ENVIVA PELLETS 2015
P/N 10203
NORTHAMPTON COUNTY

CENTRAL OFFICE PERMIT TRACKING SLIP

Facility Name: Enviva Pellets Northampton, LLC
Facility/Application ID: 6600167.15A
County/Regional Office: Northampton/RRO
Engineer: Kevin Godwin
Send Regional Office Copy of Application: ○ Yes ◉ No

PART I - ACCEPTANCE CHECKLIST

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

Fee Information:

Amount Due:
- ☐ PSD or NSR/NAA $14,294
- ☐ PSD and NSR/NAA $27,802
- ☐ TV Greenfield $ 9,442
- ☑ TV $ 918
- ☐ Ownership Change $60, $50, $25
- ☐ Renewal/Name Change – NA

Initial Amount Received: $918.00
Additional Amount Due: $0.00

Acceptance Check List:

	Yes	No	N/A
Appropriate Number of Apps Submitted (# Received_____, #Needed_____)	☑	☐	☐
Application Fee Submitted	☑	☐	☐
Zoning Addressed	☐	☐	☑
Authorized Signature	☑	☐	☐
PE Seal	☑	☐	☐
Request for Confidentiality	☐	☑	
Application Contains Toxics Modification(s)	☑	☐	☐

PART II - IBEAM UPDATES

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

Permit Application Schedule:
- ☐ Appeal
- ☐ Expedited State
- ☐ PSD
- ☐ Director Administrative Amendment
- ☑ State
- ☐ TV – State Only
- ☐ TV – Expedited
- ☐ TV – Greenfield
- ☐ TV – Reopen for Cause
- ☐ TV – Administrative
- ☐ TV – Ownership Change
- ☐ TV – 502(b)(10)
- ☐ TV – Minor
- ☐ TV – Renewal
- ☐ TV – Significant (2Q .0501(c)(2))
- ☐ TV – Significant
- ☐ TV – 1st Time

PART III - COMPLETENESS CHECKLIST

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

PART IV - GENERAL COMMENTS

- MODELING FORWARDED TO AQAB

PART V - SUPERVISOR REVIEW CHECKLIST

TVEE Updated (by Engineer): KTG 8-27-15 TVEE Verified: [illegible] Supervisor: [illegible] Chief: ~~WDC 10/6/2015~~ WDC 10/7/2015

PART VI - CLOSEOUT INFORMATION

Regulations Applicable to This Application (indicate all new regulations):
- ☐ NESHAPS/MACT
- ☐ NESHAPS/GACT
- ☐ NSPS
- ☐ 2D .1100
- ☐ 2Q .0711
- ☐ 112(j)/112(d)
- ☐ PSD/NSR
- ☐ PSD/NSR Avoidance
- ☐ Existing Source RACT/LAER
- ☐ New Source RACT/LAER
- ☐ RACT Avoidance
- ☐ RACT/LAER Added Fee* *(Notify Connie Horne)*
- ☐ Toxics/Combustion Sources After 7/10/10
- ☐ SIP Regulations (list all new):

Permit Class Information

Before	After
☐ Small	☑ Title V
☐ Syn. Minor	
☑ Title V	
☐ Proh. Small	
☐ General	

HAP Major Status (after) ☑ Major ☐ Minor ☐ Not Determined
PSD or NSR Status (after) ☑ Major ☐ Minor

Miscellaneous ☐ Multiple Permits at Facility ☐ Multi-Site Permit ☐ Recycled Oil Condition

Permit Dates Issue: 10-6-15 Effective: 10-6-15 Expiration: 2-28-17

IBEAM Closed Out By: _____ Permit Number: 10203 Revision Number: R04

OCT 13 15

☐ Public Notice Published ☐ Public Notice Affidavit (if not noticed via DAQ Website)
Document Manager Updated by Engineer: KTG Date: 10-13-15

North Carolina Department of Environmental Quality

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

October 12, 2015

Mr. Royal Smith
Vice President of Operations
Enviva Pellets Northampton, LLC
7200 Wisconsin Avenue, Suite 1000
Bethesda, Maryland 20814

Dear Mr. Smith:

SUBJECT: Air Quality Permit No. 10203R04
Facility ID: 6600167
Enviva Pellets Northampton, LLC
Garysburg, North Carolina
Northampton County
Fee Class: Title V
PSD Status: Major

In accordance with your completed Air Quality Permit Application for a modification of your permit received June 2, 2015, we are forwarding herewith Air Quality Permit No. 10203R04 to Enviva Pellets Northampton, LLC, Lebanon Church Road, Garysburg, North Carolina authorizing the construction and operation, of the emission source(s) and associated air pollution control device(s) specified herein. Additionally, any emissions activities determined from your Air Quality Permit Application as being insignificant per 15A North Carolina Administrative Code 2Q .0503(8) have been listed for informational purposes as an "ATTACHMENT." Please note the requirements for the annual compliance certification are contained in General Condition P in Section 3. The current owner is responsible for submitting a compliance certification for the entire year regardless of who owned the facility during the year.

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

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

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

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

The minor source baseline dates for PM-10, SO_2, and NOx have been triggered in Northampton County. Previous increases from this facility have not been tracked. For PSD increment tracking purposes, facility-wide emissions following this modification are as follows: PM-10 = 28.1 lb/hr; SO_2 = 4.4 lb/hr, and NOx = 28.9 lb/hr.

This Air Quality Permit shall be effective from October 12, 2015 until February 28, 2017, is nontransferable to future owners and operators, and shall be subject to the conditions and limitations as specified therein. Should you have any questions concerning this matter, please contact Kevin Godwin at (919) 707-8480.

Sincerely yours,

William D. Willets, P.E., Chief, Permitting Section
Division of Air Quality, NCDENR

Enclosure

c: Patrick Butler, Supervisor, Raleigh Regional Office
Central Files

State of North Carolina,
Department of Environmental
Quality

Division of Air Quality

AIR QUALITY PERMIT

Permit No.	Replaces Permit No.	Effective Date	Expiration Date
10203R04	10203R03	October 12, 2015	February 28, 2017

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

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

Permittee:	**Enviva Pellets Northampton, LLC**
Facility ID:	**6600167**
Facility Site Location: **City, County, State, Zip:**	**830 Lebanon Church Road** **Garysburg, Northampton County, North Carolina, 27831**
Mailing Address: **City, State, Zip:**	**7200 Wisconsin Avenue** **Bethesda, Maryland, 20814**
Application Number: **Complete Application Date:**	**6600167.15A** **June 2, 2015**
Primary SIC Code: **Division of Air Quality,** **Regional Office Address:**	**2499** **Raleigh Regional Office** **3800 Barrett Drive** **Raleigh, North Carolina, 27609**

ATTACHMENT to Permit No. 10203R04

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

Emission Source ID No.	Emission Source Description
IES-DWH	Dried wood handling
IES-PP	Pellet press system
IES-FPH	Finished product handling
IS-TK1 and IS-TK2	Two diesel storage tanks (2,000 gallon and 500 gallon capacity)
IES-EPWC	Electric powered green wood chipper
IES-RCHP-1 and IES-RCHP-2	Two electric powered wood re-chippers
IES-GWHS	Green wood handling and storage
IES-GWFB	Green wood fuel storage bin
IES-GN **NSPS IIII, MACT ZZZZ**	One emergency use generator (350 brake horsepower)
IES-FWP **NSPS IIII, MACT ZZZZ**	One fire water pump (300 brake horsepower)
IES-CHIP-1	Log Chipping

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

ATTACHMENT to Permit No. 10203R04

The following table provides a summary of the changes in Permit No. 010203R03.

Page No.	Condition No.	Description of Change
Global	Global	Updated permit number, permit format, and dates.
3	Table of Emission Sources	Included new dry line equipment and bagging system equipment.
4	2.1 A.	Included new dry line equipment and bagging system equipment.
7	2.1 A. 3.	Included new dry line equipment and bagging system equipment.
8	2.1 A. 4.	Revised language in PSD avoidance condition and included new VOC limit of 456.4 tons per consecutive 12-month period. Updated CO emission factor to 0.023 lb/ODT.
9	2.2 A. 1. and 2.	Revised State-only Toxic Air Pollutant (TAP) tables based on approved modeling.

Table of Contents

SECTION 1- PERMITTED EMISSION SOURCES AND ASSOCIATED AIR POLLUTION CONTROL DEVICES AND APPURTENANCES

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

Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-DRYER	Direct heat, wood-fired dryer (174 million Btu per hour heat input)	CD-DC and CD-WESP	One simple cyclone (205 inches in diameter) in series with one wet electrostatic precipitator (29,904 square feet of total collection plate area)
ES-DLB	Dry line feed bin	N/A	N/A
ES-DLC-1	Dry line feed conveyor	CD-HM-BF-3	One fabric filter (6,250 square feet of filter area)
ES-HM-1 through ES-HM-8	Eight hammermills	CD-HM-CYC-1 through CD-HM-CYC-8 and CD-HM-BF-1 through CD-HM-BF-3	Eight simple cyclones (120 inches in diameter each) in series with Three fabric filters (6,250 square feet of filter area each)
ES-NDS	Nuisance dust system	CD-HM-BF-3	One fabric filter (6,250 square feet of filter area)
ES-PMFS	Pellet feed mill silo	CD-PMFS-BV	One bin vent filter (377 square feet of filter area)
ES-PFB-1	Pellet fines bin	CD-PFB-BV-1	One bin vent filter (780 square feet of filter area)
ES-CLR1, through ES-CLR-6	Pellet coolers	CD-CLR-1 through CD-CLR-6	Six simple cyclones (54 inches in diameter each)
ES-FPH ES-PB-1 through ES-PB-12 ES-PL-1 and ES-PL-2	Finished product handling Twelve (12) pellet load-out bins Pellet mill load-out 1 and 2	CD-FPH-BF	One fabric filter (4,842 square feet of filter area)
ES-BSC-1	Bagging system conveyor	DC-BS-BF-1	One fabric filter (6,250 square feet of filter area)
ES-BCS-2 and ES-BCS-3	Two bagging system conveyors	N/A	N/A
ES-BSSS-1	Bagging system screen	DC-BS-BF-1	One fabric filter (6,250 square feet of filter area)
ES-BSSS-2	Bagging system screen	DC-BS-BF-2	One fabric filter (6,250 square feet of filter area

Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-BSB-1 and ES-BSB-2	Two bagging system bins	N/A	N/A

SECTION 2 - SPECIFIC LIMITATIONS AND CONDITIONS

2.1- Emission Sources and Control Devices Specific Limitations and Conditions

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

A. **Wood-fired dryer system (ID No. ES-DRYER) with associated cyclone and wet electrostatic precipitator (ID Nos. CD-DC and CD-WESP);**

Dry line feed bin (ID No. DLB);

Dry line feed conveyor (ID No. ES-DLC-1) and associated fabric filter (ID No. CD-HM-BF-3);

Hammermills (ID Nos. ES-HM-1 through ES-HM-8) with associated cyclones (ID Nos. CD-HM-CYC-1 through CD-HM-CYC-8) and fabric filters (ID Nos. CD-HM-BF1 through CD-HM-BF3);

Nuisance dust system (ID No. ES-NDS) with associated fabric filter (ID No. CD-HM-BF-3);

Pellet mill feed silo (ID No. ES-PMFS) with associated bin vent filter (ID No. CD-PMFS-BV);

Pellet fines bin (ID No. ES-PFB-1) with associated fabric filter (ID No. CD-PFB-BV-1);

Pellet coolers (ID Nos. ES-CLR1 through ES-CLR6) with associated cyclones (ID Nos. CD-CLR-1 through CD-CLR-6);

Finished product handling (ID No. ES-FPH), pellet load-out bins (ID Nos. ES-PB-1 through ES-PB-12), and pellet mill load-out (ID Nos. ES-PL-1 and ES-PL-2) with associated fabric filter (ID No. CD-FPH-BF);

Bagging system conveyor (ID No. BSC-1) and associated fabric filter (ID No. DC-BS-BF-1);

Bagging system conveyors (ID Nos. BSC-2 and 3);

Bagging system screen (ID No. ES-BSS-1) and associated fabric filter (ID No. DC-BS-BF-1);

Bagging system screen (ID No. ES-BSS-2) and associated fabric filter (ID No. DC-BS-BF-2);

Bagging system bins (ID Nos. ES-BSB-1 and 2)

The following table provides a summary of limits and standards for the emission sources described above:

Regulated Pollutant	Limits/Standards	Applicable Regulation
Particulate matter	$E = 4.10 \times P^{0.67}$ for process weight rate < 30 tph $E = 55 \times P^{0.11} - 40$ for process weight rate ≥ 30 tph Where, E = allowable emission rate (pounds per hour) P = process weight rate (tons per hour)	15A NCAC 2D .0515
Sulfur dioxide	2.3 pounds per million Btu heat input	15A NCAC 2D .0516
Visible emissions	20 percent opacity when averaged over a six minute period	15A NCAC 2D .0521
Toxic air pollutants	See Section 2.2 A.	15A NCAC 2D .1100
Volatile organic compounds and carbon monoxide	For Dryer System (**ID No. ES-DRYER**) Less than 456.5 tons VOC per consecutive 12 month period. Less than 250 tons CO per consecutive 12 month period.	15A NCAC 2Q .0317 for avoidance of 15A NCAC 2D .0530
None	Application submittal requirement/equipment operation notification	15A NCAC 02Q .0501/.0504

1. **15A NCAC 2D .0515: PARTICULATES FROM MISCELLANEOUS INDUSTRIAL PROCESSES**
   a. Emissions of particulate matter from these sources shall not exceed an allowable emission rate as calculated by the following equation: [15A NCAC 2D .0515(a)]

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

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

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

   Testing

   b. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .2601.

   Monitoring/Recordkeeping

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

   - Particulate matter emissions from the dry line feed conveyor (**ID No. ES-DLC-1**) shall be

controlled by fabric filter **(ID No. CD-HM-BF-3)**.

- Particulate matter emissions from the eight hammermills **(ID Nos. ES-HM-1 through ES-HM-8)** shall be controlled by eight simple cyclones **(ID Nos. CD-HM-CYC-1 through CD-HM-CYC-8)** in series with three fabric filters **(ID Nos. CD-HM-BF1 through CD-HM-BF3)**.

- Particulate matter emissions from the nuisance dust system **(ID No. ES-NDS)** shall be controlled by one fabric filter **(ID No. CD-HM-BF3)**.

- Particulate matter emissions from the pellet mill feed silo **(ID No. ES-PMFS)** shall be controlled by a bin vent filter **(ID No. CD-PMFS-BV)**.

- Particulate matter emissions from the pellet mill fines bin **(ID No. ES-PFB-1)** shall be controlled by a fabric filter **(ID No. CD-PFB-BV-1)**.

- Particulate matter emissions from the pellet coolers **(ID Nos. ES-CLR-1 through ES-CLR-6)** shall be controlled by six simple cyclones **(ID Nos. CD-CLR-C1 through CD-CLR-C6)**.

- Particulate matter emissions from the finished product handling **(ID No. ES-FPH)**, pellet load-out bins **(ID Nos. ES-PB-1 through ES-PB-12)**, and pellet mill load-out **(ID No. ES-PL-1 and ES-PB-2)** shall be controlled by one fabric filter **(ID No. CD-FPH-BF)**.

- Particulate matter emissions from the bagging system conveyor **(ID No. ES-BSC-1)** shall be controlled by a fabric filter **(ID No. DC-BS-BF-1)**.

- Particulate matter emissions from the bagging system screen **(ID No. ES-BSS1)** shall be controlled by a fabric filter **(ID No. DC-BS-BF-1)**.

- Particulate matter emission from the bagging system screen **(ID No. ES-BSS2)** shall be controlled by a fabric filter **(ID No. DC-BS-BF-2)**.

For bagfilters and cyclones:

d. To assure compliance, the Permittee shall perform inspections and maintenance as recommended by the manufacturer. In addition to the manufacturer's inspection and maintenance recommendations, or if there is no manufacturer's inspection and maintenance recommendations, as a minimum, the inspection and maintenance requirement shall include the following:
   i. a monthly visual inspection of the system ductwork and material collection unit for leaks.
   ii. an annual (for each 12 month period following the initial inspection) internal inspection of the bagfilters' structural integrity.

For wet electrostatic precipitator:

e. To assure compliance, the Permittee shall perform inspections and maintenance as recommended by the manufacturer. In addition to the manufacturer's inspection and maintenance recommendations, or if there is no manufacturer's inspection and maintenance recommendations, as a minimum, the Permittee shall establish the minimum primary voltage and minimum current within the first 30 days following operation of the dryer. To assure compliance and effective operation of the wet electrostatic precipitator, the Permittee shall monitor and record the primary voltage and current through the precipitator daily. The daily observation must be made for each day of the calendar year period. The Permittee shall be allowed three (3) days of absent observations per semi-annual period.

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

Reporting

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

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

a. Emissions of sulfur dioxide from the wood dryer system **(ID No. ES-DRYER)** shall not exceed 2.3 pounds per million Btu heat input. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard. [15A NCAC 2D .0516]

Testing

b. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .2601.

Monitoring/Recordkeeping

c. No monitoring/recordkeeping is required for sulfur dioxide emissions from firing wood for the wood dryer system.

3. 15A NCAC 2D .0521: CONTROL OF VISIBLE EMISSIONS

a. Visible emissions from these sources **(ID Nos. ES-DRYER, ES- DLB, ES-DLC-1, ES-BSC-1, ES-BSC-2, ES-BSC-3, ES-BSS-1, ESS-BSS-2, ES-BSB-1, ES-BSB-2, ES-HM-1 through ES-HM-8, ES-NDS, ES-PMFS, ES-PFB, ES-CLR-1 through ES-CLR-6, ES-FPH, ES-PB-1 through ES-PB-12, ES-PL-1 and ES-PL-2)** shall not be more than 20 percent opacity when averaged over a six-minute period. However, six-minute averaging periods may exceed 20 percent not more than once in any hour and not more than four times in any 24-hour period. In no event shall the six-minute average exceed 87 percent opacity. [15A NCAC 2D .0521 (d)]

Testing

b. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .2601.

Monitoring

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

Section 2.1 A.3. a. above.

Recordkeeping

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

4. 15A NCAC 2Q. 0317: AVOIDANCE CONDITIONS
15A NCAC 2D. 0530: PREVENTION OF SIGNIFICANT DETERIORATION

a. In order to avoid applicability of this regulation, the facility shall discharge into the atmosphere less than 456.4 tons of volatile organic compounds (VOCs) and less than 250 tons of carbon monoxide (CO) each per consecutive 12-month period. [15A NCAC 2D .0530]

Testing

b. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .2601

Monitoring/Recordkeeping

c. The Permittee shall demonstrate compliance with the facility-wide VOC emission limitation by calculating the rolling 12-month annual facility-wide VOC emission 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 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.

Calculations of CO emissions from the dryer system (ID No. ES-DRYER) shall also be made at the end of each month. CO emissions shall be determined by multiplying the approved CO emission factor (0.023 lb/ODT) by the plant process rate.

Calculations and the facility-wide VOC and dryer CO emissions shall be recorded monthly in a log (written or electronic format).

Reporting

d. The Permittee shall submit a semi-annual summary report, acceptable to the Regional Air Quality Supervisor, of monitoring and recordkeeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December, and July 30 of each calendar year for the preceding six-month period between January and June. The report shall contain the following:
   i. The monthly hardwood/softwood mix for the previous 17 months.
   ii. The 30 day rolling average product moisture content.
   iii. The monthly VOC and CO emissions for the previous 17 months. The emissions must be calculated for each of the 12-month periods over the previous 17 months.

2.2- Multiple Emission Sources Specific Limitations and Conditions

A. Facility-wide sources

STATE-ONLY REQUIREMENT:

1. **TOXIC AIR POLLUTANT EMISSIONS LIMITATION AND REQUIREMENT** - Pursuant to 15A NCAC 2D .1100 and in accordance with the approved application for an air toxic compliance demonstration, the following permit limit shall not be exceeded:

EMISSION SOURCE	TOXIC AIR POLLUTANTS	EMISSION LIMITS
Dryer system (ID No. ES-DRYER)	Acrolein Formaldehyde	2.93 lb/hr 6.65 lb/hr
Hammermill Filter #1	Acrolein Formaldehyde	0.177 lb/hr 0.299 lb/hr
Hammermill Filter #2	Acrolein Formaldehyde	0.177 lb/hr 0.299 lb/hr
Hammermill Filter #3	Acrolein Formaldehyde	0.118 lb/hr 0.199 lb/hr
Pellet Cooler #1 Aspiration Stack	Acrolein Formaldehyde	0.149 lb/hr 0.0945 lb/hr
Pellet Cooler #2 Aspiration Stack	Acrolein Formaldehyde	0.149 lb/hr 0.0945 lb/hr
Pellet Cooler #3 Aspiration Stack	Acrolein Formaldehyde	0.149 lb/hr 0.0945 lb/hr
Pellet Cooler #4 Aspiration Stack	Acrolein Formaldehyde	0.149 lb/hr 0.0945 lb/hr
Pellet Cooler #5 Aspiration Stack	Acrolein Formaldehyde	0.149 lb/hr 0.0945 lb/hr
Pellet Cooler #6 Aspiration Stack	Acrolein Formaldehyde	0.149 lb/hr 0.0945 lb/hr
Emergency generator (ID No. IES-GN)	Acrolein Formaldehyde	2.27E-04 lb/hr 2.89E-03 lb/hr
Fire water pump (ID No. IES-FWP)	Acrolein Formaldehyde	1.94E-04 lb/hr 2.48E-03 lb/hr

a. No reporting is required.

