ENVIVA PELLETS AHOSHIE 2015
P/N 10121
HERFORD COUNTY

DIVISION OF AIR QUALITY
October 9, 2015

MEMORANDUM

To: Robert Fisher, Washington Regional Office and
Yuki Puram, Air Quality Permitting Section

From: Shannon Vogel, Stationary Source Compliance Branch

Subject: Emissions Testing Performed in Amory and Wiggins Mississippi
Submitted for Enviva Pellets Ahoskie, LLC
Ahoskie, Hertford County, North Carolina
Facility ID 4600107, Permit No. 10121R03
Performed by Air Control Techniques, Inc. (ACT)

Enviva submitted two reports of emissions testing performed at Enviva facilities in Amory and Wiggins Mississippi in October 2013 in support of requested revisions to the draft permit for the Ahoskie facility. Air Control Techniques, Inc. performed EPA Method 320 sampling for six hazardous air pollutants (HAP) [methanol, acetaldehyde, acrolein, formaldehyde, phenol, and propionaldehyde] and EPA Method 25A for total VOC.

The testing at the Wiggins facility was performed October 10 through 13, 2013 at the following locations: Dryer 1, Dryer 2, secondary hammermill 2, pellet mill, green hammermill, and pellet coolers 1 and 2. The testing at the Amory facility was performed October 14 through 16, 2013 at the following locations: dryer, dry hammermill, green hammermill and aspirators.

The major issue with the test results as reported by Air Control Techniques was the approach to reporting results for non-detected values. The test reports stated "shaded areas indicates a calculated detection limit. Emissions were calculated based on **zero** (emphasis added) for non-detect values." ACT did not calculate a maximum possible emission rate based on the detection limit as required by SSCB for compliance evaluations.

Therefore, the reported results for the following pollutants and locations are NOT acceptable due to the use of "zero" emissions presented and/or zero emissions included in the average reported emission rates. The unacceptable results include any pollutant and location which any run value was below the detection limit and "zero" emissions were included in the reported average emission rate in pounds per hour and pounds per ton oven dried pulp.

The following is a listing of the unacceptable test results for the Wiggins Facility:
Dryer 1 - acetaldehyde, acrolein, phenol; Dryer 2 - phenol; Dry Hammermill 2 - acetaldehyde, acrolein, and phenol; Green Hammermill - phenol, propionaldehyde; Pellet Cooler 1 -phenol; Pellet Cooler 2 - phenol, propionaldehyde; Aspiration System - formaldehyde, phenol, propionaldehyde.

The following is a listing of the unacceptable test results for Amory Facility:
Dryer - acetaldehyde, acrolein, formaldehyde, phenol, propionaldehyde; Green Hammermill - acetaldehyde, acrolein, formaldehyde, phenol, propionaldehyde; Aspiration System - acetaldehyde, acrolein, phenol, propionaldehyde and Dry Hammermill - . acetaldehyde, acrolein, formaldehyde, phenol, propionaldehyde.

Inclusion in these lists does not indicate that all runs were below the detection limit, only that at least 1 run of 3 was below the detection limit and a zero value was included in the reported average.

Additionally, SSCB cannot evaluate the representativeness of the emissions from the Wiggins or Amory facilities with respect to the emissions from the Ahoskie facility. The testing seems to have been performed correctly. However due to the unacceptable calculation of the non-detected values, the results cannot be used to estimate the VOC and HAP emissions for the Enviva Ahoskie facility as reported.

If you have any questions regarding the results of this evaluation, please contact me at 919-707-8416 or shannon.vogel@ncdenr.gov.

cc: Central Files, Hertford County
IBEAM Documents - 4600107

Comprehensive Application Report for 4600107.15B

Enviva Pellets Ahoskie, LLC - Ahoskie (4600107)

Hertford County

10/06/2015

General Information:					
Permit code:	State	Permit/Latest Revision: 10121/ R03			
Application type:	Renewal	Application Dates			
Engineer/Rev. location:	Yukiko (Yuki) Puram/RCO	Received	Completeness Due	Clock Start	Calculated Issue Due
Regional Contact:	Yongcheng Chen	10/06/2015	11/20/2015	10/06/2015	01/04/2016
Facility location:	Washington Regional Office	Fee Information			
Facility classification:	Title V	Initial amount:	Date received: 10/06/2015	Amount Due:	Add. Amt Rcv'd: Date Rcv'd:
Clock is ON	Application is COMPLETE	Fund type:	Deposit Slip #:		Location rec'd: Location deposited:
Status is :	In progress	2333			

Contact Information

Type	Name	Address	City State ZIP	Telephone
Authorized	Jason Ansley, Plant Manager	142 NC Route 561 East	Ahoskie, NC 27910	(252) 209-6032
Technical/Permit	Joe Harrell, Corporate EHS Manager	142 NC Route 561 East	Ahoskie, NC 27910	(252) 209-6032

Acceptance Criteria

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

Completeness Criteria

Received?	Complete Item Description

Comprehensive Application Report for 4600107.15B

Enviva Pellets Ahoskie, LLC - Ahoskie (4600107)

Hertford County

Application Events

Event	Start	Due	Complete	Comments	Staff
TV - Acknowledgment/Complete	10/06/2015	10/16/2015	10/06/2015		kmhash

Regulations Pertaining to this Permit

Reference Rule		Regulation Description
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	.0540	Particulates Fugitive Non-process Dust Emission Sources
2D	.1100	Control of Toxic Air Pollutants
2D	.1111	Maximum Achievable Control Technology
2D	.0711	Emission Rates Requiring a Permit
2Q		
Part 63 - NESHAP/MACT	Subpart ZZZZ	Reciprocating Internal Combustion Engines

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

October 6, 2015

Mr. Jason Ansley
Plant Manager
Enviva Pellets Ahoskie, LLC
142 NC Route 561 East
Ahoskie, NC 27910

SUBJECT: Receipt of Permit Application
Renewal of Permit No. 10121R03
Application No. 4600107.15B
Enviva Pellets Ahoskie, LLC
Facility ID: 4600107, Ahoskie, Hertford County

Dear Mr. Ansley:

Your air permit application (4600107.15B) for Enviva Pellets Ahoskie, LLC, located in Hertford County, North Carolina was received by this Division on October 6, 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 October 6, 2015, unless informed otherwise by this office within 60 days.

Should you have any questions concerning this matter, please contact Yukiko (Yuki) Puram at 919-707-8470.

Sincerely,

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

cc: Washington Regional Office Files

OCT - 8 '15

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

Central File
4600107
Permit

Enviva Pellets Ahoskie, LLC
143 NC Route 561 E (27910)
Ahoskie, NC 27910
T (252) 209-9032
Fax (252) 209-8039

Hertford

July 24, 2015

Robert Fisher
Regional Air Quality Supervisor
NCDAQ-Washington Regional Office
943 Washington Square Mall
Washington, NC 27889

Subject: Enviva Pellets Ahoskie, LLC Summary Semi-annual Report for permit 10121R03

Dear Mr. Fisher:

Per condition 2.1-A-1-i on page 6 and 2.1-A-3-e on page 7 for the reporting period of January 1, 2015 to June 30, 2015, the emission sources (ID Nos. ES-DRYER, ES-DWDS, ES-DHM1 through ES-DHM4, ES-HAF, ES-PMFS, ES-CLR1 through ES-CLR5, ES-FB, ES-FPH, ES-TLB, ES-PL1, ES-PL2) and pollution control equipment, were visually inspected monthly for leaks and above normal emissions. All equipment was deemed in good repair, required no maintenance, and emitting normal emissions.

Per condition 2.1-B-2-e on page 8 and 2.1-B-3-k on page 11 for the reporting period of January 1, 2015 to June 30, 2015, the emission sources (ID Nos. ES-EG and ES-FWP) were visually inspected monthly for leaks and above normal emissions. All equipment was deemed in good repair, required no maintenance, and emitting normal emissions

Per condition 2.2-A-2-c on page 13 for the reporting period of January 1, 2015 to June 30, 2015, the facility will not exceed the TAPS emissions, because of the conservative emission factors that were submitted in the application compared to stack testing that was performed at Enviva's Mississippi facilities at a higher softwood rate. Request for deletion has been submitted.

i. Per condition 2.2-A-4-d on page 15, please review attachment for permit condition information. The monthly VOC emissions for the previous 17 months. The emissions must be calculated for each of the 12-month rolling average over the previous 17 months.
ii. The monthly softwood content of wood mixture processed in the dryer system (ES-Dryer), the hammermills (ES-DHM-1 through ES-DHM-4 and ES-HAF), and the pellet coolers (ES-CLR1 through ES-CLR-5).

Please feel free to contact Joe Harrell at (252) 370-3181 with any questions or comments. Thank you very much for your time and attention.

Sincerely,

Jason Ansley
Plant Manager

Attachment:

Month-YR	Dry Shavings	SW BDT	HW BDT	BDT Total	ES-Dryer VOC Tons	ES-DHM1 thru ES-DHM4, and ES-HAF VOC Tons	ES-Dryer and ES-DHM1 thru ES-DHM4, and ES-HAF Softwood %	ES-CLR1 thru ES-CLR5 VOC Tons	ES-CLR1 thru ES-CLR5 Softwood %
Feb-14	2,921	2,519	26,572	29,091	11.40	1.35	9%	7.31	17%
Mar-14	3,103	4,045	24,693	28,738	11.27	1.34	14%	7.28	22%
Apr-14	3,463	2,598	23,070	25,668	10.06	1.19	10%	6.66	21%
May-14	3,379	2,564	24,164	26,728	10.48	1.24	10%	6.88	20%
Jun-14	3,788	3,976	22,722	26,698	10.47	1.24	15%	6.97	25%
Jul-14	3,307	3,972	23,722	27,694	10.86	1.29	14%	7.08	23%
Aug-14	3,348	7,539	22,424	29,963	11.75	1.39	25%	7.61	33%
Sep-14	4,656	6,693	25,164	31,857	12.49	1.48	21%	8.34	31%
Oct-14	4,454	7,241	26,473	33,714	13.22	1.57	21%	8.72	31%
Nov-14	3,679	7,678	24,220	31,898	12.50	1.48	24%	8.13	32%
Dec-14	2,865	6,148	23,749	29,897	11.72	1.39	21%	7.49	28%
Jan-15	3,128	6,147	25,459	31,606	12.39	1.47	19%	7.94	27%
Feb-15	2,618	6,070	16,864	22,934	8.99	1.07	26%	5.84	34%
Mar-15	3,079	4,758	23,925	28,683	11.24	1.33	17%	7.26	25%
Apr-15	3,802	5,244	22,252	27,496	10.78	1.28	19%	7.15	29%
May-15	3,467	5,779	20,686	26,465	10.37	1.23	22%	6.84	31%
Jun-15	4,065	6,236	24,243	30,479	11.95	1.42	20%	7.89	30%
12 Month Totals	42,468.00	73,505.00	279,181.00	352,686.00	138.25	16.40	21%	90.29	29%

12 Month Total Site VOC tpy: 245

Emission Factors per Pine Trial Stack Testing results, VOC .784 lbs/ODT Dryer, .093 lbs/ODT DHM, .457 lbs/ODT Cooler.

CENTRAL OFFICE PERMIT TRACKING SLIP

Facility Name: Enviva Pellets Ahoskie, LLC **Facility/Application ID:** 4600107.15A

County/Regional Office: Hertford/WARO **Engineer:** Yuki Puram

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

PART V - SUPERVISOR REVIEW CHECKLIST

TVEE Updated (by Engineer): YP 5/22/15 TVEE Verified: 5/22/2015 Supervisor: 3/27/15 Chief 5/22/2015

PART VI - CLOSEOUT INFORMATION

Regulations Applicable to This Application (indicate all new regulations):
- [ ] NESHAPS/MACT
- [ ] NESHAPS/GACT
- [ ] NSPS
- [ ] 2D .1100
- [ ] 2Q .0711
- [ ] 2Q .0705 Last MACT/Toxics
- [ ] PSD/NSR
- [ ] PSD/NSR Avoidance
- [ ] Existing Source RACT/LAER
- [ ] New Source RACT/LAER
- [ ] RACT 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:_____ Effective:_____ Expiration:_____

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

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

Document Manager Updated by Engineer:_____ Date:_____

MAY 27 15

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

May 22, 2015

E. Royal Smith
Vice President of Operations
7200 Wisconsin Ave. Suite 1000,
Bethesda, MD 20814

SUBJECT: Air Quality Permit No. 10121R03
Facility ID: 4600107
Enviva Pellets Ahoskie, LLC
Ahoskie, Hertford County, NC
Fee Class: Title V

Dear Mr. Smith:

In accordance with your completed Air Quality Permit Application for a permit modification received January 9, 2015, we are forwarding herewith Air Quality Permit No. 10121R03 to Enviva Pellets Ahoskie, LLC, 142 N.C. Rt 561 East, Ahoskie, 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 in "ATTACHMENT 1." Please note the requirements for the annual compliance certification are contained in General Condition P in Section 3. The current owner is responsible for submitting a compliance certification for the entire year regardless of who owned the facility during the year.

The Permittee shall amend the current first time Title V Air Quality Permit Application (application 4600107.12A) to include the changes made in this permit on or before 30 days after the issuance of this permit.

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.

For PSD increment tracking purposes, PM10 emissions from this facility have increased by 2.5 pounds per hour.

This Air Quality Permit shall be effective from May 22, 2015 until November 30, 2015, 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 permit or about the requirement to file a Title V permit application as mentioned above, please contact Yuki Puram at 919-707-8470 or yuki.puram@ncdenr.gov.

Sincerely yours,

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

Enclosure

c: Robert Fisher, Supervisor, Washington Regional Office
Connie Horne (cover letter only)
Central Files

ATTACHMENT 1 to Permit No. 10121R03

Insignificant Activities under 15A NCAC 2Q .0102

Emission Source ID No.	Emission Source Description
IES-DWH	Dried wood handling
IES-PP	Pellet press system
IST-1 and IST-2	Two diesel storage tanks (2,500 gallon and 500 gallon capacity)
IES-CHP1	Electric powered green wood chipper
IES-CHP2	Green wood hammermill
IES-GWHS	Green wood handling and storage
IES-GWFB	Green wood fuel storage bin

1. Because an activity is insignificant does not mean that the activity is exempted from an applicable requirement or that the owner or operator of the source is exempted from demonstrating compliance with any applicable requirement.
2. When applicable, emissions from stationary source activities identified above shall be included in determining compliance with the permit requirements for toxic air pollutants under 15A NCAC 2D .1100 "Control of Toxic Air Pollutants" or 2Q .0711 "Emission Rates Requiring a Permit".

ATTACHMENT 2 to Permit No. 10121R03

List of changes made in the R03 permit.

