Received
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Air Permits Section

Enviva Pellets Ahoskie, LLC

NCDENR – Division of Air Quality

Application to Modify Construction and Operation Permit No. 10121R02

Prepared for:
Enviva Pellets Ahoskie, LLC

Prepared by:
Deyo and Associates, LLC

December 2014

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RECD AIR RECORDS MGMT

Tables:

Appendices:

1.0 Executive Summary

Enviva Pellets Ahoskie, LLC (Enviva) operates a wood pellet manufacturing facility at its Ahoskie, North Carolina location. Operations at the site include timber handling equipment, wood chippers, dryers, hammermills, and pelletizers, and finished product (pellet) handling equipment.

Enviva manufactures wood pellets for use as a renewable fuel for energy generation and industrial customers. Enviva's customers use wood pellets in place of coal, significantly reducing emissions of pollutants such as carbon dioxide, mercury, arsenic and lead. The company is dedicated to improving the environmental profile of energy generation while promoting sustainable forestry in the southeastern United States. Enviva holds certifications from the Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI) and the Programme for the Endorsement of Forest Certifications (PEFC). Enviva requires that all suppliers adhere to state-developed "Best Management Practices" (BMPs) in their activities to protect water quality and sensitive ecosystems. In addition, Enviva is implementing an industry leading "track and trace" system to further ensure that all fiber resources come from responsible harvests. We pay particular attention to: land use change, use and effectiveness of BMPs, wetlands, biodiversity and certification status. All of this combined ensures that Enviva's forestry activities contribute to healthy forests both today and in the future.

Enviva is a Title V major source of criteria pollutants and currently operates under Permit to Construct and Operate No. 10121R02 issued by the North Carolina Division of Air Quality (DAQ) on March 10, 2014. The facility's potential emissions of all criteria pollutants are below the PSD major source threshold of 250 tons per year.

The current air permit and supporting application(s) assume a dryer throughput of 48 oven dried tons per hour (ODT/hr) and an operating schedule of 8,760 hours per year (420,480 ODT/yr). However, due to current equipment constraints, the dryer system is only capable of achieving a production rate of approximately 43 tons per hour.

In addition, the facility has the capability to process purchased dried wood product through the facility pellet presses (bypassing the dryer and hammermills). The permitted capacity of the pellet presses and equipment downstream of the presses is 48 ODT/hr.

Therefore, Enviva is proposing to make modifications to the dryer system to increase the dryer production rates to its currently permitted capacity of 48 tons per hour. In addition, to allow the pellet mill system to process additional purchased dried wood material, Enviva is proposing to make several modifications to the pellet mill system and "downstream"

material handling equipment to increase the hourly capacity of this equipment to a design throughput of 55 ODT/hr (481,800 ODT/yr). A complete description of these facility changes are provided in Section 2.0 of this application.

Although not currently included as a permit limitation in Permit No. 10121R02, all VOC and HAP emissions calculations for the Ahoskie facility have been performed assuming an annual average softwood throughput of 10%

Since issuance of Permit No. 10121R02 and the submission of the November 2, 2012 Title V Air Permit Application (Application 4600107.12A) for the facility, Enviva has performed VOC testing of the Ahoskie dryer and hammermills while processing 30% softwood, and testing of the pellet press system while processing 45% softwood, on a trial basis approved by DAQ. Furthermore, Enviva has performed numerous VOC and HAP stack tests at several of its "high softwood-content" wood pellet manufacturing facilities (i.e. facilities processing approximately 60% softwood) to develop appropriate VOC and HAP emission factors for its dryers, hammermills, and pellet presses.

Based on the emission factors developed from these stack tests, Enviva is proposing that the facility be permitted to utilize a higher softwood content in its wood mix and comply with an increased facility-wide VOC limitation at a level that does not trigger PSD review.

Based on the physical modifications to remove equipment constraints presented in this application, Enviva requests that a facility-wide VOC emissions limit equal to the facility's baseline VOC emissions (average annual emissions from previous 24 month period) plus 249 tons per year, be included as an annual permit limitation for the facility. A complete discussion of this proposed emissions limit is provided in Section 3.1.2 of this application.

The proposed increase in softwood content has no effect on the emission rates of other criteria pollutants at the facility (CO, NOx, PM, SO_2, etc.). Particulate emissions from sources with increased throughputs as a result of this application are calculated using control device air flows and rated performances; as such, there are no changes to particulate matter emissions calculations. However, for completeness, Enviva presents baseline and future potential emissions calculations for all pollutants to demonstrate that PSD review is not triggered. A complete discussion of these emissions calculations is provided in Section 3.3 of the application.

Only Application Forms for the sources being modified as part of this application are being provided with this application. Application forms for the following sources are included in Appendix A (note that the hammermills are not being modified as part of this application but are included since the VOC and HAP emissions of the hammermills increase as a result of the facility modifications):

- Dryer (ES-DRYER)
- Hammermills (ES-DHM-1 through DHM-4, ES-HAF)
- Pellet Coolers (ES-CLR1 through CLR5)
- Pellet Mill Fines Bin (ES-FB)
- Finished Product Handling (ES-FPH)
- Truck Load-out Bin (ES-TLB)
- Pellet Load-out (ES-PL1 and PL2)

Finally, the Ahoskie facility currently operates a green wood chipper and green wood hammermill prior to the dryer at the facility. However, the facility's current permit only lists one source (Electric powered green wood chipper (ID No. IES-CHP)) in the "insignificant activity" attachment to the permit. Therefore, we are also requesting that the DENR include both the electric powered green wood chipper (IES-CHP1) and the green wood hammermill (IES-CHP2) in the insignificant activity attachment of the permit. Emissions calculations for both units are included in the facility-wide emissions calculations provided with this application.

Included with this application are a description of the facility equipment modifications (Section 2.0), revised emissions calculations (Section 3.0), a summary of any PSD and HAP issues associated with the modifications (Section 4.0), a discussion of an updated NC TAP modeling demonstration (section 5.0), and a brief summary of the permit modifications being requested, including proposed procedures for demonstrating compliance with the proposed facility-wide VOC limitation (Section 6.0). Air permit application forms for the sources listed above are provided in Appendix A and the emissions calculations for the facility are provided in Appendix B.

2.0 Equipment Modifications

2.1 Dryer Modifications

As discussed in Section 1.0 above, the facility dryer is permitted for a maximum hourly throughput of 48 ODT/hr. However, based on the dryer's current design, the maximum demonstrated throughput is approximately 43 ODT per hour[1], resulting in a bottleneck on the manufacturing process. Therefore, Enviva is proposing to make several modifications to the dryer system to increase the achievable throughput to its permitted capacity of 48 tons per hour.

Modifications to the dryer include the installation of a new control program, additional instrumentation, and associated equipment. The installation of this new equipment will increase the efficiency of the system and allow for increased throughput to the process. A revised Air Permit form for the facility dryer is provided in Appendix A of this application.

2.2 Pellet Presses and Downstream Equipment Modifications

The facility pellet presses and all equipment downstream of the pellet presses are permitted for a maximum hourly throughput of 48 ODT/hr. The pellet presses are designed to accept material both from the facility dryer as well as purchased dried wood product material obtained from off-site. To accommodate increased throughput from the facility dryer and additional material purchased from off-site, Enviva is proposing to make several modifications to the pellet presses and downstream equipment to increase the rated capacity of this equipment to 55 ODT/hr.

Modifications to the pellet press system include the installation of baffles in the hoppers under the pellet coolers in order to level the flow of the coolers to the screen. Additional modifications will be made to the conveying equipment to accommodate this increased pellet press capacity. Revised air permit application forms for the pellet presses (coolers) and equipment downstream of the pellet presses (i.e. – Pellet Mill Fines Bin (ES-FB), Finished Product Handling (ES-FPH), Truck Load-out Bin (ES-TLB), and Pellet Loading (PL-1 and PL-2)), reflecting the new hourly rated capacity, are provided in Appendix A of this application.

[1] Highest throughput capacity achieved during previous stack testing performed in 2012 and 2014.

3.0 Emissions Calculations

3.1 VOC Emissions

3.1.1 Baseline VOC Emission

In Permit No. 10121R02, the following are identified as sources of VOC emissions:

- Dryer
- Green Wood Chippers
- Bark Hog
- Diesel Tanks
- Generators (Fire pump and emergency generators)

Dryer VOC emissions were calculated using emission factors derived from AP-42 emission factors while processing 10% softwood. The green wood chippers and bark hog emission factors were calculated based on AP-42 emission factors applicable to softwood. VOC emissions from the diesel tanks and generators were calculated using the EPA Tanks Program and AP-42 emission factors for diesel powered generators, respectively. Since that time, Enviva has performed VOC testing of its hammermills and pellet coolers at several of its sites and developed VOC emission factors for these sources at varying softwood contents.

To establish the current baseline VOC emissions for the site, Enviva calculated the average annual actual VOC emissions from the most recent 24 month period (i.e. – December 2012 through November 2014). Table 3-1 provides a summary of the baseline VOC emissions for the site and the emissions calculations are provided in Appendix B.

Table 3-1: Facility-wide Baseline VOC Emissions (10% Softwood)

Baseline Date Ranges	Total VOC Emissions (tpy)
12/2012-11/2013	146.48
12/2013-11/2014	138.80
Two Year Annual Average	142.64

3.1.2 Proposed Potential VOC Emissions

Enviva is requesting a facility-wide VOC emissions limit equal to the baseline VOC emissions plus a synthetic minor VOC increase of 249 tons per year. Therefore, Enviva is requesting a facility-wide VOC emissions limitation of 391.6 tons per year. Enviva proposes to demonstrate compliance with this permit limitation by calculating the 12-month rolling total VOC emissions on a monthly basis. The calculations will be based on actual material throughputs achieved at the site and emission factors appropriate for the annual average softwood content processed at the site. Proposed permit compliance language for the performance of these calculations is provided in Section 6.1 of this application.

To demonstrate that the facility can comply with the proposed VOC permit limitation at a range of softwood contents, Enviva calculated total potential VOC emissions from the site when operating at the maximum rated capacity of the facility equipment, and annual average softwood contents of 30% for the equipment upstream of the pellet presses (i.e. - bark hog, chippers, dryer, and hammermill), and 45% softwood to the pellet presses. A further description of these calculations is provided below. Enviva proposes to process higher softwood contents than 30%/45%, provided that appropriate emission factors are derived for those elevated softwood concentrations and approved by DAQ.

In June 2014, Enviva performed VOC stack testing of the Enviva Ahoskie dryer and hammermills while processing 30% softwood and VOC testing of the pellet presses (coolers) while processing 45% softwood. Based on these tests, VOC emission factors (in units of lb/ODT (as alpha pinene)) have been developed for each source as detailed in Table 3-2.

Table 3-2: June 2014 Stack Testing VOC Emission Factors

Source	Unit ID(s)	VOC Emissions (lb/hr)	Process Throughput (ODT/hr)	VOC Emissions Factor (lb/ODT)
Dryer	ES-Dryer	31.93	40.9	0.781
Hammermills	ES-CHM-1-4, ES-HAF	0.94	10.1	0.093
Pellet Presses/Coolers	ES-CLR-1 – 5	10.24	22.4	0.457

These emission factors have been used to calculate revised VOC emissions from each of these sources based on the proposed maximum dryer and

hammermill throughput of 48 ODT/hr (420,480 ODT/yr) and the proposed pellet press throughput of 55 ODT/hr (481,800 ODT/yr).

The chipper, green hammermill, and bark-hog VOC emissions have historically been calculated using AP-42 emission factors applicable to softwood sources and no changes to the emission factors for these sources are included in the revised emissions calculations. In addition, the increased throughput and softwood content have no impact on the diesel tank or generator emission factors and therefore, no changes to those calculations are proposed as part of this application.

Table 3-3 provides a summary of the calculated emissions from all PSD-regulated VOC sources at the modified facility. VOC emissions calculations for the proposed throughput scenarios are provided in Appendix B of this submittal.

Table 3-3: Facility-wide Potential VOC Emissions
(Modified Sources and Increased Softwood Content)

Source	Unit ID	Throughputs		Total Emissions (tpy)
		(tpy)	(hr/yr)	
Dryer	ES-Dryer	420,480		164.20
Emergency Generator	ES-EG		500	0.0015
Fire Water Pump	ES-FWP		500	0.0013
Hammermills	ES-CHM-1-4, ES-HAF	420,480		16.62
Pellet Presses and Coolers	ES-CLR-1 – 5	481,800		110.09
Diesel Storage Tanks	IST-1, 2		8,760	0.00094
			Facility Totals:	290.91

As shown in Table 3-3, the modified throughputs and use of 30%/45% softwood at the Ahoskie site results in VOC emissions well below the proposed annual VOC emissions limitation of 391.6 tpy. Enviva proposes to use an even higher softwood content provided that appropriate emission factors are derived and approved by DAQ as detailed in Section 6.1 of this application.

3.2 HAP Emissions

Dryer, bark hog, and chipper/green hammermill HAP emissions were previously calculated using AP-42 emission factors from other wood product industries.

Enviva has since performed HAP emissions testing of the hammermills and pellet coolers at several of its sites and developed HAP emission factors for these units based on varying softwood content. Enviva calculated the individual and cumulative HAP emissions for the baseline scenario and the modified facility scenario detailed in Sections 3.1.1 and 3.1.2, respectively. HAP emissions for the dryer, bark-hog, and chippers, continue to be calculated using AP-42 emission factors. HAP emissions from the hammermills and pellet coolers are calculated using emission factors derived from facility testing as discussed above. Copies of those emissions calculations are provided in Appendix B.

3.3 Other Emissions

All other emissions from the modified source scenario are calculated in the same manner as in previous applications. It should be noted that the only sources with increases in throughput from the previous application are the pellet presses/coolers and equipment downstream of those sources. Particulate emissions from these sources are controlled using fabric filter control technology and no modifications to these control devices are proposed as part of this application. Since particulate emissions from those sources are calculated using the air flow rate and rated performance of the control device, the increase in process throughput does not impact the particulate matter emissions. Therefore there are no increases in particulate emissions from the site compared to the existing permit application calculations. Particulate matter emissions from the baseline and modified source scenarios are also included in Appendix B.

