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ENVIRONMENT
& HEALTH

Mr. William Willets, PE
Chief, Permitting Section, Division of Air Quality
NC Department of Environmental Quality
1641 Mail Service Center
Raleigh, NC 27699-1641

Re: Application for Air Quality Permit Modification and Renewal
Enviva Pellets Hamlet, LLC
Hamlet, North Carolina
Richmond County
Permit No.: 10365R05
Facility ID: 7700096

Dear Mr. Willets:

Date November 25, 2020

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Enclosed please find a North Carolina Department of Environmental Quality (NC DEQ) permit application package for an air quality permit modification and renewal for Enviva Pellets Hamlet, LLC (Enviva) (NC DEQ Facility ID #7700096) in Richmond County. This permit application is being submitted to request renewal of the current permit, Air Quality Permit No. 10365R05, which expires on February 28, 2021 and to request the following revisions to the current permit:

- Revisions to potential emissions for the Dryer, Green Hammermills, Dry Hammermills, Pellet Mills and Coolers, and Dried Wood Handling to reflect the results of compliance testing completed in January 2020;
- Addition of two (2) natural gas-fired burners used to heat the dryer ducts;
- Addition of two (2) propane vaporizers to vaporize liquid propane for combustion by the control device burners (CD-RTO and CD-RCO/RTO) and dryer system duct burners;
- Modifications to optimize operation of the Dryer line regenerative thermal oxidizer (CD-RTO) and increase the permitted heat input of the RTO to allow for injection of natural gas;
- Use of diesel fuel as an accelerant in the furnace during cold start-up and provide clarification on use of the dryer bypass stack;
- Removal of the additive storage silo and baghouse (ES-ADD) from the permit as these will not be installed and instead reflect the current practice of transferring additive from supersacks to a hopper (IES-ADD);
- In the updated initial Title V application submitted on July 24, 2020, the previously assumed particulate control efficiency of 90% for partial enclosure of the Debarker was removed. However, with this application

Enviva is updating the potential emissions calculations to reflect a 90% control efficiency for water spray;

- Removal of the Pellet Dust Collection Transfer Bin (ES-PDCTB) and associated baghouse (CD-PDCTB-BH) from the permit as these will not be installed;
- Update the process description for the woodyard, including Green Wood Handling (IES-GWH) and vehicle activities on unpaved roads (I-UNPAVEDROADS);
- Update Green Wood Handling (IES-GWH) throughputs and moisture contents;
- Increase the maximum annual throughput for the Bark Hog (IES-BARKHOG);
- Removal of Pellet Cooler Low Pressure (LP) Fines Relay System and associated baghouse (CD-PCLP-BH) from the permit;
- Update the fraction of particulate matter (PM) that is less than 2.5 micrometers in diameter ($PM_{2.5}$) for the Finished Product Handling baghouse (CD-FPH-BH);
- Update potential emissions for front-end loader traffic on unpaved areas (I-UNPAVEDROADS);
- Addition of two parts washers (insignificant activities);
- Update calculation methodology for diesel storage tanks from EPA TANKS 4.0 to AP-42 Section 7.1;
- Removal of the 8-hour limit on the furnace cold start-up duration included in Condition 2.2.A.3.l;
- Addition of a footnote to the equipment table in the permit to clarify the control scheme for the Dry Hammermills;
- Modify Condition 2.1 A.1.e to reflect that the dryer furnace is not considered a control device;
- Correct labeling of Condition 2.2 A.3.e.i through vi;
- Modify Condition 2.2.A.3.n to more accurately reflect the actual operation of the Dry Hammermills;
- Increase short-term production from 80 ODT/hr to 120 ODT/hr;
- Reflect the use of electric boilers to generate steam to be used in the pellet production process; and
- Incorporate previously unquantified emissions from chip screening as part of the Green Wood Handling insignificant activity (IES-GWH).

This permit renewal application is being submitted at least 90 days prior to permit expiration as required by 15A NCAC 02Q .0304(d) and (f) and Condition 2.2.A.5 of Air Quality Permit No. 10365R05.

Enviva requests that the procedures of 15A North Carolina Administrative Code (NCAC) 2Q .0504 be utilized for this modification, allowing issuance of a construction and operating permit under 15A NCAC 2Q .0300. As required, three (3) copies of the complete permit application package are enclosed. The application processing fee of $988 will be paid electronically through the ePayments System. In addition, Enviva has submitted the required zoning determination documents to both the City of Hamlet and Richmond County

zoning departments. Copies of the submitted zoning determination requests are included in Appendix E 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 Permit Engineer at Enviva, at (984) 789-3628.

Yours sincerely,

Michael Carbon
Managing Principal

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cc: Yana Kravtsova (Enviva)
Kai Simonsen (Enviva)
Stephen Stroud (Enviva)

Enclosures: Permit Application

Prepared for
Enviva Pellets Hamlet, LLC
Richmond County, North Carolina

Prepared By
Ramboll US Consulting, Inc.

Project Number
1690016258-006

Date
November 2020

APPLICATION FOR AIR QUALITY PERMIT MODIFICATION AND RENEWAL

ENVIVA PELLETS HAMLET, LLC

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CONTENTS

APPENDICES

ACRONYMS AND ABBREVIATIONS

AAL	Acceptable Ambient Level
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
FSC	Forest Stewardship Council
HAP	Hazardous Air Pollutant
hp	horsepower
ICE	Internal Combustion Engine
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
NWS	National Weather Service
ODT	Oven Dried Tons
PEFC	Programme for the Endorsement of Forest Certification
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
RICE	Reciprocating Internal Combustion Engine
RCO	Regenerative Catalytic Oxidizer
RTO	Regenerative Thermal Oxidizer
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SFI	Sustainable Forestry Initiative
TAP	Toxic Air Pollutant
TCO	Thermal Catalytic Oxidizer
tph	tons per hour
tpy	tons per year
EPA	US Environmental Protection Agency
VOC	Volatile Organic Compounds
WESP	Wet Electrostatic Precipitator

1. INTRODUCTION

Enviva Pellets Hamlet, LLC (Enviva) owns and operates a wood pellets manufacturing plant (referred to herein as "the Hamlet plant" or "the facility") in Richmond County, North Carolina under Air Quality Permit No. 10365R05 issued by the North Carolina Department of Environmental Quality (NCDEQ), Division of Air Quality (DAQ) on July 20, 2020. The plant commenced operation on July 24, 2019 and is permitted to produce up to 625,011 oven-dried tons (ODT) per year of wood pellets utilizing up to 85% softwood on a 12-month rolling basis. The plant consists of the following processes: Log Chipper, Debarker, Bark Hog, Green Hammermills, Rotary Dryer, Dry Hammermills, Pellet Mills, Pellet Coolers, Product Loadout operations and other ancillary activities.

The Hamlet plant is currently permitted as a major source with respect to the Title V permitting program and as a synthetic minor source with respect to the New Source Review (NSR) permitting program, because potential facility-wide emissions of one or more criteria pollutants were estimated to exceed the Title V major source threshold of 100 tons per year (tpy) but are limited below the NSR major source threshold of 250 tpy. Air Quality Permit No. 10365R05 authorizes implementation of emissions controls for the Dry Hammermills. Upon controlling the Dry Hammermill exhaust the plant will become a minor source of hazardous air pollutants (HAP).

Enviva is submitting this application for renewal of the construction and operation permit which expires on February 28, 2021 and to request the following revisions to Air Quality Permit No. 10365R05:

- Revisions to potential emissions for the Dryer, Green Hammermills, Dry Hammermills, Pellet Mills and Coolers, and Dried Wood Handling to reflect the results of compliance testing completed in January 2020;
- Addition of two (2) natural gas-fired burners used to heat the dryer ducts;
- Addition of two (2) propane vaporizers to vaporize liquid propane for combustion by the control device burners (CD-RTO and CD-RCO/RTO) and dryer system duct burners;
- Modifications to optimize operation of the Dryer line regenerative thermal oxidizer (CD-RTO) and increase the permitted heat input of the RTO to allow for injection of natural gas;
- Use of diesel fuel as an accelerant in the furnace during cold start-up and provide clarification on use of the dryer bypass stack;
- Removal of the additive storage silo and baghouse (ES-ADD) from the permit as these will not be installed and instead reflect the current practice of transfering additive from supersacks to a hopper (IES-ADD);
- Removal of the Pellet Dust Collection Transfer Bin (ES-PDCTB) and associated baghouse (CD-PDCTB-BH) from the permit as these will not be installed;
- Update the process description for the woodyard, including Green Wood Handling (IES-GWH) and vehicle activities on unpaved roads (I-UNPAVEDROADS);
- Update Green Wood Handling (IES-GWH) throughputs and moisture contents;
- Increase the maximum annual throughput for the Bark Hog (IES-BARKHOG);

- In the updated initial Title V application submitted on July 24, 2020, the previously assumed particulate control efficiency of 90% for partial enclosure of the Debarker was removed. With this application Enviva is updating the potential emissions calculations to reflect a 90% control efficiency for water spray;
- Removal of Pellet Cooler Low Pressure (LP) Fines Relay System and associated baghouse (CD-PCLP-BH) from the permit;
- Update the fraction of particulate matter (PM) that is less than 2.5 micrometers in diameter ($PM_{2.5}$) for the Finished Product Handling baghouse (CD-FPH-BH);
- Update potential emissions for front-end loader traffic on unpaved areas (I-UNPAVEDROADS);
- Addition of two parts washers (insignificant activities);
- Update calculation methodology for diesel storage tanks from EPA TANKS 4.0 to AP-42 Section 7.1;
- Removal of the 8-hour limit on the furnace cold start-up duration included in Condition 2.2.A.3.l;
- Addition of a footnote to the equipment table in the permit to clarify the control scheme for the Dry Hammermills;
- Modify Condition 2.1 A.1.e to reflect that the dryer furnace is not considered a control device;
- Correct labeling of Condition 2.2 A.3.e.i through vi;
- Modify Condition 2.2.A.3.n to more accurately reflect the actual operation of the Dry Hammermills;
- Increase short-term production from 80 ODT/hr to 120 ODT/hr;
- Reflect the use of electric boilers to generate steam for use in the pellet production process; and
- Incorporate previously unquantified emissions from chip screening as part of the Green Wood Handling insignificant activity (IES-GWH).

This permit renewal application is being submitted at least 90 days prior to permit expiration as required by 15A NCAC 02Q .0304(d) and (f) and Condition 2.2.A.5 of Air Quality Permit No. 10365R05.

Additional detail on requested revisions is provided in Section 2. A description of the process is provided in Section 3 and 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. The completed air permit application forms are included in Appendix A. In addition, Enviva has submitted the required zoning determination documents to both the City of Hamlet and Richmond County zoning departments. Copies of the submitted zoning determination requests are included in Appendix E of this submittal.

2. REQUESTED PERMIT REVISIONS

Enviva requests that the procedures of 15A North Carolina Administrative Code (NCAC) 2Q .0504 be utilized for this modification, allowing issuance of a construction and operating permit under 15A NCAC 2Q .0300. The following summarizes the proposed revisions to Permit No. 10365R05:

- Updates to potential emissions to reflect the results of compliance testing completed in January 2020 for the regenerative thermal oxidizer (CD-RTO) which currently controls the Dryer and Green Hammermills and will control the Dry Hammermills, the Regenerative Catalytic Oxidizer/RTO (RCO)/RTO that controls the Pellet Mills and Coolers (ES-CLR-1 through 6), and Dried Wood Handling (ES-DWH). Emissions from these sources have also been updated to reflect an increase in hourly throughput from 80 ODT/hr to 120 ODT/hr.
- The addition of two (2) natural gas-fired burners, each with a heat input of 2.5 million British thermal units per hour (MMBtu/hr), to heat the dryer system ducts (IES-DB-1 and IES-DB-2). As flue gas exits the dryer and begins to cool, wood tar can condense and coat the inner walls of the ducts creating a risk of fire. In order to prevent condensation from occurring, and thus reduce the risk of fire, the two (2) ducts (herein referred to as double ducts) on the dryer system will be heated. Potential emissions from the duct burners are below the thresholds in 15A NCAC 02Q .0503(8) and they are thus considered insignificant activities.
- The addition of two (2) propane vaporizers to vaporize propane received by truck for combustion by the RTO burners, RCO/RTO burners, and burners for the dryer system double ducts. Each vaporizer has a maximum heat input capacity of 1 MMBtu/hr and combusts propane. Potential emissions from the duct burners are below the thresholds in 15A NCAC 02Q .0503(8) and they are thus considered insignificant activities.
- Modifications to optimize operation of the RTO (CD-RTO) including enlarging the ductwork and poppet valves to allow for more air flow and the addition of two (2) canisters with combustion zone and additional burners. Enviva is also requesting authorization for injection of natural gas into the RTO which will reduce the amount of combustion air added to the RTO, thereby increasing fuel efficiency and reducing nitrogen oxide (NO_X) generation. The heat input of the RTO will be increased from 32 MMBtu/hr to 54.4 MMBtu/hr as a result of the additional burners and natural gas injection.
- Diesel fuel may be used as an accelerant for cold start-up of the furnace. The amount of fuel used per event is typically 15-30 gallons and typically 100-200 gallons per year. Emissions from diesel combustion during cold start-ups are insignificant.
- Enviva is providing clarification on use of the dryer bypass stack. The dryer bypass stack is used when the furnace is started up from a cold shutdown and when the furnace transitions from idle mode to normal operation. Emissions are vented through the dryer bypass stack for approximately 10 minutes as exhaust flow is transitioned from the furnace bypass stack to the WESP and RTO. The dryer is not operational during this time and emissions are due solely to combustion of fuel in the

furnace. Emissions during these brief transition periods are insignificant and are not separately quantified to avoid double-counting, as these emissions are already accounted for under the furnace cold start-up and idle mode scenarios.

- Removal of the additive storage silo and baghouse (ES-ADD) from the permit since these will not be installed. Additive is delivered by truck in 2,000 pound supersacks and emptied into a hopper. The additive is transferred from the hopper via enclosed screw conveyor and added to sized wood from the Pellet Mill Feed Silo discharge screw conveyor prior to transfer to the Pellet Mills. Emissions from additive handling operations are below the thresholds in 15A NCAC 02Q .0503(8) and it is thus considered an insignificant activity.
- Update the process description for Green Wood Handling (IES-GWH) to more accurately reflect the plant as constructed. Specifically, hardwood and softwood chips are stored in separate piles. Green Wood Storage Pile No. 5 (IES-GWSP-5) is specifically used for storage of hardwood chips. Green hardwood chips are unloaded via the truck dumpers and transferred to the dedicated hardwood storage pile by front-end loader. Hardwood and softwood chips from their respective storage piles are transferred to a mix pile via a front-end loader where they are manually mixed using a front-end loader. From the mix pile, the chips are then transferred to a reclaim hopper (previously referred to as the Wet Hardwood Hopper) via front-end loader.[1] From the hopper a drag chain feeds the chips through an enclosed chute onto the enclosed conveyor to the Green Hammermills.
- Update to the Green Wood Handling (IES-GWH) throughputs and moisture contents to more accurately reflect material moisture weights and to account for material blending operations in the mix storage pile.
- Increase the maximum annual throughput for the Bark Hog (IES-BARKHOG) from 113,638 ODT/yr to 175,000 ODT/yr.
- In the updated initial Title V application submitted on July 24, 2020, the previously assumed particulate control efficiency of 90% for partial enclosure of the Debarker was removed. With this application, the potential emissions have been updated to reflect a 90% control efficiency for use of water spray. The Debarker is considered an insignificant activity per 15A NCAC 02Q .0503 due to potential uncontrolled PM emissions less than 5 tpy.
- Removal of Pellet Cooler Low Pressure (LP) Fines Relay System (ES-PCLP) and associated baghouse (CD-PCLP-BH) from the permit because this is part of a closed-loop system and does not vent to the atmosphere.
- Update the fraction of PM that is $PM_{2.5}$ for the Finished Product Handling baghouse (CD-FPH-BH) to more accurately reflect emissions based on a review of National Council for Air and Stream Improvements (NCASI) particle size distribution data for similar baghouses in the wood products industry.
- Update potential emissions for front-end loader traffic on unpaved areas (I-UNPAVEDROADS) to account for additional front-end loader activity between the hardwood and softwood piles, the mix pile, and the reclaim hopper.

[1] The mix pile is included in Green Wood Storage Piles (IES-GWSP-1 through 4).

- Addition of two (2) small parts washers to the maintenance building. Potential emissions associated with each of the parts washers (IES-PW) are less than the thresholds in 15A NCAC 02Q .0503(8) so they are considered insignificant activities.
- Update the calculation methodology for diesel storage tanks from EPA TANKS 4.0 to AP-42 Section 7.1, *Organic Liquid Storage Tanks* because the TANKS software is no longer supported by EPA.[2]
- Removal of the 8-hour limit on the furnace cold start-up duration included in Condition 2.2.A.3.l. Duration of cold start-up at the Hamlet plant typically ranges from 8 to 12 hours. Enviva minimizes the duration of each cold start-up to the maximum extent possible.
- Addition of the following as a footnote to the equipment table in the permit to clarify the control scheme for the Dry Hammermills:

  "All air flow from the dry hammermills is controlled by the bagfilters (ID Nos. CD-HM-BH1 through CD-HM-BH8), the WESP (ID No. CD-WESP), and the RTO (ID No. CD-RTO). Under normal operations, all air flow from the bagfilters on the dry hammermills is ducted to the dryer furnace for treatment by the WESP and the RTO. In the event of reduced furnace/dryer operation, a portion of the air flow from the bagfilters on the dry hammermills is ducted directly to the WESP for treatment by the WESP and RTO. In the event of the shutdown of the furnace/dryer system, all air flow from the bagfilters on the dry hammermills is ducted directly to the WESP for treatment by the WESP and RTO."
- Modify Condition 2.1 A.1.e as follows to reflect that the dryer furnace is not considered a control device:

  Particulate matter emissions from dry hammermills (ES-HM-1 through 8) shall be controlled by bagfilters (CD-HM-1 through 8), in series with one wet electrostatic precipitator (CD-WESP), and one regenerative thermal oxidizer (CD-RTO).
- Correct labeling of Condition 2.2 A.3.e.i through vi;
- Modify Condition 2.2.A.3.n to more accurately reflect the actual operation of the Dry Hammermills. Enviva requests that the current language be replaced with the following:

  "All air flow from the dry hammermills shall be controlled by the bagfilters (ID Nos. CD-HM-BH1 through CD-HM-BH8), the WESP (ID No. CD-WESP), and the RTO (ID No. CD-RTO). Under normal operations, all air flow from the bagfilters on the dry hammermills shall be ducted to the dryer furnace for treatment by the WESP and the RTO. In the event of reduced furnace/dryer operation, a portion of the air flow from the bagfilters on the dry hammermills may be ducted directly to the WESP for treatment by the WESP and RTO. In the event of the shutdown of the furnace/dryer system, all air flow from the bagfilters on the dry hammermills may be ducted directly to the WESP for treatment by the WESP and RTO."
- Reflect the use of steam in the pellet production process. Steam will be generated using electric boilers which will not be sources of air emissions. Use of steam in the

[2] USEPA AP-42 Section 7.1, *Organic Liquid Storage Tanks* (06/20).

pelletizing process will improve the durability of the final product and will not result in an increase in emissions or production.

- Incorporate previously unquantified emissions from chip screening as part of the Green Wood Handling insignificant activity (IES-GWH). Total emissions from all Green Wood Handling activities, including chip screening, are insignificant (i.e., less than 5 tpy).

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 carbon dioxide (CO_2)/greenhouse gases (GHGs), 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 process description of the operations at the Hamlet plant impacted by the proposed changes in this application. An area map and process flow diagram are provided in Appendices B and C, respectively.

3.1 Green Wood Handling

With this application, Enviva is providing an updated process description for Green Wood Handling to more accurately reflect the plant as constructed. "Green" (i.e., wet) wood is delivered to the plant via trucks as either pre-chipped wood or unchipped logs from commercial harvesting for on-site chipping. Purchased chips and bark are unloaded from trucks via truck dumpers which gravity feed the chips and bark into hoppers. The hoppers feed a conveyor (IES-GWH) that transfers the material to Green Wood Storage Piles (IES-GWSP-1 through 4) or to Bark Fuel Storage Piles (IES-BFSP-1 and 2). Purchased chips are screened prior to transfer to the Green Wood Storage Piles.[3] Conveyors transferring green wood chips are partially enclosed.

Green Wood Storage Pile No. 5 (IES-GWSP-5) is specifically used for storage of hardwood chips. Green hardwood chips are unloaded via the truck dumpers and transferred to the dedicated hardwood storage pile by front-end loader. Hardwood and softwood chips from their respective storage piles are transferred to a mix pile via a front-end loader where they are manually mixed using a front-end loader. From the mix pile, the chips are then transferred to a reclaim hopper (previously referred to as the Wet Hardwood Hopper) via front-end loader.[4] From the hopper a drag chain feeds the chips through an enclosed chute onto the enclosed conveyor to the Green Hammermills.

Additionally, with this application Enviva is incorporating previously unquantified emissions from chip screening as part of the Green Wood Handling insignificant activity (IES-GWH).

[3] Chip screening is included under IES-GWH. Total emissions from all Green Wood Handling and Storage activities are insignificant.

[4] The mix pile is included in Green Wood Storage Piles (IES-GWSP-1 through 4).

Total emissions from all Green Wood Handling activities, including chip screening, are insignificant (i.e., less than 5 tpy). Enviva is also making updates to the Green Wood Handling (IES-GWH) throughputs and moisture contents to more accurately reflect material moisture weights and to account for material blending operations in the mix storage pile.

3.2 Debarking, Chipping, Bark Hog, and Bark Fuel Storage Piles and Bin

Logs are debarked by the electric-powered rotary drum Debarker (IES-DEBARK-1) and then sent to the Chipper (IES-CHIP-1) to chip the wood to specification for drying. Water spray will be used to control particulate emissions from the Debarker. Bark from the Debarker and purchased bark/chips are transferred to the Bark Hog (IES-BARKHOG) via conveyor for further processing. With this application Enviva is proposing to increase the maximum annual throughput for the Bark Hog from 113,638 ODT/yr to 175,000 ODT/yr.

Material processed by the Bark Hog is transferred to the Bark Fuel Storage Piles (IES-BFSP-1 and 2) via conveyor. The primary Bark Fuel Storage Pile (IES-BFSP-1) is located under a covered structure. The secondary Bark Fuel Storage Pile (IES-BFSP-2) serves as overflow storage as needed. Following storage in the Bark Fuel Storage Piles (IES-BFSP-1 and 2), the bark is transferred via a walking floor to a covered conveyor which feeds the fully enclosed Bark Fuel Bin (IES-BFB) where the material is pushed into the furnace.

As previously described, with this application Enviva is updating the potential emissions for the Debarker to reflect a particulate control efficiency of 90% for use of water spray. The Debarker is considered an insignificant activity per 15A NCAC 02Q .0503 due to potential uncontrolled PM emissions less than 5 tpy.

3.3 Green Hammermills, Dryer, and Dry Hammermills

Chipped wood used in pellet production is further processed by the three (3) Green Hammermills (ES-GHM-1, 2, and 3) to reduce material to the proper size prior to drying. Exhaust from the Green Hammermills is routed to the dryer line WESP/RTO control system (CD-WESP/CD-RTO-1) to control emissions of particulate matter (PM), volatile organic compounds (VOC), and HAPs.

After processing by the Green Hammermills, green wood is conveyed to a single pass rotary Dryer system (ES-DRYER). Direct contact heat is provided to the system via a 250.4 MMBtu/hr furnace that uses bark and wood chips as fuel. Green wood is fed into the Dryer where the moisture content is reduced to the desired level and routed to four (4) identical material recovery cyclones operating in parallel, which capture dried wood for further processing. Emissions from the Dryer cyclones are combined into a common duct which includes the vent from the Green Hammermills (ES-GHM-1 through 3) and routed to a WESP (CD-WESP) for particulate, metallic HAP, and hydrogen chloride removal. Emissions of VOC and organic HAP are controlled by a RTO (CD-RTO-1) following the WESP. The primary fuel for the RTO is natural gas but propane may be used as a back-up.

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 for capturing additional dried wood for further processing. Particulate emissions from each of the Dry Hammermills are controlled using individual baghouses (CD-HM-BH1 through 8).

As authorized by Permit No. 10365R05, Enviva will be implementing an air flow recirculation process in which a portion of the exhaust from each Dry Hammermill will be recirculated

back into the Dry Hammermill to reduce fresh intake air and thus decrease the volume of air that is routed to the downstream control devices (i.e., the Dry Hammermill baghouse, WESP and RTO). Specifically, the reduced Dry Hammermill exhaust stream will be routed to the Dry Hammermill baghouse then through a quench system and then to either 1) the inlet of the furnace with subsequent control by the WESP/RTO control system, 2) the inlet of the WESP/RTO control system, or a combination of the two. Since the WESP and RTO were sized for full operation of the dryer alone, adding additional air flow from Dry Hammermills for treatment requires that the furnace combustion air be reduced or replaced in its entirety. As such, the portion of Dry Hammermill exhaust that is directed to the furnace (offsetting fresh combustion air) is automatically adjusted depending on the furnace operating rate. At high furnace/dryer operating rates the air flow volume to the WESP and RTO are already maximized, thus more of the Dry Hammermill exhaust must be sent to the furnace to replace incoming combustion air so as not to exceed the air flow capacity of the WESP and RTO. At low furnace/dryer operating rates and associated exhaust rates more of the Dry Hammermill exhaust is sent directly to the WESP.

At all times 100% of the Dry Hammermill exhaust will be controlled by a baghouse, WESP, and RTO. The furnace is not a control device and has no impact on estimated potential to emit regardless of whether the Dry Hammermill exhaust is routed to the inlet of the furnace or directly to the inlet of the WESP. As such, Enviva requests that Condition 2.2.A.3.n of Air Quality Permit No. 10365R05 be modified, as discussed in Section 2, to more accurately reflect the actual operation of the Dry Hammermills.

The WESP will provide a reduction in PM, metallic HAP, and hydrogen chloride and the RTO will provide a reduction in VOC and organic HAP/TAP emissions. The quench system is considered inherent process equipment that is required to safely operate the RTO (i.e., reduce the risk of fire) and is not a control device. Safety interlocks will be installed to cease operation of the Dry Hammermills if a minimum flow rate is not maintained in the quench system or in the event of a malfunction that would prevent the WESP and/or RTO from controlling emissions from the Dry Hammermills.

With this application, Enviva is proposing modifications to optimize operation of the existing Dryer line RTO (CD-RTO) including enlarging the ductwork and poppet valves to allow for more air flow and the addition of two (2) canisters with combustion zone and additional burners. Enviva is also requesting authorization for injection of natural gas into the RTO which will reduce the amount of combustion air added to the RTO, thereby increasing fuel efficiency and reducing generation of NO_X. The heat input of the RTO will be increased from 32 MMBtu/hr to 54.4 MMBtu/hr as a result of the additional burners and natural gas injection. Potential emissions have been revised to reflect January 2020 compliance test data for the Dryer, Green Hammermills, and Dry Hammermills.

