RAMBOLL

ENVIRONMENT
& HEALTH

William Willets, PE
Chief, Permitting Section, Division of Air Quality
NC Department of Environmental Quality
1641 Mail Service Center
Raleigh, North Carolina 27609-1641

Re: **Replacement Air Quality Permit Modification Application**
Enviva Pellets Northampton, LLC
Garysburg, North Carolina
Northampton County
Permit No.: 10203R06
Facility ID: 6600167

September 14, 2020

Ramboll
8235 YMCA Plaza Drive
Suite 300
Baton Rouge, LA 70810
USA

T +1 225-408 2691

www.ramboll.com

Dear Mr. Willets:

Enclosed, please find an Air Quality Permit Modification Application that replaces the April 22, 2020 permit application submitted for Enviva Pellets Northampton, LLC ("Enviva", "the Northampton plant", or "the facility") (NC DEQ Facility ID #6600167) facility in Northampton County. The facility currently operates under Air Quality Permit No. 10203R06 ("Permit R06") issued by the North Carolina Department of Environment Quality (NCDEQ), Division of Air Quality (DAQ) on October 30, 2019. This submission updates the permit application to include all proposed revisions to Permit R06 proposed by Enviva, and discussed with DAQ, to date.

Permit R06 authorized changes to the Northampton plant in order to meet new customer softwood percentage and production rate demands and to incorporate significant emission reduction efforts to minimize emissions impacts associated with the project. Enviva submitted a permit application on February 5, 2020 which proposed updates and revisions to Permit R06 as a result of updated engineering assessments. On March 23, 2020, Enviva submitted a permit application addendum to update the February 5, 2020 application to address questions included in a March 5, 2020 email from Richard Simpson of DAQ. Additionally, as instructed by DAQ, Enviva submitted an update to the initial Title V permit application for the Northampton plant on April 3, 2020 to reflect the February 5, 2020 application addendum. However, the April 3, 2020 updated initial Title V permit application also included permit revisions in addition to the proposed changes previously addressed in the February 5, 2020 permit application and the March 23, 2020 permit application addendum. An application was submitted on April 22, 2020 that replaced the February 5, 2020 modification application and March 23, 2020 addendum and consolidated all requested modifications to Air Quality Permit R06 to be consistent with the updated initial Title V permit application.

This application replaces the April 22, 2020 application and updates the permit application for all proposed revisions to Permit R06 proposed by Enviva, and discussed with DAQ, to date.

All proposed changes that impact Permit R06 are summarized below:

- Revise the currently permitted VOC control strategy for the Dry Hammermills and Dry Shavings Hammermills;
- Update the total heat input rate for the Pellet Cooler RCO/RTO (CD-RCO-2) from 19.6 MMBtu/hr to 12.4 MMBtu/hr and revise the RCO/RTO natural gas combustion emissions to utilize an emission factor for low-NO_X burners to reflect as-built changes. The control device can operate as either an RTO or RCO. The RTO and RCO modes have the same control efficiency so there is no impact on emissions when switching between operating modes;
- Add a baghouse (CD-DSHM-BF) to the Dry Shavings Hammermills (ES-DSHM-1 and 2) for PM control;
- Remove the current throughput limitation for the Dry Hammermills (Condition 2.2A.2.b.ii) by making Dry Hammermill throughput equivalent to that of the entire facility;
- Remove the Dust Control System (ES-DCS) from the permit;
- Update emissions of $PM_{2.5}$ from Dry Hammermills and Dry Shavings Hammermills;
- Update the total heat input rate for the Dryer 1 RTO (CD-RTO-1) from 32 MMBtu/hr to 24.8 MMBtu/hr to reflect as-built changes;
- Update the total heat input rate for the Dryer 2 RTO (CD-RTO-2) from 32 MMBtu/hr to 24.8 MMBtu/hr to reflect planned design changes;
- Update the heat input for double duct burners (IES-DDB-1 through 4) from 1 MMBtu/hr each to 2.5 MMBtu/hr each;
- Update the heat input for each dryer furnace idle mode (ES-FURNACEBYP-1 and 2) from 5 MMBtu/hr to 10 MMBtu/hr;
- Change the nomenclature of the wet scrubbers (CD-WS-1 and 2) to Quench Ducts as these will be used for fire safety and not as PM control devices;
- Remove the Additive Handling baghouse (CD-ADD-BF) from the permit;
- Incorporate additional HAP emissions for Dried Wood Handling 1 and 2 (ES-DWH-1 and ES-DWH-2);
- Remove the Dryer Line 1 Dried Wood Handling baghouse (CD-DWH-BF-1) from the permit and add the existing passive bin vent control (CD-DWH-BV);
- Remove IES-DRYSHAVE-1 from the permit as this emission unit does not exist. Emissions are represented by Dry Shavings Reception (ES-DSR);
- Update $PM_{2.5}$ emissions from the Finished Product Handling baghouse (CD-FPH-BF);
- Incorporate the use of diesel fuel during furnace cold start-ups;
- Modify the language in Permit Condition 2.2 A.3.q. of Permit R06 regarding quantification of monthly NO_X emissions in a manner consistent with Enviva's November 15, 2019 request and NCDEQ's November 25, 2019 response (See Appendix E);

- Correct a typo in the CO emission factor included in Permit Condition 2.2 A.2.c.ii of Permit R06 from 0.023 lb/ODT to 0.23 lb/ODT; and

- Update the flow rate of the Dry Shavings Silo baghouse (CD-DSS-BF) from 3,600 cfm to 500 cfm to reflect as-built changes.

As shown in the table below, the changes outlined above will result in a decrease in potential emissions of all criteria pollutants, with the exception of SO_2, and total HAP compared with the R06 permit basis.

Comparison of Proposed Potential-to-Emit (PTE) to R06 Permit Basis (Excluding Fugitives)

Emissions Scenario	**CO (tpy)**	**NO_X (tpy)**	**PM (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**SO_2 (tpy)**	**VOC (tpy)**	**CO_2e (tpy)**	**Total HAP (tpy)**
R06 Permit Basis	177.13	239.24	141.54	111.23	76.13	39.11	128.85	396,047	18.89
Proposed PTE	171.20	213.05	120.33	89.74	75.57	39.13	120.32	383,222	17.97
Change in PTE	**-5.93**	**-26.19**	**-21.21**	**-21.49**	**-0.56**	**0.02**	**-8.53**	**-12,825**	**-0.92**

Enviva is requests that the procedures of 15A NCAC 2Q .0504 be applied to this project allowing issuance of a construction and operating permit under 15A NCAC 2D .0300. As required, three (3) copies of the replacement package for the permit application addendum are enclosed. Note that Enviva previously submitted the permit application processing fee in an amount of $988 with the February 5, 2020 permit application submittal and thus no additional fee is required. In addition, Enviva has submitted the required zoning determination documents to both the City of Garysburg and Northampton County zoning departments. Copies of the zoning determination requests are included in Appendix F of this submittal.

Thank you for your prompt attention to this matter. If you have any questions regarding this request, please contact me at (225) 408-2691 or Kai Simonsen, Air Quality Engineer at Enviva, at (984) 789-3628.

Yours sincerely,

Michael Carbon
Managing Principal
Air Sciences

D 225-408-2691
M 225-907-3822
mcarbon@ramboll.com

cc: Steven Van Ootegham (Enviva)
Yana Kravtsova (Enviva)
Stephen Stroud (Enviva)
Kai Simonsen (Enviva)

Enclosures: Permit Application including Appendices

Prepared for
Enviva Pellets Northampton, LLC
Northampton County, North Carolina

Prepared By
Ramboll US Corporation
Baton Rouge, Louisiana

Date
Revised September 2020

REPLACEMENT AIR QUALITY PERMIT MODIFICATION APPLICATION

ENVIVA PELLETS NORTHAMPTON, LLC

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CONTENTS

APPENDIX

ACRONYMS AND ABBREVIATIONS

AP-42	Compilation of Air Pollutant Emission Factors
bhp	brake horsepower
BMP	Best Management Practice
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CFR	Code of Federal Regulations
CI	Compression Ignition
CO	Carbon Monoxide
DAQ	Division of Air Quality
DENR	Department of Environment and Natural Resources
EPA	US Environmental Protection Agency
FSC	Forest Stewardship Council
HAP	Hazardous Air Pollutant
hp	horsepower
lb	Pound
MACT	Maximum Achievable Control Technology
MMBtu	Million British thermal units
NAAQS	National Ambient Air Quality Standards
NCAC	North Carolina Administrative Code
NCASI	National Council for Air and Stream Improvement
NCDEQ	North Carolina Department of Environmental Quality
NESHAP	National Emission Standards for Hazardous Air Pollutants
NNSR	Nonattainment New Source Review
NO_X	Nitrogen Oxides (NO + NO_2)
NSPS	New Source Performance Standards
NSR	New Source Review
ODT	Oven Dried short Tons
PEFC	Programme for the Endorsement of Forest Certifications
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter Less Than 2.5 Micrometers in Aerodynamic Diameter
PM_{10}	Particulate Matter Less Than 10 Micrometers in Aerodynamic Diameter

PSD	Prevention of Significant Deterioration
PSEU	Pollutant Specific Emission Unit
RCO	Regenerative Catalytic Oxidizer
RTO	Regenerative Thermal Oxidizer
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SFI	Sustainable Forestry Initiative
TAP	Toxic Air Pollutant
tph	tons per hour
tpy	tons per year
VOC	Volatile Organic Compounds
WESP	Wet Electrostatic Precipitator

1. INTRODUCTION

Enviva Pellets Northampton, LLC (Enviva) owns and operates a wood pellet manufacturing plant (referred to herein as "the Northampton plant", "the plant", or "the facility") in Northampton County, North Carolina. The plant currently operates under Air Quality Permit No. 10203R06 ("Permit R06") issued by the North Carolina Department of Environmental Quality (NCDEQ), Division of Air Quality (DAQ) on October 30, 2019. The plant consists of the following processes: Log Chipper, Bark Hog, Green Wood Hammermills, Rotary Dryer, Dry Hammermills, Pellet Presses and Coolers, Product Loadout operations and other ancillary activities.

Permit R06 authorized changes to the Northampton plant in order to meet new customer softwood percentage and production rate demands and to incorporate significant emission reduction efforts to minimize emissions impacts associated with the project. Enviva submitted a permit application on February 5, 2020 which proposed updates and revisions to Permit R06 as a result of updated engineering assessments. On March 23, 2020, Enviva submitted a permit application addendum to update the application submitted on February 5, 2020 to address questions included in a March 5, 2020 email from Richard Simpson of DAQ. Additionally, as instructed by DAQ, Enviva submitted an update to the initial Title V permit application for the Northampton plant on April 3, 2020 to reflect the pending February 5, 2020 modification application. However, the April 3, 2020 updated initial Title V permit application also addressed permit revisions in addition to the proposed changes previously addressed in the February 5, 2020 permit application and the March 23, 2020 permit application addendum.

An application was submitted on April 22, 2020 that replaced both the February 5, 2020 modification application and March 23, 2020 addendum and consolidated all requested modifications to Permit R06 to be consistent with the updated initial Title V permit application.

This application is intended to replace the April 22, 2020 application and updates the permit application for all proposed revisions to Permit R06 proposed by Enviva, and discussed with DAQ, to date.

All proposed changes that impact Permit R06 are summarized below:

- Revise the currently permitted VOC control strategy for the Dry Hammermills and Dry Shavings Hammermills;
- Update the total heat input rate for the Pellet Cooler RTO/RCO (CD-RCO-2) from 19.6 MMBtu/hr to 12.4 MMBtu/hr and revise the RTO/RCO natural gas combustion emissions to utilize an emission factor for low-NO_X burners to reflect as-built changes. The control device can operate as either an RTO or RCO. The RTO and RCO modes have the same control efficiency so there is no impact on emissions when switching between operating modes;
- Add a baghouse (CD-DSHM-BF) to the Dry Shavings Hammermills (ES-DSHM-1 and 2) for PM control;
- Remove the current throughput limitation for the Dry Hammermills (Condition 2.2A.2.b.ii) by making Dry Hammermill throughput equivalent to that of the entire facility;
- Remove the Dust Control System (ES-DCS) from the permit;

- Update emissions of $PM_{2.5}$ from Dry Hammermills and Dry Shavings Hammermills;
- Update the total heat input rate for the Dryer 1 RTO (CD-RTO-1) from 32 MMBtu/hr to 24.8 MMBtu/hr to reflect as-built changes;
- Update the total heat input rate for the Dryer 2 RTO (CD-RTO-2) from 32 MMBtu/hr to 24.8 MMBtu/hr to reflect planned design changes;
- Update the heat input for double duct burners (IES-DDB-1 through 4) from 1 MMBtu/hr each to 2.5 MMBtu/hr each;
- Update the heat input for each dryer furnace idle mode (ES-FURNACEBYP-1 and 2) from 5 MMBtu/hr to 10 MMBtu/hr;
- Change the nomenclature of the wet scrubbers (CD-WS-1 and 2) to Quench Ducts as these will be used for fire safety and not as PM control devices;
- Remove the Additive Handling baghouse (CD-ADD-BF) from the permit;
- Incorporate additional HAP emissions for Dried Wood Handling 1 and 2 (ES-DWH-1 and ES-DWH-2);
- Remove the Dryer Line 1 Dried Wood Handling baghouse (CD-DWH-BF-1) from the permit and add the existing passive bin vent control (CD-DWH-BV);
- Remove IES-DRYSHAVE-1 from the permit as this emission unit does not exist. Emissions are represented by Dry Shavings Reception (ES-DSR);
- Update $PM_{2.5}$ emissions from the Finished Product Handling baghouse (CD-FPH-BF);
- Incorporate the use of diesel fuel during furnace cold start-ups;
- Modify the language in Permit Condition 2.2 A.3.q. of Permit R06 regarding quantification of monthly NO_X emissions, in a manner consistent with Enviva's November 15, 2019 request and NCDEQ's November 25, 2019 response (See Appendix E);
- Correct a typo in the CO emission factor included in Permit Condition 2.2 A.2.c.ii of Permit R06 from 0.023 lb/ODT to 0.23 lb/ODT; and
- Update the flow rate of the Dry Shavings Silo baghouse (CD-DSS-BF) from 3,600 cfm to 500 cfm to reflect as-built changes.

Detailed discussions of the proposed permit revisions are included in Section 2. A process description for sources impacted by the proposed changes is provided in Section 3. Methodologies used to quantify potential emissions are summarized in Section 4. Section 5 describes the applicability of federal and state permitting programs. Section 6 includes a detailed applicability analysis of both federal and state regulations. Completed air permit application forms are included in Appendix A. The Process Flow Diagram is included in Appendix B. The Area Map is included in Appendix C. Detailed Potential Emissions Calculations are provided in Appendix D. The Permit Condition 2.2 A.3.q Modification Request and NCDEQ's Response is included in Appendix E. Copies of submitted zoning determination requests are included in Appendix F. Note that forms and calculations are only included for sources with changes proposed from Permit R06.

2. REQUESTED PERMIT REVISIONS

Enviva requests that the procedures of 15A NCAC 2Q .0504 be applied to this modification allowing issuance of a construction and operating permit under 15A NCAC 2D .0300. Changes proposed with this application are the result of engineering assessments completed as part of the expansion and emissions reductions authorized by issuance of Permit R06.

The following summarizes the proposed permit revisions:

- Revise VOC controls for Dry Hammermills and Dry Shavings Hammermills. Permit R06 requires the installation of a dedicated RTO/RCO to control emissions from the Dry Hammermills and Dry Shavings Hammermills. With this application, Enviva proposes to eliminate the requirement to install a dedicated RTO/RCO and instead implement an air recirculation process to route a portion of the Dry Hammermill exhaust back to the front end of the Dry Hammermills and ultimately route all exhaust gases exiting the Dry Hammermills and Dry Shavings Hammermills through a quench duct and then to either the Dryer 1 (ES-DRYER-1) furnace, the Dryer 1 WESP (CD-WESP-1), or combination of the two, then to the Dryer 1 RTO (CD-RTO-1) for control. This proposed control scheme will achieve a greater level of VOC, PM, PM_{10}, $PM_{2.5}$, and HAP emission reduction than required by Permit R06, and will also result in less gas combustion and lower combustion emissions by eliminating the dedicated RTO/RCO for the Dry Hammermills and Dry Shavings Hammermills. The purpose of the quench duct is to protect the RTO by reducing the risk of fire. Operation of the Dry Hammermills and Dry Shavings Hammermills will be interlocked with operation of the quench duct (i.e., the quench duct must operate in order for the Dry Hammermills and Dry Shavings Hammermills to operate). If flow in the quench duct drops below a minimum flow rate, the Dry Hammermills and Dry Shavings Hammermills will shut down.

  All exhaust from the Dry Hammermills will still be routed through existing baghouses, and all exhaust from the Dry Shavings Hammermills will be routed through a new baghouse (CD-DSHM-BF) which is proposed to be installed as part of this application. The purpose of the recirculation process is to reduce the volume of air that is ultimately routed to the downstream control device (i.e., Dryer WESP and RTO).

  Enviva has re-evaluated potential emissions for controlling the Dry Hammermills and Dry Shavings Hammermills based on this control scheme and required application forms and detailed potential emissions calculations are provided in Appendices A and D, respectively.

- Update the total heat input rate for the Pellet Cooler RTO/RCO (CD-RCO-2) from 19.6 MMBtu/hr to 12.4 MMBtu/hr and revise the RTO/RCO natural gas combustion emissions to utilize an emission factor for low-NO_X burners to reflect as-built changes. The control device can operate as either an RTO or RCO. The RTO and RCO modes have the same control efficiency so there is no impact on emissions when switching between operating modes.

- Enviva proposes to remove the current Dry Hammermill throughput limitation of 537,625 oven dried tons (ODT) per consecutive 12-month period (Condition 2.2.A.2.b.ii), which represents 85% of the plant's maximum production rate of 781,255 ODT per consecutive 12-month period. With this application, Enviva is proposing to increase the Dry Hammermill throughput to the plant's maximum production rate of 781,255 ODT per

consecutive 12-month period. Emissions increases resulting from this change are minor and do not change previous emissions analyses or modeling demonstrations.

- Remove the Dust Control System (ES-DCS) from the permit. The equipment associated with the Dust Control System is inoperable and Enviva proposes to permanently remove it from the permit. No emissions increase will result from this proposed change as the dust is contained within the Dry Hammermill building/area.
- Update the fraction of PM that is $PM_{2.5}$ for the Dry Hammermills (ES-HM-1 through 8) and Dry Shavings Hammermills (ES-DSHM-1 and ES-DSHM-2) based on a review of National Council for Air and Stream Improvement, Inc. (NCASI) data for similar baghouses in the wood products industry.
- Update the total heat input rate for the Dryer 1 RTO (CD-RTO-1) from 32 MMBtu/hr to 24.8 MMBtu/hr to reflect as-built changes.
- Update the total heat input rate for the Dryer 2 RTO (CD-RTO-2) from 32 MMBtu/hr to 24.8 MMBtu/hr to reflect planned design changes.
- Update the heat input of Dryer 1 and Dryer 2 double duct burners (IES-DDB-1 through IES-DDB-4) from 1 MMBtu/hr each to 2.5 MMBtu/hr each.
- Update the heat input of each dryer furnace idle mode (ES-FURNACEBYP-1 and 2) from 5 MMBtu/hr to 10 MMBtu/hr. Enviva has determined that 5 MMBtu/hr is insufficient for maintaining a flame in the furnace.
- The wet scrubbers (CD-WS-1 and 2) authorized for the Dry Hammermills, Dry Shavings Hammermills, Pellet Mills, and Pellet Coolers will not be used to control PM emissions but will serve as quench ducts to provide fire safety for the RTO and RTO/RCO (CD-RTO-1 and CD-RCO-2). Therefore, Enviva proposes to no longer list CD-WS-1 and 2 as control devices in the permit. The quench ducts are required for the RTO (CD-RTO-1) and RTO/RCO (CD-RCO-2) to operate safely (protection from fire). A safety interlock will be installed to cease operation of the Dry Hammermills, Dry Shavings Hammermills, Pellet Mills, and Pellet Coolers if a minimum flowrate is not maintained. As discussed above, Enviva is proposing to install a new baghouse (CD-DSHM-BF) to control PM emissions from the Dry Shavings Hammermills (ES-DSHM-1 and 2). This change will not impact emission estimates from the Dry Shavings Hammermills as the proposed baghouse will have the same control efficiency as the previously proposed wet scrubber. Additionally, the removal of the wet scrubbers as control devices will not change emissions from the Dry Hammermills, Pellet Mills, or Pellet Coolers as these sources are currently equipped with PM controls and no additional reduction was previously assumed for the wet scrubbers. Potential PM emissions from the Dry Hammermills and Dry Shavings Hammermills will decrease as a result of the changes proposed in this application, as the exhaust from the baghouses controlling these sources will now also be controlled by the Dryer 1 WESP (CD-WESP-1).
- Remove the Additive Handling Silo and associated baghouse (CD-ADD-BF) from the permit. As additive will not be received in bulk, the silo and equipment associated with controlling emissions from the receipt of bulk additive and pneumatic loading of the silo will not be installed. Instead, additive will continue to be received in supersacks, emptied into a hopper, and will be added to the process via enclosed screw conveyor.

- Update the Dried Wood Handling (ES-DWH-1 and ES-DWH-2) HAP emissions based on engineering judgment and an appropriate contingency.
- Remove the Dryer Line 1 Dried Wood Handling baghouse (CD-DWH-BF-1) from the permit as it will not be constructed and update the permit to reflect the existing passive bin vent filter (CD-DWH-BV).
- Remove IES-DRYSHAVE-1 from the permit as this emission unit does not exist. Emissions are represented by Dry Shavings Reception (ES-DSR).
- Update the fraction of PM that is $PM_{2.5}$ for the Finished Product Handling baghouse (CD-FPH-BF) based on a review of NCASI data for similar baghouses in the wood products industry.
- Incorporate the use of 15 - 30 gallons of diesel fuel per cold start-up and 100 - 200 gallons per consecutive 12-month period.
- Modify Permit Condition 2.2 A.3.q. of Permit R06. Enviva submitted a request on November 15, 2019 to revise language in Permit Condition 2.2 A.3.q regarding quantification of monthly NO_X emissions and, per NCDEQ's November 25, 2019 response (Appendix E), was asked to include the requested revision as part of the initial Title V Air Permit Application update required by Permit Condition 2.2 A.11.b. Section 5.2 of this application includes Enviva's proposed revisions to Permit Condition 2.2 A.3.q to make the language in the condition consistent with NCDEQ intent.
- Correct a typo in the CO emission factor, included in Permit Condition 2.2 A.2.c.ii of Permit R06, from 0.023 lb/ODT to 0.23 lb/ODT. This factor was added by NCDEQ during the draft permit review process to document the CO emissions basis of ES-DRYER-1 prior to installation of controls.
- Update the flow rate of the Dry Shavings Silo baghouse (CD-DSS-BF) from 3,600 cfm to 500 cfm to reflect as-built changes.

3. PROCESS DESCRIPTION

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 lifecycle CO_2/greenhouse gases, 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), Programme for the Endorsement of Forest Certification (PEFC), and Sustainable Biomass Program (SBP). Enviva requires that all suppliers adhere to state-developed "Best Management Practices" (BMPs) in their activities to protect water quality and sensitive ecosystems. In addition, Enviva is implementing an industry leading "track and trace" system to further ensure that all fiber resources come from responsible harvests. Enviva pays particular attention to: land use change, use and effectiveness of BMPs, wetlands, biodiversity, and certification status. All of this combined ensures that Enviva's forestry activities contribute to healthy forests both today and in the future. A detailed description of Enviva's Responsible Wood Supply Program can be found at:

https://www.envivabiomass.com/sustainability/responsible-sourcing/responsible-sourcing-policy/

The following sections provide a description of the sources that will be changed as part of this application. A Process flow diagram is provided in Appendix B.

3.1 Dry Hammermills and Dry Shavings Hammermills

Prior to pelletization, dried wood is reduced to the appropriate size using eight (8) Dry Hammermills operating in parallel (ES-HM-1 through ES-HM-8). Each Dry Hammermill includes a material recovery cyclone to capture Dry Hammermill material for further processing. Particulate emissions from the eight (8) Dry Hammermills are controlled using three (3) baghouses (CD-HM-BH-1 through 3).

The Northampton facility is permitted to receive purchased dry shavings to produce wood pellets in addition to green chips or logs. The dry shavings will be routed to the Dry Shavings Hammermills (ES-DSHM-1 and 2) for additional processing prior to pelletization. Particulate emissions from the Dry Shavings Hammermills will be controlled by a new baghouse (CD-DSHM-BF).

To control VOC emissions from the Dry Hammermills and Dry Shavings Hammermills, Enviva proposes to implement an air flow recirculation process to route a portion of the Dry Hammermill exhaust back into the front end of the Dry Hammermills and to ultimately route all exhaust gases exiting the Dry Hammermills and the Dry Shavings Hammermills to a quench duct and then to either the Dryer 1 (ES-DRYER-1) furnace, the Dryer 1 WESP (CD-WESP-1), or a combination of the two, and then to the Dryer 1 RTO (CD-RTO-1) for control. The proposed revised Dry Hammermill and Dry Shavings Hammermill VOC control approach allows Enviva to eliminate the need for an individual RTO/RCO to control emissions from the Dry Hammermills and Dry Shavings Hammermills. This results in less gas combustion and lower combustion emissions, while also achieving a greater level of VOC, PM, PM_{10}, $PM_{2.5}$ and HAP emissions control.

The purpose of the quench duct is to protect the RTO by reducing the risk of fire. Operation of the Dry Hammermills and Dry Shavings Hammermills will be interlocked with operation of

the quench duct (i.e., the quench duct must operate in order for the Dry Hammermills and Dry Shavings Hammermills to operate). If flow in the quench duct drops below a minimum flow rate, the Dry Hammermills and Dry Shavings Hammermills will shut down.

3.2 Additive Handling and Storage (IES-ADD)

Additive may be used in pellet production to act as a lubricant for the dies and increase the durability of the final product. Rather than install an Additive Storage Silo and associated baghouse (CD-ADD-BF) as authorized by Permit R06 (IES- ADD), the additive will continue to be received in 500 lb supersacks and emptied into a hopper. The additive is transferred from the hopper via enclosed screw conveyor and is added to milled wood from the Pellet Mill Feed Silo discharge screw conveyor prior to transfer to the Pellet Presses. The additive contains no hazardous chemicals or VOCs.

3.3 Dried Wood Handling (ES-DWH-1 and ES-DWH-2)

Dried wood from the Dryer material recovery cyclones is conveyed to screening operations that remove smaller wood particles which bypass the Dry Hammermills. The Dried Wood Handling emissions sources each include partially enclosed conveyor systems and conveyor transfer points located after each dryer (ES-DWH-1 and ES-DWH-2). Note that the emissions associated with ES-DWH-1 will not be controlled by the Dried Wood Handling baghouse (CD-DWH-BF-1) as initially authorized in Permit R06, as it will not be installed. Instead emissions will continue to be controlled by the passive bin vent (CD-DWH-BV) already in place. Emissions associated with ES-DWH-2 will be controlled by the Dried Wood Handling baghouse (CD-DWH-BF-2) as initially authorized in Permit R06

3.4 Pellet Press System and Pellet Coolers (ES-CLR-1 through ES-CLR-6)

Dried processed wood is mechanically compacted through twelve (12) presses in the Pellet Press System. Exhaust from the Pellet Press System and Pellet Press conveyors is vented through the Pellet Cooler aspiration material recovery cyclones and pollutant controls as described below, and then to the atmosphere. Formed pellets are discharged into one of six (6) pellet coolers (ES-CLR-1 thru ES-CLR-6). Chilled cooling air is passed through the pellets. At this point, the pellets contain a small amount of wood fines, which are swept out with the cooling air and are controlled by six (6) cyclones (CD-CLR-1 thru CD-CLR-6).

A quench duct will be installed prior to RTO/RCO (CD-RCO-2) for safety purposes to reduce the risk of fire and is not considered a control device. The quench duct is inherent for the RTO/RCO (CD-RCO-2) to operate safely (protection from fire). A safety interlock will be installed to cease operation of the Pellet Mills and Pellet Coolers if a minimum flowrate is not maintained.

3.5 Bypass Stacks (ES-FURNACEBYP-1, ES-FURNACEBYP-2)

The Furnace Bypass stacks (ES-FURNACEBYP-1 and ES-FURNACEBYP-2) are used to exhaust hot gases during start-ups (for temperature control). As previously discussed in Section 2, Enviva is requesting authorization to use diesel fuel as an accelerant during furnace cold start-ups. As diesel fuel is only utilized during furnace cold start-ups, only the process description for furnace cold start-ups is addressed below:

- **Cold Start-ups:** The furnace bypass stacks are used when the furnace is started up from a cold shutdown until the refractory is sufficiently heated and can sustain operations at a low level. The bypass stack is then closed, and the furnace is slowly brought up to a normal operating rate. Diesel fuel may be used as an accelerant for cold start-up. The

amount used per event is typically 15 – 30 gallons and the annual usage is typically 100 – 200 gallons and emissions resulting from diesel combustion are insignificant.

Planned Shutdowns and Idle Mode descriptions remain as previously submitted.

4. POTENTIAL EMISSIONS QUANTIFICATION

This section discusses quantification of potential emissions for those sources that will be impacted by this application. Revised facility-wide potential emissions and updated calculations for sources with proposed changes are included in Appendix D.

4.1 Dry Hammermills (ES-HM-1 through ES-HM-8) and Dry Shavings Hammermills (ES-DSHM-1 and ES-DSHM-2)

Dry Hammermill and Dry Shavings Hammermill operations generate PM, PM_{10}, $PM_{2.5}$, HAP, and VOC emissions during sizing of dried wood. Emissions from the eight (8) Dry Hammermills and two (2) Dry Shavings Hammermills are routed to baghouses for control of PM emissions (CD-HM-BH-1 through 3 and CD-DSHM-BF). . Particulate emissions from each baghouse were calculated using an exit grain loading rate, the maximum nominal exhaust flow rate of the baghouse, and the expected control efficiency of the WESP (CD-WESP-1). The $PM_{2.5}$ speciation is being updated to reflect a recent review of NCASI particle size distribution data for similar baghouses used in the wood products industry. Specifically, the fraction of $PM_{2.5}$ is being changed from 1.7% to 40% based on this review.

VOC, HAP, and TAP emissions from the Dry Hammermill and Dry Shavings Hammermill operations will be controlled as detailed in Sections 2 and 3. Uncontrolled VOC and HAP emissions at the outlet of the Dry Hammermill baghouses (CD-HM-BH-1 through 3) and the proposed new Dry Shavings Hammermill baghouse (CD-DSHM-BF) were quantified using emission factors based on process knowledge and an appropriate contingency based on engineering judgment. Controlled emissions were estimated based on the expected destruction efficiency for the RTO. NO_x and CO emissions resulting from thermal oxidation of VOC emissions in the Dry Hammermill and Dry Shavings Hammermill exhaust gas were calculated using AP-42 Section 1.4, *Natural Gas Combustion*[1], and the maximum high heating value of the anticipated VOC constituents.

Emissions of criteria pollutants, HAP, and TAP from natural gas/propane combustion by the RTO burners were estimated using emission factors from AP-42 Chapter 1. Potential GHG emissions from natural gas combustion were quantified based on emission factors from Subpart C of 40 CFR Part 98. Emissions were converted to carbon dioxide equivalent (CO_2e) based on Global Warming Potentials from Subpart A of 40 CFR 98.

4.2 Double Duct Burners (IES-DDB-1 through IES-DDB-4)

Emissions from natural gas and propane combustion by the double duct burners (IES-DDB-1 through IES-DDB-4) were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*, AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion*, NC DAQ's Wood Waste Combustion Spreadsheet, and emission factors from the South Coast Air Quality Management District's (SCAQMD) Air Emissions Reporting (AER) Tool. Enviva proposes to update the heat input of the Dryer 1 and Dryer 2 double duct burners (IES-DDB-1 through IES-DDB-4) from 1 MMBtu/hr each to 2.5 MMBtu/hr each. Detailed potential emission calculations are included in Appendix D.

[1] USEPA AP-42 Section 1.4, *Natural Gas Combustion* (07/98).