Since the existing application calculations for the dryer system were performed at a rated capacity of 48 ODT/hr, combustion related emissions from the facility dryer (CO, NOx, SO2, CO2) are also unaffected by the facility modifications. Notwithstanding, combustion related emissions calculations for both the baseline and modified source scenarios are provided in Appendix B.

4.0 Federal NSR and HAP Major Source Applicability

4.1 Federal NSR Applicability

The Enviva facility has a current potential to emit below the PSD major source threshold of 250 tpy for VOC. Pursuant to this application, Enviva proposes physical changes to the equipment at the facility to debottleneck current operations. In order to prevent these modifications from triggering PSD review, Enviva proposes to add 249 tpy of VOC emissions to the current baseline for the facility and take a new federally enforceable limit for the facility of 391.6 tons per year. Enviva understands that after the proposed modification, Ahoskie will become a major source of VOC emissions for PSD purposes. However, the proposed synthetic minor modification to the existing minor source will not trigger PSD review at this time.

4.2 HAP Major Source Applicability

With the facility modifications proposed as part of this application, Enviva will become a Title V major source of HAPs. However, this modification triggers no new HAP requirements for the facility.

5.0 North Carolina Toxic Air Pollutants

Enviva previously submitted an air dispersion modeling demonstration showing compliance with the North Carolina Toxic Air Pollutant (TAP) Regulations at 15A NCAC 02Q.0700 for Acrolein, Benzene, Formaldehyde, and Phenol. The TAP demonstration was based on a dryer softwood content of 10%. Like many aspects of the original application, due to the lack of HAP/TAP data from wood pellet dryers at that time, the TAP emissions calculations utilized AP-42 emission factors associated with "similar" wood product industries. As a result, the initial emission factors included emissions of pollutants which have since been demonstrated to not be emitted from wood pellet dryers (e.g. - benzene and phenol). In addition, the initial modeling demonstration did not include TAP emissions from the hammermills and pellet presses/coolers.

Enviva has since performed HAP testing at several of its facilities and developed additional HAP/TAP emission factors. To demonstrate compliance with NC air toxics requirements for the facility as modified pursuant to this application, Enviva has conservatively calculated the TAP emissions from the facility using emission factors derived from facilities processing in excess of 60% softwood. Based on these factors, and the inclusion of the TAP emissions from the hammermills and pellet presses/coolers, Enviva has determined that only acrolein and formaldehyde emissions exceed the TAP Emission Rate Permitting Levels (TPERs) at 2Q.0711.

As discussed with the DEQ during our December 16, 2014 meeting, Enviva will submit updated air dispersion modeling demonstrating compliance with 15A NCAC 02Q.0700 under separate cover. Included with that submittal will be detailed TAP emissions calculations and comparisons to the TPERs listed at 2Q.0711.

6.0 Permit Modifications

6.1 VOC Limitation

As detailed above, Enviva proposes a federally-enforceable facility-wide annual VOC emissions limitation of 391.6 tons per year to avoid PSD review permitting. Enviva proposes to demonstrate compliance with this VOC emissions limitation by calculating the rolling 12-month total VOC emissions on a monthly basis, based on the throughputs achieved, and softwood content utilized, during that period. Suggested language for this condition is as follows:

> *"The permittee shall demonstrate compliance with the facility-wide VOC emissions limitation in Permit Condition [Insert Condition No. Here] by calculating the rolling 12-month annual facility-wide VOC emissions on a monthly basis (by the 30th day following the end of each calendar month). The VOC emissions shall be calculated in a manner consistent with the calculation methodologies included in the air permit application supporting this limitation. Emission factors used in the calculations for each source shall be appropriate for the annual average softwood content that has been processed in the previous 12-month period. All emission factors used shall be reviewed and approved by DAQ."*

7.0 Air Permit Application Fee

A check in the amount of $918 is also being submitted for the processing of this application.

APPENDIX A

Enviva Pellets Ahoskie, LLC

North Carolina DAQ Air Permit Application Forms

FORM A1

FACILITY (General Information)

REVISED 05/25/12 — 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)

Received JAN - 9 2015 Air Permits Section

GENERAL INFORMATION

Legal Corporate/Owner Name:	Enviva, LP
Site Name:	Enviva Pellets Ahoskie, LLC
Site Address (911 Address) Line 1:	142 N.C. Route 561 East
Site Address Line 2:	
City: Ahoskie	State: North Carolina
Zip Code: 27910	County: Hertford

CONTACT INFORMATION

Permit/Technical Contact:		***Facility/Inspection Contact:***	
Name/Title: Joe Harrell		Name/Title: same as permit / technical contact	
Mailing Address Line 1: 142 N.C. Route 561 East		Mailing Address Line 1:	
Mailing Address Line 2:		Mailing Address Line 2:	
City: Ahsokie State: NC Zip Code: 27910		City: State: Zip Code:	
Phone No. (area code) (252)209-6032	Fax No. (area code)	Phone No. (area code)	Fax No. (area code)
Email Address: joe.harrell@envivabiomass.com		Email Address:	
Responsible Official/Authorized Contact:		***Invoice Contact:***	
Name/Title: Royal Smith		Name/Title: same as permit / technical contact	
Mailing Address Line 1: 7200 Wisconsin Avenue		Mailing Address Line 1:	
Mailing Address Line 2: Suite 1000		Mailing Address Line 2:	
City: Bethesda State: Maryland Zip Code: 20814		City: State: Zip Code:	
Phone No. (area code) (301)657-5567	Fax No. (area code) (301)657-5567	Phone No. (area code)	Fax No. (area code)
Email Address: Royal.Smith@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. :** 4600107
Wood pellet manuacturing facility

Primary SIC/NAICS Code:	2499 (Wood Products, Not Elsewhere Classified)	Current/Previous Air Permit No. 10121R02	Expiration Date 11/30/2015
Facility Coordinates:	Latitude: 323,525.1 UTM E	Longitude: 4,015,554.4 UTM N	

Does this application contain confidential data? YES ☐ NO ☑ ***If yes, please contact the DAQ Regional Office prior to submitting this application.*** (See Instructions)

PERSON OR FIRM THAT PREPARED APPLICATION

Person Name:	Michael Deyo	Firm Name: Deyo & Associates, LLC	
Mailing Address Line 1:	5708 Shady Mill Way	Mailing Address Line 2:	
City: Glen Allen	State: Virginia	Zip Code: 23059	County: Henrico
Phone No. (area code)	804-937-0377 Fax No. (area code) 804-441-8272	Email Address:	mtdeyo@aol.com

SIGNATURE OF RESPONSIBLE OFFICIAL/AUTHORIZED CONTACT

Name (typed): Royal Smith — Title: Vice President of Operations
X Signature(Blue Ink): — Date: 1/7/15

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)			
Existing Permitted Equipment To Be MODIFIED By This Application			
ES-DRYER	Dryer System	CD-DC	Simple Cyclone
		CD-WESP	Electrostatic precipitator
ES-CLR 1 thru 4	Four pellet coolers	CD-CLR-C1	Dual high efficiency cyclone
		CD-CLR-C2	Dual high efficiency cyclone
ES-CLR 5	Pellet Cooler #5	CD-CLR-C3	Simple Cyclone
ES-FB	Fines Bin	CD-FB-BV	One Bin Vent Filter (325 square feet)
ES-FPH	Finished Product Handling	CD-FPH-BF	One bagfilter (4,842 square feet of filter area)
ES-TLB	Truck Loadout Bin (with 12 bottoms)		
ES-PL1, PL2	Two Pellet Loadouts		
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:

Enviva Pellets Ahoskie, LLC will not handle any of the substances subject to 112(r)

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 B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

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

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood is conveyed to either a one or two rotary dryer system. Direct contact heat is provided to the system via a 175 mmBtu/hr burner system (one or two burners). Air emissions are controlled by cyclones for bulk particulate removal and additional particulate is removed utilizing a wet electrostatic precipitator (WESP) operating after the cyclone.

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: 2011	OPERATION DATE: 2011	DATE MANUFACTURED: 2011
MANUFACTURER / MODEL NO.: Teaford	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-DRYER

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

HEATING MECHANISM: ☝ INDIRECT ☝ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): 125

WOOD-FIRED BURNER

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

PERCENT MOISTURE OF FUEL: ~50%

☝ UNCONTROLLED ☝ CONTROLLED WITH FLYASH REINJECTION ☝ CONTROLLED W/O REINJECTION

FUEL FEED METHOD: Air Swept Fuel Feeders	HEAT TRANSFER MEDIA: ☝ STEAM ☝ AIR ☝ OTHER
METHOD OF TUBE CLEANING: Scraping of Burner Floor	CLEANING SCHEDULE: Annual scraping of burner floor

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)
Wet Wood	LB	Nominal 29,762	

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	SPECIFIC BTU CONTENT	SULFUR CONTENT (% BY WEIGHT)	ASH CONTENT (% BY WEIGHT)
Wet Wood	Nominal 4200 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 B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: Four dry wood hammermills	EMISSION SOURCE ID NO: ES-DHM-1, 2, 3 & 4
	CONTROL DEVICE ID NO(S): CD-DHM-C1, 2, 3, & 4 CD-DHM-FF1, 2
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-DHM-1, 2

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dried materials are reduced to the approporitate size needed for pelletization using four dry wood 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: 2011	OPERATION DATE: 2011	DATE MANUFACTURED: 2011
MANUFACTURER / MODEL NO.: Bliss, Model 44-60	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 B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: Four dry wood hammermills	EMISSION SOURCE ID NO: ES-DHM-1, 2, 3 & 4
	CONTROL DEVICE ID NO(S): CD-DHM-C1, 2, 3, & 4 CD-DHM-FF1, 2
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-DHM-1, 2

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

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	ODT	48 (includes all hammermills)	

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

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

COMMENTS:

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 and Hammermill 5	EMISSION SOURCE ID NO: ES-HAF
	CONTROL DEVICE ID NO(S): CD-HAF-FF
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-HAF

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

One set of conveyors after the hammermills transports material to the pellet press silo. A second set of conveyors transports the material from the pellet press silo to the pellet presses. Particulate emissions are route to one (1) area fabric filter. Drop points routed to common control include: dry hammermills to "accepts conveyor," "accepts conveyor" to pellet press silo infeed conveyor, pellet press silo to pellet press feed conveyor, silo bypass to pellet press conveyor, and pellet press distribuation conveyors. The plant's 5th hammermill is also routed to this filter, as is the pneumatic tranfer line assciated with dried wood transfer from the dried wood day silo.

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: 2011	OPERATION DATE: 2011	DATE MANUFACTURED: 2011
MANUFACTURER / MODEL NO.: Bliss, Model 44-60	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 B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: Hammermill Area and Hammermill 5	EMISSION SOURCE ID NO: ES-HAF
	CONTROL DEVICE ID NO(S): CD-HAF-FF
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-HAF

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

One set of conveyors after the hammermills transports material to the pellet press silo. A second set of conveyors transports the material from the pellet press silo to the pellet presses. Particulate emissions are route to one (1) area fabric filter. Drop points routed to common control include: dry hammermills to "accepts conveyor," "accepts conveyor" to pellet press silo infeed conveyor, pellet press silo to pellet press feed conveyor, silo bypass to pellet press conveyor, and pellet press distribuation conveyors. The plant's 5th hammermill is also routed to this filter, as is the pneumatic tranfer line assciated with dried wood transfer from the dried wood day silo.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Ground Wood	ODT	48 (includes all hammermills)	

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

MAXIMUM DESIGN (BATCHES / HOUR):

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: Four pellet coolers	EMISSION SOURCE ID NO: ES-CLR 1, 2, 3 & 4
	CONTROL DEVICE ID NO(S): CD-CLR-C1 & C2
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-CLR-1 & 2

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Four pellet coolers follow the pellet presses to cool the newly formed pellets down to an acceptable storage temperature. ES-CLR 1 and 2 exhaust to CD-CLR C1 and ES-CLR 3 and 4 exhaust to CD-CLR C2.

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: 2011	OPERATION DATE: 2011	DATE MANUFACTURED: 2011
MANUFACTURER / MODEL NO.: Bliss	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 Emissions 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 B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: Four pellet coolers	EMISSION SOURCE ID NO: ES-CLR 1, 2, 3 & 4
	CONTROL DEVICE ID NO(S): CD-CLR-C1 & C2
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-CLR-1 & 2

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Four pellet coolers follow the pellet presses to cool the newly formed pellets down to an acceptable storage temperature. ES-CLR 1 and 2 exhaust to CD-CLR C1 and ES-CLR 3 and 4 exhaust to CD-CLR C2.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Wood Pellets	ODT	55 (combined all 5 coolers)	

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: Pellet Cooler #5	EMISSION SOURCE ID NO: ES-CLR 5
	CONTROL DEVICE ID NO(S): CD-CLR-C3
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-CLR-3

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Fifth pellet cooler follows the pellet presses to cool the newly formed pellets down to an acceptable storage temperature. Cooler exhausts to a dedicated high efficiency cyclone.

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: 2012	OPERATION DATE: 2012	DATE MANUFACTURED: 2012
MANUFACTURER / MODEL NO.: Kahl	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 B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: Pelet Cooler #5	EMISSION SOURCE ID NO: ES-CLR 5
	CONTROL DEVICE ID NO(S): CD-CLR-3
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-CLR-3

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Fifth pellet cooler follows the pellet presses to cool the newly formed pellets down to an acceptable storage temperature. Cooler exhausts to a dedicated high efficiency cyclone.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Wood Pellets	ODT	55 (combined all 5 coolers)	

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

MAXIMUM DESIGN (BATCHES / HOUR):

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM 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-FB
	CONTROL DEVICE ID NO(S): CD-FB-BV
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-12

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: 2014	OPERATION DATE: 3/1/2014	DATE MANUFACTURED: 2014
MANUFACTURER / MODEL NO.: Aircon/CAR 36-6	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)		POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
		lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	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)		POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
		lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	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-FB
	CONTROL DEVICE ID NO(S): CD-FB-BV
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): EP-12

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: 97.3	DIAMETER: 12	***(OR)***	LENGTH:	WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY:		

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

NO. FILL TUBES:

MAXIMUM ACFM: 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 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-TLB 1 thru 12, ES-PL1 & 2
	CONTROL DEVICE ID NO(S): CD-FPH-BF
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-13

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
ES-FPH: Collection of transfer points, pellet screening operations, and pellet conveying.
ES-PB: Pellet loadout bins are used to store pellets for shipping. Pellets are then loaded from the bins directly into trucks in either of the two (2) pellet loadout areas.
ES-PL: Final product is loaded into trucks in either of the two (2) pellet loadouts. The trucks are filled directly from the pellet loadout bins.