STATE-ONLY REQUIREMENT:

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

Pollutant (CAS Number)	Carcinogens (lb/yr)	Chronic Toxicants (lb/day)	Acute Systemic Toxicants (lb/hr)	Acute Irritants (lb/hr)
1,3-Butadiene (106-99-0)	11			
Acetaldehyde (75-07-0)				6.8
Arsenic and compounds	0.053			

Pollutant (CAS Number)	Carcinogens (lb/yr)	Chronic Toxicants (lb/day)	Acute Systemic Toxicants (lb/hr)	Acute Irritants (lb/hr)
Benzene (71-43-2)	8.1			
Benzo(a)pyrene (50-32-8)	2.2			
Beryllium (7440-41-7)	0.28			
Cadmium (7440-43-9)	0.37			
Carbon tetrachloride (56-23-5)	460			
Chlorine (7782-50-5)		0.79		0.23
Chlorobenzene (108-90-7)		46		
Chloroform (67-66-3)	290			
Di(2-ethylhexyl)phthalate (117-81-7)		0.63		
Ethylene dichloride (107-06-2)	260			
Hexachlorodibenzo-p-dioxin (57653-85-7)	0.0051			
Hydrogen chloride (7647-01-0)				0.18
Manganese & compounds		0.63		
Mercury		0.013		
Methyl chloroform (71-55-6)		250		
Methyl ethyl ketone (78-93-3)		78		
Methyl isobutyl ketone (108-10-1)		52		7.6
Methylene chloride (75-09-2)	1600		0.39	
Nickel (7440-02-0)		0.13		
Pentachlorophenol (87-86-5)		0.063	0.0064	
Perchloroethylene (127-18-4)	13000			
Phenol (108-95-2)			0.24	
Polychlorinated biphenyls (1336-36-3)	5.6			
Styrene (100-42-5)			2.7	
Tetrachlorodibenzo-p-dioxin (1746-01-6)	0.00020			
Trichloroethylene (79-01-6)	4000			
Toluene (108-88-3)		98		14.4
Trichlorofluoromethane (75-01-4)			140	
Vinyl chloride (75-01-4)	26			
Xylene (1330-20-7)		57		16.4

SECTION 3 - GENERAL CONDITIONS

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

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

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

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

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

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

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

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

   If appropriate, modifications to the permit may then be made by the DAQ to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause a violation of the emission limitations specified herein.

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

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

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

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

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

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

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

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

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

17. PREVENTION OF ACCIDENTAL RELEASES - GENERAL DUTY - Pursuant to Title I Part A Section 112(r)(1) of the Clean Air Act "Hazardous Air Pollutants - Prevention of Accidental Releases - Purpose and General Duty," although a risk management plan may not be required, if the Permittee produces, processes, handles, or stores any amount of a listed hazardous substance, the Permittee has a general duty to take such steps as are necessary to prevent the accidental release of such substance and to minimize the consequences of any release. This condition is federally-enforceable only.

Permit issued this the 12th day of October, 2015.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

William D. Willets, P.E., Chief, Permitting Section
By Authority of the Environmental Management Commission

ATTACHMENT

List of Acronyms

AOS	Alternate Operating Scenario
BACT	Best Available Control Technology
Btu	British thermal unit
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CEM	Continuous Emission Monitor
CFR	Code of Federal Regulations
DAQ	Division of Air Quality
DEQ	Department of Environmental Quality
EMC	Environmental Management Commission
EPA	Environmental Protection Agency
FR	Federal Register
GACT	Generally Available Control Technology
HAP	Hazardous Air Pollutant
MACT	Maximum Achievable Control Technology
NAA	Non-Attainment Area
NCAC	North Carolina Administrative Code
NCGS	North Carolina General Statutes
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NO_x	Nitrogen Oxides
NSPS	New Source Performance Standard
OAH	Office of Administrative Hearings
PM	Particulate Matter
PM_{10}	Particulate Matter with Nominal Aerodynamic Diameter of 10 Micrometers or Less
POS	Primary Operating Scenario
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
tpy	Tons per Year
VOC	Volatile Organic Compound

NORTH CAROLINA DIVISION OF AIR QUALITY

Air Permit Review

Permit Issue Date: October 12, 2015

Region: Raleigh Regional Office
County: Northampton
NC Facility ID: 6600167
Inspector's Name: Will Wike
Date of Last Inspection: 06/04/2015
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Enviva Pellets Northampton, LLC

Facility Address:
Enviva Pellets Northampton, LLC
874 Lebanon Church Road
Garysburg, NC 27866

SIC: 2499 / Wood Products, Nec
NAICS: 321999 / All Other Miscellaneous Wood Product Manufacturing

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 15A NCAC 02D .0515, .0521
NSPS: N/A
NESHAP: N/A
PSD: N/A
PSD Avoidance: Yes
NC Toxics: 15A NCAC 02D .1100
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Heath Lucy EH&S Manager (910) 318-2743 874 Lebanon Church Road Garysburg, NC 27866	Royal Smith Vice President Operations (240) 482-3770 7200 Wisconsin Avenue, Suite 1000 Bethesda, MD 20814	Joe Harrell Corporate EH&S Manager (252) 209-6032 142 NC Route 561 East Ahoskie, NC 27910

Application Data

Application Number: 6600167.15A
Date Received: 06/02/2015
Application Type: Modification
Application Schedule: State

Existing Permit Data
Existing Permit Number: 10203/R03
Existing Permit Issue Date: 05/13/2014
Existing Permit Expiration Date: 02/28/2017

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2013	10.80	60.32	113.88	29.51	53.49	9.32	3.31 [Formaldehyde]

Review Engineer: Kevin Godwin

Review Engineer's Signature: Kevin T. Godwin **Date:** 10-12-15

Comments / Recommendations:
Issue 10203/R04
Permit Issue Date: 10/12/2015
Permit Expiration Date: 02/28/2017

I. Introduction and Purpose of Application

A. Enviva operates a wood pellets manufacturing facility at this Northampton County site. Sources include timber handling equipment, wood chippers, a wood dryer, hammermills, pelletizers, pellet coolers, and finished product handling equipment. Presently, the facility is operating under a state construction permit issued under 15A NCAC 02Q .0300.

B. This permit action is made for the following requested changes:
1. Modify the existing dryer (ID No. ES-DRYER) by installing of a new control program in order to achieve the design capacity (71.71 ODT/hour),

2. Include a dry line conveyor (ID No. ES-DLC-1) controlled by existing bagfilter (ID No. CD-HM-BF-3) and associated feed bin (ID No. ES-DLB),
3. Install two (2) pellet bagging systems including three (3) conveyors (ID Nos. ES-BCS-1, -2, and -3) two (2) screens (ID Nos. ES-BSS-1 and 2) and two (2) bins (ID Nos. ES-BSB1 and 2), and
4. Increase the softwood content in the dryer, hammermill, and pellet coolers and include a PSD avoidance limit equal to baseline VOC emissions plus 249 tons per year.

II. Changes to Existing Air Permit

The following table provides a summary of the changes in Permit No. 010203R03.

Page No.	Condition No.	Description of Change
Global	Global	Updated permit number, permit format, and dates.
3	Table of Emission Sources	Included new dry line equipment and bagging system equipment.
4	2.1 A. 1.	Included new dry line equipment and bagging system equipment.
7	2.1 A. 3.	Included new dry line equipment and bagging system equipment.
8	2.1 A. 4.	Revised language in PSD avoidance condition and included new VOC limit of 456.4 tons per consecutive 12-month period. Updated CO emission factor to 0.023 lb/ODT.
9	2.2 A. 1. and 2.	Revised State-only Toxic Air Pollutant (TAP) tables based on approved modeling.

III. Statement of Compliance

The facility was most recently inspected on June 4, 2015 by Mr. Will Wike, Raleigh Regional Office (RRO). According to the Inspection Report, the facility was found to be in apparent compliance during this inspection.

Regarding the five-year compliance history, there have been no Notices of Violation (NOV) issued to this facility.

IV. Discussion of Changes

A. Dryer Modifications – Modifications to the dryer include installation of a new control program with additional instrumentation. The control program will automatically control the process material feed rate to match the amount of heat available to the amount of water to be evaporated. The program will reduce operator interaction to achieve the maximum evaporation rate at a more consistent dryer exit moisture content. An oxygen sensor will be installed at furnace outlet to monitor for excess oxygen. This will serve to control recirculation and optimize combustion. A moisture meter will be installed on the dryer infeed.

Other equipment associated with the control program include the following: fuel pusher, grates, underfire air, underfire dampers, overfire dampers, green bin level controller, recycle damper, dryer exit temperature controller, and dryer exhaust pressure controller.

According to the application, this installation will increase system efficiency and increase throughput to achieve design capacity while processing a higher softwood mix.

B. Dry Line Conveyor System – The dry line system allows for pre-dried material to be introduced at the point of the hammermill pre-screens. Emissions from the transfer of material from the conveyor belt to the pre-screen infeed system are controlled using existing hammermill bagfilter (ID No. CD-HM-BF-1).

The dry line system will increase throughput to the hammermills by approximately 10 tons per hour containing up to 100% softwood.

According to the application, emissions from the conveyor are calculated in manner consistent with other dried wood handling equipment in previous applications. Emissions are controlled using existing bagfilter (ID No. CD-HM-BF-3).

C. Finished Product Bagging System – The system includes two pellet screeners, two feed bins, two bagging machines, and three conveyors. Pellets are transferred via conveyor from the existing finished product storage bin to the screens. Emissions are controlled by two bagfilters (ID Nos. DC-BS-BF-1 and 2). Pellets are then transferred via conveyors to two feed bins on top of a building. The bagging machines are located inside the building.

V. Regulatory Review – Specific Emission Source Limitations

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

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

where, E = allowable emission rate (lb/hr)
P = process weight rate (tph)

The dryer system design capacity is 71.71 ODT/hr. The allowable emission rate is calculated to be 48 lb/hr. PM emissions from the dryer are 7.46 lb/hr as provided by the dryer vendor. The maximum hourly facility-wide emission rate is 30.02 lb/hr. Therefore, compliance is indicated.

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

Inspection and maintenance, as recommended by the manufacturer, is required for the control equipment. Existing monitoring, recordkeeping, and reporting requirements will remain in the revised permit.

B. 15A NCAC 02D .0521 "Control of Visible Emissions" – This regulation establishes a visible emission standard for sources based on the manufacture date. For sources manufactured after July 1, 1971, the standard is 20% opacity when averaged over a 6-minute period. In order to demonstrate compliance, the Permittee will be required to observe actual visible emissions on a monthly basis for comparison to 'normal'. If emissions are observed outside of 'normal', the Permittee shall take corrective action. Recordkeeping and reporting are required. Because all emission sources are designed to be well controlled, compliance with this standard is expected.

VI. Regulatory Review – Multiple Emission Source Limitations

A. 15A NCAC 02Q .0317 for Avoidance of Prevention of Significant Deterioration – The current permit includes a limitation for VOC emissions of less than 250 tons per consecutive 12-month period so that the facility is classified as minor with regards to PSD. The condition restricts the processing of softwood to no more than 10% on an annual basis. With this application, physical changes are proposed that will debottleneck current operations and increase throughput to equipment downstream of the proposed dry line system. In order to avoid triggering PSD review, the facility will take a limit of baseline emissions plus 249 tpy. After taking the limit, the facility will be a major stationary source.

In order to develop emission factors a varying softwood mixes, Enviva has performed VOC testing of dryers, hammermills, and pellet coolers at several other sites. This facility achieved normal operating rates at Northampton in November 2013. To calculate baseline VOC emissions, Enviva used the average annual actual emissions from the 18-month period from November 2013 through April 2015. Facility-wide baseline VOC emissions using 10% softwood are 207.4 tpy. The proposed avoidance limit is baseline (207.4) plus 249 or 456.4 tons per consecutive 12-month period. Compliance will be demonstrated by calculating 12-month rolling total VOC on a monthly basis. According to the application, calculations will

be based on actual material throughputs achieved at the site and emission factors appropriate for the annual average softwood content.

Emission factors are used to calculate revised VOC emissions based on the proposed dryer throughput of 71.71 ODT/hr and an increased hammermill and pellet press throughput of 81.71 ODT/hr. To demonstrate the facility can comply with the proposed avoidance limit at a range of softwood mixes, Enviva calculated total VOC emissions when operating at maximum rated capacity and an annual average softwood content of 30%. As reported in the application, total VOC emissions are 377.46 tpy.

Enviva proposes to process higher softwood contents than 30%, provided that appropriate emission factors for those elevated softwood mixes are approved by DAQ.

Enviva proposes permit language as follows:

> "The Permittee shall demonstrate compliance with the facility-wide VOC emission limitation by calculating the rolling 12-month annual facility-wide VOC emission 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 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.
>
> Calculations of CO emissions from the dryer system (ID No. ES-DRYER) shall also be made at the end of each month. CO emissions shall be determined by multiplying the approved CO emission factor (0.023 lb/ODT) by the plant process rate.
>
> Calculations and the facility-wide VOC and dryer CO emissions shall be recorded monthly in a log."

The minor source baseline dates for PM-10, SO2, and NOx have been triggered in Northampton County. Previous increases from this facility have not been tracked. For PSD increment tracking purposes, facility-wide emissions following this modification are as follows: PM-10 = 28.1 lb/hr; SO2 = 4.4 lb/hr, and NOx = 28.9 lb/hr.

B. Hazardous Air Pollutants (HAP) – As described in the application, HAP emissions from the dryer continue to be calculated using AP-42 factors. HAP emission from the hammermills and coolers are calculated using emission factors derived from Enviva stack tests while processing higher softwood mixes. HAP emissions from other sources are calculated using the same emission factors from previous applications. With this modification, facility-wide methanol emissions increase to 15.1 tpy. Total combined facility-wide HAP emissions increase to 37.8 tpy. The facility will now be classified as a major source of HAP emissions. This modification does not trigger any new HAP requirements.

C. 15A NCAC 02D .1100 "Control of Toxic Air Pollutants" – Enviva, Northampton previously submitted an air dispersion modeling demonstration showing compliance with North Carolina Toxic Air Pollutant (TAP) rules. The demonstration was based on a 10% softwood content. Enviva has performed HAP/TAP testing as several of its sites and developed emission factors for increased softwood content. Based on the factors, Enviva calculated facility-wide TAP emissions and determined that only acrolein and formaldehyde emissions exceed the Toxic Pollutant Permitting Emission Rates (TPER) listed in 2Q .0711 and both are greater than the modeled emission rates from the previous modeling. To maintain operational flexibility, Enviva has elected to model emissions for these two pollutants at rates that are back calculated from the maximum modeled concentrations equal to the NC Acceptable Ambient Levels (AAL).

The modeling has been reviewed by DAQ, Air Quality Analysis Branch (AQAB). According to a memorandum from Ms. Nancy Jones, Meteorologist II, AQAB dated June 15, 2015, the modeling adequately demonstrates compliance, on a source-by-source basis, for all toxics modeled. The modeled

emission rates are placed in the permit as limits. Because modeled emission rates are based on maximum facility process rate, no monitoring or recordkeeping is required.

D. The following table taken from the application provides a summary of facility-wide potential controlled criteria pollutant emissions following the modifications.

Source	ID No.	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	Total VOC (tpy)	CO2e (tpy)
Dryer	ES-DRYER	60.95	125.50	29.84	29.84	29.8	19.2	209.9	162,118.83
Emergency generator	ES-EG	0.50	0.58	0.03	0.03	0.03	0.001	0.0015	93.35
Fire water pump	ES-FWP	0.43	0.49	0.02	0.02	0.02	0.001	0.0013	80.02
Hammermills/Nuisance Dust System	ES-HM-1 thru 8/ES-NDS	-	-	20.27	20.27	20.27	-	24.71	-
Pellet Mill Feed Silo	ES-PMFS	-	-	0.38	0.38	0.38	-	-	-
Pellet Fines Bin	ES-FB	-	-	0.54	0.54	0.54	-	-	-
Pellet Presses and Coolers	ES-CLR1 thru 6	-	-	38.52	35.05	21.19	-	142.86	-
Finished Product Handling and Loadout	ES-FPH, PL1,2 PB1-12	-	-	5.33	4.85	2.93	-	-	-
Finished Product Bagging and Screening	ES-BSC-1, ES-BSS-1,2	-	-	33.79	30.75	18.58	-	-	-
Dried Wood Handling	ES-DWH, ES-PP	-	-	0.12	0.06	0.01	-	-	-
Diesel Storage Tanks	TK1 and 2	-	-	-	-	-	-	9.10E-04	-
Total PSD Emissions		61.88	126.57	128.84	121.79	93.79	19.20	377.46	162,292.20
Fugitive (Non-PSD Sources)									
Bark Hog	ES-BARK	-	-	-	-	-	-	0.30	-
Chipping	ES-CHIP	-	-	-	-	-	-	1.25	-
Green Hammermills	ES-RCHIP-1 and2	-	-	-	-	-	-	1.25	-
Green wood handling	ES-GWH	-	-	0.03	0.01	0.00	-	-	-
Green wood piles	ES-GWSP1	-	-	2.65	1.33	0.20	-	2.93	-
Total Facility Emissions		61.88	126.57	131.52	123.13	93.99	19.20	382.89	162,292.20

Notes: CO dryer emission factor (0.23 lb/ODT) from Northampton October 2013 stack test.
NOx dryer emission factor (0.47 lb/ODT) from Northampton October 2013 stack test.
VOC dryer emission factor (0.781 lb/ODT) from Northampton October 2013 stack test.
Filterable TSP/PM-10/PM-2.5 dryer emission factor (0.062 lb/ODT) provided by dryer system vendor.
Condensible PM dryer emission factor (0.017 lb/MMBtu) obtained from AP-42, Section 1.6.

VII. Other Regulatory Requirements

- An application fee of $918.00 is required and was received by DAQ.
- The appropriate number of application copies was received on June 2, 2015.

- A Professional Engineer's Seal is included with this application (ref. John R. Field, P.E. Seal #04609).
- Receipt of the request for a zoning consistency determination was acknowledged by Mr. William Flynn, Director, Northampton County Planning and Zoning Department on September 9, 2015.
- Public notice is not required for this modification to the existing state construction permit.
- IBEAM ESM update was verified on August 28, 2015.
- According to the application, the facility does not handle any of the substances subject to 112(r).
- The application was signed by Mr. Royal Smith, Vice President of Operations, on June 1, 2015.

VIII. Recommendations

This permit application has been reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined that this facility is expected to achieve compliance as specified in the permit with all applicable requirements. A draft permit and review were provided to the applicant and RRO on August 28, 2015. RRO comments are addressed in Sections IV. A. and VI. B. above. DAQ recommends issuance of Permit No. 10203R04.

Comprehensive Application Report for 6600167.15A

Enviva Pellets Northampton, LLC - Garysburg (6600167)

Northampton County

10/13/2015

General Information: Permit/Latest Revision: 10203/ R04

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

Application Dates

Received	Completeness Due	Clock Start	Calculated Issue Due
06/02/2015	07/17/2015	06/02/2015	10/22/2015

Fee Information

Initial amount:	Date received:	Amount Due:	Add. Amt Rcv'd:	Date Rcv'd:
	06/02/2015			

Fund type:	Deposit Slip #:	Location rec'd:	Location deposited:
2333			

Contact Information

Type	Name	Address	City State ZIP	Telephone
Technical/Permit	Joe Harrell, Corporate EHS Manager	142 NC Route 561 East	Ahoskie, NC 27910	(252) 209-6032
Authorized	Royal Smith, Vice President, Operations	7200 Wisconsin Avenue, Suite	Bethesda, MD 20814	(301) 657-5560

Acceptance Criteria

Received?	Acceptance Criteria Description
Yes	Application fee
Yes	Appropriate number of apps submitted
N/A	Zoning Addressed
Yes	Authorized signature
Yes	PE Seal
Yes	Application contains toxic modification(s)

Completeness Criteria

Received?	Complete Item Description

Comprehensive Application Report for 6600167.15A

Enviva Pellets Northampton, LLC - Garysburg (6600167)

Northampton County

Application Events

Event	Start	Due	Complete	Comments	Staff
TV - Acknowledgment/Complete	06/02/2015	06/12/2015	06/02/2015		kmhash
Regional technical review completed/mailed	06/02/2015	07/02/2015	09/16/2015		cmmceachern
Draft to coordinator/supervisor for review	08/11/2015	08/06/2015	08/24/2015		kgodwin
Technical Add Info - for Compliance Info	08/11/2015	09/10/2015	08/26/2015		kgodwin
Technical Add Info - for Compliance Info	08/27/2015	09/26/2015	10/01/2015		kgodwin
Permit issued	10/12/2015		10/12/2015		kmhash

Outcome Information

Class before:	Title V	Class after:	Title V		
2Q .0711:	No	2D .1100:	No		
NSPS:	No	NESHAPS/MACT:	No	PSD/NSR:	No
PSD/NSR Avoid:	No	Prohibitory Small:			No
PSD/NSR Status After:	Major	General permit:			No
Multi-site permit:	No	Multi. permits at facility:			No
Quarry permit:	No	HAP Major (10/25 tpy):			Major
2Q .0705 Last MACT/Toxics:	NO	NESHAPS/GACT:			NO
New Source RACT/LAER:	NO	Existing Source RACT:			NO
RACT/LAER Added Fee:	NO	RACT Avoidance:			NO
2Q .0702 (a)(18) - Toxics/Combustion Source(s) After 07/10/10:					NO

Permit/Revision: 10203/R04
Revision Issue Date: 10/12/2015
Accumulated process days (includes public notice periods): 80
Public notice/hearing/add info after 80 days:
Manager's discretion: Appealed? No

Current Permit Information:

Issue	Effective	Expiration	Revision #
10/12/2015	10/12/2015	02/28/2017	R04

Regulations Pertaining to this Permit

Reference Rule		Regulation Description
2Q	.0317	Avoidance Conditions
Part 60 - NSPS	Subpart IIII	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
2D	.0515	Particulates Miscellaneous Industrial Processes
2D	.0516	Sulfur Dioxide Emissions Combustion Sources
2D	.0521	Control of Visible Emissions
2D	.0524	New Source Performance Standards
2D	.1100	Control of Toxic Air Pollutants
2D	.1111	Maximum Achievable Control Technology
Part 63 - NESHAP/MACT	Subpart ZZZZ	Reciprocating Internal Combustion Engines
Avoidance	2D .0530	Prevention of Significant Deterioration

Comprehensive Application Report for 6600167.15A

Enviva Pellets Northampton, LLC - Garysburg (6600167)

Northampton County

Audit Information Pertaining to this Application

Column Name	Date Changed	Old Value	New Value	Editor

DIVISION OF AIR QUALITY
June 15, 2015

MEMORANDUM

TO: Kevin Godwin, Environmental Engineer, RCO
Permit Coordinator, RRO

FROM: Nancy Jones, Meteorologist II, AQAB

THROUGH: Tom Anderson, Supervisor, Air Quality Analysis Branch (AQAB)

SUBJECT: Review of Toxics Air Dispersion Modeling Analysis – Enviva Pellets Northampton, LLC, Garysburg, Northampton County North Carolina
Facility ID: 6600167

I have reviewed the dispersion modeling analysis, received June 2, 2015, for the Enviva Pellets facility located in Northampton County, NC. The company submitted an air permit application requesting modifications to the dryer and material handling systems at the plant. These actions trigger modeling requirements to evaluate those toxics whose rates are expected to exceed the levels outlined in 15A NCAC 2Q .0700. The modeling adequately demonstrates compliance, on a source-by-source basis, for all toxics modeled.