Per 15A NCAC 02Q .0503(8), the double duct burners (IES-DDB-1 through IES-DDB-4) are considered insignificant activities because potential uncontrolled criteria pollutant and HAP emissions are less than 5 tpy and 1,000 lbs/yr, respectively.

4.3 Additive Handling and Storage (IES-ADD)

An additive may be used in the pellet production process to increase the durability of the final product and act as a lubricant for the dies. Potential emissions from transfer activities associated with Additive Handling (IES-ADD) were calculated based on AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles*.[2] Detailed potential emissions calculations are provided in Appendix D.

Per 15A NCAC 02Q .0503, Additive Handling and Storage (IES-ADD) is considered an insignificant activity because potential uncontrolled PM emissions are less than 5 tpy. There are no VOC or HAP emissions associated with additive handling and storage.

4.4 Dried Wood Handling (DWH)

As previously described in Section 3.3, Dried Wood Handling (ES-DWH-1 and ES-DWH-2) includes partially enclosed conveyor systems and conveyor transfer points located after each dryer. Particulate matter emissions from transfers associated with ES-DWH-1 were calculated based on AP-42 Section 13.2.4, *Aggregate Handling and Storage Piles*.[3] Although particulate emissions are controlled by the existing passive bin vent, no control efficiency was applied for the bin vent. Emissions from transfers associated with ES-DWH-2 will be routed through a baghouse (CD-DWH-BF-2). Particulate emissions from the baghouse (CD-DWH-BF-2) were calculated based on the exhaust flow rate and exit grain loading.

Potential VOC and HAP emissions from Dried Wood Handling (ES-DWH-1 and ES-DWH-2) were calculated based on emission factors derived from NCASI's Wood Products Database (February 2013) for dry wood handling operations at an oriented strand board (OSB) mill and process knowledge and an appropriate contingency based on engineering judgement. Note that additional HAP emissions based on engineering judgment and an appropriate contingency are being included with this application. Detailed potential emission calculations are provided in Appendix D.

4.5 Dry Shavings Silo (ES-DSS)

Dry shavings are transferred into the Dry Shavings Silo (ES-DSS) via an enclosed conveyor and bucket elevator. Particulate emissions from the Dry Shavings Silo (CD-DSS-BF) were calculated based on the baghouse exhaust flow rate and exit grain loading. As part of this application Enviva is revising the baghouse exhaust flow rate from 3,600 cfm to 500 cfm to reflect as-built changes. Detailed potential emission calculations are provided in Appendix C.

4.6 Pellet Press System and Pellet Coolers (ES-CLR-1 through ES-CLR-6)

Pellet Press System (Pellet Mills) and Pellet Cooler (ES-CLR-1 through 6) operations will generate PM, HAP, and VOC emissions during the forming and cooling of wood pellets. The Pellet Mills and Coolers are equipped with six (6) simple cyclones (CD-CLR-1 through CD-CLR-6) and will be routed to a quench duct and then through the RTO/RCO (CD-RCO-2) for VOC and HAP control. Note, the quench duct being installed is for safety purposes only to reduce the risk of fire in the RTO/RCO and is not considered a control device. PM emissions

[2] USEPA AP-42 Section 13.2.4, *Aggregate Handling and Storage Piles* (11/06).

[3] Ibid.

from the Pellet Press System (Pellet Mills) and Pellet Coolers were calculated based on a maximum exit grain loading rate and the maximum nominal exhaust flow rate for the cyclones. No change in potential particulate emissions are proposed compared to the basis of Permit R06 because no control efficiency was previously applied for the wet scrubber (CD-WS-2). Potential NOx emissions from natural gas and propane combustion by the RTO/RCO were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*[4] and AP-42 Section 1.5*, Liquefied Petroleum Gas Combustion.*[5]

Uncontrolled VOC and HAP emissions at the outlet of the Pellet Cooler cyclones were quantified based on process information and an appropriate contingency based on engineering judgement. This includes emissions from both the Pellet Mills and the Pellet Coolers. Controlled emissions were conservatively based on a 95% control efficiency for the RTO/RCO. The RTO and RCO modes have the same control efficiency so there is no impact on emissions when switching between operating modes. Detailed calculations are provided in Appendix D.

4.7 Pellet Loadout Bins (ES-PB-1 through ES-PB-12), Pellet Loadout (ES-PL-1 and ES-PL-2), and Finished Product Handling (ES-FPH)

Particulate emissions result from the transfer of finished product to the Pellet Loadout Bins. PM emissions from transfers associated with Finished Product Handling are controlled by a baghouse (CD-FPH-BF). Potential PM emissions from the baghouse were calculated based on a maximum exit grain loading rate and the maximum nominal exhaust flow rate of the baghouse. Note that with this application, the fraction of PM that is $PM_{2.5}$ is for the Finished Product Handling baghouse (CD-FPH-BF) is being updated based on a review of NCASI data for similar baghouses in the wood products industry. Detailed potential emissions calculations are provided in Appendix D.

4.8 Furnace Bypass (Cold Start-up)

Potential emissions of CO, NO_x, SO_2, PM, VOC and HAP for furnace start-up conditions were calculated based on emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers*.[6] Emissions were based on 15% of the maximum heat input capacity of the furnaces and 50 hours per year per furnace. Diesel fuel may be used as an accelerant for cold start-ups; however, as the amount used per event is typically 15 – 30 gallons and the annual usage is typically 100 – 200 gallons, emissions resulting from the use of diesel fuel are insignificant and are not included in the ES-FURNACEBYP-1 and ES-FURNACEBYP-2 emission estimates. Detailed potential emissions calculations are included in Appendix D emissions.

[4] USEPA AP-42 Section 1.4, *Natural Gas Combustion* (07/98).

[5] USEPA AP-42 Section 1.5*, Liquefied Petroleum Gas Combustion* (07/08).

[6] USEPA AP-42 Section 1.6 *Wood Residue Combustion in Boilers* (09/03).

5. STATE AND FEDERAL PERMITTING APPLICABILITY

The Enviva Northampton plant is subject to federal and state air quality permitting requirements. The following sections summarize the applicability of these requirements to the proposed permit modifications.

5.1 Federal Permitting Programs

The federal New Source Review (NSR) permitting program includes requirements for construction of new sources, and modifications to existing sources, while the Title V Operating Permit Program includes requirements for operation of Title V major sources. The following sections discuss the applicability of these requirements to the Northampton plant.

5.1.1 New Source Review

NSR is a federal pre-construction permitting program that applies to certain major stationary sources. The federal NSR permitting program is implemented in North Carolina pursuant to 15A NCAC 2D .0530 and 15A NCAC 2D .0531. The primary purpose of NSR is to support the attainment and maintenance of ambient air quality standards across the country. There are two distinct permitting programs under NSR. The particular program that applies depends on the ambient air quality in the geographic area in which the source is located. The two programs are nonattainment New Source Review (NNSR) (15A NCAC 2D .0531) and Prevention of Significant Deterioration (PSD) (15A NCAC 2D .0530). Because NNSR and PSD requirements are pollutant-specific, a stationary source can be subject to NNSR requirements for one or more regulated NSR pollutants and to PSD requirements for the remaining regulated NSR pollutants.

NNSR permitting requirements apply to new or existing stationary sources located in an area where concentrations of a "criteria pollutant"[7] exceed the National Ambient Air Quality Standard (NAAQS) for that pollutant. PSD permitting requirements apply to major stationary sources for each criteria pollutant for which the geographic area in which the source is located has been designated as unclassifiable or attainment with respect to relevant NAAQS. PSD permitting requirements also apply to certain stationary sources regardless of location for each regulated NSR pollutant that is not a criteria pollutant (e.g., fluorides, hydrogen sulfide, and sulfuric acid mist).

The Northampton plant is located in Northampton County which is classified as attainment or unclassifiable for all criteria pollutants.[8] The Northampton plant will be a minor PSD source following implementation of changes authorized with Permit R06 and the changes proposed with this application will not change this status.

5.1.2 Title V Operating Permit Program

The federal Title V Operating Permit program is promulgated in 40 CFR 70 and is implemented in North Carolina via 15A NCAC 2Q .0500. The Northampton plant is a major source with respect to the Title V Operating Permit Program because facility-wide potential emissions of one or more criteria pollutants exceed the major source threshold of 100 tpy. Changes proposed with this application will not change this status.

[7] The following are "criteria pollutants" under current NSR regulations: CO, nitrogen dioxide, SO_2, PM_{10}, $PM_{2.5}$, ozone (VOCs and NO_X), and lead.

[8] 40 CFR 81.334

5.2 North Carolina Permitting Program

In addition to the Title V permitting requirements in 15 NCAC 02Q .0500, specific requirements for permitting of construction and operation of new and modified sources are included in 15A NCAC 02Q .0300, in accordance with North Carolina's State Implementation Plan (SIP). The proposed changes are subject to the permitting procedures under 15A NCAC 02Q .0300 and the required application forms are included as Appendix A.

As discussed above, Enviva is requesting to modify Permit Condition 2.2.A.3.q. of Permit R06 as part of this application submittal per NCDEQ's November 25, 2019 response to Enviva's previous request to modify this permit condition. Appendix E contains a copy of the initial request and NCDEQ's response. The following redline edits to Permit Condition 2.2.A.3.q are being provided for clarification purposes to ensure the condition is consistent with NCDEQ's initial intent, as clarified in the public hearing officer's report dated October 25, 2019 and application review document dated October 30, 2019:

> "Monthly NOx emissions, in tons, shall be calculated by the following equation and emissions factors *until all of the proposed control devices are installed (excluding the new wood dryer controls in the event the second dryer is not installed) and new site-specific approved NOx emission factors have been established through stack testing.*"

Additionally, Enviva requests that a typo to the CO emission factor, included in Permit Condition 2.2 A.2.c.ii of Permit R06, be corrected from 0.023 lb/ODT to 0.23 lb/ODT. This factor was added by NCDEQ during the draft permit review process to document the CO emissions basis of ES-DRYER-1 prior to installation of controls.

6. REGULATORY APPLICABILITY

The Northampton plant is subject to federal and state air quality regulations. The following addresses all regulations potentially applicable to the proposed permit modifications.

6.1 New Source Performance Standards

New Source Performance Standards (NSPS) apply to new and modified sources and require sources to control emissions in accordance with standards set forth at 40 CFR Part 60. NSPS standards in 40 CFR Part 60 have been incorporated by reference in 15A NCAC 02D .0524.

6.11 40 CFR 60 Subpart A – General Provisions

All sources subject to a NSPS are subject to the general requirements under Subpart A unless excluded by the source-specific subpart. Subpart A includes requirements for initial notification, performance testing, recordkeeping, monitoring, and reporting.

6.12 40 CFR Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

NSPS Subpart Dc applies to owners or operators of steam generating units for which construction, modification, or reconstruction is commenced after June 9, 1989 and that have a maximum design heat input of 100 MMBtu/hr or less but greater than or equal to 10 MMBtu/hr. The double duct burners each have a maximum heat input of 2.5 MMBtu/hr and are not steam generating units; therefore, NSPS Subpart Dc does not apply.

6.2 National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP) regulate HAP emissions and apply to certain major and area sources of HAP. NESHAP can be found in 40 CFR Part 63 and have been incorporated by reference in 15A NCAC 02D .1111. Following implementation of the changes authorized by Permit R06 the facility-wide total HAP emissions will not exceed 25 tpy and maximum individual HAP emissions will not exceed 10 tpy. Emissions of total HAP and individual HAP will remain below 25 tpy and 10 tpy following changes proposed by this application.

6.2.1 40 CFR 63 Subpart A – General Provisions

All sources subject to a NESHAP are subject to general requirements under Subpart A unless excluded by the source-specific subpart. Subpart A includes requirements for initial notification, performance testing, recordkeeping, monitoring, and reporting.

6.2.2 40 CFR 63 Subpart B – Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Section 112(g)

Clean Air Act (CAA) Section 112(g)(2)(B) requires that a new or reconstructed stationary source that does not belong to a regulated "source category" for which a NESHAP has been promulgated must control emissions to levels that reflect "maximum achievable control technology" (MACT). As provided in §63.40(b), a case-by-case MACT evaluation is only required prior to the construction or reconstruction of a major source of HAP emissions. The Northampton plant will not be subject to 112(g) since it will be a minor source of HAP.

6.3 Compliance Assurance Monitoring

Compliance Assurance Monitoring (CAM) under 40 CFR 64 applies to emission units located at a Title V major source that use a control device to achieve compliance with an emission limit and whose pre-controlled emissions exceed the major source thresholds. A CAM plan is required to be submitted with the initial Title V operating permit application for emission units whose post-controlled emissions exceed the major source thresholds (i.e., large pollutant-specific emission units [PSEU]).[9] For emission units with post-controlled emissions below the major source thresholds, a CAM plan must be submitted with the first Title V permit renewal application.[10]

Applicability of CAM to the sources with proposed changes was addressed with the air permit application for Permit R06 and will be addressed in the Title V permit renewal application, as required. Changes proposed with this application do not change the previous CAM applicability determinations.

6.4 North Carolina Administrative Code

The Northampton plant sources are subject to regulations contained within 15A NCAC 02D and 02Q. Regulations that are potentially applicable to the proposed project are addressed in the following sections.

6.4.1 15A NCAC 02D .0515 Particulates from Miscellaneous Industrial Processes

PM emissions from all industrial processes subject to permitting and for which no other emission control standards are applicable are regulated under 15A NCAC 02D .0515. This regulation limits particulate emissions based on process throughput using the equation $E = 4.10 \times P^{0.67}$, for process rates (P) less than or equal to 30 tons per hour (tph) and $E=55 \times P^{0.11}-40$ for process rates greater than 30 tph.

This requirement applies to all processes at the Northampton plant before and after implementation of the proposed changes.

6.4.2 15A NCAC 02D .0516 Sulfur Dioxide Emissions from Combustion Sources

Emissions of SO_2 from combustion sources cannot exceed 2.3 pounds of SO_2 per MMBtu input. The Dryer furnace burner system combusts bark and wood chips and the Dryer 1 RTO (CD-RTO-1), Dryer 2 RTO (CD-RTO-2), Pellet Mills and Pellet Coolers RTO/RCO (CD-RCO-2), and double duct burners (IES-DDB-1 through IES-DDB-4) utilize natural gas and/or propane, each of which contain low amounts of sulfur and will result in SO_2 emissions well below the limit of 2.3 lb/MMBtu.

6.4.3 15A NCAC 02D .0521 Control of Visible Emissions

For sources manufactured after July 1, 1971, visible emissions cannot exceed 20 percent opacity when averaged over a six-minute period except under the following conditions:

- No six-minute period exceeds 87 percent opacity,
- No more than one six-minute period exceeds 20 percent opacity in any hour, and
- No more than four six-minute periods exceed 20 percent opacity in any 24-hour period.

[9] §64.5(a)

[10] §64.5(b)

This rule applies to all processes at the facility that may have visible emissions.

6.4.4 15A NCAC 02D .1100 Control of Toxic Air Pollutants

15A NCAC 02D .1100 outlines the procedures that must be followed if a TAP permit and associated modeling are required under 15A NCAC 02Q .0700. Under 15A NCAC 02Q .0704(d), a TAP permit application is required to include an evaluation of the TAP emissions from a facility's sources, excluding exempt sources listed in Rule .0702 of this Section. As part of the proposed changes in this application TAP emissions will decrease and thus will not change the conclusions of the modeling demonstration completed in support of Permit R06. As such, Enviva does not believe an updated TAP modeling analysis is required for the proposed changes.

APPENDIX A
PERMIT APPLICATION FORMS

FORM A

GENERAL FACILITY INFORMATION

REVISED 09/22/16 | NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate | A

NOTE- APPLICATION WILL NOT BE PROCESSED WITHOUT THE FOLLOWING:

- ☑ Local Zoning Consistency Determination (new or modification only)
- ☑ Appropriate Number of Copies of Application
- ☑ Responsible Official/Authorized Contact Signature
- ☑ P.E. Seal (if required)

Application Fee (please check one option below): ☑ Not Required ☐ ePayment ☐ Check Enclosed

GENERAL INFORMATION

Legal Corporate/Owner Name:	**Enviva Pellets Northampton, LLC**
Site Name:	**Enviva Pellets Northampton, LLC**
Site Address (911 Address) Line 1:	**309 Enviva Blvd.**
Site Address Line 2:	
City: **Garysburg**	State: **North Carolina**
Zip Code: **27839**	County: **Northampton**

CONTACT INFORMATION

Responsible Official/Authorized Contact:	***Invoice Contact:***
Name/Title: **Roland Burnett, Plant Manager**	Name/Title: **Joe Harrell, Corporate Environmental Health & Safety Manager**
Mailing Address Line 1: **309 Enviva Blvd.**	Mailing Address Line 1: **142 N.C. Route 561 East**
Mailing Address Line 2:	Mailing Address Line 2:
City: **Garysburg** State: **NC** Zip Code: **27839**	City: **Ahoskie** State: **NC** Zip Code: **27910**
Primary Phone No.: **(252) 541-2631 ext 101** Fax No.:	Primary Phone No.: **(252) 209-6032** Fax No.:
Secondary Phone No.:	Secondary Phone No.:
Email Address: **Roland.Burnett@envivabiomass.com**	Email Address: **Joe.Harrell@envivabiomass.com**
Facility/Inspection Contact:	***Permit/Technical Contact:***
Name/Title: **Joe Harrell, Corporate Environmental Health & Safety Manager**	Name/Title: **Joe Harrell, Corporate Environmental Health & Safety Manager**
Mailing Address Line 1: **142 N.C. Route 561 East**	Mailing Address Line 1: **142 N.C. Route 561 East**
Mailing Address Line 2:	Mailing Address Line 2:
City: **Ahoskie** State: **NC** Zip Code: **27910**	City: **Ahoskie** State: **NC** Zip Code: **27910**
Primary Phone No.: **(252) 209-6032** Fax No.:	Primary Phone No.: **(252) 209-6032** Fax No.:
Secondary Phone No.:	Secondary Phone No.:
Email Address: **Joe.Harrell@envivabiomass.com**	Email Address: **Joe.Harrell@envivabiomass.com**

APPLICATION IS BEING MADE FOR

☐ New Non-permitted Facility/Greenfield ☑ Modification of Facility (permitted) ☐ Renewal Title V ☐ Renewal Non-Title V
☐ Name Change ☐ Ownership Change ☐ Administrative Amendment ☐ Renewal with Modification

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):
Wood pellet manufacturing facility

Facility ID No. **6600167**

Primary SIC/NAICS Code: **2499 (Wood Products, not elsewhere classified)**

Current/Previous Air Permit No. **10203R06** Expiration Date: **February 28, 2025**

Facility Coordinates: Latitude: **36.5025** Longitude: **-77.6135**

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 Carbon**		Firm Name: **Ramboll US Corporation**	
Mailing Address Line 1: **8235 YMCA Plaza Drive, Suite 300**		Mailing Address Line 2:	
City: **Baton Rouge**	State: **LA**	Zip Code: **70810**	County:
Phone No.: **(225) 408-2691**	Fax No.:	Email Address: **mcarbon@ramboll.com**	

SIGNATURE OF RESPONSIBLE OFFICIAL/AUTHORIZED CONTACT

Name (typed): Roland Burnett — Title: Plant Manager

X Signature(Blue Ink): Roland Burnett — Date: 9-14-2020

Attach Additional Sheets As Necessary

FORMs A2, A3

EMISSION SOURCE LISTING FOR THIS APPLICATION - A2

112r APPLICABILITY INFORMATION - A3

REVISED 09/22/16 — NCDEQ/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-HM-1 through 8	Eight (8) Dry Hammermills	CD-HM-CYC-1 through 8	Cyclones
		CD-HM-BF-1 through CD-HM-BF-3	Baghouses
		CD-WESP-1	WESP
		CD-RTO-1	RTO
ES-DSHM-1 and ES-DSHM-2	Two (2) Dry Shavings Hammermills	CD-DSHM-BF	Baghouse
		CD-WESP-1	WESP
		CD-RTO-1	RTO
ES-FURNACEBYP-1 and 2	Furnace Bypass	N/A	N/A
IES-DDB-1 through 4	Double Duct Burners	N/A	N/A
IES-ADD	Additive Handling and Storage	N/A	N/A
ES-DWH-1	Dried Wood Handling 1	CD-DWH-BV	Passive Bin Vent
ES-DSR	Dry Shavings Reception	CD-DSR-BF	Baghouse
ES-FPH; ES-PB-1 through ES-PB-12; ES-PL-1 and ES-PL-2	Finished Product Handling; Twelve Pellet Loadout Bins; Pellet Loadout 1 and 2	CD-FPH-BF	Baghouse
ES-DSS	Dry Shavings Silo	CD-DSS-BF	Baghouse
ES-CLR-1 through 6	Pellet Coolers 1 through 6	CD-CLR-1 through 6	Simple Cyclones
		CD-RCO-2	RCO/RTO
Equipment To Be DELETED By This Application			
N/A	N/A	CD-WS-1	Wet Scrubber
N/A	N/A	CD-WS-2	Wet Scrubber
ES-DCS	Dust Control System	N/A	N/A
N/A	N/A	CD-ADD-BF	Baghouse
N/A	N/A	CD-DWH-BF-1	Baghouse
IES-DRYSHAVE-1	Dry Shavings Material Handling	CD-DSR-BF	Baghouse

112(r) APPLICABILITY INFORMATION — A3

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

If No, please specify in detail how your facility avoided applicability: **Enviva Pellets Northampton, LLC will not store or use any of the substances subject to Section 112(r) of the Federal Clean Air Act above the threshold quantity.**

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: _____

C. List the processes subject to 112(r) at your facility:

PROCESS DESCRIPTION	PROCESS LEVEL (1, 2, or	HAZARDOUS CHEMICAL	MAXIMUM INTENDED INVENTORY (LBS)

Attach Additional Sheets As Necessary

FORM D1

FACILITY-WIDE EMISSIONS SUMMARY

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **D1**

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)
AIR POLLUTANT EMITTED	tons/yr	tons/yr	tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix D**		
PARTICULATE MATTER < 10 MICRONS (PM_{10})			
PARTICULATE MATTER < 2.5 MICRONS ($PM_{2.5}$)			
SULFUR DIOXIDE (SO_2)			
NITROGEN OXIDES (NOx)			
CARBON MONOXIDE (CO)			
VOLATILE ORGANIC COMPOUNDS (VOC)			
LEAD			
GREENHOUSE GASES (GHG) (SHORT TONS)			
OTHER			

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

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

					Modeling Required ?	
TOXIC AIR POLLUTANT EMITTED	CAS NO.	lb/hr	lb/day	lb/year	Yes	No
		See Emission Calculations in Appendix D				

COMMENTS:

Attach Additional Sheets As Necessary

FORM D4

EXEMPT AND INSIGNIFICANT ACTIVITIES SUMMARY

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	Bark Hog IES-BARK	234377 ODT/yr	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
2.	Diesel Storage Tank for Emergency Generator #1 IES-TK-1	2,500 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
3.	Diesel Storage Tank for Fire Water Pump IES-TK-2	500 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
4.	Mobile Fuel Diesel Storage Tank IES-TK-3	5,000 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
5.	Diesel Storage Tank for Emergency Generator #2 IES-TK-4	1,000 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
6.	Debarker IES-DEBARK	781255 ODT/yr	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
7.	Green Wood Fuel Bin IES-GWFB	13.93 ODT/hr	15A NCAC 02Q .0503(8)-no quantifiable emissions
8.	Dry line hopper IES-DLH	10 ODT/hr	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
9.	Dry Shaving Material Handling and Storage IES-DRYSHAVE	Varies	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
10.	Two diesel storage tanks (2,500 gallon and 500 gallon capacity) IS-TK1	1,000 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
11.	Two bagging system bins ES-BSB-1	8,760 ODT/yr	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
12.	Green Wood Handling and Storage Change in throughput	350 bhp	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
13.	Dryer double duct burners IES-DDB-1 through IES-DDB-4	671 bhp	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
14.	Green Wood Fuel Bin IES-GWFB	300 bhp	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
15.	Dryer #1 Double Duct Burners IES-DDB-1 and IES-DDB-2	2.5 MMBtu/hr	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
16.	Dryer #2 Double Duct Burners IES-DDB-3 and IES-DDB-4	2.5 MMBtu/hr	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
17.	Propane Vaporizer IES-PVAP	1 MMBtu/hr	15A NCAC 02Q .0503(8)-low emissions, see Appendix C

Attach Additional Sheets As Necessary

FORM D5

TECHNICAL ANALYSIS TO SUPPORT PERMIT APPLICATION

REVISED 09/22/16 | **NCDEQ/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 and B1 through B9) -** 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 INFORMATION 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 and C1 through C9) -** 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, **Russell Kemp** *attest that this application for* **Enviva Pellets Northampton, LLC** *has been reviewed by me and is accurate, complete and consistent with the information supplied in the engineering plans, calculations, and all other supporting documentation to the best of my knowledge. I further attest that to the best of my knowledge the proposed design has been prepared in accordance with the applicable regulations. Although certain portions of this submittal package may have been developed by other professionals, inclusion of these materials under my seal signifies that I have reviewed this material and have judged it to be consistent with the proposed design. Note: In accordance with NC General Statutes 143-215.6A and 143-215.6B, any person who knowingly makes any false statement, representation, or certification in any application shall be guilty of a Class 2 misdemeanor which may include a fine not to exceed $10,000 as well as civil penalties up to $25,000 per violation.*

(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)

NAME: **Russell Kemp, MS, PE**

DATE: 10 SEPTEMBER 2020

COMPANY: **REUS Engineers, P.C.**

ADDRESS: **1600 Parkwood Circle, Suite 310, Atlanta, GA 30339**

TELEPHONE: **(678) 388-1654**

SIGNATURE:

PAGES CERTIFIED: **Forms B, B1, B6, B9, C1, C2, C3, C4**

Appendix C with emission calculations

Application Narrative

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

PLACE NORTH CAROLINA SEAL HERE

Attach Additional Sheets As Necessary

FORM E1

TITLE V GENERAL INFORMATION

REVISED 06/01/16 | **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** | **E1**

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

Indicate here if your facility is subject to Title V by: ☑ EMISSIONS ☐ OTHER

If subject to Title V by "OTHER", specify why: ☐ NSPS ☐ NESHAP (MACT) ☐ TITLE IV ☐ OTHER (specify) _____

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

EMISSION SOURCE ID	*EMISSION SOURCE DESCRIPTION*	*MACT*
IES-GN-1, IES-GN-2	Emergency Generator 1 and 2	Subpart ZZZZ
IES-FWP	Fire Water Pump	Subpart ZZZZ

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

REGULATION	*EMISSION SOURCE (Include ID)*	*EXPLANATION*

Comments:

Attach Additional Sheets As Necessary

FORM E2

EMISSION SOURCE APPLICABLE REGULATION LISTING

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

Attach Additional Sheets As Necessary

Summary of Regulatory Requirements and Associated Compliance Requirements
Enviva Pellets Northampton, LLC

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Dryers #1 and #2, Green Hammermills 1 through 5, Dry Shavings Hammermills 1 and 2, Dry Hammermills 1 through 8	ES-DRYER-1, ES-DRYER-2, ES-GHM-1 to ES-GHM-5, ES-DSHM-1, ES-DSHM-2, ES-HM-1 to ES-HM-8	PM	15A NCAC 02D .0515	RTO	Daily monitoring of WESP secondary voltage and current. Inspections and maintenance as recommended by the control device manufacturers, as well as monthly visual inspection of the ductwork and material collection units. Annual inspections of WESP including, but not limited to, visual check of critical components, checks for any equipment that does not alarm when de-energized, checks for signs of plugging in the hopper and gas distribution equipment, and replacement of broken equipment as required. Annual inspection of the heat transfer medium and associated inlet/outlet valves on the RTO. Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ).	Written or electronic log of WESP secondary voltage and current, date/time/result of inspections and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the WESP or RTO within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		VOC, CO, NO_X, $PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0317		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ). Maintain 3-hour block average temperature across all fireboxes comprising the RTO at or above the minimum average temperature established in the most recent performance test. Daily monitoring of minimum secondary voltage and secondary current for the WESP. Limit throughput to 781,255 ODT with a maximum of 80% softwood per consecutive 12-month period. Perform required inspections and maintenance for the WESP and RTO (see above).	Written or electronic log of monthly throughput, hardwood/softwood mix, actual emissions (facility-wide 12-month rolling basis), 3-hour block average temperature for the RTO, daily WESP secondary voltage and current, date/time/result of inspections and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the WESP or RTO within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		SO_2	15A NCAC 02D .0516		None required because inherently low sulfur content of wood fuel ensures compliance.		
		HAP	15A NCAC 02Q .0308(a)		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ).	N/A	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4).
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

Summary of Regulatory Requirements and Associated Compliance Requirements
Enviva Pellets Northampton, LLC

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Finished Product Handling, Twelve Pellet Loadout Bins, Pellet Loadout 1 and 2	ES-FPH, ES-PB-1 to ES-PB-12, ES-PL-1, ES-PL-2	PM	15A NCAC 02D .0515	Baghouse	Inspections and maintenance as recommended by the manufacturer as well as monthly visual inspections of the system ductwork and material collection units for leaks, annual internal inspection of baghouse structural integrity.	Written or electronic log of date/time/result of inspection and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit results of any maintenance performed on the baghouse within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		$PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0308(a)		Monthly actuals emissions.	Written or electronic log of actual emissions (facility-wide 12-month rolling basis).	Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
Pellet Coolers 1 through 6	ES-CLR-1 to ES-CLR-6	PM	15A NCAC 02D .0515	RTO/RCO	Inspections and maintenance as recommended by the RTO/RCO manufacturer, as well as monthly visual inspection of the ductwork and material collection units. Annual inspection of the heat transfer medium and associated inlet/outlet valves on the RTO/RCO. Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ).	Written or electronic log of date/time/result of inspections and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the RTO/RCO within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		$VOC, CO, NO_X, PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0317		Initial and periodic stack testing for VOC and $PM/PM_{10}/PM_{2.5}$ (at least annually unless a longer duration is approved by DAQ). Limit pellet production to 781,255 ODT with a maximum of 80% softwood per consecutive 12-month period. Maintain 3-hour block average temperature across all fireboxes comprising the RTO/RCO at or above the minimum average temperature established in the most recent performance test. At a minimum, perform annual internal inspection of the heat transfer medium and associated inlet/outlet valves on the RTO/RCO.	Written or electronic log of monthly throughput, hardwood/softwood mix, and actual emissions (facility-wide 12-month rolling basis). Written or electronic log of 3-hour block average temperature for the RTO/RCO, date/time/result of inspections and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made. Develop and maintain a malfunction plan for the temperature monitoring and recordmg system that describes, in detail, the operating procedures for periods of malfunctions.	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the cyclones and RTO/RCO within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		HAP	15A NCAC 02Q .0308(a)		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ).	N/A	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4).
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal". If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

Summary of Regulatory Requirements and Associated Compliance Requirements
Enviva Pellets Northampton, LLC

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Emergency Generators	IES-GN-1 and IES-GN-2	PM, CO, NO_x, NMHC, SO_2	40 CFR Part 60 Subpart IIII	N/A	All requirements are outlined in the regulation, including the following: use certified emergency engines, operate according to manufacturers procedures, use fuel oil with fuel content of no more than 15 ppmw sulfur and cetane index of at least 40, install non-resettable hour meter.	Maintain records of engine certification, fuel certifications and hours/year of operation of each engine.	N/A
		SO_2	15A NCAC 02D .0516	N/A	Non required because inherently low sulfur content of fuel achieves compliance.		
		Opacity	15A NCAC 02D .0521	N/A	Monthly visible observation for "normal" opacity during operation (only applicable if equipment is operated). If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A
		HAPs	40 CFR Part 63 Subpart ZZZZ	N/A	Comply with the NSPS requirements. No other requirements apply.	Comply with the NSPS requirements. No other requirements apply.	N/A
Fire Water Pump	IES-FWP	PM, CO, NO_x, NMHC, SO_2	40 CFR Part 60 Subpart IIII	N/A	All requirements are outlined in the regulation, including the following: use certified emergency engines, operate according to manufacturers procedures, use fuel oil with fuel content of no more than 15 ppmw sulfur and cetane index of at least 40, install non-resettable hour meter.	Maintain records of engine certification, fuel certifications and hours/year of operation of each engine.	N/A
		SO_2	15A NCAC 02D .0516	N/A	Non required because inherently low sulfur content of fuel achieves compliance.		
		Opacity	15A NCAC 02D .0521	N/A	Monthly visible observation for "normal" opacity during operation (only applicable if equipment is operated). If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A
		HAPs	40 CFR Part 63 Subpart ZZZZ	N/A	Comply with the NSPS requirements. No other requirements apply.	Comply with the NSPS requirements. No other requirements apply.	N/A
Dry Shavings Silo	ES-DSS	PM	15A NCAC 02D .0515	Baghouse	Inspections and maintenance as recommended by the manufacturer as well as monthly visual inspections of the system ductwork and material collection units for leaks, annual internal inspection of baghouse structural integrity.	Written or electronic log of date/time/result of inspection and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit results of any maintenance performed on the baghouse within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		$PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0308(a)		Monthly actuals emissions.	Written or electronic log of actual emissions (facility-wide 12-month rolling basis).	Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