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: 2011	OPERATION DATE: 2011	DATE MANUFACTURED: 2011
MANUFACTURER / MODEL NO.: Aircon Model # 13.6 RAW 268-10	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-13

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	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Pellets	ODT	55 tons per hour	

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM 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-TLB
	CONTROL DEVICE ID NO(S): CD-FPH-BF
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): EP-13

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 directly into the trucks in either of the two pellet loadout areas.

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: 52 tph		

PNEUMATICALLY FILLED	**MECHANICALLY FILLED**		**FILLED FROM**
☝ BLOWER	☝ SCREW CONVEYOR	MOTOR HP:	☝ RAILCAR
☝ COMPRESSOR	☝ BELT CONVEYOR (circled)		☝ TRUCK
☝ OTHER:	☝ BUCKET ELEVATOR		☝ STORAGE PILE
	☝ OTHER:		☝ OTHER: (circled) 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 Loading	EMISSION SOURCE ID NO: ES-PL
	CONTROL DEVICE ID NO(S): CD-FPH-BF
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-13

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Final product is loaded into trucks in either of two (2) pellet loadouts. The trucks are filled directly from the pellet loadout bins.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (CFM)	LIMITATION(UNIT/HR)
Dried Wood Pellets		35,500	

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM D1

FACILITY-WIDE EMISSIONS SUMMARY

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

AIR POLLUTANT EMITTED	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr
PARTICULATE MATTER (PM)	See 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

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

TOXIC AIR POLLUTANT EMITTED	CAS NO.	lb/hr	lb/day	lb/year	Modeling Required ? Yes	No
		See 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.	Electric Powered Chipper ES-CHIP1	420,480 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)
2.	Green Wood Hammermill ES-CHIP2	420,480 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)
3.	Green Wood Handling and Storage ES-GWHS	716,304 tpy	15A NCAC 02Q .0102(c)(2)(E)
4.	Green Wood Fuel Storage Bin ES-GWFB	130,357 tpy	15A NCAC 02Q .0102(c)(2)(E)
5.	Dried Wood Handling ES-DWH	420,480 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)
6.	10 Pelletizers (Pellet Presses) ES-PP	481,800 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)
7.	Final Product Handling ES-FPH	481,800 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)
8.	Emergency Generator Diesel Fuel Tank TK1	2,500 gallons	15A NCAC 02Q .0102(c)(1)(D)
9.	Fire Water Pump Diesel Fuel Tank TK2	500 gallons	15A NCAC 02Q .0102(c)(1)(D)
10.	Log Yard 300 Diesel Tank TK3	300 gallons	15A NCAC 02Q .0102(c)(1)(D)
11.	Electric Powered Bark Hog ES-BARK	145,080 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)

Attach Additional Sheets As Necessary

Received
JAN - 9 2015
Air Permits Section

FORM D

TECHNICAL ANALYSIS TO SUPPORT PERMIT APPLICATION

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

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

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

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

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

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

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

I, J. Rusty Field, P.E., attest that this application for Enviva Pellets Ahoskie, 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: J. Rusty Field, P.E.
DATE: 12-23-14
COMPANY: ONE Environmental Group, LLC
ADDRESS: 500 Libbie Avenue, Suite 1C
TELEPHONE: 804-303-8784
SIGNATURE:
PAGES CERTIFIED: PSD Avoidance Determination
Modified Equipment - Form Bs

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

PLACE NORTH CAROLINA SEAL HERE

Attach Additional Sheets As Necessary

APPENDIX B

Enviva Pellets Ahoskie, LLC

Baseline and Modified Source Emissions Calculations

Eniva Ahoskie Pellets, LLC
PSD Avoidance Emissions Summary
And Proposed VOC Emissions Limitation
December 2014

Section 1: Two Year Average Baseline Emissions Calculations

Date Range	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	Total VOC (tpy)
12/2012-11/2013	33.40	138.26	119.21	119.19	119.17	14.24	146.48
12/2013-11/2014	31.54	130.55	118.18	118.15	118.13	15.34	138.80
Two Year Average	32.47	134.41	118.69	118.67	118.65	14.79	142.64

Section 2: Proposed VOC Emissions Limitation

Two Year Average:	142.64	tpy
Proposed Increase:	249.00	tpy
Proposed Limit:	391.64	tpy

Section 3: Other Pollutant Increases Compared to Baseline:

Scenario	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	Total VOC (tpy)[(1)]
Two Year Average	32.47	134.41	118.69	118.67	118.65	14.79	142.64
Modified Facility:	45.09	183.98	129.66	129.63	129.60	19.20	391.64
Emissions Increase:	12.62	49.57	10.97	10.96	10.95	4.41	249.00

(1) Total VOC emissions represents proposed VOC emissions limitation to avoid PSD review.

APPENDIX B.1

Enviva Pellets Ahoskie, LLC

December 2012- November 2013

Baseline Emissions Calculations

TABLE B-1
FACILITY-WIDE CRITERIA POLLUTANT SUMMARY (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Source Description	Unit ID	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	Total VOC (tpy)	CO_{2e} biomass defferal (tpy)	CO_{2e} (tpy)
Dryer System	ES-DRYER	33.36	138.22	18.50	18.50	18.50	14.24	112.80	2,478.52	120,251.94
Emergency Generator	ES-EG	0.02	0.02	0.00	0.00	0.00	0.0000	0.0001	4.02	4.02
Fire Water Pump	ES-FWP	0.01	0.01	0.00	0.00	0.00	0.0000	0.0000	2.04	2.04
Dry Wood Hammermills	ES-CHM-1 thru 4	-	-	30.03	30.03	30.03	-	8.54	-	-
Hammermill 5	ES-HAF	-	-	12.20	12.20	12.20	-		-	-
Pellet Mill Feed Silo	ES-PMFS	-	-	0.82	0.82	0.82	-	-	-	-
Dried Wood Day Silo	DWDS	-	-	0.82	0.82	0.82	-	-	-	-
Pellet Presses and Coolers	ES-CLR1 thru -6	-	-	56.78	56.78	56.78	-	25.14	-	-
Dried Wood Handling	ES-DHW, ES-PP	-	-	0.05	0.02	0.00	-	-	-	-
Diesel Storage Tanks	TK1 & TK2	-	-	-	-	-	-	8.80E-04	-	-
	Total PSD Emissions	**33.40**	**138.26**	**119.21**	**119.19**	**119.17**	**14.24**	**146.48**	**2,484.57**	**120,257.99**
Fugitive (Non-PSD Sources)										
Chipper and Re-chipper	ES-CHIP - 1	-	-	-	-	-	-	0.41	-	-
Green Hammermill	ES-CHIP - 2	-	-	-	-	-	-	0.74	-	-
Bark Hog	IES-BARK	-	-	-	-	-	-	0.16	-	-
Green Wood Handling	ES-GWS	-	-	0.02	0.01	0.00	-	-	-	-
Green Wood Piles	ES-GWSP1	-	-	2.65	1.33	0.20	-	2.93	-	-
	Total Facility Emisions:	**33.40**	**138.26**	**121.88**	**120.52**	**119.37**	**14.24**	**150.72**	**2,484.57**	**120,257.99**

TABLE B-2
FACILITYWIDE HAP EMISSIONS SUMMARY (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Description	Dryer (tpy)	ES-HM1 thru 5 (tpy)	ES-CLR1 thru 6 (tpy)	ES-EG (tpy)	ES-FWP (tpy)	ES-BARK (tpy)	ES-CHP-1 (tpy)	ES-CHP-2 (tpy)	Total (tpy)
1,3-Butadiene	-	-	-	1.03E-06	5.23E-07	-	-	-	1.55E-06
Acetaldehyde	1.74E+00	0.00E+00	0.00E+00	2.02E-05	1.03E-05	-	-	-	1.74E+00
Acrolein	0.00E+00	5.47E-01	0.00E+00	2.44E-06	1.24E-06	-	-	-	5.47E-01
Benzene	-	-	-	2.46E-05	1.25E-05	-	-	-	3.71E-05
Formaldehyde	3.25E+00	0.00E+00	2.34E-01	3.11E-05	1.58E-05	-	-	-	3.48E+00
m-,p-Xylene	-	-	-	7.52E-06	3.81E-06	-	-	-	1.13E-05
Methanol	2.55E+00	4.56E-01	4.68E-01	-	-	0.04	0.09	0.16	3.76E+00
Propionaldehyde	3.01E-01	0.00E+00	0.00E+00	-	-	-	-	-	3.01E-01
Toluene	-	-	-	1.08E-05	5.47E-06	-	-	-	1.63E-05
Total PAH (POM)	0.00E+00	-	-	4.43E-06	2.25E-06	-	-	-	6.68E-06
TOTAL HAP	**7.84**	**1.00**	**0.70**	**0.000**	**0.000**	**0.04**	**0.09**	**0.16**	**9.82**

TABLE B-4
ROTARY DRYER -CRITERIA POLLUTANT EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Dryer Inputs

Annual Dried Wood Throughput of Dryer	**317,750**	ODT/year
Max. Hourly Dried Wood Throughput of Dryer	43.00	ODT/hr
Burner Heat Input	175.3	MMBtu/hr
Percent Hardwood	90.0%	
Percent Softwood	10.0%	
Max Potential Annual Heat Input:	**1139055**	**MMBtu/yr**

Criteria Pollutant Calculations:

Pollutant	Biomass Emission Factor (lb/ODT)	Units	Emission Factor Source	Emissions (tpy)
CO	0.21	lb/ODT	Title V Application [1]	33.4
NO_X	0.87	lb/ODT	Stack Testing [2]	138.2
Total TSP	0.116	lb/ODT	Calculated from Guaranteed WESP Specifications [3]	18.5
Total PM_{10}	0.116	lb/ODT	Calculated from Guaranteed WESP Specifications [3]	18.5
Total $PM_{2.5}$	0.116	lb/ODT	Calculated from Guaranteed WESP Specifications [3]	18.5
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6 [5]	14.2
VOC as alpha-pinene	0.710	lb/ODT	Stack Testing [4]	112.8
VOC as alpha-pinene	0.710	lb/ODT	Stack Testing [4]	112.8
Lead	0.00	N/A	N/A	0.0

Note:

[1] CO emission factor obtained from 2012 Title V Application.

[2] NOx emission factor obtained from 2012 Title V Application.

[3] WESP Outlet Air Flowrate 81,509 dSCF
PM Grain Loading 0.008 gr/dSCF
Emissions: 652.07 gr/min
0.093 lb/min
5.59 lb/hr
Dryer Capacity Basis: 48.00 ODT/hr
Calculated PM Emission Factor: 0.116 lb/ODT

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] VOC emission factors are calculated from the Northampton October 2013 stack test.

[5] 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.

TABLE B-5
ROTARY DRYER -HAP AND TAP WOOD COMBUSTION EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	317,750
Hardwood Composition	90%
Softwood Composition	10%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor Comparison				Weighted Emission Factor[3]		Emissions
					AP-42 Calculated Direct wood-fired, hardwood factors		AP-42 Green, Direct wood-fired softwood factors				
					Emission Factor (lb/ODT)	Reference	Emission Factor (lb/ODT)	Reference	Anuual EF (lb/ODT)	EF Source	(tpy)
Acetaldehyde	75-07-0	Yes	Yes	Yes	3.83E-03	1,2	7.50E-02	1	1.09E-02	AP-42	1.74E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.00E+00	1,2,4	0.00E+00	1,4	0.00E+00	AP-42	0.00E+00
Formaldehyde	50-00-0	Yes	Yes	Yes	7.15E-03	1,2	1.40E-01	1	2.04E-02	AP-42	3.25E+00
Methanol	67-56-1	Yes	No	Yes	5.62E-03	1,2	1.10E-01	1	1.61E-02	AP-42	2.55E+00
Propionaldehyde	123-38-6	Yes	No	Yes	6.64E-04	1,2	1.30E-02	1	1.90E-03	AP-42	3.01E-01
										Total HAPs	**7.84**

Notes:

[1] HAP & TAP emission factors for "Rotary Dryer, 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 since no HAP/TAP emission factors are given for direct hardwood-fired, factors were conservatively calculated by multiplying AP-42 Section 10.6.2-3 HAP factors for green, direct softwood fired by the ratio of the VOC emission factors for hardwood to softwood drying (0.24/4.7).

[3] Short-term and annual emissions based on worst case processing of 10% softwood.

[4] Through testing at other Enviva facilities Acrolein and Phenol are typically not evident in the emissions stream.

TABLE B-7
HAMMERMILLS - VOC, HAP, AND TAP EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Calculation Inputs:

Total Plant Throughput ODT/yr	317,750
% of Total Throughput to the Hammermills	85%

via AHO test for Dry Hammermill pre-screener bypass

Annual Composition and Throughput

Hammermills Throughput ODT/yr	270,088
Hardwood Composition	90%
Softwood Composition	10%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor – Stack Tests: Emission Factor (lb/ODT)	Emission Factor – Stack Tests: Reference	Emission Factor: Annual EF (lb/ODT)	Emission Factor: EF Source	Emissions (tpy)
VOC and Alpha Pinene	N/A	N/A	N/A	N/A	0.063	[1]	0.06	Stack Test	8.54
Acetaldehyde	75-07-0	Yes	Yes	Yes	0.0000	[3]	0.0000	Stack Test	0.00E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.0041	[3]	0.0041	Stack Test	5.47E-01
Formaldehyde	50-00-0	Yes	Yes	Yes	0.0000	[3]	0.0000	Stack Test	0.00E+00
Methanol	67-56-1	Yes	No	Yes	0.0034	[3]	0.0034	Stack Test	4.56E-01
Propionaldehyde	123-38-6	Yes	No	Yes	0.0000	[3]	0.0000	Stack Test	0.00E+00
								Total VOC	**8.54**
								Total HAPs	**1.00**

Notes:

[1] VOC emissions from Enviva Ahoskie July 2013 stack testing

[2] HAP & TAP emission factors obtained from Enviva Amory October 2013 Stack Testing as a conservative measure (60% softwood).