Two toxics were evaluated facility wide in the modeling. Emission rates and stack parameters used in the modeling are provided in the attached tables. AERMOD (13350) using the latest available years (2010-2014) of meteorological data from Rocky Mount/Wilson (surface) and Newport (upper air) was used to evaluate impacts in both simple and elevated terrain. Direction-specific building dimensions, determined using EPA's BPIP-Prime program (04274), were used as input to the model for building wake effect determination. Receptors were placed around the facility's property line at 25-meter intervals and extended outward to a distance of approximately 2.5 kilometers at 100 meter spacing. The following table shows the maximum impact for each toxic:

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

Pollutant	Averaging Period	% of AAL
Acrolein	1-hour	99 %
Formaldehyde	1-hour	90 %

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

cc: Tom Anderson
Nancy Jones

TABLE 3-2. MODELED SOURCE PARAMETERS

Model ID	Stack Height (m)	Stack Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
EP1	28.66	352.59	7.58	3.05
EP2	14.78	310.93	0.01	1.62
EP3	14.78	310.93	0.01	1.62
EP4	14.78	310.93	0.01	1.62
EP7	12.19	333.15	17.70	0.76
EP8	12.19	333.15	17.70	0.76
EP9	12.19	333.15	17.70	0.76
EP10	12.19	333.15	17.70	0.76
EP11	12.19	333.15	17.70	0.76
EP12	12.19	333.15	17.70	0.76
EP14	1.77	766.48	78.30	0.10
EP15	3.05	803.15	0.01	0.13

TABLE 3-3. MODELED EMISSION RATES

Model ID	Modeled Emission Rates (lb/hr)	
	ACROLEIN	FORM
EP1	2.93E+00	6.65E+00
EP2	1.77E-01	2.99E-01
EP3	1.77E-01	2.99E-01
EP4	1.18E-01	1.99E-01
EP7	1.49E-01	9.45E-02
EP8	1.49E-01	9.45E-02
EP9	1.49E-01	9.45E-02
EP10	1.49E-01	9.45E-02
EP11	1.49E-01	9.45E-02
EP12	1.49E-01	9.45E-02
EP14	2.27E-04	2.89E-03
EP15	1.94E-04	2.48E-03

NORTH CAROLINA DIVISION OF AIR QUALITY

Inspection Report
Date: 06/04/2015

Raleigh Regional Office
Enviva Pellets Northampton, LLC
NC Facility ID 6600167
County/FIPS: Northampton/131

Facility Data

Enviva Pellets Northampton, LLC
874 Lebanon Church Road
Garysburg, NC 27866
Lat: 36d 30.0294m **Long:** 77d 42.9888m
SIC: 2499 / Wood Products, Nec
NAICS: 321999 / All Other Miscellaneous Wood Product Manufacturing

Permit Data

Permit 10203 / R03
Issued 5/13/2014
Expires 2/28/2017
Classification Title V
Permit Status Active
Current Permit Application(s) State, TV-1st Time

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Heath Lucy EH&S Manager (910) 318-2743	Royal Smith Vice President Operations (240) 482-3770	Joe Harrell Corporate EH&S Manager (252) 209-6032

Program Applicability

SIP
MACT Part 63: Subpart ZZZZ
NSPS: Subpart IIII

Comments: In compliance – recommend re-inspection in one year.

Inspector's Signature:

Date of Signature:

Compliance Data

Inspection Date 06/04/2015
Inspector's Name Will Wike
Operating Status Operating
Compliance Code Compliance - inspection
Action Code FCE
On-Site Inspection Result Compliance

Total Actual emissions in TONS/YEAR:

	TSP	SO2	NOX	VOC	CO	PM10	* HAP
2013	55.91	10.80	60.32	113.88	29.51	53.49	6628.04
2012	---	---	---	---	---	---	---

* Highest HAP Emitted (in pounds)

Five Year Violation History: None

Date	Letter Type	Rule Violated	Violation Resolution Date

Performed Stack Tests since last FCE: None

Date	Test Results	Test Method(s)	Source(s) Tested

(I) DIRECTIONS TO SITE: From RRO, take I-440 Inner Beltline to US 64 East and follow to I-95 North. Follow I-95 North and take exit 176 for Hwy 46 West toward Gaston/Garysburg. Turn left onto Hwy 46 West then take a right onto Lebanon Church Road. Follow for approximately 1-2 miles and the facility will be on the left at 874 Lebanon Church Road.

(II) FACILITY DESCRIPTION: Enviva Pellets Northampton, LLC (Enviva) is proposing to construct and operate a new wood pellets manufacturing plant in the town of Gaston, NC. The proposed plant is designed to produce wood pellets with no less than 13% moisture content. Pellets will typically consist of pressed hardwoods, but could contain

up to 10% softwoods on an annual basis. The facility is conducting stack testing to determine whether compliance can be maintained with an increase in softwood content to 15% on an annual basis.

The pelletizing process is described in the air permit application (with some editing) as follows:

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

(III) INSPECTION SUMMARY: On June 4, 2015, Regina Hudock and I (Will Wike) met with Heath Lucy, EHS Manager, to conduct a compliance inspection. Upon our arrival on site, we all sat down to review the specific conditions in the facility's current air permit and to evaluate the plant's record keeping procedures. Afterwards, Mr. Lucy directed us on a tour of the facility where we observed the plant's equipment in operation.

Overall, the facility was operating well from an air quality standpoint on the day of the inspection. Comments about observations made during the inspection are provided below for each of the emission sources and specific air quality regulations listed in the facility's current air permit.

Safety note: safety shoes, safety glasses, hearing protection, safety vest, and a hardhat are required.

(IV) PERMITTED EMISSION SOURCES: At the time of the inspection, Enviva was operating under Air Permit No. 10203R03 which was issued on May 13, 2014 and expires on February 28, 2017 and includes the following emission sources and control devices:

Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-DRYER	Direct heat, wood-fired dryer (174 million Btu per hour heat input)	CD-DC and CD-WESP	One simple cyclone (149 inches in diameter) in series with one wet electrostatic precipitator (29,904 square feet of total collection plate area)
ES-HM-1 through 8	Eight hammermills	CD-HM- CYC-1 through CYC-8, and CD-HM-BF1, BF2, and BF3	Eight simple cyclones (120 inches in diameter each) in series with three fabric filters (6,250 square feet of filter area each)
ES-NDS	Nuisance dust system	CD-HM-BF-3	One fabric filter (6,250 square feet of filter area)
ES-PMFS	Pellet feed mill silo	CD-PMFS-BV	One bin vent filter (377 square feet of filter area)
ES-PFB	Pellet fines bin	CD-PFB-BV	One bin vent filter (325 square feet of filter area)
ES-CLR1, through CLR-6	Pellet coolers	CD-CLR-1 through CLR-6	Six simple cyclones (54 inches in diameter each)
ES-FPH ES-PB-1 through PB-12 ES-PL-1 and 2	Finished product handling Twelve (12) pellet load-out bins Pellet mill load-out 1 and 2	CD-FPH-BF	One fabric filter (4,842 square feet of filter area)

All permitted equipment was observed in operation with the exception of the pellet mill load-out. Two trucks were lined up for the pellet load-out, but had not yet begun the loading pellets. Visible emissions were 0% opacity for each of the operating equipment (and associated control devices). Hammermill emissions are controlled by a cyclone for each unit. Following the cyclone, hammermills 1-3 are further controlled by fabric filter 1 (ID No. CD-HM-BF1), hammermills 4-6 are further controlled by fabric filter 2 (ID No. CD-HM-BF2), and hammermills 7, 8, and nuisance dust system (ID No. ES-NDS) are further controlled by fabric filter 3 (ID No. CD-HM-BF3). The pellet mill load-out fills approximately 45-50 trucks per day. Full capacity is 50 trucks per day.

(V) SPECIFIC PERMIT CONDITIONS:

(1) 15A NCAC 2D .0515 - PARTICULATES FROM MISCELLANEOUS INDUSTRIAL PROCESSES - All of the permitted emission sources are subject to 2D .0515.

IN COMPLIANCE - The particulate emission limit for the subject emission sources is based on a formula provided in the permit. According to previous permit reviews, all of these sources should comply with 2D .0515 as long as their respective control devices are properly operated and maintained. All control devices were observed during the inspection and were in good physical condition. Initial compliance testing of the wet electrostatic precipitator (ID No. CD-WESP) for particulate emissions is required within 180 days of commencement of operation. Facility operation commenced April 23, 2013, so the testing was required by October 19, 2013. The testing was conducted on October 3, 2013. Limits on total PM are based on actual process rate. The average process rate during testing was 72 tons per hour throughput corresponding to a total PM limit of 48.0 pounds per hour. The test results showed 3.07 pounds per hour total PM, well under its limit.

The permit requires the facility to perform monthly external and annual internal inspections on the bagfilters/cyclones. Also, wet electrostatic precipitator requires daily monitoring/record keeping of primary voltage and current. Monitoring is required to be kept in a log book. Reporting is required within 30 days of written request of DAQ. At the time of the inspection, the facility was able to provide detailed records that demonstrated that the required monthly external/annual internal monitoring and primary voltage/current record keeping for the control equipment was being conducted as described in the permit demonstrating compliance with 2D .0515.

(2) 15A NCAC 2D .0516 - SULFUR DIOXIDE EMISSIONS FROM COMBUSTION SOURCES –.The dryer (ES-DRYER) is the only emission source subject to 2D .0516.

IN COMPLIANCE - The sulfur dioxide emission limit for the subject emission source shall not exceed 2.3 pounds per million Btu heat input. According to previous permit reviews, all of these sources should meet the applicable 2D .0516 through the use of wood as the combustion fuel. No sulfur dioxide emission testing, monitoring, recordkeeping, or reporting is required for any of these sources.

(3) 15A NCAC 2D .0521- CONTROL OF VISIBLE EMISSIONS - All of the permitted emission sources are subject to 2D .0521.

IN COMPLIANCE - The visible emission limit for the subject equipment is 20 percent opacity. During the inspection, most of the emission sources were observed in operation and found to have visible emissions of 0% opacity. No visible emissions testing is required by the facility's air permit. The permit requires the facility to perform monthly monitoring of visible emissions from facility equipment. These monthly visible emissions observations and any corrective actions taken are to be recorded in a logbook. Review of the logbook (same as that used for 2D .0515) indicated that the appropriate monitoring and recordkeeping are being performed. There are no reporting requirements required in the permit for 2D .0521. At the time of the inspection, the facility was able to provide detailed records that demonstrated that the required monthly visible emissions monitoring was being conducted as described in the permit demonstrating compliance with 2D .0521.

(4, 5) 15A NCAC 2D .1100 and 2Q .0711: TOXIC AIR POLLUTANT REQUIREMENTS - All of the permitted emission sources are subject to 2D .1100 and 2Q .0711.

IN COMPLIANCE - In conjunction with a prior permit application, the Permittee submitted air dispersion modeling that demonstrated that emissions of the Toxic Air Pollutants (TAPs) listed in the permit were below state Ambient Air Standards (AALs) beyond the fence line of the facility. No monitoring, recordkeeping, or reporting is required by the permit for this stipulation.

To comply with 2Q .0711, the Permittee must ensure that emissions of specified TAPs do not exceed the Toxic Permit Emission Rates (TPERs) specified in the permit. If any of the TPERs are exceeded, the facility must obtain a permit to emit TAPs and demonstrate compliance with state AALs. A review of facility records indicated that emissions of all TAPs listed in the permit is well below their respective emission limitations. No monitoring, recordkeeping, or reporting is required by the permit for this stipulation.

(6) 15A NCAC 2Q .0317 AVOIDANCE CONDITIONS for 2D .0530: PREVENTION OF SIGNIFICANT DETERIORATION (PSD) - All of the permitted emission sources are subject to 2Q .0317/2D .0521.

IN COMPLIANCE - To comply with 2Q .0317, VOC emissions from all operations at the facility must be less than 250 tons per consecutive 12-month period. No emissions testing is required for any of these sources by the facility's air permit. However, testing was voluntarily performed to demonstrate that the 250 ton per year limit would not be exceeded. See the Source Test History section below for details. The permit does require the facility to perform monthly monitoring/record keeping of calculation of VOC/CO emissions, softwood content (monthly), and moisture content (30 day rolling average) from facility operations. At the time of the inspection, the facility was able to provide detailed records that demonstrated that the required monthly monitoring and record keeping for the subject sources was being conducted as described in the permit. Specifically, annual VOC emissions were 206 tons per year and CO emissions were 63 tons per year, for the 12-month period ending April 2015, well below the 250 ton limit. The facility is required to submit semiannual reporting summarizing VOC/CO emissions during the previous six months. The most recent semiannual report (2H'14) has been reviewed and been found to demonstrate compliance with the PSD-avoidance limits.

(7) (Applicable regulation not included in permit, yet incorporated by reference) 2D .0524 New Source Performance Standards (NSPS) Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines - One emergency generator (ID Nos. IES-GN) and one fire water pump (ID No. IES-FWP) are subject to 2D .0524.

IN COMPLIANCE – NSPS Subpart IIII requires non-resettable hour meters, fuel oil with sulfur content less than or equal to 15 ppm, and maintenance and readiness testing limited to 100 hours per year per unit. The two units are each burning ultra low sulfur diesel fuel; each has a non-resettable hour meter installed; and maintenance & readiness testing is approximately 10 to 20 hours per year. Review of the fuel oil certification from the most recent purchase of diesel fuel indicated that the sulfur content meeting the 15 ppm limit and the cetane index limit of 40. The non-resettable hour meter readings for the generator and fire water pump were 27.4 and 48.6 hours, respectively. Periodic inspections and readiness testing are performed on each unit. No reporting requirements are stipulated.

(8) (Applicable regulation not included in permit, yet incorporated by reference) 40 CFR 63 - NESHAP/MACT -- Subpart ZZZZ -- Reciprocating Internal Combustion Engines - One emergency generator (ID Nos. IES-GN) and one fire water pump (ID No. IES-FWP) are subject to 2D .1111.

IN COMPLIANCE – The facility's generator and fire pump are in compliance with Subpart ZZZZ by maintaining compliance with NSPS Subpart IIII for each unit.

(VI) EXEMPT EMISSION SOURCES: The facility currently has ten emission sources listed on the Insignificant Activities List. These sources are: Dried wood handling (ID No. IES-DWH), pellet press system (ID No. IES-PP), finished product handling (ID No. IES-FPH), two diesel storage tanks (ID Nos. IS-TK1 and IS-TK2, 2,500 gallon and 500 gallon capacity, respectively), electric powered green wood chipper (ID No. IES-EPWC), two electric powered wood re-chippers (ID Nos. IES-RCHP-1 and 2), green wood handling and storage (ID No. IES-GWHS), green wood fuel storage bin (ID No. IES-GWFB), one emergency use generator (ID No. IES-GN, 350 brake horsepower [20.6 hours on non-resettable hour meter]), one fire water pump (ID No. IES-FWP, 300 brake horsepower [29.1 hours on non-resettable hour meter]), and log chipping (ID No. IES-CHIP-1).

(VII) 112(r) APPLICABILITY: Enviva has no emissions sources that are subject to the Risk Management Plan - 112(r) program.

(VIII) SOURCE TEST HISTORY: Enviva's current air permit has one stack testing requirement listed. Initial compliance testing of the wet electrostatic precipitator (ID No. CD-WESP) for particulate emissions is required within 180 days of commencement of operation. Facility operation commenced April 23, 2013, so the testing was required by October 19, 2013. The testing was conducted on October 3, 2013, and demonstrated compliance with 2D .0515 as detailed above in section (V)(1). Testing was also performed to determine the VOC, CO, and NOx emissions, respectively. The VOC and CO emission limits are 250 tons per year each, in accordance with PSD-Avoidance (2Q .0317). Testing results are to establish emission factors for VOC and CO emissions that are to be used to project annual emissions (8760 hours). The resulting VOC and CO emissions were 189.5 and 59 tons per year, respectively. No emission limits for NOx are included in the permit, yet testing resulting projected emissions are 121.9 tons per year. The compliance testing above was performed on the dryer; however, additional engineering testing was also performed on the pellet cooler and one of the hammermills (ID No. ES-HM-2). The resulting emission factors were used in the calendar year 2013 emissions inventory; yet, they had not been submitted to SSCB for review/approval. The results are now under review by SSCB.

No other stack testing is required for this facility.

(IX) ENFORCEMENT HISTORY: According to the RRO compliance databases, no Notices of Violation (NOVs) have been issued to this facility. A Notice of Deviation (NOD) dated August 22, 2014 was issued for failing to submit a 1H'14 semiannual report.

(X) EMISSIONS INVENTORY: Since facility operation commenced April 23, 2013, the first emissions inventory required by the facility was for calendar year 2013. The calendar year 2014 emissions inventory is not due until June 30, 2015. Thus, there are not multiple years of emissions to compare at this time.

(XI) CONCLUSIONS/RECOMMENDATIONS: Based on observations made during the inspection, Enviva Pellets Northampton, LLC's Gaston plant appeared to be operating in compliance with all permit requirements. The facility should be re-inspected in one year.

DEYO environmental

September 3, 2015

Via UPS
Next Day Delivery

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

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

Dear Mr. Flynn:

Enviva Pellets Northampton, LLC (Enviva) is proposing to modify its wood pellet manufacturing facility located at 830 Lebanon Church Road, Garysburg, NC. Specifically, Enviva is proposing to install a dry line wood feed conveyor system and a wood pellet bagging system to its existing manufacturing process. In accordance with § 143-215.108(f) of the North Carolina General Statutes, we are submitting this request that Northampton County issue a determination as to whether the County has in effect a zoning or subdivision ordinance that is applicable to the proposed modification. Additionally, we are requesting that you issue a determination as to whether the proposed use would be consistent with applicable zoning or subdivision ordinances. I hereby certify that to the best of my knowledge, Northampton County is the only local government having jurisdiction over any part of the land on which the facility and its appurtenances are located.

For your convenience, we have included a form with which you may remit your determination and a copy of the air permit application. As a means of demonstrating proof of transmittal, please sign, title, stamp, and date the enclosed form and mail to both the facility mailing address and the air quality office detailed attached. Finally, for the application to be deemed complete by the NCDENR, Division of Air Quality, we will need to submit proof of receipt of this request by Northampton County. Therefore, we are also requesting that you stamp this cover letter with your department's seal, signature, and date next to the seal, and return the sealed cover letter to my attention via FAX to 804-441-8272.

Thank you for your prompt attention to this matter. If you have any questions regarding this request, please contact me at (804)937-0377.

Rcvd 9/9/15 @4:10pm
NORTHAMPTON COUNTY
PLANNING AND ZONING DEPT
WILLIAM FLYNN, DIRECTOR

Sincerely,

Michael T. Deyo
Environmental Consultant

Deyo and Associates, LLC
12325 Morning Creek Rd., Glen Allen, VA 23059
804-937-0377 – mtdeyo@aol.com

Enviva Pellets Northampton, LLC

NCDENR – Division of Air Quality

Application to Modify Air Permit No. 10203R03

Prepared for:
Enviva Pellets Northampton, LLC

Prepared by:
Deyo and Associates, LLC

May 2015

Tables:

Appendices:

1.0 Executive Summary

Enviva Pellets Northampton, LLC (Enviva) operates a wood pellet manufacturing facility at its Northampton County, North Carolina location. Operations at the site include timber handling equipment, wood chippers, dryers, hammermills, 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. Enviva pays 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 North Carolina Qir Quality Permit No. 10203R03 issued by the North Carolina Division of Air Quality (DAQ) on May 13, 2014. The facility's potential emissions of all criteria pollutants are limited to levels below the PSD major source threshold of 250 tons per year. The current air permit also limits the annual average softwood content to a maximum of ten percent (10%) throughout the entire process.

The application for the current air permit assumes a dryer throughput of 71.71 oven dried tons per hour (ODT/hr) and an annual throughput capacity of 537,625 ODT/yr. However, as demonstrated in the most recent stack test dated October 2013, the dryer system is only capable of achieving a production rate of approximately 60 ODT/hr due to equipment constraints. Enviva is proposing to make modifications to the dryer system to increase the dryer production rates to the design capacity of 71.71 ODT/hr.

In addition, Enviva is also proposing to permit and operate a "dry line system" that will allow the facility to introduce pre-dried wood material into the process at the point of the hammermill pre-screens. This pre-dried material would not pass through the facility's dryer.

Finally, Enviva is proposing to install a new finished product bagging system for the bagging of pellets for commercial sale.

A complete description of these facility changes is provided in Section 2.0 of this application.

As detailed above, all VOC and HAP emissions calculations for the Northampton facility have historically been performed assuming an annual average softwood throughput of 10%.