Summary of Regulatory Requirements and Associated Compliance Requirements
Enviva Pellets Northampton, LLC

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Dry Hammermill Prescreeners 1 and 2, Additive Handling and Storage, Dry Line Hopper, Dry Line Feed Conveyor, Dry Shaving Material Handling and Storage, Green Wood Handling and Storage, Electric Powered Green Wood Chipper, Bark Hog, Debarker, Double Duct Burners	ES-PS-1 and -2, IES-ADD, IES-DLH, IES-DLC-1, IES-DRYSHAVE, ES-GWHS, IES-EPWC, IES-BARK, IES-DEBARK, IES-DDB-1 through DDB-4	PM	15A NCAC 02D .0515	N/A	Comply with the process weight limitation.	N/A	N/A
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity during operation for all sources except insignificant activities (only applicable if equipment is operated). If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
Dry Wood Handling 1	ES-DWH-1	PM	15A NCAC 02D .0515	Bin Vent Filter	Inspections and maintenance as recommended by the manufacturer as well as monthly visual inspections of the system ductwork and material collection units for leaks, annual internal inspection of control device structural integrity.	Written or electronic log of date/time/result of inspection and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit results of any maintenance performed on the control device within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		$PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0308(a)		Monthly actuals emissions.	Written or electronic log of actual emissions (facility-wide 12-month rolling basis).	Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
Dry Wood Handling 2, Dry Shavings Reception	ES-DWH-2, ES-DSR	PM	15A NCAC 02D .0515	Baghouse	Inspections and maintenance as recommended by the manufacturer as well as monthly visual inspections of the system ductwork and material collection units for leaks, annual internal inspection of baghouse structural integrity.	Written or electronic log of date/time/result of inspection and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit results of any maintenance performed on the baghouse within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		$PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0308(a)		Monthly actuals emissions.	Written or electronic log of actual emissions (facility-wide 12-month rolling basis).	Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

Summary of Regulatory Requirements and Associated Compliance Requirements
Enviva Pellets Northampton, LLC

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Furnace #1 and #2 Bypass	ES-FURNACEBYP-1, ES-FURNACEBYP-2	PM	15A NCAC 02D .0515	N/A	Comply with the process weight limitation.	N/A	N/A
		VOC, CO, NO_X, $PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0317		Limit hours of furnace bypass to 50 per year for cold start-ups. Limit heat input during cold start-ups to no more than 26.3 MMBtu/hr for Furnace 1 and 27.0 MMBtu/hr for Furnace 2. Limit duration of cold start-ups to 8 hours or less. Limit hours of operation in idle mode to 500 hours per year. Limit heat input during idle to 10 MMBtu/hr.	Written or electronic log of monthly hours of operation in cold start-up and idle mode and actual emissions (facility-wide 12-month rolling basis).	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity during operation (only applicable if equipment is operated). If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

FORM E3
EMISSION SOURCE COMPLIANCE METHOD

REVISED 09/22/16 **NCDEQ/Division Of Air Quality - Application for Air Permit to Construct/Operate** **E3**

	Regulated Pollutant
Emission Source ID NO.	Applicable Regulation
Alternative Operating Scenario (AOS) NO:	

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

MONITORING REQUIREMENTS

Is Compliance Assurance Monitoring (CAM) 40 CFR Part 64 Applicable? ☐ YES ☐ NO
If yes, is CAM Plan Attached (if applicable, CAM plan must be attached)? ☐ YES ☐ NO
Describe Monitoring Device Type:
Describe Monitoring Location:
Other Monitoring Methods (Describe In Detail): **CAM applicability and, if applicable, submission of CAM plans, will be addressed as part of a future Title V operating permit renewal application.**

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

RECORDKEEPING REQUIREMENTS

Data (Parameter) being recording:
Frequency of recordkeeping (How often is data recorded?):

REPORTING REQUIREMENTS

Generally describe what is being reported:

Frequency: ☐ MONTHLY ☐ QUARTERLY ☐ EVERY 6 MONTHS ☐ OTHER (DESCRIBE):

TESTING

Specify proposed reference test method:
Specify reference test method rule and citation:
Specify testing frequency:

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

Attach Additional Sheets As Necessary

FORM E4
EMISSION SOURCE COMPLIANCE SCHEDULE

COMPLIANCE STATUS WITH RESPECT TO ALL APPLICABLE REQUIREMENTS

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

☑ YES ☐ NO **If NO**, complete **A** through **F** below for each requirement for which compliance is not achieved.

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

☑ YES ☐ NO **If NO**, complete **A** through **F** below for each requirement for which compliance is not achieved.

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

☑ YES ☐ NO **If NO**, complete **A** through **F** below for each requirement for which compliance is not achieved.

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

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

_____

_____

_____

_____

_____

_____

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

_____

_____

_____

_____

_____

D. Detailed Schedule of Compliance:

Step(s)	Date Expected

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

_____

F. Starting date of submittal of progress reports: _____

Attach Additional Sheets As Necessary

FORM E5

TITLE V COMPLIANCE CERTIFICATION (Required)

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

SITE NAME: Enviva Pellets Northampton, LLC

SITE ADDRESS: 309 Enviva Blvd.

CITY, NC : Garysburg NC

COUNTY: Northampton

PERMIT NUMBER : 10203R06

CERTIFIES THAT (Check the appropriate statement(s):

- [x] The facility is in compliance with all applicable requirements
- [ ] In accordance with the provisions of Title 15A NCAC 2Q .0515(b)(4) the responsible company official certifies that the proposed minor modification meets the criteria for using the procedures set out in 2Q .0515 and requests that these procedures be used to process the permit application.
- [ ] The facility is not currently in compliance with all applicable requirements
  If this box is checked, you must also complete Form E4 "Emission Source Compliance Schedule"

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

Roland Burnett — **Date:** 9-14-2020

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

Roland Burnett, Plant Manager

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

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/' **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION: **Green Hammermills 1 through 5**	EMISSION SOURCE ID NO: **ES-GHM-1 through ES-GHM-5**
	DEVICE ID NO(S): **CD-WESP-1, CD-RTO-1 , CD-WESP-2 , CD-RTO-2**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1**, **EP-4**

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

Green wood chips are processed in the green hammermills. The green hammermills will also have the ability to be routed and controlled by the CD-WESP-2 and CD-RTO-2, once constructed, when the CD-WESP-1 and CD-RTO-1 are shutdown.

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)	☐ Manuf. 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: **GHM-1, 2: 2013 GHM 3, 4, 5: TBD**	DATE MANUFACTURED: **GHM-1, 2: 2013 GHM 3, 4, 5: TBD**
MANUFACTURER / MODEL NO.: **GHM-1, 2: Williams #490 GHM 3, 4, 5: TBD**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR
IS THIS SOURCE SUBJECT ☐ NSPS (SUBPARTS?):	☐ NESHAP (SUBPARTS?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%** JUN-AUG **25%** SEP-NOV **25%**

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 EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)							
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							

See Emission Calculations in Appendix D

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix D

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr

See Emission Calculations in Appendix D

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 SOURC

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-GHM-1 through ES-GHM-5**
Green Hammermills 1 through 5	CONTROL DEVICE ID NO(S): **CD-WESP-1, CD-RTO-1 , CD-WESP-2 , CD-RTO-2**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1, EP-4**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are processed in the Green Hammermills. The green hammermills will also have the ability to be routed and controlled by the CD-WESP-2 and CD-RTO-2, once constructed, when the CD-WESP-1 and CD-RTO-1 are shutdown.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Green Wood	**ODT/hr**	**150**	**N/A**

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 EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/10/19 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-HM-1 through ES-HM-8**
Dry Hammermills 1 through 8	CONTROL DEVICE ID NO(S): **CD-HM-CYC-1 through CD-HM-CYC-8, CD-HM-BF-1 through CD-HM-BF-3, CD-WESP-1, CD-RTO-1**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dried materials are reduced to appropriate size needed for pelletizing using eight (8) dry 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)	☐ Manuf. 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:	DATE MANUFACTURED:
2012	**2012**
MANUFACTURER / MODEL NO.:	
Bliss, Model 44-60	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR
IS THIS SOURCE SUBJECT T ☐ NSPS (SUBPARTS?):_____	☐ NESHAP (SUBPARTS?):_____
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%** JUN-AUG **25%** SEP-NOV **25%**

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 EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix D**						
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	CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
		See Emission Calculations in Appendix D						

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr
		See Emission Calculations in Appendix D			

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.

:OMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURC

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED 12/10/19 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-HM-1 through ES-HM-8**
Dry Hammermills 1 through 8	CONTROL DEVICE ID NO(S): **CD-HM-CYC-1 through CD-HM-CYC-8, CD-HM-BF-1 through CD-HM-BF-3, CD-WESP-1, CD-RTO-1**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Dried materials are reduced to appropriate size needed for pelletizing using eight (8) dry hammermills.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**ODT**	**144**	**N/A**

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 EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/10/19 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-DSHM-1 and ES-DSHM-2**
Dry Shavings Hammermills 1 and 2	CONTROL DEVICE ID NO(S): **CD-DSHM-BF, CD-WESP-1, CD-RTO-1**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1**

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

Dry shavings are reduced to appropriate size needed for pelletizing using two (2) dry shavings hammermill.

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)	☐ Manuf. 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:	DATE MANUFACTURED:
TBD	**TBD**
MANUFACTURER / MODEL NO.:	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR
TBD	

IS THIS SOURCE SUBJECT T ☐ NSPS (SUBPARTS?):_____ ☐ NESHAP (SUBPARTS?):_____

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%** MAR-MAY **25%** JUN-AUG **25%** SEP-NOV **25%**

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 EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)							
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							

See Emission Calculations in Appendix D

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix D

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr

See Emission Calculations in Appendix D

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 12/10/19 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-DSHM-1 and ES-DSHM-2**
Dry Shavings Hammermills 1 and 2	CONTROL DEVICE ID NO(S): **CD-DSHM-BF, CD-WESP-1, CD-RTO-1**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Dry shavings are reduced to appropriate size needed for pelletizing using two (2) dry shavings hammermills.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Shavings	**ODT/hr**	**28**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C4

CONTROL DEVICE (CYCLONE, MULTICYCLONE, OR OTHER MECHANICAL)

REVISED 12/10/19 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C4**

CONTROL DEVICE ID NO: **CD-HM-CYC-1 through CD-HM-CYC-8**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-HM-1 through ES-HM-8**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROLS NO. **1** OF **4** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2Q .0112)? ☑ YES ☐ NO

One cyclone is equipped for each dry hammermill to capture bulk PM emissions. The emissions from the cyclones are then routed to one of three bagfilters.

POLLUTANT(S) COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**90** %	**90** %	**90** %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN. H_20):	MIN	**6"**	MAX
INLET TEMPERATURE (^oF):	MIN	**Ambient**	MAX
OUTLET TEMPERATURE (^oF):	MIN	**Ambient**	MAX
INLET AIR FLOW RATE (ACFM): **15,000 (each cyclone)**		BULK PARTICLE DENSITY (LB/FT^3): **1.43E-03**	
POLLUTANT LOADING RATE (GR/FT^3): **10 (inlet)**			

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

DESCRIBE MAINTENANCE PROCEDURES:
Periodic inspection of mechanical integrity during plant outages as specified by the manufacturer.

DESCRIBE INCOMING AIR STREAM:
The material will be pulled through the cyclone under negative pressure. The cyclone will separate the material from the air stream and the air will discharge to an associated bag filter, quench duct, WESP, and RTO prior to being discharged to the atmosphere.

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:
N/A

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

Attach Additional Sheets As Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

REVISED 12/10/19 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

CONTROL DEVICE ID NO: **CD-HM-BF-1 through CD-HM-BF-3**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-HM-1 through ES-HM-8**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROLS** NO. **2** OF **4** Units (ES-HM-1 through ES-HM-8)
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:

Three (3) bag filters will be utilized for emission control on eight (8) dry hammermill cyclones. Dry Hammermills 1 through 3 vent to CD-HM-BF-1, Dry Hammermills 4 through 6 vent through CD-HM-BF-2, and emissions from Dry Hammermills 7 and 8 vent through CD-MH-BF-3.

****Dry Hammermills, ES-HM-1 through ES-HM-8 will be routed to the WESP (CD-WESP-1) and RTO (CD-RTO-1) after leaving the bag filters (CD-HM-BF-1 through 3). Refer to the control device forms associated with CD-RTO-1 for more information.**

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.0** %	**~99.0** %	**~99.0** %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN H_20): MIN: MAX: **6"** GAUGE? ☑ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-05**	INLET TEMPERATURE (^oF): MIN	MAX **120**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^{o} MIN	MAX **100**
INLET AIR FLOW RATE (ACFM): **45,000** each	FILTER OPERATING TEMP (^oF): **N/A**	
NO. OF COMPARTMENTS: **1**	NO. OF BAGS PER COMPARTMENT: **412**	LENGTH OF BAG (IN.): **144**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **5.75**
TOTAL FILTER SURFACE AREA (FT^2): **6,250**	AIR TO CLOTH RATIO: **7.20**	
DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE	FILTER MATERIAL: ☐ WOVEN ☑ FELTED	

DESCRIBE CLEANING PROCEDURES

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

DESCRIBE INCOMING AIR STREAM:

The air stream contains wood dust particles. Larger particles are removed by the upstream cyclone for product recovery.

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 | **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** | **C1**

CONTROL DEVICE ID NO: **CD-DSHM-BF**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DSHM-1 and ES-DSHM-2**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROLS** NO. **1** OF **3** Units
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:
A single baghouse will be utilized to control PM emissions from the dry shavings hammermills.

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.0** %	**~99.0** %	**~99.0** %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN H_20): MIN:	MAX: TBD	GAUGE? ☐ YES ☐ NO
BULK PARTICLE DENSITY (LB/FT^3): **TBD**	INLET TEMPERATURE (^oF): MIN	MAX **120**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^{o} MIN	MAX **100**
INLET AIR FLOW RATE (ACFM): **45,000**	FILTER OPERATING TEMP (^oF): **N/A**	
NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: TBD	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **TBD**	AIR TO CLOTH RATIO: TBD	

DRAFT TYPE: ☐ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☐ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES

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

DESCRIBE INCOMING AIR STREAM:
The air stream contains wood dust particles.

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C2

CONTROL DEVICE (Electrostatic Precipitator)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C2**

CONTROL DEVICE ID NO: **CD-WESP-1**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DRYER-1, ES-GHM-1 through ES-GHM-5, ES-HM-1 through ES-HM-8, ES-DSHM-1 and ES-DSHM-2**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROL NO. **1** OF **2** UNITS (ES-DRYER-1)
	POSITION IN SERIES OF CONTROL NO. **1** OF **2** UNITS (ES-GHM-1 through ES-GHM-5)
	POSITION IN SERIES OF CONTROL NO. **3** OF **4** UNITS (ES-HM-1 through ES-HM-8)
	POSITION IN SERIES OF CONTROL NO. **2** OF **3** UNITS (ES-DSHM-1 and ES-DSHM-2)
MANUFACTURER: **Lundberg E-Tube 115719**	MODEL NO. **Lundberg E-Tube 115719**
OPERATING SCENARIO:	
OPERATING SCENARIO: **1** OF **1**	P.E. SEAL REQUIRED (PER 2Q .0112)? ☐ YES ☐ NO

DESCRIBE CONTROL SYSTEM:

Emissions from the Dryer #1 (ES-DRYER-1) and Green Hammermills (ES-GHM-1 through ES-GHM-5) will be controlled by the WESP through a common duct for additional PM, metallic HAP, and HCl removal. Emissions from the Dry Hammermills (ES-HM-1 through ES-HM-8) and Dry Shavings Hammermills (ES-DSHM-1 and ES-DSHM-2) will be routed to either the Dryer #1 furnace, the Dryer #1 WESP (CD-WESP-1), or a combination of the two.

EQUIPMENT SPECIFICATIONS	GAS DISTRIBUTION GRIDS: ☑ YES ☐ NO
TYPE: ☑ WET ☐ DRY	☑ SINGLE-STAGE ☐ TWO-STAGE
TOTAL COLLECTION PLATE AREA (FT^2): **29,904**	NO. FIELDS **2** NO. COLLECTOR PLATES PER FIELD: **567 tubes**
COLLECTOR PLATE SIZE (FT): LENGTH: **TBD** WIDTH: **TBD**	SPACING BETWEEN COLLECTOR PLATES (INCHES): **12" hextube**
TOTAL DISCHARGE ELECTRODE LENGTH (FT): **19"**	GAS VISCOSITY (POISE): **2.054E-04 Poise**
NUMBER OF DISCHARGE ELECTRODES: **667**	NUMBER OF COLLECTING ELECTRODE RAPPERS: **none**
MAXIMUM INLET AIR FLOW RATE (ACFM): **117,000**	PARTICLE MIGRATION VELOCITY (FT/SEC): **0.234**
MINIMUM GAS TREATMENT TIME (SEC): **2.3**	BULK PARTICLE DENSITY (LB/FT^3): **45 lb/cu. Ft.**
FIELD STRENGTH (VOLTS) CHARGING: **83 kVA** COLLECTIN(**N/A**	CORONA POWER (WATTS/1000 CFM): **4000**
ELECTRICAL USAGE (KW/HOUR): **141.5**	
CLEANING PROCEDURES: ☐ RAPPING ☐ PLATE VIBRATING ☑ WASHING ☐ OTHER	
OPERATING PARAMETERS PRESSURE DROP (IN. H20): MIN MAX	WARNING ALARM? ☑ YES ☐ NO
RESISTIVITY OF POLLUTANT (OHM-CM): **N/A**	GAS CONDITIONING ☑ YES ☐ NO TYPE OF AGENT (IF YES):
INLET GAS TEMPERATURE (°F): **240 nominal**	OUTLET GAS TEMPERATURE (°F): **180 nominal**
VOLUME OF GAS HANDLED (ACFM): **117,000**	INLET MOISTURE PERCENT: **40%** MIN **50%** MAX

POWER REQUIREMENTS IS AN ENERGY MANAGEMENT SYSTEM USED? ☐ YES ☐ NO

FIELD NO.	NO. OF SETS	CHARGING	EACH TRANSFORMER (kVA)	EACH RECTIFIER Kv Ave/Peak Ma Dc
1	1		118	83/1265
2	1		118	83/1265

POLLUTANT(S) COLLECTED:	$PM/PM_{10}/PM_{2.5}$	Metal HAP/TAP	HCl	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	95 %	92.8 %	90 %	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	See Emission Calculations in Appendix D			

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE STARTUP PROCEDURES: **TBD**

DESCRIBE MAINTENANCE PROCEDURES: **TBD**

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM

Sodium Hydroxide (NaOH)

DESCRIBE ANY MONITORING DEVICES, GAUGES, OR TEST PORTS AS ATTACHMENTS: **PLC**

COMMENTS:

ATTACH A DIAGRAM OF THE TOP VIEW OF THE ESP WITH DIMENSIONS (include at a minimum the plate spacing and wire spacing and indicate the electrode type), AND THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

FORM C3
CONTROL DEVICE (THERMAL OR CATALYTIC)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C3**

AS REQUIRED BY 15A NCAC 2Q .0112, THIS FORM MUST BE SEALED BY A PROFESSIONAL ENGINEER (P.E.) LICENSED IN NORTH CAROLINA.

CONTROL DEVICE ID NO: **CD-RTO-1**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DRYER-1, ES-GHM-1 through ES-GHM-5, ES-HM-1 through ES-HM-8, ES-DSHM-1 and ES-DSHM-2**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROLS NO. 2 OF 2 UNITS (ES-DRYER-1)
	POSITION IN SERIES OF CONTROLS NO. 2 OF 2 UNITS (ES-GHM-1 through ES-GHM-5)
	POSITION IN SERIES OF CONTROLS NO. 4 OF 4 UNITS (ES-HM-1 through ES-HM-8)
	POSITION IN SERIES OF CONTROLS NO. 3 OF 3 UNITS (ES-DSHM-1 and ES-DSHM-2)
MANUFACTURER: **TBD**	MODEL NO: **TBD**
OPERATING SCENARIO:	
1 OF 1	

TYPE ☐ AFTERBURNER ☑ REGENERATIVE THERMAL OXIDATION ☐ RECUPERATIVE THERMAL OXIDATION ☐ CATALYTIC OXIDATION

EXPECTED LIFE OF CATALYST (YRS): **TBD** METHOD OF DETECTING WHEN CATALYST NEEDS REPLACMENT: **TBD**

CATALYST MASKING AGENT IN AIR STRE ☐ HALOGEN ☐ SILICONE ☐ PHOSPHOROUS COMPOUND ☐ HEAVY METAL ☐ SULFUR COMPOUND ☑ OTHER (SPECIFY) **TBD** ☐ NONE

TYPE OF CATALYST: **TBD**	CATALYST VOL (FT^3): **TBD**	VELOCITY THROUGH CATALYST (FPS): **TBD**

SCFM THROUGH CATALYST: **TBD**

DESCRIBE CONTROL SYSTEM, INCLUDING RELATION TO OTHER CONTROL DEVICES AND SOURCES, AND ATTACH DIAGRAM OF SYSTEM:
Controls emissions from Dryer #1 (ES-DRYER-1) and Green Hammermills (ES-GHM-1 through ES-GHM-5). Emissions from the Dry Hammermills (ES-HM-1 through ES-HM-8) and Dry Shavings Hammermills (ES-DSHM-1 and ES-DSHM-2) will be routed to either the Dryer #1 furnace, the Dryer #1 WESP (CD-WESP-1), or a combination of the two prior to control by CD-RTO-1.

POLLUTANT(S) COLLECTED:	**VOC**			
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**97.5** %	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR) :	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN. H_2O MIN MAX **TBD**	OUTLET TEMPERATURE (^oF): **TBD** MIN **TBD** MAX
INLET TEMPERATURE (^oF MIN MAX **TBD**	RESIDENCE TIME (SECONDS): **TBD**
INLET AIR FLOW RATE (ACFM): **TBD** (SCFM): **TBD**	COMBUSTION TEMPERATURE (^oF): **TBD**
COMBUSTION CHAMBER VOLUME (FT^3): **TBD**	INLET MOISTURE CONTENT (%): **TBD**
% EXCESS AIR: **TBD**	CONCENTRATION (ppmv) **TBD** INLET **TBD** OUTLET
AUXILIARY FUEL USED: **Natural Gas**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **24.8**

DESCRIBE MAINTENANCE PROCEDURES:
TBD

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM:
N/A

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/1 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-FURNACEBYP-1**
Furnace #1 Bypass	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-3**

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

A bypass stack following the furnace (ES-FURNACEBYP-1) will be used to exhaust hot gases during startup, shutdown, and idle mode. During cold start-ups, the furnace bypass stack is used until the refractory is sufficiently heated and can sustain operations at a low level (approximately 15% of the maximum heat input rate). Diesel fuel may be used as an accelerant for cold start-up. The amount used per event is typically 15 – 30 gallons and the annual usage is typically 100 – 200 gallons and emissions resulting from diesel combustion are insignificant. In the event of a planned shutdown the furnace heat input is decreased, and all remaining fuel is moved through the system to prevent a fire during the shutdown period. The remaining fuel is combusted prior to opening the furnace bypass stack. The furnace bypass stack is not utilized until after the furnace achieves an idle state (10 MMBtu/hr or less). The purpose of operation in "idle mode" is to maintain the temperature of the fire brick lining the furnaces which may be damaged if it cools too rapidly. Operation in "idle mode" also significantly reduces the amount of time required to restart the dryers. Use of the Furnace Bypass Stack for cold start-up and shutdowns is limited to 50 hours per year and up to 500 hours per year for "idle mode".

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)	☐ Manuf. 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:	DATE MANUFACTURED:
TBD	**TBD**
MANUFACTURER / MODEL NO.:	
TBD	EXPECTED OP. SCHEDULE: **NA** HR/DAY **NA** DAY/WK **NA** WK/

IS THIS SOURCE SUBJECT ☐ NSPS (SUBPARTS?): _____ ☐ NESHAP (SUBPARTS?): _____

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%** MAR-MAY **25%** JUN-AUG **25%** SEP-NOV **25%**

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 EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)							
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							

See Emission Calculations in Appendix D

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix D

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr

See Emission Calculations in Appendix D

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.

MPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOUR

Attach Additional Sheets As Necessary

FORM B1

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

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B1**

EMISSION SOURCE DESCRIPTION: **Furnace #1 Bypass**	EMISSION SOURCE ID NO: **ES-FURNACEBYP-1**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-3**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

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

WOOD-FIRED BURNER

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

PERCENT MOISTURE OF FUEL: **~50%**

☐ UNCONTROLLED ☐ CONTROLLED WITH FLYASH REINJECTION ☑ CONTROLLED W/O REINJECTION

FUEL FEED METHOD: **N/A** HEAT TRANSFER MEDIA: ☐ STEAM ☑ AIR ☐ OTHER (DESCRIBE) _____

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	

OIL/GAS-FIRED BURNER

TYPE OF BOILER: ☐ UTILITY ☐ INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL
TYPE OF FIRING: ☐ NORMAL ☐ TANGENTIAL ☐ LOW NOX BURNERS ☐ NO LOW NOX BURNER

OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: _____
TYPE OF BOILER: ☐ UTILITY ☐ INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL
TYPE OF FIRING: _____ TYPE(S) OF CONTROL(S) (IF ANY): _____

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Bark/Wet Wood	**tph**	**3.1**	N/A
Diesel	**gallons**	**30**	N/A

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	SPECIFIC BTU CONTENT	SULFUR CONTENT (% BY WEIGHT)	ASH CONTENT (% BY WEIGHT)
Bark/Wet Wood	**Nominal 4,200 BTU/lb**	**0.011**	
Diesel	**19,300 BTU/lb**	**0.0015**	

COMMENTS:

Attach Additional Sheets As Necessary

FORM C3
CONTROL DEVICE (THERMAL OR CATALYTIC)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C3**

AS REQUIRED BY 15A NCAC 2Q .0112, THIS FORM MUST BE SEALED BY A PROFESSIONAL ENGINEER (P.E.) LICENSED IN NORTH CAROLINA.

CONTROL DEVICE ID NO: **CD-RTO-2**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DRYER-2**
EMISSION POINT (STACK) ID NO(S): **EP-4**	POSITION IN SERIES OF CONTROLS NO. **2** OF **2** UNITS
MANUFACTURER: **TBD**	MODEL NO: **TBD**
OPERATING SCENARIO:	
1 OF **1**	

TYPE ☐ AFTERBURNER ☑ REGENERATIVE THERMAL OXIDATION ☐ RECUPERATIVE THERMAL OXIDATION ☐ CATALYTIC OXIDATION

EXPECTED LIFE OF CATALYST (YRS): **TBD**	METHOD OF DETECTING WHEN CATALYST NEEDS REPLACMENT: **TBD**

CATALYST MASKING AGENT IN AIR STRI ☐ HALOGEN ☐ SILICONE ☐ PHOSPHOROUS COMPOUND ☐ HEAVY METAL ☐ SULFUR COMPOUND ☑ OTHER (SPECIFY) **TBD** ☐ NONE

TYPE OF CATALYST: **TBD**	CATALYST VOL (FT^3): **TBD**	VELOCITY THROUGH CATALYST (FPS): **TBD**

SCFM THROUGH CATALYST: **TBD**

DESCRIBE CONTROL SYSTEM, INCLUDING RELATION TO OTHER CONTROL DEVICES AND SOURCES, AND ATTACH DIAGRAM OF SYSTEM:
Emissions leaving the WESP (CD-WESP-2) will enter the RTO (CD-RTO-2) prior to being emitted to the atmosphere.

POLLUTANT(S) COLLECTED:	**VOC**			
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**97.5** %	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR) :	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN. H_2(MIN MAX **TBD**	OUTLET TEMPERATURE (°F): **TBD** MIN **TBD** MAX
INLET TEMPERATURE (°F MIN MAX **TBD**	RESIDENCE TIME (SECONDS): **TBD**
INLET AIR FLOW RATE (ACFM): **TBD** (SCFM): **TBD**	COMBUSTION TEMPERATURE (°F): **TBD**
COMBUSTION CHAMBER VOLUME (FT^3): **TBD**	INLET MOISTURE CONTENT (%): **TBD**
% EXCESS AIR: **TBD**	CONCENTRATION (ppmv) **TBD** INLET **TBD** OUTLET
AUXILIARY FUEL USED: **Natural Gas**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **24.8**

DESCRIBE MAINTENANCE PROCEDURES:
TBD

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM:
N/A

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/' **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION: **Furnace #2 Bypass**	EMISSION SOURCE ID NO: **ES-FURNACEBYP-2**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-6**

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

A bypass stack following the furnace (ES-FURNACEBYP-2) will be used to exhaust hot gases during startup, shutdown, and idle mode. During cold start-ups, the furnace bypass stack is used until the refractory is sufficiently heated and can sustain operations at a low level (approximately 15% of the maximum heat input rate). Diesel fuel may be used as an accelerant for cold start-up. The amount used per event is typically 15 – 30 gallons and the annual usage is typically 100 – 200 gallons and emissions resulting from diesel combustion are insignificant. In the event of a planned shutdown the furnace heat input is decreased, and all remaining fuel is moved through the system to prevent a fire during the shutdown period. The remaining fuel is combusted prior to opening the furnace bypass stack. The furnace bypass stack is not utilized until after the furnace achieves an idle state (10 MMBtu/hr or less). The purpose of operation in "idle mode" is to maintain the temperature of the fire brick lining the furnaces which may be damaged if it cools too rapidly. Operation in "idle mode" also significantly reduces the amount of time required to restart the dryers. Use of the Furnace Bypass Stack for cold start-up and shutdowns is limited to 50 hours per year and up to 500 hours per year for "idle mode".

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)	☐ Manuf. of chemicals/coatings/inks (Form B7)
☐ Int.combustion engine/generator (Form B2)	☐ Coating/finishing/printing (Form B5)	☐ Incineration (Form B8)
☐ Liquid storage tanks (Form B3)	☐ Storage silos/bins (Form B6)	☐ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **TBD**	EXPECTED OP. SCHEDULE: **NA** HR/DAY **NA** DAY/WK **NA** WK/
IS THIS SOURCE SUBJECT ☐ NSPS (SUBPARTS?):	☐ NESHAP (SUBPARTS?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%** JUN-AUG **25%** SEP-NOV **25%**

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 EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix D**						
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	CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
		See Emission Calculations in Appendix D						

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr
		See Emission Calculations in Appendix D			

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.

MPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOUR

Attach Additional Sheets As Necessary

FORM B1

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

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B1**

EMISSION SOURCE DESCRIPTION: **Furnace #2 Bypass**	EMISSION SOURCE ID NO: **ES-FURNACEBYP-2**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-6**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): **180**

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: **N/A** HEAT TRANSFER MEDIA: ☐ STEAM ☑ AIR ☐ OTHER (DESCRIBE) _____

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	

OIL/GAS-FIRED BURNER

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

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

OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: _____

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

TYPE OF FIRING: _____ TYPE(S) OF CONTROL(S) (IF ANY): _____

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Bark/Wet Wood	**tph**	**3.2**	N/A
Diesel	**gallons**	**30**	N/A

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	SPECIFIC BTU CONTENT	SULFUR CONTENT (% BY WEIGHT)	ASH CONTENT (% BY WEIGHT)
Bark/Wet Wood	**Nominal 4,200 BTU/lb**	**0.011**	
Diesel	**19,300 BTU/lb**	**0.0015**	

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION: **Dried Wood Handling 1 and 2**	EMISSION SOURCE ID NO: **ES-DWH-1 and ES-DWH-2**
	CONTROL DEVICE ID NO(S): **CD-DWH-BV; CD-DWH-BF-2**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-7 and EP-21**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dried Wood Handling (ES-DWH-1 and 2) will include partially enclosed conveyor systems and conveyor transfer points located after each dryer. PM emissions from the existing dryer line dry wood handling system (ES-DWH-1) are controlled by an existing passive bin vent (CD-DWH-BV). PM emissions from the new dryer line dried wood handling system (ES-DWH-2) will be controlled by a baghouse (CD-DWH-BF-2).