TABLE B-8
PELLET PRESSES AND COOLERS - VOC, HAP, AND TAP EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	354,678
Hardwood Composition	90%
Softwood Composition	10%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor – Stack Tests: Emission Factor (lb/ODT)	Emission Factor – Stack Tests: Reference	Emission Factor: Annual EF (lb/ODT)	Emission Factor: EF Source	Emissions (tpy)
VOC as alpha-pinene	N/A	N/A	N/A	N/A	0.14	[1]	0.14	stack test	25.14
Acetaldehyde	75-07-0	Yes	Yes	Yes	0.00E+00	[2]	0.00E+00	stack test	0.00E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.00E+00	[2]	0.00E+00	stack test	0.00E+00
Formaldehyde	50-00-0	Yes	Yes	Yes	1.32E-03	[2]	1.32E-03	stack test	2.34E-01
Methanol	67-56-1	Yes	No	Yes	2.64E-03	[2]	2.64E-03	stack test	4.68E-01
Propionaldehyde	123-38-6	Yes	No	Yes	0.00E+00	[2]	0.00E+00	stack test	0.00E+00
								Total VOC	**25.14**
								Total HAPs	**0.70**

Notes:

[1] VOC emissions from Enviva Northampton September 2013 engineering stack test results.

[2] HAP & TAP emission factors obtained from Enviva Northampton September 2013 Stack Testing.

TABLE B-9
BARK HOG VOC, PM, and HAP Emissions (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Annual Throughput of Bark Hog	70,513	tons/year (dry wood)[1]
Dryer Throughput	43.00	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	(tpy)
THC as Carbon[2]	0.0041	0.14
THC as alpha-Pinene[3]	0.0047	0.16
PM[4]	N/A	N/A
Methanol[2]	0.0010	0.04

[1] The annual throughput used for the bark-hog is obtained from facility operating records. The short-term throughput is based upon the maximum throughput to the dryer.

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

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

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

TABLE B-10
ELECTRIC POWERED CHIPPER (ES-CHIP1) - VOC, HAP, AND TAP EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Annual Throughput to ES-CHP1	300,523	tn/yr
Moisture Content:	42%	
Annual Throughput to ES-CHP1	174,303	tons/year (dry wood)[1]
Short-term Throughput of Chipper	43.00	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[5] (tpy)
THC as Carbon[2]	0.0041	0.36
THC as alpha-Pinene[3]	0.0047	0.41
PM[4]	N/A	N/A
Methanol[2]	0.0010	0.09

[1] The annual throughput used for CHP1 is based on facility throughput records. The annual throughput to CHP2 is conservatively assumed to be the same as the dryer. The short-term throughput is based upon the maximum hourly throughput of the dryer.

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

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

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

[5] Short term emissions were based upon the max short term capacity of the chippers. Emissions are representative of the total combined emissions for both rechippers.

TABLE B-11
GREEN HAMMERMILL (ES-CHP2) - VOC, HAP, AND TAP EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Annual Throughput to ES-CHP2	547,845	tn/yr
Moisture Content:	42%	
Annual Throughput to ES-CHP2	317,750	tons/year (dry wood)[1]
Short-term Throughput of Green Hammermill	43.00	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[5] (tpy)
THC as Carbon[2]	0.0041	0.65
THC as alpha-Pinene[3]	0.0047	0.74
PM[4]	N/A	N/A
Methanol[2]	0.0010	**0.16**

[1] The annual throughput used for CHP1 is based on facility throughput records. The annual throughput to CHP2 is conservatively assumed to be the same as the dryer. The short-term throughput is based upon the maximum hourly throughput of the dryer.

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

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

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

[5] Short term emissions were based upon the max short term capacity of the chippers.
Emissions are representative of the total combined emissions for both rechippers.

TABLE B-12
BAGFILTER AND CYCLONE EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

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 $PM_{2.5}$	PM (tpy)	PM_{10}[3] (tpy)	$PM_{2.5}$[3] (tpy)
Dried Wood Day Silo	ES-DWDS	CD-DWS-BV	2186	0.01	8,760	100%	100%	0.82	0.82	0.82
Dry Wood Hammermills 1 & 2	ES-CHM	CD-CHM-FF1	40000	0.01	8,760	100%	100%	15.02	15.02	15.02
Dry Wood Hammermills 3 & 4	ES-CHM	CD-CHM-FF2	40000	0.01	8,760	100%	100%	15.02	15.02	15.02
Hammermill Area and HM-5	ES-HAF	CD-HAF-FF1	32,500	0.01	8,760	100%	100%	12.20	12.20	12.20
Pellet Mill Feed Silo Bin Vent Filter	ES-PMFS	CD-PMFS-BV	2,186	0.01	8,760	100%	100%	0.82	0.82	0.82
Fines Bin	ES-FB	CD-FB-BV	3,600	0.003	8,760	100%	100%	0.41	0.41	0.41
Finished Product Handing	ES-FPH, ES-PL, ES-TLB	CD-FPH-BV	35,500	0.003	8,760	100%	100%	4.00	4.00	4.00
Pellet Coolers Cyclone 1 & 2	ES-CLR-1	CD-CLR-1	27,500	0.022	8,760	100%	100%	22.71	22.71	22.71
Pellet Coolers Cyclone 3 & 4	ES-CLR-2	CD-CLR-2	27,500	0.022	8,760	100%	100%	22.71	22.71	22.71
Pellet Coolers Cyclone 5	ES-CLR-5	CD-CLR-3	13,750	0.022	8,760	100%	100%	11.36	11.36	11.36
Pellet Coolers Cyclone 6	ES-CLR-6	CD-CLR-4	0	0.022	0	100%	100%	-	-	-
							TOTAL	**105.06**	**105.06**	**105.06**

Note:

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

[2] Unless otherisw specidied, pollutant (PM) loading conservatively assumed to be 0.01 gr/dscf.

[3] It was conservatively assumed that PM_{10} and $PM_{2.5}$ equal PM emissions.

TABLE B-13
EMERGENCY GENERATOR AND FIRE PUMP (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Emergency Generator Emissions (ES-EG)

Equipment and Fuel Characteristics

Engine Output	0.26	MW
Engine Power	350	hp (brake)
Hours of Operation	22	hr/yr[1]
Heating Value of Diesel	19,300	Btu/lb
Power Conversion	7,000	Btu/hr/hp
Fuel Usage	17.6	gal/hr

Criteria Pollutant Emissions

Pollutant	Category	Emission Factor	Units	tpy
TSP	PSD	4.41E-04	lb/kW-hr (2)	1.24E-03
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	1.24E-03
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	1.24E-03
NO_x	PSD	8.82E-03	lb/kW-hr (5)	2.48E-02
SO_2	PSD	15	ppmw (3)	4.10E-05
CO	PSD	7.72E-03	lb/kW-hr (2)	2.17E-02
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	6.62E-05
Toxic/Hazardous Air Pollutant Emissions				
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	2.02E-05
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	2.44E-06
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	2.46E-05
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	4.96E-09
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	1.03E-06
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	3.11E-05
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	4.43E-06
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	1.08E-05
m-,p-Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	7.52E-06
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	3.11E-05
Total HAPs				1.02E-04

Note:

[1] Operating hours based on facility operational records.

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

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

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

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

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

Firewater Pump Emissions (ES-FWP)

Equipment and Fuel Characteristics

Engine Output	0.22	MW
Engine Power	300	hp
Hours of Operation	13	hr/yr[1]
Heating Value of Diesel	19,300	Btu/lb
Power Conversion	7,000	Btu/hr/hp
Fuel Usage	15.1	gal/hr

Criteria Pollutant Emissions

Pollutant	Category	Emission Factor	Units	tpy
TSP	PSD	4.41E-04	lb/kW-hr (2)	6.28E-04
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	6.28E-04
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	6.28E-04
NO_x	PSD	8.82E-03	lb/kW-hr (5)	1.26E-02
SO_2	PSD	15	ppmw (3)	2.08E-05
CO	PSD	7.72E-03	lb/kW-hr (2)	1.10E-02
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	3.35E-05
Toxic/Hazardous Air Pollutant Emissions				
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.03E-05
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	1.24E-06
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	1.25E-05
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	2.51E-09
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	5.23E-07
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	1.58E-05
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	2.25E-06
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	5.47E-06
m-,p-Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	3.81E-06
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	1.58E-05
Total HAPs				5.18E-05

Note:

[1] Operating hours based on facility operational records.

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

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

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

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

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

TABLE B-14
DRIED WOOD HANDLING DROP POINT EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Annual Dryer Output Throughput (ODT/yr)	317,750	
Annual Pellet Press Throughput (ODT/yr)	354,678	
Dryer Output Moisture Content:	17%	
Pellet Mill Output Moisture Content:	6%	
Amount of Fines Diverted from Hammermills	15.0%	via AHO test for Dry Hammermill pre-screener bypass

ID	Emission Source Group	Description	Control	Control Description	Throughput		PM^3 Emissions	$PM_{10}{}^3$ Emissions	$PM_{2.5}{}^3$ Emissions
					Max. Hourly[2] (tph)	Annual (tpy)	(tpy)	(tpy)	(tpy)
DP1	ES-DWH	Dryer Discharger to Outfeed Conveyor	Enclosed	Reduction to 2 mph mean wind speed	51.81	382,831	6.9E-03	3.3E-03	4.9E-04
DP2	ES-DWH	Dryer Outfeed Conveyors to Silo Feed/Silo Bypass	Enclosed	Reduction to 2 mph mean wind speed	7.77	57,425	1.0E-03	4.9E-04	7.4E-05
DP3	ES-DWH	Silo Bypass/Dryer Silo to Conveyor Hammermill Surge Bin	Enclosed	Reduction to 2 mph mean wind speed	44.04	325,407	5.9E-03	2.8E-03	4.2E-04
DP4	ES-DWH	Conveyor to Hammermill Surge Bin Drop into HM Surge Bin	Enclosed	Reduction to 2 mph mean wind speed	44.04	325,407	5.9E-03	2.8E-03	4.2E-04
DP5	ES-PP	Drop Emissions from Pellet Presses to Pellet Press Collection Conveyors	Enclosed	Reduction to 2 mph mean wind speed	51.06	377,317	2.9E-02	1.4E-02	2.1E-03
						TOTAL	**4.9E-02**	**2.3E-02**	**3.5E-03**

Note:

[1] The listing of open transfer points may not be inclusive of all transfer points downstream of the dryer. Even if a few additional points may exist, the potential emissison of the insignificant activity emission source group ES-DWH is well below the 5 tpy threshold for significant emissions. Fugitive emissions are not included in facility-wide PTE because the Northampton Pellet Mill does not belong to one of the listed 28 source categories.

[2] Max hourly rates based upon ODT production rate and moisture content at that part of the process.

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

where: E = emission factor (lb/ton)

k = particle size multiplier (dimensionless) for PM	0.74	
k = particle size multiplier (dimensionless) for PM_{10}	0.35	
k = particle size multiplier (dimensionless) for $PM_{2.5}$	0.053	
U = mean wind speed (mph)	2.00	
	Dryer Exit	Pellet Press Exit
M = material moisture content (%)	17	6
E for PM (lb/ton) =	3.6E-05	1.5E-04
E for PM_{10} (lb/ton) =	1.7E-05	7.3E-05
E for $PM_{2.5}$ (lb/ton) =	2.6E-06	1.1E-05

TABLE B-15
GREEN WOOD HANDLING DROP POINT EXAMPLE EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

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)	PM Emissions (tpy)	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)
GDP1	ES-GWH	Purchased Bark Transfer to Outdoor Storage Area	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	0	0.00E+00	0.00E+00	0.00E+00
GDP1	ES-GWH	Drop Points via Conveying from Bark Pile to Dryer	Batch Drop	4	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	135,602	2.56E-03	1.21E-03	1.83E-04
GDP2	ES-GWH	Transfer Purchased Wood Chips (Wet) to Outdoor Storage	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	275,859	1.30E-03	6.14E-04	9.32E-05
GDP2	ES-GWH	Drop Points via Conveying from Chip Pile to Dryer	Batch Drop	5	0.74	0.35	0.053	6.0	48%	3.51E-05	1.66E-05	2.51E-06	611,058	1.36E-02	6.42E-03	9.70E-04
		Total Emissions												**1.74E-02**	**8.24E-03**	**1.25E-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) 6.3

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.

TABLE B-16
TANKS EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Tank ID	Tank Description	Volume[1] (gal)	Tank Dimensions		Orientation	Throughput (gal/yr)	Turnovers[(3)]	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	379	0.152	1.45	7.25E-04
TK02	Fire Water Pump Fuel Oil Tank[2]	500	3	10	Horizontal	192	0.385	0.31	1.55E-04
							TOTAL	**1.76**	**8.80E-04**

Note:

[1] Conservative design specifications.

[2] Throughput based on fuel consumption based on engine horsepower (BHP), conversion to fuel usage (gal/hr), and engine operating hours.

[3] Tanks Program Calculations are performed with a minimum 1 turnover per year as a conservative measure.

