RAMBOLL

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: Amended Application for Initial Title V Permit
Enviva Pellets Sampson, LLC
Faison, North Carolina
Sampson County
Permit No.: 10386R04
Facility ID: 8200152

Dear Mr. Willets:

Enclosed please find an amended application for an initial Title V permit for Enviva Pellets Sampson, LLC (Enviva) (NC DEQ Facility ID #8200152) in Sampson County. Enviva is submitting this application in accordance with Condition 2.2.A.7 of Air Quality Permit No. 10386R04 (issued on October 2, 2019) which requires submittal of an amended first time Title V permit application within 12 months of commencing operation of any of the new sources or control devices authorized by Air Quality Permit No. 10386R04. This application reflects the changes authorized by Air Quality Permit No. 10386R04 and the permit modification application submitted on April 2, 2020 which requests authorization for installation of controls for the dry hammermills, pellet mills, and pellet coolers.

This application replaces the original Title V permit application (8200152.17B) that was submitted in September 2017. As required, three (3) copies of the complete permit application package are enclosed.

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

Date October 1, 2020

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Yours sincerely,

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

Enclosures: Permit Application

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

Prepared By
Ramboll US Corporation
Baton Rouge, Louisiana

Date
October 2020

AMENDED APPLICATION FOR INITIAL TITLE V PERMIT

ENVIVA PELLETS SAMPSON, LLC

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CONTENTS

APPENDIX

ACRONYMS AND ABBREVIATIONS

AER	Air Emissions Reporting
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
CISWI	Commercial and Industrial Solid Waste Incineration
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DAQ	Division of Air Quality
FSC	Forest Stewardship Council
GHG	Greenhouse Gases
gr	Grains
HAP	Hazardous Air Pollutant
hr	Hour
lb	Pound
MACT	Maximum Achievable Control Technology
MMBtu	Million British thermal units
NAAQS	National Ambient Air Quality Standards
NCAC	North Carolina Administrative Code
NCDEQ	North Carolina Department of Environmental Quality
NESHAP	National Emission Standards for Hazardous Air Pollutants
NNSR	Nonattainment New Source Review
NO_X	Nitrogen Oxides ($NO + NO_2$)
NSPS	New Source Performance Standards
NSR	New Source Review
ODT	Oven Dried short Tons
PEFC	Programme for the Endorsement of Forest Certifications
PM	Particulate Matter

$PM_{2.5}$	Particulate Matter Less Than 2.5 Micrometers in Aerodynamic Diameter
PM_{10}	Particulate Matter Less Than 10 Micrometers in Aerodynamic Diameter
PSD	Prevention of Significant Deterioration
PSEU	Pollutant Specific Emission Unit
RCO	Regenerative Catalytic Oxidizer
RTO	Regenerative Thermal Oxidizer
SCAQMD	South Coast Air Quality Management District
scf	Standard Cubic Feet
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SFI	Sustainable Forestry Initiative
TAP	Toxic Air Pollutant
tph	tons per hour
tpy	tons per year
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
WESP	Wet Electrostatic Precipitator
yr	year

1. INTRODUCTION

Enviva Pellets Sampson, LLC (Enviva) owns and operates a wood pellet manufacturing plant (referred to herein as "the Sampson plant", "the plant", or "the facility") in Sampson County, North Carolina. The plant currently operates under Air Quality Permit No. 10386R04 issued by the North Carolina Department of Environmental Quality (NCDEQ), Division of Air Quality (DAQ) on October 2, 2019. The plant consists of the following processes: Log Chipper, Bark Hog, Green Hammermills, Rotary Dryer, Dry Hammermills, Pellet Mills and Coolers, Product Loadout operations and other ancillary activities. An application for an initial Title V permit for the Sampson plant was submitted in September 2017.

Air Quality Permit No. 10386R04 authorized changes to the Sampson plant in order to meet new customer softwood percentage and production rate demands and to incorporate significant emission reduction efforts to minimize emissions impacts associated with the project. Enviva is submitting this amended initial Title V application in accordance with Condition 2.2.A.7 to reflect the changes authorized by Air Quality Permit No. 10386R04 and the permit modification application submitted on April 2, 2020.

With this application, Enviva is also requesting that the permit be updated to reflect the following:

- Removal of the additive storage silo and baghouse (ES-ADD) from the permit as these will not be installed and instead reflect transfer of additive from supersacks to a hopper (IES-ADD);
- Removal of the Pellet Sampling Transfer Bin (ES-PSTB) and associated baghouse (CD-PSTB-BH) from the permit as these will not be installed; and
- Removal of the Hammermill Area (ES-HMA), Pellet Cooler Low Pressure (LP) Fines Relay System, 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.

Upon implementation of controls for the dry hammermills, pellet mills, and pellet coolers proposed in the April 2020 permit modification application, the Sampson plant will be a synthetic minor source with respect to the Prevention of Significant Deterioration (PSD) permitting program and a minor source of hazardous air pollutants (HAP).

Section 2 includes a process description. Methodologies used to quantify potential emissions are summarized in Section 3. Section 4 describes the applicability of federal and state permitting programs. Section 5 includes a detailed applicability analysis of both federal and state regulations. The completed air permit application forms are included in Appendix A. An area map and process flow diagram are included in Appendices B and C, respectively. Detailed potential emissions calculations are provided in Appendix D.

2. 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 description of the sources that will be impacted by this application. An area map and process flow diagram are provided in Appendices B and C, respectively.

2.1 Green Wood Handling (IES-GWH) and Storage (IES-GWSP-1 through 4)

"Green" (i.e., wet) wood is delivered to the plant via trucks as either pre-chipped wood or unchipped logs from commercial thinning for on-site chipping. Purchased chips and bark are unloaded from trucks into hoppers that feed conveyors (IES-GWH) that transfer the material to Green Wood Storage Piles (IES-GWSP-1 through 4) or to Bark Fuel Storage Piles (IES-BFSP-1 and 2). Conveyors transferring green wood chips are enclosed.

Purchased chips are screened and oversized chips undergo additional chipping as needed prior to transfer to the Green Wood Storage Piles.

2.2 Debarking (IES-DEBARK-1), Chipping (IES-CHIP-1), Bark Hog (IES-BARKHOG), Bark Fuel Storage Piles (IES-BFSP-1 and 2), and Bark Fuel Bin (IES-BFB)

Logs are debarked by the electric-powered rotary drum Debarker (IES-DEBARK-1) and then sent to the electric-powered Chipper (IES-CHIP-1) which chips the wood to specification for drying. Bark from the Debarker is transferred to the Bark Hog (IES-BARKHOG) via conveyor for further processing.

Purchased bark delivered by trucks as well as bark produced by the Debarker and processed by the Bark Hog are 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 and then to a fully enclosed Bark Fuel Bin (IES-BFB) where the material is pushed into the furnace.

2.3 Green Hammermills (ES-GHM-1 through 3) and Dryer (ES-DRYER)

Green wood that has passed through the chipper is further processed in the Green Hammermills (ES-GHM-1, 2, and 3) to reduce material to the proper size. Exhaust from the Green Hammermills is routed to the dryer wet electrostatic precipitator (WESP) and regenerative thermal oxidizer (RTO) control system (CD-WESP/CD-RTO) to control particulate matter (PM), volatile organic compound (VOC), and HAP emissions. Processed wood is then conveyed to a single rotary dryer (ES-DRYER). Direct contact heat is provided to the dryer via a 250.4 MMBtu/hr furnace which combusts 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. Exhaust from the dryer cyclones is combined into a common duct with exhaust from the Green Hammermills (ES-GHM-1 through 3) and is routed to the WESP (CD-WESP) and RTO (CD-RTO) for control of particulates, VOC, and HAP.