Old Page(s)	New Page(s)	Condition/ Item*	Description of Change(s)
Global	Global	N/A	• Changed the application number and complete date. • Changed permit revision number to R03 • Changed the issuance/effective dates of the permit.
3	3	Equipment List	• Changed the dryer's maximum heat input to 175.3 million Btu per hour. • Added one simple cyclone (ID No. CD-HAF-C5) to the control device list for the hammermill area and hammermill No. 5 (ID No. ES-HAF) • Changed the ID No. for the cyclone from CD-CLR3 to CD-CLR-C3.
4	4	2.1.A Emission Source List	• Added one simple cyclone (ID No. CD-HAF-C5) in series with fabric filter (ID No. CD-DHM-FF) for the hammermill area and hammermill No. 5 (ID No. ES-HAF)
4	4	2.1.A. Summary Table	• Inserted VOC as a regulated pollutant. • Indicated "state-enforceable only" to the fugitive and toxic pollutants standards.
N/A	5	2.1.A.1.b.	• Added the testing condition.
N/A	5	2.1.A.1.c.	• Added PM control requirements.
5	5-6	2.1.A.1.e. and f.	• Separated requirements for WESP from the requirements for bag filters and cyclones. • Added an additional monitoring requirement for the WESP.
N/A	6	2.1.A.2.b.	• Added the testing condition.
N/A	6	2.1.A.3.b.	• Added the testing condition.
N/A	7	2.1.A.3.e	• Added the reporting condition for 2D .0521.
7	7	2.1.B. Summary Table	• Changed limits for NMHC and NOx, CO and PM since the rule has been changed since the previous permit has been issued.
N/A	8	2.1.B.1.b.	• Added the testing condition.
N/A	8	2.1.B.2.b.	• Added the testing condition.
N/A	8	2.1.B.2.e.	• Added the semiannual reporting requirement for 2D .0521.
8	8-10	2.1.B.3	• Updated NSPS Subpart IIII to reflect the most recent regulations. • Compliance requirements which specify operation and maintenance requirements are added. • Recordkeeping requirements for inspections and maintenance of the engine were added. • Semiannual report requirement was added.
9	11	2.1.B.4	• Updated the language to be consistent with the regulation. • Specified that this condition is applicable only to the emergency generator (ID No. ES-EG)

Old Page(s)	New Page(s)	Condition/ Item*	Description of Change(s)
N/A	11-12	2.1.B.5	• The latest GACT Subpart ZZZZ conditions were added to the fire water pump (ID No. ES-FWP)
10	12-13	2.2.A.2.a	• The emission limits table was updated to reflect the latest modeling analysis. • All the pollutants except acrolein, formaldehyde and benzene were removed. • Additional emission sources were added to represent the facility-wide emissions.
10	13	2.2.A.2.b	• Added the testing condition.
10	13	2.2.A.2.c	• Monitoring/recordkeeping/reporting requirements are updated. The facility must record the highest actual hourly emissions each month instead of monthly average emissions. • The reporting frequency was changed from quarterly to semiannually to coordinate with other reporting requirements.
10-11	13-14	2.2.A.3.a	• Inserted the following pollutants to the table: arsenic and inorganic arsenic compounds, benzo(a)pyrene, cadmium, chlorine, formaldehyde, hexachlorodibenzo-p-dioxin, hydrogen chloride and phenol.
N/A	14-15	2.2.A.4	• PDS avoidance condition, 15A NCAC 2Q .0317, was added per facility's request. • Testing, monitoring, recordkeeping and reporting requirements were added.

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

Division of Air Quality

AIR QUALITY PERMIT

Permit No.	Replaces Permit No.(s)	Effective Date	Expiration Date
10121R03	**10121R02**	**May 22, 2015**	**November 30, 2015**

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

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

Permittee:	**Enviva Pellets, LLC**
Facility ID:	**4600107**
Facility Site Location: **City, County, State, Zip:**	**142 N.C. Rt 561 East** **Ahoskie, Hertford County, North Carolina, 27910**
Mailing Address: **City, State, Zip:**	**7200 Wisconsin Avenue, Suite 1000** **Bethesda, Maryland, 20814**
Application Number: **Complete Application Date:**	**4600107.15A** **January 22, 2014**
Primary SIC Code: **Division of Air Quality,** **Regional Office Address:**	**2499** **Washington Regional Office** **943 Washington Square Mall** **Washington, North Carolina, 27889**

Table Of Contents

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

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

Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-DRYER	Direct heat, wood-fired dryer (175.3 million Btu per hour maximum heat input)	CD-DC CD-WESP	One simple cyclone (204 inches in diameter) in series with one wet electrostatic precipitator (29,904 square feet of total collection plate area)
ES-DWDS	Dried wood day silo	CD-DWDS-BV	One bin vent filter (377 square feet of filter area)
ES-DHM-1, ES-DHM-2, ES-DHM-3, ES-DHM-4	Four dry wood hammermills	CD-DHM-C1, CD-DHM-C2, CD-DHM-C3, CD-DHM-C4 CD-DHM-FF1, CD-DHM-FF2	Four simple cyclones (57 inches in diameter each) in series with two fabric filters (6,667 square feet of filter area each)
ES-HAF	Hammermill area and Hammermill No. 5	CD-HAF-C5 CD-HAF-FF	One simple cyclone One fabric filter (5,417 square feet of filter area)
ES-PMFS	Pellet feed mill silo	CD-PMFS-BV	One bin vent filter (377 square feet of filter area)
ES-CLR1, ES-CLR2, ES-CLR3, ES-CLR4	Four pellet coolers	CD-CLR-C1, CD-CLR-C2	Two multicyclones (43 inch diameter tubes each)
ES-CLR5	Pellet cooler No. 5	CD-CLR-C3	One simple cyclone
ES-EG, ES-FWP **(NSPS Subpart IIII; Area Source MACT, Subpart ZZZZ)**	One emergency use generator (350 brake horsepower; ID No. ES-EG) and one fire water pump (300 brake horsepower; ID No. ES-FWP)	N/A	N/A
ES-FB	Fines bin	CD-FB-BV	One bin vent filter (325 square feet of filter area)
ES-FPH	Finished product handling	CD-FPH-BF	One bagfilter (4,842 square feet of filter area)
ES-TLB	Truck loadout bin (with 12 bottoms)		
ES-PL1, ES-PL2	Two pellet loadouts		

SECTION 2 - SPECIFIC LIMITATIONS AND CONDITIONS

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

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

A. Wood-fired dryer (ID No. ES-DRYER) with associated cyclone (ID No. CD-DC) in series with wet electrostatic precipitator (ID No. CD-WESP)
Dried wood day silo (ID No. ES-DWDS) with bin vent filter (ID No. CD-DWDS-BV)
Four dry wood hammermills (ID Nos. ES-DHM-1 through ES-DHM-4) with associated cyclones (ID Nos. CD-DHM-C1 through CD-DHM-C4) one each in series with parallel fabric filters (ID Nos. CD-DHM-FF1 and CD-DHM-FF2)
Hammermill area and Hammermill No. 5 (ID No. ES-HAF) with associated cyclone IID No. CD-HAF-C5) in series with fabric filter (ID Nos. CD-HAF0C5 and CD-HAF-FF)
Pellet feed mill silo (ID No. ES-PMFS) with bin vent filter (ID No. CD-PMFS-BV)
Four pellet coolers (ID Nos. ES-CLR1 through ES-CLR4) with associated parallel multicyclones (ID Nos. CD-CLR-C1 and CD-CLR-C2)
One pellet cooler (ID No. ES-CLR5) with associated simple cyclone (ID No. CD-CLR-C3)
Fines bin (ID No. ES-FB) with associated bin vent filter (ID No. CD-FB-BV)
Finished product handling (ID No. ES-FPH), truck loadout bin (ID Nos. ES-TLB) and two pellet loadouts (ID Nos. ES-PL1, ES-PL2) with associated bagfilter (ID No. CD-FPH-BF)

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

Regulated Pollutant	Limits/Standards	Applicable Regulation
Particulate matter	$E = 4.10 \times P^{0.67}$ for process weight rate < 30 tph $E = 55 \times P^{0.11} - 40$ for process weigh rate ≥ 30 tph Where, E = allowable emission rate (lb/hr) P = process weight rate (tph)	15A NCAC 2D .0515
Sulfur dioxide	For Dryer System (ID No. ES-DRYER) 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
Fugitive dust	**State-enforceable only** See Section 2.2A.1	15A NCAC 2D .0540
Toxic air pollutants	**State-enforceable only** See Section 2.2 A.2	15A NCAC 2D .1100
Toxic air pollutants	**State-enforceable only** See Section 2.2 A.3	15A NCAC 2Q .0711
Volatile organic compounds	See Section 2.2 A.4 Less than 391.6 tons per consecutive 12 month period	15A NCAC 2Q .0317 for avoidance of 15A NCAC 2D .0530

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:

$E = 4.10 \times P^{0.67}$ 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 [15A NCAC 2Q .0508(f)]

b. If emissions testing is required, the testing shall be performed in accordance with General Condition 17.

Monitoring [15A NCAC 2Q .0508(f)]

For bagfilters and/or cyclones:

c. Particulate matter emissions shall be controlled as follows:
   i. Particulate matter emissions from the four dry wood hammermills **(ID Nos. ES-DHM-1 through ES-DHM-4)** shall be controlled by four simple cyclones **(ID Nos. CD-DHM-C1 through CD-DHM-C4)** in series with two fabric filters **(ID Nos. CD-FF1 and CD-FF2)**.
   ii. Particulate matter emissions from the hammermill area and hammermill No. 5 (ID No. ES-HAF) shall be controlled by a cyclone **(ID No. CD-DHM-C5)** in series with a fabric filter **(ID No. CD-HAF-FF3)**.
   iii. Particulate matter emissions from the four pellet coolers **(ID Nos. ES-CLR1 through ES-CLR4)** shall be controlled by two multicyclones **(ID Nos. CD-CLR-C1 and CD-CLR-C2)**.
   iv. Particulate matter emissions from pellet cooler No. 5 **(ID No. ES-CLR5)** shall be controlled by a simple cyclone **(ID No. CD-CLR-C3)**.
   v. Particulate matter emissions from the fines bin **(ID No. ES-FB)** shall be controlled by a bin vent filter **(ID No. CD-FB-BV)**.
   vi. Particulate matter emissions from the finished product handling **(ID No. ES-FBH)**, truck loadout bin **(ID No. ES-TLB)** and two pellet loadouts **(ID Nos. ES-PL1 and ES-PL2)** shall be controlled by a bagfilter **(ID No. CD-FPH-BF)**.

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 are 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 units 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. Particulate matter emissions from the wood-fired 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)**.

f. 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 are no manufacturer's inspection and maintenance recommendations, as a minimum, the inspection and maintenance requirement shall include the following:
   i. establish the minimum primary voltage and minimum current within the first 30 days of the effective date of this permit. 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.

ii. an annual (for each 12 month period following the initial inspection) internal inspection of the wet electrostatic precipitator. This inspection must include (but is not limited to):
   1. visual checks of critical components,
   2. checks for any equipment that does not alarm when de-energized, to ensure it is operational,
   3. checks for signs of plugging in the hopper and gas distribution equipment, and
   4. replacement of broken equipment as required.

Recordkeeping [15A NCAC 2Q .0508(f)]

g. The results of inspection and maintenance shall be maintained in a logbook (written or electronic format) on-site and made available to an authorized representative upon request. The logbook shall include 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 [15A NCAC 2Q .0508(f)]

h. The Permittee shall submit the results of any maintenance performed on any control device within 30 days of a written request by the DAQ.

i. The Permittee shall submit a summary report 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. All instances of deviations from the requirements of this permit must be clearly identified.

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

a. Emissions of sulfur dioxide from the wood-fired dryer **(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 [15A NCAC 2Q .0508(f)]

b. If emissions testing is required, the testing shall be performed in accordance with General Condition 17.

Monitoring/Recordkeeping/Reporting [15A NCAC 2Q .0508(f) and 15A NCAC 2D .2601]

c. No monitoring, recordkeeping, or reporting is required for sulfur dioxide emissions from the firing of wood in this source **(ID No. ES-DRYER)**.

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

a. Visible emissions from these sources **(ID Nos. ES-DRYER, ES-DWDS, ES-DHM-1 through ES-DHM-4, ES-HAF, ES-PMFS, ES-CLR1 through ES-CLR5, ES-FB, ES-FPH, ES-TLB, ES-PL1, ES-PL2)** 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 [15A NCAC 2Q .0508(f)]

b. If emissions testing is required, the testing shall be performed in accordance with General Condition 17.

Monitoring [15A NCAC 2Q .0508(f)]

c. To assure compliance, once a month the Permittee shall observe the emission points of these sources for any visible emissions above normal. The monthly observation must be made for each month of the calendar year period to ensure compliance with this requirement. If visible emissions from these 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 .2610 (Method 9) for 12 minutes is below the limit given in Section 2.1 A.3. a. above.

Recordkeeping [15A NCAC 2Q .0508(f)]

d. The results of the monitoring shall be maintained in a logbook (written or electronic format) on-site and made available to an authorized representative upon request. The logbook 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.

Reporting [15A NCAC 2Q .0508(f)]

e. The Permittee shall submit a summary report of the observations 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. All instances of deviations from the requirements of this permit must be clearly identified.

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

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

Regulated Pollutant	Limits/Standards	Applicable Regulation
Sulfur dioxide	2.3 pounds per million Btu heat input	15A NCAC 2D .0516
Visible emissions	20 percent opacity	15A NCAC 2D .0521
Hazardous air pollutants (HAP)	National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) located at Area Sources	15A NCAC 2D .1111 (40 CFR 63, Subpart ZZZZ)
NMHC and NOx, CO, PM	New Source Performance Standards, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines	15A NCAC 2D .0524 (40 CFR 60, Subpart IIII)
Fugitive dust	**State-enforceable only** See Section 2.2.A.1	15A NCAC 2D .0540
Toxic air pollutants	**State-enforceable only** See Section 2.2 A.2.	15A NCAC 2D .1100

1. 15A NCAC 2D .0516: SULFUR DIOXIDE EMISSIONS FROM COMBUSTION SOURCES

a. Emissions of sulfur dioxide from these sources **(ID Nos. ES-EG and ES-FWP)** 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 [15A NCAC 2Q .0508(f)]

b. If emissions testing is required, the testing shall be performed in accordance with General Condition 17.

Monitoring/Recordkeeping/Reporting [15A NCAC 2Q .0508(f)]

c. No monitoring/recordkeeping/reporting is required for sulfur dioxide emissions from the firing of diesel fuel in these sources **(ID Nos. ES-EG and ES-FWP)**.

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

a. Visible emissions from these sources **(ID Nos. ES-EG and ES-FWP)** 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 [15A NCAC 2Q .0508(f)]

b. If emissions testing is required, the testing shall be performed in accordance with General Condition 17.

Monitoring [15A NCAC 2Q .0508(f)]

c. To assure compliance, once a month the Permittee shall observe the emission points of these sources **(ID Nos. ES-EG, ES-FWP)** for any visible emissions above normal. The observation must be made semiannually or during the next maintenance period to ensure compliance with this requirement. If visible emissions from these sources are observed to be above normal, the Permittee shall either:
   i. take appropriate action to correct the above-normal emissions as soon as practicable and within the monitoring period and record the action taken as provided in the recordkeeping requirements below, or
   ii. demonstrate that the percent opacity from the emission points of the emission source in accordance with 15A NCAC 2D .2610 (Method 9) for 12 minutes is below the limit given in Section 2.1 F.2. a. above.

Recordkeeping [15A NCAC 2Q .0508(f)]

d. The results of the monitoring shall be maintained in a logbook (written or electronic format) on-site and made available to an authorized representative upon request. The logbook 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.

Reporting [15A NCAC 2Q .0508(f)]

e. The Permittee shall submit a summary report of the observations 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. All instances of deviations from the requirements of this permit must be clearly identified.

3. 15A NCAC 2D .0524 NEW SOURCE PERFORMANCE STANDARDS [40 CFR Part 60 Subpart IIII]

Applicability [15A NCAC 2Q .0508(f), 40 CFR 60.4200(a)(2)(i)]

a. For the emergency generator **(ID No. ES-EG)**, the Permittee shall comply with all applicable provisions, including the requirements for emission standards, notification, testing, reporting, record keeping, and monitoring, contained in Environmental Management Commission Standard 15A NCAC 2D .0524 "New Source Performance Standards (NSPS)" as promulgated in 40 CFR Part 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines," including Subpart A "General Provisions."

b. **General Provisions** [15A NCAC 2Q .0508(f)]
Pursuant to 40 CFR 60 .4218, the Permittee shall comply with the General Provisions of 40 CFR 60 Subpart A as presented in Table 8 of 40 CFR 60 Subpart IIII.

c. **Emission Standards** [15A NCAC 2Q .0508(f)]
The Permittee shall comply with the emission standards 40 CFR 60.4202 for all pollutants, for the same model year and maximum engine power for this engine. [40CFR 60.4205(b)]

d. **Fuel Requirements** [15A NCAC 2Q .0508(f)]
The Permittee shall use diesel fuel in the engine that meets the requirements of 40 CFR 80.510(b) including:
i. a maximum sulfur content of 15 ppm; and
ii. a minimum cetane index of 40 or a maximum aromatic content of 35 volume percent. [40 CFR 60.4207(b)]

e. **Testing** [15A NCAC 2Q .0508(f)]
If emissions testing is required, the testing shall be performed in accordance with General Condition JJ.

f. **Monitoring** [15A NCAC 2Q .0508(f)]
The engine has the following monitoring requirements:
i. The engines shall be equipped with a non-resettable hour meter prior to startup. [40CFR 60.4209(a)]
ii. The engine, if equipped with a diesel particulate filter, must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached. [40CFR 60.4209(b)]

g. **Compliance Requirements** [15A NCAC 2Q .0508(b)]
The Permittee shall:
i. operate and maintain the engines and control devices according to the manufacturer's emission related-written instructions over the entire life of the engine;
ii. change only those emission-related settings that are permitted by the manufacturer; and
iii. meet the requirements of 40 CFR 89, 94 and/or 1068 as applicable. [40CFR 60.4206 and 60.4211(a)]

h. The Permittee shall comply with the emission standards in condition c. by purchasing an engine certified to the emission standards in condition c for the same model year and maximum engine power. The engine shall be installed and configured according to the manufacturer's emission-related specifications. [40CFR 60.4211(c)]

i. In order for the engine to be considered an emergency stationary ICE under this condition, any operation other than emergency operation, maintenance and testing, emergency demand response, and operation in non- emergency situations for 50 hours per year, as described below, is prohibited.
i. There is no time limit on the use of emergency stationary ICE in emergency situations.
ii. The Permittee may operate the emergency stationary ICE for any combination of the purposes specified in paragraphs i.ii.(A) through (C) of this condition for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraph i.iii. of this condition counts as part of the 100 hours per calendar year allowed by this paragraph i.iii.
(A) Emergency stationary ICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for

maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year.