TABLE B-17
POTENTIAL GHG EMISSIONS FROM COMBUSTION SOURCES (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Operating Data:

Dryer Heat Input	1139054.86 MMBtu/yr
Emergency Generator Output	350 bhp
Operating Schedule	22 hrs/yr
No. 2 Fuel Input	16.7 gal/hr[1]
Energy Input	2.282 MMBtu/hr[2]
Fire Water Pump Output	300 bhp
Operating Schedule	13 hrs/yr
No. 2 Fuel Input	14.3 gal/hr[1]
Energy Input	1.956 MMBtu/hr[2]

Emission Unit ID	Fuel Type	Emission Factors from Table C-1 (kg/MMBtu)[3]			Tier 1 Emissions (metric tons)				
		CO2	CH4	N2O	CO2	CH4	N2O	Total CO2e biomass deferral [4]	Total CO2e
ES-DRYER	Wood and Wood Residuals	9.38E+01	3.20E-02	4.20E-03	117,773	40	5	2,479	120,252
ES-GN	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	4	1.63E-04	3.25E-05	4	4
ES-FWP	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	2	8.24E-05	1.65E-05	2	2

[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. Therefore CO2 emissions form the dryer are not included in the Total CO2e biomass deferral column.

TABLE B-18
GREEN WOOD STORAGE PILES FUGITIVE EMISSIONS (12/2012 - 11/2013)
ENVIVA PELLETS AHOSKIE

Emission Unit ID	Description	TSP Emission Factor [1] (lb/day/acre)	TSP Emission Factor [1] ($lb/hr/ft^2$)	VOC Emission Factor [3] (lb/day/acre)	VOC Emission Factor [3] ($lb/hr/ft^2$)	Width (ft)	Length (ft)	Height (ft)	Outer Surface Area of Storage Pile (ft^2)	PM Emissions (tpy)	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)	VOC as Carbon Emissions (tpy)	VOC as alpha-Pinene Emissions[5] (tpy)
GWSP1	Green Wood Pile No. 1	3.71	3.55E-06	3.60	3.44E-06	100	400	10	60,000	0.933	0.467	0.070	0.90	1.03
GWSP2	Green Wood Pile No. 2	3.71	3.55E-06	3.60	3.44E-06	200	400	10	110,400	1.717	0.859	0.129	1.67	1.90
Total										**2.651**	**1.325**	**0.199**	**2.57**	**2.93**

1. TSP emission factor based on U.S. EPA *Control of Open 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) (%):	9.8	Based on meteorological data averaged for 2007-2011 for Northampton, 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.

$$E = 1.7\left(\frac{s}{1.5}\right)\left(\frac{(365-p)}{235}\right)\left(\frac{f}{15}\right)(lb/day/acre)_{\%}$$

$PM_{2.5}$ 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 alpha-pinene by multiplying by 1.14.

APPENDIX B.2

Enviva Pellets Ahoskie, LLC

December 2013 – November 2014

Baseline Emissions Calculations

TABLE B-1
FACILITY-WIDE CRITERIA POLLUTANT SUMMARY (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Source Description	Unit ID	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	Total VOC (tpy)	CO_{2e} biomass defferal (tpy)	CO_{2e} (tpy)
Dryer System	ES-DRYER	31.50	130.51	17.47	17.47	17.47	15.34	106.51	2,670.10	129,547.41
Emergency Generator	ES-EG	0.03	0.03	0.00	0.00	0.00	0.0000	0.0001	4.89	4.89
Fire Water Pump	ES-FWP	0.01	0.02	0.00	0.00	0.00	0.0000	0.0000	2.68	2.68
Dry Wood Hammermills	ES-CHM-1 thru 4	-	-	30.03	30.03	30.03	-	8.07	-	-
Hammermill 5	ES-HAF	-	-	12.20	12.20	12.20	-		-	-
Pellet Mill Feed Silo	ES-PMFS	-	-	0.82	0.82	0.82	-	-	-	-
Dried Wood Day Silo	DWDS	-	-	0.82	0.82	0.82	-	-	-	-
Pellet Presses and Coolers	ES-CLR1 thru -6	-	-	56.78	56.78	56.78	-	24.23	-	-
Dried Wood Handling	ES-DHW, ES-PP	-	-	0.05	0.02	0.00	-	-	-	-
Diesel Storage Tanks	TK1 & TK2	-	-	-	-	-	-	8.80E-04	-	-
	Total PSD Emissions	**31.54**	**130.55**	**118.18**	**118.15**	**118.13**	**15.34**	**138.80**	**2,677.67**	**129,554.98**
Fugitive (Non-PSD Sources)										
Chipper and Re-chipper	ES-CHIP - 1	-	-	-	-	-	-	0.35	-	-
Green Hammermill	ES-CHIP - 2	-	-	-	-	-	-	0.70	-	-
Bark Hog	IES-BARK	-	-	-	-	-	-	0.18	-	-
Green Wood Handling	ES-GWS	-	-	0.02	0.01	0.00	-	-	-	-
Green Wood Piles	ES-GWSP1	-	-	2.65	1.33	0.20	-	2.93	-	-
	Total Facility Emisions:	**31.54**	**130.55**	**120.84**	**119.49**	**118.33**	**15.34**	**142.96**	**2,677.67**	**129,554.98**

TABLE B-2
FACILITYWIDE HAP EMISSIONS SUMMARY (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Description	Dryer (tpy)	ES-HM1 thru 5 (tpy)	ES-CLR1 thru 6 (tpy)	ES-EG (tpy)	ES-FWP (tpy)	ES-BARK (tpy)	ES-CHP-1 (tpy)	ES-CHP-2 (tpy)	Total (tpy)
1,3-Butadiene	-	-	-	1.25E-06	6.87E-07	-	-	-	1.94E-06
Acetaldehyde	1.64E+00	0.00E+00	0.00E+00	2.46E-05	1.35E-05	-	-	-	1.64E+00
Acrolein	0.00E+00	5.17E-01	0.00E+00	2.97E-06	1.62E-06	-	-	-	5.17E-01
Benzene	-	-	-	2.99E-05	1.64E-05	-	-	-	4.63E-05
Formaldehyde	3.07E+00	0.00E+00	2.25E-01	3.79E-05	2.07E-05	-	-	-	3.29E+00
m-,p-Xylene	-	-	-	9.15E-06	5.01E-06	-	-	-	1.42E-05
Methanol	2.41E+00	4.31E-01	4.51E-01	-	-	0.04	0.08	0.15	3.55E+00
Propionaldehyde	2.85E-01	0.00E+00	0.00E+00	-	-	-	-	-	2.85E-01
Toluene	-	-	-	1.31E-05	7.18E-06	-	-	-	2.03E-05
Total PAH (POM)	0.00E+00	-	-	5.39E-06	2.95E-06	-	-	-	8.34E-06
TOTAL HAP	**7.40**	**0.95**	**0.68**	**0.000**	**0.000**	**0.04**	**0.08**	**0.15**	**9.29**

TABLE B-4
ROTARY DRYER -CRITERIA POLLUTANT EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Dryer Inputs

Annual Dried Wood Throughput of Dryer	**300,018**	ODT/year
Max. Hourly Dried Wood Throughput of Dryer	43.00	ODT/hr
Burner Heat Input	175.3	MMBtu/hr
Percent Hardwood	90.0%	
Percent Softwood	10.0%	
Max Potential Annual Heat Input:	**1227104**	**MMBtu/yr**

Criteria Pollutant Calculations:

Pollutant	Biomass Emission Factor (lb/ODT)	Units	Emission Factor Source	Emissions (tpy)
CO	0.21	lb/ODT	Title V Application [1]	31.5
NO_X	0.87	lb/ODT	Stack Testing [2]	130.5
Total TSP	0.116	lb/ODT	Calculated from Guaranteed WESP Specifications [3]	17.5
Total PM_{10}	0.116	lb/ODT	Calculated from Guaranteed WESP Specifications [3]	17.5
Total $PM_{2.5}$	0.116	lb/ODT	Calculated from Guaranteed WESP Specifications [3]	17.5
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6 [5]	15.3
VOC as alpha-pinene	0.710	lb/ODT	Stack Testing[4]	106.5
VOC as alpha-pinene	0.710	lb/ODT	Stack Testing[4]	106.5
Lead	0.00	N/A	N/A	0.0

Note:

[1] CO emission factor obtained from 2012 Title V Application.

[2] NOx emission factor obtained from 2012 Title V Application.

[3] WESP Outlet Air Flowrate 81,509 dSCF
PM Grain Loading 0.008 gr/dSCF
Emissions: 652.07 gr/min
0.093 lb/min
5.59 lb/hr
Dryer Capacity Basis: 48.00 ODT/hr
Calculated PM Emission Factor: 0.116 lb/ODT

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] VOC emission factors are calculated from the Northampton October 2013 stack test.

[5] 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.

TABLE B-5
ROTARY DRYER -HAP AND TAP WOOD COMBUSTION EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	300,018
Hardwood Composition	90%
Softwood Composition	10%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor Comparison				Weighted Emission Factor[3]		Emissions
					AP-42 Calculated Direct wood-fired, hardwood factors		AP-42 Green, Direct wood-fired softwood factors				
					Emission Factor (lb/ODT)	Reference	Emission Factor (lb/ODT)	Reference	Anuual EF (lb/ODT)	EF Source	(tpy)
Acetaldehyde	75-07-0	Yes	Yes	Yes	3.83E-03	[1,2]	7.50E-02	[1]	1.09E-02	AP-42	1.64E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.00E+00	[1,2,4]	0.00E+00	[1,4]	0.00E+00	AP-42	0.00E+00
Formaldehyde	50-00-0	Yes	Yes	Yes	7.15E-03	[1,2]	1.40E-01	[1]	2.04E-02	AP-42	3.07E+00
Methanol	67-56-1	Yes	No	Yes	5.62E-03	[1,2]	1.10E-01	[1]	1.61E-02	AP-42	2.41E+00
Propionaldehyde	123-38-6	Yes	No	Yes	6.64E-04	[1,2]	1.30E-02	[1]	1.90E-03	AP-42	2.85E-01
										Total HAPs	**7.40**

Notes:

[1] HAP & TAP emission factors for "Rotary Dryer, 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 since no HAP/TAP emission factors are given for direct hardwood-fired, factors were conservatively calculated by multiplying AP-42 Section 10.6.2-3 HAP factors for green, direct softwood fired by the ratio of the VOC emission factors for hardwood to softwood drying (0.24/4.7).

[3] Short-term and annual emissions based on worst case processing of 10% softwood.

[4] Through testing at other Enviva facilities Acrolein and Phenol are typically not evident in the emissions stream.

TABLE B-7
HAMMERMILLS - VOC, HAP, AND TAP EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Calculation Inputs:

Total Plant Throughput ODT/yr	300,018
% of Total Throughput to the Hammermills	85%

via AHO test for Dry Hammermill pre-screener bypass

Annual Composition and Throughput

Hammermills Throughput ODT/yr	255,015
Hardwood Composition	90%
Softwood Composition	10%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor – Stack Tests		Emission Factor		Emissions
					Emission Factor (lb/ODT)	Reference	Annual EF (lb/ODT)	EF Source	(tpy)
VOC and Alpha Pinene	N/A	N/A	N/A	N/A	0.063	[1]	0.06	Stack Test	8.07
Acetaldehyde	75-07-0	Yes	Yes	Yes	0.0000	[3]	0.0000	Stack Test	0.00E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.0041	[3]	0.0041	Stack Test	5.17E-01
Formaldehyde	50-00-0	Yes	Yes	Yes	0.0000	[3]	0.0000	Stack Test	0.00E+00
Methanol	67-56-1	Yes	No	Yes	0.0034	[3]	0.0034	Stack Test	4.31E-01
Propionaldehyde	123-38-6	Yes	No	Yes	0.0000	[3]	0.0000	Stack Test	0.00E+00
								Total VOC	**8.07**
								Total HAPs	**0.95**

Notes:

[1] VOC emissions from Enviva Ahoskie July 2013 stack testing

[2] HAP & TAP emission factors obtained from Enviva Amory October 2013 Stack Testing as a conservative measure (60% softwood).

TABLE B-8
PELLET PRESSES AND COOLERS - VOC, HAP, AND TAP EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	341,819
Hardwood Composition	90%
Softwood Composition	10%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor		Emission Factor		Emissions
					Stack Tests				
					Emission Factor (lb/ODT)	Reference	Annual EF (lb/ODT)	EF Source	(tpy)
VOC as alpha-pinene	N/A	N/A	N/A	N/A	0.14	[1]	0.14	stack test	24.23
Acetaldehyde	75-07-0	Yes	Yes	Yes	0.00E+00	[2]	0.00E+00	stack test	0.00E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.00E+00	[2]	0.00E+00	stack test	0.00E+00
Formaldehyde	50-00-0	Yes	Yes	Yes	1.32E-03	[2]	1.32E-03	stack test	2.25E-01
Methanol	67-56-1	Yes	No	Yes	2.64E-03	[2]	2.64E-03	stack test	4.51E-01
Propionaldehyde	123-38-6	Yes	No	Yes	0.00E+00	[2]	0.00E+00	stack test	0.00E+00
								Total VOC	**24.23**
								Total HAPs	**0.68**

Notes:

[1] VOC emissions from Enviva Northampton September 2013 engineering stack test results.

[2] HAP & TAP emission factors obtained from Enviva Northampton September 2013 Stack Testing.

TABLE B-9
BARK HOG VOC, PM, and HAP Emissions (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Annual Throughput of Bark Hog	75,964	tons/year (dry wood)[1]
Dryer Throughput	43.00	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	(tpy)
THC as Carbon[2]	0.0041	0.16
THC as alpha-Pinene[3]	0.0047	0.18
PM[4]	N/A	N/A
Methanol[2]	0.0010	0.04

[1] The annual throughput used for the bark-hog is obtained from facility operating records. The short-term throughput is based upon the maximum throughput to the dryer.

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

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

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

TABLE B-10
ELECTRIC POWERED CHIPPER (ES-CHIP1) - VOC, HAP, AND TAP EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Annual Throughput to ES-CHP1	261,650	tn/yr
Moisture Content:	42%	
Annual Throughput to ES-CHP1	151,757	tons/year (dry wood)[1]
Short-term Throughput of Chipper	43.00	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[5] (tpy)
THC as Carbon[2]	0.0041	0.31
THC as alpha-Pinene[3]	0.0047	0.35
PM[4]	N/A	N/A
Methanol[2]	0.0010	**0.08**

[1] The annual throughput used for CHP1 is based on facility throughput records. The annual throughput to CHP2 is conservatively assumed to be the same as the dryer. The short-term throughput is based upon the maximum hourly throughput of the dryer.