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

☐ Coal,wood,oil, gas, other burner (Form B1)	☐ Woodworking (Form B4)	☐ Manuf. 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:	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.:	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR
IS THIS SOURCE SUBJECT T ☐ NSPS (SUBPARTS?):	☐ NESHAP (SUBPARTS?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25% JUN-AUG 25% SEP-NOV 25%

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 EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)							
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							

See Emission Calculations in Appendix D

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix D

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr

See Emission Calculations in Appendix D

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.

OMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOUR

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

EMISSION SOURCE DESCRIPTION: **Dried Wood Handling 1 and 2**	EMISSION SOURCE ID NO: **ES-DWH-1 and ES-DWH-2**
	CONTROL DEVICE ID NO(S): **CD-DWH-BV; CD-DWH-BF-2**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-7 and EP-21**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Dried Wood Handling (ES-DWH-1 and 2) will include partially enclosed conveyor systems and conveyor transfer points located after each dryer. PM emissions from the existing dryer line dry wood handling system (ES-DWH-1) are controlled by an existing passive bin vent (CD-DWH-BV). PM emissions from the new dryer line dried wood handling system (ES-DWH-2) will be controlled by a baghouse (CD-DWH-BF-2).

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**ODT**	**154**	

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

CONTROL DEVICE ID NO: **CD-DWH-BV**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DWH-1**
EMISSION POINT (STACK) ID NO(S): **EP-7**	POSITION IN SERIES OF CONTROLS NO. **1** OF **1** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:
PM emissions from the existing dryer line dry wood handling system (ES-DWH-1) are controlled by an existing passive bin vent (CD-DWH-BV).

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.0** %	**~99.0** %	**~99.0** %	%
CONTROL DEVICE EFFICIENCY:	**0** %	**0** %	**0** %	%
CORRESPONDING OVERALL EFFICIENCY:	%		%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN H_20): MIN: MAX: **TBD** GAUGE? ☐ YES ☑ NO	
BULK PARTICLE DENSITY (LB/FT^3): **TBD**	INLET TEMPERATURE (^oF): MIN MAX **TBD**
POLLUTANT LOADING RATE: ☐ LB/HR ☐ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN MAX **TBD**
INLET AIR FLOW RATE (ACFM): **Unknown**	FILTER OPERATING TEMP (^oF): **N/A**

NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: **TBD**	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES: **TBD**	FILTER SURFACE AREA PER CARTRIDGE (FT^2): **TBD**	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **TBD**	AIR TO CLOTH RATIO: **TBD**	

DRAFT TYPE: ☐ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☐ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

CONTROL DEVICE ID NO: **CD-DWH-BF-2**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DWH-2**
EMISSION POINT (STACK) ID NO(S): **EP-21**	POSITION IN SERIES OF CONTROLS NO. **1** OF **1** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:
A bag filter will be utilized for emission control on Dried Wood Handling operations at the post dryer conveyor for Dryer Line #2.

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.0** %	**~99.0** %	**~99.0** %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%		%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN H_20): MIN: MAX: **TBD** GAUGE? ☑ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **TBD**	INLET TEMPERATURE (^oF): MIN	MAX **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^{o}IMIN	MAX **TBD**
INLET AIR FLOW RATE (ACFM): **2,500**	FILTER OPERATING TEMP (^oF): **N/A**	
NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: **TBD**	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES: **TBD**	FILTER SURFACE AREA PER CARTRIDGE (FT^2): **TBD**	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **TBD**	AIR TO CLOTH RATIO: **TBD**	

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☑ FELTED

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/1 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION: **Dry Shavings Silo**	EMISSION SOURCE ID NO: **ES-DSS**
	CONTROL DEVICE ID NO(S): **CD-DSS-BF**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-10**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Stores dry shavings used in pellet production. PM emissions will be controlled by the Dry Shavings Baghouse (CD-DSS-BF).

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)	☐ Manuf. of chemicals/coatings/inks (Form B7)
☐ Int.combustion engine/generator (Form B2)	☐ Coating/finishing/printing (Form B5)	☐ Incineration (Form B8)
☐ Liquid storage tanks (Form B3)	☑ Storage silos/bins (Form B6)	☐ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **TBD**	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT ☐ NSPS (SUBPARTS?): ☐ NESHAP (SUBPARTS?):

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%** MAR-MAY **25%** JUN-AUG **25%** SEP-NOV **25%**

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 EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)							
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							

See Emission Calculations in Appendix D

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix D

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr

See Emission Calculations in Appendix D

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.

MPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOUR

Attach Additional Sheets As Necessary

FORM B6
EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

EMISSION SOURCE DESCRIPTION: **Dry Shavings Silo**	EMISSION SOURCE ID NO: **ES-DSS**
	CONTROL DEVICE ID NO(S): **CD-DSS-BF**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): **EP-10**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Stores dry shavings used in pellet production. PM emissions will be controlled by the Dry Shavings Baghouse (CD-DSS-BF).

MATERIAL STORED: **Dry Shavings**				DENSITY OF MATERIAL (LB/FT3): **TBD**	
CAPACITY	CUBIC FEET:			TONS:	
DIMENSIONS (FEET)	HEIGHT:	DIAMETER: **TBD**	***(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	☐ TRUCK
☐ OTHER:	☑ BUCKET ELEVATOR	☐ STORAGE PILE
	☐ OTHER:	☑ OTHER: **Conveyor**

NO. FILL TUBES:
MAXIMUM ACFM:

MATERIAL IS UNLOADED TO: **Dry Shavings Hammermills (ES-DSHM-1 and ES-DSHM-2)**

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Screw conveyor

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

CONTROL DEVICE ID NO: **CD-DSS-BF**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DSS**
EMISSION POINT (STACK) ID NO(S): **EP-10**	POSITION IN SERIES OF CONTROLS NO. **1** OF **1** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:
The silo baghouse will control emissions from the dry shavings silo (ES-DSS).

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.0** %	**~99.0** %	**~99.0** %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN H_20): MIN: MAX: **TBD** GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3): **TBD**	INLET TEMPERATURE (^oF): MIN MAX **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN MAX **TBD**
INLET AIR FLOW RATE (ACFM): **500**	FILTER OPERATING TEMP (^oF): **N/A**

NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: **TBD**	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES: **TBD**	FILTER SURFACE AREA PER CARTRIDGE (FT^2): **TBD**	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **TBD**	AIR TO CLOTH RATIO: **TBD**	

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☑ FORCED/POSITIVE FILTER MATERIAL: ☐ WOVEN ☑ FELTED

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-DSR**
Dry Shavings Reception	CONTROL DEVICE ID NO(S): **CD-DSR-BF**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-20**

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

Purchased dry shavings will be unloaded from trucks into a hopper.

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)	☐ Manuf. 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:	DATE MANUFACTURED:
TBD	**TBD**
MANUFACTURER / MODEL NO.:	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR
TBD	

IS THIS SOURCE SUBJECT T☐ NSPS (SUBPARTS?):_____ ☐ NESHAP (SUBPARTS?):_____

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%** MAR-MAY **25%** JUN-AUG **25%** SEP-NOV **25%**

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 EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)							
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							

See Emission Calculations in Appendix D

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix D

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr

See Emission Calculations in Appendix D

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 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-DSR**
Dry Shavings Reception	CONTROL DEVICE ID NO(S): **CD-DSR-BF**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-20**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Purchased dry shavings will be unloaded from trucks into a hopper.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Shavings	**ODT**	**28**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

CONTROL DEVICE ID NO: **CD-DSR-BF**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DSR**
EMISSION POINT (STACK) ID NO(S): **EP-20**	POSITION IN SERIES OF CONTROLS NO. **1** OF **1** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

A baghouse will control the transfer of dry shavings from trucks into a hopper.

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.0** %	**~99.0** %	**~99.0** %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN H_20): MIN: MAX: **TBD** GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3): **TBD**	INLET TEMPERATURE (^oF): MIN MAX **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN MAX **TBD**
INLET AIR FLOW RATE (ACFM): **2,500**	FILTER OPERATING TEMP (^oF): **N/A**

NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: **TBD**	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES: **TBD**	FILTER SURFACE AREA PER CARTRIDGE (FT^2): **TBD**	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **301**	AIR TO CLOTH RATIO: **TBD**	

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☐ WOVEN ☑ FELTED

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-CLR-1 through ES-CLR-6**
Pellet Coolers 1 through 6	CONTROL DEVICE ID NO(S): **CD-CLR-1 through CD-CLR-6, CD-RCO-2**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-18**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Six (6) pellet coolers follow the pellet presses to cool the newly formed pellets down to an acceptable storage temperature.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Wood Pellets	**ODT/hr**	**144**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C4

CONTROL DEVICE (CYCLONE, MULTICYCLONE, OR OTHER MECHANICAL)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C4**

CONTROL DEVICE ID NO: **CD-CLR-1 through CD-CLR-6**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-CLR-1 through ES-CLR-6**
EMISSION POINT (STACK) ID NO(S): **EP-18**	POSITION IN SERIES OF CONTROLS NO. **1** OF **2** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2Q .0112)? ☐ YES ☐ NO

DESCRIBE CONTROL SYSTEM :

Six (6) identical high efficiency cyclones capture bulk PM emissions from six (6) pellet coolers (ES-CLR-1 through ES-CLR-6). Each cooler vents to one dedicated cyclone. The cyclones will operate under negative pressure.

POLLUTANT(S) COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):		144		
CAPTURE EFFICIENCY:	**90+** %	**90+** %	**90+** %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN. H_20): _____ MIN **6"** MAX

INLET TEMPERATURE (°F): _____ MIN	**Ambient** MAX	OUTLET TEMPERATURE (°F): _____ MIN	**Ambient** MAX
INLET AIR FLOW RATE (ACFM): **17,100 (each)**		BULK PARTICLE DENSITY (LB/FT^3): **2.86E-05**	
POLLUTANT LOADING RATE (GR/FT^3): **0.01 (inlet)**			

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

DESCRIBE MAINTENANCE PROCEDURES:

Periodic inspection of mechanical integrity during plant outages as specified by the manufacturer.

DESCRIBE INCOMING AIR STREAM:

The material will be pulled through the cyclone under negative pressure. The cyclone will separate the material from the air stream and the air will discharge to CD-RCO-1.

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

N/A

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

Attach Additional Sheets As Necessary

FORM C3
CONTROL DEVICE (THERMAL OR CATALYTIC)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C3**

AS REQUIRED BY 15A NCAC 2Q .0112, THIS FORM MUST BE SEALED BY A PROFESSIONAL ENGINEER (P.E.) LICENSED IN NORTH CAROLINA.

CONTROL DEVICE ID NO: **CD-RCO-2**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-CLR-1 through ES-CLR-6**
	POSITION IN SERIES OF CONTROLS NO. **2** OF **2** UNITS
MANUFACTURER: **TBD**	MODEL NO: **TBD**
OPERATING SCENARIO:	
1 OF **1**	

TYPE ☐ AFTERBURNER ☐ REGENERATIVE THERMAL OXIDATION ☐ RECUPERATIVE THERMAL OXIDATION ☑ CATALYTIC OXIDATION

EXPECTED LIFE OF CATALYST (YRS): **TBD** METHOD OF DETECTING WHEN CATALYST NEEDS REPLACMENT: **TBD**

CATALYST MASKING AGENT IN AIR STRE ☐ HALOGEN ☐ SILICONE ☐ PHOSPHOROUS COMPOUND ☐ HEAVY METAL ☐ SULFUR COMPOUND ☑ OTHER (SPECIFY) **TBD** ☐ NONE

TYPE OF CATALYST: **TBD**	CATALYST VOL (FT^3): **TBD**	VELOCITY THROUGH CATALYST (FPS): **TBD**
SCFM THROUGH CATALYST: **TBD**		

DESCRIBE CONTROL SYSTEM, INCLUDING RELATION TO OTHER CONTROL DEVICES AND SOURCES, AND ATTACH DIAGRAM OF SYSTEM:

After leaving the pellet coolers (ES-CLR-1 through ES-CLR-6), emissions will pass through a cyclone, and then will be routed to a quench duct and RTO/RCO). The RTO/RCO will have the ability to operate in thermal (RTO) or catalytic (RCO) mode. See the forms associated with the pellet coolers for more information.

POLLUTANT(S) COLLECTED:	**VOC**			
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**95** %	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR) :	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN. H_2O MIN MAX **TBD**	OUTLET TEMPERATURE (^oF): **TBD** MIN **TBD** MAX
INLET TEMPERATURE (^oF MIN MAX **TBD**	RESIDENCE TIME (SECONDS): **TBD**
INLET AIR FLOW RATE (ACFM): **TBD** (SCFM): **TBD**	COMBUSTION TEMPERATURE (^oF): **TBD**
COMBUSTION CHAMBER VOLUME (FT^3): **TBD**	INLET MOISTURE CONTENT (%): **TBD**
% EXCESS AIR: **TBD**	CONCENTRATION (ppmv) **TBD** INLET **TBD** OUTLET
AUXILIARY FUEL USED: **Natural Gas**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **12.4**

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM:
N/A

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/1(**NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-FPH, ES-PB-1 through ES-PB-12, ES-PL-1, ES-PL-2**
Finished Product Handling, Twelve Pellet Loadout Bins, Pellet Loadout 1 and 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):

Pelletized product is conveyed to pellet loadout bins that feed two pellet loadout operations (ES-PL-1 and ES-PL-2). Pellet Loadout is accomplished by gravity feed of the pellets into trucks through a covered shoot that automatically telescopes upward during the loadout process to maintain constant contact with the product as it is loaded to prevent PM emissions. A slight negative pressure is maintained near the loadout area inside of the loadout building as a fire prevention measure to prevent any build-up of dust on surfaces within the building. Trucks are covered immediately after loading. Finished Product Handling, transfer of pellets to the Pellet Loadout Bins, and the truck loadout operations are all controlled by the Finished Product Handling baghouse (CD-FPH-BF).

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)	☐ Manuf. 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:	DATE MANUFACTURED:
2013	
MANUFACTURER / MODEL NO.:	
Agra 1200 Pellet Storage	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR

IS THIS SOURCE SUBJECT ☐ NSPS (SUBPARTS?): ☐ NESHAP (SUBPARTS?):

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%** MAR-MAY **25%** JUN-AUG **25%** SEP-NOV **25%**

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 EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)							
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							

See Emission Calculations in Appendix D

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

N/A

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS 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.

)MPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOUR

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-FPH**
Finished Product Handling	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 CAPACITY	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Wood Pellets	**ODT/yr**	**781,255**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B6
EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

EMISSION SOURCE DESCRIPTION: **Twelve Pellet Loadout Bins**	EMISSION SOURCE ID NO: **ES-PB-1 through ES-PB-12**
	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 into trucks in one of two pellet loadout areas.

MATERIAL STORED: **Pellet Product**				DENSITY OF MATERIAL (LB/FT3): **40**	
CAPACITY	CUBIC FEET: **2,200**			TONS:	
DIMENSIONS (FEET)	HEIGHT:	DIAMETER: **12**	***(OR)***	LENGTH: WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY **781255 ODT/yr**	

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

NO. FILL TUBES:
MAXIMUM ACFM: **750 each**

MATERIAL IS UNLOADED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-PL-1 and ES-PL-2**
Pellet Loadout 1 and 2	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 one of two pellet loadout areas.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Wood Pellets	**ODT/yr**	**781,255**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

CONTROL DEVICE ID NO: **CD-FPH-BF**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-FPH, ES-PB-1 through ES-PB-12, ES-PL-1 and ES-PL-2**
EMISSION POINT (STACK) ID NO(S): **EP-13**	POSITION IN SERIES OF CONTROLS NO. **1** OF **1** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:
The baghouse is utilized to control PM emissions from the finished product handling conveyors and screens, as well as the pellet loadout operation consisting of loading finished product from the Pellet Loadout Bins into trucks.

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.0** %	**~99.0** %	**~99.0** %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See Emission Calculations in Appendix D**			

PRESSURE DROP (IN H_20): MIN: MAX: **6"** GAUGE? ☑ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-05**	INLET TEMPERATURE (^oF): MIN	MAX **120**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN	MAX **100**
INLET AIR FLOW RATE (ACFM): **35,500**	FILTER OPERATING TEMP (^oF): **N/A**	
NO. OF COMPARTMENTS: **1**	NO. OF BAGS PER COMPARTMENT: **1**	LENGTH OF BAG (IN.): **144**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **5.75**
TOTAL FILTER SURFACE AREA (FT^2): **4,842**	AIR TO CLOTH RATIO: **7.30**	
DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE	FILTER MATERIAL: ☐ WOVEN ☑ FELTED	

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

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

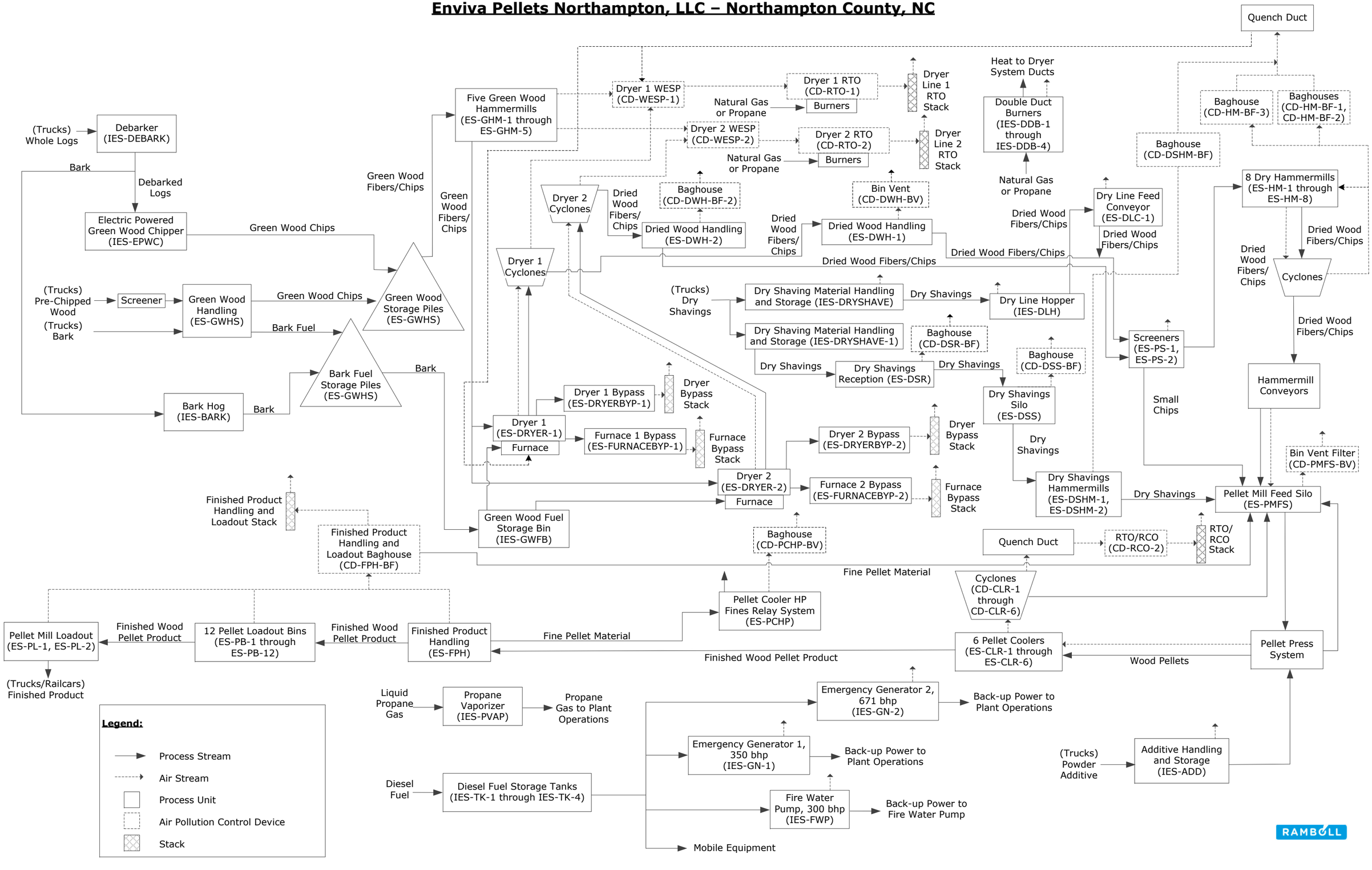
ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

COMMENTS:

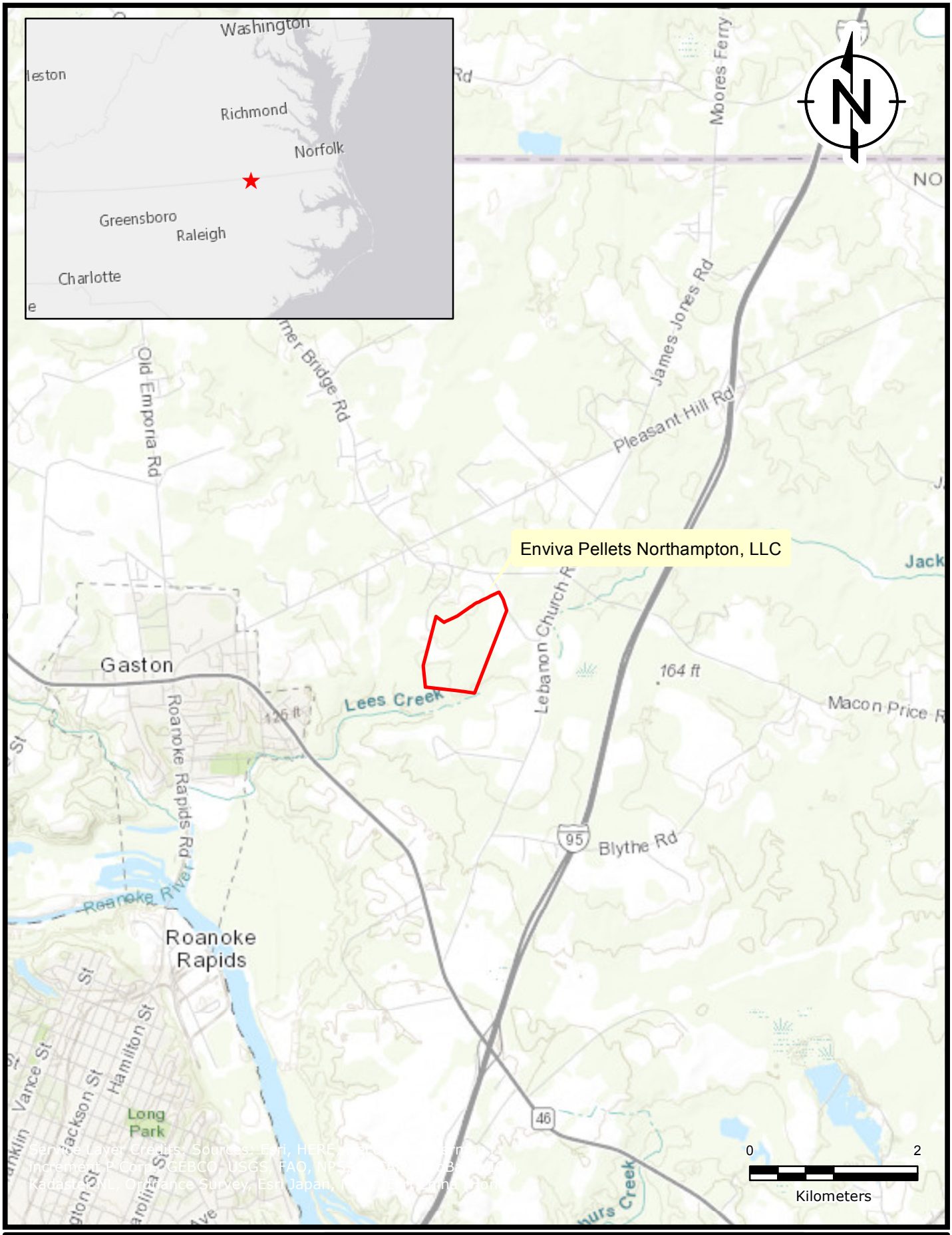
Attach Additional Sheets As Necessary

APPENDIX B
PROCESS FLOW DIAGRAM

Appendix B - Process Flow Diagram
Enviva Pellets Northampton, LLC – Northampton County, NC



APPENDIX C
AREA MAP



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Site Location Map
Enviva Pellets Northampton, LLC
Garysburg, Northampton County, North Carolina

FIGURE
1

DRAFTED BY: ARJ | DATE: 9/11/2018 | PROJECT: 1690009489

APPENDIX D
POTENTIAL EMISSIONS CALCULATIONS

Table 1
Facility-wide Criteria and CO_2e Emissions Summary
Enviva Pellets Northampton, LLC

Emission Unit ID	Source Description	Control Device ID	Control Device Description	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	Total VOC (tpy)	CO_{2e} (tpy)
ES-GHM-1 through ES-GHM-5	Green Hammermills 1 through 5	CD-WESP-1; CD-RTO-1	WESP; RTO	157.0	195.7	67.9	67.9	67.1	38.9	38.7	364,960
ES-DRYER-1[1]	Dryer #1										
ES-HM-1 through ES-HM-8	Dry Hammermills 1 through 8	CD-HM-CYC-1 through 8; CD-HM-BF-1 through 3; CD-WESP-1; CD-RTO-1	Cyclones; Baghouses; WESP; RTO								
ES-DSHM-1 and ES-DSHM-2	Dry Shavings Hammermills 1 and 2	CD-DSHM-BF; CD-WESP-1; CD-RTO-1	Baghouse; WESP; RTO								
ES-DRYER-2[1]	Dryer #2	CD-WESP-2; CD-RTO-2	WESP; RTO								
ES-FURNACEBYP-1	Furnace #1 Bypass	--	--	1.89	0.69	1.82	1.63	1.41	0.079	0.054	662
IES-DDB-1 and -2	Dryer #1 Double Duct Burners	--	--	1.80	1.56	0.17	0.17	0.17	0.013	0.24	3,048
ES-FURNACEBYP-2	Furnace #2 Bypass	--	--	1.91	0.70	1.83	1.64	1.42	0.079	0.054	665
IES-DDB-3 and -4	Dryer #2 Double Duct Burners	--	--	1.80	1.56	0.17	0.17	0.17	0.013	0.24	3,048
IES-PVAP	Propane Vaporizer	--	--	0.36	0.62	0.034	0.034	0.034	0.0026	0.048	610
ES-CLR-1 through ES-CLR-6	Pellet Coolers 1 through 6	CD-CLR-1 through CD-CLR-6; CD-RCO-2	Simple Cyclones; RCO/RTO	5.31	8.72	38.9	10.5	1.65	0.032	28.2	9,852
ES-DWH-1[4]	Dried Wood Handling 1	CD-DWH-BV	Passive Bin Vent	--	--	0.53	0.45	0.39	--	48.5	--
ES-DWH-2[4]	Dried Wood Handling 2	CD-DWH-BF-2	Baghouse								
ES-PS-1 and -2	Dry Hammermill Prescreeners 1 and 2	--	--	--	--	0.24	0.11	0.017	--	--	--
ES-PCHP	Pellet Cooler HP Fines Relay System	CD-PCHP-BV	Baghouse	--	--	0.54	0.54	0.54	--	--	--
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BV	Baghouse	--	--	0.38	0.38	0.38	--	--	--
ES-FPH; ES-PB-1 through ES-PB-12; ES-PL-1 and ES-PL-2	Finished Product Handling; Twelve Pellet Loadout Bins; Pellet Mill Loadout 1 and 2	CD-FPH-BF	Baghouse	--	--	5.33	4.85	2.13	--	--	--
IES-ADD	Additive Handling and Storage	--	--	--	--	0.26	0.12	0.018	--	--	--
IES-DLH	Dry Line Hopper	--	--	--	--	0.01	0.003	0.001	--	--	--
ES-DLC-1	Dry Line Feed Conveyor	--	--	--	--	0.01	0.003	0.001	--	--	--
IES-DRYSHAVE	Dry Shaving Material Handling and Storage	--	--	--	--	0.44	0.22	0.033	--	0.19	--
ES-DSS	Dry Shavings Silo	CD-DSS-BF	Baghouse	--	--	0.08	0.08	0.08	--	--	--
ES-DSR	Dry Shavings Reception	CD-DSR-BF	Baghouse	--	--	0.38	0.38	0.38	--	--	--
ES-GWHS	Green Wood Handling and Storage	--	--	--	--	16.3	8.17	1.23	--	8.30	--
IES-EPWC	Electric Powered Green Wood Chipper	--	--	--	--	--	--	--	--	1.95	--
IES-BARK	Bark Hog	--	--	--	--	0.47	0.26	--	--	0.59	--
IES-DEBARK	Debarker	--	--	--	--	1.56	0.86	--	--	--	--
IES-GWFB[2]	Green Wood Fuel Bin	--	--	--	--	--	--	--	--	--	--
IES-GN-1	Emergency Generator 1	--	--	0.50	0.58	0.029	0.029	0.029	0.0010	0.0015	100
IES-GN-2	Emergency Generator 2	--	--	0.14	2.46	0.0078	0.0078	0.0078	0.0018	1.68	192
IES-FWP	Fire Water Pump	--	--	0.43	0.49	0.025	0.025	0.025	8.16E-04	0.0013	85.9
IES-TK-1	Diesel Storage Tank for Emergency Generator #1	--	--	--	--	--	--	--	--	5.75E-04	--
IES-TK-2	Diesel Storage Tank for Fire Water Pump	--	--	--	--	--	--	--	--	1.60E-04	--
IES-TK-3	Mobile Fuel Diesel Storage Tank	--	--	--	--	--	--	--	--	0.0033	--
IES-TK-4	Diesel Storage Tank for Emergency Generator #2	--	--	--	--	--	--	--	--	5.75E-04	--
--	Haul Road Emissions	--	--	--	--	43.3	11.4	0.92	--	--	--
			Total Emissions:	**171.2**	**213.0**	**180.8**	**109.9**	**78.1**	**39.1**	**128.8**	**383,222**
			Total Excluding Fugitives[3]:	**171.2**	**213.0**	**120.3**	**89.7**	**75.6**	**39.1**	**120.3**	**383,222**
			PSD Major Source Threshold:	**250**	**250**	**250**	**250**	**250**	**250**	**250**	**--**
			Major Source?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**--**

Notes:

1. Each dryer line is routed to a separate RTO (CD-RTO-1 and CD-RTO-2). Although dryer line 1 and dryer line 2 are capable of processing up to 537,625 ODT/yr and 620,000 ODT/yr, respectively, the combined throughput of both dryers will not exceed 781,255 ODT/yr. In order to provide Enviva with the flexibility to use either dryer line up to its individual capacity, the total emissions from the two RTO's are based on the total facility throughput and are calculated as follows:
   - Where individual dryer emissions were calculated based on throughput (i.e. lb/ODT), the total emissions are estimated based on the total throughput of 781,255 ODT/yr, plus the emissions from the green hammermills.
   - Where individual dryer emissions were calculated based on fuel use (i.e. lb/MMBtu or lb/MMscf) or hourly test/vendor data (i.e., lb/hr), the total emissions are conservatively set equal to the sum of the emissions from the two dryer lines plus the emissions from the green hammermills assuming both dryer lines operate 8,760 hrs/yr.
2. Bark is transferred from the raw wood chip storage pile by walking floor to covered conveyors which transfer the material into the fully enclosed Green Wood Fuel Storage Bin. There are no emissions expected from transfer of material into the bin.
3. Fugitive emissions are not included in comparison against the major source threshold because the facility is not on the list of 28 source categories in 40 CFR 52.21.
4. As total VOC emissions are based on throughput, the calculated VOC emissions represent the total emissions from Dried Wood Handling 1 and 2 (ES-DWH-1 and ES-DWH-2).