(B) Emergency stationary ICE may be operated for emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP–002–3, Capacity and Energy Emergencies (incorporated by reference, see 40 CFR 60.17), or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2 as defined in the NERC Reliability Standard EOP–002–3.

(C) Emergency stationary ICE may be operated for periods where there is a deviation of voltage or frequency of 5 percent or greater below standard voltage or frequency.

iii. Emergency stationary ICE may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing and emergency demand response provided in paragraph i.ii. of this condition. Except as provided in paragraph i.iii.(A) of this condition, the 50 hours per calendar year for non- emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

(A) The 50 hours per year for non-emergency situations can be used to supply power as part of a financial arrangement with another entity if all of the following conditions are met:

(i) The engine is dispatched by the local balancing authority or local transmission and distribution system operator;

(ii) The dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads that could lead to the interruption of power supply in a local area or region.

(iii) The dispatch follows reliability, emergency operation or similar protocols that follow specific NERC, regional, state, public utility commission or local standards or guidelines.

(iv) The power is provided only to the facility itself or to support the local transmission and distribution system.

(v) The owner or operator identifies and records the entity that dispatches the engine and the specific NERC, regional, state, public utility commission or local standards or guidelines that are being followed for dispatching the engine. The local balancing authority or local transmission and distribution system operator may keep these records on behalf of the engine owner or operator. [40CFR 60.4211(f)]

Recordkeeping [15A NCAC 2Q .0508(f)]

j. To assure compliance, the Permittee shall perform inspections and maintenance on the engine as recommended by the manufacturer per 40 CFR 60.4206 and 40 CFR 60.4211(a). The results of inspection and maintenance shall be maintained in a logbook (written or electronic format) on-site and made available to an authorized representative upon request. The logbook 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 on the engine;
iv. any variance from manufacturer's recommendations, if any, and corrections made;
v. the hours of operation of the engine in emergency and non-emergency service. [40 CFR 60.4214(b)]
vi. if a PM filter is used, records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached [40 CFR60.4214(c)]; and
vii. documentation from the manufacturer that the engine is certified to meet the emission standards in condition c.

Reporting [15A NCAC 2Q .0508(f)]

k. The Permittee shall submit a summary report 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. All instances of noncompliance with the requirements of this permit shall be clearly identified.

4. 15A NCAC 2D .1111: MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY (40 CFR Part 63 Subpart ZZZZ) – New Stationary RICE located at an Area Source of HAP Emissions

Applicability [40 CFR 63.6585, 6590(a)(2)(iii)]

a. For the emergency generator **(ID No. ES-EG)**, the Permittee shall comply with all applicable provisions, including the monitoring, recordkeeping, and reporting contained in Environmental Management Commission Standard 15A NCAC 2D .1111 "Maximum Achievable Control Technology" (MACT) as promulgated in 40 CFR 63, Subpart ZZZZ, "National Emission Standards For Hazardous Air Pollutants For Stationary Reciprocating Internal Combustion Engines located at Area Sources" and Subpart A "General Provisions."

Stationary RICE subject to Regulations under 40 CFR Part 60 [15 A NCAC 2Q. 0508(f)]

b. Pursuant to 40 CFR 63.6590(c)(1), the emergency generator **(ID No. ES-EG)** must meet the requirements of 40 CFR 63 Subpart ZZZZ and Subpart A by meeting the requirements of 40 CFR part 60 subpart IIII. No further requirements apply for this engine under 40 CFR 63 Subpart ZZZZ and Subpart A.

5. 15A NCAC 2D .1111: MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY (40 CFR Part 63 Subpart ZZZZ) – Existing Stationary RICE located at an Area Source of HAP Emissions

Applicability [40 CFR 63.6585, 63.6590(a)(1)(iii)]

a. For the fire water pump **(ID No. ES-FWP)**, the Permittee shall comply with all applicable provisions, including the monitoring, recordkeeping, and reporting contained in Environmental Management Commission Standard 15A NCAC 2D .1111 "Maximum Achievable Control Technology" (MACT) as promulgated in 40 CFR 63, "Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines located at Area Sources" and Subpart A "General Provisions."

Definitions and Nomenclature

b. For the purposes of this permit condition, the definitions and nomenclature contained in 40 CFR 63.6675 shall apply.

General Provisions [40 CFR 63.6665]

c. The Permittee shall comply with the General Provisions as applicable pursuant to Table 8 of 40 CFR 63 Subpart ZZZZ.

Operating and Maintenance Requirements [15A NCAC 2Q .0508(b)]

d. During periods of startup of the IC engine, the Permittee shall minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply. [40 CFR 63.6603(a), Table 2d and 63.6625(h)]

e. Except during periods of startup of the IC engine, the Permittee shall:
   i. Change oil and filter every 500 hours of operation or annually, whichever comes first;
   ii. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first; and
   iii. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary. [40 CFR 63.6603(a), Table 2d]

f. The Permittee shall have the option to utilize the oil analysis program as described in 40 CFR 63.6625(i) in order to extend the specified oil change requirement in condition g. [40 CFR 63.6603(a), Table 2d, 63.6625(i)]

g. If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in condition e., or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under Federal, State, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under Federal, State, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under Federal, State, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the Federal, State or local law under which the risk was deemed unacceptable. [40 CFR 63.6603(a), Table 2d]

h. The permittee shall be in compliance with the emission limitations, operating limitations and other requirements that apply at all times. [40 CFR 63.6605(a)]

i. The Permittee shall operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require you to make any further efforts to reduce emissions if levels required by this standard have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source. [40 CFR 63.6605(b)]

j. The Permittee shall operate and maintain the stationary RICE according to the manufacturer's emission-related written instructions or develop a maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions. [40 CFR 63.6625(e) and 63.6640(a), Table 6]

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

A. Facility-wide sources

State-enforceable only

1. 15A NCAC 2D .0540: PARTICULATES FROM FUGITIVE DUST EMISSION SOURCES

a. As required by 15A NCAC 2D .0540 "Particulates from Fugitive Dust Emission Sources," the Permittee shall comply with all aspects of the most recently submitted fugitive dust control plan, approved September 13, 2013 and revised January 14, 2014.

State-enforceable only

2. TOXIC AIR POLLUTANT EMISSIONS LIMITATION AND REQUIREMENT

a. 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 ID	Description	Acrolein	Formaldehyde	Benzene
		lb/hr	lb/hr	lb/yr
ES-DRYER	Dryer System	2.74	5.94	2864.52

Emission Source ID	Description	Acrolein lb/hr	Formaldehyde lb/hr	Benzene lb/yr
ES-DHM-1, ES-DHM-2	Hammermills 1&2	0.209	0.272	N/A
ES-DHM-3, ES-DHM-4	Hammermills 3&4	0.209	0.272	N/A
ES-HAF	Hammermill Area Filter	0.105	0.136	N/A
ES-EG	Emergency Generator	2.27E-04	2.89E-03	17.52
ES-FWP	Firewater Pump	1.94E-04	2.48E-03	17.52
ES-CLR1, ES-CLR2	Pellet Cooler 1&2	0.366	0.274	N/A
ES-CLR3, ES-CLR4	Pellet Cooler 3&4 Cyclone	0.366	0.274	N/A
ES-CLR5	Pellet Cooler 5 Cyclone	0.183	0.137	N/A

Testing [15A NCAC 2Q .0508(f)]

b. If emissions testing is required, the testing shall be performed in accordance with General Condition JJ.

Monitoring/Recordkeeping/Reporting

c. To demonstrate compliance with the toxic air pollutant emissions limitations, the Permittee shall report acrolein, formaldehyde and benzene emissions associated with the emission sources listed in the table above. The report must contain the highest hourly emissions from each source for each month for acrolein and formaldehyde and the monthly and the 12-month total emissions for benzene. The report shall be submitted to the Regional Supervisor of DAQ 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.

State-enforceable only

3. TOXIC AIR POLLUTANT EMISSION RATES REQUIRING A PERMIT

a. 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 listed in the table below:

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 Inorganic arsenic compounds	0.053			
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 (DEHP) (117-81-7		0.63		
Ethylene dichloride (1,2-	260			

Pollutant (CAS Number)	Carcinogens (lb/yr)	Chronic Toxicants (lb/day)	Acute Systemic Toxicants (lb/hr)	Acute Irritants (lb/hr)
dichloroethane) (107-06-2)				
Hexachlorodibenzo-p-dioxin (57653-85-7)	0.0051			
Hydrogen chloride (7647-01-0)				
Manganese & compounds		0.63		
Mercury, vapor (7439-97-6)		0.013		
Methyl chloroform (1,1,1-trichloroethane) (71-55-6)		250		
Methyl ethyl ketone (78-93-3)		78		
Methyl isobutyl ketone (108-10-1)		52		7.6
Methylene chloride (75-09-2)	1600		0.39	
Nickel metal (7440-02-0)		0.13		
Pentachlorophenol (87-86-5)		0.063	0.0064	
Perchloroethylene (tetrachloroethylene) (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 (CFC 111) (75-01-4)			140	
Vinyl chloride (75-01-4)	26			
Xylene (1330-20-7)		57		16.4

Monitoring/Recordkeeping/Reporting

b. No monitoring/recordkeeping/reporting is required.

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

a. In order to avoid applicability of 15A NCAC 2D .0530, as requested by the Permittee, facility-wide VOC emissions shall be less than 391.6 tons per consecutive 12-month period.

Testing [15A NCAC 2Q .0508(f)]

b. If emissions testing is required, the testing shall be performed in accordance with General Condition 17.

Monitoring/Recordkeeping

c. The Permittee shall record and maintain the following records in a logbook (written or electronic format) and make records available to DAQ personnel upon request.
   i. The oven dried tons of wood pellets produced each month;
   ii. The facility-wide emissions of VOC's calculated each month using the best available emissions factors (vender certified compliance emission rates for emergency engines, performance stack test data, DAQ spreadsheets, EPA AP-42 emissions factors or other DAQ approved emission factors); and

iii. The average softwood content of wood mixture processed in each of the dryer system **(ID No. ES-DRYER)**, the hammermills **(ID Nos. ES-DHM-1 through ES-DHM-4 and ES-HAF)** and the pellet coolers **(ID Nos. ES-CLR1 through ES-CLR5)** shall be recorded monthly. The maximum softwood content of the wood mixture shall be less than the content used for the testing to derive the VOC emission factors.

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 VOC emissions for the previous 17 months. The emissions must be calculated for each of the 12-month rolling average over the previous 17 months.
   ii. The monthly softwood content of wood mixture processed in the dryer system **(ID No. ES-DRYER)**, the hammermills **(ID Nos. ES-DHM-1 through ES-DHM-4 and ES-HAF)** and the pellet coolers **(ID Nos. ES-CLR1 through ES-CLR5).**

SECTION 3 - GENERAL CONDITIONS

1. In accordance with G.S. 143-215.108(c)(1), TWO COPIES OF ALL DOCUMENTS, REPORTS, TEST DATA, MONITORING DATA, NOTIFICATIONS, REQUESTS FOR RENEWAL, AND ANY OTHER INFORMATION REQUIRED BY THIS PERMIT shall be submitted to the:

   Regional Supervisor
   North Carolina Division of Air Quality
   Mooresville Regional Office
   610 East Center Ave., Suite 301
   Mooresville, NC 28115
   704-663-1699

   For identification purposes, each submittal should include the facility name as listed on the permit, the facility identification number, and the permit number.

2. RECORDS RETENTION REQUIREMENT - In accordance with 15A NCAC 2D .0605, any records required by the conditions of this permit shall be kept on site and made available to DAQ personnel for inspection upon request. These records shall be maintained in a form suitable and readily available for expeditious inspection and review. These records must be kept on site for a minimum of 2 years, unless another time period is otherwise specified.

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. EQUIPMENT RELOCATION - In accordance with 15A NCAC 2Q .0301, 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.

5. REPORTING REQUIREMENT - In accordance with 15A NCAC 2Q .0309, 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.

6. In accordance with 15A NCAC 2Q .0309, 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. In accordance with G.S. 143-215.108(c)(1), the facility shall be properly operated and maintained at all times in a manner that will effect an overall reduction in air pollution. Unless otherwise specified by this permit, no emission source may be operated without the concurrent operation of its associated air cleaning device(s) and appurtenances.

7. In accordance with G.S. 143-215.108(c)(1), this permit is nontransferable by the Permittee. Future owners and operators must obtain a new air permit from the DAQ.

8. In accordance with G.S. 143-215.108(c)(1), 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.

9. In accordance with G.S. 143-215.108(c)(1), 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.

10. In accordance with 15A NCAC 2D .0605, 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.

11. 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.

12. 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.

13. In accordance with G.S. 143-215.108(c)(1), this permit does not relieve the Permittee of the responsibility of complying 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.

14. PERMIT RETENTION REQUIREMENT - In accordance with 15A NCAC 2Q .0110, 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.

15. CLEAN AIR ACT SECTION 112(r) REQUIREMENTS - Pursuant to 15A NCAC 2D .2100 "Risk Management Program," 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 with the USEPA in accordance with 40 CFR Part 68.

16. 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.**

17. GENERAL EMISSIONS TESTING AND REPORTING REQUIREMENTS - If emissions testing is required by this permit, or the DAQ, or if the Permittee submits emissions testing to the DAQ in support of a permit application or to demonstrate compliance, the Permittee shall perform such testing in accordance with 15A NCAC 2D .2600 and follow all DAQ procedures including protocol approval, regional notification, report submittal, and test results approval.

Permit issued this the 22nd day of May, 2015.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

William D. Willets, P.E., Chief, Permitting Section
Division of Air Quality, NCDENR
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
DENR	Department of Environment and Natural Resources
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: May 22, 2015

Region: Washington Regional Office
County: Hertford
NC Facility ID: 4600107
Inspector's Name: Betsy Huddleston
Date of Last Inspection: 06/25/2014
Compliance Code: 3 / Compliance - inspection

Facility Data

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

Facility Address:
Enviva Pellets Ahoskie, LLC
142 NC Route 561 East
Ahoskie, NC 27910

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: N/A
NSPS: N/A
NESHAP: N/A
PSD: N/A
PSD Avoidance: Applicable 15A NCAC 2Q .0317
NC Toxics: N/A
112(r): N/A
Other:

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Joe Harrell EHS Manager (252) 209-6032 142 NC Route 561 East Ahoskie, NC 27910	E. Smith Vice President of Operations (301) 657-5567 7200 Wisconsin Avenue Bethesda, MD 20814	Joe Harrell EHS Manager (252) 209-6032 142 NC Route 561 East Ahoskie, NC 27910

Application Data

Application Number: 4600107.15A
Date Received: 01/09/2015
Application Type: Modification
Application Schedule: State

Existing Permit Data
Existing Permit Number: 10121/R02
Existing Permit Issue Date: 03/10/2014
Existing Permit Expiration Date: 11/30/2015

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2013	8.70	100.74	56.47	37.13	113.65	15.70	5.86 [Formaldehyde]
2012	17.50	79.88	24.79	29.83	113.93	8.86	2.35 [Formaldehyde]
2011	1.10	13.50	16.30	18.90	12.60	---	--- [---]

Review Engineer: Yukiko (Yuki) Puram

Review Engineer's Signature: **Date: May 22, 2015**

Comments / Recommendations:

Issue 10121/R03
Permit Issue Date: May 22, 2015
Permit Expiration Date: November 30, 2015

I. Purpose of Application

Enviva Pellets Ahoskie, LLC (Enviva) currently holds Air Permit 10121R02. Per 15A NCAC 2Q .0504, the facility is allowed to construct and operate under 15A NCAC 2Q .0300 when a Title V permit application is submitted within one year from the date of beginning of operation. Operation of the facility commenced on November 22, 2011 and the first time Title V application (4600107.12A) was received on November 13, 2012, which was within the time period allowed. The first time Title V permit has not being issued. Meanwhile, the facility submitted a modification request (4600107.15A) to make the following changes:

- Increase the dryer heat rating to 175.3 million Btu per hour.
- Increase the dryer production rates to 48 tons per hour.
- Allow pellet mill system to process additional purchased dried wood material.
- Increase the hourly capacity of pellet mill system to 55 ODT/hr (481,800 ODT/yr).
- Increase the softwood content in its wood mix to 30% for dryer and hammer mill and 45% for pellet press. The facility requests the permit to allow them to operate at even higher softwood content in future.
- Limit the facility-wide VOC emissions to the baseline VOC emissions plus 249 tons per year to avoid PSD review.
- Include electric powered green wood chipper (IES-CHP1) and the green wood hammermil (IES-CHP2) to the insignificant activity list.