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

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

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

[5] Short term emissions were based upon the max short term capacity of the chippers. Emissions are representative of the total combined emissions for both rechippers.

TABLE B-11
GREEN HAMMERMILL (ES-CHP2) - VOC, HAP, AND TAP EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Annual Throughput to ES-CHP2	517,272	tn/yr
Moisture Content:	42%	
Annual Throughput to ES-CHP2	300,018	tons/year (dry wood)[1]
Short-term Throughput of Green Hammermill	43.00	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[5] (tpy)
THC as Carbon[2]	0.0041	0.62
THC as alpha-Pinene[3]	0.0047	0.70
PM[4]	N/A	N/A
Methanol[2]	0.0010	**0.15**

[1] The annual throughput used for CHP1 is based on facility throughput records. The annual throughput to CHP2 is conservatively assumed to be the same as the dryer. The short-term throughput is based upon the maximum hourly throughput of the dryer.

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

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

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

[5] Short term emissions were based upon the max short term capacity of the chippers. Emissions are representative of the total combined emissions for both rechippers.

TABLE B-12
BAGFILTER AND CYCLONE EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

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 $PM_{2.5}$	PM (tpy)	PM_{10}[3] (tpy)	$PM_{2.5}$[3] (tpy)
Dried Wood Day Silo	ES-DWDS	CD-DWS-BV	2186	0.01	8,760	100%	100%	0.82	0.82	0.82
Dry Wood Hammermills 1 & 2	ES-CHM	CD-CHM-FF1	40000	0.01	8,760	100%	100%	15.02	15.02	15.02
Dry Wood Hammermills 3 & 4	ES-CHM	CD-CHM-FF2	40000	0.01	8,760	100%	100%	15.02	15.02	15.02
Hammermill Area and HM-5	ES-HAF	CD-HAF-FF1	32,500	0.01	8,760	100%	100%	12.20	12.20	12.20
Pellet Mill Feed Silo Bin Vent Filter	ES-PMFS	CD-PMFS-BV	2,186	0.01	8,760	100%	100%	0.82	0.82	0.82
Fines Bin	ES-FB	CD-FB-BV	3,600	0.003	8,760	100%	100%	0.41	0.41	0.41
Finished Product Handing	ES-FPH, ES-PL, ES-TLB	CD-FPH-BV	35,500	0.003	8,760	100%	100%	4.00	4.00	4.00
Pellet Coolers Cyclone 1 & 2	ES-CLR-1	CD-CLR-1	27,500	0.022	8,760	100%	100%	22.71	22.71	22.71
Pellet Coolers Cyclone 3 & 4	ES-CLR-2	CD-CLR-2	27,500	0.022	8,760	100%	100%	22.71	22.71	22.71
Pellet Coolers Cyclone 5	ES-CLR-5	CD-CLR-3	13,750	0.022	8,760	100%	100%	11.36	11.36	11.36
Pellet Coolers Cyclone 6	ES-CLR-6	CD-CLR-4	0	0.022	0	100%	100%	-	-	-
							TOTAL	**105.06**	**105.06**	**105.06**

Note:

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

[2] Unless otherisw specidied, pollutant (PM) loading conservatively assumed to be 0.01 gr/dscf.

[3] It was conservatively assumed that PM_{10} and $PM_{2.5}$ equal PM emissions.

TABLE B-13
EMERGENCY GENERATOR AND FIRE PUMP (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Emergency Generator Emissions (ES-EG)

Equipment and Fuel Characteristics

Engine Output	0.26	MW
Engine Power	350	hp (brake)
Hours of Operation	26	hr/yr[1]
Heating Value of Diesel	19,300	Btu/lb
Power Conversion	7,000	Btu/hr/hp
Fuel Usage	17.6	gal/hr

Criteria Pollutant Emissions

Pollutant	Category	Emission Factor	Units	tpy
TSP	PSD	4.41E-04	lb/kW-hr (2)	1.51E-03
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	1.51E-03
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	1.51E-03
NO_x	PSD	8.82E-03	lb/kW-hr (5)	3.02E-02
SO_2	PSD	15	ppmw (3)	4.99E-05
CO	PSD	7.72E-03	lb/kW-hr (2)	2.64E-02
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	8.06E-05
Toxic/Hazardous Air Pollutant Emissions				
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	2.46E-05
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	2.97E-06
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	2.99E-05
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	6.03E-09
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	1.25E-06
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	3.79E-05
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	5.39E-06
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	1.31E-05
m-,p-Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	9.15E-06
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	3.79E-05
Total HAPs				1.24E-04

Note:

[1] Operating hours based on facility operational records.

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

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

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

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

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

Firewater Pump Emissions (ES-FWP)

Equipment and Fuel Characteristics

Engine Output	0.22	MW
Engine Power	300	hp
Hours of Operation	17	hr/yr[1]
Heating Value of Diesel	19,300	Btu/lb
Power Conversion	7,000	Btu/hr/hp
Fuel Usage	15.1	gal/hr

Criteria Pollutant Emissions

Pollutant	Category	Emission Factor	Units	tpy
TSP	PSD	4.41E-04	lb/kW-hr (2)	8.25E-04
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	8.25E-04
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	8.25E-04
NO_x	PSD	8.82E-03	lb/kW-hr (5)	1.65E-02
SO_2	PSD	15	ppmw (3)	2.73E-05
CO	PSD	7.72E-03	lb/kW-hr (2)	1.44E-02
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	4.41E-05
Toxic/Hazardous Air Pollutant Emissions				
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.35E-05
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	1.62E-06
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	1.64E-05
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	3.30E-09
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	6.87E-07
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.07E-05
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	2.95E-06
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	7.18E-06
m-,p-Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	5.01E-06
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.07E-05
Total HAPs				6.80E-05

Note:

[1] Operating hours based on facility operational records.

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

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

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

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

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

TABLE B-14
DRIED WOOD HANDLING DROP POINT EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Annual Dryer Output Throughput (ODT/yr)	300,018
Annual Pellet Press Throughput (ODT/yr)	341,819
Dryer Output Moisture Content:	17%
Pellet Mill Output Moisture Content:	6%
Amount of Fines Diverted from Hammermills	15.0% via AHO test for Dry Hammermill pre-screener bypass

ID	Emission Source Group	Description	Control	Control Description	Throughput		PM^3 Emissions	$PM_{10}{}^3$ Emissions	$PM_{2.5}{}^3$ Emissions
					Max. Hourly[2] (tph)	Annual (tpy)	(tpy)	(tpy)	(tpy)
DP1	ES-DWH	Dryer Discharger to Outfeed Conveyor	Enclosed	Reduction to 2 mph mean wind speed	51.81	361,467	6.5E-03	3.1E-03	4.7E-04
DP2	ES-DWH	Dryer Outfeed Conveyors to Silo Feed/Silo Bypass	Enclosed	Reduction to 2 mph mean wind speed	7.77	54,220	9.7E-04	4.6E-04	7.0E-05
DP3	ES-DWH	Silo Bypass/Dryer Silo to Conveyor Hammermill Surge Bin	Enclosed	Reduction to 2 mph mean wind speed	44.04	307,247	5.5E-03	2.6E-03	4.0E-04
DP4	ES-DWH	Conveyor to Hammermill Surge Bin Drop into HM Surge Bin	Enclosed	Reduction to 2 mph mean wind speed	44.04	307,247	5.5E-03	2.6E-03	4.0E-04
DP5	ES-PP	Drop Emissions from Pellet Presses to Pellet Press Collection Conveyors	Enclosed	Reduction to 2 mph mean wind speed	51.06	363,637	2.8E-02	1.3E-02	2.0E-03
						TOTAL	**4.7E-02**	**2.2E-02**	**3.3E-03**

Note:

[1] The listing of open transfer points may not be inclusive of all transfer points downstream of the dryer. Even if a few additional points may exist, the potential emissison of the insignificant activity emission source group ES-DWH is well below the 5 tpy threshold for significant emissions. Fugitive emissions are not included in facility-wide PTE because the Northampton Pellet Mill does not belong to one of the listed 28 source categories.

[2] Max hourly rates based upon ODT production rate and moisture content at that part of the process.

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

where: E = emission factor (lb/ton)

k = particle size multiplier (dimensionless) for PM	0.74	
k = particle size multiplier (dimensionless) for PM_{10}	0.35	
k = particle size multiplier (dimensionless) for $PM_{2.5}$	0.053	
U = mean wind speed (mph)	2.00	
	Dryer Exit	Pellet Press Exit
M = material moisture content (%)	17	6
E for PM (lb/ton) =	3.6E-05	1.5E-04
E for PM_{10} (lb/ton) =	1.7E-05	7.3E-05
E for $PM_{2.5}$ (lb/ton) =	2.6E-06	1.1E-05

TABLE B-15
GREEN WOOD HANDLING DROP POINT EXAMPLE EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

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)	PM Emissions (tpy)	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)
GDP1	ES-GWH	Purchased Bark Transfer to Outdoor Storage Area	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	0	0.00E+00	0.00E+00	0.00E+00
GDP1	ES-GWH	Drop Points via Conveying from Bark Pile to Dryer	Batch Drop	4	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	146,084	2.76E-03	1.30E-03	1.97E-04
GDP2	ES-GWH	Transfer Purchased Wood Chips (Wet) to Outdoor Storage	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	285,116	1.35E-03	6.35E-04	9.63E-05
GDP2	ES-GWH	Drop Points via Conveying from Chip Pile to Dryer	Batch Drop	5	0.74	0.35	0.053	6.0	48%	3.51E-05	1.66E-05	2.51E-06	576,957	1.28E-02	6.06E-03	9.16E-04
		Total Emissions												**1.69E-02**	**7.99E-03**	**1.21E-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) 6.3

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.

TABLE B-16
TANKS EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Tank ID	Tank Description	Volume[1] (gal)	Tank Dimensions		Orientation	Throughput (gal/yr)	Turnovers[(3)]	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	462	0.185	1.45	7.25E-04
TK02	Fire Water Pump Fuel Oil Tank[2]	500	3	10	Horizontal	253	0.506	0.31	1.55E-04
							TOTAL	**1.76**	**8.80E-04**

Note:

[1] Conservative design specifications.

[2] Throughput based on fuel consumption based on engine horsepower (BHP), conversion to fuel usage (gal/hr), and engine operating hours.

[3] Tanks Program Calculations are performed with a minimum 1 turnover per year as a conservative measure.

TABLE B-17
POTENTIAL GHG EMISSIONS FROM COMBUSTION SOURCES (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Operating Data:

Dryer Heat Input	1227103.83	MMBtu/yr
Emergency Generator Output	350	bhp
Operating Schedule	26	hrs/yr
No. 2 Fuel Input	16.7	gal/hr[1]
Energy Input	2.282	MMBtu/hr[2]
Fire Water Pump Output	300	bhp
Operating Schedule	17	hrs/yr
No. 2 Fuel Input	14.3	gal/hr[1]
Energy Input	1.956	MMBtu/hr[2]

Emission Unit ID	Fuel Type	Emission Factors from Table C-1 (kg/MMBtu)[3]			Tier 1 Emissions (metric tons)				
		CO2	CH4	N2O	CO2	CH4	N2O	Total CO2e biomass deferral[4]	Total CO2e
ES-DRYER	Wood and Wood Residuals	9.38E+01	3.20E-02	4.20E-03	126,877	43	6	2,670	129,547
ES-GN	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	5	1.98E-04	3.96E-05	5	5
ES-FWP	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	3	1.08E-04	2.16E-05	3	3

[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. Therefore CO2 emissions form the dryer are not included in the Total CO2e biomass deferral column.

TABLE B-18
GREEN WOOD STORAGE PILES FUGITIVE EMISSIONS (12/2013 - 11/2014)
ENVIVA PELLETS AHOSKIE

Emission Unit ID	Description	TSP Emission Factor [1] (lb/day/acre)	TSP Emission Factor [1] ($lb/hr/ft^2$)	VOC Emission Factor [3] (lb/day/acre)	VOC Emission Factor [3] ($lb/hr/ft^2$)	Width (ft)	Length (ft)	Height (ft)	Outer Surface Area of Storage Pile (ft^2)	PM Emissions (tpy)	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)	VOC as Carbon Emissions (tpy)	VOC as alpha-Pinene Emissions[5] (tpy)
GWSP1	Green Wood Pile No. 1	3.71	3.55E-06	3.60	3.44E-06	100	400	10	60,000	0.933	0.467	0.070	0.90	1.03
GWSP2	Green Wood Pile No. 2	3.71	3.55E-06	3.60	3.44E-06	200	400	10	110,400	1.717	0.859	0.129	1.67	1.90
Total										**2.651**	**1.325**	**0.199**	**2.57**	**2.93**

1. TSP emission factor based on U.S. EPA *Control of Open 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) (%):	9.8	Based on meteorological data averaged for 2007-2011 for Northampton, 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.

$$E = 1.7\left(\frac{s}{1.5}\right)\left(\frac{(365-p)}{235}\right)\left(\frac{f}{15}\right)(lb/day/acre)_{\%}$$

$PM_{2.5}$ 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 alpha-pinene by multiplying by 1.14.