Since the submission of the Northampton permit applications, Enviva has performed VOC testing of the Enviva Pellets Ahoskie facility while processing 30% softwood through the dryer and hammermills and 45% through the pellet press system. Furthermore, Enviva has performed HAP stack tests at several other of its wood pellet manufacturing facilities processing up to 60% softwood to develop appropriate HAP emission factors for its 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, and the operation of a new dry line system that will increase production of the system downstream of the dryer, Enviva requests that Permit Section 2.1.A.4.d be revised to include a facility-wide VOC emissions limit equal to the facility's baseline VOC emissions plus 249 tons per year. A complete discussion of this proposed emissions limit is provided in Section 6.0 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 existing 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, since there are increases in particulate emissions associated with the proposed bagging system, 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 3.0 of the application.

Included with this application are a description of the proposed equipment modifications (Section 2.0), baseline and revised emissions calculations (Section 3.0), a summary of the facility's PSD and HAP major source status (Section 4.0), a discussion of required updates to the existing 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).

Application forms for the modified dryer, hammermills, pellet coolers, new dry line conveyors, and bagging system equipment are included in Appendix A of this application. Baseline emissions calculations for the facility are provided in Appendix B and example modified facility emissions calculations are provided in Appendix C. Air dispersion modeling demonstrating compliance with 15A NCAC 02D.1100 is provided in Appendix D.

2.0 Equipment Modifications

2.1 Dryer Modifications

As discussed in Section 1.0 above, the existing application for the facility dryer details a maximum hourly throughput of 71.71 ODT/hr. Enviva is proposing to make several modifications to the dryer system to increase the achievable throughput to the design capacity of 71.71 ODT/hr.

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 Dry Line Conveyor

The Northampton facility has tested, on a trial basis, a "dry line" system where pre-dried wood material can be introduced into the manufacturing process at the point of the hammermill pre-screens. This system currently consists of a single conveyor feeding material to the pre-screener in feed conveyor. Dry material is fed via front end loader into a feed hopper and metered onto the conveyor belt. Emissions from the transfer of the material from this conveyor belt to the pre-screen infeed system are controlled using the existing hammermill baghouse #1. Enviva is requesting a permit modification to allow for the continued operation of the dry-line system. Calculations of particulate emissions associated with this material transfer are discussed in Section 3.0 of this application.

It should be noted that the dry line system will increase the throughput to the hammermills and pellet coolers by approximately 10 tons per hour of dried wood material containing up to 100% softwood. Calculations of VOC and HAP emissions from the increased throughput (and softwood content) to the hammermills and pellet coolers are also discussed in Section 3.0.

Air permit application forms for the dry line conveyor are provided in Appendix A of this application.

2.3 Finished Product Bagging System

Currently, all finished product (pellets) is shipped from the site in large bulk transportation vehicles (trucks with hoppers holding approximately 27 tons each) for use as renewable energy sources in large-scale operations such as electric power

plants. Enviva is proposing to install two new pellet bagging systems intended to load pellets into small bags (for instance, 40 lbs each) for sale to the general public.

The bagging system consists of two pellet screeners, two feed bins, two bagging machines, and three conveyors. Pellets are transferred via conveyor from the existing finished product storage bin to the screeners. Emissions from these screeners and feed conveyor are controlled using a fabric filter baghouse. Pellets are then transferred using two conveyors to two feed bins located on top of a new building constructed at the site. The bagging machines will be located within this new building.

Calculations of particulate emissions associated with the bagging system equipment are discussed in Section 3.0 and application forms for the new equipment are provided in Appendix A.

3.0 Emissions Calculations

3.1 Dry Line and Bagging System Particulate Emissions:

Particulate emissions from the dry line conveyor infeed bin are calculated in a manner consistent with emissions calculations for other dried wood handling equipment in the existing application. The emissions from this conveyor are added to the existing emissions source group ES-DWH and are included in Table C-14 of Appendix C. Emissions from the transfer from the dry line conveyor to the pre-screen infeed conveyor are controlled using the baghouse associated with the hammermill pre-screens (CD-HM-BF-3). Emissions from this baghouse are calculated using dust collector air flow and a fabric filter performance specification. Since no modifications are being made to this baghouse, there are no emissions increases associated with the second conveyor.

Particulate emissions associated with the bagging system dust collector are also calculated in a manner consistent with other dust collector sources in the existing application. Specifically, emissions calculations are performed using the dust collector air flow-rate and a performance guarantee (in units of gr/cf) provided by the dust collector vendor, and are included in Table B-12 of Appendix C. Emissions from the bagging system conveyors (transfer to the bins) are added to the existing emissions source group ES-DWH and are included in Table C-14 of Appendix C.

3.2 VOC Emissions

3.2.1 Baseline VOC Emission

Permit No. 10203R03 includes VOC emissions from the dryer, dry wood hammermills, pellet coolers, green wood chippers/hammermills, diesel tanks, and generators (fire pump and emergency generators). Dryer VOC emissions were calculated using emission factors derived from AP-42 emission factors while processing 10% softwood. Hammermill and pellet cooler VOC emissions were calculated using emission factors derived from stack testing at these low softwood levels. The green wood chipper/re-chippers 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. Since that time, Enviva has performed VOC testing of its dryers, hammermills, and pellet coolers at several of its sites and developed VOC emission factors for these sources at varying softwood contents.

To establish baseline VOC emissions, facilities typically utilize emissions from a representative consecutive 24-month period within the previous 10 years. However, as DAQ is aware, the Northampton facility only recently commenced operation and only achieved "normal operating rates" in approximately November 2013. Therefore, to calculate the current baseline VOC emissions for the site, Enviva calculated the average annual actual VOC emissions from the 18-month period from November 2013 through April 2015 (annualized the emissions over this 18-month period). 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 Range	Total VOC Emissions (tpy)
November 2013 – April 2015	207.4

3.2.2 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 456.4 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 6.0 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 an annual average softwood content of 30%. A further description of these calculations is provided below. Enviva proposes to process higher softwood contents than 30%, 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 (note that Enviva does not currently have emission factors for 30% softwood in its pellet presses and therefore, the 45% softwood testing was used for the pellet presses as a conservative measure).

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

Ahoskie Source	Ahoskie 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 throughput of 71.71 ODT/hr (and the current application annual dryer throughput of 537,625 ODT/yr) and an increased hammermill and pellet press throughput of 81.71 ODT/hr (resulting in increased hammermill and pellet press throughputs of 531,441 and 625,225 ODT/yr, respectively).

Emissions from the green wood processing equipment have historically been calculated using AP-42 emission factors applicable to softwood sources and, therefore, 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	537,625		209.88
Emergency Generator	IES-GN		500	0.0015
Fire Water Pump	IES-FWP		500	0.0013
Hammermills	ES-M-1-8,	531,441		24.71
Pellet Presses and Coolers	ES-CLR-1 – 6	625,225		142.86
Diesel Storage Tanks	IS-TK1, 2		8,760	0.00091
			Facility Totals:	377.46

As shown in Table 3-3, the modified throughputs and use of an annual average of 30% softwood at the Northampton site results in VOC emissions well below the proposed annual VOC emissions limitation of 456.4 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 6.0 of this application.

3.3 HAP/TAP Emissions

Enviva calculated the individual and cumulative HAP/TAP emissions for the baseline scenario and the modified facility scenario detailed in Sections 3.1.1 and 3.1.2, respectively. HAP and TAP emissions for the dryer continue to be calculated using AP-42 emission factors. HAP/TAP emissions calculations for the hammermills and pellet coolers at elevated softwood content are calculated using conservative emission factors derived from Enviva stack tests while processing higher softwood contents. HAP/TAP emissions from other sources are calculated using the same published emission factors used in the existing application. Example HAP/TAP emissions calculations resulting from the modified operating scenario discussed above are provided in Appendix C.

3.4 Other Emissions

All other emissions from the modified source scenario are calculated in the same manner as in previous applications. Since particulate emissions from sources using fabric filter control technology 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 from these sources. Particulate matter emissions from the baseline and modified source scenarios are also included in Appendices B and C

Since the existing application calculations for the dryer system were performed at a rated capacity of 71.71 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 Appendices B and C.

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 equipment at the facility to debottleneck current operations and to increase throughput to equipment downstream of the proposed dry-line system. 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 revise the facility's existing VOC limitation to 456.4 tons per year. Enviva understands that after the proposed modification, the Northampton site 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. The TAP demonstration was based on a softwood content of 10% for all sources. Enviva is proposing to increase throughput to equipment downstream of the proposed dry-line system and increase the allowable softwood content to the dryer, hammermills, and pellet coolers as part of this application.

As detailed in Section 3.0 above, Enviva has performed HAP/TAP testing at several of its facilities and developed additional HAP/TAP emission factors for increased softwood content. Based on these factors, Enviva has calculated TAP emissions from all sources and determined that only acrolein and formaldehyde emissions exceed the Toxic Pollutant Permitting Emission Rates (TPERs) at 2Q.0711 and both are greater than the modeled emission rates detailed in the original application.

Detailed TAP emissions calculations and comparisons to the TPERs listed at 2Q.0711 are provided in Appendix C of this application.

However, to maintain maximum future operational flexibility and ensure compliance with the NC TAP regulations, Enviva has elected to model emissions for these two pollutants at conservative rates that are back-calculated from the maximum modeled concentrations equal to the North Carolina AALs. Therefore, the emission rates included in Enviva's TAP modeling demonstration are substantially higher than those detailed in Appendix C.

Updated air dispersion modeling demonstrating compliance with 15A NCAC 02D.1100 is provided in Appendix D.

6.0 Permit Modification

6.1 Softwood Content Limitation

Section 2.1.A.4.d of the current permit limits the facility to a maximum softwood content of "10%... on an annual basis." As detailed above, Enviva requests that it be permitted to process increased softwood content material at the facility. Enviva proposes to demonstrate compliance with the facility's annual VOC emissions limit through periodic emissions calculations performed in accordance with Permit Section 2.1.A.4.c, using emission factors appropriate for the softwood content used during that period. Therefore, we request that Section 2.1.A.4.d be removed from the permit.

6.2 VOC Emissions Monitoring/Calculations

Section 2.1.A.4.c currently requires Enviva to calculate monthly VOC emissions from the dryer system. This Section also details specific emission factors that should be utilized to calculate VOC emissions from the dryer and provides the allowance for new source testing to be used to modify the dryer emission factors.

Enviva is proposing to increase the softwood content in the dryers, hammermills and pellet coolers. To accommodate this increased softwood content, Enviva proposes to calculate, on a monthly basis, facility-wide VOC emissions using emission factors appropriate for the increased softwood content for these source groups.

Therefore, we are requesting that Section 2.1.A.4.c of the permit be revised to read as follows:

> *"The permittee shall demonstrate compliance with the facility-wide VOC emissions limitation in Permit Section 2.1.A.4.a 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.*
>
> *Calculations of CO emissions from the dryer system (ID No. ES-DRYER) shall also be made at the end of each month. CO emissions shall be determined by*

multiplying the approved CO emission factor (0.023 lb/ODT) by the plant process rate.

Calculations and the facility-wide VOC and dryer CO emissions shall be recorded monthly in a log (written or electronic format)."

Note that the existing Section 2.1.a.4.c includes an outdated CO emission factor since the stack test referenced in that condition has been performed and a new CO emission factor has been established. Therefore, appropriate revisions have been made to the proposed text above.

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 Northampton, LLC

North Carolina DAQ Air Permit Application Forms

Received
JUN 02 2015
Air Permits Section

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)

GENERAL INFORMATION

Legal Corporate/Owner Name:	Enviva Pellets Northampton, LLC
Site Name:	Enviva Pellets Northampton, LLC
Site Address (911 Address) Line 1:	874 Lebanon Church Road
Site Address Line 2:	
City: Garysburg	State: North Carolina
Zip Code: 27866	County: Northampton

CONTACT INFORMATION

Permit/Technical Contact:	***Facility/Inspection Contact:***
Name/Title: Joe Harrell, Corporate Environmental Health & Safety Manager	Name/Title: Heath Lucy, Environmental Health & Safety Manager
Mailing Address Line 1: 142 N.C. Route 561 East	Mailing Address Line 1: 874 Lebanon Church Road
Mailing Address Line 2:	Mailing Address Line 2:
City: Ahoskie State: NC Zip Code: 27910	City: Garysburg State: NC Zip Code: 27866
Phone No. (area code) 252-209-6032 Fax No. (area code) N/A	Phone No. (area code) (910) 318-2743 Fax No. (area code)
Email Address: Joe.Harrell@envivabiomass.com	Email Address: heath.lucy@envivabiomass.com
Responsible Official/Authorized Contact:	***Invoice Contact:***
Name/Title: Royal Smith, Vice President Operations	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: MD Zip Code: 20814	City: State: Zip Code:
Phone No. (area code) (240) 482-3770 Fax No. (area code)	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. :** 6600167
Wood pellet manufacturing facility

Primary SIC/NAICS Code: 2499 (Wood Products, Not Elsewhere Classified)	Current/Previous Air Permit No. 10203R03 Expiration Date 2/28/2017
Facility Coordinates: Latitude: 256,700 UTM E	Longitude: 4,042,900 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: VA	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, Operations
X Signature(Blue Ink):	Date: June 1, 2015

Attach Additional Sheets As Necessary

FORMs A2, A3

EMISSION SOURCE LISTING FOR THIS APPLICATION - A2

112r APPLICABILITY INFORMATION - A3

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

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

EMISSION SOURCE ID NO.	EMISSION SOURCE DESCRIPTION	CONTROL DEVICE ID NO.	CONTROL DEVICE DESCRIPTION
Equipment To Be ADDED By This Application (New, Previously Unpermitted, or Replacement)			
ES-DLB	Dry Line Feed Bin	N/A	N/A
ES-DLC-1	Dry Line Feed Conveyor	CD-HM-BF-3	Fabric filter dust collector
ES-BSC-1	Bagging System Conveyor	DC-BS-BF-1	Fabric filter dust collector
ES-BSC-2	Bagging System Conveyor	N/A	N/A
ES-BSC-3	Bagging System Conveyor	N/A	N/A
ES-BSS1	Bagging System Screen	DC-BS-BF-1	Fabric filter dust collector
ES-BSS2	Bagging System Screen	DC-BS-BF-2	Fabric filter dust collector
ES-BSB1	Bagging System Bin	N/A	N/A - Pellets from Bin discharged via enclosed system into bagging system building
ES-BSB2	Bagging System Bin	N/A	
Existing Permitted Equipment To Be MODIFIED By This Application			
ES-DRYER	Green Wood Direct Fired Dryer System	CD-DC, CD-WESP	Three simple cyclones and WESP
ES-HM-1 thru 8	Eight (8) Hammermills	CD-HM-CYC-1 thru 8	Eight (8) Simple Cyclones
		CD-HM-BF-1 thru 3	Three (3) Bagfilters
ES-CLR-1 thru 6	Six (6) Pellet Coolers	CD-CLR-1 thru 6	Six (6) Pellet Cooler Cyclones
ES-NDS	Nuisance Dust System	CD-HM-BF-3	Bagfilter
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 Northampton, 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-1

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood is conveyed to a rotary dryer system. Direct contact heat is provided to the system via a 175.3 mmBtu/hr burner system. Air emissions are controlled by cyclones for bulk particulate removal and additional particulate is removed 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: 2012	OPERATION DATE: 2013	DATE MANUFACTURED: 2012
MANUFACTURER / MODEL NO.: Buettner 5x26R	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 C						
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 C						

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 C			

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

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

Attach Additional Sheets As Necessary

FORM B1

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

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

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

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

HEATING MECHANISM: ☝ INDIRECT ☝ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): 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)
Bark/Wet Wood	ton	21	

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: Eight (8) dry wood hammermills	EMISSION SOURCE ID NO: ES-HM-1 thru 8
	CONTROL DEVICE ID NO(S): CD-HM-CYC-1 through 8 CD-HM-BF1, 2, 3
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-2 through 4

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dried materials are reduced to the approporitate size needed for pelletization using eight 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)
- ☐ 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: 2012	OPERATION DATE: 2013	DATE MANUFACTURED: 2012
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 C						
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 C						

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 C			

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: Eight (8) dry wood hammermills	EMISSION SOURCE ID NO: ES-HM-1 through 8
	CONTROL DEVICE ID NO(S): CD-HM-CYC-1 through 8 CD-HM-BF1 through 3
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-2 through 4

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

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	ODT	81.71	

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: Nuisance Dust System	EMISSION SOURCE ID NO: ES-NDS
	CONTROL DEVICE ID NO(S): CD-HM-BF-3
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-4

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

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

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

START CONSTRUCTION DATE: 2013	OPERATION DATE: 2013	DATE MANUFACTURED: 2012
MANUFACTURER / MODEL NO.:	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 C						
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 C						

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 C			

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: Nuisance Dust System/Hammermill Area	EMISSION SOURCE ID NO: ES-NDS
	CONTROL DEVICE ID NO(S): CD-HM-BF-3
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-4

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Hammermill area dust from the hammermill and screening operations and dry line conveyor transfer will be vented to the hammermill bagfilter No. 3 (CD-HM-BF-3) to control particulate matter emissions.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Dried Wood	ODT	81.71	

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: Pellet coolers	EMISSION SOURCE ID NO: ES-CLR 1 through 6
	CONTROL DEVICE ID NO(S): CD-CLR-C1 through 6
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-10 through 15

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

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

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

START CONSTRUCTION DATE: 2012	OPERATION DATE: 2013	DATE MANUFACTURED: 2012
MANUFACTURER / MODEL NO.: Kahl Press 60-1250	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 C						
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 C						

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 C			

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

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

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

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

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

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Six pellet coolers follow the pellet presses to cool the newly formed pellets down to an acceptable storage temperature.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Wood Pellets	ODT	81.71	

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

MAXIMUM DESIGN (BATCHES / HOUR):

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: Dry Line Hopper	EMISSION SOURCE ID NO: ES-DLH
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): N/A - Fugitive

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dried wood materials aretransferred to the Dry Line Conveyor (ES-DLC).

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: 2014	DATE MANUFACTURED: 2014
MANUFACTURER / MODEL NO.: Enviva Built	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 C						
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: Dry Line Hopper	EMISSION SOURCE ID NO: ES-DLH
	CONTROL DEVICE ID NO(S): N/A- Fugitive
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): N/A - Fugitive

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Dried wood materials are transferred to Dry Line Conveyor (ES-DLC).

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Materials	ODT	10 tph	

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: Dry Line Feed Conveyor	EMISSION SOURCE ID NO: IES-DLC
	CONTROL DEVICE ID NO(S): CD-HM-BF-3
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-4

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dried wood materials are transferred from the dry line feed hopper (ES-DLH) to the exisiting hammermill pre-screens in-feed conveyor.

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: 2014	DATE MANUFACTURED: 2014
MANUFACTURER / MODEL NO.: Enviva Built	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 C						
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: Dry Line Feed Conveyor	EMISSION SOURCE ID NO: ES-DLC
	CONTROL DEVICE ID NO(S): CD-HM-BF-3
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-4

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Dried wood materials are transferred from the dry line feed bin (ES-DLB) to the exisiting hammermill pre-screens in-feed conveyor.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Materials	ODT	10 toh	

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: Bagging System Screening (includes conveyor and two screeners)	EMISSION SOURCE ID NO: ES-BSC-1, BSS1, BSS2
	CONTROL DEVICE ID NO(S): DC-BS-BF-1, DC-BS-BF-2
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-16, EP-17

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Finished product material is transferred using Bagging System Conveyor 1 (ES-BSC-1) into screens ES-BSS-1 and ES-BSS-2.

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: 2015	OPERATION DATE: 2015	DATE MANUFACTURED: 2015
MANUFACTURER / MODEL NO.: Pending	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 C						
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: Bagging System Conveyor	EMISSION SOURCE ID NO: ES-BSC-1
	CONTROL DEVICE ID NO(S): DC-BS-BF-1, DC-BS--BF-2
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-16, EP-17

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Finished product material (pellets) are transferred from the finished product bin onto Bagging System Screeners 1 and 2 (ES-BSS-1, ES-BSS-2).

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Materials	ODT	60 tn/hr	

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 B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: Bagging System Screen 1	EMISSION SOURCE ID NO: ES-BSS1
	CONTROL DEVICE ID NO(S): DC-BS-BF-1
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-16

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Finished product material (pellets) are transferred from conveyor ES-BSC-1 onto screen ES-BSS-1. The screened material is then transferred to bagging system conveyor ES-BSC-2.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Materials	ODT	30 tn/hr	

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: DC-BS-BF-1	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-BSC-1; ES-BSS-1
EMISSION POINT (STACK) ID NO(S): EP-16	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: TBD	MODEL NO: TBD
DATE MANUFACTURED 2015	PROPOSED OPERATION DATE: 2015
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: 2015
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:

A fabric filter dust collector is used to collect dust from the Pellet Bagging System Conveyor 1 and Screen 1.

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

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

BULK PARTICLE DENSITY (LB/FT^3):	INLET TEMPERATURE (°F): MIN MAX Ambient
POLLUTANT LOADING RATE: 0.01 ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (°F): MIN MAX Ambient
INLET AIR FLOW RATE (ACFM): 45000	FILTER MAX OPERATING TEMP. (°F): N/A

NO. OF COMPARTMENTS: 1	NO. OF BAGS PER COMPARTMENT: 412	LENGTH OF BAG (IN.): 144
DIAMETER OF BAG (IN.) 5.75	DRAFT: ☑ INDUCED/NEG. ☐ FORCED/POS.	FILTER SURFACE AREA (FT^2): 6250
AIR TO CLOTH RATIO: 6:1	FILTER MATERIAL: Polyester or Equivalent ☐ WOVEN ☑ FELTED	

DESCRIBE CLEANING PROCEDURES:

☑ AIR PULSE ☐ SONIC
☐ REVERSE FLOW ☐ SIMPLE BAG COLLAPSE
☐ MECHANICAL/SHAKER ☐ RING BAG COLLAPSE
☐ OTHER

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE INCOMING AIR STREAM:

The air stream will contain wood dust particulate emissions.