In order to develop the VOC emission factors from the dryer (ES-DRYER), the hammermills (ES-DHM-1 through 5), and the pellet presses (ES-CLR1 through CLR 5), a stack test is required. The facility conducted a stack testing in June 2014 and the emission factors used in the permit application were derived from the test in June 2014. The test was approved by DAQ on March 25, 2015.

II. Facility Description

Enviva is a wood pellets manufacturing plant located in Ahoskie, Hertford County in NC. The wood pellets are used as a renewable fuel for energy generation in place of coal. Most of their products are shipped to Europe to be used as energy source. Although the current permit R02 indicates the dryer (ID No. ES-DRYER) being rated at 125 mmBtu/hr, it should be rated at 175.3 mmBtu/her per letter from Enviva dated November 2, 2012. Subsequently, the facility's processing capacity should be corrected to 483,552 tons of greenwood or 420,480 ODT per year. Although Permit R02 was issued based on the wood mixture consisting of 90% hardwood and 10% softwood, the facility is currently operating at a ratio of 70% hardwood and 30% softwood with the DAQ's permission until the facility establishes emission factor with the new wood mixture.

III. History/Background/Application Chronology

December 7, 2010	The R00 permit was issued with a requirement to submit a First Time Title V application within a year of startup.
October 25, 2011	Enviva submitted application 4600107.11A.
November 22, 2011	Operation of the Enviva Pellets Ahoskie site was commenced.
January 3, 2012	Permit R01 was issued in response to application .11A. This permit changed the configuration of several control devices and incorporated modeling.
November 13, 2012	First time Title V permit application, 4600107.12A, was submitted.

April 8, 2013	Enviva submitted a letter to DAQ indicating the VOC emissions in the previous applications may be underestimated. The VOC emissions of similar facilities will be used to compare to their permit application.
December 10, 2013	Enviva submitted application 4600107.13A to incorporate the fugitive dust control plan.
March 10, 2014	Permit R02 was issued.
October 10, 2014	Permit application .12A was transferred to Yuki Puram.
October 30, 2014	Kevin Godwin, Jeff Twisdale and Yuki Puram visited the Enviva Ahoskie site to meet Mr. Joe Harrell.
October 31, 2014	Mr. Harrell submitted a copy of the updated site map with additional information.
January 9, 2015	Application 4600107.15A was submitted for modification R03.
February 11, 2015	DAQ's request for additional information regarding toxic emissions from the dryer was sent to Mr. Mike Deyo, consultant for Enviva.
February 13, 2015	Mr. Mike Deyo provided test results from other Enviva facilities indicating some of the requested toxic emissions information. However, those tests were not approved by DAQ. I requested clarification on the inputs used for the dispersion modeling analysis.
February 25, 2015	Mr. Alan McConnell, attorney representing Enviva, contacted William Willets of DAQ regarding Enviva's toxic emissions.
March 9, 2015	Mr. Mark Cuilla of DAQ spoke with Mr. McConnell to inform DAQ will grant Enviva an extended period of operation at a higher softwood content until the new permit being issued.
March 12, 2015	Additional information for PM emissions from the pellet coolers were requested to Mr. Deyo.
March 19, 2015	Mr. Deyo replied to the request for the PM emission information.
March 20, 2015	Draft permit was sent to Mr. Deyo, Mr. Harrell, Mr. Booker Pullen of DAQ and Ms. Betsy Huddleston of WaRO.
March 25, 2015	The stack tests conducted in June and July 2014 at the Ahoskie site was approved by DAQ's SSCB.
March 27, 2015	Draft permit was reviewed by Mr. Pullen.
March 30, 2015	Mr. Huddleston reviewed the permit.

April 13, 2015	As requested by Mr. McConnell, the draft permit was updated to reflect the VOC emissions approved by SSCB.
April 14, 2015	Mr. Cuilla reviewed the updated permit.
April 16, 2015	Updated draft permit was sent to Mr. McConnell.
April 28, 2015	DAQ received comments from Mr. McConnell along with test reports conducted in Amory, Mississippi and Wiggins Mississippi.
May 6, 2015	Mr. William approved to issue the permit without testing requirements for toxic pollutants before the SSCB finalize the review.
May 19, 2015	A permit to increase the percentage of softwood was extended.
May 22, 2015	Permit R03 issued.

IV. Regulatory Review – Specific Emission Source Limitations

The emission sources and associated air pollution control devices and appurtenances listed below are subject to the following regulations:

A. Direct Wood-Fired Rotary Drum Drying System (ES-DRYER)

- Wood-fired dryer (ID No. ES-DRYER) with simple cyclone (ID No. CD-DC) in series with one wet electrostatic precipitator (ID No. CD-WESP)
- Dried wood day silo (ID No. ES-DWDS) with bin vent filter (ID No. CD-DWDS-BV)
- Four dry wood hammermills (ID Nos. ES-DHM-1 through ES-DHM-4) with four simple cyclones (ID Nos. CD-DHM-C1 through CD-DHM-C4) in series with two fabric filters (ID Nos. CD-DHM-FF1 and CD-DHM-FF2)
- Hammermill area and Hammermill No. 5 (ID No. ES-HAF) with fabric filter (ID No. CD-HAF-FF)
- Pellet feed mill silo (ID No. ES-PMFS) with bin vent filter (ID No. CD-PMFS-BV)
- Five pellet coolers (ID Nos. ES-CLR1 through ES-CLR5) with two multicylones (ID Nos. CD-CLR-C1 and CD-CLR-C2) and one simple cycle (ID No. CD-CLR-3)
- Fines bin (ID No. ES-FB) with bin vent filter (ID No. CD-FB-BV)
- Finished product handling (ID No. ES-FPH), truck loadout bin (ID Nos. ES-TLB), and two pellet loadouts (ID Nos. ES-PL1, ES-PL2) all venting to bagfilter (ID No. CD-FPH-BF)

1. **<u>15A NCAC 2D .0515: Particulates from Miscellaneous Industrial Processes</u>**
This regulation establishes an allowable emission rate for particulate matter from any stack, vent, or outlet resulting from any industrial process for which no other emission control standards are applicable. This regulation applies to Total Suspended Particulate (TSP) or PM less than 100 micrometers (μm). The allowable emission rate is calculated using the following equation:

$E = 4.10 \times P^{0.67}$ for $P < 30$ tph
$E = 55 \times P^{0.11} - 40$ for $P \geq 30$ tph
where, E = allowable emission rate (lb/hr)
P = process weight rate (tph)

According to the application, the maximum dryer system operation rate is 48.0 ODT/hr. Using the equation above, the allowable emission rate is calculated to be 44.2 lb/hr. The maximum PM emission rate is 5.59 lb/hr as controlled based on the wet electrostatic precipitator (WESP) specifications. Since PM control is required to remain below the particulate emissions limit, monitoring, recordkeeping and reporting requirements for the cyclone and WESP are included in the permit to ensure compliance. Table 1 shows a summary of PM emissions from each emission source including the dryer.

Table 1: Summary of PM emissions from each emission

Emission Source	Process Rate (tph)	PM Limit (lbs/hr)	Uncontrolled PM Emissions (lb/hr)	Reference	Control Devise	Controlled PM Emissions (lb/hr)	Reference
ES-DRYER	48	**44.20**	**57.81**	1	CD-DC and CD-WESP	5.59	2
ES-DHM-1 through 4	48	**44.20**	**1372.00**	3	CD-DHM-C1 through C4, CD-DHM-FF1 andFF2	6.86	2
ES-HAF	48	**44.20**	**558.00**	3	Cyclone and Fabric Filter	2.79	2
ES-PMFS	55	45.47	38.00	3	Vent filter	0.19	2
ES-DWDS	55	45.47	38.00	3	Vent filter	0.19	2
ES-FB	7	**15.10**	**18.00**	3	Vent filter	0.09	2
ES-FPH, TLB, PL 1 and 2	55	**45.47**	**182.00**	3	Bagfilter	0.91	2
ES-CLR 1 through 6	55	**45.47**	**259.40**	4	Cyclone	12.97	2

1. Estimated using the emission factor from AP-42, chapter 1-6, Combustion of Wet Wood.
2. 2015 permit application
3. Back calculated assuming the bagfilters provides 99.5% control efficiency.
4. Back calculated assuming the multicylone provides 95% control efficiency.

Compliance is inherent for the pellet feed mill silo (ES-PMFS) and the dried wood day silo (ES-DWDS) prior to the vent filter control. Thus, no monitoring, recordkeeping or reporting is required for the associated control devices (CD-PMFS-BV and CD-DWDS-BV). PM control is required for the remaining sources to ensure particulate emissions do not exceed the allowable limit. Monitoring, recordkeeping and reporting have been kept on the permit to ensure each required bagfilter is properly operated.

Although Enviva's Northampton facility is required to monitor WESP's primary voltage and current through the precipitator, the Ahosikie site's current permit (R02) does not include this requirement. Therefore, additional monitoring requirement for WESP was added to ensure compliance with 15A NCAC 2D .0515 and to keep consistent requirements throughout the facilities in the same industry.

2. **<u>15A NCAC 2D .0516: Sulfr Dioxide Emissions from Combustion Sources</u>**

This rule limits SO2 emissions from the wood-fired dryer associated with the wet electrostatic precipitator to 2.3 pounds per million But. SO2 emissions from the dryer system are estimated 0.025lbs/mmBtu per AP-42 Table 1.6-2. Therefore, compliance is inherent. No testing, monitoring, recordkeeping or reporting is required.

3. **15A NCAC 2D .0521 "Control of Visible Emissions"**
This regulation limits visible emissions from the dryer system to 20% opacity except one per hour and four per 24 hours 6-minute average VE may exceed 20% opacity provided VE does not exceed 87% opacity. The facility is currently required to observe VE emissions monthly. A semiannual reporting requirement was added to the permit to be consistent with most of Title V facilities.

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

1. **15A NCAC 2D .0516: Sulfr Dioxide Emissions from Combustion Sources**
There are no change with this requirement at this time.

2. **15A NCAC 2D .0521 Control of Visible Emissions**
A semiannual reporting requirement was added to be consistent with other Title V facilities.

3. **15A NCAC 2D .0524 NEW SOURCE PERFORMANCE STANDARDS [40 CFR Part 60 Subpart IIII]**
Since the fire pump was manufactured in 1975, it is not subject to NSPS Subpart IIII. The emergency generator, however, is subject NSPS Subpart IIII since it was manufactured in May 2011 according to the compliance inspection report dated July 15, 2014. The inspection report also indicated that the maximum heat input rate is 200 kW (268 hp). NSPS Subpart IIII requirements have been changed since the last permit was issued. Updated compliance requirements, recordkeeping and reporting requirements are added to the permit. Mr. Joe Harrell of Enviva confirmed that the facility does not have any financial arrangement or contract obligation to supply electricity to outside of the facility. The generator will be used exclusively for an emergency purpose for the facility.

4. **15A NCAC 2D .1111: MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY (40 CFR 63 Subpart ZZZZ) – New Stationary RICE located at an Area Source of HAP Emissions**
The emergency generator is subject to both GACT Subpart ZZZZ and NSPS Subpart IIII. Per §63.6590(c)(1), a new RICE located an area source that is also subject to NSPS Subpart IIII is not subject to further requirements under this subpart as long as the requirements under NSPS Subpart IIII are met.

5. **15A NCAC 2D .1111: MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY (40 CFR 63 Subpart ZZZZ) – Existing Stationary RICE located at an Area Source of HAP Emissions**
Although the fire pump is fairly new to the site, it is still considered as an existing RICE under Subpart ZZZZ. Per §63.6590 (a)(1)(iv) "A change in ownership of an existing stationary RICE does not make that stationary RICE a new or reconstructed stationary RICE." Moreover, 40 CFR 63 subpart A defines construction as follows:

> *Construction means the on-site fabrication, erection, or installation of an affected source. Construction does not include the removal of all equipment comprising an affected source from an existing location and reinstallation of such equipment at a new location.*

Therefore, the fire pump is considered as an existing RICE located at an area source. Since it is not subject to NSPS Subpart IIII, unlike the emergency generator, it is subject to additional operating and maintenance requirements which are added to the permit.

V. Regulatory Review – Facility-wide Sources

1. **15A NCAC 2D .0540 "Particulates from Fugitive Dust Emissions"**
The facility developed a fugitive dust control plan which was revised on January 14, 2014. No change in this requirement was made at this time.

2. **15A NCAC 2D .1100 "Toxic Air Pollutant Emissions Limitation and Requirement"**
The facility conducted a dispersion modeling analysis of acrolein, benzene, formaldehyde, phenol and NO2 on October 26, 2010 and March 22, 2011. In addition, arsenic, bezo(a)pyrene, cadmium, chlorine, hexa-p-diox and hydrogen chloride were added to the pollutants subject to 15A NCAC 2D .1100 on November 10, 2011. However, according to the permit application, it was demonstrated those pollutants that were originally included in the permit are not emitted from the wood pellet dryers (e.g. benzeze and phenol). Further, Enviva determined only acrolein and formaldehyde emissions exceeded the TPER. Since Enviva is requesting to increase the operating capacity, the facility conducted a dispersion modeling analysis to demonstrate compliance with 2D .1100.

   Table 2 shows HAPs emissions from each source. The data was extracted from the permit application, Table B-2, *Facility-wide HAP Emissions Summary*:

Table 2: Facility-wide HAP Emissions Summary

Description	Dryer (tpy)	ES-HM1 thru 5 (tpy)	ES-CLR 1 thru 6 (tpy)	ES-EG (tpy)	ES-FWP (tpy)	ES - BARK (tpy)	ES – CHP - 1	ES – CHP - 2 (tpy)	Total (tpy)
1,3-Butadine	-	-	-	2.39E-05	2.05E-05	-	-	-	4.45E-05
Acetaldehyde	5.29	0.00	0.00	4.70E-04	4.03E-04	-	-	-	5.29E+00
Acrolein	0.00	0.724	0.00	5.67E-05	4.86E-05	-	-	-	0.725E-01
Benzene	-	-	-	5.71E-04	4.90E-04	-	-	-	1.06E-03
Formaldehyde	9.88	0.00	1.5	7.23E-04	6.20E-04	-	-	-	1.14E+01
m-, p-Xylene	-	-	-	1.75E-04	1.50E-04	-	-	-	3.24E-04
Methanol	7.76	0.604	2.70	-	-	0.07	0.21	0.21	1.16E+01
Propinaldehyde	0.918	0.00	0.00	-	-	-	-	-	9.18E-01
Toluene	-	-	-	2.51E-04	2.15E-04	-	-	-	4.65E-04
Total PAH (POM)	0.00	-	-	1.03E-04	8.82E-05	-	-	-	1.92E-04

In addition, the facility included a TPER comparison table (Table 3) in their dispersion modeling analysis:

Table 3:TAPs emissions comparison to TPER

Pollutant	Maximum Potential Emissions (lb/hr)	TPER	Modeling Required?	Maximum Potential Emissions (tpy)*	Facility-wide emissions from Permit Application R03
1,3-Butadiene	-	-	-	-	4.45E-05
Acetaldehyde	1.81	6.8	No	7.9	5.29
Acrolein	2.98	0.02	Yes	13.1	0.725
Benzene	-	-	-	0	1.06E-03
Formaldehyde	3.65	0.04	Yes	16.0	11.4
Phenol	0	0.24	No	0	Unavailable

Toluene	-	-	-	-	4.65E-04

*Calculated by maximum potential emissions (lb/hr)*8760 hrs/yr/2000lbs/ton

I have added a column to Table 3 to show the HAPs emissions that were included in the permit application compared to the emissions from the TPER analysis. Although the facility did not provide source-by-source emissions for the TPER analysis, the emissions used in the analysis were more conservative than those indicated in the permit application. According to this analysis, maximum emissions of acrolein and formaldehyde exceeded the TPER for which a permit is required. All the other TAPs emitted from the facility are below the TPERs listed in 2Q .0711.