2.4 Furnace and Dryer Bypass Stacks (ES-FBYPASS and ES-DBYPASS)

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. Use of the furnace bypass stack for cold start-ups is limited to 50 hours per year at a maximum heat input of 37.6 MMBtu/hr. Diesel fuel may be used as an accelerant for cold start-up. The amount used per event is approximately 15-30 gallons and the annual usage is approximately 200 gallons; therefore, emissions resulting from diesel combustion are insignificant.
- **Idle mode:** The furnace may also 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 furnace 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. Use of the furnace bypass stack for idle mode is limited to 500 hours per year at 10 MMBtu/hr.
- **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 (10 MMBtu/hr or less). Until this time, emissions continue to be controlled by the WESP and RTO.
- **Malfunction:** The furnace automatically aborts to 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 (i.e., 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 10 MMBtu/hr), the fuel feed is stopped, and the heat input rate drops rapidly.

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 not separately quantified to avoid double-counting, as these emissions are already included under the furnace cold start-up and idle mode conditions.
- **Malfunction:** The dryer system automatically aborts due to power failure, equipment failure, or furnace abort. For example, if the RTO goes offline because of an interlock failure, the dryer will immediately abort. Dryer abort may also occur if the dryer temperature is out of range, or if a spark is detected.
- **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 and have not been quantified, as the furnace is directed to its abort stack (see furnace planned shutdown above) and the dryer is no longer operating.

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

2.5 Dryer Double Duct Burners (IES-DDB-1 and 2)

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 fire risk. In order to prevent condensation from occurring and thus reduce the fire risk, the two (2) ducts (herein referred to as double ducts) are heated. The duct from the cyclone outlet to the ID fan is heated by one (1) low-NO_X burner with a maximum heat input rating of 2.5 MMBtu/hr and a second 2.5 MMBtu/hr low-NO_X burner is used to heat the duct used for exhaust gas recirculation and the WESP. The burners combust natural gas, with propane as back-up, and exhaust directly to the atmosphere. Potential emissions from the duct burners are below the thresholds in 15A NCAC 02Q .0503(8) and they are thus considered insignificant activities.

2.6 Dried Wood Handling (ES-DWH)

There are several conveyor transfer points comprising the Dried Wood Handling emission source (ES-DWH) that are located between the Dryer and Dry Hammermills. These conveyors and associated transfer points are completely enclosed with only two (2) emission points to the atmosphere that are controlled by individual baghouses (CD-DWH-BH-1 and 2).

2.7 Dry Shavings Handling (IES-DRYSHAVE)

Purchased dry shavings are unloaded from trucks into a hopper that feeds material via enclosed conveyors to a bucket elevator that ultimately fills a silo. Each of these material transfer points are entirely enclosed with the exception of truck unloading. From the silo, the dry shavings are transferred via an enclosed screw conveyor to the Dry Hammermills for further processing.

2.8 Dry Hammermills (ES-HM-1 through 8)

Dried wood chips from the dryer material recovery cyclones are conveyed to screening operations that remove smaller wood particles. Smaller particles passing through the screens are diverted to the dry hammermill discharge conveyor, while oversized wood is diverted to the eight (8) dry hammermills operating in parallel (ES-HM-1 through 8) for further size reduction prior to pelletization. Upon removal of the dry hammermill throughput limitation as requested in the April 2020 permit modification application, the screeners may or may not be used during normal process operations. Each dry hammermill includes a material recovery cyclone to capture milled fiber for further processing. Particulate emissions from the eight (8) dry hammermills are controlled using eight (8) baghouses (CD-HM-BH-1 through 8).

As proposed in the April 2020 permit modification application, an air flow recirculation process will be implemented to route a portion of the exhaust from each dry hammermill cyclone back into the front end of the respective dry hammermill to reduce fresh intake air and thus decrease the volume of air that is routed to the downstream control devices. The dry hammermill exhaust will be routed to baghouses, followed by a quench duct and then to either the dryer furnace (ES-DRYER), the dryer WESP (CD-WESP), or a combination of the two, before entering the RTO (CD-RTO). The purpose of the quench duct is to protect the RTO by reducing the risk of fire. Interlocks will be installed to cease operation of the dry hammermills if a minimum flow rate is not maintained in the quench duct or if the furnace/WESP/RTO system ceases normal operation.

At all times 100% of the dry hammermill exhaust will be controlled by a baghouse, WESP, and RTO. The furnace is not considered a control device and has no impact on estimated potential to emit. The WESP will provide a reduction in PM and metallic HAP and the RTO will provide a reduction in VOC and organic HAP and toxic air pollutant (TAP) emissions. The highest pollutant inlet loading to the control devices will occur when the furnace and dryer are operating at maximum capacity with all dry hammermill exhaust routed to the inlet of the furnace. The quench duct is considered inherent process equipment that is required to safely operate the RTO (i.e., reduce fire risk) and is not a control device.

2.9 Dry Hammermill Conveying System (ES-HMC)

A fully enclosed blower system collects and transports fines collected by the Dry Hammermill baghouses and discharges into a cyclone that separates the solids from process air. Process air from the cyclone is recirculated back to the blower and the solids are discharged on the dry hammermill conveying system (ES-HMC).

Dried, milled wood is transferred from the dry hammermill material recovery cyclones to the Pellet Mill Feed Silo via the hammermill conveying system (ES-HMC). This conveying system is vented to the hammermill conveyor baghouse (CD-HMC-BH) for control of particulate matter emissions.

2.10 Pellet Mill Feed Silo (ES-PMFS)

Sized wood from the dry hammermill material recovery cyclones is transported by a set of conveyors to the Pellet Mill Feed Silo (ES-PMFS) prior to pelletization. Particulate emissions from the Pellet Mill Feed Silo are controlled by a baghouse (CD-PMFS-BH).

2.11 Pellet Mills and Pellet Coolers (ES-CLR-1 through 6), Pellet Cooler HP Fines Relay System (ES-PCHP),

Sized wood from the Pellet Mill Feed Silo (ES-PMFS) is mechanically compressed through twelve (12) pellet mills operating in parallel. Formed pellets are discharged into one of six (6) pellet coolers (ES-CLR-1 through ES-CLR-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 are controlled utilizing six (6) cyclones operating in parallel prior to discharge to the atmosphere (CD-CLR-1 to 6). As requested in the April 2020 permit modification application the exhaust from the six (6) pellet cooler cyclones will be routed to a quench duct and then to an RTO/RCO that will primarily operate in catalytic mode with thermal as a back-up during catalyst cleaning. The purpose of the quench duct is to protect the RTO/RCO by reducing the risk of fire. Operation of the pellet mills and coolers will be interlocked with operation of the quench duct (i.e., the quench duct must be ready for operation for the pellet mills and cooler to operate). No resin or other chemical binding agents are needed for pelletization.

Two high pressure blowers collect fines from the pellet cooler discharge cyclones (ES-PCHP) and convey them to the cooler high pressure fines filter (CD-PCHP-BH). Solids separated by the filter (CD-PCHP-BH) are returned to the dry hammermill conveying system (ES-HMC) and process air is discharged to atmosphere (ES-PCHP).

Each pellet cooler discharges pellets on to screeners before pellets are discharged onto the conveyor transporting the pellets to the truck loadout bins. Pellet screener fines are collected by the Pellet Cooler Low Pressure Fines Relay System and discharged into a baghouse. The fines separated by the baghouse discharge into the Pellet Cooler High Pressure Fines Relay System (ES-PCHP) and process air is recirculated back to the low pressure blower. No emissions are vented to atmosphere from the Pellet Cooler Low-Pressure Fines Relay System which is a closed loop system.

Finished wood pellets are transferred from the pellet coolers to the truck loadout operation via a conveyor that is controlled by the Finished Product Handling Baghouse (CD-FPH-BH).

2.12 Additive Handling (IES-ADD)

Additive is used in the pellet production process to increase the durability of the final product. This dry powder additive is added to sized wood from the dry hammermills prior to transfer to the pellet mills. The dry powder contains no hazardous chemicals or VOC.

