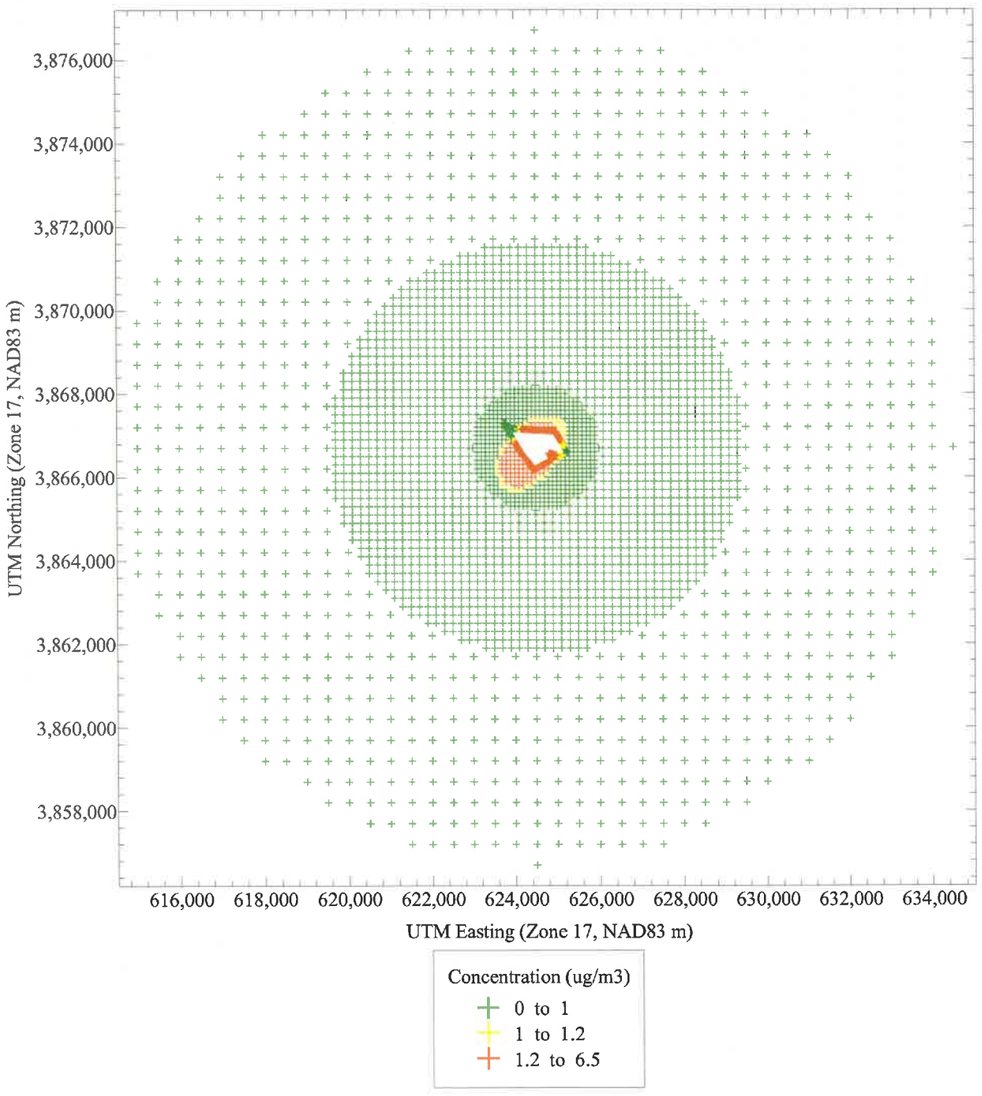
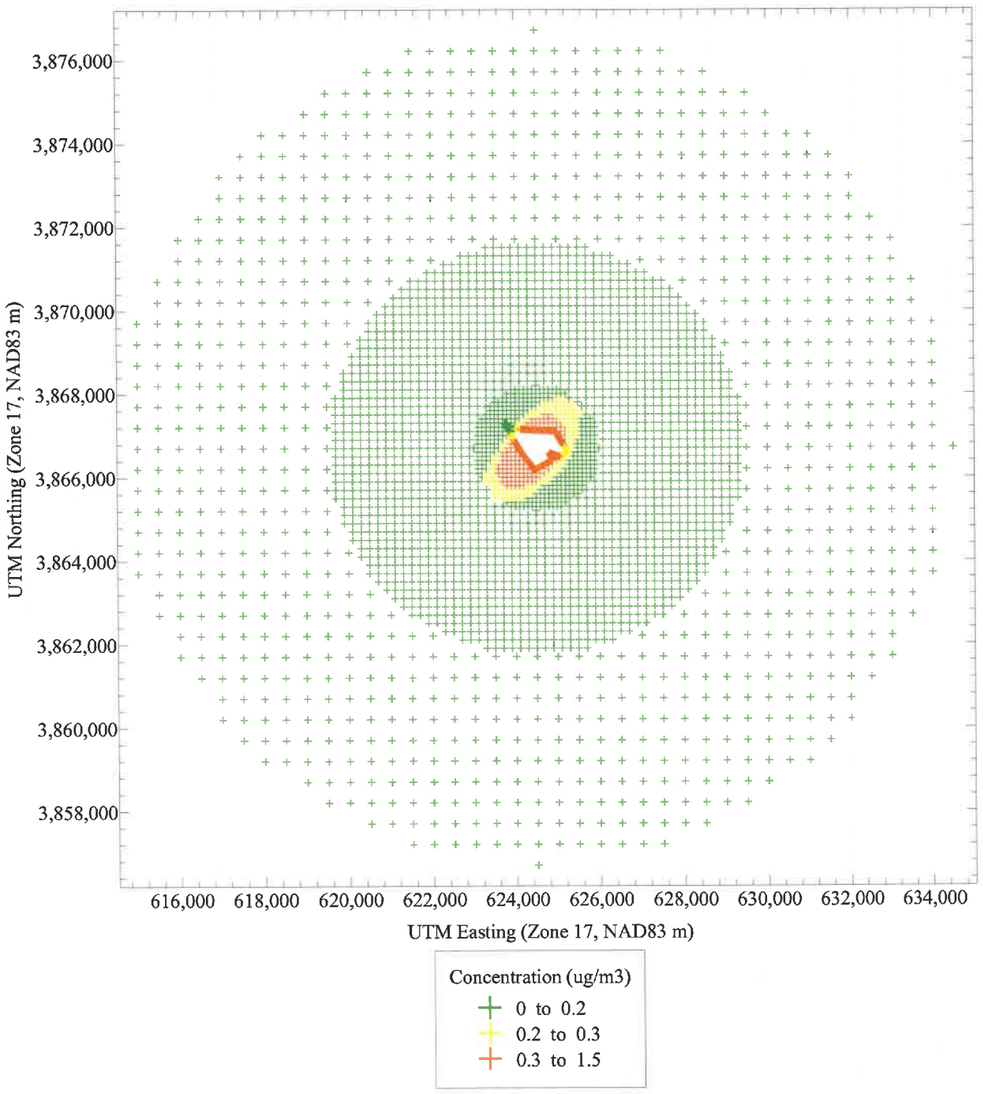
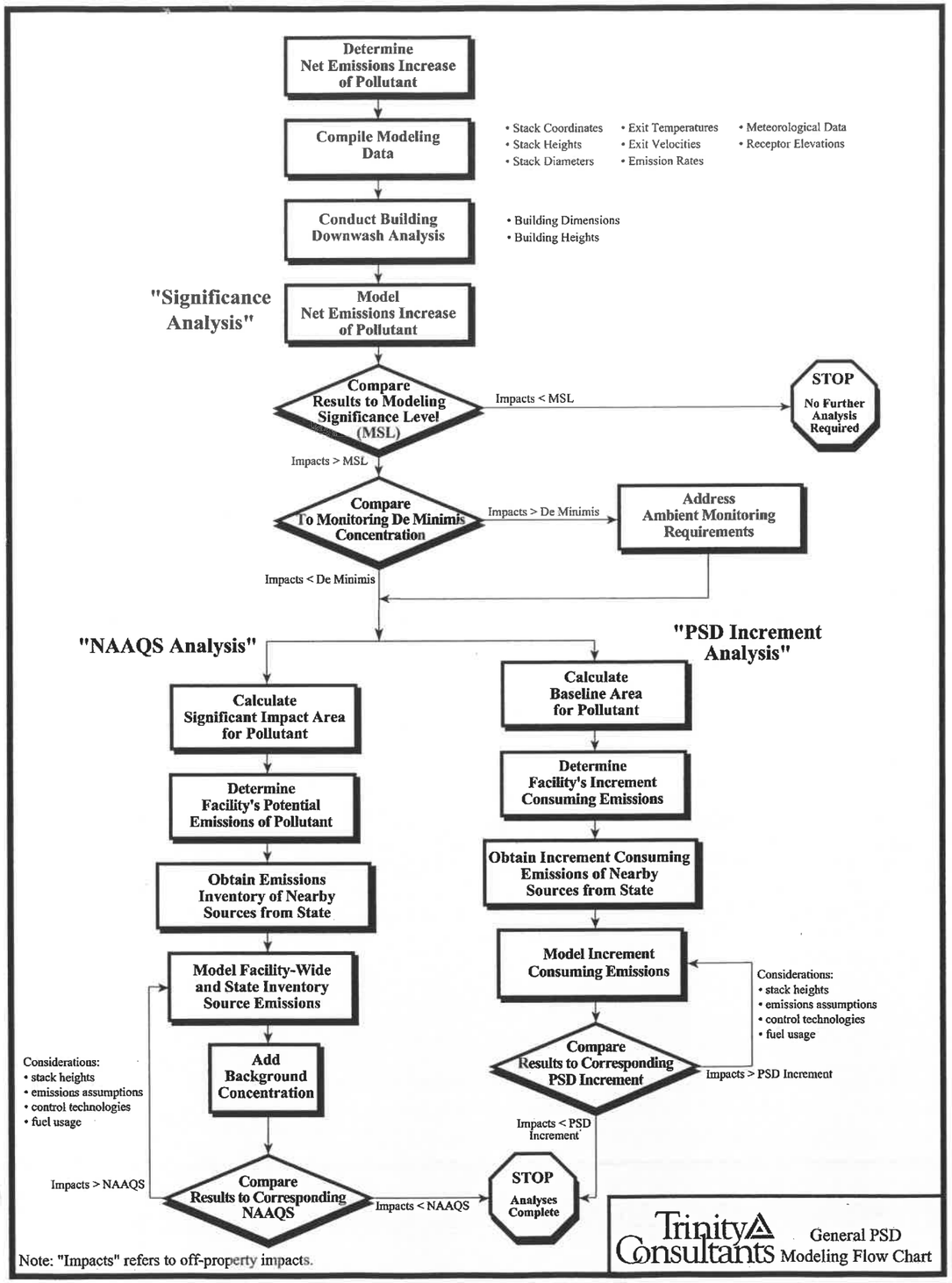


Figure E-14. Annual PM2.5 SIL Results
(SIL = 0.3 ug/m3)



APPENDIX F - PSD MODELING FLOWCHART


Determine Net Emissions Increase of Pollutant
Compile Modeling Data
• Stack Coordinates
• Stack Heights
• Stack Diameters
• Exit Temperatures
• Exit Velocities
• Emission Rates
• Meteorological Data
• Receptor Elevations
Conduct Building Downwash Analysis
• Building Dimensions
• Building Heights
"Significance Analysis"
Model Net Emissions Increase of Pollutant