The facility submitted a dispersion modeling analysis demonstrating the concentration of each of the two affected TAPs emitted from the facility will not present an unacceptable health risk at the property boundary. The modeling was reviewed by Alex Zarnowski of AQAB, and was found to adequately demonstrate compliance with the acceptable ambient levels (AALs) for each TAP. The TAP were modeled on a source-by-source basis and their emission rates were optimized up to 99.25% of the AAL for acrolein. Pursuant to 15A NCAC 2D .1100 "Control of Toxic Air Pollutants," and in accordance with the approved application for an air toxic compliance demonstration, the permit limits indicated in Table 4 shall not be exceeded:

Table 4: TAPs Emission Rates used as Inputs for the Dispersion Modeling Analysis

			Modeled Emission Rates			
			Acrolein		Formaldehyde	
Model ID	Emission Source ID	Description	g/s	lb/hr	g/s	lb/hr
EP1	ES-DRYER	Dryer System	3.45E-01	2.74E+00	7.48E-01	5.94E+00
EP2	ES-DHM-1, ES-DHM-2	Hammermills 1&2	2.63E-02	2.09E-01	3.43E-02	2.72E-01
EP3	ES-DHM-3, ES-DHM-4	Hammermills 3&4	2.63E-02	2.09E-01	3.43E-02	2.72E-01
EP4	ES-HAF	Hammermill Area Filter	1.32E-02	1.05E-01	1.71E-02	1.36E-01
EP5	ES-PMFS	Pellet Press Silo	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP6	ES-EG	Emergency Generator	2.86E-05	2.27E-04	3.64E-04	2.89E-03
EP7	ES-FWP	Firewater Pump	2.45E-05	1.94E-04	3.12E-04	2.48E-03
EP8	ES-FB	Fines Bin	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP9	ES-FPH, ES-TLB, ES-PL1, ES-PL2	Finished product handling, truck loadout bin and pellet loadouts	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP11	ES-CLR1, ES-CLR2	Pellet Cooler 1&2	4.61E-02	3.66E-01	3.45E-02	2.74E-01
EP12	ES-CLR3, ES-CLR4	Pellet Cooler 3&4 Cyclone	4.61E-02	3.66E-01	3.45E-02	2.74E-01
EP13	ES-CLR5	Pellet Cooler 5 Cyclone	2.30E-02	1.83E-01	1.72E-02	1.37E-01
EP14	ES-DWDS	Dried Wood Day Silo	0.00E+00	0.00E+00	0.00E+00	0.00E+00

In order to ensure compliance with the toxics limit, the facility was asked to demonstrate no acrolein, benzene and phenol are emitted from the dryer. On February 13, 2015, Mike Deyo, Consultant for Enviva, submitted emission test results conducted at the Enviva Northampton site and the Amory site in Mississippi. Acrolein and phenol emissions from these testing showed non-detectable limit. However,

neither of the tests were reviewed or approved by DAQ. No documents showing benzene emissions were submitted. A testing condition was added to the permit to establish emission factor or to verify there are no acrolein, phenol and benzene emissions from the dryer, hammermills and pellet coolers. Based on the technical review prepared by Dr. John Richards of Air Control Techniques, there are no detectable emissions of those three pollutants from the dryer. However, DAQ requires actual test reports showing the data. The facility submitted test reports conducted in the Ahoskie Amory site and the Wiggins site in Mississippi. Those tests are reviewed by the SSCB. The testing conditions were removed from the permit but the permit will be open for cause if the SSCB rejects these test methods.

Benzene was not included in the tests conducted in either of the Amory or the Wiggins site. Although the facility claims there are no benzene emissions from the dryer, according to EPA's AP-42, it appears to be benzene emissions from wood combustion. There seems to be no evidence of benzene emissions from the dryer itself, however, the heat in the dryer is provided by wood combustion. Moreover, the facility has been reporting actual benzene emissions from the dryer in the past years. According to their emissions inventory, benzene emissions were 381 lbs in 2013 and 255.61 in 2012. Since their actual emissions are above TPER (8.1 lbs/yr), the benzene emission limit requirement remains in the permit.

Monitoring, recordkeeping and reporting requirements for acrolein, phenol and benzene emissions are required to ensure compliance with the limits. Because the emission limits are based on the hourly emissions for acrolein and phenol, the facility must log the highest hourly emission rate every month instead of monthly average rate in order to demonstrate the compliance with 15A NCAC 2D .1100. Reporting frequency was changed from quarterly to semiannually to coordinate with other reporting requirements in the permit.

3. 15A NCAC 2Q .0711: "Toxic Air Pollutant Emission Rate Requiring a Permit"

Since Enviva stated only pollutants above the TPER were acrolein, phenol and benzene, all the other pollutants that were previously included in the 15A NCAC 2D .1100 were removed from the condition. Those pollutants are arcenic and inorganic arsenic compounds, benzo(a)pryene, cadmium, chlorine, formaldehyde, hexachlorodibenzo-p-dioxin, hydrogen chloride and phenol. No recordkeeping, monitoring, or reporting is required in this section.

4. 15A NCAC 2Q .0317 "Avoidance Conditions for 15A NCAC 2D .0530, Prevention of Significant Deterioration"

North Carolina has adopted the federal PSD requirements of 40 CFR 51.166 under North Carolina Regulation 15A NCAC 2D .0530. According to §51.166(a)(7)(iv)(a), the modification is considered as a major modification for a regulated NSR pollutant if it causes "a significant net emissions increase as defined in §51.166(b)(3)(i)(b). The table below shows Enviva's baseline emissions and potential to emit as the result of the modification:

Table 6: Summary of NSR Pollutants Emissions

	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	VOC (tpy)	CO2e (tpy)
12/2012 – 11/2013	33.40	138.26	119.21	119.19	119.37	14.24	146.48	120,257.99
12/2013 – 11/2014	31.54	130.55	118.18	118.15	118.13	15.34	138.80	129,554.98
Average 12-month emissions	32.47	134.41	118.69	118.67	118.65	14.79	142.64	124,906.49
Potential to	45.09	183.98	132.34	130.97	129.80	19.20	296.14	162,292.20

emit after the modification								
Emissions Increase	12.62	49.57	10.97	10.96	10.95	4.41	95.50	37,385.72
Proposed Emission Limit	---	---	---	---	---	---	391.64*	---

*Baseline + 249 tpy = 142.64 + 249 = 391.64

The largest emission increase as a result of this modification is 95.50 tpy of VOC except for the CO2e emissions. Although this is not considered as a significant net emission increase under the PSD rule, Enviva requested to add a PSD avoidance condition to limit the VOC emissions to 391.64 tpy.

An emission factor to calculate the VOC emissions must be approved by the DAQ. Enviva conducted a stack test on the dryer system (ID No. ES-DRYER), one of the hemmermills (ID No. ES- one of the hammermills (ID Nos. ES-DHM-1 through ES-DHM-4 and ES-HAF) and one of the pellet coolers (ID Nos. ES-CLR1 through ES-CLR5) in June and July 2014. The tests were approved by DAQ on March 25, 2015.

Enviva requested a flexibility to be able to adjust softwood content of the wood mixture. Because softwood emits more VOC than hardwood, the softwood content directly affects the VOC emissions in addition to the production rate. Therefore, the following monitoring/recordkeeping requirements were added to ensure the facility use an appropriate VOC emission factor based on the softwood content they process:

> **Monitoring/Recordkeeping**
> The Permitee shall record and maintain the following records in a logbook (written or electronic format) and make records available to DAQ personnel upon request.
> i. The oven dried tons of wood pellets produced each month;
> ii. The facility wide emissions of VOC's calculated each month using the best available emissions factors. Once testing is completed and approved by DAQ as required by paragraph b above, the facility shall calculate VOC emissions using emission factors derived from testing.
> iii. The average softwood content of wood mixture processed in each of the dryer system **(ID No. ES-DRYER)**, the hammermills **(ID Nos. ES-DHM-1 through ES-DHM-4 and ES-HAF)** and the pellet coolers **(ID Nos. ES-CLR1 through ES-CLR5)** shall be recorded monthly. The maximum softwood content of the wood mixture shall be less than the content used for the testing to derive the VOC emission factors.

In addition, a semi-annual reporting requirement was added to the permit. The facility is required to report 12-month rolling average of VOC emissions and monthly softwood content of wood mixture processed in the dryer, the hammermills and the pellet coolers.

VI. NSPS, NESHAPS, PSD, Attainment Status, 112(r), CAM

New Source Performance Standards (NSPS)
The facility is subject to 40 CFR Subpart III for their emergency engine. See the regulatory review above. No other NSPS conditions apply.

NESHAP/MACT
The facility is an area source of HAPs, and is subject to GACT 4Z for their emergency engine and fire pump. See the regulatory review above.

Prevention of Significant Deterioration (PSD)
This facility has requested limits to be considered a minor source with respect to PSD. See the regulatory review above.

112(r)
The facility does not store any regulated materials in quantities for which Section 112(r) of the Clean Air Act applies.

Compliance Assurance Monitoring (CAM)
Not applicable. CAM will not apply until after the initial Title V permit is issued.

Other Regulatory Requirements

- An application fee of $867.00 is required and was included with the application.
- The appropriate number of application copies was received on January 9, 2015.
- A Professional Engineer's Seal was included in the application (ref. J. Rusty Field, P.E. Seal No. 040609).
- Public notice is not required for this state-only construction permit under 15A NCAC 2Q .0300.
- IBEAM Emission Source Module (ESM) update was updated on May 22, 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 January 7, 2015.

V. Recommendations

This permit application was reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined that this facility is expected to achieve compliance as specified in the permit with all applicable requirements. The applicant and Washington Regional Office (WaRO) were provided a draft permit and recommended the issuance of Air Quality Permit No. 10121R03.

Comprehensive Application Report for 4600107.15A

05/22/2015

Enviva Pellets Ahoskie, LLC - Ahoskie (4600107)

Hertford County

General Information: Permit/Latest Revision: 10121/ R03

Permit code:	State
Application type:	Modification
Engineer/Rev. location:	Yukiko (Yuki) Puram/RCO
Regional Contact:	Yongcheng Chen
Facility location:	Washington 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
01/09/2015	02/23/2015	01/09/2015	05/25/2015

Fee Information

Initial amount:	Date received:	Amount Due:	Add. Amt Rcv'd:	Date Rcv'd:
$918.00	01/09/2015	0.00		

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

Contact Information

Type	Name	Address	City State ZIP	Telephone
Technical/Permit	Joe Harrell, EHS Manager	142 NC Route 561 East	Ahoskie, NC 27910	(252) 209-6032
Authorized	E. Royal Smith, Vice President of Operations	7200 Wisconsin Avenue	Bethesda, MD 20814	(301) 657-5567

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 4600107.15A 05/22/2015

Enviva Pellets Ahoskie, LLC - Ahoskie (4600107)

Hertford County

Application Events

Event	Start	Due	Complete	Comments	Staff
Acknowledgment letter due	01/09/2015	01/19/2015	01/12/2015		mjcuilla
Regional technical review completed/mailed	01/09/2015	02/08/2015	01/20/2015		mjcuilla
Technical additional information request	02/11/2015	03/13/2015	02/23/2015	Request for information on toxics modelling	mjcuilla
Draft permit to applicant	03/27/2015	04/03/2015	04/28/2015		ypuram
Draft permit to region	03/27/2015	04/03/2015	03/31/2015	via email	mjcuilla
Permit issued	05/22/2015		05/22/2015		kmhash

Comprehensive Application Report for 4600107.15A

Enviva Pellets Ahoskie, LLC - Ahoskie (4600107)

Hertford County

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: Minor General permit: No

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

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

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

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

RACT/LAER Added Fee: NO RACT Avoidance: NO

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

Permit/Revision: 10121/R03

Revision Issue Date: 05/22/2015

Accumulated process days (includes public notice periods): 87

Public notice/hearing/add info after 80 daysNo

Manager's discretion: Appealed? No

Current Permit Information:

Issue	Effective	Expiration	Revision #
05/22/2015	05/22/2015	11/30/2015	R03

Regulations Pertaining to this Permit

Reference Rule		Regulation Description
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	.0540	Particulates Fugitive Non-process Dust Emission Sources
2D	.1100	Control of Toxic Air Pollutants
2D	.1111	Maximum Achievable Control Technology
2Q	.0711	Emission Rates Requiring a Permit
Part 63 - NESHAP/MACT	Subpart ZZZZ	Reciprocating Internal Combustion Engines

- Audit Information Pertaining to this Application

Column Name	Date Changed	Old Value	New Value	Editor

Comprehensive Application Report for 4600107.15A

01/12/2015

Enviva Pellets Ahoskie, LLC - Ahoskie (4600107)

Hertford County

General Information: Permit/Latest Revision: 10121/ R02

Permit code:	State
Application type:	Modification
Engineer/Rev. location:	Yukiko (Yuki) Puram/RCO
Regional Contact:	Yongcheng Chen
Facility location:	Washington 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
01/09/2015	02/23/2015	01/09/2015	04/09/2015

Fee Information

Initial amount:	Date received:	Amount Due:	Add. Amt Rcv'd:	Date Rcv'd:
$918.00	01/09/2015	0.00		

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

Contact Information

Type	Name	Address	City State ZIP	Telephone
Technical/Permit	Joe Harrell, EHS Manager	142 NC Route 561 East	Ahoskie, NC 27910	(252) 209-6032
Authorized	E. Royal Smith, Vice President of Operations	7200 Wisconsin Avenue	Bethesda, MD 20814	(301) 657-5567

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	01/09/2015	01/19/2015	01/12/2015		kmhash

Regulations Pertaining to this Permit

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

Audit Information Pertaining to this Application

Column Name	Date Changed	Old Value	New Value	Editor

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

January 12, 2015

Mr. E. Smith
Vice President of Operations
Enviva Pellets Ahoskie, LLC
7200 Wisconsin Avenue
Suite 1000
Bethesda, MD 20814

SUBJECT: Receipt of Permit Application
Modification of Permit No. 10121R02
Application No. 4600107.15A
Enviva Pellets Ahoskie, LLC
Facility ID: 4600107, Ahoskie, Hertford County

Dear Mr. Smith:

Your air permit application (4600107.15A) for Enviva Pellets Ahoskie, LLC, located in Hertford County, North Carolina was received by this Division on January 9, 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 January 9, 2015, unless informed otherwise by this office within 60 days.

Should you have any questions concerning this matter, please contact Yukiko (Yuki) Puram at 919-707-8470.