The additive is received in 2,000 lb supersacks and is emptied into a hopper. The additive is then transferred from the hopper via enclosed screw conveyor and is added to the milled fiber conveyor which transfers milled wood to the pellet mills.

2.13 Finished Product Handling (ES-FPH) and Loadout (ES-PB1 through 4 and ES-PL-1 and 2)

Final product is conveyed to four (4) pellet loadout bins (ES-PB-1 through ES-PB-4) that feed the truck loadout station which includes two loadout spouts (ES-PL-1 and ES-PL-2). At the truck loadout station, pellets are gravity fed into trucks through two (2) covered chutes that automatically telescope upward during the loadout process to maintain constant contact with the product as it is loaded to prevent emissions. A slight negative pressure is maintained in this area of the loadout building using an induced draft fan which exhausts to the Finished Product Handling baghouse (CD-FPH-BH). Negative pressure is maintained in the loadout area as a fire prevention measure to prevent any build-up of dust on surfaces within the

building. The Finished Product Handling baghouse controls emissions from finished product handling (ES-FPH), the four (4) pellet loadout bins (ES-PB-1 through ES-PB-4), and truck loadout operations (ES-PL-1 and ES-PL-2). Trucks are covered immediately after loading.

2.14 Emergency Generator (IES-EG), Fire Water Pump (IES-FWP), and Diesel Storage Tanks (IES-TK-1 through 3)

The Sampson plant includes a 713 brake horsepower (bhp) diesel-fired emergency generator (IES-EG) for emergency operations and a 131 bhp diesel-fired fire water pump engine (IES-FWP). Aside from maintenance and readiness testing, the generator and fire water pump engines are only utilized for emergency operations.

Diesel for the emergency generator is stored in a tank of up to 2,500 gallons capacity (IES-TK-1) and diesel for the fire water pump is stored in a storage tank of up to 1,000 gallons capacity (IES-TK-2). A third diesel storage tank (IES-TK-3) with a capacity of 2,500 gallons is also located on-site.

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

The Sampson plant includes two (2) propane vaporizers to vaporize propane gas received by truck for combustion by the RTO burners, proposed RTO/RCO 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 were 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 Sampson plant's permit.

3. POTENTIAL EMISSIONS QUANTIFICATION

This section discusses quantification of potential emissions for all sources of emissions at the Sampson plant. Detailed potential emissions calculations are included in Appendix D.

3.1 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. Fugitive PM emissions from chip and bark transfer operations were calculated based on AP-42 Section 13.2.4, *Aggregate Handling and Storage Piles*.[1] Chip conveyors are completely 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 larger size of this material, 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). Detailed potential emission calculations are included in Appendix D, Table 4.

Green wood and bark contain a high moisture content approaching 50 percent water by weight. Therefore, Green Wood Handling has insignificant PM emissions. Per 15A NCAC 02Q .0503, Green Wood Handling (IES-GWH) is included on the insignificant activities list because potential uncontrolled PM emissions are less than 5 tpy.

3.2 Green Wood Storage Piles (IES-GWSP-1 through 4) and Bark Fuel Storage Piles (IES-BFSP-1 and 2)

Particulate emission factors used to quantify emissions from storage pile wind erosion for the four (4) Green Wood Storage Piles and two (2) Bark Fuel Storage Piles were calculated based on EPA's *Control of Open Fugitive Dust Sources*.[2] The number of days with rainfall greater than 0.01 inch was obtained from AP-42 Section 13.2.2, *Unpaved Roads*[3] and the percentage of time that wind speed exceeds 12 miles per hour (mph) was determined based on meteorological data from the Fayetteville National Weather Service (NWS) Station.[4] The mean silt content of 8.4% for unpaved roads at lumber mills from AP-42 Section 13.2.2 was conservatively applied in the absence of site-specific data. Exposed surface area of the pile was calculated based on worst-case pile dimensions.

VOC emissions from storage piles were quantified based on the exposed surface area of the pile and emission factors from the National Council for Air and Stream Improvement (NCASI). NCASI emission factors range from 1.6 to 3.6 pounds (lb) VOC as carbon/acre-day; however, emissions were conservatively based on the maximum emission factor. Detailed potential emission calculations are included in Appendix D, Table 5.

Per 15A NCAC 02Q .0503, the Green Wood Storage Piles (IES-GWSP-1 through 4) and the Bark Fuel Storage Piles (IES-BFSP-1 and 2) are insignificant activities based on potential uncontrolled PM and VOC emissions less than 5 tpy.

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[1] U.S. EPA AP-42 Section 13.2.4 *Aggregate Handling and Storage Piles*, (11/06).

[2] U.S. EPA *Control of Open Fugitive Dust Sources*, Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988.

[3] U.S. EPA AP-42 Section 13.2.2 *Unpaved Roads*, (11/06).

[4] AERMOD-ready data provided via email to Aubrey Jones (Ramboll) by Matthew Porter (NC DAQ) on May 12, 2017.

3.3 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).[5] 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, with the exception of the two ends where logs enter and material exits subsequent to debarking. A 90% control efficiency was applied for partial enclosure. Detailed potential emission calculations are included in Appendix D, Table 6.

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

3.4 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).[6] The bark hog is primarily enclosed and thus has minimal PM emissions. VOC and methanol emissions were quantified based on emission factors for log chipping from AP-42 Section 10.6.3, *Medium Density Fiberboard*.[7] Detailed potential emission calculations are included in Appendix D, Table 7.

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

3.5 Chipper (IES-CHIP-1)

The chipper is located inside of a building; therefore, PM emissions are negligible and were not quantified. The chipping process also results in emissions of VOC and methanol. VOC and methanol emissions were quantified based on emission factors for log chipping from AP-42 Section 10.6.3, *Medium Density Fiberboard*.[8] Detailed emission calculations are included in Appendix D, Table 8.

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

3.6 Bark Fuel Bin (IES-BFB)

Bark is transferred from the Bark Fuel Storage Piles via a walking floor to a covered conveyor and then to the fully enclosed Bark Fuel Bin (IES-BFB). Due to complete enclosure of the Bark Fuel Bin, emissions from transfer of bark into the bin are not explicitly quantified. Per 15A NCAC 02Q .0503, the Bark Fuel Bin is considered an insignificant activity due to potential uncontrolled PM emissions less than 5 tpy.

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[5] U.S. EPA. 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.

[6] Ibid.

[7] U.S. EPA. AP-42 Section 10.6.3 *Medium Density Fiberboard Manufacturing*, (8/02).

[8] Ibid.

3.7 Green Hammermills (ES-GHM-1 through ES-GHM-3) and Dryer (ES-DRYER)

Exhaust from the green hammermills and dryer is routed to a WESP/RTO (CD-WESP/CD-RTO) control system for control of particulate matter, VOC, and HAP. PM, PM less than 10 microns in diameter (PM_{10}), PM less than 2.5 microns in diameter ($PM_{2.5}$), carbon monoxide (CO), and oxides of nitrogen (NO_x) emissions were quantified based on compliance testing completed in December 2019 plus an appropriate contingency based on engineering judgement to account for inherent variability in stack test results. Potential emissions of sulfur dioxide (SO_2) from green wood combustion were calculated based on the heat input of the furnace and an emission factor for wood combustion from AP-42, Section 1.6, *Wood Residue Combustion in Boilers*[9]. VOC emissions were calculated using an emission factor derived from process information and an appropriate contingency based on engineering judgement. HAP and TAP emissions from wood combustion were calculated based on emission factors from several data sources including site-specific stack testing data and process information with an appropriate contingency based on engineering judgement and emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers*.

HAP and TAP emissions from natural gas and propane combustion by the RTO burners and emissions from direct injection of natural gas[10] were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*[11], AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion*[12], NC DAQ's Wood Waste Combustion Spreadsheet[13], and emission factors from the South Coast Air Quality Management District's (SCAQMD) Air Emissions Reporting (AER) Tool. The maximum heat input of the RTO is 45.2 MMBtu/hr, which includes the heat input of the RTO burners and direct natural gas injection. Detailed emission calculations are included in Table 9 of Appendix D.