METHOD FOR DETERMINING WHEN TO CLEAN:

☑ AUTOMATIC ☐ TIMED ☐ MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:

☐ ALARM ☑ INTERNAL INSPECTION ☐ VISIBLE EMISSION ☐ OTHER

SPECIAL CONDITIONS: None

☐ MOISTURE BLINDING ☐ CHEMICAL RESISTIVITY ☐ OTHER

EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES: Per manufacturer recommendations

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

Attach Additional Sheets As Necessary

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: Bagging System Screen 2	EMISSION SOURCE ID NO: ES-BSS-2
	CONTROL DEVICE ID NO(S): DC-BS-BF-2
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-17

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Finished product material (pellets) are transferred from conveyor ES-BSC-1 onto screen ES-BSS-2. The screened material is then transferred to bagging system conveyor ES-BSC-2.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Materials	ODT	30 tn/hr	

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: DC-BS-BF-2	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-BSC-1; ES-BSS-2
EMISSION POINT (STACK) ID NO(S): EP-17	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: TBD	MODEL NO: TBD
DATE MANUFACTURED 2015	PROPOSED OPERATION DATE: 2015
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: 2015
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? (YES) NO

DESCRIBE CONTROL SYSTEM:

A fabric filter dust collector is used to collect dust from the Pellet Bagging System Conveyor 1 and Screen 2.

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

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

BULK PARTICLE DENSITY (LB/FT^3):	INLET TEMPERATURE (°F): MIN MAX Ambient
POLLUTANT LOADING RATE: 0.01 LB/HR (GR/FT^3)	OUTLET TEMPERATURE (°F): MIN MAX Ambient
INLET AIR FLOW RATE (ACFM): 45000	FILTER MAX OPERATING TEMP. (°F): N/A

NO. OF COMPARTMENTS: 1	NO. OF BAGS PER COMPARTMENT: 412	LENGTH OF BAG (IN.): 144
DIAMETER OF BAG (IN.) 5.75	DRAFT: (INDUCED/NEG.) FORCED/POS.	FILTER SURFACE AREA (FT^2): 6250
AIR TO CLOTH RATIO: 6:1	FILTER MATERIAL: Polyester or Equivalent	WOVEN (FELTED)

DESCRIBE CLEANING PROCEDURES:

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

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE INCOMING AIR STREAM:

The air stream will contain wood dust particulate emissions.

METHOD FOR DETERMINING WHEN TO CLEAN:

(AUTOMATIC) TIMED MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:

ALARM (INTERNAL INSPECTION) VISIBLE EMISSION OTHER

SPECIAL CONDITIONS: None

MOISTURE BLINDING CHEMICAL RESISTIVITY OTHER

EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES: Per manufacturer recommendations

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

Attach Additional Sheets As Necessary

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: Bagging System Conveying and Feed Bins	EMISSION SOURCE ID NO: ES-BSC-2, BSC-3, BSB-1, and BSB-2
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): N/A- Fugitive

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Finished product material is transferred to the bagging system bins (ES-BSB-1 and ES-BSB-2) via conveyors ES-BSC-2 and ES-BSC-3. Note that the emissions associated with these units are represented by the drop points from the conveyors to the bins.

EMISSION SOURCE DESCRIPTION: Bagging System Conveying

☐ 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:	2015	OPERATION DATE:	2015	DATE MANUFACTURED:	2015
MANUFACTURER / MODEL NO.: Pending		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 C						
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: Bagging System Conveyor	EMISSION SOURCE ID NO: ES-BSC-2
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): N/A - Fugitive

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Finished product material (pellets) is transferred to ES-BSB-1 or ES-BSC-3.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Materials	ODT	60 tn/hr	

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 B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: Bagging System Conveyor	EMISSION SOURCE ID NO: ES-BSC-3
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): N/A - Fugitive

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Finished product material (pellets) is transferred from ES-BSC-2 to ES-BSB-2.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Materials	ODT	60 tn/hr	

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: Bagging System Bin 1	EMISSION SOURCE ID NO: ES-BSB-1
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): N/A

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Finished product material (pellets) are transferred from ES-BSC-2.

MATERIAL STORED: Wood pellets				DENSITY OF MATERIAL (LB/FT3): 40		
CAPACITY	CUBIC FEET: 100			TONS: 2		
DIMENSIONS (FEET)	HEIGHT:	DIAMETER:	***(OR)***	LENGTH: 7-8'	WIDTH: 7-8'	HEIGHT 6-7'
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY: 30 tph		

PNEUMATICALLY FILLED	**MECHANICALLY FILLED**		**FILLED FROM**
☝ BLOWER	☝ SCREW CONVEYOR		☝ RAILCAR
☝ COMPRESSOR	☝ BELT CONVEYOR (circled)	MOTOR HP:	☝ TRUCK
☝ OTHER:	☝ BUCKET ELEVATOR		☝ STORAGE PILE
	☝ OTHER:		☝ OTHER: (circled) Screen

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS FILLED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO? Direct coupled to a duplex net weigh scale.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 30

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 30

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: Bagging System Bin 2	EMISSION SOURCE ID NO: ES-BSB-2
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): N/A

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Finished product material (pellets) are transferred from ES-BSC-3.

MATERIAL STORED: Wood pellets				DENSITY OF MATERIAL (LB/FT3): 40		
CAPACITY	CUBIC FEET: 100			TONS: 2		
DIMENSIONS (FEET)	HEIGHT:	DIAMETER:	***(OR)***	LENGTH: 7-8'	WIDTH: 7-8'	HEIGHT 6-7'
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY: 30 tph		

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

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS FILLED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO? Direct coupled to a duplex net weigh scale.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 30

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 30

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 Emissions Calculations in Appendix C		
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 Emissions Calculations in Appendix C		

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 Emissions Calculations in Appendix C				

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. Dry Line Hopper (ES-DLH)	10 tph	15A NCAC 02Q .0102 (c)(2)(E) - negligible emissions,
2. Dry Line Conveyor (ES-DLC-1)	10 tph	15A NCAC 02Q .0102 (c)(2)(E) - negligible emissions,
3. Bagging System Conveying (ES-BSC-2, ES-BSC-3, ES-BSB-1 and ES-BSB-2)	60 tph (ES-BSC-2), 30 tph (ES-BSC-3, ES-BSB-1, ES-BSB-2)	15A NCAC 02Q .0102 (c)(2)(E) - negligible emissions,
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Attach Additional Sheets As Necessary

Received
JUN 02 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, attest that this application for Enviva Pellets, Northampton, LLC has been reviewed by me and is accurate, complete and consistent with the information supplied in the engineering plans, calculations, and all other supporting documentation to the best of my knowledge. I further attest that to the best of my knowledge the proposed design has been prepared in accordance with the applicable regulations. Although certain portions of this submittal package may have been developed by other professionals, inclusion of these materials under my seal signifies that I have reviewed this material and have judged it to be consistent with the proposed design. Note: In accordance with NC General Statutes 143-215.6A and 143-215.6B, any person who knowingly makes any false statement, representation, or certification in any application shall be guilty of a Class 2 misdemeanor which may include a fine not to exceed $10,000 as well as civil penalties up to $25,000 per violation.

(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)

NAME: J. Rusty Field
DATE: 5/27/15
COMPANY: ONE Environmental Group
ADDRESS: 1508 Willow Lawn Drive, Suite 200, Richmond, VA 23230
TELEPHONE: 804-303-8784
SIGNATURE:
PAGES CERTIFIED: Entire Application

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

PLACE NORTH CAROLINA SEAL HERE

Attach Additional Sheets As Necessary

Between tabs

APPENDIX B

Enviva Pellets Northampton, LLC

Baseline Emissions Calculations

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

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	51.89	106.86	27.34	27.34	27.34	19.20	162.51	3,341.43	162,118.83
Emergency Generator	ES-EG	0.02	0.02	0.00	0.00	0.00	0.0000	0.0000	2.80	2.80
Fire Water Pump	ES-FWP	0.01	0.01	0.00	0.00	0.00	0.0000	0.0000	2.40	2.40
Hammermills/Nuisance Dust System	ES-HM-1 thru 8/ ES-NDS	-	-	20.27	20.27	20.27	-	12.30	-	-
Pellet Mill Feed Silo	ES-PMFS	-	-	0.38	0.38	0.38	-	-	-	-
Pellet Fines Bin	ES-FB	-	-	0.54	0.54	0.54	-	-	-	-
Pellet Presses and Coolers	ES-CLR1 thru -6	-	-	38.52	35.05	21.19	-	32.61	-	-
Finished Product Handling & Loadout	ES-FPH, PL1,2 PB1-12	-	-	5.33	4.85	2.93	-	-	-	-
Dried Wood Handling	ES-DWH, ES-PP	-	-	0.06	0.03	0.00	-	-	-	-
Diesel Storage Tanks	TK1 & TK2	-	-	-	-	-	-	9.10E-04	-	-
	Total PSD Emissions	**51.92**	**106.90**	**92.45**	**88.47**	**72.66**	**19.20**	**207.42**	**3,346.64**	**162,124.03**
Fugitive (Non-PSD Sources)										
Bark-Hog	ES-BARK	-	-	-	-	-	-	0.21	-	-
Rechipping	ES-CHIP	-	-	-	-	-	-	0.61	-	-
Green Hammermills	ES-RCHIP - 1 and 2	-	-	-	-	-	-	1.07	-	-
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:	**51.92**	**106.90**	**95.12**	**89.80**	**72.86**	**19.20**	**212.03**	**3,346.64**	**162,124.03**

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

Dryer Inputs

Dryer Throughput (@ Dryer Exit)	**551,542**	tons/year
Annual Dried Wood Throughput of Dryer	**457,780**	ODT/year
Max. Hourly Dried Wood Throughput of Dryer	71.71	ODT/hr
Burner Heat Input	175.3	MMBtu/hr
Long Term Percent Hardwood	90.0%	
Long Term Percent Softwood	10.0%	
Short Term Percent Hardwood	90.0%	
Short Term Percent Softwood	10.0%	
Max Potential Annual Heat Input:	**1535628**	**MMBtu/yr**

Criteria Pollutant Calculations:

Pollutant	Biomass Emission Factor (lb/ODT)	Units	Emission Factor Source	Control Efficiency (%)	Emissions (lb/hr)	Emissions (tpy)
CO	0.23	lb/ODT	Calculated from NOR October 18, 2013 Stack Test [(2)]	N/A	16.26	51.9
NO_X	0.47	lb/ODT	Calculated from NOR October 18, 2013 Stack Test [(2)]	N/A	33.48	106.9
$PM/PM_{10}/PM_{2.5}$ Condensible Fraction	0.017	lb/MMBtu	AP-42, Section 1.6 [3]	Included in factor	2.98	13.1
TSP (Filterable)	0.062	lb/ODT	Calculated from Guaranteed WESP Specifications [1]	Included in factor	4.48	14.3
Total TSP (Filterable + Condensible)					7.46	27.3
PM_{10} (Filterable)	0.062	lb/ODT	TSP=PM10=PM2.5	Included in factor	4.48	14.3
Total PM_{10} (Filterable + Condensible)					7.46	27.3
$PM_{2.5}$ (Filterable)	0.062	lb/ODT	TSP=PM10=PM2.5	Included in factor	4.48	14.3
Total $PM_{2.5}$ (Filterable + Condensible)					7.46	27.3
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6 [6]	N/A	4.38	19.2
Uncontrolled Long Term VOC	0.710	lb/ODT	See Note 4	N/A	N/A	162.5
Short Term VOC (as alpha-pinene)	0.710	lb/ODT	See Note 5	See Note 9	50.91	N/A
Lead	0.00	N/A	N/A	Included in factor	0.00	0.0

Note:

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

[2] CO, NOx, and VOC emission factors are calculated from the Northampton October 2013 stack test.

[3] Condensible PM Factor obtained from AP-42, Section 1.6, Table 1.6-1.

[4] Long Term VOC Emissions: Northampton October 2013 stack testing.

[5] Short Term VOC Emissions: Northampton October 2013 stack testing.

[6] No emission factor is provided in AP-42, Section 1.6 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 1.6-2.

[7] Unontrolled non-HAP VOCs represent total VOCs minus HAP emissions.

[8] Total controlled long term VOC emissions represent controlled non-HAP VOC emissions plus HAP emissions.

[9] As a conservative mesaure, no control efficiency assumed for short term emissions.

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

Calculation Inputs:

Total Plant Throughput ODT/yr	459,973
% of Total Throughput to the Hammermills	85%

via AHO test for Dry Hammermill pre-screener bypass

Annual Composition and Throughput

Hammermills Throughput ODT/yr	390,977
Hardwood Composition	90%
Softwood Composition	10%

Short Term Composition and Throughput

ODT/hr	71.71
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	Short-term EF [3] (lb/ODT)	Annual EF[1] (lb/ODT)	EF Source	(lb/hr)	(tpy)
VOC and Alpha Pinene	N/A	N/A	N/A	N/A	0.063	1	0.063	0.06	Stack Test	4.51	12.30
									Total VOC	**4.51**	**12.30**

Notes:

[1] Stack test and Long-term VOC: VOC Emission factor obtained from Ahoskie July 2013 stack testing.

[3] Short-term VOCs: VOC Emission factor obtained from Ahoskie July 2013 stack testing.

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

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	459,973
Hardwood Composition	90%
Softwood Composition	10%

Short Term Composition and Throughput

ODT/hr	71.71
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	Short-term EF [3] (lb/ODT)	Annual EF [1] (lb/ODT)	EF Source	(lb/hr)	(tpy)
VOC as alpha-pinene	N/A	N/A	N/A	N/A	0.142	[1]	0.142	0.14	stack test	10.17	32.61
									Total VOC	**10.17**	**32.61**

Notes:

[1] Stack test and Long-term VOC: VOC emissions from Enviva Northampton September 2013 engineering stack test results.

[3] Short-term VOCs: VOC emissions from Enviva Northampton September 2013 engineering stack test results.

TABLE B-9
BARK HOG
ENVIVA PELLETS NORTHAMPTON

Annual Throughput of Bark Hog	92,132	tons/year (dry wood)[1]
Dryer Throughput	71.71	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[6]	
		(lb/hr)	(tpy)
THC as Carbon[2]	0.0041	2.940E-01	0.19
THC as alpha-Pinene[3]	0.0047	**3.337E-01**	0.21
PM[4]	N/A	**N/A**	**N/A**
Methanol[2]	0.0010	**7.171E-02**	0.05

[1] The annual throughput used for the chipper is calculated as 12% of dryer throughput, adjusted for moisture content (wet basis). 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-CHIP-1) - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLETS NORTHAMPTON

Annual Throughput to ES-CHIP-1	527,641	tn/yr
Moisture Content:	50%	
Annual Throughput to ES-CHIP-1	263,820	tons/year (dry wood)[1]
Short-term Throughput of Chipper	71.71	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[5]	
		(lb/hr)	(tpy)
THC as Carbon[2]	0.0041	2.940E-01	0.54
THC as alpha-Pinene[3]	0.0047	**3.337E-01**	0.61
PM[4]	N/A	**N/A**	**N/A**
Methanol[2]	0.0010	**7.171E-02**	**0.13**

[1] The hourly and annual throughputs used for the chipper are conservatively assumed to be the same as the annual throughput of the dryer (note that 50% of the dryer throughput normally comes from purchased chips).

[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 HAMMERMILLS (ES-RCHP 1 and 2) - VOC, HAP, AND TAP EMISSIONS

ENVIVA PELLETS NORTHAMPTON

Combined Annual Throughput to ES-RCHP-1,2	915,560	tn/yr
Moisture Content:	50%	
Annual Throughput to ES-CHP2	457,780	tons/year (dry wood)[1]
Short-term Throughput of Green Hammermill	71.71	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[5]	
		(lb/hr)	(tpy)
THC as Carbon[2]	0.0041	2.940E-01	0.94
THC as alpha-Pinene[3]	0.0047	**3.337E-01**	1.07
PM[4]	N/A	**N/A**	**N/A**
Methanol[2]	0.0010	**7.171E-02**	**0.23**

[1] The hourly and annual throughput used for the hammermills is assumed to be the same as the annual throughput of the dryer. Note that the throughputs listed above are throughputs that are allocated across both hammermills.

[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 NORTHAMPTON

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)
Hammermills 1-3	ES-HM-1 through 3	CD-HM-BF-1	45000	0.004	8,760	100%	100%	1.54	6.76	1.54	6.76	1.54	6.76
Hammermills 4-6	ES-HM-4 through 6	CD-HM-BF-2	45000	0.004	8,760	100%	100%	1.54	6.76	1.54	6.76	1.54	6.76
Hammermills 7, 8, NDS	ES-HM-7 and 8, ES-NDS	CD-HM-BF-3	45,000	0.004	8,760	100%	100%	1.54	6.76	1.54	6.76	1.54	6.76
Pellet Mill Feed Silo Bin Vent Filter	ES-PMFS	CD-PMFS-BV	2,500	0.004	8,760	100%	100%	0.09	0.38	0.09	0.38	0.09	0.38
Pellet Mill Fines Bin Bin Vent Filter	ES-FB	CD-FB-BV	3,600	0.004	8,760	100%	100%	0.12	0.54	0.12	0.54	0.12	0.54
Pellet Coolers Cyclone 1	ES-CLR-1	CD-CLR-1	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Pellet Coolers Cyclone 2	ES-CLR-2	CD-CLR-2	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Pellet Coolers Cyclone 3	ES-CLR-3	CD-CLR-3	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Pellet Coolers Cyclone 4	ES-CLR-4	CD-CLR-4	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Pellet Coolers Cyclone 5	ES-CLR-5	CD-CLR-5	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Pellet Coolers Cyclone 6	ES-CLR-6	CD-CLR-6	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Finished Product Handing	ES-FPH, ES-PL1,2, ES-PB1-12	CD-FPH-BV	35,500	0.004	8,760	91%	55%	1.22	5.33	1.11	4.85	0.67	2.93
							TOTAL	**14.85**	**65.04**	**13.95**	**61.09**	**10.34**	**45.31**

Note:

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

[2] Pollutant loading provided by Aircon.

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

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

Emergency Generator Emissions (ES-EG)

Equipment and Fuel Characteristics

Engine Output	0.26	MW
Engine Power	350	hp (brake)
Hours of Operation	15	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	8.63E-04
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	0.12	8.63E-04
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	0.12	8.63E-04
NO_x	PSD	8.82E-03	lb/kW-hr (5)	2.30	1.73E-02
SO_2	PSD	15	ppmw (3)	3.81E-03	2.86E-05
CO	PSD	7.72E-03	lb/kW-hr (2)	2.01	1.51E-02
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	6.15E-03	4.61E-05
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.88E-03	1.41E-05
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	2.27E-04	1.70E-06
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	2.29E-03	1.71E-05
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	4.61E-07	3.45E-09
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	9.58E-05	7.18E-07
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.89E-03	2.17E-05
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	4.12E-04	3.09E-06
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	1.00E-03	7.52E-06
m-,p-Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	6.98E-04	5.24E-06
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.89E-03	2.17E-05
Total HAPs				9.49E-03	7.12E-05

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	15	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	7.40E-04
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	0.10	7.40E-04
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	0.10	7.40E-04
NO_x	PSD	8.82E-03	lb/kW-hr (5)	1.97	1.48E-02
SO_2	PSD	15	ppmw (3)	3.26E-03	2.45E-05
CO	PSD	7.72E-03	lb/kW-hr (2)	1.73	1.29E-02
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	5.27E-03	3.95E-05
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.61E-03	1.21E-05
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	1.94E-04	1.46E-06
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	1.96E-03	1.47E-05
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	3.95E-07	2.96E-09
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	8.21E-05	6.16E-07
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.48E-03	1.86E-05
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	3.53E-04	2.65E-06
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	8.59E-04	6.44E-06
m-,p-Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	5.99E-04	4.49E-06
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.48E-03	1.86E-05
Total HAPs				8.13E-03	6.10E-05

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 NORTHAMPTON

Annual Dryer Output Throughput (ODT/yr)	457,780
Maxium Dry Line Annual Throughput (ODT/yr)	2,193
Dryer Throughput Plus Dry-line Throughput (ODT/yr)	459,973
Amount of Fines Diverted from Hammermills	15.0%
Annual Hammermill Throughput (ODT/yr)	390,977
Pellet Press Throughput (ODT/yr)	459,973
Max Dryer Short-Term Throughput (ODT/hr)	71.710
Dry-line Feed Throughput (ODT/hr)	0.000
Max Hammermill and Pellet Press Throughput (ODT/hr)	71.710
Dryer Output Moisture Content:	17%
Pellet Mill Output Moisture Content:	7%

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 Dryer Collection Conveyor Belt	Enclosed	Reduction to 2 mph mean wind speed	86.40	551,542	3.1E-03	9.9E-03	1.5E-03	4.7E-03	2.2E-04	7.1E-04
DP2	ES-DWH	Pre-screen Feeder Fines Overs to Hammermills Infeed and Distribution	Enclosed	Reduction to 2 mph mean wind speed	12.96	83,128	4.7E-04	1.5E-03	2.2E-04	7.1E-04	3.3E-05	1.1E-04
DP3	ES-DWH	Hammermills Cyclone Diverter Gates to Hammermills System Discharge Collection Conveyor Belt	Enclosed	Reduction to 2 mph mean wind speed	73.44	471,057	2.6E-03	8.5E-03	1.2E-03	4.0E-03	1.9E-04	6.1E-04
DP4	ES-DWH	Hammermills System Discharge Collection Conveyor Belt to Pellet Mill Feed Silo Infeed Screw	Enclosed	Reduction to 2 mph mean wind speed	86.40	554,184	3.1E-03	1.0E-02	1.5E-03	4.7E-03	2.2E-04	7.1E-04
DP5	ES-DWH	Conveyor Drop Point for Dry Line Throughput to Hammermill Pre-screen	Enclosed	Reduction to 2 mph mean wind speed	0.00	2,643	0.0E+00	4.8E-05	0.0E+00	2.2E-05	0.0E+00	3.4E-06
DP6	ES-PP	Drop Emissions from Pellet Presses to Pellet Press Collection Conveyors	Enclosed	Reduction to 2 mph mean wind speed	77.11	494,595	9.6E-03	3.1E-02	4.5E-03	1.5E-02	6.9E-04	2.2E-03
						TOTAL	**1.9E-02**	**6.1E-02**	**9.0E-03**	**2.9E-02**	**1.4E-03**	**4.3E-03**

Note:

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

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

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

where: E = emission factor (lb/ton)

k = particle size multiplier (dimensionless) for PM	0.74	
k = particle size multiplier (dimensionless) for PM_{10}	0.35	
k = particle size multiplier (dimensionless) for $PM_{2.5}$	0.053	
U = mean wind speed (mph)	2.00	
	Dryer Exit	Pellet Press Exit
M = material moisture content (%)	17	7
E for PM (lb/ton) =	3.6E-05	1.2E-04
E for PM_{10} (lb/ton) =	1.7E-05	5.9E-05
E for $PM_{2.5}$ (lb/ton) =	2.6E-06	8.9E-06

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

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	50%	3.52E-05	1.67E-05	2.52E-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	50%	3.52E-05	1.67E-05	2.52E-06	92,132	1.64E-03	7.79E-04	1.17E-04
GDP2	ES-GWH	Transfer Purchased Wood Chips (Wet) to Outdoor Storage	Batch Drop	1	0.74	0.35	0.053	6.3	50%	3.52E-05	1.67E-05	2.52E-06	512,828	2.28E-03	1.08E-03	1.63E-04
GDP2	ES-GWH	Drop Points via Conveying from Chip Pile to Dryer	Batch Drop	5	0.74	0.35	0.053	6.0	50%	3.31E-05	1.57E-05	2.37E-06	967,807	2.03E-02	9.61E-03	1.45E-03
		Total Emissions												**2.42E-02**	**1.15E-02**	**1.73E-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 NORTHAMPTON

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	264	0.11	1.51	7.55E-04
TK02	Fire Water Pump Fuel Oil Tank[2]	500	3	10	Horizontal	227	0.45	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 NORTHAMPTON

Operating Data:

Dryer Heat Input	1535628.00 MMBtu/yr
Emergency Generator Output	350 bhp
Operating Schedule	15 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	15 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	3	1.13E-04	2.26E-05	3	3
ES-FWP	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	2	9.70E-05	1.94E-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
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.