Sincerely,

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

cc: Washington Regional Office Files

Received
JAN - 9 2015
Air Permits Section

Enviva Pellets Ahoskie, LLC

NCDENR – Division of Air Quality

Application to Modify Construction and Operation Permit No. 10121R02

Prepared for:
Enviva Pellets Ahoskie, LLC

Prepared by:
Deyo and Associates, LLC

December 2014

Tables:

Appendices:

1.0 Executive Summary

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.0 Equipment Modifications

2.1 Dryer Modifications

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

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

2.2 Pellet Presses and Downstream Equipment Modifications

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

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

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

3.0 Emissions Calculations

3.1 VOC Emissions

3.1.1 Baseline VOC Emission

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

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

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

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

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

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

3.1.2 Proposed Potential VOC Emissions

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

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

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

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

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

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

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

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

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

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

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

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

3.2 HAP Emissions

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

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

3.3 Other Emissions

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

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

4.0 Federal NSR and HAP Major Source Applicability

4.1 Federal NSR Applicability

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

4.2 HAP Major Source Applicability

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

5.0 North Carolina Toxic Air Pollutants

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

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

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

6.0 Permit Modifications

6.1 VOC Limitation

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

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

7.0 Air Permit Application Fee

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

APPENDIX A

Enviva Pellets Ahoskie, LLC

North Carolina DAQ Air Permit Application Forms

FORM A1

FACILITY (General Information)

REVISED 05/25/12 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | A1

NOTE- APPLICATION WILL NOT BE PROCESSED WITHOUT THE FOLLOWING:

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

Received JAN – 9 2015 Air Permits Section

GENERAL INFORMATION

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

CONTACT INFORMATION

Permit/Technical Contact:				***Facility/Inspection Contact:***			
Name/Title: Joe Harrell				Name/Title: same as permit / technical contact			
Mailing Address Line 1: 142 N.C. Route 561 East				Mailing Address Line 1:			
Mailing Address Line 2:				Mailing Address Line 2:			
City: Ahsokie	State: NC	Zip Code: 27910		City:	State:	Zip Code:	
Phone No. (area code) (252)209-6032	Fax No. (area code)			Phone No. (area code)	Fax No. (area code)		
Email Address: joe.harrell@envivabiomass.com				Email Address:			

Responsible Official/Authorized Contact:				***Invoice Contact:***			
Name/Title: Royal Smith				Name/Title: same as permit / technical contact			
Mailing Address Line 1: 7200 Wisconsin Avenue				Mailing Address Line 1:			
Mailing Address Line 2: Suite 1000				Mailing Address Line 2:			
City: Bethesda	State: Maryland	Zip Code: 20814		City:	State:	Zip Code:	
Phone No. (area code) (301)657-5567	Fax No. (area code) (301)657-5567			Phone No. (area code)	Fax No. (area code)		
Email Address: Royal.Smith@envivabiomass.com				Email Address:			

APPLICATION IS BEING MADE FOR

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

FACILITY CLASSIFICATION AFTER APPLICATION (Check Only One)

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

FACILITY (Plant Site) INFORMATION

Describe nature of (plant site) operation(s): **Facility ID No. :** 4600107
Wood pellet manuacturing facility

Primary SIC/NAICS Code: 2499 (Wood Products, Not Elsewhere Classified)		Current/Previous Air Permit No. 10121R02	Expiration Date 11/30/2015
Facility Coordinates: Latitude: 323,525.1 UTM E		Longitude: 4,015,554.4 UTM N	
Does this application contain confidential data?	**YES** ☐ **NO** ☑	******If yes, please contact the DAQ Regional Office prior to submitting this application.*** (See Instructions)**	

PERSON OR FIRM THAT PREPARED APPLICATION

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

SIGNATURE OF RESPONSIBLE OFFICIAL/AUTHORIZED CONTACT

Name (typed): Royal Smith		Title: Vice President of Operations	
X Signature(Blue Ink):		Date: 1/6/15	

Attach Additional Sheets As Necessary

FORMs A2, A3

EMISSION SOURCE LISTING FOR THIS APPLICATION - A2

112r APPLICABILITY INFORMATION - A3

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

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

EMISSION SOURCE ID NO.	EMISSION SOURCE DESCRIPTION	CONTROL DEVICE ID NO.	CONTROL DEVICE DESCRIPTION
Equipment To Be ADDED By This Application (New, Previously Unpermitted, or Replacement)			
Existing Permitted Equipment To Be MODIFIED By This Application			
ES-DRYER	Dryer System	CD-DC	Simple Cyclone
		CD-WESP	Electrostatic precipitator
ES-CLR 1 thru 4	Four pellet coolers	CD-CLR-C1	Dual high efficiency cyclone
		CD-CLR-C2	Dual high efficiency cyclone
ES-CLR 5	Pellet Cooler #5	CD-CLR-C3	Simple Cyclone
ES-FB	Fines Bin	CD-FB-BV	One Bin Vent Filter (325 square feet)
ES-FPH	Finished Product Handling	CD-FPH-BF	One bagfilter (4,842 square feet of filter area)
ES-TLB	Truck Loadout Bin (with 12 bottoms)		
ES-PL1, PL2	Two Pellet Loadouts		
Equipment To Be DELETED By This Application			

112(r) APPLICABILITY INFORMATION — A 3

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

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

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

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

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

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

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

Yes ☝ No ☝ If yes, please specify: _____

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

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

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

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

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

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

START CONSTRUCTION DATE: 2011	OPERATION DATE: 2011	DATE MANUFACTURED: 2011
MANUFACTURER / MODEL NO.: Teaford	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25% SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

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

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

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

Attach Additional Sheets As Necessary

FORM B1

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

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

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

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

HEATING MECHANISM: ☝ INDIRECT ☝ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): 125

WOOD-FIRED BURNER

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

PERCENT MOISTURE OF FUEL: ~50%

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

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

COAL-FIRED BURNER

TYPE OF BOILER — IF OTHER DESCRIBE:

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

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

METHOD OF TUBE CLEANING: — CLEANING SCHEDULE:

OIL/GAS-FIRED BURNER

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

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

METHOD OF TUBE CLEANING: — CLEANING SCHEDULE:

OTHER FUEL-FIRED BURNER

TYPE OF FUEL: _____ PERCENT MOISTURE: _____

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

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

METHOD OF TUBE CLEANING: — CLEANING SCHEDULE:

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Wet Wood	LB	Nominal 29,762	

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	SPECIFIC BTU CONTENT	SULFUR CONTENT (% BY WEIGHT)	ASH CONTENT (% BY WEIGHT)
Wet Wood	Nominal 4200 BTU/lb	0.011	

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

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

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

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

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

START CONSTRUCTION DATE: 2011	OPERATION DATE: 2011	DATE MANUFACTURED: 2011
MANUFACTURER / MODEL NO.: Bliss, Model 44-60	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25% SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

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

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

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

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

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

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

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

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

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

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

COMMENTS:

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

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

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

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

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

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

START CONSTRUCTION DATE: 2011	OPERATION DATE: 2011	DATE MANUFACTURED: 2011
MANUFACTURER / MODEL NO.: Bliss, Model 44-60	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25% SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

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

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

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

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

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

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

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

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

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

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

MAXIMUM DESIGN (BATCHES / HOUR):

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

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

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

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

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

START CONSTRUCTION DATE: 2011	OPERATION DATE: 2011	DATE MANUFACTURED: 2011
MANUFACTURER / MODEL NO.: Bliss	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25% SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

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

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

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

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: Four pellet coolers	EMISSION SOURCE ID NO: ES-CLR 1, 2, 3 & 4
	CONTROL DEVICE ID NO(S): CD-CLR-C1 & C2
OPERATING SCENARIO: _____1_____ OF _____1_____	EMISSION POINT (STACK) ID NO(S): EP-CLR-1 & 2

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

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

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

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

MAXIMUM DESIGN (BATCHES / HOUR):

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

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

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

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

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

START CONSTRUCTION DATE: 2012	OPERATION DATE: 2012	DATE MANUFACTURED: 2012
MANUFACTURER / MODEL NO.: Kahl	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25% SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

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

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

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

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

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

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

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

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

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

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

MAXIMUM DESIGN (BATCHES / HOUR):

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: Pellet Fines Bin	EMISSION SOURCE ID NO: ES-FB
	CONTROL DEVICE ID NO(S): CD-FB-BV
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-12

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

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

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

START CONSTRUCTION DATE: 2014	OPERATION DATE: 3/1/2014	DATE MANUFACTURED: 2014
MANUFACTURER / MODEL NO.: Aircon/CAR 36-6	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25% SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

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

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

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

Attach Additional Sheets As Necessary

FORM B6

EMISSION SOURCE (STORAGE SILO/BINS)

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

EMISSION SOURCE DESCRIPTION: Pellet Fines Bin	EMISSION SOURCE ID NO: ES-FB
	CONTROL DEVICE ID NO(S): CD-FB-BV
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): EP-12

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

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

MATERIAL STORED: Fine pellet material					DENSITY OF MATERIAL (LB/FT3): 40		
CAPACITY	CUBIC FEET: 2200				TONS:		
DIMENSIONS (FEET)	HEIGHT: 97.3	DIAMETER: 12	***(OR)***		LENGTH:	WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)		ACTUAL:			MAXIMUM DESIGN CAPACITY:		

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

NO. FILL TUBES:

MAXIMUM ACFM: 750 each

MATERIAL IS FILLED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: Finished Product Handling / Pellet Loadout Bins / Pellet Loadout	EMISSION SOURCE ID NO: ES-FPH, ES-TLB 1 thru 12, ES-PL1 & 2
	CONTROL DEVICE ID NO(S): CD-FPH-BF
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-13

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

ES-FPH: Collection of transfer points, pellet screening operations, and pellet conveying.

ES-PB: Pellet loadout bins are used to store pellets for shipping. Pellets are then loaded from the bins directly into trucks in either of the two (2) pellet loadout areas.

ES-PL: Final product is loaded into trucks in either of the two (2) pellet loadouts. The trucks are filled directly from the pellet loadout bins.

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

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

START CONSTRUCTION DATE: 2011	OPERATION DATE: 2011	DATE MANUFACTURED: 2011
MANUFACTURER / MODEL NO.: Aircon Model # 13.6 RAW 268-10	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25% SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

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

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

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

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: Finished Product Handling	EMISSION SOURCE ID NO: ES-FPH
	CONTROL DEVICE ID NO(S): CD-FPH-BF
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-13

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

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Pellets	ODT	55 tons per hour	

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B6

EMISSION SOURCE (STORAGE SILO/BINS)

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

EMISSION SOURCE DESCRIPTION: Pellet Loadout Bins	EMISSION SOURCE ID NO: ES-TLB
	CONTROL DEVICE ID NO(S): CD-FPH-BF
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): EP-13

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Pellet loadout bins are used to store pellets for shipping. Pellets are then loaded from the bins directly into the trucks in either of the two pellet loadout areas.

MATERIAL STORED: Pellet Product				DENSITY OF MATERIAL (LB/FT3): 40		
CAPACITY	CUBIC FEET:			TONS:		
DIMENSIONS (FEET)	HEIGHT:	DIAMETER: 12	***(OR)***	LENGTH:	WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY: 52 tph		

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

NO. FILL TUBES:

MAXIMUM ACFM: 750 each

MATERIAL IS FILLED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: Pellet Loading	EMISSION SOURCE ID NO: ES-PL
	CONTROL DEVICE ID NO(S): CD-FPH-BF
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-13

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Final product is loaded into trucks in either of two (2) pellet loadouts. The trucks are filled directly from the pellet loadout bins.

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

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

MAXIMUM DESIGN (BATCHES / HOUR):

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM D1

FACILITY-WIDE EMISSIONS SUMMARY

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

AIR POLLUTANT EMITTED	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr
PARTICULATE MATTER (PM)	See Appendix B		
PARTICULATE MATTER < 10 MICRONS (PM_{10})			
PARTICULATE MATTER < 2.5 MICRONS ($PM_{2.5}$)			
SULFUR DIOXIDE (SO2)			
NITROGEN OXIDES (NOx)			
CARBON MONOXIDE (CO)			
VOLATILE ORGANIC COMPOUNDS (VOC)			
LEAD			
OTHER			

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

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

TOXIC AIR POLLUTANT EMITTED	CAS NO.	lb/hr	lb/day	lb/year	Modeling Required ? Yes	No
		See Appendix B				

COMMENTS:

Attach Additional Sheets As Necessary

FORM D4

EXEMPT AND INSIGNIFICANT ACTIVITIES SUMMARY

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

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

DESCRIPTION OF EMISSION SOURCE	SIZE OR PRODUCTION RATE	BASIS FOR EXEMPTION OR INSIGNIFICANT ACTIVITY
1. Electric Powered Chipper ES-CHIP1	420,480 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)
2. Green Wood Hammermill ES-CHIP2	420,480 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)
3. Green Wood Handling and Storage ES-GWHS	716,304 tpy	15A NCAC 02Q .0102(c)(2)(E)
4. Green Wood Fuel Storage Bin ES-GWFB	130,357 tpy	15A NCAC 02Q .0102(c)(2)(E)
5. Dried Wood Handling ES-DWH	420,480 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)
6. 10 Pelletizers (Pellet Presses) ES-PP	481,800 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)
7. Final Product Handling ES-FPH	481,800 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)
8. Emergency Generator Diesel Fuel Tank TK1	2,500 gallons	15A NCAC 02Q .0102(c)(1)(D)
9. Fire Water Pump Diesel Fuel Tank TK2	500 gallons	15A NCAC 02Q .0102(c)(1)(D)
10. Log Yard 300 Diesel Tank TK3	300 gallons	15A NCAC 02Q .0102(c)(1)(D)
11. Electric Powered Bark Hog ES-BARK	145,080 ODT/yr	15A NCAC 02Q .0102(c)(2)(E)

Attach Additional Sheets As Necessary

FORM D

TECHNICAL ANALYSIS TO SUPPORT PERMIT APPLICATION

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

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

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

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

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

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

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

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

(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)

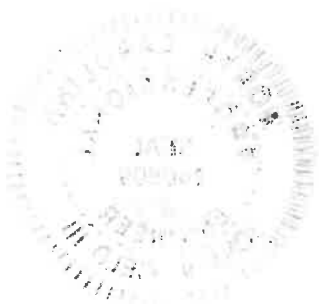
NAME: J. Rusty Field, P.E.
DATE: 12-23-14
COMPANY: ONE Environmental Group, LLC
ADDRESS: 500 Libbie Avenue, Suite 1C
TELEPHONE: 804-303-8784
SIGNATURE:
PAGES CERTIFIED: PSD Avoidance Determination
Modified Equipment - Form Bs

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

PLACE NORTH CAROLINA SEAL HERE

NORTH CAROLINA PROFESSIONAL SEAL 040609 ENGINEER JOHN R. FIELD III

Attach Additional Sheets As Necessary



APPENDIX B

Enviva Pellets Ahoskie, LLC

Baseline and Modified Source Emissions Calculations

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

Section 1: Two Year Average Baseline Emissions Calculations

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

Section 2: Proposed VOC Emissions Limitation

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

Section 3: Other Pollutant Increases Compared to Baseline:

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

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

APPENDIX B.1

Enviva Pellets Ahoskie, LLC

December 2012- November 2013

Baseline Emissions Calculations

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

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

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

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

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

Dryer Inputs

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

Criteria Pollutant Calculations:

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

Note:

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

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

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

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

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

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

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

Calculation Inputs:

Annual Composition and Throughput

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

Emission Calculations:

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

Notes:

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

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

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

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

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

Calculation Inputs:

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

via AHO test for Dry Hammermill pre-screener bypass

Annual Composition and Throughput

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

Emission Calculations:

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

Notes:

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

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

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

Calculation Inputs:

Annual Composition and Throughput

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

Emission Calculations:

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

Notes:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Note:

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

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

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

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

Emergency Generator Emissions (ES-EG)

Equipment and Fuel Characteristics

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

Criteria Pollutant Emissions

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

Note:

[1] Operating hours based on facility operational records.

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

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

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

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

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

Firewater Pump Emissions (ES-FWP)

Equipment and Fuel Characteristics

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

Criteria Pollutant Emissions

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

Note:

[1] Operating hours based on facility operational records.

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

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

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

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

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

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

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

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

Note:

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

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

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

where: E = emission factor (lb/ton)

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

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

ID	Emission Source Group	Transfer Activity	Type of Operation	Number of Drop Points	PM Particle Size Multiplier (dimensionless)	PM_{10} Particle Size Multiplier (dimensionless)	$PM_{2.5}$ Particle Size Multiplier (dimensionless)	Mean Wind Speed (U) (mph)	Material Moisture Content (M)[1] (%)	PM Emission Factor[2] (lb/ton)	PM_{10} Emission Factor[2] (lb/ton)	$PM_{2.5}$ Emission Factor[2] (lb/ton)	Potential Throughput (tpy)	PM Emissions (tpy)	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)
GDP1	ES-GWH	Purchased Bark Transfer to Outdoor Storage Area	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	0	0.00E+00	0.00E+00	0.00E+00
GDP1	ES-GWH	Drop Points via Conveying from Bark Pile to Dryer	Batch Drop	4	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	135,602	2.56E-03	1.21E-03	1.83E-04
GDP2	ES-GWH	Transfer Purchased Wood Chips (Wet) to Outdoor Storage	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	275,859	1.30E-03	6.14E-04	9.32E-05
GDP2	ES-GWH	Drop Points via Conveying from Chip Pile to Dryer	Batch Drop	5	0.74	0.35	0.053	6.0	48%	3.51E-05	1.66E-05	2.51E-06	611,058	1.36E-02	6.42E-03	9.70E-04
		Total Emissions												**1.74E-02**	**8.24E-03**	**1.25E-03**

1. Average moisture content for logs, bark, and wood chips (wet) based on material balance provided by design engineering firm (Mid-South Engineering).