Compare Results to Modeling Significance Level (MSL)
Impacts < MSL
STOP
No Further Analysis Required
Impacts > MSL
Compare To Monitoring De Minimis Concentration
Impacts > De Minimis
Address Ambient Monitoring Requirements
Impacts < De Minimis
"NAAQS Analysis"
"PSD Increment Analysis"
Calculate Significant Impact Area for Pollutant
Determine Facility's Potential Emissions of Pollutant
Obtain Emissions Inventory of Nearby Sources from State
Model Facility-Wide and State Inventory Source Emissions
Add Background Concentration
Considerations:
• stack heights
• emissions assumptions
• control technologies
• fuel usage
Compare Results to Corresponding NAAQS
Impacts > NAAQS
Impacts < NAAQS
STOP
Analyses Complete
Calculate Baseline Area for Pollutant
Determine Facility's Increment Consuming Emissions
Obtain Increment Consuming Emissions of Nearby Sources from State
Model Increment Consuming Emissions
Considerations:
• stack heights
• emissions assumptions
• control technologies
• fuel usage
Compare Results to Corresponding PSD Increment
Impacts > PSD Increment
Impacts < PSD Increment
Note: "Impacts" refers to off-property impacts.
Trinity Consultants
General PSD Modeling Flow Chart

APPENDIX G - ELECTRONIC MODELING FILES