APPENDIX C

Enviva Pellets Northampton, LLC

Modified Source Emissions Calculations

TABLE C-1
FACILITY-WIDE CRITERIA POLLUTANT SUMMARY
ENVIVA PELLETS NORTHAMPTON

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	60.95	125.50	29.84	29.84	29.84	19.20	209.88	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
Hammermills/Nuisance Dust System	ES-HM-1 thru 8/ ES-NDS	-	-	20.27	20.27	20.27	-	24.71	-	-
Pellet Mill Feed Silo	ES-PMFS	-	-	0.38	0.38	0.38	-	-	-	-
Pellet Fines Bin	ES-FB	-	-	0.54	0.54	0.54	-	-	-	-
Pellet Presses and Coolers	ES-CLR1 thru -6	-	-	38.52	35.05	21.19	-	142.86	-	-
Finished Product Handling & Loadout	ES-FPH, PL1,2 PB1-12	-	-	5.33	4.85	2.93	-	-	-	-
Finished Product Bagging Screening	ES-BSC-1, ES-BSS-1, 2	-	-	33.79	30.75	18.58	-	-	-	-
Dried Wood Handling	ES-DWH, ES-PP	-	-	0.12	0.06	0.01	-	-	-	-
Diesel Storage Tanks	TK1 & TK2	-	-	-	-	-	-	9.10E-04	-	-
	Total PSD Emissions	**61.88**	**126.57**	**128.84**	**121.79**	**93.79**	**19.20**	**377.46**	**3,514.80**	**162,292.20**
Fugitive (Non-PSD Sources)										
Bark-Hog	ES-BARK	-	-	-	-	-	-	0.30	-	-
Chipping	ES-CHIP	-	-	-	-	-	-	1.25	-	-
Green Hammermills	ES-RCHIP - 1 and 2	-	-	-	-	-	-	1.25	-	-
Green Wood Handling	ES-GWH	-	-	0.03	0.01	0.00	-	-	-	-
Green Wood Piles	ES-GWSP1	-	-	2.65	1.33	0.20	-	2.93	-	-
	Total Facility Emisions:	**61.88**	**126.57**	**131.52**	**123.13**	**93.99**	**19.20**	**382.89**	**3,514.80**	**162,292.20**

TABLE C-2
FACILITYWIDE HAP EMISSIONS SUMMARY
ENVIVA PELLETS NORTHAMPTON

Description	Dryer (tpy)	ES-HM1 thru 8 (tpy)	ES-CLR1 thru 6 (tpy)	ES-EG (tpy)	ES-FWP (tpy)	ES-BARK (tpy)	ES-CHIP-1 (tpy)	ES-RCHIP-1,2 (tpy)	Total (tpy)
1,3-Butadiene	-	-	-	2.39E-05	2.05E-05	-	-	-	4.45E-05
Acetaldehyde	6.77E+00	0.00E+00	0.00E+00	4.70E-04	4.03E-04	-	-	-	6.77E+00
Acrolein	0.00E+00	1.08E+00	0.00E+00	5.67E-05	4.86E-05	-	-	-	1.08E+00
Benzene	-	-	-	5.71E-04	4.90E-04	-	-	-	1.06E-03
Formaldehyde	1.26E+01	0.00E+00	1.11E+00	7.23E-04	6.20E-04	-	-	-	1.37E+01
m-,p-Xylene	-	-	-	1.75E-04	1.50E-04	-	-	-	3.24E-04
Methanol	9.93E+00	9.41E-01	3.58E+00	-	-	0.06	0.27	0.27	1.51E+01
Propionaldehyde	1.17E+00	0.00E+00	0.00E+00	-	-	-	-	-	1.17E+00
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	**30.51**	**2.02**	**4.69**	**0.002**	**0.002**	**0.06**	**0.27**	**0.27**	**37.82**

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

TAP Emissions

Description		Dryer			Hammermills			Pellet Coolers			Emergency Generator			Fire Water Pump			Total		
Pollutant	CAS Number	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)
1,3-Butadiene	106-99-0			0.00E+00									4.79E-02			4.11E-02			8.90E-02
Acetaldehyde	75-07-0	3.34E+00		1.35E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.88E-03			1.61E-03			3.34E+00		
Acrolein	107-02-8	0.00E+00			3.31E-01	7.94E+00	2.15E+03	0.00E+00	0.00E+00	0.00E+00	2.27E-04			1.94E-04			3.31E-01		
Arsenic				0.00E+00															0.00E+00
Benzene	71-43-2			0.00E+00									1.14E+00			9.80E-01			2.12E+00
Benzo(a)pyrene	50-32-8			0.00E+00									2.30E-04			1.97E-04			4.28E-04
Beryllium metal (un-reacted) (Also include in BEC)				0.00E+00															0.00E+00
Cadmium Metal (elemental un-reacted) –(Add w/CDC)				0.00E+00															0.00E+00
Carbon Tetrachloride				0.00E+00															0.00E+00
Chlorine		0.00E+00	0.00E+00														0.00E+00	0.00E+00	
Chlorobenzene			0.00E+00															0.00E+00	
Chloroform	67-66-3			0.00E+00															0.00E+00
Chromic acid (Chromium VI)	7738-94-5		0.00E+00															0.00E+00	
Di(2-ethylhexyl)phthalate (DEHP)			0.00E+00															0.00E+00	
Ethylene dichloride (1,2-dichloroethane)				0.00E+00															0.00E+00
Formaldehyde	50-00-0	6.23E+00			0.00E+00	0.00E+00	0.00E+00	2.90E-01	6.97E+00	2.22E+03	2.89E-03			2.48E-03			6.52E+00		
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8				0.00E+00															0.00E+00
Hydrogen chloride (hydrochloric acid)		0.00E+00															0.00E+00		
Manganese & compounds			0.00E+00															0.00E+00	
Mercury, vapor (Include in Mercury&Compds)			0.00E+00															0.00E+00	
Methyl chloroform (1,1,1 trichloroethane)		0.00E+00	0.00E+00														0.00E+00	0.00E+00	
Methyl ethyl ketone		0.00E+00	0.00E+00														0.00E+00	0.00E+00	
m-,p-Xylene	1330-20-7	0.00E+00	0.00E+00								6.98E-04	1.68E-02	3.49E-01	5.99E-04	1.44E-02	2.99E-01	1.30E-03	3.11E-02	
Methyl isobutyl ketone	108-10-1	0.00E+00	0.00E+00														0.00E+00	0.00E+00	
Methylene chloride	75-09-2	0.00E+00		0.00E+00													0.00E+00		0.00E+00
Nickel metal (Component of Nickel & Compounds)			0.00E+00															0.00E+00	
Pentachlorophenol		0.00E+00	0.00E+00														0.00E+00	0.00E+00	
Perchloroethylene (tetrachloroethylene)				0.00E+00															0.00E+00
Phenol	108-95-2	0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00							0.00E+00		
Polychlorinated biphenyls				0.00E+00															0.00E+00
Styrene	100-42-5	0.00E+00															0.00E+00		
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-				0.00E+00															0.00E+00
Toluene	108-88-3		0.00E+00									2.40E-02			2.06E-02			4.47E-02	
Trichloroethylene				0.00E+00															0.00E+00
Trichlorofluoromethane (CFC 111)		0.00E+00															0.00E+00		
Vinyl chloride				0.00E+00															0.00E+00

TPER Comparison Table

Pollutant	CAS Number	Total			TPER (2Q .0711)			Modeling Required?
		(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	
1,3-Butadiene	106-99-0			8.90E-02			1.10E+01	No
Acetaldehyde	75-07-0	3.34E+00			6.80E+00			No
Acrolein	107-02-8	3.31E-01			2.00E-02			Yes
Arsenic				0.00E+00			1.60E-02	No
Benzene	71-43-2			2.12E+00			8.10E+00	No
Benzo(a)pyrene	50-32-8			4.28E-04			2.20E+00	No
Beryllium				0.00E+00			2.80E-01	No
Cadmium				0.00E+00			3.70E-01	No
Carbon Tetrachloride				0.00E+00			4.60E+02	No
Chlorine		0.00E+00	0.00E+00		2.30E-01	7.90E-01		No
Chlorobenzene			0.00E+00			4.60E+01		No
Chloroform	67-66-3			0.00E+00			2.90E+02	No
Chromic acid (Chromium VI)	7738-94-5		0.00E+00			1.30E-02		No
Di(2-ethylhexyl)phthalate (DEHP)			0.00E+00			6.30E-01		No
Ethylene dichloride (1,2-dichloroethane)				0.00E+00			2.60E+02	No
Formaldehyde	50-00-0	6.52E+00			4.00E-02			Yes
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8				0.00E+00			5.10E-03	No
Hydrogen chloride (hydrochloric acid)		0.00E+00			1.80E-01			No
Manganese & compounds			0.00E+00			6.30E-01		No
Mercury, vapor (Include in Mercury&Compds)			0.00E+00			1.30E-02		No
Methyl chloroform (1,1,1 trichloroethane)		0.00E+00	0.00E+00		6.40E+01	2.50E+02		No
Methyl ethyl ketone		0.00E+00	0.00E+00		2.24E+01	7.80E+01		No
Xylene	1330-20-7	1.30E-03	3.11E-02		1.64E+01	5.70E+01		No
Methyl isobutyl ketone	108-10-1	0.00E+00	0.00E+00		7.60E+00	5.20E+01		No
Methylene chloride	75-09-2	0.00E+00		0.00E+00	3.90E-01		1.60E+03	No
Nickel metal (Component of Nickel & Compounds)			0.00E+00			1.30E-01		No
Pentachlorophenol		0.00E+00	0.00E+00		6.40E-03	6.30E-02		No
Perchloroethylene (tetrachloroethylene)				0.00E+00			1.30E+04	No
Phenol	108-95-2	0.00E+00			2.40E-01			No
Polychlorinated biphenyls				0.00E+00			5.60E+00	No
Styrene	100-42-5	0.00E+00			2.70E+00			No
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-				0.00E+00			2.00E-04	No
Toluene	108-88-3		4.47E-02			9.80E+01		No
Trichloroethylene				0.00E+00			4.00E+03	No
Trichlorofluoromethane (CFC 111)		0.00E+00			1.40E+02			No
Vinyl chloride				0.00E+00			2.60E+01	No

TABLE C-4
ROTARY DRYER -CRITERIA POLLUTANT EMISSIONS
ENVIVA PELLETS NORTHAMPTON

Dryer Inputs

Dryer Throughput (@ Dryer Exit)	**647,741**	tons/year
Annual Dried Wood Throughput of Dryer	**537,625**	ODT/year
Max. Hourly Dried Wood Throughput of Dryer	71.71	ODT/hr
Burner Heat Input	175.3	MMBtu/hr
Long Term Percent Hardwood	70.0%	
Long Term Percent Softwood	30.0%	
Short Term Percent Hardwood	40.0%	
Short Term Percent Softwood	60.0%	
Max Potential Annual Heat Input:	**1535628**	**MMBtu/yr**

Criteria Pollutant Calculations:

Pollutant	Biomass Emission Factor (lb/ODT)	Units	Emission Factor Source	Control Efficiency (%)	Emissions (lb/hr)	Emissions (tpy)
CO	0.23	lb/ODT	Calculated from NOR October 18, 2013 Stack Test [2]	N/A	16.26	60.9
NO_X	0.47	lb/ODT	Calculated from NOR October 18, 2013 Stack Test [2]	N/A	33.48	125.5
$PM/PM_{10}/PM_{2.5}$ Condensible Fraction	0.017	lb/MMBtu	AP-42, Section 1.6 [3]	Included in factor	2.98	13.1
TSP (Filterable)	0.062	lb/ODT	Calculated from Guaranteed WESP Specifications [1]	Included in factor	4.48	16.8
Total TSP (Filterable + Condensible)					7.46	29.8
PM_{10} (Filterable)	0.062	lb/ODT	TSP=PM10=PM2.5	Included in factor	4.48	16.8
Total PM_{10} (Filterable + Condensible)					7.46	29.8
$PM_{2.5}$ (Filterable)	0.062	lb/ODT	TSP=PM10=PM2.5	Included in factor	4.48	16.8
Total $PM_{2.5}$ (Filterable + Condensible)					7.46	29.8
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6 [6]	N/A	4.38	19.2
Uncontrolled Long Term VOC	0.781	lb/ODT	See Note 4	N/A	N/A	209.9
Short Term VOC (as alpha-pinene)	0.781	lb/ODT	See Note 5	N/A	55.99	N/A
Lead	0.00	N/A	N/A	Included in factor	0.00	0.0

Note:

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

[2] CO, NOx, and VOC emission factors are calculated from the Northampton October 2013 stack test.

[3] Condensible PM Factor obtained from AP-42, Section 1.6, Table 1.6-1.

[4] Long Term VOC Emissions: VOC emission factor obtained from Ahoskie June 2014 stack testing (30% softwood).

[5] Short Term VOC Emissions: VOC emission factor obtained from Ahoskie June 2014 stack testing since Ahoskie VOC emissions were slightly higher than Amory October 2013 Stack Testing

[6] No emission factor is provided in AP-42, Section 1.6 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 1.6-2.

TABLE C-5
ROTARY DRYER -HAP AND TAP WOOD COMBUSTION EMISSIONS
ENVIVA PELLETS NORTHAMPTON

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	537,625
Hardwood Composition	70%
Softwood Composition	30%

Short Term Composition and Throughput

ODT/hr	71.71
Hardwood Composition	40%
Softwood Composition	60%

Control Efficiency:	0%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor Comparison				Weighted Emission Factor[3]			Unonctrolled Emissions		Controlled 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)	(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	3.34E+00	6.77E+00	3.34E+00	6.77E+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	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	6.23E+00	1.26E+01	6.23E+00	1.26E+01
Methanol	67-56-1	Yes	No	Yes	5.62E-03	[1,2]	1.10E-01	[1]	6.82E-02	3.69E-02	AP-42	4.89E+00	9.93E+00	4.89E+00	9.93E+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	5.78E-01	1.17E+00	5.78E-01	1.17E+00
											Total HAPs	**15.04**	**30.51**	**15.04**	**30.51**

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 emissions based on worst case processing of 60% softwood.

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

TABLE C-7
HAMMERMILLS - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLETS NORTHAMPTON

Calculation Inputs:

Total Plant Throughput ODT/yr	625,225
% of Total Throughput to the Hammermills	85%

Annual Composition and Throughput

Hammermills Throughput ODT/yr	531,441
Hardwood Composition	70%
Softwood Composition	30%

Short Term Composition and Throughput

ODT/hr	81.71
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 (3)(4) (lb/ODT)	Annual EF(2) (lb/ODT)	EF Source	(lb/hr)	(tpy)
VOC and Alpha Pinene	N/A	N/A	N/A	N/A	0.093	1	0.732	0.09	Stack Test	59.84	24.71
Acetaldehyde	75-07-0	Yes	Yes	Yes	0.000	2	0.000	0.0000	Stack Test	0.00E+00	0.00E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.004	2	0.004	0.0040	Stack Test	3.31E-01	1.08E+00
Formaldehyde	50-00-0	Yes	Yes	Yes	0.000	2	0.000	0.0000	Stack Test	0.00E+00	0.00E+00
Methanol	67-56-1	Yes	No	Yes	0.004	2	0.004	0.0035	Stack Test	2.89E-01	9.41E-01
Propionaldehyde	123-38-6	Yes	No	Yes	0.000	2	0.000	0.0000	Stack Test	0.00E+00	0.00E+00
									Total VOC	**59.84**	**24.71**
									Total HAPs	**0.62**	**2.02**

Notes:

[1] Stack test and Long-term VOC: VOC emission factor obtained from Ahoskie June 2014 stack testing (30% softwood).

[2] Stack test and Long-term HAPs: HAP & TAP emission factors obtained from Enviva Amory facility October 2013 stack testing. Amory stack testing performed at 60% softwood.

[3] Short-term VOCs: VOC emission factors obtained from Amory October 2013 Stack Testing

[4] Short-term HAPs: HAP & TAP emission factors obtained from Enviva Amory facility October 2013 stack testing. Amory stack testing performed at 60% softwood.

TABLE C-8
PELLET PRESSES AND COOLERS - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLETS NORTHAMPTON

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	625,225
Hardwood Composition	70%
Softwood Composition	30%

Short Term Composition and Throughput

ODT/hr	81.71
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 [3][4] (lb/ODT)	Annual EF[2] (lb/ODT)	EF Source	(lb/hr)	(tpy)
VOC as alpha-pinene	N/A	N/A	N/A	N/A	4.57E-01	1	1.81E+00	0.46	stack test	147.52	142.86
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	3.55E-03	2	3.55E-03	3.55E-03	stack test	2.90E-01	1.11E+00
Methanol	67-56-1	Yes	No	Yes	1.15E-02	2	1.15E-02	1.15E-02	stack test	9.36E-01	3.58E+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	**147.52**	**142.86**
									Total HAPs	**1.23**	**4.69**

Notes:

[1] Stack test and Long-term VOC: VOC emission factor obtained from Ahoskie June 2014 stack testing (45% softwood).

[2] Stack test and Long-term HAPs: HAP & TAP emission factors obtained from Enviva Amory facility October 2013 stack testing. Amory stack testing performed at 60% softwood.

[3] Short-term VOCs: VOC emission factor obtained from Amory October 2013 Stack Testing

[4] Short-term HAPs: HAP & TAP emission factors obtained from Enviva Amory facility October 2013 stack testing. Amory stack testing performed at 60% softwood.

TABLE C-9
BARK HOG
ENVIVA PELLETS NORTHAMPTON

Annual Throughput of Bark Hog	129,030	tons/year (dry wood)[1]
Dryer Throughput	71.71	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[6]	
		(lb/hr)	(tpy)
THC as Carbon[2]	0.0041	2.940E-01	0.26
THC as alpha-Pinene[3]	0.0047	**3.337E-01**	0.30
PM[4]	N/A	**N/A**	**N/A**
Methanol[2]	0.0010	**7.171E-02**	0.06

[1] The annual throughput used for the chipper is calculated as 12% of dryer throughput, adjusted for moisture content (wet basis). 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 C-10
ELECTRIC POWERED CHIPPER (ES-CHIP-1) - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLETS NORTHAMPTON

Annual Throughput to ES-CHIP-1	1,075,250	tn/yr
Moisture Content:	50%	
Annual Throughput to ES-CHIP-1	537,625	tons/year (dry wood)[1]
Short-term Throughput of Chipper	71.71	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[5]	
		(lb/hr)	(tpy)
THC as Carbon[2]	0.0041	2.940E-01	1.10
THC as alpha-Pinene[3]	0.0047	**3.337E-01**	1.25
PM[4]	N/A	**N/A**	**N/A**
Methanol[2]	0.0010	**7.171E-02**	**0.27**

[1] The hourly and annual throughputs used for the chipper are conservatively assumed to be the same as the annual throughput of the dryer (note that 50% of the dryer throughput normally comes from purchased chips).

[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 C-11
GREEN HAMMERMILLS (ES-RCHP 1 and 2) - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLETS NORTHAMPTON

Combined Annual Throughput to ES-RCHP-1,2	1,075,250	tn/yr
Moisture Content:	50%	
Annual Throughput to ES-CHP2	537,625	tons/year (dry wood)[1]
Short-term Throughput of Green Hammermill	71.71	tons/hr (dry wood)[1]

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[5]	
		(lb/hr)	(tpy)
THC as Carbon[2]	0.0041	2.940E-01	1.10
THC as alpha-Pinene[3]	0.0047	**3.337E-01**	1.25
PM[4]	N/A	**N/A**	**N/A**
Methanol[2]	0.0010	**7.171E-02**	**0.27**

[1] The hourly and annual throughput used for the hammermills is assumed to be the same as the annual throughput of the dryer. Note that the throughputs listed above are throughputs that are allocated across both hammermills.