2. Emission factor calculation based on formula from AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, Equation 13.2.1, (11/06).

where: E = emission factor (lb/ton)

k = particle size multiplier (dimensionless) for PM 0.74

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

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

U = mean wind speed (mph) 6.3

M = material moisture content (%)

3. PM_{10} control efficiency of 74.7% applied for three-sided enclosed structure with 50% porosity per Sierra Research *"Final BACM Technological and Economic Feasibility Analysis"*, report prepared for the San Joaquin Valley Unified Air Pollution Control District (3/03). The control efficiency is assumed equivalent for PM_{10} and $PM_{2.5}$ emissions.

4. These green wood handling emissions are representative of the fugitive emissions at the site. Note there may be multiple drop points for each type but as shown these emissions will be negligible.

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

Tank ID	Tank Description	Volume[1] (gal)	Tank Dimensions		Orientation	Throughput (gal/yr)	Turnovers[(3)]	TANKS 4.0 VOC Emissions	
			Diameter (ft)	Height/Length (ft)				(lb/yr)	(tpy)
TK01	Emergency Generator Fuel Oil Tank[2]	2,500	6	12	Vertical	379	0.152	1.45	7.25E-04
TK02	Fire Water Pump Fuel Oil Tank[2]	500	3	10	Horizontal	192	0.385	0.31	1.55E-04
							TOTAL	**1.76**	**8.80E-04**

Note:

[1] Conservative design specifications.

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

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

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

Operating Data:

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

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

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

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

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

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

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

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

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

where:

s, silt content of wood chips (%):	4.8	s - silt content(%) for lumber sawmills (minimum), from AP-42 Table 13.2.2-1
p, number of days with rainfall greater than 0.01 inch:	120	Based on AP-42, Section 13.2.2, Figure 13.2.1-2.
f (time that wind exceeds 5.36 m/s - 12 mph) (%):	9.8	Based on meteorological data averaged for 2007-2011 for Northampton, NC.
PM_{10}/TSP ratio:	50%	PM_{10} is assumed to equal 50% of TSP based on U.S. EPA *Control of Open Fugitive Dust Sources*, Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988.
		$PM_{2.5}$ 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.

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

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

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

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

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

Emission factor converted from as carbon to as alpha-pinene by multiplying by 1.14.

APPENDIX B.2

Enviva Pellets Ahoskie, LLC

December 2013 – November 2014

Baseline Emissions Calculations

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

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

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

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

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

Dryer Inputs

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

Criteria Pollutant Calculations:

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

Note:

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

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

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

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

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

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

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

Calculation Inputs:

Annual Composition and Throughput

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

Emission Calculations:

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

Notes:

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

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

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

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

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

Calculation Inputs:

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

via AHO test for Dry Hammermill pre-screener bypass

Annual Composition and Throughput

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

Emission Calculations:

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

Notes:

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

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

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

Calculation Inputs:

Annual Composition and Throughput

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

Emission Calculations:

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

Notes:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Note:

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

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

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

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

Emergency Generator Emissions (ES-EG)

Equipment and Fuel Characteristics

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

Criteria Pollutant Emissions

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

Note:

[1] Operating hours based on facility operational records.

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

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

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

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

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

Firewater Pump Emissions (ES-FWP)

Equipment and Fuel Characteristics

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

Criteria Pollutant Emissions

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

Note:

[1] Operating hours based on facility operational records.

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

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

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

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

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

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

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

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

Note:

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

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

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

where: E = emission factor (lb/ton)

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

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

ID	Emission Source Group	Transfer Activity	Type of Operation	Number of Drop Points	PM Particle Size Multiplier (dimensionless)	PM_{10} Particle Size Multiplier (dimensionless)	$PM_{2.5}$ Particle Size Multiplier (dimensionless)	Mean Wind Speed (U) (mph)	Material Moisture Content (M)[1] (%)	PM Emission Factor[2] (lb/ton)	PM_{10} Emission Factor[2] (lb/ton)	$PM_{2.5}$ Emission Factor[2] (lb/ton)	Potential Throughput (tpy)	PM Emissions (tpy)	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)
GDP1	ES-GWH	Purchased Bark Transfer to Outdoor Storage Area	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	0	0.00E+00	0.00E+00	0.00E+00
GDP1	ES-GWH	Drop Points via Conveying from Bark Pile to Dryer	Batch Drop	4	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	146,084	2.76E-03	1.30E-03	1.97E-04
GDP2	ES-GWH	Transfer Purchased Wood Chips (Wet) to Outdoor Storage	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	285,116	1.35E-03	6.35E-04	9.63E-05
GDP2	ES-GWH	Drop Points via Conveying from Chip Pile to Dryer	Batch Drop	5	0.74	0.35	0.053	6.0	48%	3.51E-05	1.66E-05	2.51E-06	576,957	1.28E-02	6.06E-03	9.16E-04
		Total Emissions												**1.69E-02**	**7.99E-03**	**1.21E-03**

1. Average moisture content for logs, bark, and wood chips (wet) based on material balance provided by design engineering firm (Mid-South Engineering).

2. Emission factor calculation based on formula from AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, Equation 13.2.1, (11/06).

where: E = emission factor (lb/ton)

k = particle size multiplier (dimensionless) for PM 0.74

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

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

U = mean wind speed (mph) 6.3

M = material moisture content (%)

3. PM_{10} control efficiency of 74.7% applied for three-sided enclosed structure with 50% porosity per Sierra Research *"Final BACM Technological and Economic Feasibility Analysis"*, report prepared for the San Joaquin Valley Unified Air Pollution Control District (3/03). The control efficiency is assumed equivalent for PM_{10} and $PM_{2.5}$ emissions.

4. These green wood handling emissions are representative of the fugitive emissions at the site. Note there may be multiple drop points for each type but as shown these emissions will be negligible.

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

Tank ID	Tank Description	Volume[1] (gal)	Tank Dimensions		Orientation	Throughput (gal/yr)	Turnovers[(3)]	TANKS 4.0 VOC Emissions	
			Diameter (ft)	Height/Length (ft)				(lb/yr)	(tpy)
TK01	Emergency Generator Fuel Oil Tank[2]	2,500	6	12	Vertical	462	0.185	1.45	7.25E-04
TK02	Fire Water Pump Fuel Oil Tank[2]	500	3	10	Horizontal	253	0.506	0.31	1.55E-04
							TOTAL	**1.76**	**8.80E-04**

Note:

[1] Conservative design specifications.

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

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

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

Operating Data:

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

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

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

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

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

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

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

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

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

where:

s, silt content of wood chips (%):	4.8	s - silt content(%) for lumber sawmills (minimum), from AP-42 Table 13.2.2-1
p, number of days with rainfall greater than 0.01 inch:	120	Based on AP-42, Section 13.2.2, Figure 13.2.1-2.
f (time that wind exceeds 5.36 m/s - 12 mph) (%):	9.8	Based on meteorological data averaged for 2007-2011 for Northampton, NC.
PM_{10}/TSP ratio:	50%	PM_{10} is assumed to equal 50% of TSP based on U.S. EPA *Control of Open Fugitive Dust Sources* , Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988.

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

$PM_{2.5}$ is assumed to equal 7.5 % of TSP U.S. EPA Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors. November 2006.

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

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

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

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

Emission factor converted from as carbon to as alpha-pinene by multiplying by 1.14.

APPENDIX B.3

Enviva Pellets Ahoskie, LLC

Modified Source Emissions Calculations

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

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

TABLE B-2
FACILITYWIDE HAP EMISSIONS SUMMARY
ENVIVA PELLETS AHOSKIE

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

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

Dryer Inputs

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

Criteria Pollutant Calculations:

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

Note:

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

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

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

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

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

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

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

Calculation Inputs:

Annual Composition and Throughput

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

Short Term Composition and Throughput

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

Emission Calculations:

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

Notes:

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

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

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

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

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

Calculation Inputs:

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

via AHO test for Dry Hammermill pre-screener bypass

Annual Composition and Throughput

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

Short Term Composition and Throughput

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

Emission Calculations:

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

Notes:

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

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

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

Calculation Inputs:

Annual Composition and Throughput

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

Short Term Composition and Throughput

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

Emission Calculations:

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

Notes:

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

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

TABLE B-9
BARK HOG
ENVIVA PELLETS AHOSKIE

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

TABLE B-12
BAGFILTER AND CYCLONE EMISSIONS
ENVIVA PELLETS AHOSKIE

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

Note:

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

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

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

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

Emergency Generator Emissions (ES-EG)

Equipment and Fuel Characteristics

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

Criteria Pollutant Emissions

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

Note:

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

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

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

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

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

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

Firewater Pump Emissions (ES-FWP)

Equipment and Fuel Characteristics

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

Criteria Pollutant Emissions

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

Note:

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

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

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

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

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

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

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

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

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

Note:

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

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

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

where: E = emission factor (lb/ton)

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

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

ID	Emission Source Group	Transfer Activity	Type of Operation	Number of Drop Points	PM Particle Size Multiplier (dimensionless)	PM_{10} Particle Size Multiplier (dimensionless)	$PM_{2.5}$ Particle Size Multiplier (dimensionless)	Mean Wind Speed (U) (mph)	Material Moisture Content (M)[1] (%)	PM Emission Factor[2] (lb/ton)	PM_{10} Emission Factor[2] (lb/ton)	$PM_{2.5}$ Emission Factor[2] (lb/ton)	Potential Throughput (tpy)	PM Emissions (tpy)	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)
GDP1	ES-GWH	Purchased Bark Transfer to Outdoor Storage Area	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	26,409	1.25E-04	5.88E-05	8.92E-06
GDP1	ES-GWH	Drop Points via Conveying from Bark Pile to Dryer	Batch Drop	4	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	279,000	5.27E-03	2.48E-03	3.77E-04
GDP2	ES-GWH	Transfer Purchased Wood Chips (Wet) to Outdoor Storage	Batch Drop	1	0.74	0.35	0.053	6.3	48%	3.73E-05	1.76E-05	2.67E-06	277,865	1.31E-03	6.19E-04	9.39E-05
GDP2	ES-GWH	Drop Points via Conveying from Chip Pile to Dryer	Batch Drop	5	0.74	0.35	0.053	6.0	48%	3.51E-05	1.66E-05	2.51E-06	808,615	1.80E-02	8.49E-03	1.28E-03
		Total Emissions												**2.47E-02**	**1.17E-02**	**1.76E-03**

1. Average moisture content for logs, bark, and wood chips (wet) based on material balance provided by design engineering firm (Mid-South Engineering).

2. Emission factor calculation based on formula from AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, Equation 13.2.1, (11/06).

where: E = emission factor (lb/ton)

k = particle size multiplier (dimensionless) for PM 0.74

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

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

U = mean wind speed (mph) 6.3

M = material moisture content (%)

3. PM_{10} control efficiency of 74.7% applied for three-sided enclosed structure with 50% porosity per Sierra Research *"Final BACM Technological and Economic Feasibility Analysis"*, report prepared for the San Joaquin Valley Unified Air Pollution Control District (3/03). The control efficiency is assumed equivalent for PM_{10} and $PM_{2.5}$ emissions.

4. These green wood handling emissions are representative of the fugitive emissions at the site. Note there may be multiple drop points for each type but as shown these emissions will be negligible.

TABLE B-16
TANKS EMISSIONS
ENVIVA PELLETS AHOSKIE

Tank ID	Tank Description	Volume[1] (gal)	Tank Dimensions		Orientation	Throughput (gal/yr)	Turnovers[(3)]	TANKS 4.0 VOC Emissions	
			Diameter (ft)	Height/Length (ft)				(lb/yr)	(tpy)
TK01	Emergency Generator Fuel Oil Tank[2]	2,500	6	12	Vertical	8,813	3.53	1.51	7.55E-04
TK02	Fire Water Pump Fuel Oil Tank[2]	500	3	10	Horizontal	7,554	15.11	0.31	1.55E-04
							TOTAL	**1.82**	**9.10E-04**

Note:

[1] Conservative design specifications.

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

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

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

Operating Data:

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

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

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

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

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

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

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

Emission Unit ID	Description	TSP Emission Factor [1] (lb/day/acre)	TSP Emission Factor [1] ($lb/hr/ft^2$)	VOC Emission Factor [3] (lb/day/acre)	VOC Emission Factor [3] ($lb/hr/ft^2$)	Width (ft)	Length (ft)	Height (ft)	Outer Surface Area of Storage Pile (ft^2)	PM Emissions (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.

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

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.

TOXICS AIR DISPERSION MODELING ANALYSIS

ENVIVA PELLETS AHOSKIE, LLC • AHOSKIE, NORTH CAROLINA

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1. INTRODUCTION

Enviva Pellets Ahoskie, LLC (Enviva) currently operates a wood pellet manufacturing facility in Ahoskie, NC (Ahoskie facility) under Permit to Construct and Operate No. 10121R02, issued on March 10, 2014. Enviva submitted an air permit application to the North Carolina Division of Air Quality (DAQ) dated December 2014 requesting modifications to the dryer and material handling systems at the plant.[1]

The December 2014 application proposes changes to the dryer system to increase the production rates to the current permitted capacity of 48 oven-dried tons per hour (ODT/hr). The dryer system can currently process 43 ODT/hr due to equipment constraints. In addition to the drying system upgrades, Enviva also proposes to make modifications to the downstream material handling system to accommodate a throughput of 55 ODT/hr. Appendix B of the December 2014 permit application includes detailed potential emission calculations for the facility once the modifications have been completed. Table 1-1 presents a comparison of the facility-wide toxic air pollutant (TAP) potential emission rates after these modifications to their respective Toxics Permitting Emission Rates (TPER).

TABLE 1-1. TPER COMPARISON TABLE

Unit	HAP	TAP?	Worst Case Emiss. Rate (lb/hr)	TPER (lb/hr)	Modeling Required?
Facilty-wide	Acetaldehyde	Yes	1.81E+00	6.8	No
	Acrolein	Yes	2.98E+00	0.02	Yes
	Formaldehyde	Yes	3.65E+00	4.00E-02	Yes
	Methanol	No	7.17E+00	N/A	No
	Phenol	Yes	0.00E+00	2.40E-01	No
	Propionaldehyde	No	1.81E+00	N/A	No

As shown, there are two (2) TAP with facility-wide emissions in excess of their respective TPER, acrolein and formaldehyde. As such, a dispersion modeling analysis was required in order to demonstrate that those TAP 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.