3.4 Furnace and Dryer Bypass Stacks

Bypass stacks for the furnace and dryer are used to exhaust hot gases during start-ups (for temperature control), shutdowns, and malfunctions. Specifically, the Furnace Bypass Stack is used in the following situations:

- **Cold Start-ups:** The furnace bypass stack is 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 (approximately 15% of the maximum heat input rate). 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 approximately 30 gallons and the annual usage is approximately 200 gallons; therefore, emissions resulting from diesel combustion are insignificant.

- **Malfunction:** The furnace can self-abort and open the bypass stack in the event of a malfunction. This may be caused by failsafe interlocks associated with the furnace or dryer and emissions control systems as well as failures of, or interruptions in, utility supply systems (e.g., electricity, compressed air, water/fire protection). As soon as the furnace aborts it automatically switches to "idle mode" (defined as operation at up to a maximum heat input rate of 15 MMBtu/hr). The fuel feed is then stopped and the heat input rate drops rapidly.
- **Planned Shutdown:** 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. 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 (15 MMBtu/hr or less). Until this time, emissions continue to be controlled by the WESP and RTO.

Conditions under which the dryer bypass stack is used are as follow:

- **Cold Start-ups and Transition from Furnace Idle:** The dryer bypass stack is used when the furnace is started up from a cold shutdown and when the furnace transitions from idle mode to normal operation. Emissions are vented through the dryer bypass stack for approximately 10 minutes as exhaust flow is transitioned from the furnace bypass stack to the WESP and RTO. The Dryer is not operational during this time and emissions are due solely to combustion of fuel in the furnace. Emissions during these brief transition periods are insignificant and are not separately quantified to avoid double-counting, as these emissions are already accounted for under the furnace cold start-up and idle mode scenarios.
- **Malfunction:** The dryer system can self-abort due to power failure, equipment failure, or furnace abort. If the RTO goes offline because of an interlock failure, the dryer will immediately abort. This may occur if the dryer temperature is out of range or due to equipment or power failure. Dryer abort is also triggered if a spark is detected in the dryer system.
- **Planned Shutdown:** During planned shutdowns, as the remaining fuel is combusted by the furnace, the Operator reduces the chip input to the dryer. When only a small amount of chips remain the dryer drum is emptied. The dryer bypass stack is then opened, and a purge air fan is used to ensure no explosive build-up occurs in the drum. Emissions during this time are negligible, as the furnace is directed to its abort stack (see furnace planned shutdown above) and the dryer is no longer operating.

Use of the Furnace Bypass Stack for start-up and shutdown will not exceed 50 hours per year. Additionally, the furnace may operate up to 500 hours per year in "idle mode" with emissions routed to the Furnace Bypass Stack. 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 furnace. Emissions from start-up, shutdown, and furnace idle mode operations are quantified and included in the facility-wide potential emissions presented in this permit application.

Malfunctions are infrequent, unpredictable, and minimized to the maximum extent possible. They cannot be permitted, as they are by definition, unplanned events. Malfunction emissions cannot reasonably be quantified and are not included in the facility-wide potential emissions.

With this application Enviva is requesting removal of the 8-hour limit on the furnace cold start-up duration included in Condition 2.2.A.3.l. of Air Quality Permit No. 10365R05. Duration of cold start-up at the Hamlet plant typically ranges from 8 to 12 hours. Enviva minimizes the duration of each cold start-up to the maximum extent possible.

3.5 Dryer Duct Burners

As flue gas exits the dryer and begins to cool, wood tar can condense and coat the inner walls of the dryer ducts creating a risk of fire. In order to prevent condensation from occurring and thus reduce the risk of fire, the duct from the cyclone outlet to the ID fan and the duct used for exhaust gas recirculation and the WESP are each heated by a low-NO_X burner with a maximum heat input capacity of 2.5 MMBtu/hr. The two (2) burners combust natural gas or propane as back-up and exhaust directly to the atmosphere. Potential emissions from each duct burner are below the thresholds in 15A NCAC 02Q .0503(8) and they are thus considered insignificant activities. Enviva requests that the duct burners be added to the list of insignificant activities.

3.6 Dried Wood Handling

Dried materials from the Dryer material recovery cyclones are conveyed to screening operations that remove smaller wood particles. Oversized wood is diverted to the Dry Hammermills (ES-HM-1 through 8) for further size reduction prior to pelletization, each of which is followed by a material recovery cyclone that is controlled by a baghouse. Smaller particles passing through the screens bypass the hammermills and are pneumatically conveyed directly to the material recovery cyclones for the Dry Hammermills. The screens may or may not be used during normal process operations.

There are several other conveyor transfer points located between the Dryer and Dry Hammermills comprising the Dried Wood Handling (ES-DWH) emission source. These transfer points are completely enclosed with only two (2) emission points that are controlled by individual baghouses (CD-DWH-BH1 and 2). Potential emissions for Dried Wood Handling have been revised to reflect January 2020 compliance test data.

3.7 Additive Handling and Storage

Additive may be used in the pellet production process to increase the durability of the final product. Additive is delivered by truck in 2,000 pound supersacks, stored, and moved from storage to a feed system via fork truck where it’s emptied into a hopper. The additive is transferred from the hopper via enclosed screw conveyor and added to sized wood from the Pellet Mill Feed Silo discharge screw conveyor prior to transfer to the Pellet Mills. The additive contains no hazardous chemicals or VOCs. Emissions from additive handling are below the thresholds in 15A NCAC 02Q .0503(8) and it is thus considered an insignificant activity.

After further engineering review Enviva has decided not to install an Additive Storage Silo and baghouse (ES-ADD) and requests that these be removed from the permit.

3.8 Pellet Mills and Pellet Coolers

Dried processed wood is mechanically compacted through pellet press dies. Exhaust from the Pellet Mills is vented through the Pellet Cooler aspiration material recovery cyclones, to the emission controls as described below, and then to the atmosphere. No resin or other chemical binding agents are used in the pelletization process. As part of this application Enviva is proposing to install electric boilers to generate steam for use in the pelletizing process. The boilers will not be sources of air emissions and are thus exempt from permitting. Use of steam in the pelletizing process will improve the durability of the final product and will not result in an increase in emissions or production.

Formed pellets are discharged from the twelve (12) Pellet Mills into one of six (6) Pellet Coolers (ES-PCLR-1 through ES-PCLR-6) where 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 removed by the pellet cooler cyclones while the air is routed to a quench duct. The exhaust from the quench duct is then sent to a RCO/RTO (CD-RCO/RTO) for control of VOC, HAP, and PM emissions. The RCO is able to operate in thermal mode during catalyst cleaning. The purpose of the quench duct is to protect the RCO/RTO by reducing the risk of fire. Operation of the Pellet Mills and Coolers is interlocked with operation of the quench duct (i.e., the quench duct must be ready for operation in order for the Pellet Mills and Coolers to operate). Potential emissions have been revised to reflect January 2020 compliance test data.

An aspiration system, previously referred to as the Pellet Cooler LP Fines Relay System (ES-PCLP), is used to recirculate air for the Pellet Coolers. This system and its associated baghouse (CD-PCLP-BH) are currently identified as an emission point to the atmosphere in Air Quality Permit No. 10365R05; however, this is a closed loop system and does not exhaust to the atmosphere. Enviva requests that this source (ES-PCLP) and associated baghouse (CD-PCLP-BH) be removed from the permit.

3.9 Finished Product Handling and Loadout

Finished product is conveyed to two (2) storage bins (ES-PB-1 and ES-PB-2) that feed a rail loadout station. At the rail loadout station, pellets are gravity fed into closed top rail cars. Atmospheric emissions from pellet loadout are minimal because dried wood fines have already been removed in the pellet screener, and a slight negative pressure is maintained in the loadout area of the building as a fire prevention measure to prevent any build-up of dust on surfaces within the building. This slight negative pressure is produced via an induced draft fan that exhausts to the Finished Product Handling baghouse (CD-FPH-BH). This baghouse controls emissions from Finished Product Handling (ES-FPH) and the two (2) Pellet Loadout Bins (ES-PB-1 to ES-PB-2). Rail car loading is entirely enclosed because pellets are loaded into closed top hopper cars.

3.10 Parts Washers

Two (2) small parts washers are used in the maintenance building. Waste solvent is collected by the vendor and transported off-site. Potential emissions associated with each of the parts washers (IES-PW) are less than the thresholds in 15A NCAC 02Q .0503(8) so they are considered insignificant activities. Enviva requests that the parts washers be added to the list of insignificant activities.

3.11 Diesel Storage Tanks

Diesel for the emergency generator is stored in a tank of up to 1,000 gallons capacity (IES-TK-1) and diesel for the fire water pump engine is stored in a storage tank of up to 185 gallons capacity (IES-TK-2). The plant also has a third diesel storage tank with a capacity of up to 5,000 gallons (IES-TK-3) for distributing diesel fuel to mobile equipment.

3.12 Unpaved Roads

Front-end loaders are used to transfer chips: 1) to the hardwood pile, 2) from the hardwood pile to the mix pile, 3) from the softwood piles to the mix pile, and 4) from the mix pile to the reclaim hopper. Potential emissions have been revised to more accurately reflect front-end loader movements on unpaved areas at the plant.

3.13 Propane Vaporizers (IES-PV-1 and 2)

The Hamlet plant includes two (2) propane vaporizers to vaporize propane received by truck for combustion by the RTO burners, proposed RCO/RTO burners, and burners for the dryer system double ducts. Each vaporizer has a maximum heat input capacity of 1 MMBtu/hr and combusts propane. The propane vaporizers are exempt from construction permitting pursuant to 15A NCAC 02Q .0102(h)(1)(B) but should be added to the list of insignificant activities in the Hamlet plant's permit.

4. POTENTIAL EMISSIONS QUANTIFICATION

The following summarizes the data sources and calculation methodologies used in quantifying potential emissions from the sources at the Hamlet plant that will be impacted by the changes proposed in this application. Detailed potential emissions calculations are provided in Appendix D.

4.1 Green Wood Handling (IES-GWH)

Fugitive PM emissions result from unloading purchased chips and bark from trucks into hoppers and transfer of these materials to storage piles via conveyors. Similarly, emissions also result from front-end loaders transferring purchased hardwood chips to Green Wood Storage Pile No. 5 (IES-GWSP-5), transferring hardwood and softwood chips to the mix pile, blending chips in the mix pile, and transfer of chips from the mix pile to the reclaim hopper (IES-GWH). Fugitive PM emissions from chip and bark transfer operations were calculated based on AP-42 Section 13.2.4, *Aggregate Handling and Storage Piles*.[5] Chip conveyors are partially enclosed; therefore, emissions were only quantified for the final drop points (i.e., from conveyor to pile). Bark conveyors are not enclosed; however, due to the large size of this material any fugitive PM emissions occurring along the conveyor itself are negligible. As such, emissions were only quantified for the final drop points (i.e., from conveyor to pile). Transfer from the Reclaim Hopper to the conveyor that feeds the Green Hammermills is completely enclosed; therefore, emissions were only quantified for the drop points to the storage pile and into the hopper. The number of transfer points for Green Wood Storage Pile No. 5 was conservatively multiplied by a factor of 10 to account for emissions associated with front-end loaders blending hardwood and softwood chips in the mix pile. Detailed potential emission calculations are included in Table 4 of Appendix D.

Emissions from screening of purchased chips are included under IES-GWH and were calculated based on the potential throughput and an emission factor for chip screening from the National Council for Air and Stream Improvement (NCASI) Technical Bulleting No. 1020.[6] Detailed potential emission calculations are included in Table 4 of Appendix D.

Green wood and bark contain a high moisture content approaching 50 percent water by weight. As such, per 15A NCAC 02Q .0503, Green Wood Handling (IES-GWH) is an insignificant activity because potential uncontrolled PM emissions are less than 5 tpy.

4.2 Debarker (IES-DEBARK-1)

PM emissions occur as a result of log debarking. Potential PM emissions from debarking were quantified based on emission factors from EPA's *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants* for Source Classification Code (SCC) 3-07-008-01 (Log Debarking).[7] All PM was assumed to be larger than 2.5 microns in diameter. PM emissions from debarking are minimal due to the high moisture content of green wood (~50%) and the fact that the debarking drum is enclosed, except for the two ends where logs enter and material exits after debarking. A 90% control

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

[6] National Council for Air and Stream Improvement, Inc. (NCASI). 2013. *Compilation of criteria air pollutant emissions data for sources at pulp and paper mills including boilers – an update to Technical Bulletin No. 884*. Technical Bulletin No. 1020. Research Triangle Park, NC: National Council for Air and Stream Improvement, Inc.

[7] USEPA. Office of Air Quality Planning and Standards. *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants.* EPA 450/4-90-003. March 1990.

efficiency was applied for use of water spray. Detailed potential emission calculations are included in Table 6 of Appendix D.

4.3 Bark Hog (IES-BARKHOG)

Processing of bark by the Bark Hog results in emissions of PM, VOC, and methanol. Particulate emission factors were not available for this specific operation; therefore, potential PM emissions were quantified based on emission factors from EPA's *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants* for log debarking (SCC 3-07-008-01).[8] The Bark Hog is largely enclosed and thus has minimal PM emissions. A 90% control efficiency was applied for partial enclosure. VOC and methanol emissions were quantified based on emission factors for log chipping from AP-42 Section 10.6.3, *Medium Density Fiberboard*.[9] Detailed potential emission calculations are included in Table 7 of Appendix D.

The Bark Hog is considered an insignificant activity per 15A NCAC 02Q .0503 due to potential uncontrolled emissions less than 5 tpy.

4.4 Green Hammermills (ES-GHM-1 through ES-GHM-3), Dryer (ES-Dryer), and Dry Hammermills (ES-HM-1 through ES-HM-8)

As described in Section 3, aside from normal operation there are several other potential operating conditions for the dryer line. Emissions were quantified as described in the following subsections.

4.4.1 Normal Operation

Exhaust from the Green Hammermills, Dryer, and Dry Hammermills will be routed to the WESP/RTO control system for control of PM, VOC, and HAP. As shown in Table 9 of Appendix D, potential emissions of VOC, PM, PM less than 10 microns in diameter (PM_{10}), $PM_{2.5}$, carbon monoxide (CO) and NO_X from the Furnace/Dryer, Green Hammermills, and RTO fuel combustion were calculated based on January 2020 compliance test data with an appropriate contingency based on engineering judgement to account for inherent variability in stack test results.

Potential emissions of sulfur dioxide (SO_2) were calculated based on an emission factor from AP-42 Section 10.6.2, *Particle Board Manufacturing*.[10] Potential criteria pollutant emissions from injection of natural gas into the RTO were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*.[11]

Potential criteria pollutant emissions from the Dry Hammermills were calculated based on January 2020 compliance test data with an appropriate contingency based on engineering judgement to account for inherent variability in stack test results. A 95% control efficiency was applied to VOC emissions for control by the RTO. Thermally generated emissions of CO and NO_X resulting from combustion of VOC in the Dry Hammermill exhaust stream by the

[8] USEPA. Office of Air Quality Planning and Standards. *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants.* EPA 450/4-90-003. March 1990.

[9] USEPA AP-42 Section 10.6.3, *Medium Density Fiberboard Manufacturing* (08/02).

[10] USEPA AP-42 Section 10.6.2, *Particle Board Manufacturing* (6/02).

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

RTO were calculated using emission factors from AP-42 Section 1.4, *Natural Gas Combustion*[12], and the maximum high heating value of the anticipated VOC constituents.

HAP and toxics air pollutant (TAP) emissions at the RTO outlet were calculated based on emission factors from several data sources including emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers*[13], NC DAQ's Wood Waste Combustion Spreadsheet[14], and emission factors derived based on process knowledge with an appropriate contingency based on engineering judgement. The RTO burners combust natural gas with propane as back-up. HAP emissions from natural gas injection and natural gas and propane combustion by the RTO burners were calculated based on AP-42 Section 1.4, *Natural Gas Combustion* and Section 1.5, *Liquified Petroleum Gas Combustion*.[15,16]

Combustion of wood by the Dryer furnace and fuel combustion by the RTO will also result in emissions of GHG. The emissions were quantified based on emission factors from AP-42, Section 10.6.1 for a rotary dryer with an RTO control device. Enviva has conservatively calculated the CO_2 emissions using the higher hardwood emission factor because the dryer at the Hamlet facility processes a combination of hardwood and softwood. GHG emissions from RTO natural gas injection were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*.[17] Emissions were converted to carbon dioxide equivalent (CO_2e) using global warming potentials from 40 CFR Part 98 Table A-1.

4.4.2 Furnace and Dryer Bypass - Cold Start-up (ES-FURNACEBYPASS)

Potential emissions of CO, NO_X, SO_2, PM, VOC and HAP for furnace and dryer bypass conditions were calculated based on emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers*.[18] GHG emissions were calculated based on emission factors for biomass combustion from Tables C-1 and C-2 of 40 CFR Part 98 and global warming potentials from Table A-1. Emissions were based on 15% of the maximum heat input capacity of the furnace (15% of 250.4 MMBtu/hr) and 50 hours per year of operation. As previously described in Section 3, during cold start-ups emissions may be released through the dryer bypass stack for approximately 10 minutes during transition from the furnace bypass stack to the WESP and RTO. Emissions during these brief transition periods are insignificant and are not separately quantified to avoid double-counting, as they are already accounted for under the 50 hours per year of furnace bypass.

Emissions from diesel combustion during cold start-ups are insignificant and were not explicitly quantified. Detailed potential emission calculations are included in Table 10 of Appendix D.

4.4.3 Furnace and Dryer Bypass - Idle Mode (ES-FURNACEBYPASS)

The furnace may operate up to 500 hours per year in "idle mode", which is defined as operation up to a maximum heat input rate of 15 MMBtu/hr. During this time, emissions

[12] Ibid.

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

[14] NCDAQ Wood Waste Combustion Spreadsheet for a wood stoker boiler. Available online at: https://files.nc.gov/ncdeq/Air%20Quality/permits/files/WWC_rev_K_20170308.xlsx.

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

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

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

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

from biomass combustion in the furnace exhaust out of the furnace bypass stack. Potential emissions of CO, NO_X, SO_2, VOC, and HAP were calculated based on emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers*.[19] GHG emissions were calculated based on emission factors for biomass combustion from Tables C-1 and C-2 of 40 CFR Part 98 and global warming potentials from Table A-1. As previously described in Section 2, as the furnace ramps up from idle mode to normal operation, emissions may be released through the dryer bypass stack for approximately 10 minutes during transition from the furnace bypass stack to the WESP and RTO. Emissions during these brief transition periods are insignificant and are not separately quantified to avoid double-counting, as they are already accounted for under the 500 hours per year of furnace bypass. Detailed potential emission calculations are included in Table 11 of Appendix D.

4.5 Dryer Duct Burners (IES-DB-1 and IES-DB-2)

Emissions from natural gas and propane combustion by the dryer duct burners (IES-DDB) were calculated based on emission factors from AP-42 Section 1.4, *Natural Gas Combustion* and AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion* and the maximum heat input capacity of the burners (2.5 MMBtu/hr each).[20,21] Detailed potential emission calculations are included in Table 12 of Appendix D.

Per 15A NCAC 02Q.0503, the duct burners are considered insignificant activities because potential uncontrolled criteria pollutant and HAP emissions are less than 5 tpy and 1,000 pounds per year (lb/yr), respectively.

4.6 Dried Wood Handling (ES-DWH)

As previously described in Section 3, ES-DWH includes conveyor transfer points located between the Dryer and Dry Hammermills with emissions controlled by two (2) baghouses (CD-DWH-BH-1 and 2). PM emissions from these baghouses were calculated based on a maximum exit grain loading rate and the maximum nominal exhaust flow rate of the baghouses. Detailed potential emissions calculations are provided in Table 15 of Appendix D.

Additionally, dried wood may continue to emit VOC and HAP as it is transferred between the Dryer and Dry Hammermills due to the elevated temperature of the material. Potential VOC and HAP emissions were calculated based on January 2020 compliance testing data with an appropriate contingency based on engineering judgement to account for inherent variability in stack test results.[22] Potential emissions calculations are provided in Table 13 of Appendix D.

4.7 Additive Handling and Storage (ES-ADD)

An additive may be used in the pellet production process to increase the durability of the final product. Potential emissions from transfer of additive from supersacks to the hopper were calculated based on AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles*.[23] Detailed potential emissions calculations are provided in Table 16 Appendix D.

[19] Ibid.

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

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

[22] NCASI VOC Dry Wood handling factor based oriented-strand board operations.

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

4.8 Pellet Mills and Pellet Coolers (ES-CLR-1 through 6)

Pellet Mills and Pellet Cooler operations generate PM, HAP, and VOC emissions during the forming and cooling of wood pellets. The Pellet Mills and Coolers are routed to a quench duct, followed by an RCO/RTO (CD-RCO/RTO) for VOC and HAP. The oxidizer operates in thermal mode as an RTO during catalyst cleaning. Potential emissions from the Pellet Mills and Pellet Coolers were calculated based on January 2020 compliance test data with an appropriate contingency based on engineering judgement to account for inherent variability in stack test results. Potential emissions from fuel combustion by the RCO/RTO were calculated based on emission factors from AP-42 Sections 1.4 and 1.5.[24,25] Refer to Table 17 of Appendix D for detailed potential emissions calculations.

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.

4.9 Pellet Loadout Bins (ES-PB-1 through 2), Finished Product Handling (ES-FPH), and Pellet Loadouts (ES-PL-1 through 3)

PM emissions result from the transfer of finished product to the Pellet Loadout Bins. No emissions are anticipated for the transfer of pellets from the bins to rail cars because wood pellets are loaded into closed top rail cars. PM emissions from Finished Product Handling, the two (2) Pellet Loadout Bins, and three (3) Pellet Loadouts are controlled by a baghouse (CD-FPH-BH). 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. Detailed potential emissions calculations are provided in Table 15 of Appendix D.

4.10 Diesel Storage Tanks (IES-TK-1 through 3)

The storage of diesel in on-site storage tanks generates emissions of VOC. VOC emissions from the three (3) Diesel Storage Tanks were calculated based on AP-42 Section 7.1, *Organic Liquid Storage Tanks* using actual tank characteristics (e.g., orientation, dimensions, etc.) and potential annual throughput.[26] VOC emissions from the storage tanks are below 5 tpy and thus, per 15A NCAC 02Q .0503(8), they are listed as insignificant sources in the permit. Refer to Table 20 of Appendix D for detailed potential emission calculations.

4.11 Unpaved Roads

Fugitive PM emissions occur as a result of front-end loaders traveling on unpaved roads to transfer hardwood and softwood chips to storage piles and the reclaim hopper. Emission factors were calculated based on Equation 1a from AP-42 Section 13.2.2, *Unpaved Roads*[27] using a surface material silt content (8.4%) and 110 days with rainfall greater than 0.01 inch based on Figure 13.2.2-9. A 90% control efficiency was applied for water/dust suppression activities. This control efficiency is based on data from the *Air Pollution Engineering Manual* of the Air and Waste Management Association. Refer to Table 22 of Appendix D for detailed potential emissions calculations.

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

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

[26] USEPA AP-42 Section 7.1, *Organic Liquid Storage Tanks* (06/20).

[27] USEPA AP-42 Section 13.2.2, *Unpaved Roads* (01/11).

4.12 Propane Vaporizers (IES-PV-1 and 2)

The direct-fired propane vaporizers are used to heat liquid propane to convert it to a gas for combustion by the RTO burners, RCO/RTO burners, and dryer system double duct burners. Combustion of propane by each vaporizer's 1 MMBtu/hr burner results in emissions of criteria pollutants, HAP, and GHG. Potential criteria pollutant emissions were quantified based on emission factors from AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion*.[28] Potential SO_2 emissions assume a sulfur content of 0.54 grains per 100 cubic feet for propane.[29] Potential HAP emissions were quantified based on emission factors from the South Coast Air Quality Management District's (SCAQMD's) Air Emissions Reporting (AER) Tool for external combustion equipment fired with liquid petroleum gas (LPG).[30]

Potential GHG emissions were quantified based on emission factors from AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion*.[31] Emissions were converted to CO_2e based on Global Warming Potentials from Subpart A of 40 CFR 98. Potential emissions from the propane vaporizers were quantified based on a rated capacity of 1 MMBtu/hr (each) and assume continuous operation (8,760 hours per year). Refer to Appendix D, Table 23 for detailed potential emissions calculations.

The propane vaporizers are considered insignificant activities per 15A NCAC 02Q .0503 because potential uncontrolled emissions for each vaporizer are less than 5 tpy.

[28] USEPA AP-42 Section 1.5 *Liquefied Petroleum Gas Production* (7/08).

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

[30] 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.

[31] USEPA AP-42 Section 1.5 *Liquefied Petroleum Gas Production* (7/08).

5. STATE AND FEDERAL PERMITTING APPLICABILITY

The Enviva Hamlet plant is subject to numerous federal and state air quality permitting requirements. The following sections summarize the applicability of these requirements given the changes proposed in this application.

5.1 Federal Permitting Programs

The federal 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 Hamlet 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 NSR (NNSR) (15A NCAC 2D .0531) and 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 modified existing stationary sources located in an area where concentrations of a "criteria pollutant"[32] exceed the National Ambient Air Quality Standard (NAAQS) for that pollutant. PSD permitting requirements apply to stationary sources located in an area where concentrations of criteria pollutants do not exceed a NAAQS.

The Hamlet plant is located in Richmond County which is classified as attainment or unclassifiable for all criteria pollutants.[33] The Hamlet plant is currently permitted as a synthetic minor PSD source because facility-wide potential emissions of one or more criteria pollutants are limited below the major source threshold of 250 tpy. The changes proposed in this application will not impact the plant's synthetic minor 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 Hamlet plant is a major source with respect to the Title V Operating Permit Program, because facility-wide emissions of one or more criteria pollutants exceed the major source threshold of 100 tpy. Enviva submitted an application on July 24, 2020 for an initial Title V permit for the Hamlet plant within 12 months of commencing initial operation in accordance with Condition 2.2.A.6 of Air Quality Permit No. 10365R05 and 15A NCAC 02Q .0504(d). This application will not impact the plant's major source status.

[32] 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.

[33] 40 CFR 81.334

5.2 North Carolina Permitting Program

The Hamlet plant currently operates under Air Quality Permit No. 10365R05 issued by DAQ in accordance with the permitting procedure under 15A NCAC 02Q .0300. 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). Since the Hamlet plant does not yet have a Title V permit the proposed changes are subject to the permitting procedures under 15A NCAC 02Q .0300 and the required application forms are included as Appendix A.

With this application Enviva is also requesting renewal of Air Quality Permit No. 10365R05 which expires on February 28, 2021. This permit renewal application is being submitted at least 90 days prior to permit expiration as required by 15A NCAC 02Q .0304(d) and (f) and Condition 2.2.A.5 of Air Quality Permit No. 10365R05.

6. REGULATORY APPLICABILITY

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

6.1.1 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. Subpart A is applicable because the Emergency Generator and Fire Water Pump Engine are subject to NSPS Subpart IIII; however, these sources will not be impacted by the changes proposed in this application.