3.8 Furnace and Dryer Bypass - Cold Start-up (ES-FBYPASS and ES-DBYPASS)

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*.[14] GHG emissions were calculated based on emission factors for biomass combustion from Tables C-1 and C-2 of 40 Code of Federal Regulations (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 2, 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.

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[9] U.S. EPA. AP-42 Section 1.6, *Wood Residue Combustion in Boilers,* (09/03).

[10] Natural gas injection in an RTO reduces the amount of combustion air added to an RTO thereby increasing fuel efficiency and reducing NOx generation.

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

[12] U.S. EPA. AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion,* (07/08).

[13] 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.

[14] U.S. EPA. AP-42 Section 1.6 *Wood Residue Combustion in Boilers,* (09/03).

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

3.9 Furnace and Dryer Bypass - Idle Mode (ES-FBYPASS and ES-DBYPASS)

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 10 MMBtu/hr. During this time, emissions 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*.[15] 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 10b of Appendix D.

3.10 Double Duct Burners (IES-DDB-1 and IES-DDB-2)

CO, NO_x, SO_2, PM, VOC, and HAP emissions from natural gas and propane combustion by the double duct burners (IES-DDB-1 through IES-DDB-2) were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*[16], AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion*[17], and emission factors from the South Coast Air Quality Management District's (SCAQMD) Air Emissions Reporting (AER) Tool.[18] Detailed emission calculations are included in Table 11 of Appendix D.

Per 15A NCAC 02Q.0503, the double duct burners (IES-DDB-1 through IES-DDB-2) 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.

3.11 Dried Wood Handling Operations (ES-DWH)

Dried wood handling operations (ES-DWH) include conveyor transfer points located between the dryer and dry hammermills. Emissions from these transfers are routed through one of two (2) baghouses (CD-DWH-BH-1 and BH-2). PM, PM_{10} and $PM_{2.5}$ emissions from each baghouse were calculated based on the exhaust flow rate and exit grain loading. VOC, HAP, and TAP emissions were estimated based on emission factors derived from December 2019 compliance test data and include an appropriate contingency based on engineering judgement to account for inherent variability in stack test results. Detailed potential emission calculations are provided in Table 12 of Appendix D.

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[15] U.S. EPA. AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion,* (07/08).

[16] U.S. EPA. AP-42 Section 1.4, *Natural Gas Combustion,* (07/98).

[17] U.S. EPA. AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion,* (07/08).

[18] 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

3.12 Dry Shavings Handling (IES-DRYSHAVE)

Particulate emissions occur during unloading of dry shavings from trucks and may also occur as a result of air displaced during silo loading. Potential emissions were calculated based on AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles*.[19] Dry shavings are transferred into the dry shavings silo via enclosed bucket elevator. Since the actual transfer is enclosed within the silo, a 90% control efficiency was applied for this material transfer point. Detailed potential emission calculations are provided in Appendix D, Table 13.

Per 15A NCAC 02Q .0503, dry shavings handling (IES-DRYSHAVE) is considered an insignificant activity because potential uncontrolled PM emissions are less than 5 tpy.

3.13 Dry Hammermills (ES-HM-1 through ES-HM-8)

Dry hammermill operations generate particulate matter, HAP, and VOC emissions during sizing of dried wood. Exhaust from the eight (8) dry hammermills are routed to baghouses for control of PM emissions (CD-HM-BH-1 through 8). Particulate emissions from the baghouses were calculated using an exit grain loading rate and the total maximum nominal exhaust flow rate of the baghouses. Exhaust from the baghouses will be routed through a quench duct and then to either the dryer furnace (ES-DRYER), the dryer WESP (CD-WESP), or a combination of the two, followed by the dryer RTO (CD-RTO). A 92.75% control efficiency was applied to the dry hammermill particulate emissions for the WESP.

Uncontrolled VOC, HAP, and TAP emissions at the outlet of the dry hammermill baghouses (CD-HM-BH1 through BH8) were quantified based on results from December 2019 compliance testing, process information, and appropriate contingencies based on engineering judgement. Controlled VOC, HAP, and TAP emissions were estimated based on a 95% destruction efficiency for the RTO (CD-RTO). NO_x and CO emissions resulting from thermal oxidation of VOC in the dry hammermill exhaust were calculated using emission factors from AP-42 Section 1.4, *Natural Gas Combustion*[20], and the maximum high heating value of the anticipated VOC constituents. Detailed potential emissions calculations are provided in Table 9 of Appendix D.

3.14 Dry Hammermill Conveying System (ES-HMC)

PM emissions that escape the dry hammermill conveying system (ES-HMC) are controlled by a baghouse (CD-HMC-BH). PM emissions from this baghouse were calculated based on an exit grain loading rate and the maximum nominal exhaust flow rate of the baghouse. Refer to Appendix D, Table 14.

3.15 Pellet Mill Feed Silo (ES-PMFS)

The Pellet Mill Feed Silo is equipped with a baghouse (CD-PMFS-BH) to control PM emissions associated with silo loading and unloading operations. PM emissions were calculated based on an exit grain loading rate and the maximum nominal exhaust flow rate of the baghouse. Refer to Appendix D, Table 14 for detailed potential emissions calculations.

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

Pellet mill and pellet cooler operations generate PM, VOC, HAP, and TAP emissions during the forming and cooling of wood pellets. The twelve (12) pellet mills and six (6) pellet coolers

[19] U.S. EPA. AP-42 Section 13.2.4, *Aggregate Handling and Storage Piles,* (11/06).

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

are equipped with six (6) simple cyclones (CD-CLR-1 through CD-CLR-6) which will exhaust through a quench duct and RTO/RCO (CD-RCO) for VOC and HAP control. PM, PM_{10}, and $PM_{2.5}$ emissions from the pellet mills and pellet coolers were calculated based on results of December 2019 compliance testing, process information, and an appropriate contingency based on engineering judgement.

Uncontrolled VOC, HAP, and TAP emissions at the outlet of the pellet cooler cyclones were quantified based on results from December 2019 compliance testing, process information, and an appropriate contingency based on engineering judgement. This includes emissions from both the pellet mills and the pellet coolers. Controlled VOC, HAP and TAP emissions were conservatively based on a 95% control efficiency for the RCO/RTO. NO_X and CO emissions resulting from thermal oxidation of VOC in the cyclone exhaust were calculated using AP-42 Section 1.4, *Natural Gas Combustion*[21], and the maximum high heating value of the anticipated VOC constituents.

Emissions of criteria pollutants, HAP, and TAP from natural gas and propane combustion by the RTO/RCO burners and direct natural gas injection into the RTO/RCO were estimated using emission factors from AP-42 Section 1.4, *Natural Gas Combustion*, and AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion.*[22,23] GHG emissions were calculated using emission factors for natural gas and propane combustion from Tables C-1 and C-2 of 40 CFR Part 98 and global warming potentials from Table A-1. Detailed potential emission calculations are provided in Table 15 of Appendix D.

3.17 Pellet Cooler HP Fines Relay System (ES-PCHP)

Potential particulate emissions from the Pellet Cooler HP Fines Relay System baghouse (CD-PCHP-BH) were calculated based on the maximum exit grain loading rate and exhaust flow rate of the baghouse. Detailed potential emissions calculations are provided in Table 14 of Appendix D.

3.18 Additive Handling (IES-ADD)

A dry powder additive is used in the pellet production process to increase the durability of the final product. Potential emissions from transfer activities associated with Additive Handling (IES-ADD) were calculated based on AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles.*[24] Detailed potential emissions calculations are provided in Appendix D, Table 21. There are no HAPs or VOC materials present in the additive. Emissions from additive handling operations are below the thresholds in 15A NCAC 02Q .0503(8) and it is thus considered an insignificant activity.