Table 2
Facility-Wide HAP Emissions Summary
Enviva Pellets Northampton, LLC

Description	HAP	CD-RTO-1 and CD-RTO-2 [1] (tpy)	ES-FURNACE BYP-1 (tpy)	IES-DDB-1 and -2 (tpy)	ES-FURNACE BYP-2 (tpy)	IES-DDB-3 and -4 (tpy)	IES-PVAP (tpy)	CD-RCO-2 (tpy)	ES-DWH-1 and -2 (tpy)	IES-GN-1 (tpy)	IES-GN-2 (tpy)	IES-FWP (tpy)	IES-EPWC (tpy)	IES-BARK (tpy)	Total (tpy)	Major Source?
Acetaldehyde	Y	1.82E+00	2.62E-03	3.26E-07	2.64E-03	3.26E-07	-	4.92E-01	-	4.70E-04	2.96E-05	4.03E-04	-	-	2.32E+00	No
Acrolein	Y	1.34E+00	1.26E-02	3.86E-07	1.27E-02	3.86E-07	-	9.75E-01	-	5.67E-05	9.25E-06	4.86E-05	-	-	2.34E+00	No
Formaldehyde	Y	1.87E+00	1.39E-02	3.29E-02	1.40E-02	3.29E-02	6.57E-03	2.03E-01	3.28E-01	7.23E-04	9.26E-05	6.20E-04	-	-	2.50E+00	No
Methanol	Y	1.48E+00	-	-	-	-	-	4.14E-01	7.62E-01	-	-	-	3.91E-01	1.17E-01	3.16E+00	No
Phenol	Y	6.43E-01	1.61E-04	-	1.62E-04	-	-	4.92E-01	-	-	-	-	-	-	1.14E+00	No
Propionaldehyde	Y	5.47E-01	1.93E-04	-	1.94E-04	-	-	2.85E-01	8.20E-02	-	-	-	-	-	9.14E-01	No
Acetophenone	Y	1.24E-07	1.01E-08	-	1.02E-08	-	-	-	-	-	-	-	-	-	1.45E-07	No
Ammonia	N	6.82E-01	-	6.87E-02	-	6.87E-02	-	1.70E-01	-	-	-	-	-	-	9.89E-01	No
Antimony and compounds	Y	8.91E-04	2.49E-05	-	2.51E-05	-	-	-	-	-	-	-	-	-	9.41E-04	No
Arsenic	Y	2.52E-03	6.95E-05	4.29E-06	6.99E-05	4.29E-06	-	1.06E-05	-	-	-	-	-	-	2.68E-03	No
Benzene	Y	3.18E-01	-	1.55E-02	-	1.55E-02	3.11E-03	3.86E-02	-	5.71E-04	9.11E-04	4.90E-04	-	-	3.92E-01	No
Benzo(a)pyrene	Y	1.01E-04	8.21E-06	2.58E-08	8.26E-06	2.58E-08	-	6.39E-08	-	2.39E-05	3.02E-07	9.87E-08	-	-	1.42E-04	No
Beryllium	Y	1.27E-04	3.47E-06	2.58E-07	3.49E-06	2.58E-07	-	6.39E-07	-	-	-	-	-	-	1.35E-04	No
1,3-Butadiene	Y	-	-	-	-	-	-	-	-	2.39E-05	-	2.05E-05	-	-	4.45E-05	No
Cadmium	Y	6.97E-04	1.29E-05	2.36E-05	1.30E-05	2.36E-05	-	5.86E-05	-	-	-	-	-	-	8.29E-04	No
Carbon tetrachloride	Y	1.75E-03	1.42E-04	-	1.43E-04	-	-	-	-	-	-	-	-	-	2.04E-03	No
Chlorine	Y	1.23E+00	2.49E-03	-	2.51E-03	-	-	-	-	-	-	-	-	-	1.23E+00	No
Chlorobenzene	Y	1.28E-03	1.04E-04	-	1.05E-04	-	-	-	-	-	-	-	-	-	1.49E-03	No
Chloroform	Y	1.09E-03	-	-	-	-	-	-	-	-	-	-	-	-	1.09E-03	No
Chromium VI	Y	6.93E-04	-	3.01E-05	-	3.01E-05	-	7.45E-05	-	-	-	-	-	-	8.28E-04	No
Chromium–Other compounds	Y	1.97E-03	6.63E-05	-	6.67E-05	-	-	-	-	-	-	-	-	-	2.11E-03	No
Cobalt compounds	Y	7.33E-04	2.05E-05	-	2.06E-05	-	-	4.47E-06	-	-	-	-	-	-	7.79E-04	No
Dichlorobenzene	Y	2.56E-04	-	2.58E-05	-	2.58E-05	-	6.39E-05	-	-	-	-	-	-	3.71E-04	No
Dichloroethane, 1,2-	Y	1.13E-03	9.16E-05	-	9.21E-05	-	-	-	-	-	-	-	-	-	1.31E-03	No
Dichloropropane, 1,2-	Y	1.28E-03	1.04E-04	-	1.05E-04	-	-	-	-	-	-	-	-	-	1.49E-03	No
Dinitrophenol, 2,4-	Y	7.00E-06	5.68E-07	-	5.72E-07	-	-	-	-	-	-	-	-	-	8.14E-06	No
Di(2-ethylhexyl)phthalate	Y	1.83E-06	3.09E-08	-	3.17E-08	-	-	-	-	-	-	-	-	-	1.89E-06	No
Ethyl benzene	Y	1.21E-03	9.79E-05	-	9.84E-05	-	-	-	-	-	-	-	-	-	1.40E-03	No
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	N	6.96E-10	-	-	-	-	-	-	-	-	-	-	-	-	6.96E-10	No
Hexane	Y	3.83E-01	-	3.86E-02	-	3.86E-02	-	9.58E-02	-	-	-	-	-	-	5.57E-01	No
Indeno(1,2,3-cd)pyrene	Y	3.83E-07	-	3.86E-08	-	3.86E-08	-	9.58E-08	-	-	-	-	-	-	5.57E-07	No
Hydrochloric acid	Y	2.96E+00	6.00E-02	-	6.03E-02	-	-	-	-	-	-	-	-	-	3.08E+00	No
Lead	Y	5.52E-03	-	1.07E-05	-	1.07E-05	-	2.66E-05	-	-	-	-	-	-	5.57E-03	No
Manganese	Y	1.81E-01	5.05E-03	8.16E-06	5.08E-03	8.16E-06	-	2.02E-05	-	-	-	-	-	-	1.91E-01	No
Mercury	Y	4.50E-04	1.11E-05	5.58E-06	1.11E-05	5.58E-06	-	1.38E-05	-	-	-	-	-	-	4.97E-04	No
Methyl bromide	Y	5.84E-04	4.74E-05	-	4.76E-05	-	-	-	-	-	-	-	-	-	6.79E-04	No
Methyl chloride	Y	8.95E-04	7.26E-05	-	7.30E-05	-	-	-	-	-	-	-	-	-	1.04E-03	No
Methyl ethyl ketone	N	2.10E-04	-	-	-	-	-	-	-	-	-	-	-	-	2.10E-04	No
3-Methylchloranthrene	Y	3.83E-07	-	3.86E-08	-	3.86E-08	-	9.58E-08	-	-	-	-	-	-	5.57E-07	No
Methylene chloride	Y	1.13E-02	-	-	-	-	-	-	-	-	-	-	-	-	1.13E-02	No
Naphthalene	Y	3.91E-03	3.06E-04	1.31E-05	3.08E-04	1.31E-05	-	3.25E-05	-	-	1.53E-04	-	-	-	4.73E-03	No
Nickel	Y	4.17E-03	1.04E-04	4.51E-05	1.05E-04	4.51E-05	-	1.12E-04	-	-	-	-	-	-	4.58E-03	No
Nitrophenol, 4-	Y	4.28E-06	3.47E-07	-	3.49E-07	-	-	-	-	-	-	-	-	-	4.98E-06	No
Pentachlorophenol	Y	1.98E-06	1.61E-07	-	1.62E-07	-	-	-	-	-	-	-	-	-	2.31E-06	No
Perchloroethylene	Y	1.48E-03	1.20E-04	-	1.21E-04	-	-	-	-	-	-	-	-	-	1.72E-03	No
Phosphorus metal, yellow or white	Y	3.05E-03	8.52E-05	-	8.57E-05	-	-	-	-	-	-	-	-	-	3.22E-03	No
Polychlorinated biphenyls	Y	3.17E-07	2.57E-08	-	2.59E-08	-	-	-	-	-	-	-	-	-	3.69E-07	No
Polycyclic Organic Matter	Y	1.36E-02	3.95E-04	8.76E-04	3.97E-04	8.76E-04	1.75E-04	2.17E-03	-	1.03E-04	2.49E-04	8.82E-05	-	-	1.89E-02	No
Selenium compounds	Y	3.21E-04	8.84E-06	5.15E-07	8.89E-06	5.15E-07	-	1.28E-06	-	-	-	-	-	-	3.41E-04	No
Styrene	Y	7.39E-02	-	-	-	-	-	-	-	-	-	-	-	-	7.39E-02	No
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	3.35E-10	2.72E-11	-	2.73E-11	-	-	-	-	-	-	-	-	-	3.89E-10	No
Toluene	Y	1.89E-03	-	7.30E-05	-	7.30E-05	-	1.81E-04	-	2.51E-04	3.30E-04	2.15E-04	-	-	3.01E-03	No
Trichloroethane, 1,1,1-	Y	1.21E-03	9.79E-05	-	9.84E-05	-	-	-	-	-	-	-	-	-	1.40E-03	No
Trichloroethylene	Y	1.17E-03	1.97E-05	-	2.03E-05	-	-	-	-	-	-	-	-	-	1.21E-03	No
Trichlorofluoromethane	N	1.60E-03	-	-	-	-	-	-	-	-	-	-	-	-	1.60E-03	No
Trichlorophenol, 2,4,6-	Y	8.56E-07	6.95E-08	-	6.99E-08	-	-	-	-	-	-	-	-	-	9.95E-07	No
Vinyl chloride	Y	7.00E-04	5.68E-05	-	5.72E-05	-	-	-	-	-	-	-	-	-	8.14E-04	No
Xylene	Y	9.73E-04	-	-	-	-	-	-	-	1.75E-04	2.26E-04	1.50E-04	-	-	1.52E-03	No
TOTAL HAP		**12.9**	**0.099**	**0.088**	**0.099**	**0.088**	**0.010**	**3.00**	**1.17**	**0.0024**	**0.0018**	**0.0020**	**0.39**	**0.12**	**18.0**	No

Notes:

[1] Each dryer line is routed to a separate RTO (CD-RTO-1 and CD-RTO-2). Although dryer line 1 and dryer line 2 are capable of processing up to 537,625 ODT/yr and 620,000 ODT/yr, respectively, the combined throughput of both dryers will not exceed 781,255 ODT/yr. In order to provide Enviva with the flexibility to use either dryer line up to its individual capacity, the total emissions from the two RTO's are based on the total facility throughput and are calculated as follows:
- Where individual dryer emissions were calculated based on throughput (i.e. lb/ODT), the total emissions are estimated based on the total throughput of 781,255 ODT/yr, plus the emissions from the green hammermills.
- Where individual dryer emissions were calculated based on fuel use (i.e. lb/MMBtu or lb/MMscf) or hourly test/vendor data (i.e., lb/hr), the total emissions are conservatively set equal to the sum of the emissions from the two dryer lines plus the emissions from the green hammermills assuming both dryer lines operate 8,760 hrs/yr.

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Table 3
Potential Emissions Summary

Description: Potential emissions for the RTOs include the sum of emissions from the dryer/furnace (ES-DRYER-1), Green Hammermills, Dry Hammermills, and Dry Shavings Hammermills as estimated in Tables 3a through 3d, 4a, and 4b. This includes combustion emissions from fuel and vent gases, particulate emissions, VOC, and HAPs.

Summary of Potential Emissions for CD-RTO-1 and CD-RTO-2

Pollutant	Max (lb/hr)	Annual (tpy)
CO	33.11	157.04
NOx	44.79	195.68
SO_2	8.88	38.91
PM	15.51	67.93
PM_{10}	15.51	67.93
$PM_{2.5}$	15.32	67.12
VOC	9.92	38.75
Acetaldehyde	4.09E-01	1.82E+00
Acrolein	3.24E-01	1.34E+00
Formaldehyde	4.17E-01	1.87E+00
Methanol	1.70E-01	1.48E+00
Phenol	2.93E-02	6.43E-01
Propionaldehyde	5.78E-02	5.47E-01
Acetophenone	2.84E-08	1.24E-07
Ammonia	1.56E-01	6.82E-01
Antimony and compounds	2.03E-04	8.91E-04
Arsenic	5.76E-04	2.52E-03
Benzene	7.25E-02	3.18E-01
Benzo(a)pyrene	2.32E-05	1.01E-04
Beryllium	2.89E-05	1.27E-04
Cadmium	1.59E-04	6.97E-04
Carbon tetrachloride	4.00E-04	1.75E-03
Chlorine	2.81E-01	1.23E+00
Chlorobenzene	2.93E-04	1.28E-03
Chloroform	2.49E-04	1.09E-03
Chromium VI	1.58E-04	6.93E-04
Chromium–Other compounds	4.51E-04	1.97E-03
Cobalt compounds	1.67E-04	7.33E-04
Dichlorobenzene	5.84E-05	2.56E-04
Dichloroethane, 1,2-	2.58E-04	1.13E-03
Dichloropropane, 1,2-	2.93E-04	1.28E-03
Dinitrophenol, 2,4-	1.60E-06	7.00E-06
Di(2-ethylhexyl)phthalate	4.17E-07	1.83E-06
Ethyl benzene	2.75E-04	1.21E-03

Summary of Potential Emissions for CD-RTO-1 and CD-RTO-2

Pollutant	Max (lb/hr)	Annual (tpy)
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	1.59E-10	6.96E-10
Hexane	8.75E-02	3.83E-01
Indeno(1,2,3-cd)pyrene	8.75E-08	3.83E-07
Hydrochloric acid	6.75E-01	2.96E+00
Lead	1.26E-03	5.52E-03
Manganese	4.12E-02	1.81E-01
Mercury	1.03E-04	4.50E-04
Methyl bromide	1.33E-04	5.84E-04
Methyl chloride	2.04E-04	8.95E-04
Methyl ethyl ketone	4.80E-05	2.10E-04
3-Methylchloranthrene	8.75E-08	3.83E-07
Methylene chloride	2.58E-03	1.13E-02
Naphthalene	8.91E-04	3.91E-03
Nickel	9.52E-04	4.17E-03
Nitrophenol, 4-	9.77E-07	4.28E-06
Pentachlorophenol	4.53E-07	1.98E-06
Perchloroethylene	3.38E-04	1.48E-03
Phosphorus metal, yellow or white	6.95E-04	3.05E-03
Polychlorinated biphenyls	7.24E-08	3.17E-07
Polycyclic Organic Matter	3.09E-03	1.36E-02
Selenium compounds	7.33E-05	3.21E-04
Styrene	1.69E-02	7.39E-02
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	7.64E-11	3.35E-10
Toluene	4.32E-04	1.89E-03
Trichloroethane, 1,1,1-	2.75E-04	1.21E-03
Trichloroethylene	2.66E-04	1.17E-03
Trichlorofluoromethane	3.64E-04	1.60E-03
Trichlorophenol, 2,4,6-	1.95E-07	8.56E-07
Vinyl chloride	1.60E-04	7.00E-04
Xylene	2.22E-04	9.73E-04

Table 3a
Potential Criteria Emissons
Dryer #1 (ES-DRYER-1, CD-WESP-1, CD-RTO-1)
Enviva Pellets Northampton, LLC

Calculation Basis

Annual Dried Wood Throughput[1]	781,255	ODT/year
Max. Hourly Dried Wood Throughput of Dryer	71.71	ODT/hr
Burner Heat Input	175.3	MMBtu/hr
Percent Hardwood	20.0%	
Percent Softwood	80.0%	
Annual Operation	8,760	hr/yr
Annual Heat Input	1,535,628	MMBtu/yr
Number of RTO Burners	4	
RTO Burner Rating	6.2	MMBtu/hr
RTO Control Efficiency	97.50%	

Potential Criteria Emissions

Pollutant	Biomass Emission Factor	Units	Emission Factor Source	Uncontrolled Emissions		Controlled Emissions	
				Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)
CO	0.4	lb/ODT	Note 2	--	--	28.68	156.3
NO_X	22.23	lb/hr	Note 2	--	--	22.23	97.4
$PM/PM_{10}/PM_{2.5}$ (Filterable + Condensable)	7.6	lb/hr	Note 4	--	--	7.60	33.3
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6[3]	--	--	4.38	19.2
Total VOC (as propane)	2.64	lb/ODT	Note 5	189.31	1031.3	4.73	25.8

Notes:

[1] Annual dried wood throughput is based on total facility production. Although dryer line 1 and dryer line 2 are capable of processing up to 537,625 ODT/yr and 620,000 ODT/yr, respectively, the combined throughput of both dryers will not exceed 781,255 ODT/yr. In order to to provide Enviva with the flexibility to use either dryer line up to its individual capacity, the total emissions from the two dryer lines are based on the total facility throughput and calculated as follows:
- Where individual dryer emissions are calculated based on throughput (i.e. lb/ODT), the total emissions are estimated based on the total throughput of 781,255 ODT/yr.
- Where individual dryer emissions are calculated based on fuel use (i.e. lb/MMBtu or lb/MMscf) or hourly test/vendor data (i.e., lb/hr), the total emissions are conservatively set equal to the sum of the emissions from the two dryer lines assuming both dryer lines operate 8,760 hrs/yr.
- The total furnace heat input is listed as 175.3 MMBtu/hr. This is equal to the sum of 155.3 MMBtu/hr from the grate and 2 additional 10 MMBtu/hr dust burners which have been permitted but not installed.

[2] Emissions based on process knowledge and/or information from NCASI database and includes appropriate contingency based on engineering judgement.

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

[4] Particulate emission factor is based on process knowledge and an appropriate contingency based on engineering judgement.

[5] VOC emission factor based on process knowledge and an appropriate contingency based on engineering judgement. Factor represents uncontrolled emissions.

Abbreviations:

hr - hour
lb - pound
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NO_X - nitrogen oxides
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

References:

U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98.
U.S. EPA. AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.

Table 3bi
Potential VOC Emissons
Green Hammermills (ES-GHM-1 through ES-GHM-5, CD-WESP-1, CD-RTO-1 or CD-WESP-2, CD-RTO-2)
Enviva Pellets Northampton, LLC

Calculation Basis

Hourly Throughput[1]	150.0 ODT/hr
Annual Throughput	781,255 ODT/yr
Hours of Operation	8,760 hr/yr
RTO Control Efficiency	97.50%

Potential VOC Emissions

Pollutant	CAS No.	HAP	NC TAP	VOC	Emission Factor[2]	Potential Emissions[3]	
					(lb/ODT)	Max (lb/hr)	Annual (tpy)
Acetaldehyde	75-07-0	Y	Y	Y	8.4E-03	0.032	0.082
Acrolein	107-02-8	Y	Y	Y	1.6E-02	0.059	0.15
Formaldehyde	50-00-0	Y	Y	Y	4.8E-03	0.018	0.047
Methanol	67-56-1	Y	N	Y	3.7E-02	0.140	0.36
Phenol	108-95-2	Y	Y	Y	4.6E-03	0.017	0.045
Propionaldehyde	123-38-6	Y	N	Y	1.2E-03	0.005	0.012
					Total TAP Emissions	0.125	0.326
					Total HAP Emissions	**0.27**	**0.70**
Total VOC (as propane)	--	N/A	N/A	Y	0.32	1.21	3.15

Notes:

1. The max hourly throughput is based on the maximum capacity for the 2 existing green hammermills ratioed up to reflect 3 additional hammermills (i.e. 119.4 tph * 5/2 * (1 - 50% moisture content) = 150 ODT/hr).
2. Emission factors based on process knowledge and an appropriate contingency based on engineering judgement. The emission factors represent uncontrolled emissions.
3. The emissions from the green hammermills will primarily be controlled by the RTO on the existing dryer line (CD-RTO-1). During periods when the existing dryer line is down, the emissions from the green hammermills will be controlled by the RTO on the new dryer line (CD-RTO-2).

Thermally Generated Potential Criteria Pollutant Emissions

Maximum high heating value of VOC constituents	0.018	MMBtu/lb
Uncontrolled VOC emissions	126	tons/yr
Uncontrolled VOC emissions	48	lb/hr
Heat input of uncontrolled VOC emissions	4,666	MMBtu/yr
Heat input of uncontrolled VOC emissions	0.9	MMBtu/hr

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	8.2E-02	lb/MMBtu[1]	0.07	0.19
NO_X	9.8E-02	lb/MMBtu[1]	0.09	0.23

Notes:

1. CO and NO_x emission factors are from AP-42, Fifth Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion, 07/98 for small boilers.

Abbreviations:

CAS - chemical abstract service
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NC - North Carolina
ODT - oven dried tons
RTO - Regenerative Thermal Oxidizer
TAP - toxic air pollutant
tph - tons per hour
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

Reference:

U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98.

Table 3bii
Potential Emissions at Outlet of RTO-1 Stack (CD-RTO-1)
Dry Hammermills (ES-HM-1 through ES-HM-8)
Enviva Pellets Northampton, LLC

Calculation Basis

Total Plant Throughput	781,255	ODT/yr
% of Total Throughput to the Hammermills	100%	
Hours of Operation	8760	hr/yr

Hammermills Annual Throughput	781,255	ODT/yr
Hammermills Hourly Throughput	144	ODT/hr
Number of RTO Burners	4	
RTO Burner Rating	6.2	MMBtu/hr
Control Efficiency[1]	97.5%	

Potential VOC and HAP Emissions

Pollutant	CAS No.	HAP	NC TAP	VOC	Emission Factor[2] (lb/ODT)	Potential Emissions[3] Max (lb/hr)	Potential Emissions[3] Annual (tpy)
Acetaldehyde	75-07-0	Y	Y	Y	0.0073	0.026	0.071
Acrolein	107-02-8	Y	Y	Y	0.0092	0.033	0.090
Formaldehyde	50-00-0	Y	Y	Y	0.0071	0.026	0.069
Methanol	67-56-1	Y	N	Y	0.0071	0.026	0.069
Phenol	108-95-2	Y	Y	Y	0.0028	0.010	0.027
Propionaldehyde	123-38-6	Y	N	Y	0.012	0.045	0.12
					Total HAP Emissions	**0.17**	**0.45**
					Total TAP Emissions	**0.10**	**0.26**
Total VOC (as propane)	--		--	Y	0.77	2.75	7.47

Notes:

1. A 97.5% control efficiency is applied to the potential emissions for the RTO.
2. Emission factors based on process knowledge and an appropriate contingency based on engineering judgement. The emission factors represent uncontrolled emissions.
3. The emissions from the dry hammermills will be routed to the Dryer 1 Furnace, Dryer 1 WESP, or a combination of the two then controlled by the RTO on the existing dryer line (CD-RTO-1).

Thermally Generated Potential Criteria Pollutant Emissions

Maximum high heating value of VOC constituents	0.018	MMBtu/lb
Uncontrolled VOC emissions	299	tons/yr
Uncontrolled VOC emissions	110	lb/hr
Heat input of uncontrolled VOC emissions	11,054	MMBtu/yr
Heat input of uncontrolled VOC emissions	2	MMBtu/hr

Pollutant	Emission Factor[1]	Units	Potential Emissions Max (lb/hr)	Potential Emissions Annual (tpy)
CO	0.082	lb/MMBtu	0.17	0.46
NO_X	0.098	lb/MMBtu	0.20	0.54

Notes:

1. Emission factor for CO and NOx from AP-42, Section 1.4 - Natural Gas Combustion, 07/98. Emission factors converted from lb/MMscf to lb/MMBtu based on assumed heating value of 1,020 Btu/scf for natural gas per AP-42 Section 1.4.

Abbreviations:

CAS - chemical abstract service
CO - carbon monoxide
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NC - North Carolina
NO_X - nitrogen oxides
ODT - oven dried tons
RTO - Regenerative Thermal Oxidizer
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

References:

U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98.

Table 3biii
Potential Emissions at Outlet of RTO-1 Stack (CD-RTO-1)
Dry Shavings Hammermills (ES-DSHM-1 and -2)
Enviva Pellets Northampton, LLC

Calculation Basis

Hammermills Hourly Throughput	28	ODT/hr
Hammermills Annual Throughput	245,000	ODT/yr
RTO Control Efficiency[1]	97.5%	

Potential PM, VOC, and HAP Emissions

Pollutant	CAS No.	HAP	NC TAP	VOC	Emission Factor[2] (lb/ODT)	Potential Emissions[3] Max (lb/hr)	Potential Emissions[3] Annual (tpy)
Acetaldehyde	75-07-0	Y	Y	Y	0.0073	0.0051	0.022
Acrolein	107-02-8	Y	Y	Y	0.0092	0.0064	0.028
Formaldehyde	50-00-0	Y	Y	Y	0.0071	0.0050	0.022
Methanol	67-56-1	Y	N	Y	0.0071	0.0050	0.022
Phenol	108-95-2	Y	Y	Y	0.0028	0.0020	0.009
Propionaldehyde	123-38-6	Y	N	Y	0.0124	0.0087	0.038
					Total HAP Emissions	**0.032**	**0.14**
					Total TAP Emissions	**0.018**	**0.081**
Total VOC (as propane)	--		--	Y	0.765	0.53	2.34

Notes:

1. A 97.5% control efficiency is applied to the potential emissions for the RTO.
2. Emission factors based on process knowledge and an appropriate contingency based on engineering judgement. The emission factors represent uncontrolled emissions.
3. The emissions from the two dry shavings hammermills will be routed to the Dryer 1 Furnace, Dryer 1 WESP, or a combination of the two then controlled by the RTO on the existing dryer line (CD-RTO-1).

Thermally Generated Potential Criteria Pollutant Emissions

Maximum high heating value of VOC constituents	0.018	MMBtu/lb
Uncontrolled VOC emissions	94	tons/yr
Uncontrolled VOC emissions	21	lb/hr
Heat input of uncontrolled VOC emissions	3,467	MMBtu/yr
Heat input of uncontrolled VOC emissions	0.40	MMBtu/hr

Pollutant	Emission Factor[1]	Units	Potential Emissions Max (lb/hr)	Potential Emissions Annual (tpy)
CO	0.082	lb/MMBtu	0.033	0.14
NO_X	0.098	lb/MMBtu	0.039	0.17

Notes:

1. Emission factor for CO and NOx from AP-42, Section 1.4 - Natural Gas Combustion, 07/98. Emission factors converted from lb/MMscf to lb/MMBtu based on assumed heating value of 1,020 Btu/scf for natural gas per AP-42 Section 1.4.

Abbreviations:

CAS - chemical abstract service
CO - carbon monoxide
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NC - North Carolina
NO_X - nitrogen oxides
ODT - oven dried tons
RTO - Regenerative Thermal Oxidizer
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

References:

U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98.

Table 3c
Potential HAP and TAP Emissions
Dryer #1 (ES-DRYER-1, CD-WESP-1, CD-RTO-1)
Enviva Pellets Northampton, LLC

Calculation Basis

Annual Dried Wood Throughput[10]	781,255 ODT/year
Max. Hourly Dried Wood Throughput of Dryer	71.71 ODT/hr
Burner Heat Input	175.3 MMBtu/hr
Percent Hardwood	20.0%
Percent Softwood	80.0%
Annual Operation	8,760 hr/yr
Annual Heat Input	1,535,628 MMBtu/yr
Number of RTO Burners	4
RTO Burner Rating	6.2 MMBtu/hr
RTO Control Efficiency	97.50%

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Dryer Burner - Biomass Source								
Acetaldehyde	Y	Y	Y	1.7E-01	lb/ODT	1	0.30	1.64
Acrolein	Y	Y	Y	1.1E-01	lb/ODT	1	0.20	1.07
Formaldehyde	Y	Y	Y	1.4E-01	lb/ODT	1	0.26	1.40
Methanol	Y	N	Y	1.0E-01	lb/ODT	1	0.19	1.02
Phenol	Y	Y	Y	5.8E-02	lb/ODT	1	0.10	0.56
Propionaldehyde	Y	N	Y	3.9E-02	lb/ODT	1	0.07	0.38
Acetophenone	Y	N	Y	3.2E-09	lb/MMBtu	2,3	1.4E-08	6.1E-08
Antimony and compounds	Y	N	N	7.9E-06	lb/MMBtu	2,4	1.0E-04	4.4E-04
Arsenic	Y	Y	N	2.2E-05	lb/MMBtu	2,4	2.8E-04	1.2E-03
Benzene	Y	Y	Y	4.2E-03	lb/MMBtu	2,3	1.8E-02	8.1E-02
Benzo(a)pyrene	Y	Y	Y	2.6E-06	lb/MMBtu	2,3	1.1E-05	5.0E-05
Beryllium	Y	Y	N	1.1E-06	lb/MMBtu	2,4	1.4E-05	6.1E-05
Cadmium	Y	Y	N	4.1E-06	lb/MMBtu	2,4	5.2E-05	2.3E-04
Carbon tetrachloride	Y	Y	Y	4.5E-05	lb/MMBtu	2,3	2.0E-04	8.6E-04
Chlorine	Y	Y	N	7.9E-04	lb/MMBtu	2,9	1.4E-01	6.1E-01
Chlorobenzene	Y	Y	Y	3.3E-05	lb/MMBtu	2,3	1.4E-04	6.3E-04
Chloroform	Y	Y	Y	2.8E-05	lb/MMBtu	2,3	1.2E-04	5.4E-04
Chromium VI	-[5]	Y	N	3.5E-06	lb/MMBtu	2,4,5	4.4E-05	1.9E-04
Chromium–Other compounds	Y	N	N	1.8E-05	lb/MMBtu	2,4	2.2E-04	9.7E-04
Cobalt compounds	Y	N	N	6.5E-06	lb/MMBtu	2,4	8.3E-05	3.6E-04
Dichloroethane, 1,2-	Y	Y	Y	2.9E-05	lb/MMBtu	2,3	1.3E-04	5.6E-04
Dichloropropane, 1,2-	Y	N	Y	3.3E-05	lb/MMBtu	2,3	1.4E-04	6.3E-04
Dinitrophenol, 2,4-	Y	N	Y	1.8E-07	lb/MMBtu	2,3	7.9E-07	3.5E-06
Di(2-ethylhexyl)phthalate	Y	Y	Y	4.7E-08	lb/MMBtu	2,3	2.1E-07	9.0E-07
Ethyl benzene	Y	N	Y	3.1E-05	lb/MMBtu	2,3	1.4E-04	6.0E-04
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	N	Y	Y	1.8E-11	lb/MMBtu	2,3	7.8E-11	3.4E-10
Hydrochloric acid	Y	Y	N	1.9E-02	lb/MMBtu	2,6	3.3E-01	1.5E+00
Lead	Y	N	N	4.8E-05	lb/MMBtu	2,4	6.1E-04	2.7E-03
Manganese	Y	Y	N	1.6E-03	lb/MMBtu	2,4	2.0E-02	8.9E-02
Mercury	Y	Y	N	3.5E-06	lb/MMBtu	2,4	4.4E-05	1.9E-04
Methyl bromide	Y	N	Y	1.5E-05	lb/MMBtu	2,3	6.6E-05	2.9E-04
Methyl chloride	Y	N	Y	2.3E-05	lb/MMBtu	2,3	1.0E-04	4.4E-04
Methyl ethyl ketone	N	Y	Y	5.4E-06	lb/MMBtu	2,3	2.4E-05	1.0E-04
Methylene chloride	Y	Y	Y	2.9E-04	lb/MMBtu	2,3	1.3E-03	5.6E-03
Naphthalene	Y	N	Y	9.7E-05	lb/MMBtu	2,3	4.3E-04	1.9E-03
Nickel	Y	Y	N	3.3E-05	lb/MMBtu	2,4	4.2E-04	1.8E-03
Nitrophenol, 4-	Y	N	Y	1.1E-07	lb/MMBtu	2,3	4.8E-07	2.1E-06
Pentachlorophenol	Y	Y	N	5.1E-08	lb/MMBtu	2	2.2E-07	9.8E-07
Perchloroethylene	Y	Y	N	3.8E-05	lb/MMBtu	2	1.7E-04	7.3E-04
Phosphorus metal, yellow or white	Y	N	N	2.7E-05	lb/MMBtu	2,4	3.4E-04	1.5E-03
Polychlorinated biphenyls	Y	Y	Y	8.2E-09	lb/MMBtu	2,3	3.6E-08	1.6E-07
Polycyclic Organic Matter	Y	N	N	1.3E-04	lb/MMBtu	2	5.5E-04	2.4E-03
Selenium compounds	Y	N	N	2.8E-06	lb/MMBtu	2,4	3.6E-05	1.6E-04
Styrene	Y	Y	Y	1.9E-03	lb/MMBtu	2,3	8.3E-03	3.6E-02
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	Y	8.6E-12	lb/MMBtu	2,3	3.8E-11	1.7E-10
Toluene	Y	Y	Y	3.0E-05	lb/MMBtu	2,3	1.3E-04	5.8E-04
Trichloroethane, 1,1,1-	Y	Y	N	3.1E-05	lb/MMBtu	2	1.4E-04	6.0E-04
Trichloroethylene	Y	Y	Y	3.0E-05	lb/MMBtu	2,3	1.3E-04	5.8E-04
Trichlorofluoromethane	N	Y	Y	4.1E-05	lb/MMBtu	2,3	1.8E-04	7.9E-04
Trichlorophenol, 2,4,6-	Y	N	Y	2.2E-08	lb/MMBtu	2,3	9.6E-08	4.2E-07
Vinyl chloride	Y	Y	Y	1.8E-05	lb/MMBtu	2,3	7.9E-05	3.5E-04
Xylene	Y	Y	Y	2.5E-05	lb/MMBtu	2,3	1.1E-04	4.8E-04
					Total HAP Emissions (related to biomass)		**1.64**	**8.38**
					Total TAP Emissions (related to biomass)		**1.38**	**6.97**

Table 3c
Potential HAP and TAP Emissions
Dryer #1 (ES-DRYER-1, CD-WESP-1, CD-RTO-1)
Enviva Pellets Northampton, LLC

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
RTO - Natural Gas/Propane Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	7	5.8E-07	2.6E-06
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	7	4.4E-08	1.9E-07
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	7	3.9E-07	1.7E-06
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	7	4.4E-08	1.9E-07
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	7	4.4E-08	1.9E-07
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	7	3.7E-07	1.6E-06
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	7	4.4E-07	1.9E-06
Ammonia	N	Y	N	3.2	lb/MMscf	7	7.8E-02	3.4E-01
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	7	5.8E-08	2.6E-07
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	7	4.9E-06	2.1E-05
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	7	4.4E-08	1.9E-07
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	8	1.8E-02	7.7E-02
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	7	2.9E-08	1.3E-07
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	7	4.4E-08	1.9E-07
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	7	2.9E-08	1.3E-07
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	7	4.4E-08	1.9E-07
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	7	2.9E-07	1.3E-06
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	7	2.7E-05	1.2E-04
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	7	3.4E-05	1.5E-04
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	7	4.4E-08	1.9E-07
Cobalt	Y	N	N	8.4E-05	lb/MMscf	7	2.0E-06	8.9E-06
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	7	2.9E-08	1.3E-07
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	7	2.9E-05	1.3E-04
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	7	7.3E-08	3.2E-07
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	7	6.8E-08	3.0E-07
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	8	3.7E-02	1.6E-01
Hexane	Y	Y	Y	1.8	lb/MMscf	7	4.4E-02	1.9E-01
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	7	4.4E-08	1.9E-07
Lead	Y	N	N	5.0E-04	lb/MMscf	7	1.2E-05	5.3E-05
Manganese	Y	Y	N	3.8E-04	lb/MMscf	7	9.2E-06	4.0E-05
Mercury	Y	Y	N	2.6E-04	lb/MMscf	7	6.3E-06	2.8E-05
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	7	1.5E-05	6.5E-05
Nickel	Y	Y	N	2.1E-03	lb/MMscf	7	5.1E-05	2.2E-04
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	8	9.9E-04	4.3E-03
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	7	4.1E-07	1.8E-06
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	7	1.2E-07	5.3E-07
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	7	5.8E-07	2.6E-06
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	7	8.3E-05	3.6E-04
					Total HAP Emissions (related to natural gas/propane)		**0.10**	**0.44**
					Total TAP Emissions (related to natural gas/propane)		**0.16**	**0.36**

Notes:

1. Emission factors based on process knowledge and an appropriate contingency based on engineering judgement. The emission factors represent uncontrolled emissions.