6.1.2 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 and propane vaporizers each have a maximum heat input less than 10 MMBtu/hr and are not steam generating units; therefore, NSPS Subpart Dc does not apply. The proposed boilers are electric and are therefore not subject to this subpart.

6.1.3 40 CFR 60 Subpart CCCC – Standards of Performance for Commercial and Industrial Solid Waste Incineration Units

NSPS Subpart CCCC regulates emissions from commercial and industrial solid waste incineration (CISWI) units. A CISWI unit is one that combusts a solid waste meeting the definition under §241.2. The Hamlet plant's Dryer is heated by a furnace which combusts bark and wood chip as fuels. In accordance with §241.2, traditional fuels that are produced as fuels and are unused products that have not been discarded, including cellulosic biomass (virgin wood), are not solid waste. As such, the furnace is not considered a CISWI unit, and Subpart CCCC does not apply.

6.2 National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP) regulate HAP emissions and are applicable 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. Air Quality Permit No. 10365R05 issued by DAQ on July 20, 2020 authorizes installation/implementation of emissions controls for the Dry Hammermills. Upon controlling the Dry Hammermill exhaust the plant will become a minor source of HAP. The following sections address applicability based on minor source status.

6.2.1 40 CFR 63 Subpart A – General Provisions

All sources subject to a NESHAP 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. The Emergency Generator and Fire Water Pump Engine are subject to ZZZZ of this part and thus, Subpart A is also applicable to these sources. These sources will not be impacted by the changes proposed in this application.

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). Because Wood Pellet Manufacturing Plants are not a regulated source category under 40 CFR 63, the Hamlet plant was subject to 112(g) and underwent a case-by-case MACT analysis pursuant to 40 CFR 63 Subpart B as part of the initial PSD construction permitting process. However, the plant will no longer be a major source for HAP emissions following implementation of controls for the Dry Hammermills authorized by Air Quality Permit No. 1036R05. Per the final rule published in the Federal Register on November 19, 2020, *Reclassification of Major Sources as Area Sources Under Section 112 of the Clean Air Act*, if a source that was previously classified as major limits its potential to emit of HAP below the major source thresholds, the source will no longer be subject to a major source MACT or other major source requirements that were applicable to it as a major source under CAA section 112.[34] This final rule, which becomes effective on January 19, 2021, amends the General Provisions to the NESHAP to provide that a major source can be reclassified as an area source at any time by limiting its potential to emit HAP below the major source thresholds. The HAP limits must be legally and practically enforceable.

Requirements to install, maintain, and operate the controls are incorporated into the Hamlet plant's permit and will ensure that the facility becomes and remains a minor source of HAP. These requirements are both legally and practically enforceable. Per the final rule amendments, the Hamlet plant will no longer be subject to the requirements of Subpart B upon implementation of the controls for the Dry Hammermills.

6.2.3 40 CFR 63 Subpart DDDDD – NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters

Subpart DDDDD, also referred to as the Boiler MACT, provides emission standards for boilers and process heaters located at major sources of HAP emissions. The rule defines a process heater in §63.7575 as a device with the primary purpose of transferring heat indirectly to a process material or to a heat transfer material for use in a process unit. Upon implementation of the Dry Hammermill control authorized by Air Quality Permit No. 10365R05, the Hamlet plant will no longer be a major source of HAP. Furthermore, the Hamlet plant's Dryer is heated by a wood-fired furnace that provides direct heating of the wood chips, not indirect. Subpart DDDDD is thus not applicable to the Furnace/Dryer. The propane vaporizers also provide direct heating and are therefore not subject to Subpart DDDDD. The duct burners do not meet the Subpart DDDDD definition of a process heater and are not subject to this subpart.

[34] Federal Register. Vol. 85, No. 224. November 19, 2020.

6.2.4 40 CFR 63 Subpart JJJJJJ – NESHAP for Industrial, Commercial, and Institutional Boilers at Area Sources

Subpart JJJJJJ includes emission standards for boilers located at area sources of HAP emissions. The rule defines a boiler in §63.11237 as an "*enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam and/or hot water […].*" The duct burners do not meet the Subpart JJJJJJ definition of a boiler and electric boilers are exempt from this Subpart per §63.11195(j); therefore, Subpart JJJJJJ is not applicable to any sources at the Hamlet plant.

6.3 Compliance Assurance Monitoring

Compliance Assurance Monitoring (CAM) under 40 CFR 64 is applicable 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]).[35] 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.[36] All emission units at the Hamlet plant have post-controlled emissions below the major source threshold and thus, if CAM is applicable, it does not need to be addressed until the first Title V permit renewal application.

6.4 Chemical Accident Prevention Provisions

The Chemical Accident Prevention Provisions, promulgated in 40 CFR 68, provide requirements for the development of risk management plans (RMP) for regulated substances. Applicability of RMP requirements is based on the types and amounts of chemicals stored at a facility. Propane, which is a regulated substance under Subpart F of this rule, is stored at the Hamlet plant for use as a back-up fuel for the RTO burners, RCO/RTO burners, and dryer system double duct burners. Per §68.126, substances used as a fuel or held for sale as a fuel at a retail facility are excluded from all provisions; therefore, an RMP is not required for the Hamlet plant.

6.5 North Carolina Administrative Code

The Hamlet plant sources are subject to regulations contained within 15A NCAC 02D and 02Q. Regulations that are potentially applicable to the sources impacted by this application are addressed in the following sections.

6.5.1 15A NCAC 02D .0504 Particulates from Wood Burning Indirect Heat Exchangers

15A NCAC 02D .0504 provides PM emission limits for indirect heat exchangers combusting wood. An indirect heat exchanger is defined as equipment used for the alteration of the temperature of one fluid by the use of another fluid in which the two fluids are not mixed. The Dryer is heated by a wood-fired furnace; however, the furnace provides direct heating of the wood chips, not indirect. As such, this regulation does not apply.

[35] §64.5(a)

[36] §64.5(b)

6.5.2 15A NCAC 02D .0512 Particulates from Wood Products Finishing Plants

This regulation provides control requirements designed to reduce PM emissions from the working, sanding, or finishing of wood. The Hamlet plant does not perform the subject wood finishing operations and thus, 15A NCAC 02D .0512 does not apply.

6.5.3 15A NCAC 02D .0515 Particulates from Miscellaneous Industrial Processes

PM emissions resulting from any industrial process 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 rule applies to all processes at the Hamlet plant before and after implementation of the proposed changes and Enviva will continue to comply. Emissions from impacted PM sources at the Hamlet plant will either be insignificant or controlled, and thus, will comply with this regulation.

6.5.4 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 furnace combusts bark and wood chips; the propane vaporizers combust propane; and the duct burners, RTO, and RCO/RCO utilize natural gas or propane, each of which contain low amounts of sulfur and result in SO_2 emissions well below the limit of 2.3 lb/MMBtu.

6.5.5 15A NCAC 02D .0521 Control of Visible Emissions

For sources manufactured after July 1, 1971, visible emissions shall not 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.

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

6.5.6 15A NCAC 02D .0540 Particulate from Fugitive Dust Emission Sources

15A NCAC 02D .0540 requires that a fugitive dust control plan be prepared if ambient monitoring or air dispersion modeling show a violation or the potential for a violation of a PM NAAQS, or if NC DAQ observes excess fugitive dust emissions from the facility beyond the property boundary for six (6) minutes in any one hour using EPA Method 22. Previous dispersion modeling for the Hamlet plant did not show a violation or the potential for a violation of the PM_{10} or $PM_{2.5}$ NAAQS. As such, a fugitive dust control plan is not required at this time.

6.5.7 15A NCAC 02D .1100 Control of Toxic Air Pollutant Emissions

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. A TAP modeling analysis was performed as part of the permitting effort in January 2015 and the

results demonstrated that the facility would not exceed any Acceptable Ambient Levels (AALs).[37] Since that time total potential TAP emissions have been decreased from 31.6 tpy to 12.2 tpy. As such, Enviva believes additional TAP modeling is not warranted.

6.5.8 15A NCAC 02Q .0700 Toxic Air Pollutant Procedures

As discussed in the previous section, total potential HAP emissions are significantly lower than estimated in previous permitting and given that previous TAP modeling showed concentrations well below the AALs no TAP modeling was conducted as part of this application.

[37] 15A NCAC 02D .1104

APPENDIX A
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:

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

Application Fee (please check one option below)

- [ ] Not Required
- [x] ePayment
- [ ] Check Enclosed

GENERAL INFORMATION

Legal Corporate/Owner Name: Enviva Pellets Hamlet, LLC

Site Name: Enviva Pellets Hamlet, LLC

Site Address (911 Address) Line 1: 1125 North NC Highway 177

Site Address Line 2:

City: Hamlet — State: North Carolina

Zip Code: 28345 — County: Richmond

CONTACT INFORMATION

Responsible Official/Authorized Contact:

Name/Title: Paul Pereira, Plant Manager

Mailing Address Line 1: 1125 North NC Highway 177

Mailing Address Line 2:

City: Hamlet — State: NC — Zip Code: 28345

Primary Phone No.: (919) 218-6800 — Fax No.:

Secondary Phone No.:

Email Address: Paul.Pereira@envivabiomass.com

Invoice Contact:

Name/Title: Justin Spencer, Regional Environmental Compliance Manager

Mailing Address Line 1: 4242 Six Forks Road, Suite 1050

Mailing Address Line 2:

City: Raleigh — State: NC — Zip Code: 27609

Primary Phone No.: (304) 654-2054 — Fax No.:

Secondary Phone No.:

Email Address: Justin.Spencer@envivabiomass.com

Facility/Inspection Contact:

Name/Title: Justin Spencer, Regional Environmental Compliance Manager

Mailing Address Line 1: 4242 Six Forks Road, Suite 1050

Mailing Address Line 2:

City: Raleigh — State: NC — Zip Code: 27609

Primary Phone No.: (304) 654-2054 — Fax No.:

Secondary Phone No.:

Email Address: Justin.Spencer@envivabiomass.com

Permit/Technical Contact:

Name/Title: Kai Simonsen, Air Permit Engineer

Mailing Address Line 1: 4242 Six Forks Road, Suite 1050

Mailing Address Line 2:

City: Raleigh — State: NC — Zip Code: 27609

Primary Phone No.: (919) 428-0289 — Fax No.:

Secondary Phone No.:

Email Address: Kai.Simonsen@envivabiomass.com

APPLICATION IS BEING MADE FOR

- [ ] New Non-permitted Facility/Greenfield
- [x] Modification of Facility (permitted)
- [ ] Renewal Title V
- [x] 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
- [x] Title V

FACILITY (Plant Site) INFORMATION

Describe nature of (plant site) operation(s):
Wood pellet manufacturing facility

Facility ID No. 7700096

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

Current/Previous Air Permit No. 10365R05 — Expiration Date: 02/28/2021

Facility Coordinates: Latitude: 34 degrees, 56 minutes, 2.4 seconds — Longitude: 79 degrees, 38 minutes, 3.3 seconds

Does this application contain confidential data? [ ] YES [x] 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 — 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): Paul Pereira — Title: Plant Manager

X Signature(Blue Ink): Paul Pereira — Date: 11-25-2020

Attach Additional Sheets As Necessary

FORM A (continued, page 2 of 2)
GENERAL FACILITY INFORMATION

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SECTION AA1 - APPLICATION FOR NON-TITLE V PERMIT RENEWAL

Enviva Pellets Hamlet, LLC (Company Name) hereby formally requests renewal of Air Permit No. 10365R05

There have been no modifications to the originally permitted facility or the operations therein that would require an air permit since the last permit was issued.

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

If yes, have you already submitted a Risk Manage Plan (RMP) to EPA? ☐ YES ☐ NO Date Submitted:

Did you attach a current emissions inventory? ☐ YES ☑ NO

If no, did you submit the inventory via AERO or by mail? ☑ Via AERO ☐ Mailed Date Mailed:

SECTION AA2- APPLICATION FOR TITLE V PERMIT RENEWAL

In accordance with the provisions of Title 15A 2Q .0513, the responsible official of _____ (Company Name) hereby formally requests renewal of Air Permit No. _____ (Air Permit No.) and further certifies that:

(1) The current air quality permit identifies and describes all emissions units at the above subject facility, except where such units are exempted under the North Carolina Title V regulations at 15A NCAC 2Q .0500;

(2) The current air quality permit cits all applicable requirements and provides the method or methods for determing compliance with the applicable requirements;

(3) The facility is currently in compliance, and shall continue to comply, with all applicable requiremetns. (Note: As provided under 15A NCAC 2Q .0512 compliance with the conditions of the permit shall be deemed compliance with the applicable requirements specifically identified in the permit);

(4) For applicable requirements that become effective during the term of the renewed permit that the facility shall comply on a timely basis;

(5) The facility shall fulfill applicable enhanced monitoring requirements and submit a compliance certification as required by 40 CFR Part 64.

The responsible official (signature on page 1) certifies under the penalty of law that all information and statements provided above, based on information and belief formed after reasonable inquiry, are true, accurate, and complete.

SECTION AA3- APPLICATION FOR NAME CHANGE

New Facility Name: _____

Former Facility Name: _____

An official facility name change is requested as described above for the air permit mentioned on page 1 of this form. Complete the other sections if there have been modifications to the originally premitted facility that would requie an air quality permit since the last permit was issued and if ther has been an ownership change associated with this name change.

SECTION AA4- APPLICATION FOR AN OWNERSHIP CHANGE

By this application we hereby request transfer of Air Quality Permit No. _____ from the former owner to the new owner as described below. The transfer of permit responsibility, coverage and liability shall be effective _____ (immediately or insert date.) The legal ownership of the facility described on page 1 of this form has been or will be transferred on _____ (date). There have been no modifications to the originally permitted facility that would require an air quality permit since the last permit was issued.

Signature of New (Buyer) Responsible Official/Authorized Contact (as typed on page 1):

X Signature (Blue Ink): _____

Date:

New Facility Name:

Former Facility Name:

Signature of Former (Seller) Responsible Official/Authorized Contact:

Name (typed or print):

Title:

X Signature (Blue Ink): _____

Date:

Former Legal Corporate/Owner Name:

In lieu of the seller's signature on this form, a letter may be submitted with the seller's signature indicating the ownership change

SECTION AA5- APPLICATION FOR ADMINISTRATIVE AMENDMENT

Describe the requested administrative amendment here (attach additional documents as necessary):

FORMs A2, A3

EMISSION SOURCE LISTING FOR THIS APPLICATION - A2

112r APPLICABILITY INFORMATION - A3

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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)			
N/A			
Existing Permitted Equipment To Be MODIFIED By This Application			
ES-DRYER	Wood-fired Direct Heat Drying System	CD-WESP	Wet Electrostatic Precipitator
		CD-RTO	Regenerative Thermal Oxidizer
ES-GHM-1 through 3	Three (3) Green Wood Hammermills	CD-WESP	Wet Electrostatic Precipitator
		CD-RTO	Regenerative Thermal Oxidizer
ES-HM-1 through 8	Eight (8) Dry Hammermills	CD-HM-BH-1 through 8	Baghouses
		CD-WESP	Wet Electrostatic Precipitator
		CD-RTO	Regenerative Thermal Oxidizer
ES-CLR-1 through 6	Twelve (12) Pellet Mills and Six (6) Pellet Coolers	CD-RCO/RTO	Regenerative Catalytic Oxidizer/Regenerative Thermal Oxidizer
ES-FPH	Finished Product Handling	CD-FPH-BH	Baghouse
ES-PB1 and 2	Two (2) Pellet Loadout Bins		
ES-PL-1 through 3	Three (3) Pellet Loadouts		
ES-DWH	Dried Wood Handling	CD-DWH-BH-1	Baghouse
		CD-DWH-BH-2	Baghouse
Equipment To Be DELETED By This Application			
ES-PDCTB	Pellet Dust Collection Transfer Bin	CD-PDCTB	Baghouse
ES-ADD	Additive Handling and Storage	CD-ADD-BH	Baghouse
ES-PCLP	Pellet Cooler LP Fines Relay System	CD-PCHP-BH	Baghouse

112(r) APPLICABILITY INFORMATION — A 3

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

If No, please specify in detail how your facility avoided applicability: **The Hamlet plant does not store any regulated substances in excess of their threshold quantities, as determined under §68.115.**

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 3)	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. Debarker IES-DEBARK	N/A	15A NCAC 02Q .0503(8)
2. Log Chipping IES-CHIP-1	N/A	15A NCAC 02Q .0503(8)
3. Bark Hog IES-BARKHOG	N/A	15A NCAC 02Q .0503(8)
4. Green Wood Handling Operations IES-GWH	N/A	15A NCAC 02Q .0503(8)
5. Diesel Storage Tank IES-TK-1	1,000 gallons	15A NCAC 02Q .0503(8)
6. Diesel Storage Tank IES-TK-2	185 gallons	15A NCAC 02Q .0503(8)
7. Diesel Storage Tank IES-TK-3	5,000 gallons	15A NCAC 02Q .0503(8)
8. Green Wood Storage Piles IES-GWSP-1 through 5	N/A	15A NCAC 02Q .0503(8)
9. Bark Fuel Storage Piles IES-BFSP-1 and 2	N/A	15A NCAC 02Q .0503(8)
10. Dry Shaving Material Handling IES-DRYSHAVE	N/A	15A NCAC 02Q .0503(8)
11. Bark Fuel Bin IES-BFB	N/A	15A NCAC 02Q .0503(8)
12. Diesel-fired Emergency Generator IES-GN	671 bhp	15A NCAC 02Q .0503(8)
13. Diesel-fired Fire Water Pump IES-FWP	131 bhp	15A NCAC 02Q .0503(8)
14. Dryer System Double Duct Burners IES-DB-1 and 2	2.5 MMBtu/hr each	15A NCAC 02Q .0503(8)
15. Propane Vaporizers IES-PV-1 and 2	1 MMBtu/hr each	15A NCAC 02Q .0503(8)
16. Wet Hardwood Hopper IES-GWH	N/A	15A NCAC 02Q .0503(8)
17. Parts Washers IES-PW-1 and -2	N/A	15A NCAC 02Q .0503(8)
18. Additive Handling IES-ADD	N/A	15A NCAC 02Q .0503(8)

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

(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)

NAME:	**Russell Kemp, MS, PE**
DATE:	20 NOVEMBER 2020
COMPANY:	REUS Engineers, P.C.
ADDRESS:	1600 Parkwood Circle, Suite 310, Atlanta, GA 30339
TELEPHONE:	(678) 388-1654
SIGNATURE:	
PAGES CERTIFIED:	Forms A, B, B1, B9, C1, C2, C3
	Appendix D 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

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, IES-FWP	**Emergency Generator and Fire 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*
40 CFR 63 Subpart DDDD as incorported in 15 A NCAC 2D .1111	**All sources at site**	**Wood pellet manufacturing does not meet the definition of a plywood and composite wood products (PCWP) manufacturing facility as defined in §63.2292. Thus this regulation is not applicable to the Hamlet plant.**

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
ES 1	*Coal/Wood Boiler*	*P - Coal*	*PM*	*NCAC 2D .0503*
		A - Wood	*PM*	*NCAC 2D .0504*
See attached table following Form E3 for a summary of regulatory requirements and associated compliance requirements				

Attach Additional Sheets As Necessary

FORM E3

EMISSION SOURCE COMPLIANCE METHOD

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

Emission Source ID NO.	Regulated Pollutant
	Applicable Regulation

Alternative Operating Scenario (AOS) NO:

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

MONITORING REQUIREMENTS

Is Compliance Assurance Monitoring (CAM) 40 CFR Part 64 Applicable? ☐ YES ☐ NO

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

Describe Monitoring Device Type: **CAM applicability will be assessed as part of the first Title V**

Describe Monitoring Location: **renewal application. All emission units have post-controlled**

Other Monitoring Methods (Describe In Detail): **emissions below the major source threshold.**

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

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

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Wood-fired Dryer, Green Hammermills, and Dry Hammermills	ES-Dryer, ES-GHM-1 to 3, ES-DHM-1 through 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 inspection 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 60 days after sample collection, unless an alternate date is approved in advance by DAQ. 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	15A NCAC 02Q .0317		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ). Maintain average combustion chamber temperature for the RTO at or above the temperature range established during the most recent performance test. Daily monitoring of minimum secondary voltage and secondary current for the WESP. Limit throughput to 625,011 ODT 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 of VOC, NO_X, and CO (facility-wide 12-month rolling basis for the previous 17 months), combustion chamber temperatures for the RTO, daily WESP secondary voltage and current, 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. Develop and maintain written malfunction plan for RTO temperature monitoring and recording system.	Submit written report of test results not later than 60 days after sample collection, unless an alternate date is approved in advance by DAQ. 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), including facility-wide 12-month rolling actual VOC, NO_X, and CO emissions for the previous 17 months. Identify all instances of deviations from permit requirements.
		$PM_{10}/PM_{2.5}$	15A NCAC 02Q .0308(a)		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ). Daily monitoring of minimum secondary voltage and secondary current for the WESP. Perform required inspections and maintenance for the WESP and RTO (see above).	Written or electronic log of monthly throughput, hardwood/softwood mix, daily WESP secondary voltage and current, 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 written report of test results not later than 60 days after sample collection, unless an alternate date is approved in advance by DAQ. 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.
		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 60 days after sample collection, unless an alternate date is approved in advance by DAQ.
		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 Hamlet, LLC

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Finished Product Handling, Pellet Loadout Bins, Pellet Loadouts	ES-FPH, ES-PB-1 to -2, ES-PL-1 to -3	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.
		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.
Pellet Mills and Coolers	ES-CLR-1 to -6	PM	15A NCAC 02D .0515	RCO/RTO	Inspections and maintenance as recommended by the RCO/RTO 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 RCO/RTO. 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 inspection 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 60 days after sample collection, unless an alternate date is approved in advance by DAQ. Submit results of any maintenance performed on the RCO/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	15A NCAC 02Q .0317		Initial and periodic stack testing for VOC (at least annually unless a longer duration is approved by DAQ). Limit pellet production to 625,011 ODT per consecutive 12-month period. Continuously monitor and record the temperature of the combustion chamber and maintain temperature at or above the temperature range established during the performance test. Perform periodic catalyst activity checks as recommended by the RCO/RTO manufacturer. At a minimum, perform annual internal inspection of the primary heat exchanger and associated inlet/outlet valves of the control device to ensure structural integrity.	Written or electronic log of monthly throughput, hardwood/softwood mix, and actual VOC, CO, and NO_X emissions (facility-wide 12-month rolling basis for the previous 17 months). Written or electronic log of date/time/result of inspection and maintenance, results of each inspection, results of maintenance on RCO/RTO any variance from manufacturers' recommendations, if any, and corrections made.	Submit written report of test results not later than 60 days after sample collection, unless alternate date is approved in advance by DAQ. Submit results of any maintenance performed on the RCO/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), including facility-wide 12-month rolling actual VOC, NO_X, and CO emissions for the previous 17 months. Identify all instances of deviations from permit requirements.
		$PM_{10}/PM_{2.5}$	15A NCAC 02Q .0308(a)		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ). Perform required inspections and maintenance for the RCO/RTO (see above).	Written or electronic log of monthly throughput, hardwood/softwood mix, 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 written report of test results not later than 60 days after sample collection, unless alternate date is approved in advance by DAQ. Submit results of any maintenance performed on the RCO/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.
		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 60 days after sample collection, unless an alternate date is approved in advance by DAQ.
		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 Hamlet, LLC

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Dried Wood Handling	ES-DWH	PM	15A NCAC 02D .0515	Baghouses	Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ). 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 written report of test results not later than 60 days after sample collection, unless an alternate date is approved in advance by DAQ. 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.
		VOC	15A NCAC 02Q .0317		Initial stack testing. Limit throughput to 625,011 ODT per consecutive 12-month period.	Written or electronic log of actual criteria pollutant emissions (facility-wide 12-month rolling basis for the previous 17 months).	Submit written report of test results not later than 60 days after sample collection, unless an alternate date is approved in advance by DAQ. Submit facility-wide 12-month rolling actual emissions for the previous 17 months semi-annually (on or before Jan 30th and July 30th.
		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 60 days after sample collection, unless an alternate date is approved in advance by DAQ.
		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.
Furnace Bypass	ES-FURNACEBYPASS	PM	15A NCAC 02D .0515	N/A	Comply with the process weight limitation.	N/A	N/A
		VOC, CO, NO_X	15A NCAC 02Q .0317		Limit hours of furnace bypass to 50 per year for cold start-ups. Limit heat input during cold start-up to no more than 37.6 MMBtu/hr. Limit hours of operation in idle mode to 500 hours per year. Limit heat input during idle to 15 MMBtu/hr.	Written or electronic log of monthly hours of operation in cold start-up and idle mode and actual VOC, CO, NO_X emissions (facility-wide 12-month rolling basis for the previous 17 months).	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th), including facility-wide 12-month rolling actual VOC, CO, and NO_X emissions for the previous 17 months. Identify all instances of deviations from permit requirements.
		Opacity	15A NCAC 02D .0521		N/A	N/A	N/A

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)

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

SITE NAME: Enviva Pellets Hamlet, LLC

SITE ADDRESS: 1125 North NC Highway 177

CITY, NC : Hamlet, NC

COUNTY: Richmond

PERMIT NUMBER : 10365R05

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.

Paul Pereira — **Date:** 11-25-2020

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

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

EMISSION SOURCE DESCRIPTION: **Green Hammermills**	EMISSION SOURCE ID NO: **ES-GHM-1 through 3**
	CONTROL DEVICE ID NO(S): **CD-WESP, CD-RTO**
OPERATING SCENARIO _____1_____ OF _____1_____	EMISSION POINT (STACK) ID NO(S): **EP-1**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are processed in the three (3) green hammermills.

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

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

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: **Green Hammermills**	EMISSION SOURCE ID NO: **ES-GHM-1 through 3**
	CONTROL DEVICE ID NO(S): **CD-WESP, CD-RTO**
OPERATING SCENARIO: __1_____ OF ___1_____	EMISSION POINT (STACK) ID NO(S): **EP-1**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are processed in the three (3) green wood hammermills.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Green Wood	**ODT**	**120**	

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-DRYER**
Green Wood Direct-Fired Rotary Dryer System	CONTROL DEVICE ID NO(S): **CD-WESP, CD-RTO**
OPERATING SCENARIO __1_____ OF ___1_____	EMISSION POINT (STACK) ID NO(S): **EP-1**

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

Green wood is conveyed to a rotary dryer system. Direct contact heat is provided to the system via a 250.4 MMBtu/hr furnace. Air emissions are controlled utilizing a wet electrostatic precipitator (WESP) for particulate and metal HAP removal. VOC and organic HAP emissions are controlled by a regenerative thermal oxidizer (RTO).

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.: **TSI/TBD** EXPECTED OP. SCHEDULE: **_24__** HR/DAY **_7___** DAY/WK **_52__** WK/YR

IS THIS SOURCE SUBJECT TO? ☐ 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 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.