[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 C-12
BAGFILTER AND CYCLONE EMISSIONS
ENVIVA PELLETS NORTHAMPTON

Emission Unit	Emission Source ID	Filter. Vent -or- Cyclone ID	Flowrate[1] (cfm)	Pollutant Loading[2] (gr/cf)	Annual Operation (hours)	% PM that is		Emissions					
								PM		PM_{10}[3]		$PM_{2.5}$[3]	
						PM_{10}	$PM_{2.5}$	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Hammermills 1-3	ES-HM-1 through 3, DLC	CD-HM-BF-1	45000	0.004	8,760	100%	100%	1.54	6.76	1.54	6.76	1.54	6.76
Hammermills 4-6	ES-HM-4 through 6	CD-HM-BF-2	45000	0.004	8,760	100%	100%	1.54	6.76	1.54	6.76	1.54	6.76
Hammermills 7, 8, NDS	ES-HM-7 and 8, ES-NDS	CD-HM-BF-3	45,000	0.004	8,760	100%	100%	1.54	6.76	1.54	6.76	1.54	6.76
Pellet Mill Feed Silo Bin Vent Filter	ES-PMFS	CD-PMFS-BV	2,500	0.004	8,760	100%	100%	0.09	0.38	0.09	0.38	0.09	0.38
Pellet Mill Fines Bin Bin Vent Filter	ES-FB	CD-FB-BV	3,600	0.004	8,760	100%	100%	0.12	0.54	0.12	0.54	0.12	0.54
Pellet Coolers Cyclone 1	ES-CLR-1	CD-CLR-1	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Pellet Coolers Cyclone 2	ES-CLR-2	CD-CLR-2	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Pellet Coolers Cyclone 3	ES-CLR-3	CD-CLR-3	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Pellet Coolers Cyclone 4	ES-CLR-4	CD-CLR-4	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Pellet Coolers Cyclone 5	ES-CLR-5	CD-CLR-5	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Pellet Coolers Cyclone 6	ES-CLR-6	CD-CLR-6	17,100	0.01	8,760	91%	55%	1.47	6.42	1.33	5.84	0.81	3.53
Finished Product Handing	ES-FPH, ES-PL1,2, ES-PB1-12	CD-FPH-BV	35,500	0.004	8,760	91%	55%	1.22	5.33	1.11	4.85	0.67	2.93
Finished Product Bagging Screens	ES-BSC-1, ES-BSS-1	CD-BS-BF-1	45,000	0.01	8,760	91%	55%	3.86	16.89	3.51	15.37	2.12	9.29
Finished Product Bagging Screens	ES-BSC-1, ES-BSS-2	CD-BS-BF-2	45,000	0.01	8,760	91%	55%	3.86	16.89	3.51	15.37	2.12	9.29
							TOTAL	**22.56**	**98.83**	**20.97**	**91.84**	**14.59**	**63.89**

Note:

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

[2] Pollutant loading provided by Aircon.

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

TABLE C-13
EMERGENCY GENERATOR AND FIRE PUMP
ENVIVA PELLETS NORTHAMPTON

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 C-14
DRIED WOOD HANDLING DROP POINTEMISSIONS
ENVIVA PELLETS NORTHAMPTON

Annual Dryer Output Throughput (ODT/yr)	537,625
Maxium Dry Line Annual Throughput (ODT/yr)	87,600
Dryer Throughput Plus Dry-line Throughput (ODT/yr)	625,225
Amount of Fines Diverted from Hammermills	15.0%
Annual Hammermill Throughput (ODT/yr)	531,441
Pellet Press Throughput (ODT/yr)	625,225
Max Dryer Short-Term Throughput (ODT/hr)	71.710
Dry-line Feed Throughput (ODT/hr)	10.000
Max Hammermill and Pellet Press Throughput (ODT/hr)	81.710
Max Bagging System Throughput (ODT/hr)	60.000
Dryer Output Moisture Content:	17%
Pellet Mill Output Moisture Content:	7%

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 Dryer Collection Conveyor Belt	Enclosed	Reduction to 2 mph mean wind speed	86.40	647,741	3.1E-03	1.2E-02	1.5E-03	5.5E-03	2.2E-04	8.3E-04
DP2	ES-DWH	Pre-screen Feeder Fines Overs to Hammermills Infeed and Distribution	Enclosed	Reduction to 2 mph mean wind speed	14.77	112,992	5.3E-04	2.0E-03	2.5E-04	9.6E-04	3.8E-05	1.5E-04
DP3	ES-DWH	Hammermills Cyclone Diverter Gates to Hammermills System Discharge Collection Conveyor Belt	Enclosed	Reduction to 2 mph mean wind speed	83.68	640,291	3.0E-03	1.2E-02	1.4E-03	5.4E-03	2.2E-04	8.2E-04
DP4	ES-DWH	Hammermills System Discharge Collection Conveyor Belt to Pellet Mill Feed Silo Infeed Screw	Enclosed	Reduction to 2 mph mean wind speed	98.45	753,283	3.5E-03	1.4E-02	1.7E-03	6.4E-03	2.5E-04	9.7E-04
DP5	ES-DWH	Drop Point for Dry Line Transfer from Dry Line Hopper to Dry Line Conveyor	Enclosed	Reduction to 2 mph mean wind speed	12.05	105,542	4.3E-04	1.9E-03	2.0E-04	9.0E-04	3.1E-05	1.4E-04
DP6	ES-PP	Drop Emissions from Pellet Presses to Pellet Press Collection Conveyors	Enclosed	Reduction to 2 mph mean wind speed	87.86	672,285	1.1E-02	4.2E-02	5.2E-03	2.0E-02	7.8E-04	3.0E-03
DP7	ES-DWH	Drop Emissions from Bagging System Coneyors to Bagging System Bins	Enclosed	Reduction to 2 mph mean wind speed	64.52	625,225	8.0E-03	3.9E-02	3.8E-03	1.8E-02	5.8E-04	2.8E-03
						TOTAL	3.0E-02	1.2E-01	1.4E-02	5.7E-02	2.1E-03	8.7E-03

Note:

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

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

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

where: E = emission factor (lb/ton)

k = particle size multiplier (dimensionless) for PM	0.74		
k = particle size multiplier (dimensionless) for PM_{10}	0.35		
k = particle size multiplier (dimensionless) for $PM_{2.5}$	0.053		
U = mean wind speed (mph)	2.00		
		Dryer Exit	Pellet Press Exit
M = material moisture content (%)		17	7
E for PM (lb/ton) =		3.6E-05	1.2E-04
E for PM_{10} (lb/ton) =		1.7E-05	5.9E-05
E for $PM_{2.5}$ (lb/ton) =		2.6E-06	8.9E-06

TABLE C-15
GREEN WOOD HANDLING DROP POINT EXAMPLE EMISSIONS
ENVIVA PELLETS NORTHAMPTON

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	50%	3.52E-05	1.67E-05	2.52E-06	129,030	5.75E-04	2.73E-04	4.11E-05
GDP1	ES-GWH	Drop Points via Conveying from Bark Pile to Dryer	Batch Drop	4	0.74	0.35	0.053	6.3	50%	3.52E-05	1.67E-05	2.52E-06	258,060	4.60E-03	2.18E-03	3.29E-04
GDP2	ES-GWH	Transfer Purchased Wood Chips (Wet) to Outdoor Storage	Batch Drop	1	0.74	0.35	0.053	6.3	50%	3.52E-05	1.67E-05	2.52E-06	537,625	2.39E-03	1.14E-03	1.71E-04
GDP2	ES-GWH	Drop Points via Conveying from Chip Pile to Dryer	Batch Drop	5	0.74	0.35	0.053	6.0	50%	3.31E-05	1.57E-05	2.37E-06	1,075,250	2.25E-02	1.07E-02	1.61E-03
		Total Emissions												**3.01E-02**	**1.43E-02**	**2.15E-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 C-16
TANKS EMISSIONS
ENVIVA PELLETS NORTHAMPTON

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 C-17
POTENTIAL GHG EMISSIONS FROM COMBUSTION SOURCES
ENVIVA PELLETS NORTHAMPTON

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 C-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.

APPENDIX D

Enviva Pellets Northampton, LLC

Toxic Air Pollutant Air Dispersion Modeling Demonstration

TOXICS AIR DISPERSION MODELING ANALYSIS

ENVIVA PELLETS NORTHAMPTON, LLC

NORTHAMPTON COUNTY, NORTH CAROLINA

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May 2015

Project 153401.0073

Environmental solutions delivered uncommonly well

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Enviva Pellets Northampton, LLC (Enviva) currently operates a wood pellet manufacturing facility in Northampton County, NC (Northampton facility) under Title V Operating Permit No. 10203R03, issued on May 13, 2014. Enviva submitted, under separate cover, an air permit application to the North Carolina Division of Air Quality (DAQ) dated May 2015 requesting modifications to the dryer and material handling systems at the plant.

The application for the current air permit assumed a dryer throughput of 71.71 oven dried tons per hour (ODT/hr) and an annual throughput capacity of 537,625 ODT/yr. However, as demonstrated in the most recent stack test dated October 2013, the dryer system was only capable of achieving a production rate of approximately 60 ODT/hr due to equipment constraints. Enviva is proposing to make modifications to the dryer system to increase the dryer production rates to the design capacity of 71.71 ODT/hr.

In addition, Enviva is also proposing to install and operate a "dry line system" that will allow the facility to introduce pre-dried wood material into the process at the point of the hammermill pre-screens. This pre-dried material would not pass through the facility's dryer. Finally, Enviva is proposing to install a new finished product bagging system for the bagging of pellets for commercial sale.

When considering these process changes, along with an evaluation of toxic air pollutant (TAP) emission factors for actual facility operations, two (2) TAPs have emissions in excess of their respective Toxics Permitting Emission Rates (TPER). Table 1-1 presents the TPER comparison for each TAP emitted from the facility.

TABLE 1-1. TPER COMPARISON TABLE

Pollutant	CAS Number	Facility-Wide Emissions			TPER (2Q .0711)			Modeling Required?
		(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	
1,3-Butadiene	106-99-0			8.90E-02			1.10E+01	No
Acetaldehyde	75-07-0	3.34E+00			6.80E+00			No
Acrolein	107-02-8	3.31E-01			2.00E-02			Yes
Benzene	71-43-2			2.12E+00			8.10E+00	No
Benzo(a)pyrene	50-32-8			4.28E-04			2.20E+00	No
Formaldehyde	50-00-0	6.52E+00			4.00E-02			Yes
Xylene	1330-20-7	1.30E-03	3.11E-02		1.64E+01	5.70E+01		No
Toluene	108-88-3		4.47E-02			9.80E+01		No

As such, a dispersion modeling analysis was required in order to demonstrate that those TAPs will be in compliance with their respective Acceptable Ambient Levels (AAL). The remainder of this report contains the documentation required for this modeled compliance demonstration.

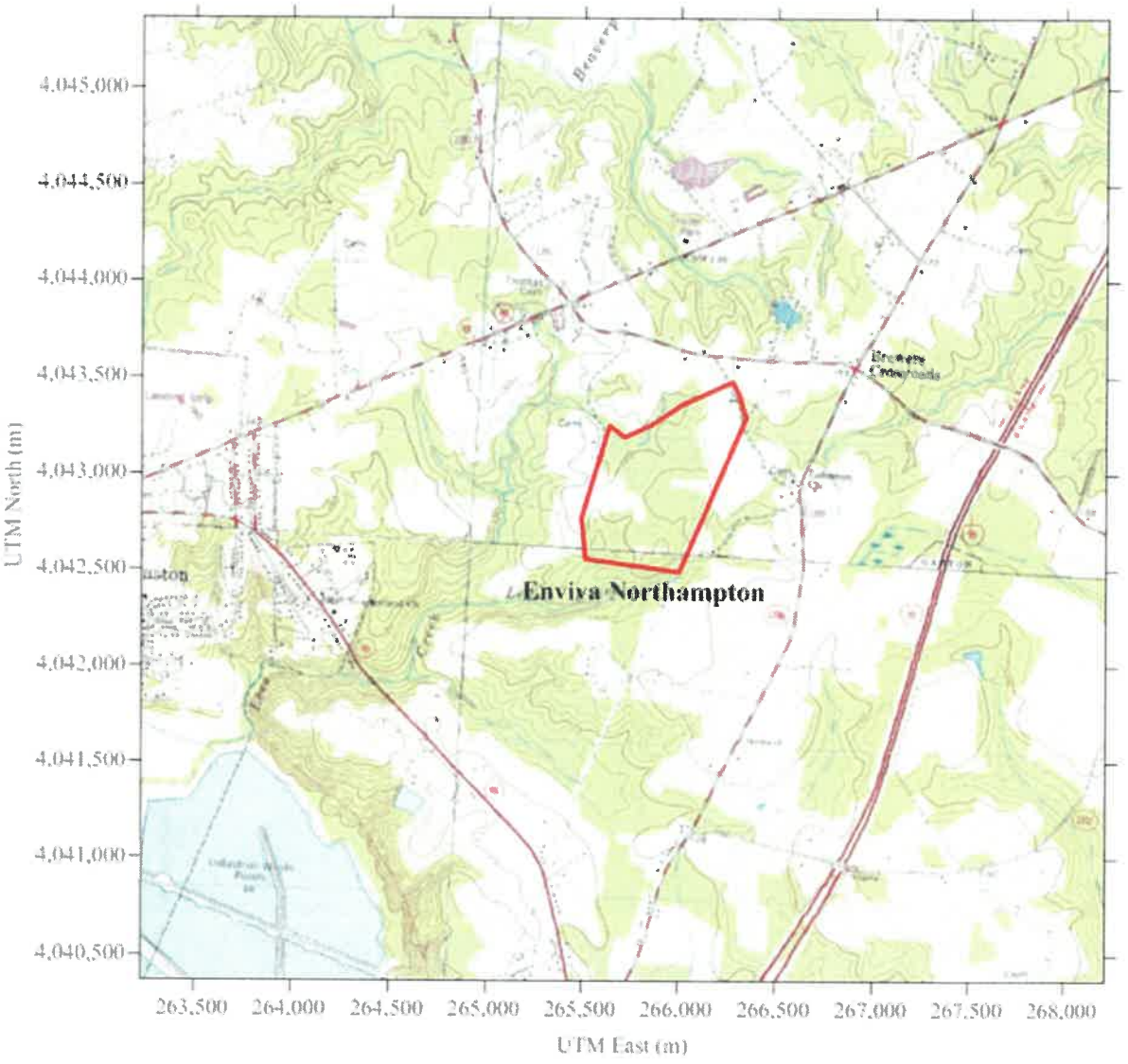
This section presents a description of the Enviva Northampton facility location and site characteristics required as part of the air dispersion modeling evaluation.

2.1. FACILITY LOCATION

Enviva operates a wood pellets manufacturing plant in Northampton County, near Garysburg, NC. The Northampton plant consists of a wood drying system along with various material handling operations and emergency equipment.

Figure 2-1 provides a map of the area surrounding the Northampton property. The approximate central Universal Transverse Mercator (UTM) coordinates of the facility are 265.7 kilometers (km) east and 4,042.9 km north in Zone 18 (NAD 83). A signed survey of the property is included in Appendix C.

FIGURE 2-1. TOPOGRAPHIC MAP OF THE ENVIVA NORTHAMPTON AREA



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

Potential emissions of 2 compounds regulated under 15A NCAC 2Q .0700 (NC Air Toxics) exceed their toxics permitting emission rates (TPER) and this air dispersion modeling evaluation has been conducted to demonstrate compliance with all applicable AAL.

This section presents the input data and modeling methodology utilized in the TAP modeling compliance demonstration. The modeling methodology conforms to the Guidelines for Evaluating the Air Quality Impacts of Toxic Pollutants in North Carolina (February 2014) and more recent changes posted on NCDAQ's Air Quality Analysis Branch (AQAB) website. In lieu of a modeling protocol, a protocol checklist is provided in Appendix A.

3.1. MODEL SELECTION

The AERMOD dispersion model (version 14134) was used to calculate off-property concentrations in the modeling analysis. AERMOD was promulgated as the preferred model in 40 CFR 51, Appendix W on November 9, 2005 and is recommended by the NCDAQ for evaluating criteria and toxic air pollutant concentrations from industrial facilities such as Enviva's Northampton plant.[1] AERMOD was run using the regulatory default option, which automatically implements NCDAQ and U.S. EPA recommended model options.

3.2. SOURCE DESCRIPTION

Table 3-1 presents a table of the modeled sources and their locations at the Northampton plant. All locations are expressed in UTM Zone 18 (NAD83) coordinates.

TABLE 3-1. MODELED SOURCE LOCATIONS

Model ID	Description	UTM-E (m)	UTM-N (m)	Elevation (m)
EP1	Wet ESP Stack	266,018.7	4,042,780.2	48.91
EP2	Hammermill Filter #1	266,040.7	4,042,879.0	49.02
EP3	Hammermill Filter #2	266,040.9	4,042,883.2	49.05
EP4	Hammermill Filter #3	266,041.3	4,042,893.2	49.13
EP7	Pellet Cooler #1 Aspiration Stack	266,109.2	4,042,965.1	50.36
EP8	Pellet Cooler #2 Aspiration Stack	266,104.2	4,042,965.3	50.32
EP9	Pellet Cooler #3 Aspiration Stack	266,099.3	4,042,965.5	50.29
EP10	Pellet Cooler #4 Aspiration Stack	266,093.0	4,042,965.8	50.24
EP11	Pellet Cooler #5 Aspiration Stack	266,087.3	4,042,966.0	50.20
EP12	Pellet Cooler #6 Aspiration Stack	266,082.3	4,042,966.2	50.15
EP14	Emergency Generator	266,061.4	4,042,777.6	48.75
EP15	Diesel Fire Pump	266,054.2	4,043,084.1	46.90

Tables 3-2 and 3-3 present the stack parameters and emission rates input to the model for each of the sources. The hammermill baghouses (EP2-4) and firewater pump (EP15) discharges are

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

oriented horizontally and thus, per NCDAQ guidance, were modeled with an exit velocity of 0.01 m/s. All other emission points at the site are unobstructed, vertical releases.

TABLE 3-2. MODELED SOURCE PARAMETERS

Model ID	Stack Height (m)	Stack Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
EP1	28.66	352.59	7.58	3.05
EP2	14.78	310.93	0.01	1.62
EP3	14.78	310.93	0.01	1.62
EP4	14.78	310.93	0.01	1.62
EP7	12.19	333.15	17.70	0.76
EP8	12.19	333.15	17.70	0.76
EP9	12.19	333.15	17.70	0.76
EP10	12.19	333.15	17.70	0.76
EP11	12.19	333.15	17.70	0.76
EP12	12.19	333.15	17.70	0.76
EP14	1.77	766.48	78.30	0.10
EP15	3.05	803.15	0.01	0.13

TABLE 3-3. MODELED EMISSION RATES

Model ID	Modeled Emission Rates (lb/hr)	
	ACROLEIN	FORM
EP1	2.93E+00	6.65E+00
EP2	1.77E-01	2.99E-01
EP3	1.77E-01	2.99E-01
EP4	1.18E-01	1.99E-01
EP7	1.49E-01	9.45E-02
EP8	1.49E-01	9.45E-02
EP9	1.49E-01	9.45E-02
EP10	1.49E-01	9.45E-02
EP11	1.49E-01	9.45E-02
EP12	1.49E-01	9.45E-02
EP14	2.27E-04	2.89E-03
EP15	1.94E-04	2.48E-03

Note that the modeled emission rates in many cases exceed the calculated rates in the permit application as they were optimized with respect to the AAL.

3.3. METEOROLOGICAL DATA

The AERMOD modeling results were based on sequential hourly surface observations from Rocky Mount/Wilson, NC and upper air data from Newport, NC. These stations are recommended by NCDAQ for modeling facilities located in Northampton County. The base elevation for the surface station is 46 m.[2]

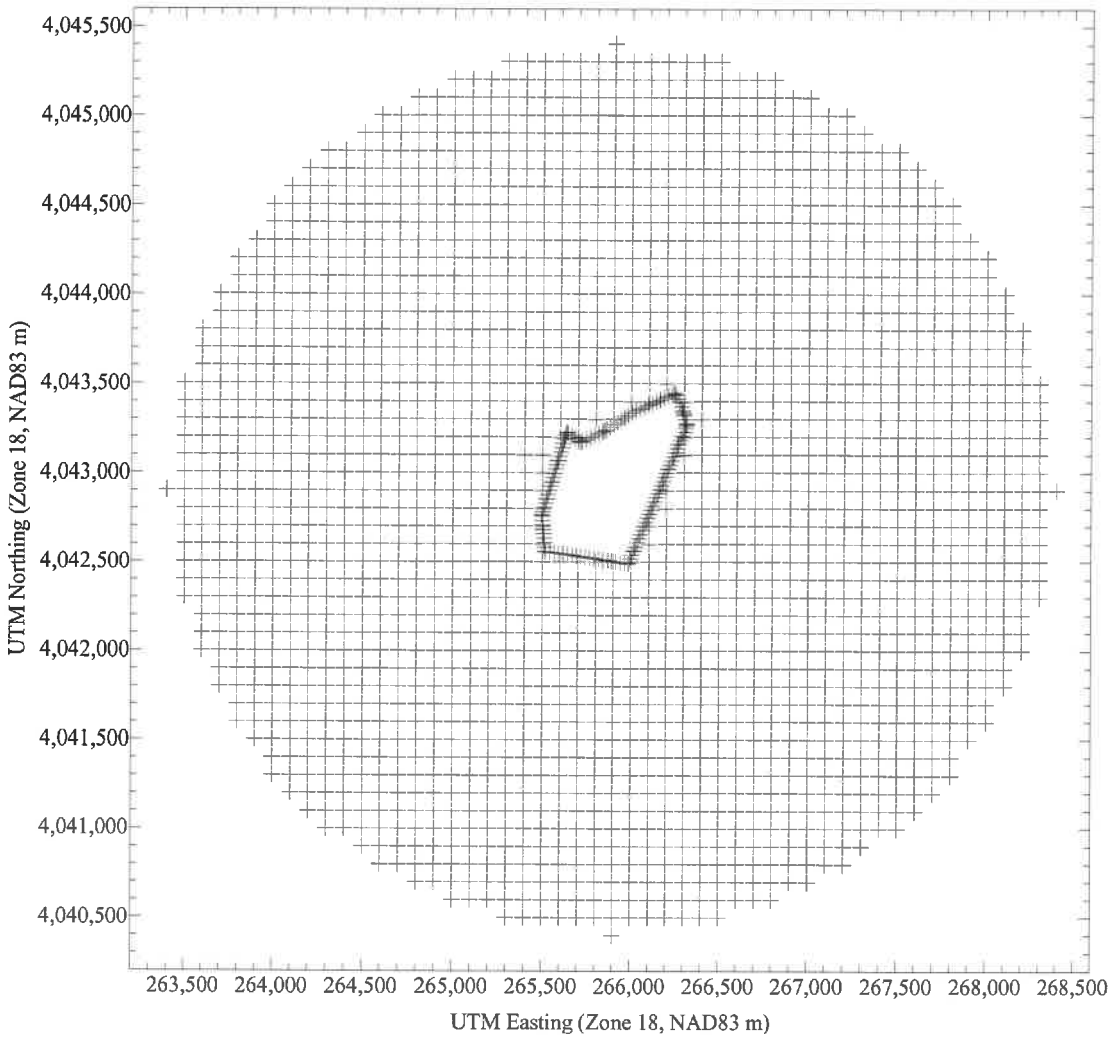
The five (5) most recent years of meteorological data (2010-2014) were downloaded from NCDAQ's website and input to AERMOD. Since both affected TAP have short-term AAL, the modeling analyses utilized all 5 years in a single, concatenated file.