2. Emission factors (criteria and HAP/TAP) for wood combustion in a stoker boiler from NCDAQ Wood Waste Combustion Spreadsheet/AP-42, Fifth Edition, Volume 1, Chapter 1.6 - Wood Residue Combustion in Boilers, 09/03.

3. The control efficiency of 97.5% for the RTO is applied to all VOC hazardous and toxic pollutants.

4. The control efficiency of the wet electrostatic precipitator (WESP) for filterable particulate matter is applied to all metal hazardous and toxic pollutants from the dryer and duct burners. Actual design filterable efficiency is estimated to 96.4%, but 92.75% is assumed for toxics permitting.

   WESP Control Efficiency for metal HAP 92.8%

5. Chromium VI is a subset of chromium compounds, which is accounted for separately as a HAP. As such, Chromium VI is only calculated as a TAP.

6. The WESP employs a caustic solution in its operation in which hydrochloric acid will have high water solubility. This caustic solution will neutralize the acid and effectively control it by 90%, per conversation on October 18, 2011 with Steven A. Jaasund, P.E. of Lundberg Associates, a manufacturer of WESPs.

   WESP HCl Control Efficiency 90.00%

7. Emission factors for natural gas combustion are from NCDAQ Natural Gas Combustion Spreadsheet and AP-42, Fifth Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion, 07/98. The emission factors for acetaldehyde, acrolein, and ammonia are cited in the NCDAQ spreadsheet as being sourced from the USEPA's WebFIRE database.

8. The RTO burners can fire either natural gas or propane; Propane is worst-case for these HAP emissions. Emission factors for propane combustion from the South Coast Air Quality Management District's Air Emissions Reporting Tool for external combustion equipment fired with LPG.

9. It was assumed that chlorine is not oxidized in the RTO.

10. Annual dried wood throughput is based on total facility production. Although dryer line 1 and dryer line 2 are capable of processing up to 537,625 ODT/yr and 620,000 ODT/yr, respectively, the combined throughput of both dryers will not exceed 781,255 ODT/yr. In order to to provide Enviva with the flexibility to use either dryer line up to its individual capacity, the total emissions from the two dryer lines are based on the total facility throughput and calculated as follows:
    - Where individual dryer emissions are calculated based on throughput (i.e. lb/ODT), the total emissions are estimated based on the total throughput of 781,255 ODT/yr.
    - Where individual dryer emissions are calculated based on fuel use (i.e. lb/MMBtu or lb/MMscf), the total emissions are conservatively set equal to the sum of the emissions from the two dryer lines assuming both dryer lines operate 8,760 hrs/yr.

Table 3c
Potential HAP and TAP Emissions
Dryer #1 (ES-DRYER-1, CD-WESP-1, CD-RTO-1)
Enviva Pellets Northampton, LLC

Abbreviations:

HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NC - North Carolina
ODT - oven dried tons
RTO - regenerative thermal oxidizer
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

References:

U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98.
U.S. EPA. AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.
South Coast Air Quality Management District. AER Reporting tool. Emission factors available in the Help and Support Manual at: http://www.aqmd.gov/home/rules-compliance/compliance/annual-emission-reporting
U.S. EPA WebFIRE database available at: https://cfpub.epa.gov/webfire/

Table 3d
Potential PM Emissions from Baghouses/Cyclones
Enviva Pellets Northampton, LLC

Emission Unit ID [1]	Source Description	Control Device ID	Control Device Description	Exhaust Flow Rate[1]	Exit Grain Loading[2]	Annual Operation	Particulate Speciation		Potential Emissions[5]					
									PM		PM_{10}		$PM_{2.5}$	
				(cfm)	(gr/cf)	(hours)	PM_{10} (% of PM)	$PM_{2.5}$ (% of PM)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)
ES-HM-1 through 3	Dry Hammermills 1 through 3	CD-HM-BF-1	One (1) existing baghouse[3]	45,000	0.004	8,760	100%	40%	0.08	0.34	0.08	0.34	0.03	0.14
ES-HM-4 through 6	Dry Hammermills 4 through 6	CD-HM-BF-2	One (1) existing baghouse[3]	45,000	0.004	8,760	100%	40%	0.08	0.34	0.08	0.34	0.03	0.14
ES-HM-7 and 8	Dry Hammermills 7 through 8	CD-HM-BF-3	One (1) existing baghouse[3]	45,000	0.004	8,760	100%	40%	0.08	0.34	0.08	0.34	0.03	0.14
ES-DSHM-1 and -2	Dry Shavings Hammermills	CD-DSHM-BF	One (1) baghouse[3]	45,000	0.004	8,760	100%	40%	0.08	0.34	0.08	0.34	0.03	0.14

Notes:

1. ES-HM-1 through 8, ES-DSHM-1 and 2, and the associated baghouses are not release points to the atmosphere. These calculations estimate the contribution of PM emissions from these units that will be emitted at CD-RTO-1.
2. Filter, Vent, and Cyclone inlet flow rate (cfm) provided by design engineering firm (Mid-South Engineering Co.). The exit flowrate was conservatively assumed to be the same as the inlet flowrate.
3. Pollutant loading provided by Aircon.
4. No speciation data is available for PM_{10}. Therefore, it is conservatively assumed to be equal to total PM. $PM_{2.5}$ speciation based on NCASI data for similar wood products sources.
5. Potential emissions assume a 95% control efficiency for Dryer Line #1 wet electrostatic precipitator (CD-WESP-1).

Abbreviations:

cf - cubic feet
cfm - cubic feet per minute
ES - Emission Sources
IES - Insignificant Emission Source
gr - grain
hr - hour
lb - pound
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
tpy - tons per year

Reference:

U.S. EPA. AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03

Table 3e
Potential Emissions
Dryer #1 Furnace Bypass (ES-FURNACEBYP-1) (Cold Start-up)[1]
Enviva Pellets Northampton, LLC

Calculation Basis

Hourly Heat Input Capacity	26.3 MMBtu/hr
Annual Heat Input Capacity	1,315 MMBtu/yr
Hours of Operation[1]	50 hr/yr

Potential Criteria Pollutant Emissions - Furnace Bypass (Cold Start-up)

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	0.60	lb/MMBtu[2]	15.8	0.39
NO_X	0.22	lb/MMBtu[2]	5.78	0.14
SO_2	0.025	lb/MMBtu[2]	0.66	0.016
VOC	0.017	lb/MMBtu[2]	0.45	0.011
Total PM	0.58	lb/MMBtu[2]	15.2	0.38
Total PM_{10}	0.52	lb/MMBtu[2]	13.6	0.34
Total $PM_{2.5}$	0.45	lb/MMBtu[2]	11.8	0.29

Notes:

1. During cold start-ups, the furnace bypass stack is used until the refractory is sufficiently heated and can sustain operations at a low level (approximately 15% of the maximum heat input rate). The furnace bypass stack is then closed, and the furnace is slowly brought up to a normal operating rate. Diesel fuel may be used as an accelerant for cold start-up. The amount used per event is typically 15 – 30 gallons and the annual usage is typically 100 – 200 gallons and emissions resulting from diesel combustion are insignificant. In the event of a planned dryer shutdown, the dryer throughput and furnace heat input are decreased. Dryer raw material input ceases, and all remaining material is moved through the system to prevent a fire. On shutdown of the dryer, the furnace operating rate quickly approaches idle state. The furnace bypass stack is not utilized during a planned shutdown until after the furnace achieves an idle state (defined as 10 MMBtu/hr or less).

2. CO, NO_X, SO_2, PM, and VOC emission rates based on AP-42, Chapter 1.6 - Wood Residue Combustion in Boilers, 09/03 for bark/bark and wet wood/wet wood-fired boilers. VOC emission factor excludes formaldehyde.

Table 3e
Potential Emissions
Dryer #1 Furnace Bypass (ES-FURNACEBYP-1) (Cold Start-up)[1]
Enviva Pellets Northampton, LLC

Potential HAP Emissions - Furnace Bypass (Cold Start-up)

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
Acetaldehyde	8.30E-04	lb/MMBtu	1	2.18E-02	5.46E-04
Acrolein	4.00E-03	lb/MMBtu	1	1.05E-01	2.63E-03
Formaldehyde	4.40E-03	lb/MMBtu	1	1.16E-01	2.89E-03
Phenol	5.10E-05	lb/MMBtu	1	1.34E-03	3.35E-05
Propionaldehyde	6.10E-05	lb/MMBtu	1	1.60E-03	4.01E-05
Acetophenone	3.2E-09	lb/MMBtu	1	8.41E-08	2.10E-09
Antimony and compounds	7.9E-06	lb/MMBtu	1	2.08E-04	5.19E-06
Arsenic	2.2E-05	lb/MMBtu	1	5.78E-04	1.45E-05
Benzo(a)pyrene	2.6E-06	lb/MMBtu	1	6.84E-05	1.71E-06
Beryllium	1.1E-06	lb/MMBtu	1	2.89E-05	7.23E-07
Cadmium	4.1E-06	lb/MMBtu	1	1.08E-04	2.70E-06
Carbon tetrachloride	4.5E-05	lb/MMBtu	1	1.18E-03	2.96E-05
Chlorine	7.9E-04	lb/MMBtu	1	2.08E-02	5.19E-04
Chlorobenzene	3.3E-05	lb/MMBtu	1	8.68E-04	2.17E-05
Chromium–Other compounds	2.1E-05	lb/MMBtu	1	5.52E-04	1.38E-05
Cobalt compounds	6.5E-06	lb/MMBtu	1	1.71E-04	4.27E-06
Dinitrophenol, 2,4-	1.8E-07	lb/MMBtu	1	4.73E-06	1.18E-07
Di(2-ethylhexyl)phthalate	4.7E-08	lb/MMBtu	1	1.24E-06	3.09E-08
Ethyl benzene	3.1E-05	lb/MMBtu	1	8.15E-04	2.04E-05
Dichloroethane, 1,2-	2.9E-05	lb/MMBtu	1	7.63E-04	1.91E-05
Hydrochloric acid	1.9E-02	lb/MMBtu	1	5.00E-01	1.25E-02
Lead	4.8E-05	lb/MMBtu	1	1.26E-03	3.16E-05
Manganese	1.6E-03	lb/MMBtu	1	4.21E-02	1.05E-03
Mercury	3.5E-06	lb/MMBtu	1	9.20E-05	2.30E-06
Methyl bromide	1.5E-05	lb/MMBtu	1	3.94E-04	9.86E-06
Methyl chloride	2.3E-05	lb/MMBtu	1	6.05E-04	1.51E-05
Trichloroethane, 1,1,1-	3.1E-05	lb/MMBtu	1	8.15E-04	2.04E-05
Naphthalene	9.7E-05	lb/MMBtu	1	2.55E-03	6.38E-05
Nickel	3.3E-05	lb/MMBtu	1	8.68E-04	2.17E-05
Nitrophenol, 4-	1.1E-07	lb/MMBtu	1	2.89E-06	7.23E-08
Pentachlorophenol	5.1E-08	lb/MMBtu	1	1.34E-06	3.35E-08
Perchloroethylene	3.8E-05	lb/MMBtu	1	9.99E-04	2.50E-05
Phosphorus metal, yellow or white	2.7E-05	lb/MMBtu	1	7.10E-04	1.77E-05
Polychlorinated biphenyls	8.2E-09	lb/MMBtu	1	2.14E-07	5.36E-09
Polycyclic Organic Matter	1.3E-04	lb/MMBtu	1	3.29E-03	8.22E-05
Dichloropropane, 1,2-	3.3E-05	lb/MMBtu	1	8.68E-04	2.17E-05
Selenium compounds	2.8E-06	lb/MMBtu	1	7.36E-05	1.84E-06
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	8.6E-12	lb/MMBtu	1	2.26E-10	5.65E-12
Trichloroethylene	3.0E-05	lb/MMBtu	1	7.89E-04	1.97E-05
Trichlorophenol, 2,4,6-	2.2E-08	lb/MMBtu	1	5.78E-07	1.45E-08
Vinyl chloride	1.8E-05	lb/MMBtu	1	4.73E-04	1.18E-05
Total HAP Emissions (Biomass Combustion)				**0.83**	**0.02**

Notes:

[1.] Emission factors for wood combustion in a stoker boiler from AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.

Abbreviations:

CO - carbon monoxide
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
NO_X - nitrogen oxides
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03

Table 3f
Potential Emissions
Dryer #1 Furnace Bypass (ES-FURNACEBYP-1) (Idle Mode)[1]
Enviva Pellets Northampton, LLC

Calculation Basis

Hourly Heat Input Capacity	10 MMBtu/hr
Annual Heat Input Capacity	5,000 MMBtu/yr
Hours of Operation[1]	500 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions per Dryer Line

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	0.60	lb/MMBtu[2]	6.00	1.50
NO_X	0.22	lb/MMBtu[2]	2.20	0.55
SO_2	0.025	lb/MMBtu[2]	0.25	0.063
VOC	0.017	lb/MMBtu[2]	0.170	0.043
Total PM	0.58	lb/MMBtu[2]	5.77	1.44
Total PM_{10}	0.52	lb/MMBtu[2]	5.17	1.29
Total $PM_{2.5}$	0.45	lb/MMBtu[2]	4.47	1.12

Notes:

1. As part of this submittal Enviva is requesting a limit of 500 hours per year of "idle mode" for each furnace.
2. CO, NO_X, SO_2, PM, PM_{10}, $PM_{2.5}$, and VOC emission rates based on AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03 for bark/bark and wet wood/wet wood-fired boilers. PM_{10} and $PM_{2.5}$ factors equal to the sum of the filterable and condensible factors from Table 1.6-1. VOC emission factor excludes formaldehyde.

Table 3f
Potential Emissions
Dryer #1 Furnace Bypass (ES-FURNACEBYP-1) (Idle Mode)[1]
Enviva Pellets Northampton, LLC

Potential HAP Emissions per Dryer Line

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
Acetaldehyde	8.30E-04	lb/MMBtu	1	8.30E-03	2.08E-03
Acrolein	4.00E-03	lb/MMBtu	1	4.00E-02	1.00E-02
Formaldehyde	4.40E-03	lb/MMBtu	1	4.40E-02	1.10E-02
Phenol	5.10E-05	lb/MMBtu	1	5.10E-04	1.28E-04
Propionaldehyde	6.10E-05	lb/MMBtu	1	6.10E-04	1.53E-04
Acetophenone	3.20E-09	lb/MMBtu	1	3.20E-08	8.00E-09
Antimony and compounds	7.90E-06	lb/MMBtu	1	7.90E-05	1.98E-05
Arsenic	2.20E-05	lb/MMBtu	1	2.20E-04	5.50E-05
Benzo(a)pyrene	2.60E-06	lb/MMBtu	1	2.60E-05	6.50E-06
Beryllium	1.10E-06	lb/MMBtu	1	1.10E-05	2.75E-06
Cadmium	4.10E-06	lb/MMBtu	1	4.10E-05	1.03E-05
Carbon tetrachloride	4.50E-05	lb/MMBtu	1	4.50E-04	1.13E-04
Chlorine	7.90E-04	lb/MMBtu	1	7.90E-03	1.98E-03
Chlorobenzene	3.30E-05	lb/MMBtu	1	3.30E-04	8.25E-05
Chromium–Other compounds	2.10E-05	lb/MMBtu	1	2.10E-04	5.25E-05
Cobalt compounds	6.50E-06	lb/MMBtu	1	6.50E-05	1.63E-05
Dinitrophenol, 2,4-	1.80E-07	lb/MMBtu	1	1.80E-06	4.50E-07
Bis(2-ethylhexyl)phthalate	4.70E-08	lb/MMBtu	1	4.70E-07	1.18E-07
Ethyl benzene	3.10E-05	lb/MMBtu	1	3.10E-04	7.75E-05
Dichloroethane, 1,2-	2.90E-05	lb/MMBtu	1	2.90E-04	7.25E-05
Hydrochloric acid	1.90E-02	lb/MMBtu	1	1.90E-01	4.75E-02
Lead	4.80E-05	lb/MMBtu	1	4.80E-04	1.20E-04
Manganese	1.60E-03	lb/MMBtu	1	1.60E-02	4.00E-03
Mercury	3.50E-06	lb/MMBtu	1	3.50E-05	8.75E-06
Methyl bromide	1.50E-05	lb/MMBtu	1	1.50E-04	3.75E-05
Methyl chloride	2.30E-05	lb/MMBtu	1	2.30E-04	5.75E-05
Trichloroethane, 1,1,1-	3.10E-05	lb/MMBtu	1	3.10E-04	7.75E-05
Naphthalene	9.70E-05	lb/MMBtu	1	9.70E-04	2.43E-04
Nickel	3.30E-05	lb/MMBtu	1	3.30E-04	8.25E-05
Nitrophenol, 4-	1.10E-07	lb/MMBtu	1	1.10E-06	2.75E-07
Pentachlorophenol	5.10E-08	lb/MMBtu	1	5.10E-07	1.28E-07
Perchloroethylene	3.80E-05	lb/MMBtu	1	3.80E-04	9.50E-05
Phosphorus metal, yellow or white	2.70E-05	lb/MMBtu	1	2.70E-04	6.75E-05
Polychlorinated biphenyls	8.15E-09	lb/MMBtu	1	8.15E-08	2.04E-08
Polycyclic Organic Matter	1.25E-04	lb/MMBtu	1	1.25E-03	3.13E-04
Dichloropropane, 1,2-	3.30E-05	lb/MMBtu	1	3.30E-04	8.25E-05
Selenium compounds	2.80E-06	lb/MMBtu	1	2.80E-05	7.00E-06
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	8.60E-12	lb/MMBtu	1	8.60E-11	2.15E-11
Trichloroethene	3.00E-05	lb/MMBtu	1	3.00E-04	7.50E-05
Trichlorophenol, 2,4,6-	2.20E-08	lb/MMBtu	1	2.20E-07	5.50E-08
Vinyl chloride	1.80E-05	lb/MMBtu	1	1.80E-04	4.50E-05
Total HAP Emissions (Biomass Combustion)				**0.31**	**0.079**

Notes:

1. Emission factors for wood combustion in a stoker boiler from AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.

Abbreviations:

CO - carbon monoxide
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
NO_X - nitrogen oxides
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03

Table 3g
Potential Emissions
Dryer #1 Double Duct Burners (IES-DDB-1 and -2)
Enviva Pellets Northampton, LLC

Duct Burner Inputs

Duct Burner Rating	2.5	MMBtu/hr
Number of Duct Burners	2	
Annual Operation	8,760	hr/yr

Potential Criteria Pollutant Emissions - Natural Gas Combustion

Pollutant	Emission Factor	Units	Emission Factor Source	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
CO	84.0	lb/MMscf	Note 1	0.41	1.80
NO_X	50.0	lb/MMscf	Note 2	0.25	1.07
SO_2	0.60	lb/MMscf	Note 1	0.0029	0.013
VOC	5.50	lb/MMscf	Note 1	0.027	0.12
$PM/PM_{10}/PM_{2.5}$ Condensable	5.70	lb/MMscf	Note 1	0.028	0.12
$PM/PM_{10}/PM_{2.5}$ Filterable	1.90	lb/MMscf	Note 1	0.0093	0.041
Total $PM/PM_{10}/PM_{2.5}$				0.037	0.16

Potential Criteria Pollutant Emissions - Propane Combustion

Pollutant	Emission Factor[3]	Units	Emission Factor Source	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
CO	7.50	lb/Mgal	Note 3	0.41	1.80
NO_X	6.50	lb/Mgal	Note 4	0.36	1.56
SO_2	0.054	lb/Mgal	Note 3,5	0.0030	0.013
VOC	1.00	lb/Mgal	Note 3	0.055	0.24
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	Note 3	0.027	0.12
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	Note 3	0.011	0.048
Total $PM/PM_{10}/PM_{2.5}$				0.038	0.17

Notes:

1. Emission factors for natural gas combustion from AP-42 Section 1.4 - Natural Gas Combustion, 07/98. Natural gas heating value of 1,020 Btu/scf assumed per AP-42.
2. Emission factors for NO_X assume burners are low-NO_X burners, per email from Kai Simonsen (Enviva) on August 8, 2018.
3. Emission factors for propane combustion obtained from AP-42 Section 1.5 - Liquefied Petroleum Gas Combustion, 07/08. Propane heating value of 91.5 MMBtu/Mgal assumed per AP-42.
4. AP-42 Section 1.5 does not include an emission factor for low-NO_X burners. Per AP-42 Section 1.4, low-NO_X burners reduce NO_X emissions by accomplishing combustion in stages, reducing NO_X emissions 40 to 85% relative to uncontrolled emission levels. A conservative control efficiency of 50% was applied to the uncontrolled NO_X emission factor from AP-42 Section 1.5. This reduction is consistent with the magnitude of reduction between the uncontrolled and low-NO_X emission factors in AP-42 Section 1.4.
5. SO_2 emissions are based on an assumed fuel sulfur content of 0.54 grains/100 ft^3 per *A National Methodology and Emission Inventory for Residential Fuel Combustion* .

Table 3g
Potential Emissions
Dryer #1 Double Duct Burners (IES-DDB-1 and -2)
Enviva Pellets Northampton, LLC

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Duct Burners - Natural Gas/Propane Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	1	1.2E-07	5.2E-07
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	1	7.8E-08	3.4E-07
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	1	7.5E-08	3.3E-07
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	1	8.8E-08	3.9E-07
Ammonia	N	Y	N	3.2	lb/MMscf	1	1.6E-02	6.9E-02
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	1	1.2E-08	5.2E-08
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	1	9.8E-07	4.3E-06
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	2	3.6E-03	1.6E-02
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	1	5.9E-09	2.6E-08
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	1	5.9E-09	2.6E-08
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	1	5.9E-08	2.6E-07
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	1	5.4E-06	2.4E-05
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	1	6.9E-06	3.0E-05
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Cobalt	Y	N	N	8.4E-05	lb/MMscf	1	4.1E-07	1.8E-06
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	1	5.9E-09	2.6E-08
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	1	5.9E-06	2.6E-05
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	1	1.5E-08	6.4E-08
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	1	1.4E-08	6.0E-08
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	2	7.5E-03	3.3E-02
Hexane	Y	Y	Y	1.8	lb/MMscf	1	8.8E-03	3.9E-02
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Lead	Y	N	N	5.0E-04	lb/MMscf	1	2.5E-06	1.1E-05
Manganese	Y	Y	N	3.8E-04	lb/MMscf	1	1.9E-06	8.2E-06
Mercury	Y	Y	N	2.6E-04	lb/MMscf	1	1.3E-06	5.6E-06
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	1	3.0E-06	1.3E-05
Nickel	Y	Y	N	2.1E-03	lb/MMscf	1	1.0E-05	4.5E-05
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	2	2.0E-04	8.8E-04
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	1	8.3E-08	3.7E-07
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	1	2.5E-08	1.1E-07
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	1	1.2E-07	5.2E-07
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	1	1.7E-05	7.3E-05
Total HAP Emissions (related to natural gas/propane)							**0.020**	**0.088**
Total TAP Emissions (related to natural gas/propane)							**0.032**	**0.14**

Table 3g
Potential Emissions
Dryer #1 Double Duct Burners (IES-DDB-1 and -2)
Enviva Pellets Northampton, LLC

Notes:

1. Emission factors for natural gas combustion are from NCDAQ Natural Gas Combustion Spreadsheet and AP-42, Fifth Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion, 07/98. The emission factors for acetaldehyde, acrolein, and ammonia are cited in the NCDAQ spreadsheet as being sourced from the USEPA's WebFIRE database.

2. The duct burners can fire either natural gas or propane; Propane is worst-case for these HAP emissions. Emission factors for propane combustion from the South Coast Air Quality Management District's Air Emissions Reporting Tool for external combustion equipment fired with LPG.

Abbreviations:

CO - carbon monoxide
HAP - hazardous air pollutant
hr - hour
lb - pound
LPG - liquified petroleum gas
Mgal - thousand gallons
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NC - North Carolina
NO_X - nitrogen oxides
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

References:

U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98.

U.S. EPA. AP-42, Section 1.5 - Liquefied Petroleum Gas Production, 07/08.

South Coast Air Quality Management District. AER Reporting tool. Emission factors available in the Help and Support Manual at: http://www.aqmd.gov/home/rules-compliance/compliance/annual-emission-reporting

U.S. EPA WebFIRE database available at: https://cfpub.epa.gov/webfire/

A National Methodology and Emission Inventory for Residential Fuel Combustion (2001). Retrieved from https://www3.epa.gov/ttnchie1/conference/ei12/area/haneke.pdf.

Table 4a
Potential Criteria Emissons
Dryer #2 (ES-DRYER-2, CD-WESP-2, CD-RTO-2)
Enviva Pellets Northampton, LLC

Calculation Basis

Annual Dried Wood Throughput[1]	781,255 ODT/year
Max. Hourly Dried Wood Throughput of Dryer	82.10 ODT/hr
Burner Heat Input	180.0 MMBtu/hr
Percent Hardwood	20.0%
Percent Softwood	80.0%
Annual Operation	8,760 hr/yr
Annual Heat Input	1,576,800 MMBtu/yr
Number of RTO Burners	4
RTO Burner Rating	6.2 MMBtu/hr
RTO Control Efficiency	97.50%

Potential Criteria Emissions

Pollutant	Biomass Emission Factor	Units	Emission Factor Source	Uncontrolled Emissions		Controlled Emissions	
				Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)
CO	0.4	lb/ODT	Note 2	--	--	32.84	156.3
NO_X	22.23	lb/hr	Note 2	--	--	22.23	97.4
$PM/PM_{10}/PM_{2.5}$ (Filterable + Condensable)	7.6	lb/hr	Note 4	--	--	7.60	33.3
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6[3]	--	--	4.50	19.7
Total VOC (as propane)	2.640	lb/ODT	Note 5	216.74	1031.3	5.42	25.8

Notes:

[1] Annual dried wood throughput is based on total facility production. Although dryer line 1 and dryer line 2 are capable of processing up to 537,625 ODT/yr and 620,000 ODT/yr, respectively, the combined throughput of both dryers will not exceed 781,255 ODT/yr. In order to provide Enviva with the flexibility to use either dryer line up to its individual capacity, the total emissions from the two dryer lines are based on the total facility throughput and calculated as follows:
- Where individual dryer emissions are calculated based on throughput (i.e. lb/ODT), the total emissions are estimated based on the total throughput of 781,255 ODT/yr.
- Where individual dryer emissions are calculated based on fuel use (i.e. lb/MMBtu or lb/MMscf) or hourly test/vendor data (i.e., lb/hr), the total emissions are conservatively set equal to the sum of the emissions from the two dryer lines assuming both dryer lines operate 8,760 hr/yr.
- Dryer line 1 described as 175.3 MMBtu/hr = 155.3 MMBtu/hr from the grate and 2 additional 10 MMBtu/hr dust burners permitted but not added.

[2] Emissions based on process knowledge and/or information from NCASI database and includes appropriate contingency based on engineering judgement.

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

[4] Particulate emission factor is based on process knowledge and an appropriate contingency based on engineering judgement.

[5] VOC emission factor based on process knowledge and an appropriate contingency based on engineering judgement. Factor represents uncontrolled emissions.

Abbreviations:

hr - hour
lb - pound
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NO_X - nitrogen oxides
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

References:

U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98.
U.S. EPA. AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.