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

Attach Additional Sheets As Necessary

FORM B1

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

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

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

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): **250.4**

WOOD-FIRED BURNER

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

PERCENT MOISTURE OF FUEL: **20 to 50%**

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

FUEL FEED METHOD: **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	**tons**	**29.8**	

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM 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: **Green Wood Direct-Fired Rotary Dryer System (Furnace Bypass)**	EMISSION SOURCE ID NO: **ES-FURNACEBYPASS**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO _____1_____ OF _____1_____	EMISSION POINT (STACK) ID NO(S): **EP-19**

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

The furnace bypass stack (ES-FURNACEBYPASS) is used to exhaust hot gases during start-ups, shutdowns, and malfunctions. During cold start-ups, diesel fuel may be used as an accelerant. The amount used per event is approximately 30 gallons and the annual usage is approximately 200 gallons; therefore emissions resulting from diesel combustion are insignificant.

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 TO? ☐ 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)	**See Emission Calculations in Appendix D**						
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 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.

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

Attach Additional Sheets As Necessary

FORM B1

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

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

EMISSION SOURCE DESCRIPTION: **Green Wood Direct-Fired Rotary Dryer System (Furnace Bypass)**	EMISSION SOURCE ID NO: **ES-FURNACEBYPASS**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-19**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): **250.4**

WOOD-FIRED BURNER

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

PERCENT MOISTURE OF FUEL: **20 to 50%**

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

FUEL FEED METHOD: **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)

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM 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: **Eight (8) Hammermills**	EMISSION SOURCE ID NO: **ES-HM-1 through 8**
	CONTROL DEVICE ID NO(S): **CD-HM-BH-1 through 8, CD-WESP, CD-RTO**
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 the appropriate size needed for pelletization 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: **TBD** DATE MANUFACTURED: **TBD**

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

IS THIS SOURCE SUBJECT TO? ☐ NSPS (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.

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: **Eight (8) Hammermills**	EMISSION SOURCE ID NO: **ES-HM-1 through 8**
	CONTROL DEVICE ID NO(S): **CD-HM-BH-1 through 8, CD-WESP, CD-RTO**
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 the appropriate size needed for pelletization 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**	**120**	

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-HM-BH-1 through 8**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-HM-1 through 8**
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:

Eight (8) baghouses are utilized for emission control on the eight dry hammermill material recovery cyclones. For each dry hammermill, a portion of the exhaust will be recirculated back to the dry hammermill and the remaining exhaust will be routed to the baghouse followed by a quench system and then to the WESP (CD-WESP) and RTO (CD-RTO).

All emissions from the dry hammermills will be controlled by a baghouse. The purpose of the recirculation is to reduce the volume of air routed to CD-RTO.

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANTS COLLECTED:	PM	PM_{10}	$PM_{2.5}$	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See 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): **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) **TBD**
INLET AIR FLOW RATE (ACFM): **5,000 each**	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): **2,575**	AIR TO CLOTH RATIO: **5.82:1**	

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. 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 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**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DRYER, ES-DHM-1 through 8, and ES-GHM-1 through 3**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROLS (ES-DHM-1 through 8): NO. **2** OF **3** UNITS
	POSITION IN SERIES OF CONTROLS (ES-DRYER): NO. **1** OF **2** UNITS
	POSITION IN SERIES OF CONTROLS (ES-GHM-1 through 3): NO. **1** OF **2** UNITS

MANUFACTURER: **Lundberg**	MODEL NO. **TBD**
OPERATING SCENARIO:	
OPERATING SCENARIO: 1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:
Emissions from the Dryer, Dry Hammermills, and Green Hammermills are routed to the WESP for PM, metal HAP, and HCl removal.

EQUIPMENT SPECIFICATIONS	GAS DISTRIBUTION GRIDS: ☑ YES ☐ NO
TYPE: ☑ WET ☐ DRY	☑ SINGLE-STAGE ☑ TWO-STAGE
TOTAL COLLECTION PLATE AREA (FT^2): **31,039**	NO. FIELDS **TBD** NO. COLLECTOR PLATES PER FIELD: **TBD**
COLLECTOR PLATE SIZE (FT): LENGTH: **TBD** WIDTH: **TBD**	SPACING BETWEEN COLLECTOR PLATES (INCHES): **TBD**
TOTAL DISCHARGE ELECTRODE LENGTH (FT): **TBD**	GAS VISCOSITY (POISE): **TBD**
NUMBER OF DISCHARGE ELECTRODES: **TBD**	NUMBER OF COLLECTING ELECTRODE RAPPERS: **TBD**
MAXIMUM INLET AIR FLOW RATE (ACFM): **TBD**	PARTICLE MIGRATION VELOCITY (FT/SEC): **TBD**
MINIMUM GAS TREATMENT TIME (SEC): **TBD**	BULK PARTICLE DENSITY (LB/FT^3): **TBD**
FIELD STRENGTH (VOLTS) CHARGING: COLLECTING: **TBD**	CORONA POWER (WATTS/1000 CFM): **TBD**
ELECTRICAL USAGE (KW/HOUR): **TBD**	
CLEANING PROCEDURES: ☐ RAPPING ☐ PLATE VIBRATING ☐ WASHING ☐ OTHER _____	
OPERATING PARAMETERS PRESSURE DROP (IN. H20): MIN MAX	WARNING ALARM? ☐ YES ☐ NO
RESISTIVITY OF POLLUTANT (OHM-CM): **TBD**	GAS CONDITIONING ☐ YES ☐ NO TYPE OF AGENT (IF YES):
INLET GAS TEMPERATURE (°F): **TBD**	OUTLET GAS TEMPERATURE (°F): **TBD**
VOLUME OF GAS HANDLED (ACFM): **TBD**	INLET MOISTURE PERCENT: **TBD** MIN **TBD** 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

POLLUTANT(S) COLLECTED:	$PM / PM_{10} / PM_{2.5}$			
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR)	**See 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:
Refer to previous submittal.

DESCRIBE MAINTENANCE PROCEDURES:
Refer to previous submittal.

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM

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, ES-DHM-1 through 8, and ES-GHM-1 through 3**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROLS (ES-DHM-1 through 8) NO. __3_____ OF ___3____ UNITS
	POSITION IN SERIES OF CONTROLS (ES-DRYER) NO. __2_____ OF ___2____ UNITS
	POSITION IN SERIES OF CONTROLS (ES-GHM-1 through 3) NO. __2_____ OF ___2____ UNITS

MANUFACTURER: **Lundberg**	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:

CATALYST MASKING AGENT IN AIR STREAM: ☐ 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 dry hammermill baghouses will be controlled by the WESP and RTO prior to being released to the atmosphere. The WESP and RTO also control emissions from the furnace/dryer and green hammermills.

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 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 or Propane**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **54.4 (including natural gas injection)**

DESCRIBE MAINTENANCE PROCEDURES:
As per manufacturer's specifications

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

EMISSION SOURCE DESCRIPTION: **Dried Wood Handling**	EMISSION SOURCE ID NO: **ES-DWH**
	CONTROL DEVICE ID NO(S): **CD-DWH-BH-1 and 2**
OPERATING SCENARIO _____1_____ OF _____1_____	EMISSION POINT (STACK) ID NO(S): **EP-17 and 18**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
There are several transfer points comprising emission source ES-DWH that are located between the dryer and dry hammermills. These sources are completely enclosed with only two (2) emission points that are controlled by individual baghouses (CD-DWH-BH-1 and 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: **TBD** DATE MANUFACTURED: **TBD**

MANUFACTURER / MODEL NO.: **TBD** EXPECTED OP. SCHEDULE: **_24__** HR/DAY **__7__** DAY/WK **_52__** WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (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)	**See Emission Calculations in Appendix D**						
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 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.

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: **Dried Wood Handling**	EMISSION SOURCE ID NO: **ES-DWH**
	CONTROL DEVICE ID NO(S): **CD-DWH-BH-1 and 2**
OPERATING SCENARIO: _____1_____ OF _____1_____	EMISSION POINT (STACK) ID NO(S): **EP-17 and 18**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
There are several transfer points comprising emission source ES-DWH that are located between the dryer and dry hammermills. These sources are completely enclosed with only two (2) emission points that are controlled by individual baghouses (CD-DWH-BH-1 and 2).

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**ODT**	**120**	

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-BH-1 and 2**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DWH**
EMISSION POINT (STACK) ID NO(S): **EP-17 & 18**	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:
Two (2) baghouses are used to create a slight negative pressure on the dried wood handling. The baghouses collect dust from the air volume present in the dried wood handling.

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANTS COLLECTED:				
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See 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): **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) **TBD**
INLET AIR FLOW RATE (ACFM): **1,000**	FILTER OPERATING TEMP (^oF): **N/A**

NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: **TBD**	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES: **TBD**	FILTER SURFACE AREA PER CARTRIDGE (FT^2): **TBD**	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **378**	AIR TO CLOTH RATIO: **2.65:1**	

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 additive 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: **Hammermill Collection Conveyor**	EMISSION SOURCE ID NO: **ES-HMC**
	CONTROL DEVICE ID NO(S): **CD-HMC-BH**
OPERATING SCENARIO ____1_____ OF _____1_____	EMISSION POINT (STACK) ID NO(S): **EP-11**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Conveying system for material from the 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)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☑ 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 TO? ☐ 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 FACTOR	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.

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-HMC**
Hammermill Collection Conveyor	CONTROL DEVICE ID NO(S): **CD-HMC-BH**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-11**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Dust from the dry hammermill collection conveyor is vented to a baghouse (CD-HMC-BH) to control particluate matter emissions.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**ODT**	**120**	

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-HMC-BH**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-HMC**
EMISSION POINT (STACK) ID NO(S): **EP-11**	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:
This baghouse controls particulate from the dry hammermill conveying system.

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANTS COLLECTED:				
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See 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): **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) **TBD**
INLET AIR FLOW RATE (ACFM): **1,500**	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): **378**	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 particules.

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-CLR1 through 6**
Pellet Mills and Pellet Coolers	CONTROL DEVICE ID NO(S): **CD-RCO/RTO**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-10**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Six (6) Pellet Coolers follow the twelve (12) pellet mills to cool the newly formed pellets down to an acceptable storage temperature.

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

☐ Coal,wood,oil, gas, other burner (Form B1)	☐ Woodworking (Form B4)	☐ 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 TO? ☐ 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 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.

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-CLR1 through 6**
Pellet Mills and Pellet Coolers	CONTROL DEVICE ID NO(S): **CD-RCO/RTO**
OPERATING SCENARIO: _____1_____ OF _____1_____	EMISSION POINT (STACK) ID NO(S): **EP-10**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Six (6) Pellet Coolers follow the twelve (12) pellet mills 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)
Dried Wood	**ODT**	**120**	

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 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/RTO**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-CLR-1 through 6**
EMISSION POINT (STACK) ID NO(S): **EP-10**	POSITION IN SERIES OF CONTROLS NO. **2** OF **2** UNITS
MANUFACTURER: **Lundberg**	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: **Sampling and analysis at least once per 12 months**

CATALYST MASKING AGENT IN AIR STREAM: ☐ 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:
Exhaust from the Pellet Mills and Coolers will enter the RCO (with thermal mode backup) prior to being emitted to the atmosphere.

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 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 or Propane**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **32**

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

EMISSION SOURCE DESCRIPTION: **Finished Product Handling/Pellet Loadout Bins/Pellet Loadouts**	EMISSION SOURCE ID NO: **ES-FPH, ES-PB1 and 2, ES-PL-1 through 3**
	CONTROL DEVICE ID NO(S): **CD-FPH-BH**
OPERATING SCENARIO _____1_____ OF _____1_____	EMISSION POINT (STACK) ID NO(S): **EP-16**

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

Pelletized product is conveyed to one of two pellet loadout bins (ES-PB-1 and 2) that feed a rail loadout station. At the rail loadout station, pellets are gravity fed into closed top rail cars. Atmospheric emissions from pellet loadout are minimal because dried wood fines have already been removed in the pellet screener, and a slight negative pressure is maintained in the loadout area of the building as a fire prevention measure to prevent any build-up of dust on surfaces within the building. This slight negative pressure is produced via an induced draft fan that exhausts to the Finished Product Handling baghouse (CD-FPH-BH). This baghouse controls emissions from Finished Product Handling (ES-FPH), the two (2) Pellet Loadout Bins (ES-PB-1 to ES-PB-2), and the enclosed rail loadout chutes (ES-PL-1 through 3). Rail car loading is entirely enclosed because pellets are loaded into closed top hopper cars.

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 TO? ☐ 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 FACTOR	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.

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: **Finished Product Handling/Pellet Loadout Bins/Pellet Loadouts**	EMISSION SOURCE ID NO: **ES-FPH**
	CONTROL DEVICE ID NO(S): **CD-FPH-BH**
OPERATING SCENARIO: _____1_____ OF _____1_____	EMISSION POINT (STACK) ID NO(S): **EP-16**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Pelletized product is conveyed to one of two pellet loadout bins (ES-PB-1 and 2) that feed a rail loadout station.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Wood Pellets	**ODT**	**120**	

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B6

EMISSION SOURCE (STORAGE SILO/BINS)

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

EMISSION SOURCE DESCRIPTION: **Two (2) Pellet Loadout Bins**	EMISSION SOURCE ID NO: **ES-PB1 and 2**
	CONTROL DEVICE ID NO(S): **CD-FPH-BH**
OPERATING SCENARIO: _____1_____ OF _____1_____	EMISSION POINT(STACK) ID NO(S): **EP-16**

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 closed top hopper rail cars.

MATERIAL STORED: **Pellet Product**				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: **120 ODT/hr**	

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: **TBD**

MAXIMUM ACFM: **TBD**

MATERIAL IS UNLOADED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: **CD-FPH-BH**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-FPH, ES-PB-1 and 2, ES-PL-1 through 3**
EMISSION POINT (STACK) ID NO(S): **EP-16**	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:
This baghouse controls particulate from the finished product handling pellet conveyors and screens, the pellet loadout bins, and the pellet loadout chutes.

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANTS COLLECTED:				
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See calculations in Appendix D**			

PRESSURE DROP (IN H_2O): MIN:	MAX: **TBD**	GAUGE? ☑ YES ☐ NO	Warning Alarm ☑ Yes ☐ No
BULK PARTICLE DENSITY (LB/FT^3): **TBD**		INLET TEMPERATURE (^oF): **TBD**	
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3		OUTLET TEMPERATURE (^oF) **TBD**	
INLET AIR FLOW RATE (ACFM): **8,500**		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): **1,665**	AIR TO CLOTH RATIO: **5.10:1**		
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 particules.

PARTICLE SIZE DISTRIBUTION

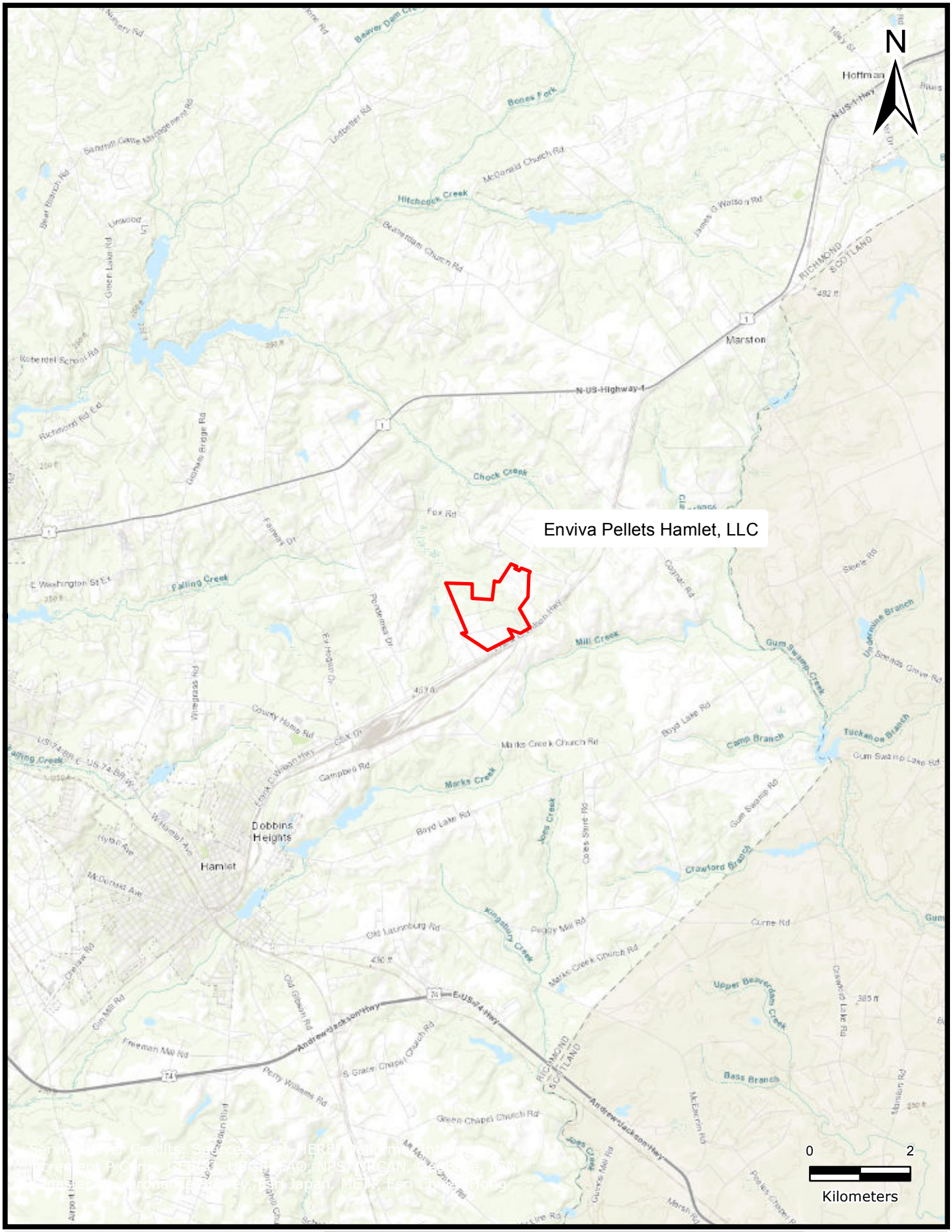
SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1	**Unknown**	
1-10		
10-25		
25-50		
50-100		
>100		
	TOTAL = 100	

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
AREA MAP



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Area Map
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, NC

FIGURE
1

DRAFTED BY: ARJ | DATE: 4/10/2020 | PROJECT: 1690016258

APPENDIX C
PROCESS FLOW DIAGRAM

Figure 1. Process Flow Diagram
Enviva Pellets Hamlet, LLC – Richmond County, NC

***Note**: Emissions from the Dry Hammermills will go to either:*
1) The dryer furnace, WESP, and RTO;
2) Directly to the existing WESP and RTO; or
3) A combination of the two.

(Trucks) Whole Logs
Debarker IES-DEBARK-1
Bark
Debarked Logs
Chipper IES-CHIP-1
Green Wood Chips
Green Wood Hammermills ES-GHM-1 to 3
WESP CD-WESP
RTO CD-RTO
Burners
Natural Gas
Dryer RTO Stack
(Trucks) Dry Shavings
Dry Shavings Handling IES-DRYSHAVE
Baghouses CD-HM-BH1 to 8
Collected Fines
Baghouses CD-DWH-BH1 to 2
Cyclones
Dried Wood Fibers/Chips
Dried Wood Handling ES-DWH
Dry Hammermills ES-HM-1 to 8
Cyclones
Oversized Chips
Quench System
(Trucks) Pre-Chipped Wood
(Trucks) Bark
Green Wood Handling IES-GWH
Green Wood Chips
Bark/Fuel Chips
Green Wood Storage Piles IES-GWSP-1 to 5
Green Wood Fibers/Chips
Dryer ES-DRYER
Furnace
Dryer Bypass Stack
Furnace Bypass Stack
Smaller Particles
Dry Wood Fibers
Bark Fuel Bin IES-BFB
Bark Fuel Storage Piles IES-BFSP-1 to 2
Bark Hog IES-BARKHOG
Bark
Natural Gas
Duct Burners IES-DB-1 to 2
***Note**: The RCO will operate primarily in catalytic mode with thermal mode as a back-up.*
Pellet Coolers RCO/RTO Stack
RCO/RTO CD-RCO/RTO
Burners
Natural Gas
(Trucks) Powder Additive
Baghouse CD-HMC-BH
Hammermill Conveyors ES-HMC
Dry Fines
Baghouse CD-PCHP-BH
Additive Handling and Storage IES-ADD
Baghouse CD-PMFS-BH
Pellet Mill Feed Silo ES-PMFS
Quench System
Finished Product Baghouse CD-FPH-BH
Cyclones
Collected Fines
Railcar Loadout Operations ES-PL-1 to 3
Pellet Loadout Bins ES-PB-1 to 2
Finished Product Handling ES-FPH
Finished Wood Pellet Product
Pellet Coolers and Screens ES-CLR-1 to 6
Wood Pellets
Pellet Press System (Pellet Mills)
(Railcars) Finished Product
Electric Boilers
Steam
Pellet Cooler HP Fines Relay System ES-PCHP
Collected Fines

Legend:
- Process Stream
- Air Stream
- Process Unit
- Air Pollution Control Device
- Stack

Diesel Fuel
Diesel Fuel Storage Tanks IES-TK-1 to 3
Emergency Generator IES-GN
Back-up Power to Plant Operations
Emergency Fire Pump Engine IES-FWP
Back-up Power to Fire Water Pump
Mobile Equipment
Parts Washer IES-PW-1 and 2
Propane
Propane Vaporizers IES-PV-1 to 2

RAMBOLL

APPENDIX D
POTENTIAL EMISSIONS CALCULATIONS

Table 1
Calculation Inputs
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Operational Data	
Green Hammermills, Dryer, Dry Hammermills, Pellet Mills, Pellet Coolers	
Short-Term Maximum Throughput (ODT/hr)	120
Annual Throughput (ODT/yr)	625,011
Hours of Operation (hr/yr)	8,760
Softwood Composition	85%

Table 2
Summary of Facility-wide Potential Emissions
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Emission Unit ID	Source Description	Control Device ID	Control Device Description	CO (tpy)	NO_x (tpy)	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	VOC (tpy)	CO_2e (tpy)
IES-CHIP-1	Log Chipping	--	--	--	--	--	--	--	--	1.56	--
IES-BARKHOG	Bark Hog	--	--	--	--	0.35	0.19	--	--	0.44	--
IES-DEBARK-1	Debarker	--	--	--	--	1.08	0.59	--	--	--	--
ES-DRYER	250.4 MMBtu/hr Wood-fired Direct Heat Drying System	CD-WESP CD-RTO-1	WESP; RTO	159	144	43.0	43.0	42.3	27.4	79.6	248,938
ES-GHM-1 through 3	Three (3) Green Wood Hammermills										
ES-HM-1 through 8[1]	Eight (8) Dry Hammermills	CD-HM-BH1 through 8; CD-WESP; CD-RTO-1	Eight (8) baghouses; WESP; RTO								
ES-FURNACEBYPASS	Furnace Bypass Stack	--	--	2.81	1.03	2.71	2.42	2.10	0.12	0.080	935
IES-DB-1 and 2	Dryer Duct Burners	--	--	1.80	1.56	0.17	0.17	0.17	0.013	0.24	3,048
ES-HMC	Hammermill Collection Conveyor	CD-HMC-BH	One (1) baghouse	--	--	0.23	0.23	0.23	--	--	--
ES-PCHP	Pellet Cooler HP Fines Relay System	CD-PCHP-BH	One (1) baghouse	--	--	0.075	0.075	0.075	--	--	--
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BH	One (1) baghouse	--	--	0.37	0.37	0.37	--	--	--
ES-CLR-1 through 6[2]	Twelve (12) Pellet Mills Six (6) Pellet Coolers	CD-RCO/RTO	RCO/RTO	22.1	2.40	1.01	1.01	0.51	0.083	1.23	19,505
ES-FPH	Finished Product Handling	CD-FPH-BH	One (1) baghouse	--	--	1.28	1.16	0.51	--	--	--
ES-PB-1 and 2	Two (2) Pellet Loadout Bins										
ES-PL-1 through 3	Three (3) Pellet Loadouts										
ES-DWH	Dried Wood Handling-Operations	CD-DWH-BH1 and 2	Two (2) baghouses	--	--	0.30	0.30	0.30	--	15.7	--
IES-ADD	Additive Handling and Storage	--	--	--	--	3.5E-04	1.7E-04	2.5E-05	--	--	--
IES-GWH	Green Wood Handling Operations	--	--	--	--	1.80	1.55	1.37	--	--	--
IES-TK-1	1,000 gallon Diesel Storage Tank	--	--	--	--	--	--	--	--	3.1E-04	--
IES-TK-2	185 gallon Diesel Storage Tank	--	--	--	--	--	--	--	--	6.8E-05	--
IES-TK-3	5,000 gallon Diesel Storage Tank	--	--	--	--	--	--	--	--	0.0020	--
IES-GWSP-1 through 5	Green Wood Storage Piles	--	--	--	--	13.5	6.73	1.01	--	7.02	--
IES-BFSP-1 and 2	Bark Fuel Storage Piles	--	--	--	--	0.56	0.28	0.042	--	0.29	--
IES-DRYSHAVE	Dry Shaving Material Handling	--	--	--	--	0.054	0.025	0.0039	--	--	--
IES-BFB[3]	Bark Fuel Bin	--	--	--	--	--	--	--	--	--	--
IES-GN	671 hp Diesel-fired Emergency Generator	--	--	0.14	2.46	0.0078	0.0078	0.0078	6.6E-04	1.68	179
IES-FWP	131 hp Diesel-fired Fire Water Pump	--	--	0.070	0.18	0.0092	0.0092	0.0092	4.8E-04	0.0081	50.4
IES-PW1 and 2[4]	Two (2) Parts Washers	--	--	--	--	--	--	--	--	--	--
IES-PV-1 and 2	Two (2) Propane Vaporizers	--	--	0.72	1.24	0.067	0.067	0.067	0.0052	0.096	1,223
--	Paved Roads	--	--	--	--	16.3	3.27	0.80	--	--	--
--	Unpaved Roads	--	--	--	--	12.5	3.55	0.36	--	--	--
			Total Emissions:	**187**	**153**	**95.3**	**65.0**	**50.3**	**27.7**	**108**	**273,878**
			Total Excluding Fugitives[5]:	**187**	**153**	**50.7**	**49.6**	**46.7**	**27.7**	**101**	**273,878**
			PSD Major Source Threshold:	**250**	**250**	**250**	**250**	**250**	**250**	**250**	**--**

Notes:

1. The dry hammermills are equipped with eight (8) baghouses for PM control. The Dry Hammermill baghouse exhaust will be routed to either the furnace followed by the WESP/RTO, directly to the WESP/RTO, or a combination of the two. The RTO provides 95% control of VOC and HAP emissions.
2. The pellet coolers are equipped with an RCO for VOC control that will operate primarily in catalytic mode with thermal (RTO) mode as a backup. The RTO and RCO modes have the same control efficiency so there will be no impact on emissions during thermal mode usage.
3. Bark is transferred from the primary Bark Fuel Storage Pile by walking floor to covered conveyors which transfer the bark into the fully enclosed Bark Fuel Bin. There are no emissions expected from transfer of material into the bin.
4. Emissions from the parts washers are insignificant.
5. 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.