[1] The December 2014 permit application submitted by Enviva to DAQ on January 8, 2015

2. FACILITY DESCRIPTION

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

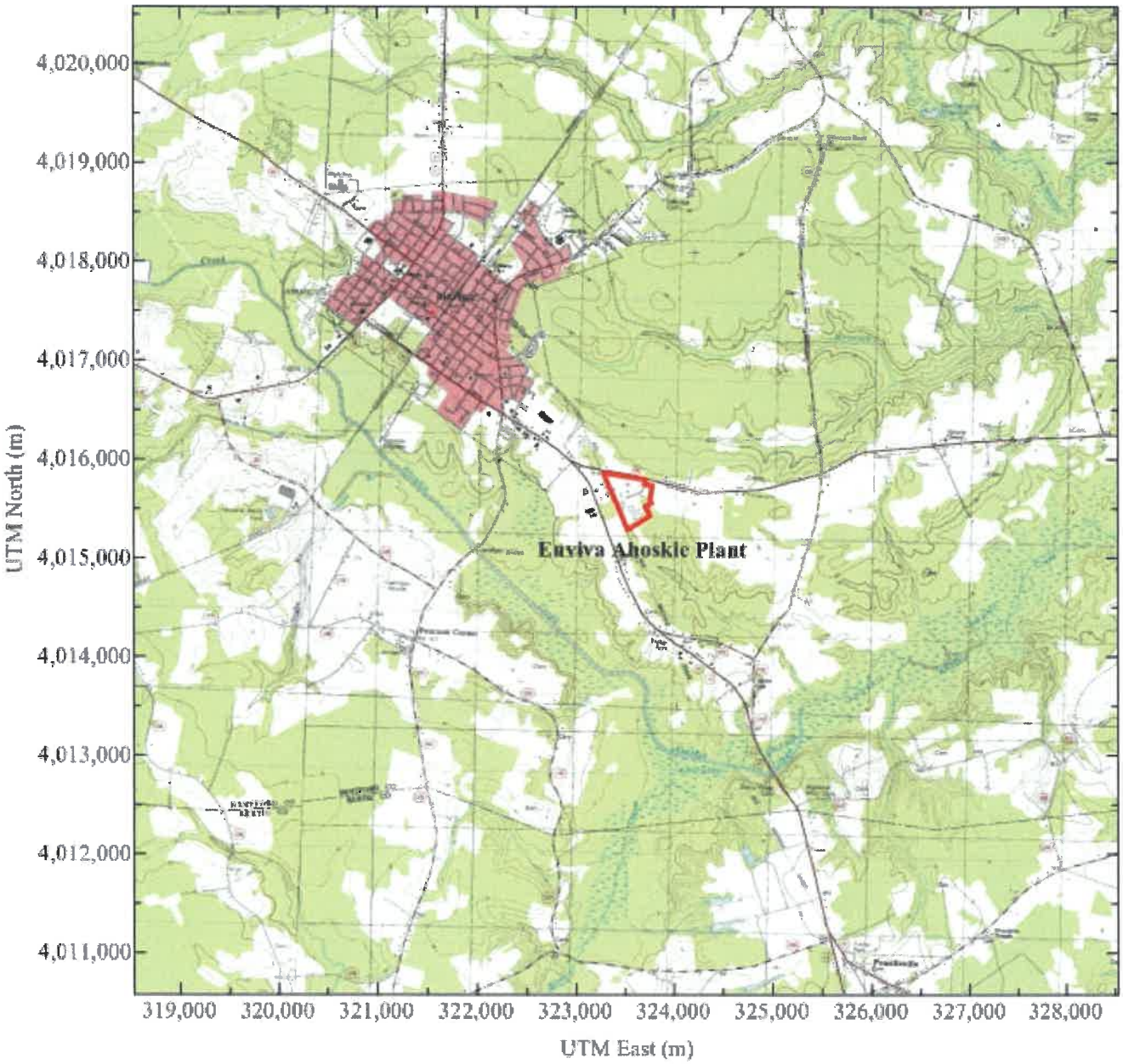
2.1. FACILITY LOCATION

Enviva operates a wood pellet manufacturing plant in the city of Ahoskie, NC. The plant exists on a 39 acre parcel, along NC 561, near the intersection with US Highway 13. The site was formerly a sawmill plant owned by Georgia Pacific. The approximate Universal Transverse Mercator (UTM) coordinates for the facility are 323.6 km East and 4,015.6 km North, Zone 18, in the North American 1983 Datum (NAD83). A map showing the location of the facility on the 7.5 minute USGS topographic maps is presented in Figure 2-1.

2.2. FACILITY LANDUSE

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.

FIGURE 2-1. TOPOGRAPHIC MAP OF THE ENVIVA AHOSKIE PLANT



3. DISPERSION MODELING ANALYSIS

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 Ahoskie plant.[2] 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 Ahoskie 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	Dryer WESP Stack	323,540.2	4,015,565.0	15.65
EP2	Hammermills 1&2	323,542.4	4,015,462.0	15.20
EP3	Hammermills 3&4	323,548.3	4,015,465.0	15.23
EP4	Hammermill Area Filter	323,553.1	4,015,468.0	15.28
EP5	Pellet Press Silo	323,593.0	4,015,510.0	15.54
EP6	Emergency Generator	323,550.6	4,015,538.0	15.64
EP7	Firewater Pump Stack	323,616.1	4,015,462.0	15.26
EP8	Pellet Mill Fines Bin Vent	323,556.8	4,015,602.0	15.41
EP9	Loadout Bag Filter	323,573.3	4,015,523.0	15.61
EP10	Portable Greenwood Chipper	323,523.9	4,015,657.0	15.77
EP11	Pellet Cooler 1&2 Cyclone	323,614.6	4,015,498.0	15.50
EP12	Pellet Cooler 3&4 Cyclone	323,622.3	4,015,502.0	15.53
EP13	Pellet Cooler 5 Cyclone	323,634.4	4,015,506.0	15.58
EP14	Dried Wood Day Silo	323,576.3	4,015,446.0	15.01

[2] 40 CFR 51, Appendix W–*Guideline on Air Quality Models*, Appendix A.1– AMS/EPA Regulatory Model (AERMOD).

Table 3-2 presents the stack parameters input to the model for each of the sources. Note that EP2, EP3 and EP4 will be rotated from horizontal discharges to vertical stacks as part of the proposed facility modifications. The stack parameters shown for those 3 sources reflect the vertical discharges.

TABLE 3-2. MODELED SOURCE PARAMETERS

Model ID	Stack Height (m)	Stack Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
EP1	27.58	347.59	8.21	3.05
EP2	15.70	293.15	4.04	2.44
EP3	15.70	293.15	4.04	2.44
EP4	15.70	293.15	4.74	2.03
EP5	22.68	293.15	3.65	0.60
EP6	3.05	919.82	78.30	0.13
EP7	2.44	954.00	109.19	0.10
EP8	14.94	293.15	0.01	0.74
EP9	16.76	310.93	14.33	1.22
EP10	6.10	310.93	19.81	0.91
EP11	7.52	293.15	19.95	0.91
EP12	7.52	293.15	19.95	0.91
EP13	6.10	293.15	16.39	0.71
EP14	21.82	293.15	3.65	0.60

Table 3-3 presents the modeled emission rates for each of the sources. Note that the rates shown have been optimized from the calculated potentials in the permit application in order to maximize operational flexibility with respect to NC State Air Toxics.

TABLE 3-3. MODELED EMISSION RATES

Model ID	Modeled Emission Rates (g/s)	
	ACROLEIN	FORM
EP1	3.45E-01	7.48E-01
EP2	2.63E-02	3.43E-02
EP3	2.63E-02	3.43E-02
EP4	1.32E-02	1.71E-02
EP5	0.00E+00	0.00E+00
EP6	2.86E-05	3.64E-04
EP7	2.45E-05	3.12E-04
EP8	0.00E+00	0.00E+00
EP9	0.00E+00	0.00E+00
EP10	0.00E+00	0.00E+00
EP11	4.61E-02	3.45E-02
EP12	4.61E-02	3.45E-02
EP13	2.30E-02	1.72E-02
EP14	0.00E+00	0.00E+00

3.3. METEOROLOGICAL DATA

The AERMOD modeling analysis utilized sequential hourly surface observations from Elizabeth City, NC and upper air data from Newport, NC. These stations are recommended by NCDAQ for modeling facilities located in Hertford County. The five (5) most recent, model-ready years (2005-2009) were downloaded from the NCDAQ website.[3] Since all modeled TAP have short-term AAL, a single, five-year meteorological data file was used in all analyses.

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 kilometers (km) from the facility. The impacts were reviewed to ensure that the maximum impacts were captured within the 100 m spaced 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.[4]

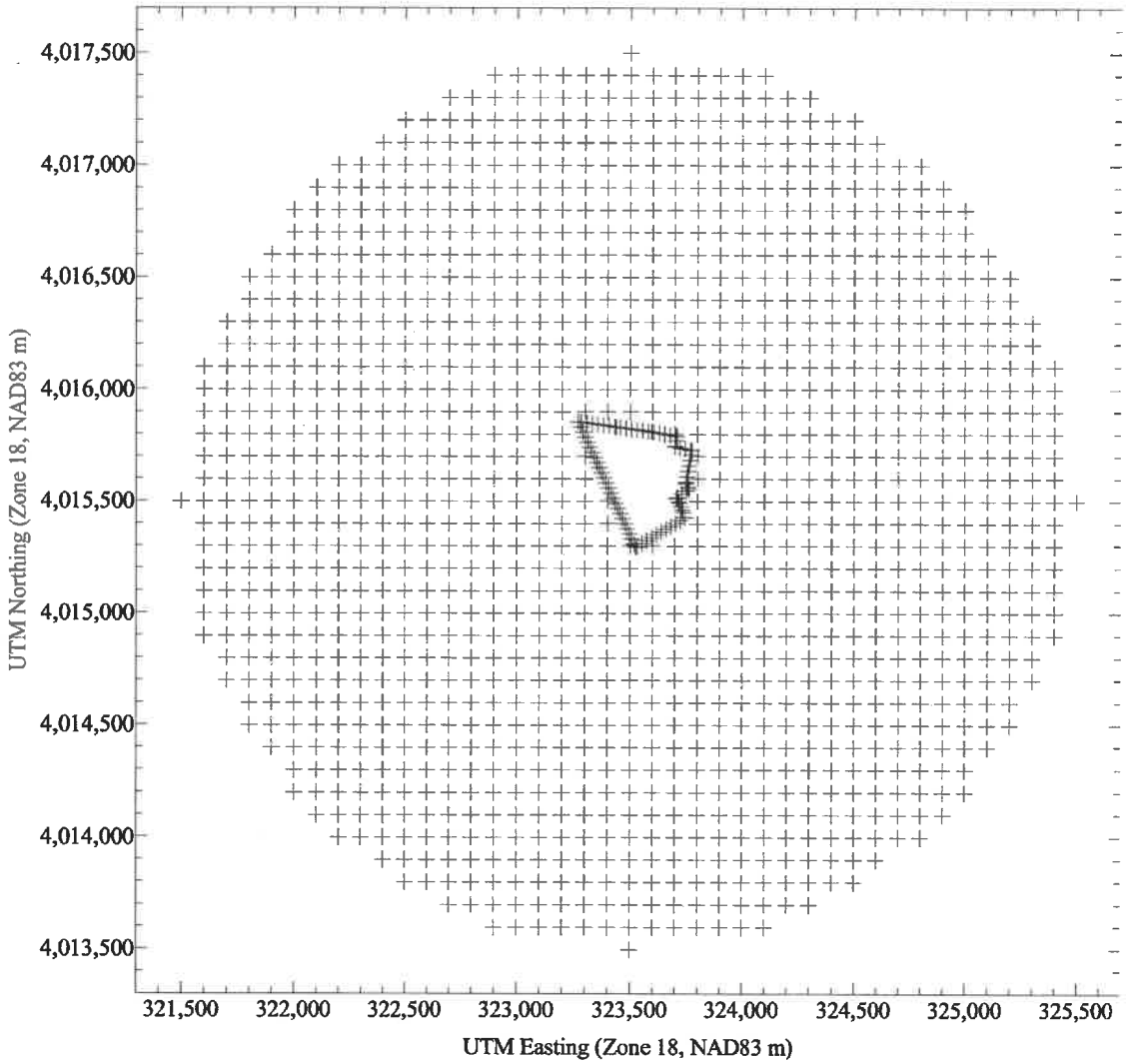
Receptor terrain elevations input to the model were interpolated from National Elevation Database (NED) data obtained from the USGS. NED data consist of arrays of regularly spaced elevations. The

[3] http://www.ncair.org/permits/mets/metdata.shtml

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

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. Figure 3-1 shows the receptors included in the modeling analysis.

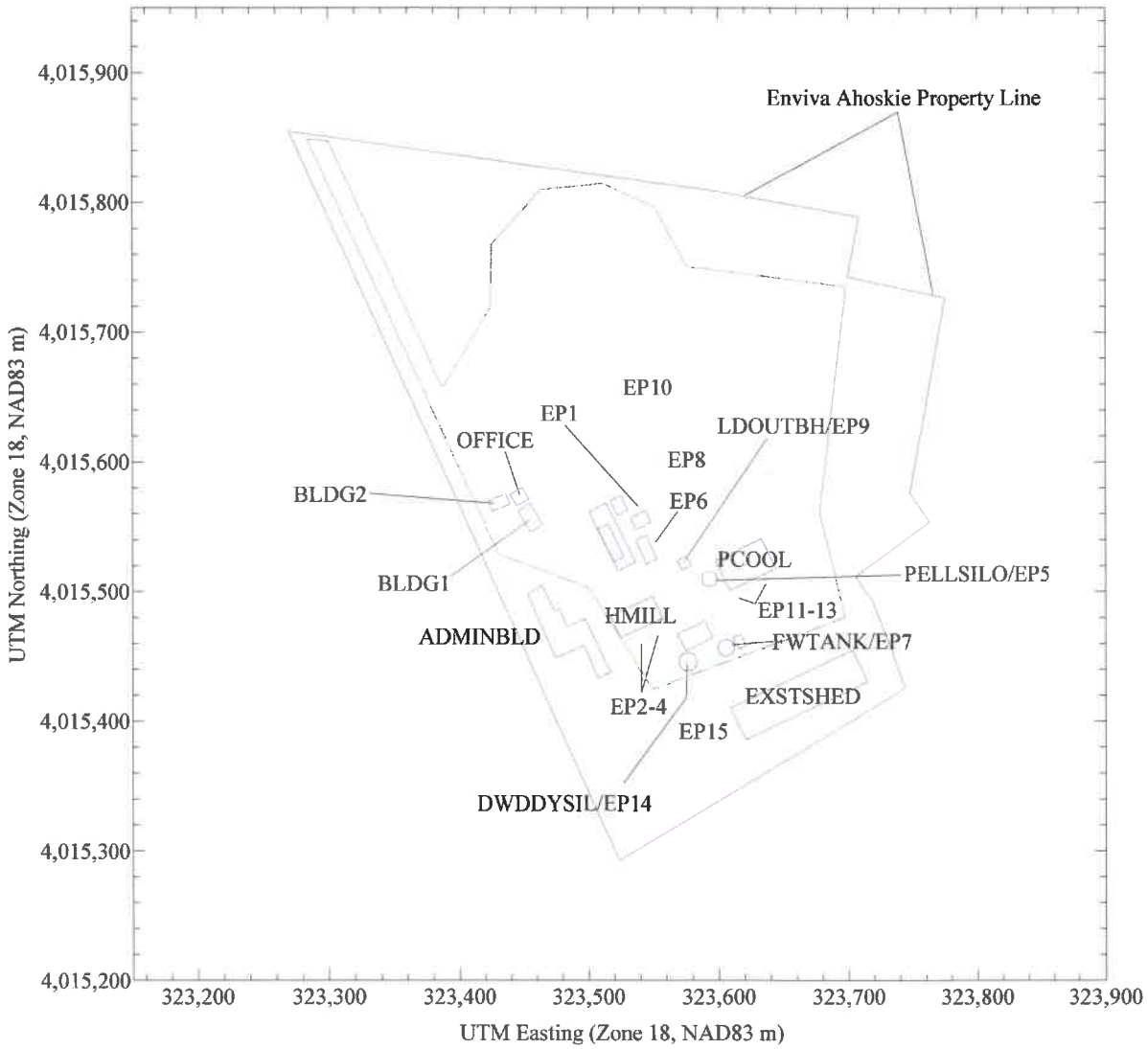
FIGURE 3-1. MODELED RECEPTOR GRID



3.5. BUILDING DOWNWASH

A Good Engineering Practice (GEP) stack height evaluation was conducted to determine if inclusion of building wake effects would be required in the modeling analysis. The latest version of Building Profile Input Program for PRIME (BPIP PRIME, version 04274) was used to calculate downwash values for input into the PRIME algorithm. Building heights and any other significant structures were specified for modeling purposes to facilitate the calculation of downwash, GEP stack heights, and building wake effects by the model. Figure 3-2 illustrates the modeled stacks and downwash structures at the Ahoskie Plant.

FIGURE 3-2. AHOSKIE PLANT LAYOUT



4. TAP MODELING RESULTS

This section presents the results of the TAP dispersion modeling analysis conducted for the Enviva Ahoskie 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 (2005-2009) 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 (%)
Acrolein	1-Hour	323,730.60	4,015,530.40	07083123	79.40	80	99.25%
Formaldehyde	1-Hour	323,730.60	4,015,530.40	07083123	69.92	150	46.61%

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 Ahoskie, LLC **Facility ID:** 4600107 **Address:** 142 N.C. Route 561 East Ahoskie, NC 27910	**Consultant (if applicable):** Trinity Consultants
Contact Name: Joe Harrell	**Contact Name:** Jonathan Hill
Phone Number: 252-209-6032 x202 **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*	N/A

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

SCREEN LEVEL MODELING

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

REFINED LEVEL MODELING

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

APPENDIX B - ELECTRONIC MODELING FILES