3.19 Pellet Loadout Bins (ES-PB1 through 4), Finished Product Handling (ES-FPH), and Pellet Loadout (ES-PL-1 and 2)

PM emissions occur during transfer of finished product to the pellet loadout bins and during transfer of pellets from the bins to trucks. PM emissions from finished product handling, the four (4) pellet loadout bins, and the two (2) truck loadout spouts are all controlled by a single baghouse (CD-FPH-BH). Potential PM emissions from the baghouse were calculated

[21] U.S. EPA. AP-42 Section 1.4, *Natural Gas Combustion,* (07/98).

[22] U.S. EPA. AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion,* (07/08).

[23] Natural gas injection in an RTO reduces the amount of combustion air added to an RTO, thereby increasing fuel efficiency and reducing NOx generation.

[24] U.S. EPA, AP-42 Section 13.2.4, *Aggregate Handling and Storage Piles,* (11/06).

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 14 of Appendix D.

3.20 Emergency Generator (IES-EG) and Fire Water Pump (ES-FWP)

Combustion of diesel fuel by the emergency generator and fire water pump generates emissions of criteria pollutants, HAP, and GHG. Potential PM, NO_X, and CO emissions from operation of the emergency generator were calculated based on applicable emission standards from 40 CFR 60, New Source Performance Standards (NSPS), Subpart IIII and the maximum horsepower rating of the engine. NO_X emissions were conservatively based on the emission standard for NO_X + non-methane hydrocarbon (NMHC).

Potential PM, NO_X, and CO emissions from the fire water pump were calculated based on emission factors from the manufacturer specification sheet and the maximum horsepower rating of the engine. Potential SO_2 emissions from each engine were calculated based on the fuel sulfur restriction in NSPS Subpart IIII.[25] Potential VOC and HAP emissions were quantified based on emission factors from AP-42 Sections 3.4, *Large Stationary Diesel and All Stationary Dual-fuel Engines* and 3.3, *Stationary Internal Combustion Engines*.[26, 27] Annual potential emissions were conservatively calculated based on 500 hours per year.

Combustion of diesel fuel by the engines also results in emissions of GHG. Potential GHG emissions from each engine were quantified based on emission factors from Subpart C of 40 CFR Part 98 – *Mandatory Greenhouse Gas Reporting*. Emissions were converted to carbon dioxide equivalent based on Global Warming Potentials from Subpart A of 40 CFR 98.

The emergency generator and fire water pump are considered insignificant activities pursuant to 15A NCAC 02Q .0503. Detailed potential emissions calculations are provided in Tables 16 and 17 of Appendix D.

3.21 Diesel Storage Tanks (ES-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 using AP-42, Section 7.1, *Organic Liquid Storage Tanks,* based on the actual tank characteristics (e.g., orientation, dimensions, etc.) and potential annual throughput.[28] VOC emissions from the storage tanks are below 5 tpy and thus, per 15A NCAC 02Q .0503, they are considered insignificant activities. Refer to Table 18 of Appendix D for detailed potential emissions calculations.

3.22 Paved Roads

Fugitive PM emissions occur as a result of trucks and employee vehicles traveling on paved roads on the Sampson plant property. Emission factors were calculated based on Equation 2 from AP-42 Section 13.2.1, *Paved Roads*[29] using the mean silt loading for quarries (8.2 g/m^2) and 110 days with rainfall greater than 0.01 inch based on Figure 13.2.1-2. A 90% control efficiency was applied for water/dust suppression activities followed by sweeping. This control efficiency is based on the *Air Pollution Engineering Manual* of the Air and Waste

[25] Sulfur content in accordance with Year 2013 standards of 40 CFR 80.510(b) as required by NSPS Subpart IIII.
[26] U.S. EPA. AP-42 Section 3.4 – *Large Stationary Diesel and All Stationary Duel-fuel Engines*, (10/96).
[27] U.S. EPA. AP-42 Section 3.3 - *Stationary Internal Combustion Engines*, (10/96).
[28] U.S. EPA. AP-42 Section 7.1 – *Organic Liquid Storage Tanks*, (06/20).
[29] U.S. EPA. AP-42 Section 13.2.1 – *Paved Roads*, (01/11).

Management Association. Refer to Appendix D, Table 19 for detailed potential emissions calculations.

3.23 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, proposed 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*.[30] Potential SO_2 emissions assume a sulfur content of 0.54 grains per 100 cubic feet for propane.[31] Potential HAP emissions were quantified based on emission factors from the SCAQMD's AER Tool for external combustion equipment fired with LPG.[32]

Potential GHG emissions were quantified based on emission factors from AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion*.[33] 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 20 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.

[30] U.S. EPA AP-42 Section 1.5 *Liquefied Petroleum Gas Production* (7/08).

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

[32] 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.

[33] U.S. EPA AP-42 Section 1.5 *Liquefied Petroleum Gas Production* (7/08).

4. STATE AND FEDERAL PERMITTING APPLICABILITY

The Enviva Sampson plant is subject to federal and state air quality permitting requirements. The following sections summarize the applicability of these requirements to the facility.

4.1 Federal Permitting Programs

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

4.1.1 New Source Review

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

NNSR permitting requirements apply to new or existing stationary sources located in an area where concentrations of a "criteria pollutant"[34] exceed the National Ambient Air Quality Standard (NAAQS) for that pollutant. PSD permitting requirements apply to major stationary sources for each criteria pollutant for which the geographic area in which the source is located has been designated as unclassifiable or attainment with respect to relevant NAAQS. PSD permitting requirements also apply to certain stationary sources regardless of location for each regulated NSR pollutant that is not a criteria pollutant (e.g., fluorides, hydrogen sulfide, and sulfuric acid mist).

The Sampson plant is located in Sampson County which is classified as attainment or unclassifiable for all criteria pollutants.[35] The Sampson plant is an existing major PSD source; however, upon implementation of the controls for the dry hammermills, pellet mills, and pellet coolers proposed in the April 2020 permit modification application the plant will no longer be a major PSD source.

4.1.2 Title V Operating Permit Program

The federal Title V Operating Permit program is promulgated in 40 CFR Part 70 and is implemented in North Carolina via 15A NCAC 2Q .0500. The Sampson plant is a major source with respect to the Title V Operating Permit Program because facility-wide potential emissions of one or more criteria pollutants exceed the major source threshold of 100 tpy. Additionally, the plant is currently considered a major source of HAP due to total HAP emissions and maximum individual HAP emissions exceeding the major source thresholds of

[34] 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.

[35] 40 CFR 81.334

25 tpy, and 10 tpy, respectively. Upon implementation of controls for the dry hammermills, pellet mills, and pellet coolers proposed in the April 2020 permit modification application the plant will no longer be a major source of HAPs, but will still be a major source for Title V purposes because the potential emissions will still exceed 100 tpy of criterial pollutants. This application is being submitted in accordance with Condition 2.2.A.7 of Air Quality Permit No. 10386R04 which requires submittal of an amended first time Title V permit application within 12 months of commencing operation of any of the new sources or control devices authorized by Air Quality Permit No. 10386R04. The original Title V permit application (8200152.17B) was submitted in September 2017. The required application forms are included as Appendix A.

4.2 North Carolina Permitting Program

In addition to the Title V permitting requirements in 15 NCAC 02Q .0500, specific requirements for permitting of construction and operation of new and modified sources are included in 15A NCAC 02Q .0300, in accordance with North Carolina's State Implementation Plan (SIP). No changes are requested as part of this amended initial Title V application.

5. REGULATORY APPLICABILITY

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

5.1 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.

5.1.1 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 to the emergency generator and fire water pump because they are subject to 40 CFR 60 Subpart IIII.

5.1.2 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.