Abbreviations:

ES - Emission Source
IES - Insignificant Emission Source
CO - carbon monoxide
CO_2e - carbon dioxide equivalent
NO_x - nitrogen oxides
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 compounds
WESP - Wet Electrostatic Precipitator

Table 3
Summary of Facility-wide HAP Emissions
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Pollutant	CD-RTO[1] (tpy)	ES-FURNACEBYPASS (tpy)	CD-RCO/RTO[2] (tpy)	ES-DWH (tpy)	IES-GN (tpy)	IES-FWP (tpy)	IES-BARKHOG (tpy)	IES-CHIP-1 (tpy)	IES-PV-1 and 2 (tpy)	IES-DB-1 and 2 (tpy)	Total HAP (tpy)
Acetaldehyde	0.60	0.0039	0.90	0.15	2.96E-05	1.76E-04	--	--	--	3.26E-07	1.65
Acetophenone	1.75E-07	1.50E-08	--	--	--	--	--	--	--	--	1.90E-07
Acrolein	2.01	0.019	0.79	--	9.25E-06	2.12E-05	--	--	--	3.86E-07	2.81
Antimony and compounds	6.28E-04	3.70E-05	--	--	--	--	--	--	--	--	6.65E-04
Arsenic	0.0018	1.03E-04	2.75E-05	--	--	--	--	--	--	--	0.0019
Benzene	0.23	0.020	9.95E-02	--	9.11E-04	2.14E-04	--	--	0.0062	1.55E-02	0.37
Benzo(a)pyrene	1.43E-04	1.22E-05	1.65E-07	--	3.02E-07	4.31E-08	--	--	--	2.58E-08	1.56E-04
Beryllium	9.03E-05	5.16E-06	1.65E-06	--	--	--	--	--	--	2.58E-07	9.73E-05
Butadiene, 1,3-	--	--	--	--	--	8.96E-06	--	--	--	--	8.96E-06
Cadmium	5.83E-04	1.92E-05	1.51E-04	--	--	--	--	--	--	2.36E-05	7.77E-04
Carbon tetrachloride	0.0025	2.11E-04	--	--	--	--	--	--	--	--	0.0027
Chlorine	0.87	0.0037	--	--	--	--	--	--	--	--	0.87
Chlorobenzene	0.0018	1.55E-04	--	--	--	--	--	--	--	--	0.0020
Chloroform	0.0015	1.31E-04	--	--	--	--	--	--	--	--	0.0017
Chromium VI	6.05E-04	1.64E-05	1.92E-04	--	--	--	--	--	--	3.01E-05	8.44E-04
Chromium–Other compounds	0.0014	8.21E-05	--	--	--	--	--	--	--	--	0.0015
Cobalt	5.36E-04	3.05E-05	1.15E-05	--	--	--	--	--	--	--	5.78E-04
Dichlorobenzene	2.80E-04	--	1.65E-04	--	--	--	--	--	--	2.58E-05	4.71E-04
Dichloroethane, 1,2-	0.0016	1.36E-04	--	--	--	--	--	--	--	--	0.0017
Dichloropropane, 1,2-	0.0018	1.55E-04	--	--	--	--	--	--	--	--	0.0020
Dinitrophenol, 2,4-	9.87E-06	8.44E-07	--	--	--	--	--	--	--	--	1.07E-05
Di(2-ethylhexyl)phthalate	2.58E-06	2.20E-07	--	--	--	--	--	--	--	--	2.80E-06
Ethyl benzene	0.0017	1.45E-04	--	--	--	--	--	--	--	--	0.0018
Formaldehyde	3.46	0.021	0.94	0.14	9.26E-05	2.71E-04	--	--	0.013	3.29E-02	4.60
Hexane	0.42	--	0.25	--	--	--	--	--	--	3.86E-02	0.71
Hydrochloric acid	0.15	0.089	--	--	--	--	--	--	--	--	0.24
Lead	0.0039	2.25E-04	6.87E-05	--	--	--	--	--	--	--	0.0042
Manganese	0.13	0.0075	5.22E-05	--	--	--	--	--	--	--	0.13
Mercury	3.39E-04	1.64E-05	3.57E-05	--	--	--	--	--	--	5.58E-06	3.97E-04
Methanol	2.35	--	0.28	0.28	--	--	0.088	0.31	--	--	3.30
Methyl bromide	8.23E-04	7.03E-05	--	--	--	--	--	--	--	--	8.93E-04
Methyl chloride	0.0013	1.08E-04	--	--	--	--	--	--	--	--	0.0014
Methylene chloride	0.016	1.36E-03	--	--	--	--	--	--	--	--	0.017
Naphthalene	0.0055	4.55E-04	8.38E-05	--	1.53E-04	1.95E-05	--	--	--	1.31E-05	0.0062
Nickel	0.0031	1.55E-04	2.89E-04	--	--	--	--	--	--	4.51E-05	0.0036
Nitrophenol, 4-	6.03E-06	5.16E-07	--	--	--	--	--	--	--	--	6.55E-06
Pentachlorophenol	5.59E-05	2.39E-07	--	--	--	--	--	--	--	--	5.62E-05
Perchloroethylene	0.042	1.78E-04	--	--	--	--	--	--	--	--	0.042
Phenol	0.20	2.39E-04	0.34	--	--	--	--	--	--	--	0.54
Phosphorus metal, yellow or white	0.0021	1.27E-04	--	--	--	--	--	--	--	--	0.0023
Polychlorinated biphenyls	4.47E-07	3.82E-08	--	--	--	--	--	--	--	--	4.85E-07
Propionaldehyde	9.01	2.86E-04	0.16	0.044	--	--	--	--	--	--	9.21
Selenium	2.28E-04	1.31E-05	3.30E-06	--	--	--	--	--	--	--	2.45E-04
Styrene	0.10	0.0089	--	--	--	--	--	--	--	--	0.11
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	4.72E-10	4.03E-11	--	--	--	--	--	--	--	--	5.12E-10
Toluene	0.051	0.0043	4.67E-04	--	3.30E-04	9.38E-05	--	--	--	7.30E-05	0.057
Polycyclic Organic Matter	0.14	5.85E-04	5.61E-03	--	2.49E-04	3.85E-05	--	--	3.50E-04	8.76E-04	0.14
Trichloroethane, 1,1,1-	0.034	1.45E-04	--	--	--	--	--	--	--	--	0.034
Trichloroethylene	0.0016	1.41E-04	--	--	--	--	--	--	--	--	0.0018
Trichlorophenol, 2,4,6-	1.21E-06	1.03E-07	--	--	--	--	--	--	--	--	1.31E-06
Vinyl chloride	9.87E-04	8.44E-05	--	--	--	--	--	--	--	--	0.0011
Xylene	0.0014	1.17E-04	--	--	2.26E-04	6.53E-05	--	--	--	--	0.0018
Total HAP Emissions[4] (tpy)	**19.8**	**0.18**	**3.76**	**0.61**	**0.0018**	**8.88E-04**	**0.088**	**0.31**	**0.020**	**0.088**	**24.88**
Maximum Individual HAP	**Propionaldehyde**	**Hydrochloric acid**	**Formaldehyde**	**Methanol**	**Benzene**	**Formaldehyde**	**Methanol**	**Methanol**	**Formaldehyde**	**Hexane**	**Propionaldehyde**
Maximum Individual HAP Emissions (tpy)	**9.01**	**0.089**	**0.94**	**0.28**	**9.11E-04**	**2.71E-04**	**0.088**	**0.31**	**0.013**	**0.039**	**9.21**

Notes:

1. Includes emissions at outlet of the RTO stack as well as the HAP combustion emissions resulting from natural gas combustion by the RTO burners. CD-RTO controls emissions from the green hammermills (ES-GHM-1 through 3), furnace/dryer (ES-DRYER), and dry hammermills (ES-DHM-1 through 8).

2. Includes emissions at the outlet of RCO/RTO stack as well as the HAP combustion emissions resulting from natural gas combustion by the RCO/RTO burners. CD-RCO/RTO controls emissions from the pellet mills and pellet coolers (ES-CLR-1 through 6). The RCO/RTO operates primarily in catalytic mode with thermal (RTO) mode as a backup. The RTO and RCO modes have the same control efficiency so there is no impact on emissions during thermal mode usage.

3. Because benzo(a)pyrene and naphthalene emissions were presented individually and as components of total PAH emissions, the total HAP emissions presented here do not match the sum of all pollutant emissions to avoid double counting benzo(a)pyrene and naphthalene emissions.

4. Several combustion sources at the Hamlet plant may fire either natural gas or propane (i.e., RTO and RCO/RTO burners, duct burners). For conservatism, worst-case emissions across both fuel types were selected for each individual HAP. This results in an unrealistic estimate of total HAP emissions. Annual potential emissions based on sources firing natural gas are 24.7 tpy and 24.2 tpy for propane combustion.

Abbreviations:

HAP - hazardous air pollutant
RTO - regenerative thermal oxidizer
RCO - regenerative catalytic oxidizer
tpy - tons per year

Table 4
Green Wood Handling
IES-GWH
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Source	Transfer Activity[1]	Number of Drop Points	Material Moisture Content[2]	PM Emission Factor[3]	PM_{10} Emission Factor[3]	$PM_{2.5}$ Emission Factor[3]	Potential Throughput[4]		Potential PM Emissions		Potential PM_{10} Emissions		Potential $PM_{2.5}$ Emissions	
			(%)	(lb/ton)	(lb/ton)	(lb/ton)	(tph)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
ES-GWH	Purchased Bark/Fuel Chips Transfer to Outdoor Storage Area	1	48%	5.0E-05	2.4E-05	3.6E-06	50	350,000	0.0025	0.0087	0.0012	0.0041	1.78E-04	6.24E-04
	Purchased Wood Chips to Outdoor Storage Area	4	48%	5.0E-05	2.4E-05	3.6E-06	148	1,300,000	0.030	0.13	0.014	0.061	0.0021	0.0093
	Purchased Wood Chips to Wet Hardwood Pile[5]	10	48%	5.0E-05	2.4E-05	3.6E-06	74	650,000	0.037	0.16	0.017	0.076	0.0026	0.012
	Purchased Wood Chips Transfer to Wet Hardwood Hopper	1	48%	5.0E-05	2.4E-05	3.6E-06	148	1,300,000	0.0074	0.032	0.0035	0.015	5.29E-04	0.0023
	Processed Wood Chips to Outdoor Storage Area	2	48%	5.0E-05	2.4E-05	3.6E-06	275	1,300,000	0.027	0.065	0.013	0.031	0.0020	0.0046
	Chip Truck Dump to Dumpers	2	48%	5.0E-05	2.4E-05	3.6E-06	148	1,300,000	0.015	0.065	0.0070	0.031	0.0011	0.0046
								Total Emissions:	**0.12**	**0.46**	**0.056**	**0.22**	**0.0085**	**0.033**

Notes:

1. These green wood handling emissions are representative of the fugitive emissions at the site.
2. Average moisture content for bark based on material balance provided by design engineering firm (Mid-South Engineering). Moisture content for purchased and process wood chips provided by Enviva on July 12, 2017. Assumed the lower moisture content between pine and hardwood to conservatively estimate PM emissions. (Hardwood 42% moisture; pine 51% (purchased wood chips) and 49% (processed wood chips).
3. Emission factor calculation based on formula from AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, Equation 13.2.1, (11/06).

   where: E = emission factor (lb/ton)

   k = particle size multiplier (dimensionless) for PM 0.74

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

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

   U = mean wind speed (mph) 7.85
4. Potential throughputs based on engineering estimates.
5. Conservative assumption used for the number of drop points to account for mixing of softwood and hardwood chips in the mix pile.

Calculation Basis for Chip Screening

Hourly Throughput	77 ODT/hr
Annual Throughput	676,000 ODT/yr

Potential Criteria Pollutant Emissions from Screening of Purchased Chips

Pollutant	Emission Factor[1] (lb/ODT)	Potential Emissions (lb/hr)	Potential Emissions (tpy)
$PM/PM_{10}/PM_{2.5}$	0.0040	0.30	1.34

Notes:

1. Emission factor from NCASI Technical Bulletin No. 1020 Table 9.1 for chip screening converted from units of bone dry tons (BDT) to ODT based on a moisture content of 48%.

Abbreviations:

hr - hour
lb - pound
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
tpy - tons per year
yr - year

References:

U.S. EPA. AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, (11/06).
National Council for Air and Stream Improvement, Inc. (NCASI). 2013. *Compilation of criteria air pollutant emissions data for sources at pulp and paper mills including boilers – an update to Technical Bulletin No. 884.* Technical Bulletin No. 1020. Research Triangle Park, NC: National Council for Air and Stream Improvement, Inc.

Table 6
Debarker Potential Emissions
IES-DEBARK-1
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Calculation Basis

Maximum Hourly Throughput	275 ton/hr
Annual Throughput[1]	1,078,143 ton/yr

Potential Criteria Pollutant Emissions

Source	Pollutant	Emission Factor (lb/ton)	Potential Emissions[3]	
			(lb/hr)	(tpy)
IES-DEBARK-1	TSP[2]	0.020	0.55	1.08
	PM_{10}[2]	0.011	0.30	0.59

Notes:

1. Approximately 2 tons of green material is needed for every 1 ODT of pellets, and 1.15 times that amount for purchased logs. At most, Enviva would purchase 75% of the needed logs with the remaining 25% of green material coming from purchased chips.
2. Particulate matter emission factors from the USEPA document titled *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants.* Source Classification Code 3-07-008-01 (Log Debarking). All PM is assumed to be larger than 2.5 microns in diameter.
3. A 90% control efficiency was applied for use of water spray.

Abbreviations:

hr - hour
lb - pound
ODT - oven dried tons
tpy - tons per year
yr - year

Reference:

U.S. EPA. 1990. *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants* . Source Classification Code 3-07-008-01 (Log Debarking).

Table 7
Bark Hog Potential Emissions
IES-BARKHOG
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Calculation Basis

Maximum Hourly Throughput	50 ton/hr, wet
	25 ODT/hr
Maximum Annual Throughput	175,000 ODT/yr
	350,000 ton/yr, wet
Approx. Moisture Content	50% of total weight

Potential Criteria Pollutant and HAP Emissions

Pollutant	Emission Factor	Potential Emissions	
		(lb/hr)	(tpy)
THC as carbon[1]	0.0041 lb/ODT	0.10	0.36
VOC as propane[2]	0.0050 lb/ODT	0.13	0.44
Methanol[1]	0.0010 lb/ODT	0.025	0.09
PM[3]	0.020 lb/ton	0.10	0.35
PM_{10}[3]	0.011 lb/ton	0.055	0.19

Notes:

1. Emission factor obtained from available emissions factors for chippers in AP-42 Section 10.6.3, Medium Density Fiberboard, 08/02, Table 7 and Section 10.6.4, Hardboard and Fiberboard, 10/02, Tables 7 and 9. Emission factors for THC and Methanol are the same across all three tables.
2. Emission factor for VOC as propane is from AP-42, Section 10.6.3., Medium Density Fiberboard, 08/02, Table 7.
3. Particulate matter emission factors from the USEPA document titled *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants. Source Classification Code 3-07-008-01 (Log Debarking)*. All PM is assumed to be larger than 2.5 microns. PM emissions are assumed to be controlled due to the bark hog being partially enclosed (assumed 90% control).

Abbreviations:

hr - hour
lb - pound
ODT - oven dried tons
THC - total hydrocarbon
tpy - tons per year
yr - year

References:

U.S. EPA. AP-42, Section 10.6.3 - Medium Density Fiberboard, (08/02).
U.S. EPA. AP-42, Section 10.6.4 - Hardboard and Fiberboard, (10/02).
U.S. EPA. 1990. AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants. Source Classification Code 3-07-008-01 (Log Debarking).

Table 9
Potential Emissions at Outlet of CD-RTO Stack
ES-DRYER, ES-GHM-1 through 3, ES-DHM-1 through 8
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Calculation Basis

Maximum Hourly Throughput	120	ODT/hr
Annual Throughput	625,011	ODT/yr
Hourly Heat Input Capacity	250.4	MMBtu/hr
Annual Heat Input Capacity	2,193,504	MMBtu/yr
Hours of Operation	8,760	hr/yr
RTO Burners Total Heat Input	44.4	MMBtu/hr
RTO Natural Gas Injection	10.0	MMBtu/hr
RTO Control Efficiency	95%	

Total Potential Emissions at RTO Stack

Pollutant	Potential Emissions[1]	
	(lb/hr)	(tpy)
CO	60.5	159
NO_x	54.9	144
SO_2	6.27	27.4
VOC	30.5	79.6
PM	16.5	43.0
PM_{10}	16.5	43.0
$PM_{2.5}$	16.2	42.3
CO_2e	94,783	248,938
Total HAP	7.30	19.8
Total TAP	3.05	9.07

Notes:
1. Total emissions from the furnace/dryer, green hammermills, dry hammermills, natural gas combustion by the RTO burners, and natural gas injection. Detailed calculations are provided below.

Potential Criteria Pollutant and Greenhouse Gas Emissions from Dryer/Furnace and Green Hammermills

Pollutant	Controlled Emission Factor	Units	Potential Emissions[1]	
			(lb/hr)	(tpy)
CO	0.50	lb/ODT[2]	59.6	155
NO_X	0.45	lb/ODT[2]	54.3	141
SO_2	0.025	lb/MMBtu[3]	6.26	27.4
VOC	0.22	lb/ODT[2]	26.6	69.3
$PM/PM_{10}/PM_{2.5}$ (Filterable + Condensable)	0.088	lb/ODT[2]	10.5	27.4
CO_2	780	lb/ODT[4]	93,600	243,754

Notes:
1. Exhaust from the dryer (ES-DRYER) and green hammermills (ES-GHM-1 through 3) are routed to a WESP and then RTO for control of VOC, HAP, and particulates. Additional emissions routed to the RTO from the dry hammermills are shown in the tables below.
2. Emission factor based on January 2020 compliance testing with a 20% contingency to account for inherent variability in stack testing results. The VOC emission factor was adjusted to account for the difference in pine percentage during testing and the maximum allowable.
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 on AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.
4. Emission factor for CO_2 from AP-42, Section 10.6.1 for rotary dryer with RTO control device. Enviva has conservatively calculated the CO_2 emissions using the hardwood emission factor because the dryer at Hamlet processes a combination of hardwood and softwood and the hardwood emission factor is greater than the softwood emission factor.

Potential Criteria Pollutant Emissions from Dry Hammermills[1]

Pollutant	Emission Factor (lb/ODT)[2]	Potential Emissions	
		(lb/hr)	(tpy)
PM	0.049	5.86	15.3
PM_{10}	0.049	5.86	15.3
$PM_{2.5}$	0.047	5.61	14.6
VOC	0.032	3.89	10.1

Notes:
1. A portion of the exhaust from each dry hammermill will be recirculated back into the dry hammermill to reduce the volume of air that will be routed to CD-RTO. All emissions from the dry hammermills will be controlled by a baghouse. Exhaust from the eight (8) dry hammermill baghouses (ES-DHM-1 through 8) will be controlled by the WESP and RTO.
2. Emission factor based on January 2020 compliance testing with a 20% contingency to account for inherent variability in stack testing results. The VOC emission factor was adjusted to account for the difference in pine percentage during testing and the maximum allowable. A 95% control efficiency is applied to VOC emission for control by the RTO.

Table 9
Potential Emissions at Outlet of CD-RTO Stack
ES-DRYER, ES-GHM-1 through 3, ES-DHM-1 through 8
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Thermally Generated Potential Criteria Pollutant Emissions from Dry Hammermill VOC

Maximum high heating value of VOC constituents	0.018	MMBtu/lb
Uncontrolled VOC emissions	203	tons/yr
Heat input of uncontrolled VOC emissions	7,497	MMBtu/yr

Pollutant	Emission Factor	Units	Potential Emissions	
			(lb/hr)	(tpy)
CO	0.082	lb/MMBtu[1]	0.070	0.31
NO_X	0.10	lb/MMBtu[1]	0.084	0.37

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.

Potential Criteria Pollutant and Greenhouse Gas Emissions from RTO Natural Gas Injection[1]

Pollutant	Emission Factor[2] (lb/MMscf)	Potential Emissions	
		(lb/hr)	(tpy)
CO	84.0	0.82	3.61
NO_X	50	0.49	2.15
VOC	5.50	0.054	0.24
SO_2	0.60	0.0059	0.026
$PM/PM_{10}/PM_{2.5}$ Condensable	5.70	0.056	0.24
$PM/PM_{10}/PM_{2.5}$ Filterable	1.90	0.019	0.082
Total $PM/PM_{10}/PM_{2.5}$	--	0.075	0.33
CO_2	120,000	1,176	5,153
CH_4	2.30	0.023	0.099
N_2O	2.20	0.022	0.094
CO_2e	--	1,183	5,184

Notes:
1. Enviva is requesting authorization for injection of natural gas into the RTO (10 MMBtu/hr) which will reduce the amount of combustion air added to the RTO, thereby increasing fuel efficiency and reducing generation of NO_X.
2. 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.

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							(lb/hr)	(tpy)
Furnace Biomass Combustion, Drying, Green Hammermills, and Dry Hammermills								
Acetaldehyde	Y	Y	Y	0.0019	lb/ODT	1	0.23	0.60
Acrolein	Y	Y	Y	0.0064	lb/ODT	1	0.77	2.01
Formaldehyde	Y	Y	Y	0.011	lb/ODT	1	1.33	3.46
Methanol	Y	N	Y	0.0075	lb/ODT	1	0.90	2.35
Phenol	Y	Y	Y	0.00063	lb/ODT	1	0.08	0.20
Propionaldehyde	Y	N	Y	0.029	lb/ODT	1	3.46	9.01
Acetophenone	Y	N	Y	3.20E-09	lb/MMBtu	1	4.0E-08	1.8E-07
Antimony and compounds	Y	N	N	7.90E-06	lb/MMBtu	2,4	1.4E-04	6.3E-04
Arsenic	Y	Y	N	2.20E-05	lb/MMBtu	2,4	4.0E-04	0.0017
Benzene	Y	Y	Y	0.0042	lb/MMBtu	2,3	0.053	0.23
Benzo(a)pyrene	Y	Y	Y	2.60E-06	lb/MMBtu	2,3	3.3E-05	1.4E-04
Beryllium	Y	Y	N	1.10E-06	lb/MMBtu	2,4	2.0E-05	8.7E-05
Cadmium	Y	Y	N	4.10E-06	lb/MMBtu	2,4	7.4E-05	3.3E-04
Carbon tetrachloride	Y	Y	Y	4.50E-05	lb/MMBtu	2,3	5.6E-04	0.0025
Chlorine	Y	Y	N	7.90E-04	lb/MMBtu	2	0.20	0.87
Chlorobenzene	Y	Y	Y	3.30E-05	lb/MMBtu	2,3	4.1E-04	0.0018
Chloroform	Y	Y	Y	2.80E-05	lb/MMBtu	2,3	3.5E-04	0.0015
Chromium VI	-[5]	Y	N	3.50E-06	lb/MMBtu	2,4,5	6.4E-05	2.8E-04
Chromium–Other compounds	Y	N	N	1.75E-05	lb/MMBtu	2,4	3.2E-04	0.0014
Cobalt	Y	N	N	6.50E-06	lb/MMBtu	2,4	1.2E-04	5.2E-04
Dichloroethane, 1,2-	Y	Y	Y	2.90E-05	lb/MMBtu	2,3	3.6E-04	0.0016
Dichloropropane, 1,2-	Y	N	Y	3.30E-05	lb/MMBtu	2,3	4.1E-04	0.0018
Dinitrophenol, 2,4-	Y	N	Y	1.80E-07	lb/MMBtu	2,3	2.3E-06	9.9E-06
Di(2-ethylhexyl)phthalate	Y	Y	Y	4.70E-08	lb/MMBtu	2,3	5.9E-07	2.6E-06
Ethyl benzene	Y	N	Y	3.10E-05	lb/MMBtu	2,3	3.9E-04	0.0017
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	N	Y	Y	1.79E-11	lb/MMBtu	2,3	2.2E-10	9.8E-10
Hydrochloric acid	Y	Y	N	1.33E-03	lb/MMBtu	2,6	0.03	0.15
Lead	Y	N	N	4.80E-05	lb/MMBtu	2,4	8.7E-04	0.0038
Manganese	Y	Y	N	0.0016	lb/MMBtu	2,4	0.029	0.13
Mercury	Y	Y	N	3.50E-06	lb/MMBtu	2,4	6.4E-05	2.8E-04
Methyl bromide	Y	N	Y	1.50E-05	lb/MMBtu	2,3	1.9E-04	8.2E-04
Methyl chloride	Y	N	Y	2.30E-05	lb/MMBtu	2,3	2.9E-04	0.0013
Methyl ethyl ketone	N	Y	Y	5.40E-06	lb/MMBtu	2,3	6.8E-05	3.0E-04
Methylene chloride	Y	Y	Y	2.90E-04	lb/MMBtu	2,3	0.0036	0.016
Naphthalene	Y	N	Y	9.70E-05	lb/MMBtu	2,3	0.0012	0.0053
Nickel	Y	Y	N	3.30E-05	lb/MMBtu	2,4	6.0E-04	0.0026
Nitrophenol, 4-	Y	N	Y	1.10E-07	lb/MMBtu	2,3	1.4E-06	6.0E-06
Pentachlorophenol	Y	Y	N	5.10E-08	lb/MMBtu	2	1.3E-05	5.6E-05
Perchloroethylene	Y	Y	N	3.80E-05	lb/MMBtu	2	0.0095	0.042
Phosphorus metal, yellow or white	Y	N	N	2.70E-05	lb/MMBtu	2,4	4.9E-04	0.0021
Polychlorinated biphenyls	Y	Y	Y	8.15E-09	lb/MMBtu	2,3	1.0E-07	4.5E-07
Polycyclic Organic Matter	Y	N	N	1.25E-04	lb/MMBtu	2	0.031	0.14
Selenium	Y	N	N	2.80E-06	lb/MMBtu	2,4	5.1E-05	2.2E-04
Styrene	Y	Y	Y	0.0019	lb/MMBtu	2,3	0.024	0.10
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	Y	8.60E-12	lb/MMBtu	2,3	1.1E-10	4.7E-10
Toluene	Y	Y	Y	9.20E-04	lb/MMBtu	2,3	0.012	0.050
Trichloroethane, 1,1,1-	Y	Y	N	3.10E-05	lb/MMBtu	2	0.0078	0.034
Trichloroethylene	Y	Y	Y	3.00E-05	lb/MMBtu	2,3	3.8E-04	0.0016
Trichlorofluoromethane	N	Y	Y	4.10E-05	lb/MMBtu	2,3	5.1E-04	0.0022
Trichlorophenol, 2,4,6-	Y	N	Y	2.20E-08	lb/MMBtu	2,3	2.8E-07	1.2E-06
Vinyl chloride	Y	Y	Y	1.80E-05	lb/MMBtu	2,3	2.3E-04	9.9E-04
Xylene	Y	Y	Y	2.50E-05	lb/MMBtu	2,3	3.1E-04	0.0014
						Total HAP Emissions:	**7.17**	**19.4**
						Total TAP Emissions:	**2.78**	**7.90**