Table 4b
Potential HAP and TAP Emissions
Dryer #2 (ES-DRYER-2, CD-WESP-2, CD-RTO-2)
Enviva Pellets Northampton, LLC

Calculation Basis

Annual Dried Wood Throughput[1]	781,255 ODT/year
Max. Hourly Dried Wood Throughput of Dryer	82.10 ODT/hr
Burner Heat Input	180.0 MMBtu/hr
Percent Hardwood	20.0%
Percent Softwood	80.0%
Annual Operation	8,760 hr/yr
Annual Heat Input	1,576,800 MMBtu/yr
Number of RTO Burners	4
RTO Burner Rating	6.2 MMBtu/hr
RTO Control Efficiency	97.50%

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Biomass Source								
Acetaldehyde	Y	Y	Y	1.7E-01	lb/ODT	2	0.35	1.64
Acrolein	Y	Y	Y	1.1E-01	lb/ODT	2	0.23	1.07
Formaldehyde	Y	Y	Y	1.4E-01	lb/ODT	2	0.29	1.40
Methanol	Y	N	Y	1.0E-01	lb/ODT	2	0.22	1.02
Phenol	Y	Y	Y	5.8E-02	lb/ODT	2	0.12	0.56
Propionaldehyde	Y	N	Y	3.9E-02	lb/ODT	2	0.08	0.38
Acetophenone	Y	N	Y	3.2E-09	lb/MMBtu	3,4	1.4E-08	6.3E-08
Antimony and compounds	Y	N	N	7.9E-06	lb/MMBtu	3,5	1.0E-04	4.5E-04
Arsenic	Y	Y	N	2.2E-05	lb/MMBtu	3,5	2.9E-04	1.3E-03
Benzene	Y	Y	Y	4.2E-03	lb/MMBtu	3,4	1.9E-02	8.3E-02
Benzo(a)pyrene	Y	Y	Y	2.6E-06	lb/MMBtu	3,4	1.2E-05	5.1E-05
Beryllium	Y	Y	N	1.1E-06	lb/MMBtu	3,5	1.4E-05	6.3E-05
Cadmium	Y	Y	N	4.1E-06	lb/MMBtu	3,5	5.4E-05	2.3E-04
Carbon tetrachloride	Y	Y	Y	4.5E-05	lb/MMBtu	3,4	2.0E-04	8.9E-04
Chlorine	Y	Y	N	7.9E-04	lb/MMBtu	3,10	1.4E-01	6.2E-01
Chlorobenzene	Y	Y	Y	3.3E-05	lb/MMBtu	3,4	1.5E-04	6.5E-04
Chloroform	Y	Y	Y	2.8E-05	lb/MMBtu	3,4	1.3E-04	5.5E-04
Chromium VI	-[5]	Y	N	3.5E-06	lb/MMBtu	3,5,6	4.6E-05	2.0E-04
Chromium–Other compounds	Y	N	N	1.8E-05	lb/MMBtu	3,5	2.3E-04	1.0E-03
Cobalt compounds	Y	N	N	6.5E-06	lb/MMBtu	3,5	8.5E-05	3.7E-04
Dichloroethane, 1,2-	Y	Y	Y	2.9E-05	lb/MMBtu	3,4	1.3E-04	5.7E-04
Dichloropropane, 1,2-	Y	N	Y	3.3E-05	lb/MMBtu	3,4	1.5E-04	6.5E-04
Dinitrophenol, 2,4-	Y	N	Y	1.8E-07	lb/MMBtu	3,4	8.1E-07	3.5E-06
Di(2-ethylhexyl)phthalate	Y	Y	Y	4.7E-08	lb/MMBtu	3,4	2.1E-07	9.3E-07
Ethyl benzene	Y	N	Y	3.1E-05	lb/MMBtu	3,4	1.4E-04	6.1E-04
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	N	Y	Y	1.8E-11	lb/MMBtu	3,4	8.1E-11	3.5E-10
Hydrochloric acid	Y	Y	N	1.9E-02	lb/MMBtu	3,7	3.4E-01	1.5E+00
Lead	Y	N	N	4.8E-05	lb/MMBtu	3,5	6.3E-04	2.7E-03
Manganese	Y	Y	N	1.6E-03	lb/MMBtu	3,5	2.1E-02	9.1E-02
Mercury	Y	Y	N	3.5E-06	lb/MMBtu	3,5	4.6E-05	2.0E-04
Methyl bromide	Y	N	Y	1.5E-05	lb/MMBtu	3,4	6.8E-05	3.0E-04
Methyl chloride	Y	N	Y	2.3E-05	lb/MMBtu	3,4	1.0E-04	4.5E-04
Methyl ethyl ketone	N	Y	Y	5.4E-06	lb/MMBtu	3,4	2.4E-05	1.1E-04
Methylene chloride	Y	Y	Y	2.9E-04	lb/MMBtu	3,4	1.3E-03	5.7E-03
Naphthalene	Y	N	Y	9.7E-05	lb/MMBtu	3,4	4.4E-04	1.9E-03
Nickel	Y	Y	N	3.3E-05	lb/MMBtu	3,5	4.3E-04	1.9E-03
Nitrophenol, 4-	Y	N	Y	1.1E-07	lb/MMBtu	3,4	5.0E-07	2.2E-06
Pentachlorophenol	Y	Y	N	5.1E-08	lb/MMBtu	3	2.3E-07	1.0E-06
Perchloroethylene	Y	Y	N	3.8E-05	lb/MMBtu	3	1.7E-04	7.5E-04
Phosphorus metal, yellow or white	Y	N	N	2.7E-05	lb/MMBtu	3,5	3.5E-04	1.5E-03
Polychlorinated biphenyls	Y	Y	Y	8.2E-09	lb/MMBtu	3,4	3.7E-08	1.6E-07
Polycyclic Organic Matter	Y	N	N	1.3E-04	lb/MMBtu	3	5.6E-04	2.5E-03
Selenium compounds	Y	N	N	2.8E-06	lb/MMBtu	3,5	3.7E-05	1.6E-04
Styrene	Y	Y	Y	1.9E-03	lb/MMBtu	3,4	8.6E-03	3.7E-02
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	Y	8.6E-12	lb/MMBtu	3,4	3.9E-11	1.7E-10
Toluene	Y	Y	Y	3.0E-05	lb/MMBtu	3,4	1.4E-04	5.9E-04
Trichloroethane, 1,1,1-	Y	Y	N	3.1E-05	lb/MMBtu	3	1.4E-04	6.1E-04
Trichloroethylene	Y	Y	Y	3.0E-05	lb/MMBtu	3,4	1.4E-04	5.9E-04
Trichlorofluoromethane	N	Y	Y	4.1E-05	lb/MMBtu	3,4	1.8E-04	8.1E-04
Trichlorophenol, 2,4,6-	Y	N	Y	2.2E-08	lb/MMBtu	3,4	9.9E-08	4.3E-07
Vinyl chloride	Y	Y	Y	1.8E-05	lb/MMBtu	3,4	8.1E-05	3.5E-04
Xylene	Y	Y	Y	2.5E-05	lb/MMBtu	3,4	1.1E-04	4.9E-04
Total HAP Emissions (related to biomass)							**1.82**	**8.44**
Total TAP Emissions (related to biomass)							**1.52**	**7.03**

Table 4b
Potential HAP and TAP Emissions
Dryer #2 (ES-DRYER-2, CD-WESP-2, CD-RTO-2)
Enviva Pellets Northampton, LLC

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
RTO - Natural Gas/Propane Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	8	5.8E-07	2.6E-06
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	8	4.4E-08	1.9E-07
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	8	3.9E-07	1.7E-06
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	8	4.4E-08	1.9E-07
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	8	4.4E-08	1.9E-07
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	8	3.7E-07	1.6E-06
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	8	4.4E-07	1.9E-06
Ammonia	N	Y	N	3.2	lb/MMscf	8	7.8E-02	3.4E-01
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	8	5.8E-08	2.6E-07
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	8	4.9E-06	2.1E-05
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	8	4.4E-08	1.9E-07
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	9	1.8E-02	7.7E-02
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	8	2.9E-08	1.3E-07
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	8	4.4E-08	1.9E-07
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	8	2.9E-08	1.3E-07
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	8	4.4E-08	1.9E-07
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	8	2.9E-07	1.3E-06
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	8	2.7E-05	1.2E-04
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	8	3.4E-05	1.5E-04
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	8	4.4E-08	1.9E-07
Cobalt	Y	N	N	8.4E-05	lb/MMscf	8	2.0E-06	8.9E-06
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	8	2.9E-08	1.3E-07
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	8	2.9E-05	1.3E-04
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	8	7.3E-08	3.2E-07
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	8	6.8E-08	3.0E-07
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	9	3.7E-02	1.6E-01
Hexane	Y	Y	Y	1.8	lb/MMscf	8	4.4E-02	1.9E-01
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	8	4.4E-08	1.9E-07
Lead	Y	N	N	5.0E-04	lb/MMscf	8	1.2E-05	5.3E-05
Manganese	Y	Y	N	3.8E-04	lb/MMscf	8	9.2E-06	4.0E-05
Mercury	Y	Y	N	2.6E-04	lb/MMscf	8	6.3E-06	2.8E-05
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	8	1.5E-05	6.5E-05
Nickel	Y	Y	N	2.1E-03	lb/MMscf	8	5.1E-05	2.2E-04
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	9	9.9E-04	4.3E-03
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	8	4.1E-07	1.8E-06
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	8	1.2E-07	5.3E-07
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	8	5.8E-07	2.6E-06
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	8	8.3E-05	3.6E-04
Total HAP Emissions (related to natural gas/propane)							**0.10**	**0.44**
Total TAP Emissions (related to natural gas/propane)							**0.16**	**0.36**

Notes:

1. Annual dried wood throughput is based on total facility production. Although dryer line 1 and dryer line 2 are capable of processing up to 537,625 ODT/yr and 620,000 ODT/yr, respectively, the combined throughput of both dryers will not exceed 781,255 ODT/yr. In order to provide Enviva with the flexibility to use either dryer line up to its individual capacity, the total emissions from the two dryer lines are based on the total facility throughput and calculated as follows:
   - Where individual dryer emissions are calculated based on throughput (i.e. lb/ODT), the total emissions are estimated based on the total throughput of 781,255 ODT/yr.
   - Where individual dryer emissions are calculated based on fuel use (i.e. lb/MMBtu or lb/MMscf), the total emissions are conservatively set equal to the sum of the emissions from the two dryer lines assuming both dryer lines operate 8,760 hrs/yr.
2. Emission factor based on process knowledge and an appropriate contingency based on engineering judgement. The emission factors represent uncontrolled emissions.
3. Emission factors (criteria and HAP/TAP) for wood combustion in a stoker boiler from NCDAQ Wood Waste Combustion Spreadsheet/AP-42, Fifth Edition, Volume 1, Chapter 1.6 - Wood Residue Combustion in Boilers, 09/03.
4. The control efficiency of 97.5% for the RTO is applied to all VOC hazardous and toxic pollutants.
   The control efficiency of the wet electrostatic precipitator (WESP) for filterable particulate matter is applied to all metal hazardous and toxic pollutants from the dryer and duct burners. Actual design filterable efficiency is estimated to 96.4%, but 92.75% is assumed for toxics permitting.
5. WESP Control Efficiency for metal HAP 92.8%
6. Chromium VI is a subset of chromium compounds, which is accounted for separately as a HAP. As such, Chromium VI is only calculated as a TAP.
   The WESP employs a caustic solution in its operation in which hydrochloric acid will have high water solubility. This caustic solution will neutralize the acid and effectively control it by 90%, per conversation on October 18, 2011 with Steven A. Jaasund, P.E. of Lundberg Associates, a manufacturer of WESPs.
7. WESP HCl Control Efficiency 90.00%
8. Emission factors for natural gas combustion are from NCDAQ Natural Gas Combustion Spreadsheet and AP-42, Fifth Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion, 07/98. The emission factors for acetaldehyde, acrolein, and ammonia are cited in the NCDAQ spreadsheet as being sourced from the USEPA's WebFIRE database.
9. The RTO burners can fire either natural gas or propane; Propane is worst-case for these HAP emissions. Emission factors for propane combustion from the South Coast Air Quality Management District's Air Emissions Reporting Tool for external combustion equipment fired with LPG.
10. It was assumed that chlorine is not oxidized in the RTO.

Table 4b
Potential HAP and TAP Emissions
Dryer #2 (ES-DRYER-2, CD-WESP-2, CD-RTO-2)
Enviva Pellets Northampton, LLC

Abbreviations:

HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NC - North Carolina
ODT - oven dried tons
RTO - regenerative thermal oxidizer
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

References:

U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98.
U.S. EPA. AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.
South Coast Air Quality Management District. AER Reporting tool. Emission factors available in the Help and Support Manual at: http://www.aqmd.gov/home/rules-compliance/compliance/annual-emission-reporting
U.S. EPA WebFIRE database available at: https://cfpub.epa.gov/webfire/

Table 4c
Potential Emissions
Dryer #2 Furnace Bypass (ES-FURNACEBYP-2) (Cold Start-up)[1]
Enviva Pellets Northampton, LLC

Calculation Basis

Hourly Heat Input Capacity	27 MMBtu/hr
Annual Heat Input Capacity	1,350 MMBtu/yr
Hours of Operation[1]	50 hr/yr

Potential Criteria Pollutant Emissions - Furnace Bypass (Cold Start-up)

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	0.60	lb/MMBtu[2]	16.2	0.41
NO_X	0.22	lb/MMBtu[2]	5.94	0.15
SO_2	0.025	lb/MMBtu[2]	0.68	0.017
VOC	0.017	lb/MMBtu[2]	0.46	0.011
Total PM	0.58	lb/MMBtu[2]	15.6	0.39
Total PM_{10}	0.52	lb/MMBtu[2]	14.0	0.35
Total $PM_{2.5}$	0.45	lb/MMBtu[2]	12.1	0.30

Notes:

1. During cold start-ups, the furnace bypass stack is used until the refractory is sufficiently heated and can sustain operations at a low level (approximately 15% of the maximum heat input rate). The furnace bypass stack is then closed, and the furnace is slowly brought up to a normal operating rate. Diesel fuel may be used as an accelerant for cold start-up. The amount used per event is typically 15 – 30 gallons and the annual usage is typically 100 – 200 gallons and emissions resulting from diesel combustion are insignificant. In the event of a planned dryer shutdown, the dryer throughput and furnace heat input are decreased. Dryer raw material input ceases, and all remaining material is moved through the system to prevent a fire. On shutdown of the dryer, the furnace operating rate quickly approaches idle state. The furnace bypass stack is not utilized during a planned shutdown until after the furnace achieves an idle state (defined as 10 MMBtu/hr or less).

2. CO, NO_X, SO_2, PM, and VOC emission rates based on AP-42, Chapter 1.6 - Wood Residue Combustion in Boilers, 09/03 for bark/bark and wet wood/wet wood-fired boilers. VOC emission factor excludes formaldehyde.

Table 4c
Potential Emissions
Dryer #2 Furnace Bypass (ES-FURNACEBYP-2) (Cold Start-up)[1]
Enviva Pellets Northampton, LLC

Potential HAP Emissions - Furnace Bypass (Cold Start-up)

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
Acetaldehyde	8.30E-04	lb/MMBtu	1	2.24E-02	5.60E-04
Acrolein	4.00E-03	lb/MMBtu	1	1.08E-01	2.70E-03
Formaldehyde	4.40E-03	lb/MMBtu	1	1.19E-01	2.97E-03
Phenol	5.10E-05	lb/MMBtu	1	1.38E-03	3.44E-05
Propionaldehyde	6.10E-05	lb/MMBtu	1	1.65E-03	4.12E-05
Acetophenone	3.2E-09	lb/MMBtu	1	8.64E-08	2.16E-09
Antimony and compounds	7.9E-06	lb/MMBtu	1	2.13E-04	5.33E-06
Arsenic	2.2E-05	lb/MMBtu	1	5.94E-04	1.49E-05
Benzo(a)pyrene	2.6E-06	lb/MMBtu	1	7.02E-05	1.76E-06
Beryllium	1.1E-06	lb/MMBtu	1	2.97E-05	7.43E-07
Cadmium	4.1E-06	lb/MMBtu	1	1.11E-04	2.77E-06
Carbon tetrachloride	4.5E-05	lb/MMBtu	1	1.22E-03	3.04E-05
Chlorine	7.9E-04	lb/MMBtu	1	2.13E-02	5.33E-04
Chlorobenzene	3.3E-05	lb/MMBtu	1	8.91E-04	2.23E-05
Chromium–Other compounds	2.1E-05	lb/MMBtu	1	5.67E-04	1.42E-05
Cobalt compounds	6.5E-06	lb/MMBtu	1	1.76E-04	4.39E-06
Dinitrophenol, 2,4-	1.8E-07	lb/MMBtu	1	4.86E-06	1.22E-07
Di(2-ethylhexyl)phthalate	4.7E-08	lb/MMBtu	1	1.27E-06	3.17E-08
Ethyl benzene	3.1E-05	lb/MMBtu	1	8.37E-04	2.09E-05
Dichloroethane, 1,2-	2.9E-05	lb/MMBtu	1	7.83E-04	1.96E-05
Hydrochloric acid	1.9E-02	lb/MMBtu	1	5.13E-01	1.28E-02
Lead	4.8E-05	lb/MMBtu	1	1.30E-03	3.24E-05
Manganese	1.6E-03	lb/MMBtu	1	4.32E-02	1.08E-03
Mercury	3.5E-06	lb/MMBtu	1	9.45E-05	2.36E-06
Methyl bromide	1.5E-05	lb/MMBtu	1	4.05E-04	1.01E-05
Methyl chloride	2.3E-05	lb/MMBtu	1	6.21E-04	1.55E-05
Trichloroethane, 1,1,1-	3.1E-05	lb/MMBtu	1	8.37E-04	2.09E-05
Naphthalene	9.7E-05	lb/MMBtu	1	2.62E-03	6.55E-05
Nickel	3.3E-05	lb/MMBtu	1	8.91E-04	2.23E-05
Nitrophenol, 4-	1.1E-07	lb/MMBtu	1	2.97E-06	7.43E-08
Pentachlorophenol	5.1E-08	lb/MMBtu	1	1.38E-06	3.44E-08
Perchloroethylene	3.8E-05	lb/MMBtu	1	1.03E-03	2.57E-05
Phosphorus metal, yellow or white	2.7E-05	lb/MMBtu	1	7.29E-04	1.82E-05
Polychlorinated biphenyls	8.2E-09	lb/MMBtu	1	2.20E-07	5.50E-09
Polycyclic Organic Matter	1.3E-04	lb/MMBtu	1	3.38E-03	8.44E-05
Dichloropropane, 1,2-	3.3E-05	lb/MMBtu	1	8.91E-04	2.23E-05
Selenium compounds	2.8E-06	lb/MMBtu	1	7.56E-05	1.89E-06
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	8.6E-12	lb/MMBtu	1	2.32E-10	5.81E-12
Trichloroethylene	3.0E-05	lb/MMBtu	1	8.10E-04	2.03E-05
Trichlorophenol, 2,4,6-	2.2E-08	lb/MMBtu	1	5.94E-07	1.49E-08
Vinyl chloride	1.8E-05	lb/MMBtu	1	4.86E-04	1.22E-05
Total HAP Emissions (Biomass Combustion)				**0.85**	**0.02**

Notes:

1. Emission factors for wood combustion in a stoker boiler from AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.

Abbreviations:

CO - carbon monoxide
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
NO_X - nitrogen oxides
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03

Table 4d
Potential Emissions
Dryer #2 Furnace Bypass (ES-FURNACEBYP-2) (Idle Mode)[1]
Enviva Pellets Northampton, LLC

Calculation Basis

Hourly Heat Input Capacity	10 MMBtu/hr
Annual Heat Input Capacity	5,000 MMBtu/yr
Hours of Operation[1]	500 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions per Dryer Line

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	0.60	lb/MMBtu[2]	6.00	1.50
NO_X	0.22	lb/MMBtu[2]	2.20	0.55
SO_2	0.025	lb/MMBtu[2]	0.25	0.063
VOC	0.017	lb/MMBtu[2]	0.170	0.043
Total PM	0.58	lb/MMBtu[2]	5.77	1.44
Total PM_{10}	0.52	lb/MMBtu[2]	5.17	1.29
Total $PM_{2.5}$	0.45	lb/MMBtu[2]	4.47	1.12

Notes:

1. As part of this submittal Enviva is requesting a limit of 500 hours per year of "idle mode" for each furnace.
2. CO, NO_X, SO_2, PM, PM_{10}, $PM_{2.5}$, and VOC emission rates based on AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03 for bark/bark and wet wood/wet wood-fired boilers. PM_{10} and $PM_{2.5}$ factors equal to the sum of the filterable and condensible factors from Table 1.6-1. VOC emission factor excludes formaldehyde.

Table 4d
Potential Emissions
Dryer #2 Furnace Bypass (ES-FURNACEBYP-2) (Idle Mode)[1]
Enviva Pellets Northampton, LLC

Potential HAP Emissions per Dryer Line

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
Acetaldehyde	8.30E-04	lb/MMBtu	1	8.30E-03	2.08E-03
Acrolein	4.00E-03	lb/MMBtu	1	4.00E-02	1.00E-02
Formaldehyde	4.40E-03	lb/MMBtu	1	4.40E-02	1.10E-02
Phenol	5.10E-05	lb/MMBtu	1	5.10E-04	1.28E-04
Propionaldehyde	6.10E-05	lb/MMBtu	1	6.10E-04	1.53E-04
Acetophenone	3.2E-09	lb/MMBtu	1	3.20E-08	8.00E-09
Antimony and compounds	7.9E-06	lb/MMBtu	1	7.90E-05	1.98E-05
Arsenic	2.2E-05	lb/MMBtu	1	2.20E-04	5.50E-05
Benzo(a)pyrene	2.6E-06	lb/MMBtu	1	2.60E-05	6.50E-06
Beryllium	1.1E-06	lb/MMBtu	1	1.10E-05	2.75E-06
Cadmium	4.1E-06	lb/MMBtu	1	4.10E-05	1.03E-05
Carbon tetrachloride	4.5E-05	lb/MMBtu	1	4.50E-04	1.13E-04
Chlorine	7.9E-04	lb/MMBtu	1	7.90E-03	1.98E-03
Chlorobenzene	3.3E-05	lb/MMBtu	1	3.30E-04	8.25E-05
Chromium–Other compounds	2.1E-05	lb/MMBtu	1	2.10E-04	5.25E-05
Cobalt compounds	6.5E-06	lb/MMBtu	1	6.50E-05	1.63E-05
Dinitrophenol, 2,4-	1.8E-07	lb/MMBtu	1	1.80E-06	4.50E-07
Bis(2-ethylhexyl)phthalate	4.7E-08	lb/MMBtu	1	4.70E-07	1.18E-07
Ethyl benzene	3.1E-05	lb/MMBtu	1	3.10E-04	7.75E-05
Dichloroethane, 1,2-	2.9E-05	lb/MMBtu	1	2.90E-04	7.25E-05
Hydrochloric acid	1.9E-02	lb/MMBtu	1	1.90E-01	4.75E-02
Lead	4.8E-05	lb/MMBtu	1	4.80E-04	1.20E-04
Manganese	1.6E-03	lb/MMBtu	1	1.60E-02	4.00E-03
Mercury	3.5E-06	lb/MMBtu	1	3.50E-05	8.75E-06
Methyl bromide	1.5E-05	lb/MMBtu	1	1.50E-04	3.75E-05
Methyl chloride	2.3E-05	lb/MMBtu	1	2.30E-04	5.75E-05
Trichloroethane, 1,1,1-	3.1E-05	lb/MMBtu	1	3.10E-04	7.75E-05
Naphthalene	9.7E-05	lb/MMBtu	1	9.70E-04	2.43E-04
Nickel	3.3E-05	lb/MMBtu	1	3.30E-04	8.25E-05
Nitrophenol, 4-	1.1E-07	lb/MMBtu	1	1.10E-06	2.75E-07
Pentachlorophenol	5.1E-08	lb/MMBtu	1	5.10E-07	1.28E-07
Perchloroethylene	3.8E-05	lb/MMBtu	1	3.80E-04	9.50E-05
Phosphorus metal, yellow or white	2.7E-05	lb/MMBtu	1	2.70E-04	6.75E-05
Polychlorinated biphenyls	8.2E-09	lb/MMBtu	1	8.15E-08	2.04E-08
Polycyclic Organic Matter	1.3E-04	lb/MMBtu	1	1.25E-03	3.13E-04
Dichloropropane, 1,2-	3.3E-05	lb/MMBtu	1	3.30E-04	8.25E-05
Selenium compounds	2.8E-06	lb/MMBtu	1	2.80E-05	7.00E-06
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	8.6E-12	lb/MMBtu	1	8.60E-11	2.15E-11
Trichloroethene	3.0E-05	lb/MMBtu	1	3.00E-04	7.50E-05
Trichlorophenol, 2,4,6-	2.2E-08	lb/MMBtu	1	2.20E-07	5.50E-08
Vinyl chloride	1.8E-05	lb/MMBtu	1	1.80E-04	4.50E-05
Total HAP Emissions (Biomass Combustion)				**0.31**	**0.079**

Notes:

1. Emission factors for wood combustion in a stoker boiler from AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.

Abbreviations:

CO - carbon monoxide
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
NO_X - nitrogen oxides
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03

Table 4e
Potential Emissions
Dryer #2 Double Duct Burners (IES-DDB-3 and -4)
Enviva Pellets Northampton, LLC

Duct Burner Inputs

Duct Burner Rating	2.5 MMBtu/hr
Number of Duct Burners	2
Annual Operation	8,760 hr/yr

Potential Criteria Pollutant Emissions:

Potential Criteria Pollutant Emissions - Natural Gas Combustion

Pollutant	Emission Factor	Units	Emission Factor Source	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
CO	84.0	lb/MMscf	Note 1	0.41	1.80
NO_X	50.0	lb/MMscf	Note 2	0.25	1.07
SO_2	0.60	lb/MMscf	Note 1	0.0029	0.013
VOC	5.50	lb/MMscf	Note 1	0.027	0.12
$PM/PM_{10}/PM_{2.5}$ Condensable	5.70	lb/MMscf	Note 1	0.028	0.12
$PM/PM_{10}/PM_{2.5}$ Filterable	1.90	lb/MMscf	Note 1	0.0093	0.041
Total $PM/PM_{10}/PM_{2.5}$				0.037	0.16

Potential Criteria Pollutant Emissions - Propane Combustion

Pollutant	Emission Factor	Units	Emission Factor Source	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
CO	7.50	lb/Mgal	Note 3	0.41	1.80
NO_X	6.50	lb/Mgal	Note 4	0.36	1.56
SO_2	0.054	lb/Mgal	Note 3,5	0.0030	0.013
VOC	1.00	lb/Mgal	Note 3	0.055	0.24
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	Note 3	0.027	0.12
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	Note 3	0.011	0.048
Total $PM/PM_{10}/PM_{2.5}$				0.038	0.17

Notes:

1. Emission factors for natural gas combustion from AP-42 Section 1.4 - Natural Gas Combustion, 07/98. Natural gas heating value of 1,020 Btu/scf assumed per AP-42.
2. Emission factors for NO_X assume burners are low-NO_X burners, per email from Kai Simonsen (Enviva) on August 8, 2018.
3. Emission factors for propane combustion obtained from AP-42 Section 1.5 - Liquefied Petroleum Gas Combustion, 07/08. Propane heating value of 91.5 MMBtu/Mgal assumed per AP-42.
4. AP-42 Section 1.5 does not include an emission factor for low-NO_X burners. Per AP-42 Section 1.4, low-NO_X burners reduce NO_X emissions by accomplishing combustion in stages, reducing NO_X emissions 40 to 85% relative to uncontrolled emission levels. A conservative control efficiency of 50% was applied to the uncontrolled NO_X emission factor from AP-42 Section 1.5. This reduction is consistent with the magnitude of reduction between the uncontrolled and low-NO_X emission factors in AP-42 Section 1.4.
5. SO_2 emissions are based on an assumed fuel sulfur content of 0.54 grains/100 ft^3 per *A National Methodology and Emission Inventory for Residential Fuel Combustion*.

Table 4e
Potential Emissions
Dryer #2 Double Duct Burners (IES-DDB-3 and -4)
Enviva Pellets Northampton, LLC

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Duct Burners - Natural Gas/Propane Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	1	1.2E-07	5.2E-07
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	1	7.8E-08	3.4E-07
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	1	7.5E-08	3.3E-07
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	1	8.8E-08	3.9E-07
Ammonia	N	Y	N	3.2	lb/MMscf	1	1.6E-02	6.9E-02
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	1	1.2E-08	5.2E-08
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	1	9.8E-07	4.3E-06
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	2	3.6E-03	1.6E-02
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	1	5.9E-09	2.6E-08
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	1	5.9E-09	2.6E-08
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	1	5.9E-08	2.6E-07
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	1	5.4E-06	2.4E-05
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	1	6.9E-06	3.0E-05
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Cobalt	Y	N	N	8.4E-05	lb/MMscf	1	4.1E-07	1.8E-06
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	1	5.9E-09	2.6E-08
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	1	5.9E-06	2.6E-05
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	1	1.5E-08	6.4E-08
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	1	1.4E-08	6.0E-08
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	2	7.5E-03	3.3E-02
Hexane	Y	Y	Y	1.8	lb/MMscf	1	8.8E-03	3.9E-02
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	1	8.8E-09	3.9E-08
Lead	Y	N	N	5.0E-04	lb/MMscf	1	2.5E-06	1.1E-05
Manganese	Y	Y	N	3.8E-04	lb/MMscf	1	1.9E-06	8.2E-06
Mercury	Y	Y	N	2.6E-04	lb/MMscf	1	1.3E-06	5.6E-06
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	1	3.0E-06	1.3E-05
Nickel	Y	Y	N	2.1E-03	lb/MMscf	1	1.0E-05	4.5E-05
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	2	2.0E-04	8.8E-04
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	1	8.3E-08	3.7E-07
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	1	2.5E-08	1.1E-07
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	1	1.2E-07	5.2E-07
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	1	1.7E-05	7.3E-05
Total HAP Emissions (related to natural gas/propane)							**0.020**	**0.088**
Total TAP Emissions (related to natural gas/propane)							**0.032**	**0.14**

Table 4e
Potential Emissions
Dryer #2 Double Duct Burners (IES-DDB-3 and -4)
Enviva Pellets Northampton, LLC

Notes:

1. Emission factors for natural gas combustion are from NCDAQ Natural Gas Combustion Spreadsheet and AP-42, Fifth Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion, 07/98. The emission factors for acetaldehyde, acrolein, and ammonia are cited in the NCDAQ spreadsheet as being sourced from the USEPA's WebFIRE database.

2. The duct burners can fire either natural gas or propane; Propane is worst-case for these HAP emissions. Emission factors for propane combustion from the South Coast Air Quality Management District's Air Emissions Reporting Tool for external combustion equipment fired with LPG.

Abbreviations:

CO - carbon monoxide
HAP - hazardous air pollutant
hr - hour
lb - pound
LPG - liquified petroleum gas
Mgal - thousand gallons
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NC - North Carolina
NO_X - nitrogen oxides
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

References:

U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98.

U.S. EPA. AP-42, Section 1.5 - Liquefied Petroleum Gas Production, 07/08.

South Coast Air Quality Management District. AER Reporting tool. Emission factors available in the Help and Support Manual at: http://www.aqmd.gov/home/rules-compliance/compliance/annual-emission-reporting

U.S. EPA WebFIRE database available at: https://cfpub.epa.gov/webfire/

A National Methodology and Emission Inventory for Residential Fuel Combustion (2001). Retrieved from https://www3.epa.gov/ttnchie1/conference/ei12/area/haneke.pdf.

Table 6
Potential Emissions at Outlet of RCO-2 Stack (CD-RCO-2)
Pellet Coolers (ES-CLR-1 through ES-CLR-6)
Enviva Pellets Northampton, LLC

Calculation Basis

Annual Throughput	781,255 ODT/yr
Hourly Throughput	144 ODT/hr
Hours of Operation	8,760 hr/yr
Number of Burners	2 burners
RCO/RTO Burner Rating	6.2 MMBtu/hr
RCO/RTO Control Efficiency	95.0%

Pellet Cooler and Pellet Mill Potential Process VOC and HAP Emissions

Pollutant	CAS No.	NC TAP	VOC	Emission Factor[1] (lb/ODT)	Emissions at RCO/RTO Outlet[2] Max (lb/hr)	Annual (tpy)
Acetaldehyde	75-07-0	Y	Y	0.025	0.181	0.49
Acrolein	107-02-8	Y	Y	0.050	0.36	0.97
Formaldehyde	50-00-0	Y	Y	0.006	0.04	0.12
Methanol	67-56-1	N	Y	0.021	0.15	0.41
Phenol	108-95-2	Y	Y	0.025	0.18	0.49
Propionaldehyde	123-38-6	N	Y	0.015	0.105	0.29
				Total HAP Emissions	**1.02**	**2.78**
				Total TAP Emissions	**0.77**	**2.08**
Total VOC (as propane)	--	--	Y	1.4	10.17	27.60

Notes:

1. Emission factors based on process knowledge and an appropriate contingency based on engineering judgement. The emission factors represent uncontrolled emissions.