5.1.3 40 CFR 60 Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels

NSPS Subpart Kb applies to volatile organic liquid (VOL) storage tanks that were constructed after July 23, 1984, have a maximum storage capacity greater than or equal to 75 m^3 (19,813 gal), and meet the following criteria:[36]

- The storage tank has a storage capacity greater than or equal to 75 m^3 (19,813 gal) but less than 151 m^3 (39,890 gal), and stores a VOL with a maximum true vapor pressure greater than or equal to 15.0 kPa (2.2 psia); or
- The storage tank has a storage capacity greater than or equal to 39,890 gal and stores a VOL with a maximum true vapor pressure greater than or equal to 3.5 kPa (0.51 psia).

The Sampson plant includes three (3) diesel storage tanks. These tanks are not subject to NSPS Subpart Kb, as the storage capacity of each tank is less than 19,813 gal, and diesel has a maximum true vapor pressure less than 2.2 psia.

5.1.4 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 Sampson plant's dryer is heated by a furnace which combusts

[36] 40 CFR 60.110b(a)-(b)

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.

5.1.5 40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

NSPS Subpart IIII applies to owners or operators of compression ignition (CI) internal combustion engines (ICE) manufactured after April 1, 2006 that are not fire pump engines, and fire pump engines manufactured after July 1, 2006. The 713 bhp emergency generator and 131 bhp fire pump at the Sampson plant are subject to NSPS Subpart IIII and will continue to comply with all applicable requirements.

5.2 National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP) regulate HAP emissions and apply to certain major and area sources of HAP. NESHAP can be found in 40 CFR Part 63 and have been incorporated by reference in 15A NCAC 02D .1111. Currently the Sampson plant is a major source of HAP; however, following implementation of the controls proposed in the April 2020 permit modification application for the dry hammermills, pellet mills, and pellet coolers the plant will be an area source of HAP.

5.2.1 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. Subpart A is applicable to the emergency generator and fire water pump because they are subject to 40 CFR 63 Subpart ZZZZ.

5.2.2 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 Sampson plant previously underwent a case-by-case MACT analysis pursuant to Subpart B. However, the plant will no longer be a major source of HAP emissions following implementation of controls for the dry hammermills, pellet mills, and pellet coolers as proposed in the April 2020 permit modification application. Per the January 1, 2018 EPA policy memo, *Reclassification of Major Source 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.[37] A proposed rule was published in the Federal Register on July 26, 2019 that would amend 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

[37] U.S. EPA. Memorandum from William L. Wehrum (Assistant Administrator) to Regional Air Directors. *Reclassification of Major Sources as Area Sources Under Section 112 of the Clean Air Act*. January 1, 2018.

emit HAP below the major source thresholds.[38] The HAP limits must be legally and practically enforceable.

Requirements to install, maintain, and operate the controls for the dry hammermills, pellet mills, and pellet coolers will be incorporated into Air Quality Permit No. 10386R05 and will ensure that the facility becomes and remains a minor source of HAP. Upon issuance of this permit these requirements will be both legally and practically enforceable. Per the EPA policy memo, the Sampson plant will no longer be subject to the requirements of Subpart B upon implementation of the controls for the dry hammermills, pellet mills, and pellet coolers.

5.2.3 40 CFR 63 Subpart DDDD – NESHAP for Plywood and Composite Wood Products

Subpart DDDD regulates HAP emissions from plywood and composite wood products (PCWP) manufacturing facilities located at major sources of HAPs. A PCWP manufacturing facility is defined in §63.2292 as one that manufactures plywood and/or composite wood products by bonding wood material or agricultural fiber to form a panel, engineered wood product, or other product defined in §63.2292. Further, an engineered wood product is defined as a product made with wood elements that are bound together with resin, such as laminated strand lumber and glue-laminated beams. The wood pellets manufactured at the Sampson plant do not meet the definition for any of the PCWP products defined in §63.2292 as being subject to Subpart DDDD. Wood pellets are not an engineered wood product, as they are not bound together with resin or other chemical agent. Furthermore, the Sampson plant will no longer be classified as a major source of HAP upon implementation of controls for the dry hammermills, pellet mills, and pellet coolers. As such, this regulation is not applicable.

5.2.4 40 CFR 63 Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines

Subpart ZZZZ applies to reciprocating internal combustion engines (RICE) located at major and area source of HAP emissions. Emergency stationary RICE are defined in §63.6675 as any stationary RICE that operates in an emergency situation. These situations include engines used for power generation when a normal power source is interrupted, or when engines are used to pump water in the case of fire or flood. The Sampson plant's emergency generator and fire water pump engine are both classified as emergency stationary RICE under Subpart ZZZZ. Further, the engines are both classified as new sources, as they were constructed after June 12, 2006 [§63.6590(a)(2)(iii)].

Enviva must meet the requirements of Subpart ZZZZ by meeting the requirements of NSPS Subpart IIII for the emergency generator and fire water pump [§63.6590(c)(1)]. No further requirements apply under Subpart ZZZZ. The requirements under Subpart ZZZZ will not change as a result of the reclassification of the Sampson plant from a major source to an area source.

5.2.5 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. The duct burners are

[38] Federal Register. Vol. 84, No. 144. July 26, 2019.

not subject to Subpart DDDDD because they don't transfer heat to a process material or to a heat transfer material for use in a process unit and thus do not meet the definition of a process heater. The propane vaporizers provide direct heating and are therefore not subject to Subpart DDDDD. The Sampson plant's dryer is heated by a wood-fired furnace burner system; however, the furnace burner system provides direct heating of the wood chips, not indirect. Furthermore, upon implementation of controls for the dry hammermills, pellet mills, and pellet coolers the Sampson plant will no longer be a major source of HAP. As such, Subpart DDDDD does not apply.

5.2.6 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; therefore, Subpart JJJJJ is not applicable.

5.3 Compliance Assurance Monitoring

Compliance Assurance Monitoring (CAM) under 40 CFR 64 applies to emission units located at a Title V major source that use a control device to achieve compliance with an emission limit and whose pre-controlled emissions exceed the major source thresholds. A CAM plan is required to be submitted with the initial Title V operating permit application for emission units whose post-controlled emissions exceed the major source thresholds (i.e., large pollutant-specific emission units [PSEU]).[39] 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.[40]

CAM will potentially be applicable to sources at the Sampson plant; however, no emission units have post-controlled emissions above the major source threshold. As such, any CAM plans that may be required are not due until submittal of the initial Title V renewal. Applicability of 40 CFR 64 requirements will be fully assessed at that time.

5.4 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 Sampson plant for use as a back-up fuel for the RTO burners, proposed 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 Sampson plant.

5.5 North Carolina Administrative Code

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

[39] §64.5(a)
[40] §64.5(b)

5.5.1 15A NCAC 02D .0503 Particulates from Fuel Burning Indirect Heat Exchangers

15A NCAC 02D .0503 provides PM emission limits for indirect heat exchangers combusting fuel, including natural gas. 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 separated by an impervious surface such that there is no mixing of the two fluids."* Per 15A NCAC 02D .0503(d), this rule applies to installations in which fuel is burned for the purposes of producing heat or power by indirect heat transfer. The duct burners are natural gas-fired and are subject to this regulation. The allowable emissions of PM are calculated by the equation $E = 1.090Q^{-0.2594}$ where E is the allowable emission limit in lb/MMBtu and Q is the maximum heat input in MMBtu/hr.

5.5.2 15A NCAC 02D .0504 Particulates from Wood Burning Indirect Heat Exchangers

15A NCAC 02D .0504 includes 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 (ES-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.

5.5.3 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 Sampson plant does not perform the subject wood finishing operations and thus, 15A NCAC 02D .0512 does not apply.

5.5.4 15A NCAC 02D .0515 Particulates from Miscellaneous Industrial Processes

PM emissions from all stacks, outlets, and vents are regulated under 15A NCAC 02D .0515. This regulation limits particulate emissions resulting from any industrial process for which no other emission control standards are applicable. Allowable emission rates (E) are calculated o three significant figures 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.