Table 9
Potential Emissions at Outlet of CD-RTO Stack
ES-DRYER, ES-GHM-1 through 3, ES-DHM-1 through 8
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							(lb/hr)	(tpy)
RTO Natural Gas/Propane Combustion								
2-Methylnaphthalene	Y	N	Y	2.40E-05	lb/MMscf	7	1.28E-06	5.61E-06
3-Methylchloranthrene	Y	N	Y	1.80E-06	lb/MMscf	7	9.60E-08	4.20E-07
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.60E-05	lb/MMscf	7	8.53E-07	3.74E-06
Acenaphthene	Y	N	Y	1.80E-06	lb/MMscf	7	9.60E-08	4.20E-07
Acenaphthylene	Y	N	Y	1.80E-06	lb/MMscf	7	9.60E-08	4.20E-07
Ammonia	N	Y	N	3.2	lb/MMscf	7	0.17	0.75
Anthracene	Y	N	Y	2.40E-06	lb/MMscf	7	1.28E-07	5.61E-07
Arsenic	Y	Y	N	2.00E-04	lb/MMscf	7	1.07E-05	4.67E-05
Benz(a)anthracene	Y	N	Y	1.80E-06	lb/MMscf	7	9.60E-08	4.20E-07
Benzene	Y	N	Y	7.10E-04	lb/MMBtu	8	3.15E-02	1.35E-04
Benzo(a)pyrene	Y	Y	Y	1.20E-06	lb/MMscf	7	6.40E-08	2.80E-07
Benzo(b)fluoranthene	Y	N	Y	1.80E-06	lb/MMscf	7	9.60E-08	4.20E-07
Benzo(g,h,i)perylene	Y	N	Y	1.20E-06	lb/MMscf	7	6.40E-08	2.80E-07
Benzo(k)fluoranthene	Y	N	Y	1.80E-06	lb/MMscf	7	9.60E-08	4.20E-07
Beryllium	Y	Y	N	1.20E-05	lb/MMscf	7	6.40E-07	2.80E-06
Cadmium	Y	Y	N	0.0011	lb/MMscf	7	5.87E-05	2.57E-04
Chromium VI	Y	N	N	0.0014	lb/MMscf	7	7.47E-05	3.27E-04
Chrysene	Y	N	Y	1.80E-06	lb/MMscf	7	9.60E-08	4.20E-07
Cobalt	Y	N	N	8.40E-05	lb/MMscf	7	4.48E-06	1.96E-05
Dibenzo(a,h)anthracene	Y	N	Y	1.20E-06	lb/MMscf	7	6.40E-08	2.80E-07
Dichlorobenzene	Y	Y	Y	0.0012	lb/MMscf	7	6.40E-05	2.80E-04
Fluoranthene	Y	N	Y	3.00E-06	lb/MMscf	7	1.60E-07	7.01E-07
Fluorene	Y	N	Y	2.80E-06	lb/MMscf	7	1.49E-07	6.54E-07
Hexane	Y	Y	Y	1.8	lb/MMscf	7	0.096	0.42
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.80E-06	lb/MMscf	7	9.60E-08	4.20E-07
Lead	Y	N	N	5.00E-04	lb/MMscf	7	2.67E-05	1.17E-04
Manganese	Y	Y	N	3.80E-04	lb/MMscf	7	2.03E-05	8.88E-05
Mercury	Y	Y	N	2.60E-04	lb/MMscf	7	1.39E-05	6.07E-05
Naphthalene	Y	N	Y	6.10E-04	lb/MMscf	7	3.25E-05	1.42E-04
Nickel	Y	Y	N	0.0021	lb/MMscf	7	1.12E-04	4.91E-04
Polycyclic Organic Matter	Y	Y	Y	4.00E-05	lb/MMBtu	8,9	1.74E-06	7.63E-06
Phenanthrene	Y	N	Y	1.70E-05	lb/MMscf	7	9.07E-07	3.97E-06
Pyrene	Y	N	Y	5.00E-06	lb/MMscf	7	2.67E-07	1.17E-06
Selenium	Y	N	N	2.40E-05	lb/MMscf	7	1.28E-06	5.61E-06
Toluene	Y	Y	Y	0.0034	lb/MMscf	7	1.81E-04	7.94E-04
						Total HAP Emissions:	**0.13**	**0.42**
						Total TAP Emissions:	**0.27**	**1.17**

Notes:

1. Emission factor derived from process information and an appropriate contingency based on engineering judgement.
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. A control efficiency of 95% for the RTO is applied to all VOC hazardous and toxic pollutants for those emission factors that are not derived from Enviva stack test data.
4. The control efficiency of the wet electrostatic precipitator (WESP) for filterable particulate matter is applied to all metal hazardous and toxic pollutants. Actual design filterable efficiency is estimated to 96.4%, but 92.75% is assumed for toxics permitting.
5. Chromium VI is a subset of chrome 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.
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 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.
8. Propane is worst-case for these HAP emissions. Emission factors for propane combustion were obtained from the SCAQMD's AER Tool for external combustion equipment fired with LPG.
9. The PAH emission factor for propane combustion was used to estimate emissions of Polycyclic Organic Matter (POM). Individual constituents of POM were subtracted from the total to avoid double-counting.

Abbreviations:

AER - Air Emission Reporting
CAS - chemical abstract service
CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
kg - kilogram
lb - pound
MMBtu - Million British thermal units
NC - North Carolina
NO_x - nitrogen oxides
N_2O - nitrous oxide
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
POM - polycyclic organic matter
RTO - regenerative thermal oxidizer
SCAQMD - South Coast Air Quality Management District
SO_2 - sulfur dioxide
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 1.6 - Wood Residue Combustion in Boilers, 09/03
U.S. EPA. AP-42, Section 1.4 - Natural Gas Combustion, 07/98
U.S. EPA. AP-42, Section 10.6.2 - Particleboard, 06/02
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

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Table 10
Potential Emissions for Furnace Bypass (Cold Start-up)[1]
ES-FURNACEBYPASS
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Calculation Basis

Hourly Heat Input Capacity (HHV)	37.6 MMBtu/hr
Annual Heat Input Capacity	1,878 MMBtu/yr
Hours of Operation	50 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions from Dryer Line Cold Start-up[1]

Pollutant	Emission Factor[2] (lb/MMBtu)	Potential Emissions	
		(lb/hr)	(tpy)
CO	0.60	22.5	0.56
NO_x	0.22	8.26	0.21
SO_2	0.025	0.94	0.023
VOC	0.017	0.64	0.016
Total PM	0.58	21.7	0.54
Total PM_{10}	0.52	19.4	0.49
Total $PM_{2.5}$	0.45	16.8	0.42
CO_2	195	7,324	183
CH_4	0.021	0.79	0.020
N_2O	0.013	0.49	0.012
CO_2e	--	7,489	187

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.
2. Emission factors from 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 10

Potential Emissions for Furnace Bypass (Cold Start-up)[1]

ES-FURNACEBYPASS

Enviva Pellets Hamlet, LLC

Potential HAP and TAP Emissions from Dryer Line Cold Start-up

Pollutant	HAP	NC TAP	Emission Factor[1] (lb/MMBtu)	Potential Emissions (lb/hr)	Potential Emissions (tpy)
Furnace Biomass Combustion					
Acetaldehyde	Y	Y	8.30E-04	0.031	7.79E-04
Acrolein	Y	Y	0.0040	0.15	0.0038
Formaldehyde	Y	Y	0.0044	0.17	0.0041
Phenol	Y	Y	5.10E-05	0.0019	4.79E-05
Propionaldehyde	Y	N	6.10E-05	0.0023	5.73E-05
Acetophenone	Y	N	3.20E-09	1.20E-07	3.00E-09
Antimony and compounds	Y	N	7.90E-06	2.97E-04	7.42E-06
Arsenic	Y	Y	2.20E-05	8.26E-04	2.07E-05
Benzene	Y	Y	0.0042	0.16	0.0039
Benzo(a)pyrene	Y	Y	2.60E-06	9.77E-05	2.44E-06
Beryllium	Y	Y	1.10E-06	4.13E-05	1.03E-06
Cadmium	Y	Y	4.10E-06	1.54E-04	3.85E-06
Carbon tetrachloride	Y	Y	4.50E-05	0.0017	4.23E-05
Chlorine	Y	Y	7.90E-04	0.030	7.42E-04
Chlorobenzene	Y	Y	3.30E-05	0.0012	3.10E-05
Chloroform	Y	Y	2.80E-05	0.0011	2.63E-05
Chromium VI	Y	Y	3.50E-06	1.31E-04	3.29E-06
Chromium–Other compounds	Y	N	1.75E-05	6.57E-04	1.64E-05
Cobalt	Y	N	6.50E-06	2.44E-04	6.10E-06
Dinitrophenol, 2,4-	Y	N	1.80E-07	6.76E-06	1.69E-07
Di(2-ethylhexyl)phthalate	Y	Y	4.70E-08	1.77E-06	4.41E-08
Ethyl benzene	Y	N	3.10E-05	0.0012	2.91E-05
Dichloroethane, 1,2-	Y	Y	2.90E-05	0.0011	2.72E-05
Hydrochloric acid	Y	Y	0.019	0.71	0.018
Lead	Y	N	4.80E-05	0.0018	4.51E-05
Manganese	Y	Y	0.0016	0.060	0.0015
Mercury	Y	Y	3.50E-06	1.31E-04	3.29E-06
Methyl bromide	Y	N	1.50E-05	5.63E-04	1.41E-05
Methyl chloride	Y	N	2.30E-05	8.64E-04	2.16E-05
Methylene chloride	Y	Y	2.90E-04	1.09E-02	2.72E-04
Trichloroethane, 1,1,1-	Y	Y	3.10E-05	0.0012	2.91E-05
Naphthalene	Y	N	9.70E-05	0.0036	9.11E-05
Nickel	Y	Y	3.30E-05	0.0012	3.10E-05
Nitrophenol, 4-	Y	N	1.10E-07	4.13E-06	1.03E-07
Pentachlorophenol	Y	Y	5.10E-08	1.92E-06	4.79E-08
Perchloroethylene	Y	Y	3.80E-05	0.0014	3.57E-05
Phosphorus metal, yellow or white	Y	N	2.70E-05	0.0010	2.54E-05
Polychlorinated biphenyls	Y	Y	8.15E-09	3.06E-07	7.65E-09
Polycyclic Organic Matter	Y	N	1.25E-04	0.0047	1.17E-04
Dichloropropane, 1,2-	Y	N	3.30E-05	0.0012	3.10E-05
Selenium compounds	Y	N	2.80E-06	1.05E-04	2.63E-06
Styrene	Y	Y	0.0019	0.071	0.0018
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	8.60E-12	3.23E-10	8.08E-12
Toluene	Y	Y	9.20E-04	0.035	8.64E-04
Trichloroethylene	Y	Y	3.00E-05	0.0011	2.82E-05
Trichlorophenol, 2,4,6-	Y	N	2.20E-08	8.26E-07	2.07E-08
Vinyl chloride	Y	Y	1.80E-05	6.76E-04	1.69E-05
Xylene	Y	Y	2.50E-05	9.39E-04	2.35E-05
			Total HAP Emissions:	**1.45**	**0.036**
			Total TAP Emissions:	**1.44**	**0.036**

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:

CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
NO_x - nitrogen oxides
N_2O - nitrous oxide
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
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

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

Table 11
Potential Emissions for Furnace Bypass (Idle Mode)[1]
ES-FURNACEBYPASS
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Calculation Basis

Hourly Heat Input Capacity (HHV)	15.0 MMBtu/hr
Annual Heat Input Capacity	7,500 MMBtu/yr
Hours of Operation	500 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions from Furnace Idle Mode[1]

Pollutant	Emission Factor[2] (lb/MMBtu)	Potential Emissions	
		(lb/hr)	(tpy)
CO	0.60	9.00	2.25
NO_x	0.22	3.30	0.83
SO_2	0.025	0.38	0.094
VOC	0.017	0.26	0.064
Total PM	0.58	8.66	2.16
Total PM_{10}	0.52	7.76	1.94
Total $PM_{2.5}$	0.45	6.71	1.68
CO_2	195	2,925	731
CH_4	0.021	0.32	0.079
N_2O	0.013	0.20	0.049
CO_2e	--	2,991	748

Notes:

1. Hours of operation in furnace "idle mode" are limited to 500 hours per year. Idle mode is defined as operation up to 15 MMBtu/hr.
2. Emission factors from 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 11
Potential Emissions for Furnace Bypass (Idle Mode)[1]
ES-FURNACEBYPASS
Enviva Pellets Hamlet, LLC

Potential HAP and TAP Emissions from Furnace Idle Mode

Pollutant	HAP	NC TAP	Emission Factor[1] (lb/MMBtu)	Potential Emissions (lb/hr)	Potential Emissions (tpy)
Furnace Biomass Combustion					
Acetaldehyde	Y	Y	8.30E-04	0.012	0.0031
Acrolein	Y	Y	0.0040	0.060	0.015
Formaldehyde	Y	Y	0.0044	0.066	0.017
Phenol	Y	Y	5.10E-05	7.65E-04	1.91E-04
Propionaldehyde	Y	N	6.10E-05	9.15E-04	2.29E-04
Acetophenone	Y	N	3.2E-09	4.80E-08	1.20E-08
Antimony and compounds	Y	N	7.9E-06	1.19E-04	2.96E-05
Arsenic	Y	Y	2.2E-05	3.30E-04	8.25E-05
Benzene	Y	Y	0.0042	0.063	0.016
Benzo(a)pyrene	Y	Y	2.6E-06	3.90E-05	9.75E-06
Beryllium	Y	Y	1.1E-06	1.65E-05	4.13E-06
Cadmium	Y	Y	4.1E-06	6.15E-05	1.54E-05
Carbon tetrachloride	Y	Y	4.5E-05	6.75E-04	1.69E-04
Chlorine	Y	Y	7.9E-04	0.012	0.0030
Chlorobenzene	Y	Y	3.3E-05	4.95E-04	1.24E-04
Chloroform	Y	Y	2.8E-05	4.20E-04	1.05E-04
Chromium VI	Y	Y	3.5E-06	5.25E-05	1.31E-05
Chromium–Other compounds	Y	N	1.8E-05	2.63E-04	6.56E-05
Cobalt	Y	N	6.5E-06	9.75E-05	2.44E-05
Dinitrophenol, 2,4-	Y	N	1.8E-07	2.70E-06	6.75E-07
Di(2-ethylhexyl)phthalate	Y	Y	4.7E-08	7.05E-07	1.76E-07
Ethyl benzene	Y	N	3.1E-05	4.65E-04	1.16E-04
Dichloroethane, 1,2-	Y	Y	2.9E-05	4.35E-04	1.09E-04
Hydrochloric acid	Y	Y	0.019	0.29	0.071
Lead	Y	N	4.8E-05	7.20E-04	1.80E-04
Manganese	Y	Y	0.0016	0.024	0.0060
Mercury	Y	Y	3.5E-06	5.25E-05	1.31E-05
Methyl bromide	Y	N	1.5E-05	2.25E-04	5.63E-05
Methyl chloride	Y	N	2.3E-05	3.45E-04	8.63E-05
Methylene chloride	Y	Y	2.90E-04	4.35E-03	1.09E-03
Trichloroethane, 1,1,1-	Y	Y	3.1E-05	4.65E-04	1.16E-04
Naphthalene	Y	N	9.7E-05	0.0015	3.64E-04
Nickel	Y	Y	3.3E-05	4.95E-04	1.24E-04
Nitrophenol, 4-	Y	N	1.1E-07	1.65E-06	4.13E-07
Pentachlorophenol	Y	Y	5.1E-08	7.65E-07	1.91E-07
Perchloroethylene	Y	Y	3.8E-05	5.70E-04	1.43E-04
Phosphorus metal, yellow or white	Y	N	2.7E-05	4.05E-04	1.01E-04
Polychlorinated biphenyls	Y	Y	8.1E-09	1.22E-07	3.05E-08
Polycyclic Organic Matter	Y	N	1.2E-04	0.0019	4.68E-04
Dichloropropane, 1,2-	Y	N	3.3E-05	4.95E-04	1.24E-04
Selenium compounds	Y	N	2.8E-06	4.20E-05	1.05E-05
Styrene	Y	Y	0.0019	0.029	0.0071
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	8.6E-12	1.29E-10	3.23E-11
Toluene	Y	Y	9.2E-04	0.014	0.0035
Trichloroethylene	Y	Y	3.0E-05	4.50E-04	1.13E-04
Trichlorophenol, 2,4,6-	Y	N	2.2E-08	3.30E-07	8.25E-08
Vinyl chloride	Y	Y	1.8E-05	2.70E-04	6.75E-05
Xylene	Y	Y	2.5E-05	3.75E-04	9.38E-05
		Total HAP Emissions:		**0.58**	**0.15**
		Total TAP Emissions:		**0.57**	**0.14**

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:

CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
NO_x - nitrogen oxides
N_2O - nitrous oxide
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
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

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

Table 12
Potential Emissions from Double Duct Burners
IES-DB-1 and -2
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Duct Burner Inputs

Hourly Heat Input Capacity	2.5	MMBtu/hr
Number of Duct Burners	2	
Annual Heat Input Capacity	43,800	MMBtu/yr
Annual Operation	8,760	hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions - Natural Gas/Propane Combustion

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Hourly (lb/hr)	Annual (tpy)
Natural Gas Combustion					
CO	84.0	lb/MMscf	2	0.41	1.80
NO_X	50.0	lb/MMscf	3	0.25	1.07
SO_2	0.60	lb/MMscf	2	0.0029	0.013
VOC	5.50	lb/MMscf	2	0.027	0.12
$PM/PM_{10}/PM_{2.5}$ Condensable	5.70	lb/MMscf	2	0.028	0.12
$PM/PM_{10}/PM_{2.5}$ Filterable	1.90	lb/MMscf	2	0.0093	0.041
Total $PM/PM_{10}/PM_{2.5}$				0.037	0.16
CO_2	120,000	lb/MMscf	2	588	2,576
CH_4	2.30	lb/MMscf	2	0.011	0.049
N_2O	0.64	lb/MMscf	2	0.0031	0.014
CO_2e			4	589	2,582
Propane Combustion					
CO	7.50	lb/Mgal	5	0.41	1.80
NO_X	6.50	lb/Mgal	6	0.36	1.56
SO_2	0.054	lb/Mgal	5,7	0.0030	0.013
VOC	1.00	lb/Mgal	5	0.055	0.24
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	5	0.027	0.12
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	5	0.011	0.048
Total $PM/PM_{10}/PM_{2.5}$				0.038	0.17
CO_2	62.9	kg/MMBtu	4	693	3,035
CH_4	0.0030	kg/MMBtu	4	0.033	0.14
N_2O	0.0006	kg/MMBtu	4	0.0066	0.029
CO_2e			4	696	3,048

Notes:

1. The duct burners fire natural gas with propane as back-up. Potential emissions in Table 2 are based on worst-case emissions across the two fuels on a pollutant-by-pollutant basis.
2. 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.
3. Emission factors for NO_X assume burners are low-NO_X burners.
4. Global Warming Potentials from 40 CFR Part 98 Table A-1.
5. 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 Section 1.5.
6. 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.
7. 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 12
Potential Emissions from Double Duct Burners
IES-DB-1 and -2
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Hourly (lb/hr)	Annual (tpy)
Duct Burners - Natural Gas/Propane Combustion								
2-Methylnaphthalene	Y	N	Y	2.40E-05	lb/MMscf	1	1.18E-07	5.15E-07
3-Methylchloranthrene	Y	N	Y	1.80E-06	lb/MMscf	1	8.82E-09	3.86E-08
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.60E-05	lb/MMscf	1	7.84E-08	3.44E-07
Acenaphthene	Y	N	Y	1.80E-06	lb/MMscf	1	8.82E-09	3.86E-08
Acenaphthylene	Y	N	Y	1.80E-06	lb/MMscf	1	8.82E-09	3.86E-08
Acetaldehyde	Y	Y	Y	1.52E-05	lb/MMscf	1	7.45E-08	3.26E-07
Acrolein	Y	Y	Y	1.80E-05	lb/MMscf	1	8.82E-08	3.86E-07
Ammonia	N	Y	N	3.2	lb/MMscf	1	1.57E-02	6.87E-02
Anthracene	Y	N	Y	2.40E-06	lb/MMscf	1	1.18E-08	5.15E-08
Arsenic & Compounds	Y	Y	N	2.00E-04	lb/MMscf	1	9.80E-07	4.29E-06
Benz(a)anthracene	Y	N	Y	1.80E-06	lb/MMscf	1	8.82E-09	3.86E-08
Benzene	Y	N	Y	7.10E-04	lb/MMBtu	2	3.55E-03	1.55E-02
Benzo(a)pyrene	Y	Y	Y	1.20E-06	lb/MMscf	1	5.88E-09	2.58E-08
Benzo(b)fluoranthene	Y	N	Y	1.80E-06	lb/MMscf	1	8.82E-09	3.86E-08
Benzo(g,h,i)perylene	Y	N	Y	1.20E-06	lb/MMscf	1	5.88E-09	2.58E-08
Benzo(k)fluoranthene	Y	N	Y	1.80E-06	lb/MMscf	1	8.82E-09	3.86E-08
Beryllium	Y	Y	N	1.20E-05	lb/MMscf	1	5.88E-08	2.58E-07
Cadmium	Y	Y	N	1.10E-03	lb/MMscf	1	5.39E-06	2.36E-05
Chromium VI	Y	N	N	1.40E-03	lb/MMscf	1	6.86E-06	3.01E-05
Chrysene	Y	N	Y	1.80E-06	lb/MMscf	1	8.82E-09	3.86E-08
Cobalt compounds	Y	N	N	8.40E-05	lb/MMscf	1	4.12E-07	1.80E-06
Dibenzo(a,h)anthracene	Y	N	Y	1.20E-06	lb/MMscf	1	5.88E-09	2.58E-08
Dichlorobenzene	Y	Y	Y	1.20E-03	lb/MMscf	1	5.88E-06	2.58E-05
Fluoranthene	Y	N	Y	3.00E-06	lb/MMscf	1	1.47E-08	6.44E-08
Fluorene	Y	N	Y	2.80E-06	lb/MMscf	1	1.37E-08	6.01E-08
Formaldehyde	Y	Y	Y	1.50E-03	lb/MMBtu	2	7.50E-03	3.29E-02
Hexane	Y	Y	Y	1.8	lb/MMscf	1	8.82E-03	3.86E-02
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.80E-06	lb/MMscf	1	8.82E-09	3.86E-08
Lead and Lead Compounds	Y	N	N	5.00E-04	lb/MMscf	1	2.45E-06	1.07E-05
Manganese & Compounds	Y	Y	N	3.80E-04	lb/MMscf	1	1.86E-06	8.16E-06
Mercury	Y	Y	N	2.60E-04	lb/MMscf	1	1.27E-06	5.58E-06
Naphthalene	Y	N	Y	6.10E-04	lb/MMscf	1	2.99E-06	1.31E-05
Nickel	Y	Y	N	2.10E-03	lb/MMscf	1	1.03E-05	4.51E-05
Polycyclic Organic Matter	Y	N	N	4.00E-05	lb/MMBtu	2	2.00E-04	8.76E-04
Phenanthrene	Y	N	Y	1.70E-05	lb/MMscf	1	8.33E-08	3.65E-07
Pyrene	Y	N	Y	5.00E-06	lb/MMscf	1	2.45E-08	1.07E-07
Selenium compounds	Y	N	N	2.40E-05	lb/MMscf	1	1.18E-07	5.15E-07
Toluene	Y	Y	Y	3.40E-03	lb/MMscf	1	1.67E-05	7.30E-05
						Total HAP Emissions:	**0.020**	**0.088**
						Total TAP Emissions:	**0.032**	**0.14**

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
NCDAQ - North Carolina Divison of Air Quality
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
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

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.

RAMBOLL

Table 13
Dried Wood Handling Potential Emissions
ES-DWH
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Calculation Basis

Maximum Hourly Throughput[1]	120 ODT/hr
Annual Throughput[1]	625,011 ODT/yr

Potential VOC and HAP Emissions

Pollutant	Emission Factor[2] (lb/ODT)	Potential Emissions	
		(lb/hr)	(tpy)
Formaldehyde	4.32E-04	0.052	0.14
Methanol	8.88E-04	0.11	0.28
Acetaldehyde	4.80E-04	0.058	0.15
Propionaldehyde	1.42E-04	0.017	0.044
Total HAP Emissions:		**0.23**	**0.61**
VOC as propane	0.050	6.04	15.7

Notes:

1. Hourly and annual throughputs assumed to be the same as the dryer throughput.
2. Emission factor based on January 2020 compliance testing at the Hamlet plant and December 2019 compliance testing at the Enviva Sampson plant plus a 20% contingency to account for inherent variability in stack test results. The VOC emission factor was adjusted to account for the difference in pine percentage during testing and the maximum allowable.

Abbreviations:

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

Table 15
Summary of Potential Emissions from Baghouses
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Emission Unit ID	Source Description	Control Device ID	Control Device Description	Exhaust Flow Rate	Exit Grain Loading	Particulate Speciation		Potential Emissions					
								PM		PM_{10}		$PM_{2.5}$	
				(cfm)	(gr/cf)	PM_{10} (% of PM)	$PM_{2.5}$ (% of PM)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
ES-HMC	Hammermill Collection Conveyor	CD-HMC-BH	One (1) baghouse[1, 2]	1,500	0.004	100%	100%	0.051	0.23	0.051	0.23	0.051	0.23
ES-PCHP	Pellet Cooler HP Fines Relay System	CD-PCHP-BH	One (1) baghouse[1, 2]	500	0.004	100%	100%	0.017	0.075	0.017	0.075	0.017	0.075
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BH	One (1) baghouse[1, 2]	2,444	0.004	100%	100%	0.084	0.37	0.084	0.37	0.084	0.37
ES-FPH	Finished Product Handling	CD-FPH-BH	One (1) baghouse[3, 4]	8,500	0.004	91%	40.0%	0.29	1.28	0.27	1.16	0.12	0.51
ES-PB-1 and 2	Two (2) Pellet Loadout Bins												
ES-PL-1 through 3	Three (3) Pellet Loadouts												
ES-DWH	Dried Wood Handling Operations (conveyors)	CD-DWH-BH1	One (1) baghouse[1, 2]	1,000	0.004	100%	100%	0.034	0.15	0.034	0.15	0.034	0.15
		CD-DWH-BH2	One (1) baghouse[1, 2]	1,000	0.004	100%	100%	0.034	0.15	0.034	0.15	0.034	0.15

Notes:

1. No speciation data is available for PM_{10}. Therefore, it is conservatively assumed to be equal to total PM.
2. No speciation data is available for $PM_{2.5}$. Therefore, it is conservatively assumed to be equal to total PM.
3. Finished product handling PM_{10} speciation is based on emission factors for wet wood combustion controlled by a mechanical separator from AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03. Because the particle size of particulate matter from finished product handling is anticipated to be larger than flyash, this factor is believed to be a conservative indicator of speciation.
4. Finished product handling $PM_{2.5}$ speciation is based on a review of NCASI particle size distribution data for similar baghouses in the wood products industry.