2. A 95.0% control efficiency is applied to the potential emissions for the RTO.

Emissions from the pellet mills and pellet coolers will be controlled by an RCO/RTO that can operate in either catalytic mode (RCO) or thermal mode (RTO). The RTO and RCO modes have the same control efficiency so there will be no impact on emissions when switching between operating modes.

Thermally Generated Potential Criteria Pollutant Emissions

Maximum high heating value of VOC constituents	1.8E-02	MMBtu/lb
Uncontrolled VOC emissions	552	tons/yr
Uncontrolled VOC emissions	203	lb/hr
Heat input of uncontrolled VOC emissions	20,417	MMBtu/yr
Heat input of uncontrolled VOC emissions	4	MMBtu/hr

Pollutant	Emission Factor[1]	Units	Potential Emissions Max (lb/hr)	Annual (tpy)
CO	8.2E-02	lb/MMBtu	0.31	0.84
NO_X	9.8E-02	lb/MMBtu	0.37	1.00

Natural Gas Combustion Potential Criteria Pollutant Emissions

Pollutant	Emission Factor[1]	Units	Potential Emissions Max (lb/hr)	Annual (tpy)
CO	8.2E-02	lb/MMBtu	1.02	4.47
NO_X	4.9E-02	lb/MMBtu	0.61	2.66
SO_2	5.9E-04	lb/MMBtu	0.0073	0.032
VOC	5.4E-03	lb/MMBtu	0.067	0.29
Total PM	7.5E-03	lb/MMBtu	0.092	0.40
Total PM_{10}	7.5E-03	lb/MMBtu	0.092	0.40
Total $PM_{2.5}$	7.5E-03	lb/MMBtu	0.092	0.40

Potential Criteria Pollutant Emissions - Propane Combustion

Pollutant	Emission Factor[2]	Units	Potential Emissions Max (lb/hr)	Annual (tpy)
CO	7.50	lb/Mgal	1.02	4.45
NO_X	13.0	lb/Mgal	1.76	7.72
SO_2	0.054	lb/Mgal	0.0073	0.032
VOC	1.00	lb/Mgal	0.14	0.59
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	0.068	0.30
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	0.027	0.12
Total $PM/PM_{10}/PM_{2.5}$			0.095	0.42

Table 6
Potential Emissions at Outlet of RCO-2 Stack (CD-RCO-2)
Pellet Coolers (ES-CLR-1 through ES-CLR-6)
Enviva Pellets Northampton, LLC

Natural Gas Combustion Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Natural Gas Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	3	2.9E-07	1.3E-06
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	3	2.2E-08	9.6E-08
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	3	1.9E-07	8.5E-07
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	3	2.2E-08	9.6E-08
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	3	2.2E-08	9.6E-08
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	3	1.8E-07	8.1E-07
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	3	2.2E-07	9.58E-07
Ammonia	N	Y	N	3.2	lb/MMscf	3	3.89E-02	1.70E-01
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	3	2.9E-08	1.3E-07
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	3	2.4E-06	1.1E-05
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	3	2.2E-08	9.6E-08
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	4	8.8E-03	3.9E-02
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	3	1.5E-08	6.4E-08
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	3	2.2E-08	9.6E-08
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	3	1.5E-08	6.4E-08
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	3	2.2E-08	9.6E-08
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	3	1.5E-07	6.4E-07
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	3	1.3E-05	5.9E-05
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	3	1.7E-05	7.5E-05
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	3	2.2E-08	9.6E-08
Cobalt Compounds	Y	N	N	8.4E-05	lb/MMscf	3	1.0E-06	4.5E-06
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	3	1.5E-08	6.4E-08
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	3	1.5E-05	6.4E-05
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	3	3.6E-08	1.6E-07
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	3	3.4E-08	1.5E-07
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	4	1.9E-02	8.1E-02
Hexane	Y	Y	Y	1.8	lb/MMscf	3	2.2E-02	9.6E-02
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	3	2.2E-08	9.6E-08
Lead	Y	N	N	5.0E-04	lb/MMscf	3	6.1E-06	2.7E-05
Manganese	Y	Y	N	3.8E-04	lb/MMscf	3	4.6E-06	2.0E-05
Mercury	Y	Y	N	2.6E-04	lb/MMscf	3	3.2E-06	1.4E-05
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	3	7.4E-06	3.2E-05
Nickel	Y	Y	N	2.1E-03	lb/MMscf	3	2.6E-05	1.1E-04
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	4	5.0E-04	2.2E-03
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	3	2.1E-07	9.1E-07
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	3	6.1E-08	2.7E-07
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	3	2.9E-07	1.3E-06
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	3	4.1E-05	1.8E-04
					Total HAP Emissions (natural gas combustion)		**0.050**	**0.22**
					Total TAP Emissions (natural gas combustion)		**0.08**	**0.35**

Notes:

1. Emission factors from AP-42, Section 1.4 - Natural Gas Combustion, 07/98. Emission factors converted from lb/MMscf to lb/MMBtu based on assumed heating value of 1,020 Btu/scf for natural gas per AP-42 Section 1.4.
2. Emission factors for propane combustion obtained from AP-42 Section 1.5 - Liquefied Petroleum Gas Combustion, 07/08.
3. Emission factors for natural gas combustion are from NCDAQ Natural Gas Combustion Spreadsheet and AP-42, Fifth Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion, 07/98 for small boilers. The emission factors for acetaldehyde, acrolein, and ammonia are cited in the NCDAQ spreadsheet as being sourced from the USEPA's WebFIRE database.
4. The RCO/RTO burner can fire either natural gas or propane; Propane is worst-case for these HAP emissions. Emission factors for propane combustion from the South Coast Air Quality Management District's Air Emissions Reporting Tool for external combustion equipment fired with LPG.

Abbreviations:

CAS - chemical abstract service
CO - carbon monoxide
HAP - hazardous air pollutant
hr - hour
lb - pound
LPG - liquified petroleum gas
Mgal - thousand gallons
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NC - North Carolina
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RCO - regenerative catalytic oxidizer
RTO - regenerative thermal oxidizer
TAP - toxic air pollutant
tpy - tons per year
SO_2 - sulfur dioxide
VOC - volatile organic compound
yr - year

References:

U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98.
U.S. EPA. AP-42, Section 1.5 - Liquefied Petroleum Gas Production, 07/08.
South Coast Air Quality Management District. AER Reporting tool. Emission factors available in the Help and Support Manual at:
U.S. EPA WebFIRE database available at: https://cfpub.epa.gov/webfire/
A National Methodology and Emission Inventory for Residential Fuel Combustion (2001). Retrieved from https://www3.epa.gov/ttnchie1/conference/ei12/area/haneke.pdf.

Table 7
Potential VOC and HAP Emissions
Dried Wood Handling 1 and 2 (ES-DWH-1 and ES-DWH-2)
Enviva Pellets Northampton, LLC

Calculation Basis

Hourly Throughput[1]	154 ODT/hr
Annual Throughput[1]	781,255 ODT/yr

Potential Criteria Pollutant Emissions

Pollutant	Emission Factor (lb/ODT)	Potential Emissions[4]	
		Max (lb/hr)	Annual (tpy)
Formaldehyde[2]	8.4E-04	0.13	0.33
Methanol[2]	2.0E-03	0.30	0.76
Propionaldehyde[5]	2.1E-04	0.03	0.08
Total HAP Emissions		**0.46**	**1.17**
VOC as carbon[2]	0.10	15.6	39.5
VOC as propane[3]	0.12	19.1	48.5

Notes:

1. Hourly and annual throughputs assumed to be the same as the combined dryer throughputs.
2. Emission factors derived from NCASI's Wood Products Database (February 2013) for dry wood handling operations at an OSB mill, mean emission factors. The emission factors were converted from lb/MSF (3/8") to lb/ODT using the typical density and moisture content of an OSB panel.
3. VOC as propane = (1.22 x VOC as carbon) + formaldehyde.
4. As emissions are based on throughput, the calculated emissions represent the total emissions from Dried Wood Handling 1 and 2 (ES-DWH-1 and ES-DWH-2).
5. Emission factor based on process knowledge and an appropriate contingency based on engineering judgement.

Abbreviations:

hr - hour
lb - pound
ODT - oven dried tons
tpy - tons per year
VOC - volatile organic compound
yr - year

Table 8
Potential PM Emissions from Baghouses/Cyclones
Enviva Pellets Northampton, LLC

Emission Unit ID	Source Description	Control Device ID	Control Device Description	Exhaust Flow Rate[1]	Exit Grain Loading[2]	Annual Operation	Particulate Speciation		Potential Emissions					
									PM		PM_{10}		$PM_{2.5}$	
				(cfm)	(gr/cf)	(hours)	PM_{10} (% of PM)	$PM_{2.5}$ (% of PM)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)
ES-PCHP	Pellet Cooler HP Fines Relay System	CD-PCHP-BV	One (1) baghouse[4]	3,600	0.004	8,760	100%	100%	0.12	0.54	0.12	0.54	0.12	0.54
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BV	One (1) baghouse[4]	2,500	0.004	8,760	100%	100%	0.086	0.38	0.086	0.38	0.086	0.38
ES-CLR-1	Pellet Cooler	CD-CLR-1	One (1) existing Cyclone[5]	17,100	0.01	8,760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.047	0.21
ES-CLR-2	Pellet Cooler	CD-CLR-2	One (1) existing Cyclone[5]	17,100	0.01	8,760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.047	0.21
ES-CLR-3	Pellet Cooler	CD-CLR-3	One (1) existing Cyclone[5]	17,100	0.01	8,760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.047	0.21
ES-CLR-4	Pellet Cooler	CD-CLR-4	One (1) existing Cyclone[5]	17,100	0.01	8,760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.047	0.21
ES-CLR-5	Pellet Cooler	CD-CLR-5	One (1) existing Cyclone[5]	17,100	0.01	8,760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.047	0.21
ES-CLR-6	Pellet Cooler	CD-CLR-6	One (1) existing Cyclone[5]	17,100	0.01	8,760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.047	0.21
ES-DWH-2	Dried Wood Handling-2	CD-DWH-BF-2	One (1) baghouse	2,500	0.004	8,760	100%	100%	0.086	0.38	0.086	0.38	0.086	0.38
ES-DSR	Dry Shavings Reception	CD-DSR-BF	One (1) baghouse	2,500	0.004	8760	100%	100%	0.086	0.38	0.086	0.38	0.086	0.38
ES-FPH; ES-PB-1 through 12; ES-PL-1 and -2	Finished Product Handling; Twelve pellet loadout bins; Pellet mill loadout 1 and 2	CD-FPH-BF	One (1) baghouse[3,6]	35,500	0.004	8,760	91%	40%	1.22	5.33	1.11	4.85	0.49	2.13
ES-DSS	Dry Shavings Silo	CD-DSS-BF	One (1) baghouse[4]	500	0.004	8,760	100%	100%	0.02	0.08	0.02	0.08	0.02	0.08

Notes:

1. Filter, Vent, and Cyclone inlet flow rate (cfm) provided by design engineering firm (Mid-South Engineering Co.). The exit flowrate was conservatively assumed to be the same as the inlet flowrate.
2. Pollutant loading provided by Aircon.
3. Finished product handling $PM_{2.5}$ speciation based on review of NCASI data for similar baghouses in the wood products industry.
4. No speciation data is available for $PM_{10}/PM_{2.5}$. Therefore, it is conservatively assumed to be equal to total PM.
5. Pellet cooler $PM_{10}/PM_{2.5}$ speciation based on process knowledge and engineering judgement.
6. Finished product handling PM_{10} speciation based on AP-42 factors for wet wood combustion (Section 1.6) controlled by a mechanical separator. Since the particle size of particulate matter from a pellet cooler is anticipated to be larger than flyash, this factor is believed to be a conservative indicator of speciation.

Abbreviations:

cf - cubic feet
cfm - cubic feet per minute
ES - Emission Sources
IES - Insignificant Emission Source
gr - grain
hr - hour
lb - pound
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
tpy - tons per year

Reference:

U.S. EPA. AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03

Table 9a
Potential Emissions from Material Handling
Enviva Pellets Northampton, LLC

Source	Transfer Activity[1]	Control	Control Description	Number of Drop Points	Material Moisture Content	PM Emission Factor[1]	PM_{10} Emission Factor[1]	$PM_{2.5}$ Emission Factor[1]	Potential Throughput[2]		Potential PM Emissions		Potential PM_{10} Emissions		Potential $PM_{2.5}$ Emissions	
					(%)	(lb/ton)	(lb/ton)	(lb/ton)	(tph)	(tpy)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)
ES-GWHS	Material feed conveyance system to dryer burner fuel storage bin	--	--	5	48%	3.7E-05	1.8E-05	2.7E-06	44	389,054	8.3E-03	3.6E-02	3.9E-03	1.7E-02	5.9E-04	2.6E-03
	Material feed conveyance system to raw wood chip storage pile	--	--	1	48%	3.7E-05	1.8E-05	2.7E-06	400	1,502,414	1.5E-02	2.8E-02	7.1E-03	1.3E-02	1.1E-03	2.0E-03
	Material feed conveyance system to dryer burner	--	--	0	45%	4.1E-05	1.9E-05	2.9E-06	44	389,054	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Material feed conveyance system to rotary drum wood dryer	--	--	0	48%	3.7E-05	1.8E-05	2.7E-06	300	1,502,414	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Material feed conveyance system to fuel storage piles	--	--	3	45%	4.1E-05	1.9E-05	2.9E-06	44	389,054	5.5E-03	2.4E-02	2.6E-03	1.1E-02	3.9E-04	1.7E-03
IES-DLH	Drop point for dry shavings to dry line hopper	--	--	1	17%	1.6E-04	7.6E-05	1.1E-05	10.0	87,600	1.6E-03	7.0E-03	7.6E-04	3.3E-03	1.1E-04	5.0E-04
ES-DLC-1	Drop point for dry line hopper to dry line feed conveyor	--	--	1	17%	1.6E-04	7.6E-05	1.1E-05	10.0	87,600	1.6E-03	7.0E-03	7.6E-04	3.3E-03	1.1E-04	5.0E-04
IES-DRYSHAVE	Existing dry shaving walking floor truck dump	--	--	1	8.0%	4.6E-04	2.2E-04	3.3E-05	48.0	87,600	2.2E-02	2.0E-02	1.0E-02	9.5E-03	1.6E-03	1.4E-03
	Existing dry shaving loader	--	--	2	8.0%	4.6E-04	2.2E-04	3.3E-05	10.0	87,600	9.2E-03	4.0E-02	4.3E-03	1.9E-02	6.6E-04	2.9E-03
IES-ADD	Additive Handling and Storage	--	--	1	0.25%	5.9E-02	2.8E-02	4.2E-03	1.0	8,760	5.9E-02	2.6E-01	2.8E-02	1.2E-01	4.2E-03	1.8E-02
ES-PS-1 and 2	Drop points from the dry line feed conveyor to the Dry Hammermill Pre-screeners	--	--	2	17.0%	1.6E-04	7.6E-05	1.1E-05	300.0	1,502,414	9.6E-02	2.4E-01	4.5E-02	1.1E-01	6.9E-03	1.7E-02
ES-DWH-1	Dried Wood Handling 1[3]	--	--	2	17.0%	1.6E-04	7.6E-05	1.1E-05	185.3	941,271	5.9E-02	1.5E-01	2.8E-02	7.1E-02	4.2E-03	1.1E-02
										Total Emissions:	**0.28**	**0.81**	**0.13**	**0.38**	**0.020**	**0.058**

Notes:

1. Emission factor calculation based on formula from AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, Equation 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

2. Throughputs represent actual weight of materials. Throughput for dry shaving material handling is based on comparable Enviva facilities.

3. Emissions from dried wood handling associated with the existing dryer line are controlled by an existing passive bin vent.

Abbreviations:

hr - hour
lb - pound
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
tpy - tons per year
yr - year

References:

U.S. EPA. AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, 11/06.

Table 16
Potential GHG Emissions
Facility-wide
Enviva Pellets Northampton, LLC

Operating Data:

Dryer-1 Heat Input	175.3	MMBtu/hr
Annual Heat Input	1,554,814	MMBtu/yr
Duct Burner 1 and 2 Heat Input	3	MMBtu/hr
Number of Burners	2	
Operating Schedule	8,760	hrs/yr
Dryer-2 Heat Input	180.0	MMBtu/hr
Annual Heat Input	1,576,800	MMBtu/yr
Duct Burner 3 and 4 Heat Input	3	MMBtu/hr
Number of Burners	2	
Operating Schedule	8,760	hrs/yr
RTO-1 Heat Input	31.6	MMBtu/hr
Operating Schedule	8,760	hrs/yr
Furnace 1 Bypass Heat Input	26	MMBtu/hr
Operating Schedule	50	hrs/yr
Furnace 1 Idle Heat Input	10	MMBtu/hr
Operating Schedule	500	hrs/yr
RTO-2 Heat Input	28.8	MMBtu/hr
Operating Schedule	8,760	hrs/yr
Furnace 2 Bypass Heat Input	27	MMBtu/hr
Operating Schedule	50	hrs/yr
Furnace 2 Idle Heat Input	10	MMBtu/hr
Operating Schedule	500	hrs/yr
RCO-2 Heat Input	16.2	MMBtu/hr
Operating Schedule	8,760	hrs/yr
Propane Vaporizer Heat Input	1	MMBtu/hr
Operating Schedule	8,760	hrs/yr
Emergency Generator 1 Output	350	bhp
Operating Schedule	500	hrs/yr
Power Conversion	7,000	Btu/hr/hp
Energy Input	2.450	MMBtu/hr
Emergency Generator 2 Output	671	bhp
Operating Schedule	500	hrs/yr
Power Conversion	7,000	Btu/hr/hp
Energy Input	4.69	MMBtu/hr
Fire Water Pump Output	300	bhp
Operating Schedule	500	hrs/yr
Power Conversion	7,000	Btu/hr/hp
Energy Input	2.100	MMBtu/hr

Table 16
Potential GHG Emissions
Facility-wide
Enviva Pellets Northampton, LLC

Emission Unit ID	Fuel Type	Emission Factors from Table C-1 (kg/MMBtu)[1]			Tier 1 Emissions (short tons)			
		CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	Total CO_2e
ES-DRYER-1	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	160,761	308	1,839	162,908
IES-DDB-1 and -2	Propane	62.87	7.50E-02	1.79E-01	3,035	3.62	8.63	3,048
ES-DRYER-2	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	163,034	313	1,865	165,212
IES-DDB-3 and -4	Propane	62.87	7.50E-02	1.79E-01	3,035	3.62	8.63	3,048
CD-RTO-1[2]	Propane	62.87	7.50E-02	1.79E-01	19,202	22.91	54.61	19,280
ES-FURNACEBYP-1	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	136	0.26	1.55	138
ES-FURNACEBYP-1 (Idle Mode)	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	517	0.99	5.91	524
CD-RTO-2[3]	Propane	62.87	7.50E-02	1.79E-01	17,489	20.86	49.74	17,560
ES-FURNACEBYP-2	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	140	0.27	1.60	141
ES-FURNACEBYP-2 (Idle Mode)	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	517	0.99	5.91	524
CD-RCO-2[4]	Propane	62.87	7.50E-02	1.79E-01	9,812	11.71	27.91	9,852
IES-PVAP	Propane	62.87	7.50E-02	1.79E-01	607.08	0.72	1.73	610
IES-GN-1	No. 2 Fuel Oil (Distillate)	73.96	7.50E-02	1.79E-01	100	0.10	0.24	100
IES-GN-2	No. 2 Fuel Oil (Distillate)	73.96	7.50E-02	1.79E-01	191	0.19	0.46	192
IES-FWP	No. 2 Fuel Oil (Distillate)	73.96	7.50E-02	1.79E-01	86	0.09	0.21	86

Notes:

[1] Emission factors from Table C-1 and C-2 of GHG Reporting Rule. Emission factors for methane and N_2O already multiplied by their respective GWPs of 25 and 298.

[2] CD-RTO-1 heat input includes heat input contributed by VOC in the furnace/dryer, green hammermill, dry hammermill, and dry shavings hammermills' exhaust streams in addition to the RTO burners.

[3] CD-RTO-2 heat input includes heat input contributed by VOC in the furnace/dryer exhaust stream in addition to the RTO burners.

[4] CD-RCO-2 heat input includes the heat input contributed by VOC in the pellet cooler exhaust stream in addition to the RCO/RTO burners.

APPENDIX E
PERMIT CONDITION 2.2 A.3.Q MODIFICATION REQUEST AND NCDEQ'S RESPONSE

Enviva Pellets Northampton LLC
874 Lebanon Church Road
Garysburg, NC 27381

+1 (252) 541 2631
fax (252) 541 2632

www.envivabiomass.com

November 15, 2019

Michael A. Abraczinskas, Director
NC Department of Environmental Quality
Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641
Via Electronic and Federal Express 7769 9497 8780

RE: Request for Permit Modification Through Informal Means, Air Quality Permit No. 10203R06, Issued on October 30, 2019 to Enviva Pellets Northampton, LLC.

Dear Mr. Abraczinskas:

This letter is a request for modification through informal means, pursuant to NCGS 150B-22, of the above-referenced permit (the "Permit") issued to Enviva Pellets Northampton LLC ("Enviva") on October 30. 2019.

Specifically, Enviva requests that the last sentence (prior to the equation) of Condition 2.2.A.3.q of the Permit be revised to include the language presented in underlining below:

> "Monthly NOx emissions, in tons, shall be calculated by the following equations and emission factors until all of the proposed control devices are installed (excluding the new wood dryer controls in the event the second dryer is not installed) and new site-specific approved NOx emission factors have been established through stack testing."

The requested language comes verbatim from the Hearing Officer's Report and Recommendations for the Permit (recommendation in response to Public Comments, Section 1, Comment 1, page 7) and from the Application Review document for the Permit dated October 30, 2019 prepared by Review Engineer Richard Simpson (page 30).

Thank you for your consideration of this request.

Sincerely,

Brandon Roberts, Director, Manufacturing
Enviva Pellets Northampton LLC

cc: Michael Pjetraj, DAQ
William Willets, DAQ
Ray Stewart, DAQ
Richard Simpson, DAQ
Yana Kravtsova, Enviva
Kai Simonsen, Enviva
Alan McConnell, Kilpatrick Townsend

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

MICHAEL ABRACZINSKAS
Director

NORTH CAROLINA
Environmental Quality

November 25, 2019

Mr. Brandon Roberts
Director, Manufacturing
Enviva Pellets Northampton, LLC
309 Enviva Boulevard
Garysburg, North Carolina 27831

Subject: Permit Applicability Determination
Applicability Determination No. 3495
Enviva Pellets Northampton, LLC
Garysburg, North Carolina
Facility ID No. 6600167
Permit No. 10203R06

Dear Mr. Roberts:

The Division of Air Quality (DAQ) received your November 15, 2019 request that this Office determine whether an informal modification could be performed on Air Permit 10203R06 dated October 30, 2019. Your request is to include additional language to Permit Condition 2.2 A.3.q. The requested additional language is underlined below:

> "Monthly NOx emissions, in tons, shall be calculated by the following equations and emission factors until all of the proposed control devices are installed (excluding the new wood dryer controls in the event the second dryer is not installed) and new site-specific approved NOx emission factors have been established through stack testing."

DAQ has evaluated the information submitted for the additional condition language for Permit Section 2.2 A.3.q. and determined that it is not needed at this time. Permit Section 2.2 A.11.b. reads: "The Permittee shall amend the first time Title V Air Quality Permit Application (6600167.14B) within 90 days of the issuance of Permit No. 10203R06." DAQ will include your suggested language in Section 2.2 A.3.q. in the upcoming initial Title V permit since the application is due before February 2020.

Should you have any questions concerning this matter, please contact Richard Simpson at (919) 707-8476 or richard.simpson@ncdenr.gov.

Sincerely yours,

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

c: Ray Stewart, Supervisor, Raleigh Regional Office
Central Files

APPENDIX F
ZONING DETERMINATION REQUESTS

April 13, 2020

Dear Customer,

The following is the proof-of-delivery for tracking number: 770072422515

Delivery Information:

Status:	Delivered	**Delivered To:**	Receptionist/Front Desk
Signed for by:	J.OWENS	**Delivery Location:**	504 OLD HIGHWAY RD
Service type:	FedEx Priority Overnight		GARYSBURG, NC, 27831
Special Handling:	Deliver Weekday	**Delivery date:**	Mar 24, 2020 10:16

Shipping Information:

Tracking number:	770072422515	**Ship Date:**	Mar 23, 2020
		Weight:	2.0 LB/0.91 KG

Recipient:
Town of Garysburg, Town of Garysburg
504 Old Highway Road
GARYSBURG, NC, US, 27831

Shipper:
Ramboll, Ramboll
8235 YMCA Plaza Dr.
Suite 300
Baton Rouge, LA, US, 70810

Reference 1690009489

Thank you for choosing FedEx

RAMBOLL

ENVIRONMENT
& HEALTH

March 23, 2020

Town of Garysburg
504 Old Highway Road
PO Box 278
Garysburg, North Carolina 27831

Dear Sir/Madam:

On behalf of Enviva Pellets Northampton, LLC (Enviva), I am writing to inform you that Enviva is submitting this modification application to replace in-total, the modification application previously submitted on February 5, 2020 for the Enviva Northhampton plant. As with the previously submitted modification application, Enviva intends to modify the wood pellet manufacturing facility at 309 Enviva Blvd. in Garysburg in Northampton County. I hereby certify that to the best of my knowledge, the City of Garysburg, in addition to the County of Northampton, has jurisdiction over part of the land on which the facility and its appurtenances are to be located.

In accordance with § 143-215.108(f) of the North Carolina General Statutes, Enviva request that you issue a determination as to whether your municipality has in effect a zoning or subdivision ordinance that is applicable to the proposed facility modification. Additionally, please issue a determination as to whether the proposed modification would be consistent with applicable zoning or subdivision ordinances. Note that all of the proposed modifications will occur within the existing facility fence line. For your convenience, I have included a form with which you may remit your determination and a copy of the draft air permit application as required. As a means of demonstrating proof of transmittal, please sign, title, stamp, and date the enclosed form and mail to both the facility mailing address and the checked air quality office at your earliest convenience.

Thank you for your prompt attention to this matter. If you have any questions regarding this request, please contact me at (225) 408-2691 or Steven P. Van Ootegham, Air Quality Engineer at Enviva, at (984) 368-0002.

Sincerely,

Michael Carbon
Managing Principal

Enclosures:
N.C.G.S. § 143-215.108(f)
Zoning Consistency Determination Form
Draft Air Permit Application

April 13, 2020

Dear Customer,

The following is the proof-of-delivery for tracking number: 770072404696

Delivery Information:

Status:	Delivered	**Delivered To:**	Receptionist/Front Desk
Signed for by:	T.LAMM	**Delivery Location:**	9495 HWY 305
Service type:	FedEx Priority Overnight		JACKSON, NC, 27845
Special Handling:	Deliver Weekday	**Delivery date:**	Mar 24, 2020 11:26

Shipping Information:

Tracking number:	770072404696	**Ship Date:**	Mar 23, 2020
		Weight:	1.0 LB/0.45 KG

Recipient:
Mr. William Flynn, Northhampton County
9495 Hwy 305
JACKSON, NC, US, 27845

Shipper:
Ramboll, Ramboll
8235 YMCA Plaza Dr.
Suite 300
Baton Rouge, LA, US, 70810

Reference 1690009489

Thank you for choosing FedEx

RAMBOLL

ENVIRONMENT
& HEALTH

March 23, 2020

Mr. William Flynn
Northampton County
9495 Hwy 305
Jackson, North Carolina 27845

Dear Mr. Flynn:

On behalf of Enviva Pellets Northampton, LLC (Enviva), I am writing to inform you that Enviva is submitting this modification application to replace in-total, the modification application previously submitted on February 5, 2020 for the Enviva Northampton plant. As with the previously submitted modification application, Enviva intends to modify the wood pellet manufacturing facility at 309 Enviva Blvd. in Garysburg in Northampton County. I hereby certify that to the best of my knowledge, the County of Northampton, in addition to the City of Garysburg, has jurisdiction over part of the land on which the facility and its appurtenances are to be located.

In accordance with § 143-215.108(f) of the North Carolina General Statutes, Enviva request that you issue a determination as to whether your municipality has in effect a zoning or subdivision ordinance that is applicable to the proposed facility modification. Additionally, please issue a determination as to whether the proposed modification would be consistent with applicable zoning or subdivision ordinances. Note that all of the proposed modifications will occur within the existing facility fence line. For your convenience, I have included a form with which you may remit your determination and a copy of the replacement draft air permit application as required. As a means of demonstrating proof of transmittal, please sign, title, stamp, and date the enclosed form and mail to both the facility mailing address and the checked air quality office at your earliest convenience.

Thank you for your prompt attention to this matter. If you have any questions regarding this request, please contact me at (225) 408-2691 or Steven P. Van Ootegham, Air Quality Engineer at Enviva, at (984) 368-0002.

Sincerely,

Michael Carbon
Managing Principal

Enclosures:
N.C.G.S. § 143-215.108(f)
Zoning Consistency Determination Form
Draft Air Permit Application

Zoning Consistency Determination

Facility Name	Enviva Pellets Northampton, LLC
Facility Street Address	309 Enviva Blvd.
Facility City	Garysburg
Description of Process	Wood pellet manufacturing facility
SIC/NAICS Code	2499
Facility Contact	Steven P. Van Ootegham, Air Quality Engineer
Phone Number	984-368-0002
Mailing Address	4242 Six Forks Road, Suite 1050
Mailing City, State Zip	Raleigh, NC 27609

Based on the information given above:

- ☐ I have received a copy of the air permit application (draft or final) AND...

- ☐ There are no applicable zoning ordinances for this facility at this time
- ☐ The proposed operation IS consistent with applicable zoning ordinances
- ☐ The proposed operation IS NOT consistent with applicable zoning ordinances
  (please include a copy of the rules in the package sent to the air quality office)
- ☐ The determination is pending further information and can not be made at this time
- ☐ Other:

_____

Agency _____

Name of Designated Official _____

Title of Designated Official _____

Signature _____

Date _____

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

All PSD and Title V Applications

√ Attn: William Willets, PE
DAQ – Permitting Section
1641 Mail Service Center
Raleigh, NC 27699-1641

Local Programs

☐ Attn: David Brigman
Western NC Regional Air Quality Agency
49 Mount Carmel Road
Asheville, NC 28806
(828) 250-6777

☐ Attn: Leslie Rhodes
Mecklenburg County Air Quality
700 N. Tryon Street, Suite 205
Charlotte, NC 28202-2236
(704) 336-5430

☐ Attn: William Minor Barnette
Forsyth County Office of Environmental Assistance and Protection
201 N. Chestnut Street
Winston-Salem, NC 27101-4120
(336) 703-2440

Division of Air Quality Regional Offices

☐ Attn: Paul Muller
Asheville Regional Office
2090 U.S. Highway 70
Swannanoa, NC 28778
(828) 296-4500

Attn: Steven Vozzo
Fayetteville Regional Office
225 Green Street, Suite 714
Fayetteville, NC 28301
(910) 433-3300

☐ Attn: Ron Slack
Mooresville Regional Office
610 East Center Avenue, Suite 301
Mooresville, NC 28115
(704) 663-1699

✓ Attn: Patrick Butler, PE
Raleigh Regional Office
1628 Mail Service Center
Raleigh, NC 27699-1628
(919) 791-4200

☐ Attn: Robert Fisher
Washington Regional Office
943 Washington Square Mall
Washington, NC 27889
(252) 946-6481

☐ Attn: Brad Newland
Wilmington Regional Office
127 Cardinal Drive Extension
Wilmington, NC 28405
(910) 796-7215

☐ Attn: Lisa Edwards, PE
Winston-Salem Regional Office
450 West Hanes Mill Road, Suite 300
Winston-Salem, NC 27105
(336) 776-9800