APPENDIX B.3

Enviva Pellets Ahoskie, LLC

Modified Source Emissions Calculations

TABLE B-1
FACILITY-WIDE CRITERIA POLLUTANT SUMMARY
ENVIVA PELLETS AHOSKIE

Source Description	Unit ID	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	Total VOC (tpy)	$CO_{2e\ biomass\ defferal}$ (tpy)	CO_{2e} (tpy)
Dryer System	ES-DRYER	44.15	182.91	24.48	24.48	24.48	19.20	164.20	3,341.43	162,118.83
Emergency Generator	ES-EG	0.50	0.58	0.03	0.03	0.03	0.0010	0.0015	93.35	93.35
Fire Water Pump	ES-FWP	0.43	0.49	0.02	0.02	0.02	0.0008	0.0013	80.02	80.02
Dry Wood Hammermills	ES-CHM-1 thru 4	-	-	30.03	30.03	30.03	-	16.62	-	-
Hammermill 5	ES-HAF	-	-	12.20	12.20	12.20	-		-	-
Pellet Mill Feed Silo	ES-PMFS	-	-	0.82	0.82	0.82	-	-	-	-
Dried Wood Day Silo	DWDS	-	-	0.82	0.82	0.82	-	-	-	-
Pellet Fines Bin	ES-FB	-	-	0.41	0.41	0.41	-	-	-	-
Finished Product Handling & Loadout	ES-FPH, TLB, PL1,2	-	-	4.00	4.00	4.00	-	-	-	-
Pellet Presses and Coolers	ES-CLR1 thru -6	-	-	56.78	56.78	56.78	-	110.09	-	-
Dried Wood Handling	ES-DWH, ES-PP	-	-	0.07	0.03	0.00	-	-	-	-
Diesel Storage Tanks	TK1 & TK2	-	-	-	-	-	-	9.10E-04	-	-
	Total PSD Emissions	**45.09**	**183.98**	**129.66**	**129.63**	**129.60**	**19.20**	**290.91**	**3,514.80**	**162,292.20**
Fugitive (Non-PSD Sources)										
Chipper and Re-chipper	ES-CHIP - 1	-	-	-	-	-	-	0.98	-	-
Green Hammermill	ES-CHIP - 2	-	-	-	-	-	-	0.98	-	-
Bark Hog	IES-BARK	-	-	-	-	-	-	0.34	-	-
Green Wood Handling	ES-GWH	-	-	0.02	0.01	0.00	-	-	-	-
Green Wood Piles	ES-GWSP1	-	-	2.65	1.33	0.20	-	2.93	-	-
	Total Facility Emisions:	**45.09**	**183.98**	**132.34**	**130.97**	**129.80**	**19.20**	**296.14**	**3,514.80**	**162,292.20**

TABLE B-2
FACILITYWIDE HAP EMISSIONS SUMMARY
ENVIVA PELLETS AHOSKIE

Description	Dryer (tpy)	ES-HM1 thru 5 (tpy)	ES-CLR1 thru 6 (tpy)	ES-EG (tpy)	ES-FWP (tpy)	ES-BARK (tpy)	ES-CHP-1 (tpy)	ES-CHP-2 (tpy)	Total (tpy)
1,3-Butadiene	-	-	-	2.39E-05	2.05E-05	-	-	-	4.45E-05
Acetaldehyde	5.29E+00	0.00E+00	0.00E+00	4.70E-04	4.03E-04	-	-	-	5.29E+00
Acrolein	0.00E+00	7.24E-01	0.00E+00	5.67E-05	4.86E-05	-	-	-	7.25E-01
Benzene	-	-	-	5.71E-04	4.90E-04	-	-	-	1.06E-03
Formaldehyde	9.88E+00	0.00E+00	1.50E+00	7.23E-04	6.20E-04	-	-	-	1.14E+01
m-,p-Xylene	-	-	-	1.75E-04	1.50E-04	-	-	-	3.24E-04
Methanol	7.76E+00	6.04E-01	2.70E+00	-	-	0.07	0.21	0.21	1.16E+01
Propionaldehyde	9.18E-01	0.00E+00	0.00E+00	-	-	-	-	-	9.18E-01
Toluene	-	-	-	2.51E-04	2.15E-04	-	-	-	4.65E-04
Total PAH (POM)	0.00E+00	-	-	1.03E-04	8.82E-05	-	-	-	1.91E-04
TOTAL HAP	**23.86**	**1.33**	**4.19**	**0.002**	**0.002**	**0.07**	**0.21**	**0.21**	**29.88**

TABLE B-4
ROTARY DRYER -CRITERIA POLLUTANT EMISSIONS
ENVIVA PELLETS AHOSKIE

Dryer Inputs

Annual Dried Wood Throughput of Dryer	**420,480**	ODT/year
Max. Hourly Dried Wood Throughput of Dryer	48.00	ODT/hr
Burner Heat Input	175.3	MMBtu/hr
Percent Hardwood	70.0%	
Percent Softwood	30.0%	
Max Potential Annual Heat Input:	**1535628**	**MMBtu/yr**

Criteria Pollutant Calculations:

Pollutant	Biomass Emission Factor (lb/ODT)	Units	Emission Factor Source	Emissions (lb/hr)	Emissions (tpy)
CO	0.21	lb/ODT	Title V Application [1]	10.08	44.2
NO_X	0.87	lb/ODT	Stack Testing [2]	41.76	182.9
Total TSP	0.116	lb/ODT	Calculated from Guaranteed WESP Specifications [3]	5.59	24.5
Total PM_{10}	0.116	lb/ODT	Calculated from Guaranteed WESP Specifications [3]	5.59	24.5
Total $PM_{2.5}$	0.116	lb/ODT	Calculated from Guaranteed WESP Specifications [3]	5.59	24.5
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6 [5]	4.38	19.2
VOC as alpha-pinene	0.781	lb/ODT	Stack Testing [4]	37.49	164.2
Lead	0.00	N/A	N/A	0.00	0.0

Note:

[1] CO emission factor obtained from 2012 Title V Application.

[2] NOx emission factor obtained from 2012 Title V Application.

[3]

WESP Outlet Air Flowrate	81,509	dSCF
PM Grain Loading	0.008	gr/dSCF
Emission	652.07	gr/min
	0.093	lb/min
	5.59	lb/hr
Dryer Capacity Basis:	48.00	ODT/hr
Calculated PM Emission Factor:	0.116	lb/ODT

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] VOC emission factors for 30% softwood obtained from June 2014 stack testing.

[5] 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.

TABLE B-5
ROTARY DRYER -HAP AND TAP WOOD COMBUSTION EMISSIONS
ENVIVA PELLETS AHOSKIE

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	420,480
Hardwood Composition	70%
Softwood Composition	30%

Short Term Composition and Throughput

ODT/hr	48.00
Hardwood Composition	40%
Softwood Composition	60%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor Comparison				Weighted Emission Factor[3]			Emissions	
					AP-42 Calculated Direct wood-fired, hardwood factors		AP-42 Green, Direct wood-fired softwood factors						
					Emission Factor (lb/ODT)	Reference	Emission Factor (lb/ODT)	Reference	Short-term EF (lb/ODT)	Anuual EF (lb/ODT)	EF Source	(lb/hr)	(tpy)
Acetaldehyde	75-07-0	Yes	Yes	Yes	3.83E-03	1,2	7.50E-02	1	4.65E-02	2.52E-02	AP-42	2.23E+00	5.29E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.00E+00	1,2,4	0.00E+00	1,4	0.00E+00	0.00E+00	AP-42	0.00E+00	0.00E+00
Formaldehyde	50-00-0	Yes	Yes	Yes	7.15E-03	1,2	1.40E-01	1	8.69E-02	4.70E-02	AP-42	4.17E+00	9.88E+00
Methanol	67-56-1	Yes	No	Yes	5.62E-03	1,2	1.10E-01	1	6.82E-02	3.69E-02	AP-42	3.28E+00	7.76E+00
Propionaldehyde	123-38-6	Yes	No	Yes	6.64E-04	1,2	1.30E-02	1	8.07E-03	4.36E-03	AP-42	3.87E-01	9.18E-01
											Total HAPs	**10.07**	**23.86**

Notes:

[1] HAP & TAP emission factors for "Rotary Dryer, 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 since no HAP/TAP emission factors are given for direct hardwood-fired, factors were conservatively calculated by multiplying AP-42 Section 10.6.2-3 HAP factors for green, direct softwood fired by the ratio of the VOC emission factors for hardwood to softwood drying (0.24/4.7).

[3] Short-term and annual emissions based on worst case processing of 50% softwood.

[4] Through testing at other Enviva facilities Acrolein and Phenol are typically not evident in the emissions stream.

TABLE B-7
HAMMERMILLS - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLETS AHOSKIE

Calculation Inputs:

Total Plant Throughput ODT/yr	420,480
% of Total Throughput to the Hammermills	85%

via AHO test for Dry Hammermill pre-screener bypass

Annual Composition and Throughput

Hammermills Throughput ODT/yr	357,408
Hardwood Composition	70%
Softwood Composition	30%

Short Term Composition and Throughput

ODT/hr	48.00
Hardwood Composition	40%
Softwood Composition	60%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor – Stack Tests		Emission Factor			Emissions	
					Emission Factor (lb/ODT)	Reference	Short-term EF (lb/ODT)	Annual EF (lb/ODT)	EF Source	(lb/hr)	(tpy)
VOC and Alpha Pinene	N/A	N/A	N/A	N/A	0.093	[1]	0.09	0.09	Stack Test	4.46	16.62
Acetaldehyde	75-07-0	Yes	Yes	Yes	0.0000	[3]	0.0000	0.0000	Stack Test	0.00E+00	0.00E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.0041	[3]	0.0041	0.0041	Stack Test	1.95E-01	7.24E-01
Formaldehyde	50-00-0	Yes	Yes	Yes	0.0000	[3]	0.0000	0.0000	Stack Test	0.00E+00	0.00E+00
Methanol	67-56-1	Yes	No	Yes	0.0034	[3]	0.0034	0.0034	Stack Test	1.62E-01	6.04E-01
Propionaldehyde	123-38-6	Yes	No	Yes	0.0000	[3]	0.0000	0.0000	Stack Test	0.00E+00	0.00E+00
									Total VOC	**4.46**	**16.62**
									Total HAPs	**0.36**	**1.33**

Notes:

[1] VOC emissions from Enviva Ahoskie June 2014 VOC testing using 33% softwood.

[2] HAP & TAP emission factors obtained from Enviva Amory facility October 2013 stack testing. Amory stack testing performed at 60% softwood and therefore, considered conservative for use at Ahoskie.

TABLE B-8
PELLET PRESSES AND COOLERS - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLETS AHOSKIE

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	481,800
Hardwood Composition	55%
Softwood Composition	45%

Short Term Composition and Throughput

ODT/hr	55.00
Hardwood Composition	40%
Softwood Composition	60%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor – Stack Tests		Emission Factor			Emissions	
					Emission Factor (lb/ODT)	Reference	Short-term EF (lb/ODT)	Annual EF (lb/ODT)	EF Source	(lb/hr)	(tpy)
VOC as alpha-pinene	N/A	N/A	N/A	N/A	0.46	[1]	0.46	0.46	stack test	25.14	110.09
Acetaldehyde	75-07-0	Yes	Yes	Yes	0.00E+00	[2]	0.00E+00	0.00E+00	stack test	0.00E+00	0.00E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.00E+00	[2]	0.00E+00	0.00E+00	stack test	0.00E+00	0.00E+00
Formaldehyde	50-00-0	Yes	Yes	Yes	6.22E-03	[2]	6.22E-03	6.22E-03	stack test	3.42E-01	1.50E+00
Methanol	67-56-1	Yes	No	Yes	1.12E-02	[2]	1.12E-02	1.12E-02	stack test	6.16E-01	2.70E+00
Propionaldehyde	123-38-6	Yes	No	Yes	0.00E+00	[2]	0.00E+00	0.00E+00	stack test	0.00E+00	0.00E+00
									Total VOC	**0.00**	**110.09**
									Total HAPs	**0.96**	**4.19**

Notes:

[1] VOC emissions from Enviva Ahoskie June 2014 VOC testing using 45% softwood.

[2] HAP & TAP emission factors derived from Enviva Northampton's September 2013 stack testing (represents the higher of the measured emission factors obtained from stack testing during the Northampton and Amory October 2013 stack tests). Amory testing performed at 60% softwood.

TABLE B-9
BARK HOG
ENVIVA PELLETS AHOSKIE

Annual Throughput of Bark Hog	145,080	tons/year (dry wood)[1]
Dryer Throughput	48.00	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[6]	
		(lb/hr)	(tpy)
THC as Carbon[2]	0.0041	1.968E-01	0.30
THC as alpha-Pinene[3]	0.0047	2.234E-01	0.34
PM[4]	N/A	N/A	N/A
Methanol[2]	0.0010	4.800E-02	0.07

[1] The annual throughput used for the chipper is calculated using the dryer throughput and the Title V air permit application ratio of 145,080 Bark Hog Throughput / of 420,800 Dryer ODT. The short-term throughput is based upon the maximum hourly throughput of the dryer.

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

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

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

TABLE B-10
ELECTRIC POWERED CHIPPER (ES-CHP1) - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLETS AHOSKIE

Annual Throughput to ES-CHP1	724,966	tn/yr
Moisture Content:	42%	
Annual Throughput to ES-CHP1	420,480	tons/year (dry wood)[1]
Short-term Throughput of Chipper	48.00	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[5]	
		(lb/hr)	(tpy)
THC as Carbon[2]	0.0041	1.968E-01	0.86
THC as alpha-Pinene[3]	0.0047	**2.234E-01**	0.98
PM[4]	N/A	**N/A**	**N/A**
Methanol[2]	0.0010	**4.800E-02**	**0.21**

[1] The annual throughput used for the chipper is conservatively assumed to be the same as the annual throughput of the dryer; while the short-term throughput is based upon the maximum hourly throughput of the dryer.

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

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

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

[5] Short term emissions were based upon the max short term capacity of the chippers. Emissions are representative of the total combined emissions for both rechippers.

TABLE B-11
GREEN HAMMERMILL (ES-CHP2) - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLETS AHOSKIE

Annual Throughput to ES-CHP2	724,966	tn/yr
Moisture Content:	42%	
Annual Throughput to ES-CHP2	420,480	tons/year (dry wood)[1]
Short-term Throughput of Green Hammermill	48.00	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[5]	
		(lb/hr)	(tpy)
THC as Carbon[2]	0.0041	1.968E-01	0.86
THC as alpha-Pinene[3]	0.0047	**2.234E-01**	0.98
PM[4]	N/A	**N/A**	**N/A**
Methanol[2]	0.0010	**4.800E-02**	**0.21**

[1] The annual throughput used for the hammermill is conservatively assumed to be the same as the annual throughput of the dryer; while the short-term throughput is based upon the maximum hourly throughput of the dryer.

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

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

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

[5] Short term emissions were based upon the max short term capacity of the chippers.
Emissions are representative of the total combined emissions for both rechippers.