Abbreviations:

cf - cubic feet
cfm - cubic feet per minute
ES - Emission Sources
IES - Insignificant Emission Source
gr - grain
hr - hour
lb - pound
NCASI - National Council for Air and Stream Improvement, Inc.
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. AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03

Table 16
Additive Handling
IES-ADD
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Source	Transfer Activity	Number of Drop Points	Material Moisture Content	PM Emission Factor[1]	PM_{10} Emission Factor[1]	$PM_{2.5}$ Emission Factor[1]	Potential Throughput[2,3]		Potential PM Emissions		Potential PM_{10} Emissions		Potential $PM_{2.5}$ Emissions	
			(%)	(lb/ton)	(lb/ton)	(lb/ton)	(tph)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
IES-ADD	Transfer from Supersacks to Hopper	1	10%	4.47E-04	2.12E-04	3.20E-05	0.18	1,563	8.22E-05	3.49E-04	3.89E-05	1.65E-04	5.89E-06	2.50E-05

Notes:

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

where: E = emission factor (lb/ton)

k = particle size multiplier (dimensionless) for F 0.74

k = particle size multiplier (dimensionless) for F 0.35

k = particle size multiplier (dimensionless) for F 0.053

U = mean wind speed (mph) 7.85

2. Hourly and annual additive throughputs based on expected maximum usage.

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 17
Potential VOC and HAP Emissions at Outlet of Pellet Mill/Pellet Cooler RCO/RTO Stack
ES-CLR-1 through 6
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Calculation Basis

Maximum Hourly Throughput	120 ODT/hr
Annual Throughput	625,011 ODT/yr
Hours of Operation	8,760 hr/yr
Number of Burners	4 burners
RCO/RTO Burner Rating	8 MMBtu/hr
RCO/RTO Control Efficiency	95%

Pellet Mill and Pellet Cooler Potential Emissions

Pollutant	CAS No.	NC TAP	VOC	Controlled Emission Factor[1,2] (lb/ODT)	Potential Emissions at RCO/RTO Stack[3] (lb/hr)	(tpy)
Acetaldehyde	75-07-0	Y	Y	0.0029	0.35	0.90
Acrolein	107-02-8	Y	Y	0.0025	0.30	0.79
Formaldehyde	50-00-0	Y	Y	0.0030	0.36	0.94
Methanol	67-56-1	N	Y	0.00088	0.11	0.28
Phenol	108-95-2	Y	Y	0.0011	0.13	0.34
Propionaldehyde	123-38-6	N	Y	5.16E-04	0.062	0.16
				Total HAP Emissions	**1.31**	**3.40**
				Total TAP Emissions	**1.14**	**2.96**
VOC (as propane)	--	--	Y	0.079	0.47	1.23
CO	--	--	--	0.071	8.50	22.1
NO_X	--	--	--	0.0077	0.92	2.40
PM	--	--	--	0.0032	0.39	1.01
PM_{10}	--	--	--	0.0032	0.39	1.01
$PM_{2.5}$	--	--	--	0.0016	0.20	0.51

Notes:

1. Emission factor derived from process information and an appropriate contingency based on engineering judgement.
2. Emission factors for VOC and HAP are based on post-RCO/RTO test data. The pellet mills and coolers are equipped with an RCO that operates primarily in catalytic mode with thermal (RTO) mode as a backup. The RTO and RCO modes have the same control efficiency so there is no impact on emissions during thermal mode usage.
3. Particulate, CO, and NO_X emissions include emissions from fuel combustion by the RCO/RTO.

Table 17
Potential VOC and HAP Emissions at Outlet of Pellet Mill/Pellet Cooler RCO/RTO Stack
ES-CLR-1 through 6
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Potential Criteria Pollutant and Greenhouse Gas Emissions from RCO/RTO Fuel Combustion

Pollutant	Emission Factor	Units	Potential Emissions[1]	
			(lb/hr)	(tpy)
Natural Gas				
SO_2	5.9E-04	lb/MMBtu[2]	0.019	0.082
CO_2	53.06	kg/MMBtu[3]	3,743	16,396
CH_4	0.0010	kg/MMBtu[3]	0.071	0.31
N_2O	1.0E-04	kg/MMBtu[3]	0.0071	0.031
CO_2e			3,747	16,412
Propane				
SO_2	0.054	lb/Mgal[4]	0.019	0.083
CO_2	62.87	kg/MMBtu[3]	4,435	19,427
CH_4	0.0030	kg/MMBtu[3]	0.21	0.93
N_2O	6.0E-04	kg/MMBtu[3]	0.042	0.19
CO_2e			4,453	19,505

Notes:

1. Emissions of VOC, CO, NO_X, PM, PM_{10}, and $PM_{2.5}$ are not included in these tables because they are already reflected in the lb/ODT factors above. The RCO/RTO will fire natural gas with propane as back-up. Potential emissions in Table 2 are based on worst-case emissions across the two fuels on a pollutant-by-pollutant basis.
2. Emission factor 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.
3. Emission factors for natural gas and propane combustion by the burners obtained from Table C-1 and C-2 of 40 CFR Part 98 and Global Warming Potentials from Table A-1.
4. Emission factors for propane combustion obtained from AP-42 Section 1.5 - Liquefied Petroleum Gas Combustion, 07/08. Heat content of propane was assumed to be 91.5 MMBtu/gal per AP-42 Section 1.5.

Table 17
Potential VOC and HAP Emissions at Outlet of Pellet Mill/Pellet Cooler RCO/RTO Stack
ES-CLR-1 through 6
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Potential HAP and TAP Emissions from RTO/RCO Natural Gas/Propane Combustion

Pollutant	HAP	NC TAP	VOC	Emission Factor[1,2] (lb/MMBtu)	Potential Emissions (lb/hr)	Potential Emissions (tpy)
RTO/RCO Natural Gas/Propane Combustion						
2-Methylnaphthalene	Y	N	Y	2.35E-08	7.53E-07	3.30E-06
3-Methylchloranthrene	Y	N	Y	1.76E-09	5.65E-08	2.47E-07
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.57E-08	5.02E-07	2.20E-06
Acenaphthene	Y	N	Y	1.76E-09	5.65E-08	2.47E-07
Acenaphthylene	Y	N	Y	1.76E-09	5.65E-08	2.47E-07
Ammonia	N	Y	N	3.14E-03	0.10	0.44
Anthracene	Y	N	Y	2.35E-09	7.53E-08	3.30E-07
Arsenic	Y	Y	N	1.96E-07	6.27E-06	2.75E-05
Benz(a)anthracene	Y	N	Y	1.76E-09	5.65E-08	2.47E-07
Benzene	Y	N	Y	7.10E-04	0.023	0.10
Benzo(a)pyrene	Y	Y	Y	1.18E-09	3.76E-08	1.65E-07
Benzo(b)fluoranthene	Y	N	Y	1.76E-09	5.65E-08	2.47E-07
Benzo(g,h,i)perylene	Y	N	Y	1.18E-09	3.76E-08	1.65E-07
Benzo(k)fluoranthene	Y	N	Y	1.76E-09	5.65E-08	2.47E-07
Beryllium	Y	Y	N	1.18E-08	3.76E-07	1.65E-06
Cadmium	Y	Y	N	1.08E-06	3.45E-05	1.51E-04
Chromium VI	Y	N	N	1.37E-06	4.39E-05	1.92E-04
Chrysene	Y	N	Y	1.76E-09	5.65E-08	2.47E-07
Cobalt	Y	N	N	8.24E-08	2.64E-06	1.15E-05
Dibenzo(a,h)anthracene	Y	N	Y	1.18E-09	3.76E-08	1.65E-07
Dichlorobenzene	Y	Y	Y	1.18E-06	3.76E-05	1.65E-04
Fluoranthene	Y	N	Y	2.94E-09	9.41E-08	4.12E-07
Fluorene	Y	N	Y	2.75E-09	8.78E-08	3.85E-07
Hexane	Y	Y	Y	1.76E-03	0.056	0.25
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.76E-09	5.65E-08	2.47E-07
Lead	Y	N	N	4.90E-07	1.57E-05	6.87E-05
Manganese	Y	Y	N	3.73E-07	1.19E-05	5.22E-05
Mercury	Y	Y	N	2.55E-07	8.16E-06	3.57E-05
Naphthalene	Y	N	Y	5.98E-07	1.91E-05	8.38E-05
Nickel	Y	Y	N	2.06E-06	6.59E-05	2.89E-04
Polycyclic Organic Matter	Y	N	N	4.00E-05	1.28E-03	5.61E-03
Phenanthrene	Y	N	Y	1.67E-08	5.33E-07	2.34E-06
Pyrene	Y	N	Y	4.90E-09	1.57E-07	6.87E-07
Selenium	Y	N	N	2.35E-08	7.53E-07	3.30E-06
Toluene	Y	Y	Y	3.33E-06	1.07E-04	4.67E-04
				Total HAP Emissions:	**0.081**	**0.35**
				Total TAP Emissions:	**0.16**	**0.69**

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 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.
2. The RTO/RCO burners can fire either natural gas or propane. Propane is worst-case for benzene and polycyclic organic matter (POM) emissions. Emission factors for propane combustion were obtained 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
HAP - hazardous air pollutant
hr - hour
lb - pound
NC - North Carolina
ODT - oven dried tons
POM - polycyclic organic matter
RCO - regenerative catalytic oxidizer
RTO - regenerative thermal oxidizer
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

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

Table 20
Diesel Storage Tanks
IES-TK-1 through 3
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Calculation Constants

Description	IES-TK-1	IES-TK-2	IES-TK-3	Units	Notes
α - Tank Paint Solar Absorptance	0.25			dimensionless	AP-42, Chapter 7 - Table 7.1-6 for White Tank, Average Condition
I - Annual Avg Total Solar Insolation Factor	1,395			dimensionless	AP-42, Chapter 7 - Table 7.1-7 for Charlotte, NC
T_{AX} - Annual Avg Maximum Ambient Temperature	530.5			R	AP-42, Chapter 7 - Table 7.1-7 for Charlotte, NC
T_{AN} - Annual Avg Minimum Ambient Temperature	510.8			R	AP-42, Chapter 7 - Table 7.1-7 for Charlotte, NC
R - Ideal Gas Constant	10.731			psia*ft^3/lb-mole R	AP-42, Chapter 7 - Page 7.1-23
Kp - Product Factor	1			dimensionless	Assume conservative value of 1
P_{VX} - Vapor Pressure at T_{AX}	0.0092			psia	AP-42, Chapter 7 - Equation 1-25 (exp[A-(B/T_{LA})])
P_{VN} - Vapor Pressure at T_{AN}	0.0048			psia	AP-42, Chapter 7 - Equation 1-25 (exp[A-(B/T_{LA})])
ΔP_V - Daily Vapor Pressure Range	0.0044			psia	AP-42, Chapter 7 - Equation 1-9
ΔP_B - Breather Vent Pressure Setting Range	0.06			psia	AP-42, Chapter 7 - Page 7.1-19 Note 3 (default)
P_A - Atmospheric Pressure	14.32			psia	AP-42, Chapter 7 - Table 7.1-7 for Charlotte, NC

Calculation Inputs

Description	IES-TK-1	IES-TK-2	IES-TK-3	Units	Notes
Tank Diameter	5.3	3.3	6.0	ft	Dimensions were provided by Enviva
Tank Length	6.0	3.3	23.7	ft	Dimensions were provided by Enviva
Tank Design Volume	1,000	185	5,000	gal	Conservative design specifications
Tank Working Volume	500	92.5	2,500	gal	50% of tank design volume because tanks will not be full at all times
Tank Throughput	15,958	4,500	200,000	gal/yr	Throughput for IES-TK-1 and IES-TK-2 based on fuel consumption provided by Enviva and 500 hours of operation per year for the fire pump and emergency generator. Throughput for IES-TK-3 provided by Enviva.
Equivalent Tank Diameter (D_E)	6.4	3.7	13.4	ft	AP-42, Chapter 7 - Equation 1-14 (SQRT(LD/(PI/4)))
Effective Height (H_E)	4.2	2.6	4.7	ft	AP-42, Chapter 7 - Equation 1-15 (PI/4*D)
V_v - Vapor Space Volume	66.2	13.8	334.6	ft^3	AP-42, Chapter 7 - Equation 1-3 (PI/4*D^2*H_{VO}), substitute D_E for D for horizontal tanks
H_{vo} - Vapor Space Outage	2.1	1.3	2.4	ft	AP-42, Chapter 7 - H_{VO} = 0.5*H_E for horizontal tanks
P_{VA} - Vapor Pressure	0.009	0.009	0.009	psia	Vapor pressure for Distillate Fuel Oil No. 2 at 70°F
M_v - Vapor Molecular Weight	130	130	130	lb/lb-mole	AP-42, Chapter 7 - Table 7.1-2 for diesel
Q - Throughput	380.0	107.1	4,762	bbl/yr	

Table 20
Diesel Storage Tanks
IES-TK-1 through 3
Enviva Pellets Hamlet, LLC

Calculated Values

Description	IES-TK-1	IES-TK-2	IES-TK-3	Units	Notes
K_e - Vapor Space Expansion Factor	0.036	0.036	0.036	dimensionless	AP-42, Chapter 7 - Equation 1-5 ($\Delta T_V/T_{LA}$ + ((ΔP_V - ΔP_B)/(P_A - ΔP_{VA}))
ΔT_v - Daily Vapor Temperature Range	20.77	20.77	20.77	R	AP-42, Chapter 7 - Equation 1-7 (0.7*ΔT_A + 0.02*a*I)
ΔT_A - Daily Ambient Temperature Range	19.7	19.7	19.7	R	AP-42, Chapter 7 - Equation 1-11 (T_{AX} - T_{AN})
K_S - Vented Vapor Saturation Factor	1.00	1.00	1.00	dimensionless	AP-42, Chapter 7 - Equation 1-21 (1/(1 + 0.053P_{VA}*H_{VO}))
W_v - Stock Vapor Density	0.00021	0.00021	0.00021	lb/ft^3	AP-42, Chapter 7 - Equation 1-22 (Mv * P_{VA}) / (R * T_V)
T_V - Average Vapor Temperature	524.1	524.1	524.1	R	AP-42, Chapter 7 - Equation 1-33 (0.7*T_{AA} + 0.3T_B + 0.009a*I)
T_{AA} - Daily Average Ambient Temperature	520.7	520.7	520.7	R	AP-42, Chapter 7 - Equation 1-30 ((T_{AX} + T_{AN})/2)
T_B - Liquid Bulk Temperature	521.7	521.7	521.7	R	AP-42, Chapter 7 - Equation 1-31 (T_{AA} + 0.003aI)
T_{LA} - Daily Average Liquid Surface Temperature	523.0	521.7	521.7	R	AP-42, Chapter 7 - Equation 1-28 (0.4*T_{AA} + 0.6T_B + 0.005*a*I)
N - Number of Turnovers	31.9	48.6	80.0	dimensionless	
K_N - Working Loss Turnover (Saturation) Factor	1	0.78	0.54	dimensionless	AP-42, Chapter 7 - Page 7.1-28 (For N>36, K_N = (180 + N)/6N; For N≤36, K_N = 1)
V_Q - Net Working Loss Throughput	2,133	602	26,733	ft^3/yr	AP-42 Chapter 7 - Equation 1-39 (5.614*Q)
K_p - Working Loss Product Factor	1	1	1	dimensionless	AP-42 Chapter 7 - Page 7.1-28
K_B - Vent Setting Correction Factor	1	1	1	dimensionless	AP-42 Chapter 7 - Page 7.1-28

Potential VOC Emissions

Description	IES-TK-1	IES-TK-2	IES-TK-3	Units	Notes
L_s - Standing Loss	0.18	0.038	0.91	lbs/yr	AP-42, Chapter 7 - Equation 1-2 (365 * Vv * Wv * Ke * Ks)
L_w - Working Loss	0.44	0.098	3.0	lbs/yr	AP-42, Chapter 7 - Equation 1-35 (V_Q * K_N * K_p * W_V * K_B)
L_t - Total Loss	0.62	0.14	3.9	lbs/yr	AP-42, Chapter 7 - Equation 1-1 (Ls + Lw)
Contingency Factor	1.00	1.00	1.00	dimensionless	Assumed contingency factor to account for unaccounted variables.
Total VOC Emissions per Tank	0.62	0.14	3.9	lbs/yr	
Total VOC Emissions	**3.1E-04**	**6.8E-05**	**0.0020**	**tons/yr**	

Reference:

U.S. AP-42, Section 7.1 - Organic Liquid Storage Tanks, 07/2020

Table 22
Potential Fugitive PM Emissions from Unpaved Roads
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Vehicle Activity	Distance Traveled per Roundtrip[1] (ft)	Trips Per Day[2]	Daily VMT	Events Per Year (days)	Empty Truck Weight (lb)	Loaded Truck Weight (lb)	Average Truck Weight (ton)	Annual VMT
Front End Loader to Hardwood Pile	600	343	39	365	56,375	63,375	30	14,221
Front End Loader from Hardwood Pile to Mix Pile	300	82	5	365	56,375	63,375	30	1,706
Front End Loader from Softwood Pile to Mix Pile	300	466	26	365	56,375	63,375	30	9,670
Front End Loader from Mix Pile to Reclaim Hopper	200	549	21	365	56,375	63,375	30	7,584
							30	**33,182**

Notes:
1. Distance traveled per round trip was estimated based on truck route and site layout.
2. Daily trip counts based on engineering estimates.

Emission Calculations Unpaved Roads:

Pollutant	Empirical Constant (k)[1]	Silt Content (S)[2]	Particle Constant a[1]	Particle Constant b[1]	Emission Factor[3]	Potential Emissions[4]
	(lb/VMT)	(%)	(-)	(-)	(lb/VMT)	(tpy)
PM	4.9	8.4	0.7	0.45	7.51	12.5
PM_{10}	1.5	8.4	0.9	0.45	2.14	3.55
$PM_{2.5}$	0.15	8.4	0.9	0.45	0.21	0.36

Notes:
1. Constants (k, a, & b) based on AP-42, Section 13.2.2 (Unpaved Roads), Table 13.2.2-2 for Industrial Roads, November 2006
2. Silt loading factor based on AP-42, Section 13.2.2 (Unpaved Roads), Table 13.2.2-1, Lumber Sawmills, November 2006
3. Emission factors calculated based on Equation 1a from AP-42 Section 13.2.2 - Unpaved Roads, 11/06.

Particulate Emission Factor: $E_{ext} = k (s/12)^a \times (W/3)^b * (365-P/365)$

k = particle size multiplier for particle size range and units of interest
E = size-specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)
P=number of days with at least 0.01 in of precipitation during the averaging period = 110 Per AP-42, Section 13.2.1, Figure 13.2.1-2 (Richmond County, NC).

4. Potential emissions calculated from appropriate emission factor times vehicle miles traveled with control efficiency of 90% for water / dust suppression activities.

Abbreviations:
ft - feet
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
VMT - vehicle miles traveled
VOC - volatile organic compound

Reference:
U.S. EPA. AP-42, Section 13.2.2 - Unpaved Roads, 11/06.

Table 23
Potential Emissions from Propane Vaporizers
IES-PV-1 and 2
Enviva Pellets Hamlet, LLC
Hamlet, Richmond County, North Carolina

Calculation Basis[1]

Propane Heating Value[2]	91.5 MMBtu/Mgal
Hours of Operation	8,760 hr/yr
No. of Vaporizers	2
Maximum Heat Input Rate	1.0 MMBtu/hr
Hourly Fuel Consumption	0.011 Mgal/hr

Notes:
1. The propane vaporizers are considered insignificant activities per 15A NCAC 02Q .0503 .
2. Propane heat content from AP-42 Section 1.5 - Liquefied Petroleum Gas Production, 7/08.

Potential Criteria Pollutant and Greenhouse Gas Emissions

Pollutant	Emission Factor[1]	Units	Potential Emissions	
			(lb/hr)	(tpy)
CO	7.5	lb/Mgal	0.16	0.72
NO_X	13.0	lb/Mgal	0.28	1.24
SO_2[2]	0.054	lb/Mgal	0.0012	0.0052
VOC	1.0	lb/Mgal	0.022	0.096
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	0.011	0.048
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	0.0044	0.019
Total $PM/PM_{10}/PM_{2.5}$			0.015	0.067
CO_2	12,500	lb/Mgal	273	1,197
CH_4	0.20	lb/Mgal	0.0044	0.019
N_2O	0.90	lb/Mgal	0.020	0.086
CO_2e			279	1,223

Notes:
1. Emission factors obtained from AP-42 1.5- Liquefied Petroleum Gas Combustion, 07/08, Table 1.5-1.
2. 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* .

Potential HAP Emissions

Pollutant	CAS No.	VOC	Emission Factor[1]	Potential Emissions	
			(lb/MMBtu)	(lb/hr)	(tpy)
Benzene	71-43-2	Y	7.1E-04	0.0014	0.0062
Formaldehyde	50-00-0	Y	0.0015	0.0030	0.013
PAHs	--	N	4.0E-05	8.0E-05	3.5E-04
			Total HAP Emissions	**0.0044**	**0.020**

Notes:
1. 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:

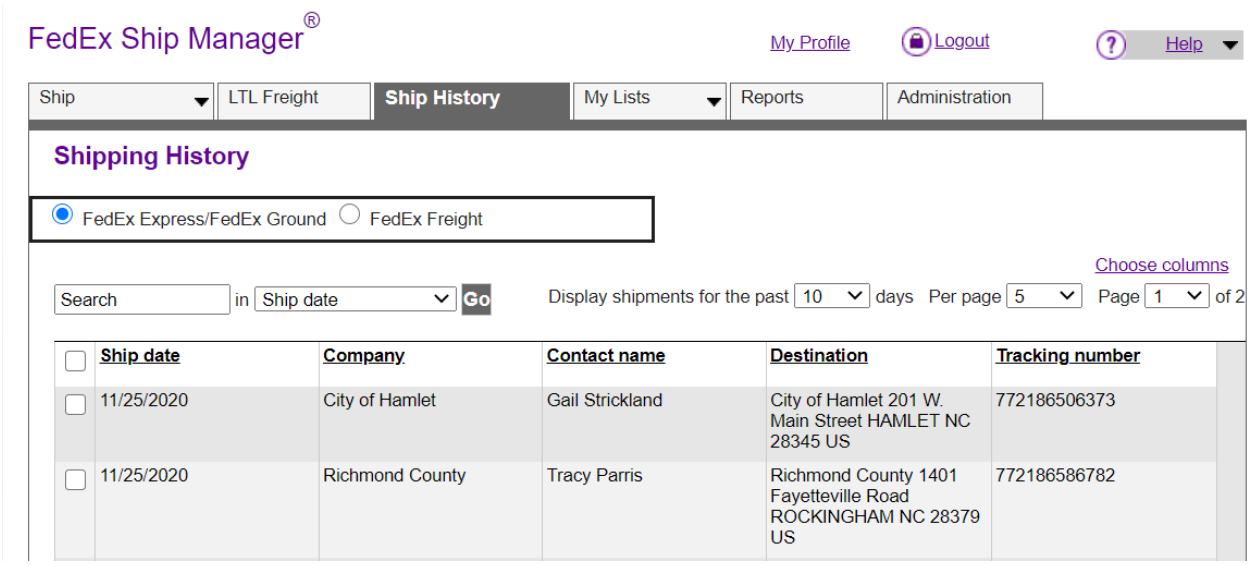
Btu - British thermal unit
CAS - chemical abstract service
CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
gal - gallon
HAP - hazardous air pollutant
hr - hour
lb - pound
LPG - liquified petroleum gas
MMBtu - Million British thermal units
Mgal - Thousand gallons
NO_X - nitrogen oxides
N_2O - nitrous oxide
PAH - polycyclic aromatic hydrocarbon
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 micro
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

References:

A National Methodology and Emission Inventory for Residential Fuel Combustion (2001). Retrieved from https://www3.epa.gov/ttnchie1/conference/ei12/area/haneke.pdf.
U.S. EPA. AP-42, Chapter 1.5 - Liquid Petroleum Gas Combustion, 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

APPENDIX E
ZONING CONSISTENCY DETERMINATION REQUESTS

Proof of Zoning Consistency Determination Request Shipments



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	Ship date	Company	Contact name	Destination	Tracking number
☐	11/25/2020	City of Hamlet	Gail Strickland	City of Hamlet 201 W. Main Street HAMLET NC 28345 US	772186506373
☐	11/25/2020	Richmond County	Tracy Parris	Richmond County 1401 Fayetteville Road ROCKINGHAM NC 28379 US	772186586782

RAMBOLL

ENVIRONMENT
& HEALTH

November 25, 2020

Ms. Tracy Parris
Richmond County
1401 Fayetteville Road
Rockingham, North Carolina 28379

Dear Ms. Parris:

On behalf of Enviva Pellets Hamlet, LLC (Enviva), I am writing to inform you that Enviva intends to modify the wood pellet manufacturing facility at 1125 North NC Highway 177 in Hamlet in Richmond County. I hereby certify that to the best of my knowledge, the County of Richmond, in addition to the City of Hamlet, have 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 requests 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 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 Kai Simonsen, Air Permit Engineer at Enviva, at (984) 368-3628.

Sincerely,

Michael Carbon
Managing Principal

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

§ 143-215.108. Control of sources of air pollution; permits required.

(a) Except as provided in subsections (a1) and (a2) of this section, no person shall do any of the following things or carry out any of the following activities that contravene or will be likely to contravene standards established pursuant to G.S. 143-215.107 or set out in G.S. 143-215.107D unless that person has obtained a permit for the activity from the Commission and has complied with any conditions of the permit:

(1) Establish or operate any air contaminant source, except as provided in G.S. 143-215.108A.

(2) Build, erect, use, or operate any equipment that may result in the emission of an air contaminant or that is likely to cause air pollution, except as provided in G.S. 143-215.108A.

(3) Alter or change the construction or method of operation of any equipment or process from which air contaminants are or may be emitted.

(4) Repealed by Session Laws 2003-428, s. 1, effective August 19, 2003.

(a1) The Commission may by rule establish procedures that meet the requirements of section 502(b)(10) of Title V (42 U.S.C. § 7661a(b)(10)) and 40 Code of Federal Regulations § 70.4(b)(12) (1 July 1993 Edition) to allow a permittee to make changes within a permitted facility without requiring a revision of the permit.

(a2) The Commission may adopt rules that provide for a minor modification of a permit. At a minimum, rules that provide for a minor modification of a permit shall meet the requirements of 40 Code of Federal Regulations § 70.7(e)(2) (1 July 1993 Edition). If the Commission adopts rules that provide for a minor modification of a permit, a permittee shall not make a change in the permitted facility while the application for the minor modification is under review unless the change is authorized under the rules adopted by the Commission.