All emissions from PM sources at the Sampson plant are either negligible or controlled by cyclones, baghouses, or the WESP, and thus, comply with this rule.

5.5.5 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 emergency generator and fire water pump combust ultra-low sulfur diesel, the propane vaporizers combust propane, and the dryer furnace combusts bark and wood chips. The RTO (CD-RTO), the proposed RCO/RTO (CD-RCO), and the double duct burners are natural gas-fired with propane as a back-up. All of these fuels contain low amounts of sulfur and result in SO_2 emissions well below the limit of 2.3 lb/MMBtu.

5.5.6 15A NCAC 02D .0521 Control of Visible Emissions

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

- No six-minute period exceeds 87 percent opacity,
- No more than one six-minute period exceeds 20 percent opacity in any hour, and

- No more than four six-minute periods exceed 20 percent opacity in any 24-hour period.

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

5.5.7 15A NCAC 02D .0540 Particulate from Fugitive Dust Emission Sources

15A NCAC 02D .0540 requires a fugitive dust control plan be prepared if ambient monitoring or air dispersion modeling show violation or a 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 Sampson plant does 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.

5.5.8 15A NCAC 02D .1100 Control of Toxic Air Pollutants

A TAP permit application is required to include an evaluation of the TAP emissions from a facility's sources, excluding exempt sources listed under 15A NCAC 02Q .0702(a)(18). This regulation (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.

No modifications are requested as part of this amended application for an initial Title V permit, and previous TAP modeling showed concentrations well below the Acceptable Ambient Levels (AALs).[41]

5.5.9 15A NCAC 02Q .0700 Toxic Air Pollutant Procedures

As described above, no modifications are requested as part of this amended application for an initial Title V permit and previous TAP modeling showed concentrations well below the AALs. TAP modeling is not required as part of this submittal.

[41] Acrolein had the highest modeled concentration at 83.7% of the AAL.

APPENDIX A
PERMIT APPLICATION FORMS

FORM A

GENERAL FACILITY INFORMATION

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

NOTE- APPLICATION WILL NOT BE PROCESSED WITHOUT THE FOLLOWING:

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

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

GENERAL INFORMATION

Legal Corporate/Owner Name:	**Enviva Pellets Sampson, LLC**
Site Name:	**Enviva Pellets Sampson, LLC**
Site Address (911 Address) Line 1:	**5 Connector Road, US 117**
Site Address Line 2:	
City: **Faison**	State: **North Carolina**
Zip Code: **28341**	County: **Sampson**

CONTACT INFORMATION

Responsible Official/Authorized Contact:	***Invoice Contact:***
Name/Title: **Ken McBride, Plant Manager**	Name/Title: **Johnathan Toler, Corporate Safety Coordinator**
Mailing Address Line 1: **5 Connector Road, US 117**	Mailing Address Line 1: **5 Connector Road, US 117**
Mailing Address Line 2:	Mailing Address Line 2:
City: **Faison** State: **NC** Zip Code: **28341**	City: **Faison** State: **NC** Zip Code: **28341**
Primary Phone No.: **919-820-9693** Fax No.:	Primary Phone No.: **910-515-5822** Fax No.:
Secondary Phone No.:	Secondary Phone No.:
Email Address: **Ken.McBride@envivabiomass.com**	Email Address: **Johnathan.Toler@envivabiomass.com**
Facility/Inspection Contact:	***Permit/Technical Contact:***
Name/Title: **Johnathan Toler, Corporate Safety Coordinator**	Name/Title: **Kai Simonsen, Air Permit Engineer**
Mailing Address Line 1: **5 Connector Road, US 117**	Mailing Address Line 1: **4242 Six Forks Road, Suite 1050**
Mailing Address Line 2:	Mailing Address Line 2:
City: **Faison** State: **NC** Zip Code: **28341**	City: **Raleigh** State: **NC** Zip Code: **27609**
Primary Phone No.: **910-515-5822** Fax No.:	Primary Phone No.: **984-789-3628** Fax No.:
Secondary Phone No.:	Secondary Phone No.:
Email Address: **Johnathan.Toler@envivabiomass.com**	Email Address: **Kai.Simonsen@envivabiomass.com**

APPLICATION IS BEING MADE FOR

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

FACILITY CLASSIFICATION AFTER APPLICATION (Check Only One)

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

FACILITY (Plant Site) INFORMATION

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

Facility ID No. **8200152**

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

Current/Previous Air Permit No. **10386R04** Expiration Date: **9/30/2027**

Facility Coordinates: Latitude: **35 degrees, 7 minutes, 19.8 seconds** Longitude: **78 degrees, 10 minutes, 59.7 seconds**

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

PERSON OR FIRM THAT PREPARED APPLICATION

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

SIGNATURE OF RESPONSIBLE OFFICIAL/AUTHORIZED CONTACT

Name (typed): **Ken McBride** Title: **Plant Manager**

X Signature(Blue Ink): Date: 10-1-2020

Attach Additional Sheets As Necessary

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

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

SECTION AA1 - APPLICATION FOR NON-TITLE V PERMIT RENEWAL

_____ (Company Name) hereby formally requests renewal of Air Permit No. _____

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 cites 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 requirements. (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 permitted facility that would require an air quality permit since the last permit was issued and if there 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):

Attach Additional Sheets As Necessary

FORMs A2, A3

EMISSION SOURCE LISTING FOR THIS APPLICATION - A2

112r APPLICABILITY INFORMATION - A3

REVISED 09/22/16 — NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate — **A2**

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

EMISSION SOURCE ID NO.	EMISSION SOURCE DESCRIPTION	CONTROL DEVICE ID NO.	CONTROL DEVICE DESCRIPTION
Equipment To Be ADDED By This Application (New, Previously Unpermitted, or Replacement)			
Existing Permitted Equipment To Be MODIFIED By This Application			
Equipment To Be DELETED By This Application			
ES-PSTB	Pellet Sampling Transfer Bin	CD-PSTB-BH	Baghouse
ES-HMA	Hammermill Area	CD-PCLP-BH	Baghouse
ES-PCLP	Pellet Cooler LP Fines Relay System		

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 Sampson plant does not store any regulated substances in excess of their respective 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

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

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM D4

EXEMPT AND INSIGNIFICANT ACTIVITIES SUMMARY

REVISED 09/22/16 NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate D4

ACTIVITIES EXEMPTED PER 2Q .0102 OR INSIGNIFICANT ACTIVITIES PER 2Q .0503 FOR TITLE V SOURCES		
DESCRIPTION OF EMISSION SOURCE	SIZE OR PRODUCTION RATE	BASIS FOR EXEMPTION OR INSIGNIFICANT ACTIVITY
1. Green Wood Handling Operations IES-GWH	Varies	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
2. Bark Hog IES-BARKHOG	25 ODT/hr	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
3. Emergency Generator Diesel Fuel Storage Tank IES-TK1	1,000 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
4. Firewater Pump Engine Diesel Fuel Storage Tank IES-TK2	185 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
5. Mobile Sources Diesel Fuel Storage Tank IES-TK3	3,000 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
6. Green Wood Storage Piles IES-GWSP-1 through 4	N/A	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
7. Bark Fuel Storage Piles IES-BFSP-1 and 2	N/A	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
8. Dry Shavings Material Handling IES-DRYSHAVE	25 tons/hr	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
9. Debarker IES-DEBARK-1	275 tons/hr	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
10. Bark Fuel Bin IES-BFB	N/A	15A NCAC 02Q .0503(8)-negligible emissions, see Appendix D
11. Diesel Fired Emergency Generator IES-EG	713 HP	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
12. Diesel Fired Fire Water Pump IES-FWP	131 HP	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
13. Log Chipping IES-CHIP-1	138 ODT/hr	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
14. Double Duct Burners IES-DDB-1 and 2	2.5 MMMBtu/hr each	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
15. Paved Roads IES-PAVEDROADS	N/A	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
16. Propane Vaporizers IES-PV-1 and 2	1 MMBtu/hr each	15A NCAC 02Q .0503(8)-low emissions, see Appendix D
17. Additive Handling and Storage IES-ADD	1,643 tpy	15A NCAC 02Q .0503(8)-low emissions, see Appendix D