TABLE B-12
BAGFILTER AND CYCLONE EMISSIONS
ENVIVA PELLETS AHOSKIE

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 $PM_{2.5}$	Emissions PM (lb/hr)	Emissions PM (tpy)	Emissions PM_{10}[3] (lb/hr)	Emissions PM_{10}[3] (tpy)	Emissions $PM_{2.5}$[3] (lb/hr)	Emissions $PM_{2.5}$[3] (tpy)
Dried Wood Day Silo	ES-DWDS	CD-DWS-BV	2186	0.01	8,760	100%	100%	0.19	0.82	0.19	0.82	0.19	0.82
Dry Wood Hammermills 1 & 2	ES-CHM	CD-CHM-FF1	40000	0.01	8,760	100%	100%	3.43	15.02	3.43	15.02	3.43	15.02
Dry Wood Hammermills 3 & 4	ES-CHM	CD-CHM-FF2	40000	0.01	8,760	100%	100%	3.43	15.02	3.43	15.02	3.43	15.02
Hammermill Area and HM-5	ES-HAF	CD-HAF-FF1	32,500	0.01	8,760	100%	100%	2.79	12.20	2.79	12.20	2.79	12.20
Pellet Mill Feed Silo Bin Vent Filter	ES-PMFS	CD-PMFS-BV	2,186	0.01	8,760	100%	100%	0.19	0.82	0.19	0.82	0.19	0.82
Fines Bin	ES-FB	CD-FB-BV	3,600	0.003	8,760	100%	100%	0.09	0.41	0.09	0.41	0.09	0.41
Finished Product Handing	ES-FPH, ES-PL, ES-TLB	CD-FPH-BV	35,500	0.003	8,760	100%	100%	0.91	4.00	0.91	4.00	0.91	4.00
Pellet Coolers Cyclone 1 & 2	ES-CLR-1 & 2	CD-CLR-1	27,500	0.022	8,760	100%	100%	5.19	22.71	5.19	22.71	5.19	22.71
Pellet Coolers Cyclone 3 & 4	ES-CLR-3 & 4	CD-CLR-2	27,500	0.022	8,760	100%	100%	5.19	22.71	5.19	22.71	5.19	22.71
Pellet Coolers Cyclone 5	ES-CLR-5	CD-CLR-3	13,750	0.022	8,760	100%	100%	2.59	11.36	2.59	11.36	2.59	11.36
Pellet Coolers Cyclone 6	ES-CLR-6	CD-CLR-4	0	0.022	0	100%	100%	-	-	-	-	-	-
							TOTAL	**23.99**	**105.06**	**23.99**	**105.06**	**23.99**	**105.06**

Note:

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

[2] Unless otherisw specidied, pollutant (PM) loading conservatively assumed to be 0.01 gr/dscf.

[3] It was conservatively assumed that PM_{10} and $PM_{2.5}$ equal PM emissions.

TABLE B-13
EMERGENCY GENERATOR AND FIRE PUMP
ENVIVA PELLETS AHOSKIE

Emergency Generator Emissions (ES-EG)

Equipment and Fuel Characteristics

Engine Output	0.26	MW
Engine Power	350	hp (brake)
Hours of Operation	500	hr/yr[1]
Heating Value of Diesel	19,300	Btu/lb
Power Conversion	7,000	Btu/hr/hp
Fuel Usage	17.6	gal/hr

Criteria Pollutant Emissions

Pollutant	Category	Emission Factor	Units	Emissions	
				lb/hr	tpy
TSP	PSD	4.41E-04	lb/kW-hr (2)	0.12	2.88E-02
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	0.12	2.88E-02
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	0.12	2.88E-02
NO_x	PSD	8.82E-03	lb/kW-hr (5)	2.30	5.75E-01
SO_2	PSD	15	ppmw (3)	3.81E-03	9.52E-04
CO	PSD	7.72E-03	lb/kW-hr (2)	2.01	5.03E-01
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	6.15E-03	1.54E-03
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.88E-03	4.70E-04
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	2.27E-04	5.67E-05
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	2.29E-03	5.71E-04
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	4.61E-07	1.15E-07
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	9.58E-05	2.39E-05
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.89E-03	7.23E-04
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	4.12E-04	1.03E-04
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	1.00E-03	2.51E-04
m-,p-Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	6.98E-04	1.75E-04
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.89E-03	7.23E-04
Total HAPs				9.49E-03	2.37E-03

Note:

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

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

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

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

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

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

Firewater Pump Emissions (ES-FWP)

Equipment and Fuel Characteristics

Engine Output	0.22	MW
Engine Power	300	hp
Hours of Operation	500	hr/yr[1]
Heating Value of Diesel	19,300	Btu/lb
Power Conversion	7,000	Btu/hr/hp
Fuel Usage	15.1	gal/hr

Criteria Pollutant Emissions

Pollutant	Category	Emission Factor	Units	Emissions	
				lb/hr	tpy
TSP	PSD	4.41E-04	lb/kW-hr (2)	0.10	2.47E-02
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	0.10	2.47E-02
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	0.10	2.47E-02
NO_x	PSD	8.82E-03	lb/kW-hr (5)	1.97	4.93E-01
SO_2	PSD	15	ppmw (3)	3.26E-03	8.16E-04
CO	PSD	7.72E-03	lb/kW-hr (2)	1.73	4.32E-01
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	5.27E-03	1.32E-03
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.61E-03	4.03E-04
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	1.94E-04	4.86E-05
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	1.96E-03	4.90E-04
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	3.95E-07	9.87E-08
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	8.21E-05	2.05E-05
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.48E-03	6.20E-04
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	3.53E-04	8.82E-05
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	8.59E-04	2.15E-04
m-,p-Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	5.99E-04	1.50E-04
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.48E-03	6.20E-04
Total HAPs				8.13E-03	2.03E-03

Note:

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

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

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

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

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

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

TABLE B-14
DRIED WOOD HANDLING DROP POINTEMISSIONS
ENVIVA PELLETS AHOSKIE

Annual Dryer Output Throughput (ODT/yr)	420,480
Annual Pellet Press Throughput (ODT/yr)	481,800
Max Dryer Short-Term Throughput (ODT/hr)	48.000
Max Pellet Press Throughput (ODT/hr)	55.000
Dryer Output Moisture Content:	17%
Pellet Mill Output Moisture Content:	6%
Amount of Fines Diverted from Hammermills	15.0% via AHO test for Dry Hammermill pre-screener bypass

ID	Emission Source Group	Description	Control	Control Description	Throughput		Potential Uncontrolled Emissions for PM[3]		Potential Uncontrolled Emissions for PM_{10}[3]		Potential Uncontrolled Emissions for $PM_{2.5}$[3]	
					Max. Hourly[2]	Annual						
					(tph)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
DP1	ES-DWH	Dryer Discharger to Outfeed Conveyor	Enclosed	Reduction to 2 mph mean wind speed	57.83	506,602	2.1E-03	9.1E-03	9.8E-04	4.3E-03	1.5E-04	6.5E-04
DP2	ES-DWH	Dryer Outfeed Conveyors to Silo Feed/Silo Bypass	Enclosed	Reduction to 2 mph mean wind speed	8.67	75,990	3.1E-04	1.4E-03	1.5E-04	6.5E-04	2.2E-05	9.8E-05
DP3	ES-DWH	Silo Bypass/Dryer Silo to Conveyor Hammermill Surge Bin	Enclosed	Reduction to 2 mph mean wind speed	49.16	430,612	1.8E-03	7.7E-03	8.4E-04	3.7E-03	1.3E-04	5.5E-04
DP4	ES-DWH	Conveyor to Hammermill Surge Bin Drop into HM Surge Bin	Enclosed	Reduction to 2 mph mean wind speed	49.16	430,612	1.8E-03	7.7E-03	8.4E-04	3.7E-03	1.3E-04	5.5E-04
DP5	ES-PP	Drop Emissions from Pellet Presses to Pellet Press Collection Conveyors	Enclosed	Reduction to 2 mph mean wind speed	58.51	512,553	9.0E-03	4.0E-02	4.3E-03	1.9E-02	6.5E-04	2.8E-03
						TOTAL	**1.5E-02**	**6.6E-02**	**7.1E-03**	**3.1E-02**	**1.1E-03**	**4.7E-03**

Note:

[1] The listing of open transfer points may not be inclusive of all transfer points downstream of the dryer. Even if a few additional points may exist, the potential emissison of the insignificant activity emission source group ES-DWH is well below the 5 tpy threshold for significant emissions. Fugitive emissions are not included in facility-wide PTE because the Northampton Pellet Mill does not belong to one of the listed 28 source categories.

[2] Max hourly rates based upon ODT production rate and moisture content at that part of the process.

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

where:			
E = emission factor (lb/ton)			
k = particle size multiplier (dimensionless) for PM	0.74		
k = particle size multiplier (dimensionless) for PM_{10}	0.35		
k = particle size multiplier (dimensionless) for $PM_{2.5}$	0.053		
U = mean wind speed (mph)	2.00		
		Dryer Exit	Pellet Press Exit
M = material moisture content (%)		17	6
E for PM (lb/ton) =		3.6E-05	1.5E-04
E for PM_{10} (lb/ton) =		1.7E-05	7.3E-05
E for $PM_{2.5}$ (lb/ton) =		2.6E-06	1.1E-05

TABLE B-15
GREEN WOOD HANDLING DROP POINT EXAMPLE EMISSIONS
ENVIVA PELLETS AHOSKIE

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)	PM Emissions (tpy)	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)
GDP1	ES-GWH	Purchased Bark Transfer to Outdoor Storage Area	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	26,409	1.25E-04	5.88E-05	8.92E-06
GDP1	ES-GWH	Drop Points via Conveying from Bark Pile to Dryer	Batch Drop	4	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	279,000	5.27E-03	2.48E-03	3.77E-04
GDP2	ES-GWH	Transfer Purchased Wood Chips (Wet) to Outdoor Storage	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	277,865	1.31E-03	6.19E-04	9.39E-05
GDP2	ES-GWH	Drop Points via Conveying from Chip Pile to Dryer	Batch Drop	5	0.74	0.35	0.053	6.0	48%	3.51E-05	1.66E-05	2.51E-06	808,615	1.80E-02	8.49E-03	1.28E-03
		Total Emissions												**2.47E-02**	**1.17E-02**	**1.76E-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) 6.3

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.

TABLE B-16
TANKS EMISSIONS
ENVIVA PELLETS AHOSKIE

Tank ID	Tank Description	Volume[1] (gal)	Tank Dimensions		Orientation	Throughput (gal/yr)	Turnovers[(3)]	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	8,813	3.53	1.51	7.55E-04
TK02	Fire Water Pump Fuel Oil Tank[2]	500	3	10	Horizontal	7,554	15.11	0.31	1.55E-04
							TOTAL	**1.82**	**9.10E-04**

Note:

[1] Conservative design specifications.

[2] Throughput based on fuel consumption based on engine horsepower (BHP), conversion to fuel usage (gal/hr), and engine operating hours.

[3] Tanks Program Calculations are performed with a minimum 1 turnover per year as a conservative measure.

TABLE B-17
POTENTIAL GHG EMISSIONS FROM COMBUSTION SOURCES
ENVIVA PELLETS AHOSKIE

Operating Data:

Dryer Heat Input	1535628.00 MMBtu/yr
Emergency Generator Output	350 bhp
Operating Schedule	500 hrs/yr
No. 2 Fuel Input	16.7 gal/hr[1]
Energy Input	2.282 MMBtu/hr[2]
Fire Water Pump Output	300 bhp
Operating Schedule	500 hrs/yr
No. 2 Fuel Input	14.3 gal/hr[1]
Energy Input	1.956 MMBtu/hr[2]

Emission Unit ID	Fuel Type	Emission Factors from Table C-1 (kg/MMBtu)[3]			Tier 1 Emissions (metric tons)				
		CO2	CH4	N2O	CO2	CH4	N2O	Total CO2e biomass deferral [4]	Total CO2e
ES-DRYER	Wood and Wood Residuals	9.38E+01	3.20E-02	4.20E-03	158,777	54	7	3,341	162,119
ES-EG	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	93	3.77E-03	7.55E-04	93	93
ES-FWP	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	80	3.23E-03	6.47E-04	80	80

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

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

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

[4] As per NC DAQ Biomass Deferral Rule 15A NCAC 02D .0544, CO2 emissions from bioenergy and other biogeneic sources are not applicable towards PSD and Title V permitting. Therefore CO2 emissions form the dryer are not included in the Total CO2e biomass deferral column.

TABLE B-18
GREEN WOOD STORAGE PILES FUGITIVE EMISSIONS
ENVIVA PELLETS AHOSKIE

Emission Unit ID	Description	TSP Emission Factor [1] (lb/day/acre)	TSP Emission Factor [1] (lb/hr/ft²)	VOC Emission Factor [3] (lb/day/acre)	VOC Emission Factor [3] (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 alpha-Pinene Emissions [4] (lb/hr)	VOC as alpha-Pinene Emissions [4] (tpy)
GWSP1	Green Wood Pile No. 1	3.71	3.55E-06	3.60	3.44E-06	100	400	10	60,000	0.213	0.933	0.107	0.467	0.0160	0.070	0.21	0.90	0.24	1.03
GWSP2	Green Wood Pile No. 2	3.71	3.55E-06	3.60	3.44E-06	200	400	10	110,400	0.392	1.717	0.196	0.859	0.0294	0.129	0.38	1.67	0.43	1.90
Total										**0.605**	**2.651**	**0.303**	**1.325**	**0.0454**	**0.199**	**0.59**	**2.57**	**0.67**	**2.93**

1. TSP emission factor based on U.S. EPA *Control of Open Fugitive Dust Sources* . Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988, Page 4-17.

$$E = 1.7\left(\frac{s}{1.5}\right)\left(\frac{(365-p)}{235}\right)\left(\frac{f}{15}\right)(\text{lb/day/acre})$$

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) (%):	9.8	Based on meteorological data averaged for 2007-2011 for Northampton, 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 alpha-pinene by multiplying by 1.14.