3.4. MODELED RECEPTORS

The receptors included in the modeling analysis consisted of property line receptors, spaced 25 meters (m) apart, and Cartesian receptor points spaced every 100 m, extending out 2.5 kilometers (km) from the center of the facility. There are no public right-of-ways (e.g. roads, railways) traversing the property line, so the same receptor grid was modeled for the one-hour (1-hr) and annual TAP analyses. The impacts were reviewed to ensure that the maximum impacts were captured within the 100 m spaced grid. Figure 3-2 shows the receptors included in the modeling analysis.

[2] http://www.ncair.org/permits/mets/ProfileBaseElevations.pdf

FIGURE 3-2. MODELED RECEPTOR GRID



The AERMOD model is capable of handling both simple and complex terrain. Through the use of the AERMOD terrain preprocessor (AERMAP), AERMOD incorporates not only the receptor heights, but also an effective height (hill height scale) that represents the significant terrain features surrounding a given receptor that could lead to plume recirculation and other terrain interaction.[3]

Receptor terrain elevations input to the model were interpolated from National Elevation Database (NED) data obtained from the USGS. NED data consist of arrays of regularly spaced elevations. The array elevations are at a resolution of 1 arcsecond (approximately 30 m intervals) and were interpolated using the latest version of AERMAP (version 11103) to determine elevations at the defined receptor intervals. The data obtained from the NED files were checked for completeness and spot-checked for accuracy against elevations on corresponding USGS 1:24,000 scale topographical quadrangle maps. AERMAP was also used to establish the base elevation of all Enviva structures and emission sources.

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

3.5. BUILDING DOWNWASH

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

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

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

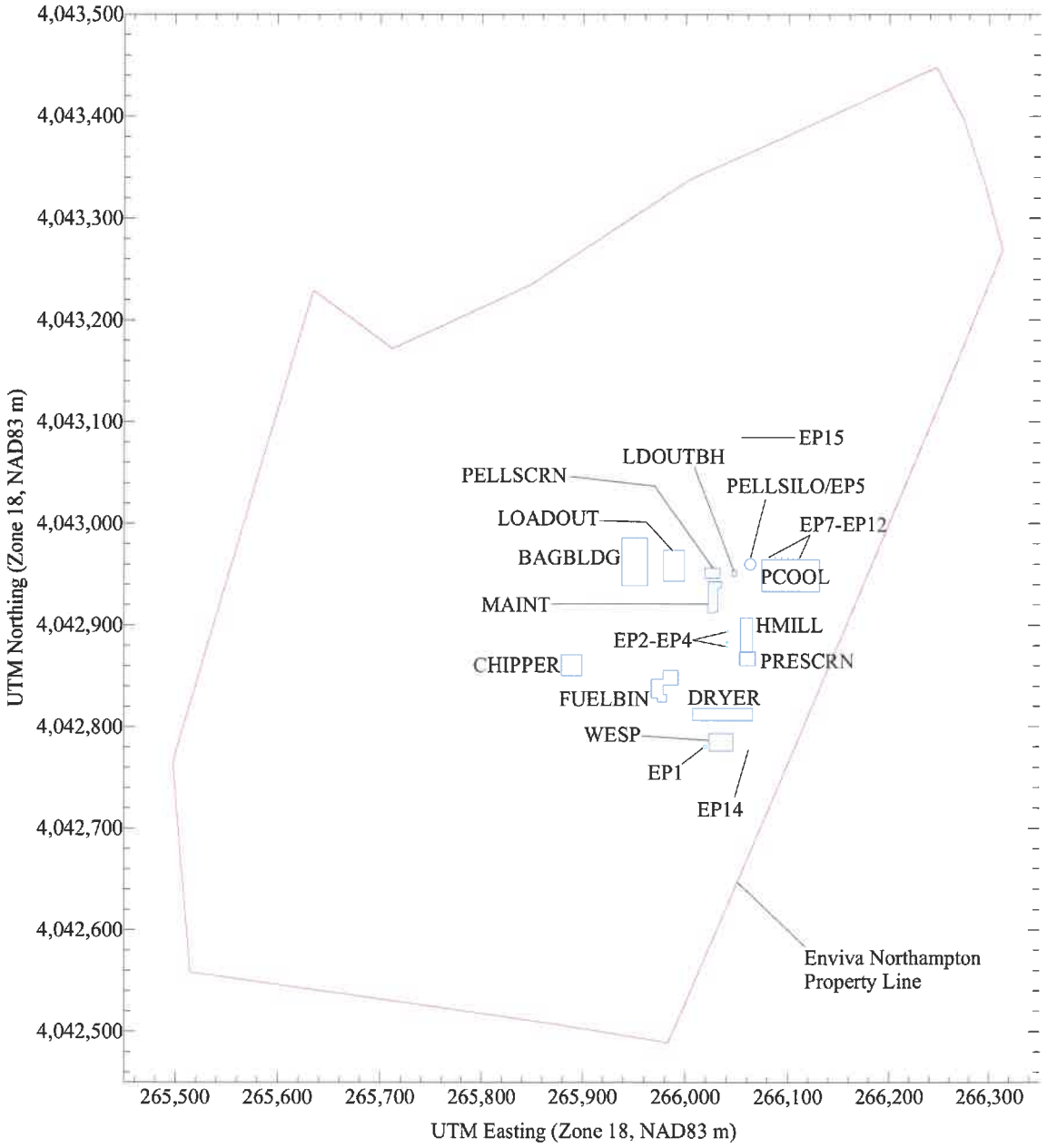
H_{GEP} = minimum GEP stack height,
H = structure height, and
L = lesser dimension of the structure (height or projected width).

This equation is limited to stacks located within 5L of a structure. Stacks located at a distance greater than 5L are not subject to the wake effects of the structure. The wind direction-specific downwash dimensions and the dominant downwash structures used in this analysis are determined using BPIP. In general, the lowest GEP stack height for any source is 65 meters by default.[4] None of the proposed emission units at the Northampton will exceed GEP height.

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

[4] 40 CFR §51.100(ii)

FIGURE 3-3. ENVIVA NORTHAMPTON MODELED SITE LAYOUT



This section presents the results of the TAP dispersion modeling analysis conducted for the Enviva Northampton wood pellet manufacturing facility.

4.1. TAP MODELING RESULTS

Table 4-1 presents the results for each of the modeled TAPs. Since the impacts for each TAP were greater than 50% of the AAL, all 5 years of meteorological data (2010-2014) were modeled.

TABLE 4-1. TAP MODELING RESULTS

Pollutant	Averaging Period	UTM-E (m)	UTM-N (m)	Date/Time (YYMMDDHH)	Maximum Concentration ($\mu g/m^3$)	AAL ($\mu g/m^3$)	% of AAL (%)
Formaldehyde	1-Hour	266,171.10	4,042,931.10	10083106	134.63	150	89.76%
Acrolein	1-Hour	266,171.10	4,042,931.10	10083106	79.50	80	99.38%

The maximum impacts all occur along the facility property line. As shown, all modeled impacts are below their respective AAL and as such, the modified facility will continue be in compliance with all applicable NC TAP regulations. The electronic modeling files used in the TAP analysis are contained on the CD-ROM in Appendix B.

APPENDIX A - MODELING PROTOCOL CHECKLIST

A.1
North Carolina Modeling Protocol Checklist

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

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

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

FACILITY INFORMATION	
Name: Enviva Pellets Northampton, LLC **Facility ID: 6600167** **Address: 874 Lebanon Church Rd.** **Garysburg, NC 27866**	**Consultant (if applicable): Trinity Consultants** 1 Copley Parkway Suite 310 Morrisville, NC 27560
Contact Name: Joe Harrell	**Contact Name: Jonathan Hill**
Phone Number: 252-209-6032 **Email: joe.harrell@envivabiomass.com**	**Phone Number: 919-462-9693** **Email: jhill@trinityconsultants.com**

GENERAL

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

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

SCREEN LEVEL MODELING

Model: The latest version of the AERSCREEN model must be used. The use of other screening models should be approved by NCDAQ prior to submitting the modeling report.	**NA**
Source / Source emission parameters: Provide a table listing the sources modeled and the applicable source emission parameters. See NC Form 3 – Appendix A.	**NA**
Merged Sources: Identify merged sources and show all appropriate calculations. See Section 3.3	**NA**
GEP Analysis: See Section 3.2 and NC Form 1 – Appendix A	**NA**
Terrain: Indicate the terrain modeled: simple (Section 4.4), and complex (Section 4.5 and NC Form 4 – Appendix A). If complex terrain is within 5 kilometers of the facility, complex terrain must be evaluated. Simple terrain must include terrain elevations if any terrain is greater than the stack base of any source modeled. Simple: _____ Complex:_____	NA
Meteorology: Refer to Section 4.1 for AERSCREEN inputs.	**NA**
Receptors: AERSCREEN – use shortest distance to property boundary for each source modeled and use sufficient range to find maximum (See Section 4.1 (i) and (j)). Terrain above stack base must be evaluated.	**NA**
Modeling Results: For each affected pollutant, modeling results should be summarized, converted to the applicable averaging period (See Table 3), and presented in tabular format indicating compliance status with the applicable AAL, SIL, or NAAQS. See NC Form S5 – Appendix A.	**NA**
Modeling Files: Either electronic or hard copies of AERSCREEN output must be submitted.	**NA**

REFINED LEVEL MODELING

Model: The latest version of AERMOD should be used, and may be found at http://www.epa.gov/scram001/dispersion_prefrec.htm. The use of other refined models must be approved by NCDAQ prior to submitting the modeling report.	**AERMOD 13350**
Source / Source emission parameters: Provide a table listing the sources modeled and the applicable source emission parameters. See NC Form 3 - Appendix A.	**X**
GEP Analysis: Use BPIP-Prime with AERMOD.	**X**
Cavity Impact Analysis: No separate cavity analysis is required when using AERMOD as long as receptors are placed in cavity susceptible areas. See Section 4.2 and 5.2.	**NA**
Terrain: Use digital elevation data from the USGS NED database (http://seamless.usgs.gov/index.php). Use of other sources of terrain elevations or the non-regulatory Flat Terrain option will require prior approval from DAQ AQAB.	**X**
Coordinate System: Specify the coordinate system used (e.g., NAD27, NAD83, etc.) to identify the source, building, and receptor locations. Note: Be sure to specify in the AERMAP input file the correct base datum (NADA) to be used for identifying source input data locations. Clearly note in both the protocol checklist and the modeling report which datum was used.	**NAD83**
Receptors: The receptor grid should be of sufficient size and resolution to identify the maximum pollutant impact. See Section 5.3.	**X**

Meteorology: Indicate the AQAB, pre-processed, 5-year data set used in the modeling demonstration: (See Section 5.5 and Appendix B) AERMOD__RWI 2010-2014_____ If processing your own raw meteorology, then pre-approval from AQAB is required. Additional documentation files (e.g. AERMET stage processing files) will also be necessary. For NC toxics, the modeling demonstration requires only the last year of the standard 5 year data set (e.g., 2005) provided the maximum impacts are less than 50% of the applicable AAL(s).	X
Modeling Results: For each affected pollutant and averaging period, modeling results should be summarized and presented in tabular format indicating compliance status with the applicable AAL, SIL or NAAQS. See NC Form R5 - Appendix A.	X
Modeling Files: Submit input and output files for AERMOD. Also include BPIP-Prime files, AERMAP files, DEM files, and any AERMET input and output files, including raw meteorological data.	X

Comprehensive Application Report for 6600167.15A

Enviva Pellets Northampton, LLC - Garysburg (6600167)

Northampton County

06/02/2015

General Information: Permit/Latest Revision: 10203/ R03

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

Application Dates

Received	Completeness Due	Clock Start	Calculated Issue Due
06/02/2015	07/17/2015	06/02/2015	08/31/2015

Fee Information

Initial amount:	Date received:	Amount Due:	Add. Amt Rcv'd:	Date Rcv'd:
	06/02/2015			

Fund type:	Deposit Slip #:	Location rec'd:	Location deposited:
2333			

Contact Information

Type	Name	Address	City State ZIP	Telephone
Authorized	Royal Smith, Vice President Operations	7200 Wisconsin Avenue, Suite 1000	Bethesda, MD 20814	(240) 482-3770
Technical/Permit	Joe Harrell, Corporate EH&S Manager	142 NC Route 561 East	Ahoskie, NC 27910	(252) 209-6032

Acceptance Criteria

Received?	Acceptance Criteria Description
Yes	Application fee
Yes	Appropriate number of apps submitted
N/A	Zoning Addressed
Yes	Authorized signature
Yes	PE Seal
Yes	Application contains toxic modification(s)

Completeness Criteria

Received?	Complete Item Description

Application Events

Event	Start	Due	Complete	Comments	Staff
TV - Acknowledgment/Complete	06/02/2015	06/12/2015	06/02/2015		kmhash

Regulations Pertaining to this Permit

Reference Rule		Regulation Description
2Q	.0317	Avoidance Conditions
Part 60 - NSPS	Subpart IIII	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
2D	.0515	Particulates Miscellaneous Industrial Processes
2D	.0516	Sulfur Dioxide Emissions Combustion Sources
2D	.0521	Control of Visible Emissions
2D	.0524	New Source Performance Standards
2D	.1100	Control of Toxic Air Pollutants
2D	.1111	Maximum Achievable Control Technology
Part 63 - NESHAP/MACT	Subpart ZZZZ	Reciprocating Internal Combustion Engines
Avoidance	2D .0530	Prevention of Significant Deterioration

Audit Information Pertaining to this Application

Column Name	Date Changed	Old Value	New Value	Editor

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

June 2, 2015

Mr. Royal Smith
Vice President Operations
Enviva Pellets Northampton, LLC
7200 Wisconsin Avenue, Suite 1000
Bethesda, MD 20814

SUBJECT: Receipt of Permit Application
Modification of Permit No. 10203R03
Application No. 6600167.15A
Enviva Pellets Northampton, LLC
Facility ID: 6600167, Garysburg, Northampton County

Dear Mr. Smith:

Your air permit application (6600167.15A) for Enviva Pellets Northampton, LLC, located in Northampton County, North Carolina was received by this Division on June 2, 2015.

This application submittal **did** contain all the required elements as indicated and has been accepted for processing. Your application will be considered complete as of June 2, 2015, unless informed otherwise by this office within 60 days.

Should you have any questions concerning this matter, please contact Kevin Godwin at 919-707-8480.

Sincerely,

William D. Willets, P.E., Chief, Permits Section
Division of Air Quality, NCDENR

cc: Raleigh Regional Office Files

DIVISION OF AIR QUALITY
June 15, 2015

MEMORANDUM

TO: Kevin Godwin, Environmental Engineer, RCO
Permit Coordinator, RRO

FROM: Nancy Jones, Meteorologist II, AQAB

THROUGH: Tom Anderson, Supervisor, Air Quality Analysis Branch (AQAB)

SUBJECT: Review of Toxics Air Dispersion Modeling Analysis – Enviva Pellets Northampton, LLC, Garysburg, Northampton County North Carolina
Facility ID: 6600167

I have reviewed the dispersion modeling analysis, received June 2, 2015, for the Enviva Pellets facility located in Northampton County, NC. The company submitted an air permit application requesting modifications to the dryer and material handling systems at the plant. These actions trigger modeling requirements to evaluate those toxics whose rates are expected to exceed the levels outlined in 15A NCAC 2Q .0700. The modeling adequately demonstrates compliance, on a source-by-source basis, for all toxics modeled.

Two toxics were evaluated facility wide in the modeling. Emission rates and stack parameters used in the modeling are provided in the attached tables. AERMOD (13350) using the latest available years (2010-2014) of meteorological data from Rocky Mount/Wilson (surface) and Newport (upper air) was used to evaluate impacts in both simple and elevated terrain. Direction-specific building dimensions, determined using EPA's BPIP-Prime program (04274), were used as input to the model for building wake effect determination. Receptors were placed around the facility's property line at 25-meter intervals and extended outward to a distance of approximately 2.5 kilometers at 100 meter spacing. The following table shows the maximum impact for each toxic:

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

Pollutant	Averaging Period	% of AAL
Acrolein	1-hour	99 %
Formaldehyde	1-hour	90 %

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

cc: Tom Anderson
Nancy Jones

TABLE 3-2. MODELED SOURCE PARAMETERS

Model ID	Stack Height (m)	Stack Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
EP1	28.66	352.59	7.58	3.05
EP2	14.78	310.93	0.01	1.62
EP3	14.78	310.93	0.01	1.62
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TABLE 3-3. MODELED EMISSION RATES

Model ID	Modeled Emission Rates (lb/hr)	
	ACROLEIN	FORM
EP1	2.93E+00	6.65E+00
EP2	1.77E-01	2.99E-01
EP3	1.77E-01	2.99E-01
EP4	1.18E-01	1.99E-01
EP7	1.49E-01	9.45E-02
EP8	1.49E-01	9.45E-02
EP9	1.49E-01	9.45E-02
EP10	1.49E-01	9.45E-02
EP11	1.49E-01	9.45E-02
EP12	1.49E-01	9.45E-02
EP14	2.27E-04	2.89E-03
EP15	1.94E-04	2.48E-03

Comprehensive Application Report for 6600167.15A

06/02/2015

Enviva Pellets Northampton, LLC - Garysburg (6600167)

Northampton County

General Information: Permit/Latest Revision: 10203/ R03

Permit code:	State
Application type:	Modification
Engineer/Rev. location:	Kevin Godwin/RCO
Regional Contact:	Charles McEachern
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Clock is ON	Application is COMPLETE
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	06/02/2015			

Fund type:	Deposit Slip #:	Location rec'd:	Location deposited:
2333			

Contact Information

Type	Name	Address	City State ZIP	Telephone
Authorized	Royal Smith, Vice President Operations	7200 Wisconsin Avenue, Suite 1000	Bethesda, MD 20814	(240) 482-3770
Technical/Permit	Joe Harrell, Corporate EH&S Manager	142 NC Route 561 East	Ahoskie, NC 27910	(252) 209-6032

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Yes	Application contains toxic modification(s)

Completeness Criteria

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TV - Acknowledgment/Complete	06/02/2015	06/12/2015	06/02/2015		kmhash

Regulations Pertaining to this Permit

Reference Rule		Regulation Description
2Q	.0317	Avoidance Conditions
Part 60 - NSPS	Subpart IIII	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
2D	.0515	Particulates Miscellaneous Industrial Processes
2D	.0516	Sulfur Dioxide Emissions Combustion Sources
2D	.0521	Control of Visible Emissions
2D	.0524	New Source Performance Standards
2D	.1100	Control of Toxic Air Pollutants
2D	.1111	Maximum Achievable Control Technology
Part 63 - NESHAP/MACT	Subpart ZZZZ	Reciprocating Internal Combustion Engines
Avoidance	2D .0530	Prevention of Significant Deterioration

Audit Information Pertaining to this Application

Column Name	Date Changed	Old Value	New Value	Editor

NCDENR

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

June 2, 2015

Mr. Royal Smith
Vice President Operations
Enviva Pellets Northampton, LLC
7200 Wisconsin Avenue, Suite 1000
Bethesda, MD 20814

SUBJECT: Receipt of Permit Application
Modification of Permit No. 10203R03
Application No. 6600167.15A
Enviva Pellets Northampton, LLC
Facility ID: 6600167, Garysburg, Northampton County

Dear Mr. Smith:

Your air permit application (6600167.15A) for Enviva Pellets Northampton, LLC, located in Northampton County, North Carolina was received by this Division on June 2, 2015.

This application submittal **did** contain all the required elements as indicated and has been accepted for processing. Your application will be considered complete as of June 2, 2015, unless informed otherwise by this office within 60 days.

Should you have any questions concerning this matter, please contact Kevin Godwin at 919-707-8480.

Sincerely,

William D. Willets, P.E., Chief, Permits Section
Division of Air Quality, NCDENR

cc: Raleigh Regional Office Files

1641 Mail Service Center, Raleigh, North Carolina 27699-1641
Phone: 919-707-8400 \ Internet: www.ncdenr.gov