(b) The Commission shall act upon all applications for permits so as to effectuate the purposes of this Article by reducing existing air pollution and preventing, so far as reasonably possible, any increased pollution of the air from any additional or enlarged sources.

(c) The Commission shall have the power:

(1) To grant and renew a permit with any conditions attached that the Commission believes necessary to achieve the purposes of this Article or the requirements of the Clean Air Act and implementing regulations adopted by the United States Environmental Protection Agency;

(2) To grant and renew any temporary permit for such period of time as the Commission shall specify even though the action allowed by such permit may result in pollution or increase pollution where conditions make such temporary permit essential;

(3) To terminate, modify, or revoke and reissue any permit upon not less than 60 days' written notice to any person affected;

(3a) To suspend any permit pursuant to the provisions of G.S. 150B-3(c);

(4) To require all applications for permits and renewals to be in writing and to prescribe the form of such applications;

(5) To request such information from an applicant and to conduct such inquiry or investigation as it may deem necessary and to require the submission of plans and specifications prior to acting on any application for a permit;

(5a) To require that an applicant satisfy the Department that the applicant, or any parent, subsidiary, or other affiliate of the applicant or parent:

a. Is financially qualified to carry out the activity for which a permit is required under subsection (a); and

b. Has substantially complied with the air quality and emission control standards applicable to any activity in which the applicant has previously engaged, and has been in substantial compliance with federal and state laws, regulations, and rules for the protection of the environment.

As used in this subdivision, the words "affiliate," "parent," and "subsidiary" have the same meaning as in 17 Code of Federal Regulations 240.12b-2 (1 April 1990 Edition);

(6) To adopt rules, as it deems necessary, establishing the form of applications and permits and procedures for the granting or denial of permits and renewals pursuant to this section; and all permits, renewals and denials shall be in writing;

(7) To prohibit any stationary source within the State from emitting any air pollutant in amounts that will prevent attainment or maintenance by any other state of any national ambient air quality standard or that will interfere with measures required to be included in the applicable implementation plan for any other state to prevent deterioration of air quality or protect visibility; and

(8) To designate certain classes of activities for which a general permit may be issued, after considering the environmental impact of an activity, the frequency of the activity, the need for individual permit oversight, and the need for public review and comment on individual permits.

(d) (1) The Commission may conduct any inquiry or investigation it considers necessary before acting on an application and may require an applicant to submit plans, specifications, and other information the Commission considers necessary to evaluate the application. A permit application may not be deemed complete unless it is accompanied by a copy of the request for determination as provided in subsection (f) of this section that bears a date of receipt entered by the clerk of the local government and until the 15-day period for issuance of a determination has elapsed.

(2) The Commission shall adopt rules specifying the times within which it must act upon applications for permits required by Title V and other permits required by this section. The times specified shall be extended for the period during which the Commission is prohibited from issuing a permit under subdivisions (3) and (4) of this subsection. The Commission shall inform a permit applicant as to whether or not the application is complete within the time specified in the rules for action on the application. If the Commission fails to act on an application for a permit required by Title V or this section within the time period specified, the failure to act on the application constitutes a final agency decision to deny the permit. A permit applicant, permittee, or other person aggrieved, as defined in G.S. 150B-2, may seek judicial review of a failure to act on the application as provided in G.S. 143-215.5 and Article 4 of Chapter 150B of the General Statutes. Notwithstanding the provisions of G.S. 150B-51, upon review of a failure to act on an application for a permit required by Title V or this section, a court may either: (i) affirm the denial of the permit or (ii) remand the application to the Commission for action upon the application within a specified time.

(3) If the Administrator of the United States Environmental Protection Agency validly objects to the issuance of a permit required by Title V within 45 days

after the Administrator receives the proposed permit and the required portions of the permit application, the Commission shall not issue the permit until the Commission revises the proposed permit to meet all objections noted by the Administrator or otherwise satisfies all objections consistent with Title V and implementing regulations adopted by the United States Environmental Protection Agency.

(4) If the Administrator of the United States Environmental Protection Agency validly objects to the issuance of a permit required by Title V after the expiration of the 45-day review period specified in subdivision (3) of this subsection as a result of a petition filed pursuant to section 505(b)(2) of Title V (42 U.S.C. § 7661d(b)(2)) and prior to the issuance of the permit by the Commission, the Commission shall not issue the permit until the Commission revises the proposed permit to meet all objections noted by the Administrator or otherwise satisfies all objections consistent with Title V and implementing regulations adopted by the United States Environmental Protection Agency.

(d1) No Title V permit issued pursuant to this section shall be issued or renewed for a term exceeding five years. All other permits issued pursuant to this section shall be issued for a term of eight years.

(e) A permit applicant, permittee, or third party who is dissatisfied with a decision of the Commission may commence a contested case by filing a petition under G.S. 150B-23 within 30 days after the Commission notifies the applicant or permittee of its decision. If the permit applicant, permittee, or third party does not file a petition within the required time, the Commission's decision on the application is final and is not subject to review.

(f) An applicant for a permit under this section for a new facility or for the expansion of a facility permitted under this section shall request each local government having jurisdiction over any part of the land on which the facility and its appurtenances are to be located to issue a determination as to whether the local government has in effect a zoning or subdivision ordinance applicable to the facility and whether the proposed facility or expansion would be consistent with the ordinance. The request to the local government shall be accompanied by a copy of the draft permit application and shall be delivered to the clerk of the local government personally or by certified mail. The determination shall be verified or supported by affidavit signed by the official designated by the local government to make the determination and, if the local government states that the facility is inconsistent with a zoning or subdivision ordinance, shall include a copy of the ordinance and the specific reasons for the determination of inconsistency. A copy of any such determination shall be provided to the applicant when it is submitted to the Commission. The Commission shall not act upon an application for a permit under this section until it has received a determination from each local government requested to make a determination by the applicant. If a local government determines that the new facility or the expansion of an existing facility is inconsistent with a zoning or subdivision ordinance, and unless the local government makes a subsequent determination of consistency with all ordinances cited in the determination or the proposed facility is determined by a court of competent jurisdiction to be consistent with the cited ordinances, the Commission shall attach as a condition of the permit a requirement that the applicant, prior to construction or operation of the facility under the permit, comply with all lawfully adopted local ordinances, including those cited in the determination, that apply to the facility at the time of construction or operation of the facility. If a local government fails to submit a determination to the Commission as provided by this subsection within 15 days after receipt of the request, the Commission may proceed to consider the permit application without regard to local zoning and

subdivision ordinances. This subsection shall not be construed to affect the validity of any lawfully adopted franchise, local zoning, subdivision, or land-use planning ordinance or to affect the responsibility of any person to comply with any lawfully adopted franchise, local zoning, subdivision, or land-use planning ordinance. This subsection shall not be construed to limit any opportunity a local government may have to comment on a permit application under any other law or rule. This subsection shall not apply to any facility with respect to which local ordinances are subject to review under either G.S. 104E-6.2 or G.S. 130A-293.

(g) Repealed by Session Laws 2014-120, s. 38(c), effective September 18, 2014.

(h) Expedited Review of Applications Certified by a Professional Engineer. – The Commission shall adopt rules governing the submittal of permit applications certified by a professional engineer, including draft permits, that can be sent to public notice and hearing upon receipt and subjected to technical review by personnel within the Department. These rules shall specify, at a minimum, any forms to be used; a checklist for applicants that lists all items of information required to prepare a complete permit application; the form of the certification required on the application by a professional engineer; and the information that must be included in the draft permit. The Department shall process an application that is certified by a professional engineer as provided in subdivisions (1) through (7) of this subsection.

(1) Initiation of Review. Upon receipt of an application certified by a professional engineer in accordance with this subsection and the rules adopted pursuant to this subsection, the Department shall determine whether the application is complete as provided in subdivision (2) of this subsection. Within 30 days after the date on which an application is determined to be complete, the Department shall:

a. Publish any required notices, using the draft permit included with the application;

b. Schedule any required public meetings or hearings on the application and permit; and

c. Initiate any and all technical review of the application in a manner to ensure substantial completion of the technical review by the time of any public hearing on the application, or if there is no hearing, by the close of the notice period.

(2) Completeness Review. Within 10 working days of receipt of the permit application certified by a professional engineer under this subsection, the Department shall determine whether the application is complete for purposes of this subsection. The Department shall determine whether the permit application certified by a professional engineer is complete by comparing the information provided in the application with the checklist contained in the rules adopted by the Commission pursuant to this subsection.

a. If the application is not complete, the Department shall promptly notify the applicant in writing of all deficiencies of the application, specifying the items that need to be included, modified, or supplemented in order to make the application complete, and the 10-day time period is suspended after this request for further information. If the applicant submits the requested information within the time specified, the 10-day time period shall begin again on the day the additional information was submitted. If the additional information is not submitted within the time periods specified, the Department shall return the application to the applicant, and the

applicant may treat the return of the application as a denial of the application or may resubmit the application at a later time.

b. If the Department fails to notify the applicant that an application is not complete within the time period set forth in this subsection, the application shall be deemed to be complete.

(3) Time for Permit Decision. For any application found to be complete under subdivision (2) of this subsection, the Department shall issue a permit decision within 30 days of the last day of any public hearing on the application, or if there is no hearing, within 30 days of the close of the notice period.

(4) Rights if Permit Decision Not Made in Timely Fashion. If the Department fails to issue a permit decision within the time periods specified in subdivision (3) of this subsection, the applicant may:

a. Take no action, thereby consenting to the continued review of the application; or

b. Treat the failure to issue a permit decision as a denial of the application and appeal the denial as provided in subdivision (2) of subsection (d) of this section.

(5) Power to Halt Review. At any time after the permit application certified by a professional engineer has been determined to be complete under subdivision (2) of this subsection, the Department may immediately terminate review of that application, including technical review and any hearings or meetings scheduled on the application, upon a determination of one of the following:

a. The permit application is not in substantial compliance with the applicable rules; or

b. The applicant failed to pay all permit application fees.

(6) Rights if Review Halted. If the Department terminates review of an application under subdivision (5) of this subsection, the applicant may take any of the following actions:

a. Revise and resubmit the application; or

b. Treat the action as a denial of the application and appeal the denial under Article 3 of Chapter 150B of the General Statutes.

(7) Option; No Additional Fee. The submittal of a permit application certified by a professional engineer to be considered under this subsection shall be an option and shall not be required of any applicant. The Department shall not impose any additional fees for the receipt or processing of a permit application certified by a professional engineer.

(i) Rules for Review of Applications Other Than Those Certified by a Professional Engineer. – The Commission shall adopt rules governing the times of review for all permit applications submitted pursuant to this section other than those certified by a professional engineer pursuant to subsection (h) of this section. Those rules shall specify maximum times for, among other things, the following actions in reviewing the permit applications covered by this subsection:

(1) Determining that the permit application is complete;

(2) Requesting additional information to determine completeness;

(3) Determining that additional information is needed to conduct a technical review of the application;

(4) Completing all technical review of the permit application;

(5) Holding and completing all public meetings and hearings required for the application;
(6) Completing the record from reviewing and acting on the application; and
(7) Taking final action on the permit, including granting or denying the application.

(j) No Power to Regulate Residential Combustion. – Nothing in this section shall be interpreted to give the Commission or the Department the power to regulate the emissions from any combustion heater, appliance, or fireplace in private dwellings, except to the extent required by federal law. For purposes of this subsection, "combustion heater, appliance, or fireplace" means any heater, appliance, or fireplace that burns combustion fuels, including, but not limited to, natural or liquefied petroleum gas, fuel oil, kerosene, wood, or coal, for heating, cooking, drying, or decorative purposes. (1973, c. 821, s. 6; c. 1262, s. 23; 1979, c. 545, ss. 2, 3; 1987, c. 461, s. 2; c. 827, ss. 154, 206; 1989, c. 168, s. 30; c. 492; 1989 (Reg. Sess., 1990), c. 1037, s. 2; 1991, c. 552, s. 5; c. 629, s. 1; c. 761, s. 27(a)-(c); 1993, c. 400, s. 8; 1995, c. 484, s. 2; 1995 (Reg. Sess., 1996), c. 728, s. 1; 2002-4, s. 2; 2003-340, s. 1.8(b); 2003-428, ss. 1, 2; 2011-398, s. 60(a); 2013-413, s. 29; 2014-115, s. 17; 2014-120, ss. 24(g), 38(c).)

Zoning Consistency Determination

Facility Name	Enviva Pellets Hamlet, LLC
Facility Street Address	1125 North NC Highway 177
Facility City	Hamlet
Description of Process	Wood pellet manufacturing facility
SIC/NAICS Code	2499
Facility Contact	Kai Simonsen, Air Permit Engineer
Phone Number	984-789-3628
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: Heather Carter
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

RAMBOLL

ENVIRONMENT
& HEALTH

November 25, 2020

Ms. Gail Strickland
City of Hamlet
201 W. Main Street
Hamlet, North Carolina 28345

Dear Ms. Strickland:

On behalf of Enviva Pellets Hamlet, LLC (Enviva), I am writing to inform you that Enviva intends to modify the wood pellet manufacturing facility at 1125 North NC Highway 177 in Hamlet in Richmond County. I hereby certify that to the best of my knowledge, the City of Hamlet, in addition to the County of Richmond, have 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 requests 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 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 Kai Simonsen, Air Permit Engineer at Enviva, at (984) 368-3628.

Sincerely,

Michael Carbon
Managing Principal

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

§ 143-215.108. Control of sources of air pollution; permits required.

(a) Except as provided in subsections (a1) and (a2) of this section, no person shall do any of the following things or carry out any of the following activities that contravene or will be likely to contravene standards established pursuant to G.S. 143-215.107 or set out in G.S. 143-215.107D unless that person has obtained a permit for the activity from the Commission and has complied with any conditions of the permit:

(1) Establish or operate any air contaminant source, except as provided in G.S. 143-215.108A.

(2) Build, erect, use, or operate any equipment that may result in the emission of an air contaminant or that is likely to cause air pollution, except as provided in G.S. 143-215.108A.

(3) Alter or change the construction or method of operation of any equipment or process from which air contaminants are or may be emitted.

(4) Repealed by Session Laws 2003-428, s. 1, effective August 19, 2003.

(a1) The Commission may by rule establish procedures that meet the requirements of section 502(b)(10) of Title V (42 U.S.C. § 7661a(b)(10)) and 40 Code of Federal Regulations § 70.4(b)(12) (1 July 1993 Edition) to allow a permittee to make changes within a permitted facility without requiring a revision of the permit.

(a2) The Commission may adopt rules that provide for a minor modification of a permit. At a minimum, rules that provide for a minor modification of a permit shall meet the requirements of 40 Code of Federal Regulations § 70.7(e)(2) (1 July 1993 Edition). If the Commission adopts rules that provide for a minor modification of a permit, a permittee shall not make a change in the permitted facility while the application for the minor modification is under review unless the change is authorized under the rules adopted by the Commission.

(b) The Commission shall act upon all applications for permits so as to effectuate the purposes of this Article by reducing existing air pollution and preventing, so far as reasonably possible, any increased pollution of the air from any additional or enlarged sources.

(c) The Commission shall have the power:

(1) To grant and renew a permit with any conditions attached that the Commission believes necessary to achieve the purposes of this Article or the requirements of the Clean Air Act and implementing regulations adopted by the United States Environmental Protection Agency;

(2) To grant and renew any temporary permit for such period of time as the Commission shall specify even though the action allowed by such permit may result in pollution or increase pollution where conditions make such temporary permit essential;

(3) To terminate, modify, or revoke and reissue any permit upon not less than 60 days' written notice to any person affected;

(3a) To suspend any permit pursuant to the provisions of G.S. 150B-3(c);

(4) To require all applications for permits and renewals to be in writing and to prescribe the form of such applications;

(5) To request such information from an applicant and to conduct such inquiry or investigation as it may deem necessary and to require the submission of plans and specifications prior to acting on any application for a permit;

(5a) To require that an applicant satisfy the Department that the applicant, or any parent, subsidiary, or other affiliate of the applicant or parent:

a. Is financially qualified to carry out the activity for which a permit is required under subsection (a); and

b. Has substantially complied with the air quality and emission control standards applicable to any activity in which the applicant has previously engaged, and has been in substantial compliance with federal and state laws, regulations, and rules for the protection of the environment.

As used in this subdivision, the words "affiliate," "parent," and "subsidiary" have the same meaning as in 17 Code of Federal Regulations 240.12b-2 (1 April 1990 Edition);

(6) To adopt rules, as it deems necessary, establishing the form of applications and permits and procedures for the granting or denial of permits and renewals pursuant to this section; and all permits, renewals and denials shall be in writing;

(7) To prohibit any stationary source within the State from emitting any air pollutant in amounts that will prevent attainment or maintenance by any other state of any national ambient air quality standard or that will interfere with measures required to be included in the applicable implementation plan for any other state to prevent deterioration of air quality or protect visibility; and

(8) To designate certain classes of activities for which a general permit may be issued, after considering the environmental impact of an activity, the frequency of the activity, the need for individual permit oversight, and the need for public review and comment on individual permits.

(d) (1) The Commission may conduct any inquiry or investigation it considers necessary before acting on an application and may require an applicant to submit plans, specifications, and other information the Commission considers necessary to evaluate the application. A permit application may not be deemed complete unless it is accompanied by a copy of the request for determination as provided in subsection (f) of this section that bears a date of receipt entered by the clerk of the local government and until the 15-day period for issuance of a determination has elapsed.

(2) The Commission shall adopt rules specifying the times within which it must act upon applications for permits required by Title V and other permits required by this section. The times specified shall be extended for the period during which the Commission is prohibited from issuing a permit under subdivisions (3) and (4) of this subsection. The Commission shall inform a permit applicant as to whether or not the application is complete within the time specified in the rules for action on the application. If the Commission fails to act on an application for a permit required by Title V or this section within the time period specified, the failure to act on the application constitutes a final agency decision to deny the permit. A permit applicant, permittee, or other person aggrieved, as defined in G.S. 150B-2, may seek judicial review of a failure to act on the application as provided in G.S. 143-215.5 and Article 4 of Chapter 150B of the General Statutes. Notwithstanding the provisions of G.S. 150B-51, upon review of a failure to act on an application for a permit required by Title V or this section, a court may either: (i) affirm the denial of the permit or (ii) remand the application to the Commission for action upon the application within a specified time.

(3) If the Administrator of the United States Environmental Protection Agency validly objects to the issuance of a permit required by Title V within 45 days

after the Administrator receives the proposed permit and the required portions of the permit application, the Commission shall not issue the permit until the Commission revises the proposed permit to meet all objections noted by the Administrator or otherwise satisfies all objections consistent with Title V and implementing regulations adopted by the United States Environmental Protection Agency.

(4) If the Administrator of the United States Environmental Protection Agency validly objects to the issuance of a permit required by Title V after the expiration of the 45-day review period specified in subdivision (3) of this subsection as a result of a petition filed pursuant to section 505(b)(2) of Title V (42 U.S.C. § 7661d(b)(2)) and prior to the issuance of the permit by the Commission, the Commission shall not issue the permit until the Commission revises the proposed permit to meet all objections noted by the Administrator or otherwise satisfies all objections consistent with Title V and implementing regulations adopted by the United States Environmental Protection Agency.

(d1) No Title V permit issued pursuant to this section shall be issued or renewed for a term exceeding five years. All other permits issued pursuant to this section shall be issued for a term of eight years.

(e) A permit applicant, permittee, or third party who is dissatisfied with a decision of the Commission may commence a contested case by filing a petition under G.S. 150B-23 within 30 days after the Commission notifies the applicant or permittee of its decision. If the permit applicant, permittee, or third party does not file a petition within the required time, the Commission's decision on the application is final and is not subject to review.

(f) An applicant for a permit under this section for a new facility or for the expansion of a facility permitted under this section shall request each local government having jurisdiction over any part of the land on which the facility and its appurtenances are to be located to issue a determination as to whether the local government has in effect a zoning or subdivision ordinance applicable to the facility and whether the proposed facility or expansion would be consistent with the ordinance. The request to the local government shall be accompanied by a copy of the draft permit application and shall be delivered to the clerk of the local government personally or by certified mail. The determination shall be verified or supported by affidavit signed by the official designated by the local government to make the determination and, if the local government states that the facility is inconsistent with a zoning or subdivision ordinance, shall include a copy of the ordinance and the specific reasons for the determination of inconsistency. A copy of any such determination shall be provided to the applicant when it is submitted to the Commission. The Commission shall not act upon an application for a permit under this section until it has received a determination from each local government requested to make a determination by the applicant. If a local government determines that the new facility or the expansion of an existing facility is inconsistent with a zoning or subdivision ordinance, and unless the local government makes a subsequent determination of consistency with all ordinances cited in the determination or the proposed facility is determined by a court of competent jurisdiction to be consistent with the cited ordinances, the Commission shall attach as a condition of the permit a requirement that the applicant, prior to construction or operation of the facility under the permit, comply with all lawfully adopted local ordinances, including those cited in the determination, that apply to the facility at the time of construction or operation of the facility. If a local government fails to submit a determination to the Commission as provided by this subsection within 15 days after receipt of the request, the Commission may proceed to consider the permit application without regard to local zoning and

subdivision ordinances. This subsection shall not be construed to affect the validity of any lawfully adopted franchise, local zoning, subdivision, or land-use planning ordinance or to affect the responsibility of any person to comply with any lawfully adopted franchise, local zoning, subdivision, or land-use planning ordinance. This subsection shall not be construed to limit any opportunity a local government may have to comment on a permit application under any other law or rule. This subsection shall not apply to any facility with respect to which local ordinances are subject to review under either G.S. 104E-6.2 or G.S. 130A-293.

(g) Repealed by Session Laws 2014-120, s. 38(c), effective September 18, 2014.

(h) Expedited Review of Applications Certified by a Professional Engineer. – The Commission shall adopt rules governing the submittal of permit applications certified by a professional engineer, including draft permits, that can be sent to public notice and hearing upon receipt and subjected to technical review by personnel within the Department. These rules shall specify, at a minimum, any forms to be used; a checklist for applicants that lists all items of information required to prepare a complete permit application; the form of the certification required on the application by a professional engineer; and the information that must be included in the draft permit. The Department shall process an application that is certified by a professional engineer as provided in subdivisions (1) through (7) of this subsection.

(1) Initiation of Review. Upon receipt of an application certified by a professional engineer in accordance with this subsection and the rules adopted pursuant to this subsection, the Department shall determine whether the application is complete as provided in subdivision (2) of this subsection. Within 30 days after the date on which an application is determined to be complete, the Department shall:

a. Publish any required notices, using the draft permit included with the application;

b. Schedule any required public meetings or hearings on the application and permit; and

c. Initiate any and all technical review of the application in a manner to ensure substantial completion of the technical review by the time of any public hearing on the application, or if there is no hearing, by the close of the notice period.

(2) Completeness Review. Within 10 working days of receipt of the permit application certified by a professional engineer under this subsection, the Department shall determine whether the application is complete for purposes of this subsection. The Department shall determine whether the permit application certified by a professional engineer is complete by comparing the information provided in the application with the checklist contained in the rules adopted by the Commission pursuant to this subsection.

a. If the application is not complete, the Department shall promptly notify the applicant in writing of all deficiencies of the application, specifying the items that need to be included, modified, or supplemented in order to make the application complete, and the 10-day time period is suspended after this request for further information. If the applicant submits the requested information within the time specified, the 10-day time period shall begin again on the day the additional information was submitted. If the additional information is not submitted within the time periods specified, the Department shall return the application to the applicant, and the

applicant may treat the return of the application as a denial of the application or may resubmit the application at a later time.

b. If the Department fails to notify the applicant that an application is not complete within the time period set forth in this subsection, the application shall be deemed to be complete.

(3) Time for Permit Decision. For any application found to be complete under subdivision (2) of this subsection, the Department shall issue a permit decision within 30 days of the last day of any public hearing on the application, or if there is no hearing, within 30 days of the close of the notice period.

(4) Rights if Permit Decision Not Made in Timely Fashion. If the Department fails to issue a permit decision within the time periods specified in subdivision (3) of this subsection, the applicant may:

a. Take no action, thereby consenting to the continued review of the application; or

b. Treat the failure to issue a permit decision as a denial of the application and appeal the denial as provided in subdivision (2) of subsection (d) of this section.

(5) Power to Halt Review. At any time after the permit application certified by a professional engineer has been determined to be complete under subdivision (2) of this subsection, the Department may immediately terminate review of that application, including technical review and any hearings or meetings scheduled on the application, upon a determination of one of the following:

a. The permit application is not in substantial compliance with the applicable rules; or

b. The applicant failed to pay all permit application fees.

(6) Rights if Review Halted. If the Department terminates review of an application under subdivision (5) of this subsection, the applicant may take any of the following actions:

a. Revise and resubmit the application; or

b. Treat the action as a denial of the application and appeal the denial under Article 3 of Chapter 150B of the General Statutes.

(7) Option; No Additional Fee. The submittal of a permit application certified by a professional engineer to be considered under this subsection shall be an option and shall not be required of any applicant. The Department shall not impose any additional fees for the receipt or processing of a permit application certified by a professional engineer.

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(1) Determining that the permit application is complete;

(2) Requesting additional information to determine completeness;

(3) Determining that additional information is needed to conduct a technical review of the application;

(4) Completing all technical review of the permit application;

(5) Holding and completing all public meetings and hearings required for the application;
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(7) Taking final action on the permit, including granting or denying the application.

(j) No Power to Regulate Residential Combustion. – Nothing in this section shall be interpreted to give the Commission or the Department the power to regulate the emissions from any combustion heater, appliance, or fireplace in private dwellings, except to the extent required by federal law. For purposes of this subsection, "combustion heater, appliance, or fireplace" means any heater, appliance, or fireplace that burns combustion fuels, including, but not limited to, natural or liquefied petroleum gas, fuel oil, kerosene, wood, or coal, for heating, cooking, drying, or decorative purposes. (1973, c. 821, s. 6; c. 1262, s. 23; 1979, c. 545, ss. 2, 3; 1987, c. 461, s. 2; c. 827, ss. 154, 206; 1989, c. 168, s. 30; c. 492; 1989 (Reg. Sess., 1990), c. 1037, s. 2; 1991, c. 552, s. 5; c. 629, s. 1; c. 761, s. 27(a)-(c); 1993, c. 400, s. 8; 1995, c. 484, s. 2; 1995 (Reg. Sess., 1996), c. 728, s. 1; 2002-4, s. 2; 2003-340, s. 1.8(b); 2003-428, ss. 1, 2; 2011-398, s. 60(a); 2013-413, s. 29; 2014-115, s. 17; 2014-120, ss. 24(g), 38(c).)

Zoning Consistency Determination

Facility Name	Enviva Pellets Hamlet, LLC
Facility Street Address	1125 North NC Highway 177
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Description of Process	Wood pellet manufacturing facility
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Facility Contact	Kai Simonsen, Air Permit Engineer
Phone Number	984-789-3628
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

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