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 Sampson, 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:	29 SEPT 2020
COMPANY:	REUS Engineers, P.C.
ADDRESS:	1600 Parkwood Circle, Suite 310, Atlanta, GA 30339
TELEPHONE:	678-388-1654
SIGNATURE:	
PAGES CERTIFIED:	Forms B, B1, B9, C1, C2, C3, C4
	Potential emission calculations (Appendix D)
	Application Report

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

PLACE NORTH CAROLINA SEAL HERE

Received
OCT 07 2020
Air Permits Section

Attach Additional Sheets As Necessary

FORM E1

TITLE V GENERAL INFORMATION

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

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

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

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

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-EG, IES-FWP	Emergency Generator and Fire Water Pump Engine	40 CFR 63 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 incorporated in 15A NCAC 2D 0.1111	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. Furthermore, upon implementation of the proposed controls for the Dry Hammermills, Pellet Mills, and Pellet Coolers the plant will no longer be a major source of HAP. Thus, this regulation is not applicable to the Sampson 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
See attached table following Form E3 for a summary of regulatory requirements and associated compliance requirements for the Sampson Plant.				

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. **See attached table following Form E3 for a summary of regulatory requirements and associated compliance requirements for the Sampson Plant.**	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

Note - CAM plans are not required to be submitted until the first Title V permit renewal.

Describe Monitoring Device Type:
Describe Monitoring Location:
Other Monitoring Methods (Describe In Detail):

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 Sampson, 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	PM	15A NCAC 02D .0515	RTO	Daily monitoring of WESP secondary voltage and current. Inspections and maintenance as recommended by the control device manufacturers, as well as monthly visual inspection of the ductwork and material collection units. Annual inspections of WESP including, but not limited to, visual check of critical components, checks for any equipment that does not alarm when de-energized, checks for signs of plugging in the hopper and gas distribution equipment, and replacement of broken equipment as required. Annual inspection of the heat transfer medium and associated inlet/outlet valves on the RTO. Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ).	Written or electronic log of WESP secondary voltage and current, date/time/result of inspections and maintenances, results of each inspections, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the WESP or RTO within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		VOC, CO, NO_x, $PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0317		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ). Maintain 3-hour average firebox temperature for each of the two fireboxes comprising the RTO at or above the minimum average temperatures established in the most recent performance test. Daily monitoring of minimum secondary voltage and secondary current for the WESP. Limit throughput to 657,000 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 (facility-wide 12-month rolling basis), 3-hour rolling average firebox temperatures for each firebox comprising the RTO, daily WESP secondary voltage and current, date/time/result of inspections and maintenances, results of each inspections, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the WESP or RTO within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		SO_2	15A NCAC 02D .0516		None required because inherently low sulfur content of wood fuel ensures compliance		
		HAP	15A NCAC 02Q .0308(a)		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ).	N/A	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4).
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal". If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
Pellet Mill Feed Silo	ES-PMFS	PM	15A NCAC 02D .0515	Baghouse	Inspections and maintenance, including monthly inspection of ductwork and material collection unit for leaks, and annual internal inspection of control device/baghouse integrity.	Written or electronic log of date and time of each inspection, results of inspection and maintenance, variance from manufacturer's recommendation, and actual emissions (facility-wide 12-month rolling basis).	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. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal". If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

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

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Finished Product Handling	ES-FPH, ES-PB-1 to -4, ES-PL-1 to 2	PM	15A NCAC 02D .0515	Baghouse	Inspections and maintenance as recommended by the manufacturer as well as monthly visual inspections of the system ductwork and material collection units for leaks, annual internal inspection of baghouse structural integrity.	Written or electronic log of date/time/result of inspection and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, corrections made, and actual emissions (facility-wide 12-month rolling basis).	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. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		$PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0308(a)		Monthly actuals emissions.	Written or electronic log of actual emissions (facility-wide 12-month rolling basis).	Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal". If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
Pellet Mills and Coolers	ES-CLR-1 to -6	PM	15A NCAC 02D .0515	RTO/RCO	Inspections and maintenance as recommended by the RTO/RCO manufacturer, as well as monthly visual inspection of the ductwork and material collection units. Annual inspection of the heat transfer medium and associated inlet/outlet valves on the RTO. 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, corrections made, and actual emissions (facility-wide 12-month rolling basis).	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the 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. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		VOC, CO, NO_x, $PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0317		Initial and periodic stack testing for VOC and $PM/PM_{10}/PM_{2.5}$ (at least annually unless a longer duration is approved by DAQ). Limit pellet production to 657,000 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 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 emissions (facility-wide 12-month rolling basis). Written or electronic log of date/time/result of inspections and maintenances, results of each inspections, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the cyclones and RTO/RCO within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		HAP	15A NCAC 02Q .0308(a)		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ).	N/A	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4).
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal". If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

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

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Pellet Cooler HP Fines Relay System	ES-PCHP	PM	15A NCAC 02D .0515	Baghouse	Inspections and maintenance, including monthly inspection of ductwork and material collection unit for leaks, and annual internal inspection of control device/baghouse 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, corrections made, and actual emissions (facility-wide 12-month rolling basis).	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. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal". If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
Hammermill Conveyor	ES-HMC	PM	15A NCAC 02D .0515	Baghouse	Inspections and maintenance, including monthly inspection of ductwork and material collection unit for leaks, and annual internal inspection of control device/baghouse 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, corrections made, and actual emissions (facility-wide 12-month rolling basis).	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. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal". If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
Dried Wood Handling	ES-DWH	PM	15A NCAC 02D .0515	Baghouses	Initial stack testing. 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, corrections made, and actual emissions (facility-wide 12-month rolling basis).	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the 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 (completed).	Written or electronic log of actual criteria pollutant emissions (facility-wide 12-month rolling basis).	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Make log of facility-wide 12-month rolling actual emissions for criteria pollutants available to DAQ upon request.
		HAP	15A NCAC 02Q .0308(a)		Initial stack testing.	N/A	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4).
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal". If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

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

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Emergency Generator	IES-ES	PM, CO, NO_x, NMHC, SO_2	40 CFR Part 60 Subpart IIII	N/A	All requirement are outlined in the regulation, including the following: use certified emergency engines, operate according to manufacturers procedures, use fuel oil with fuel content of no more than 15 ppmw sulfur and cetane index of at least 40, install non-resettable hour meter.	Maintain records of engine certification, fuel certifications and hours/year of operate of each engine.	Annual Compliance Certification
		SO_2	15A NCAC 02D .0516	N/A	Non required because inherently low sulfur content of fuel achieves compliance		
		Opacity	15A NCAC 02D .0521	N/A	N/A	N/A	N/A
		HAPs	40 CFR Part 63 Subpart ZZZZ	N/A	Comply with the NSPS requirements above and no other requirements apply.	Comply with the NSPS requirements above and no other requirements apply.	Annual Compliance Certification
Fire Water Pump	IES-FWP	PM, CO, NO_x, NMHC, SO_2	40 CFR Part 60 Subpart IIII	N/A	All requirement are outlined in the regulation, including the following: use certified emergency engines, operate according to manufacturers procedures, use fuel oil with fuel content of no more than 15 ppmw sulfur and cetane index of at least 40, install non-resettable hour meter.	Maintain records of engine certification, fuel certifications and hours/year of operate of each engine.	Annual Compliance Certification
		SO_2	15A NCAC 02D .0516	N/A	Non required because inherently low sulfur content of fuel achieves compliance		
		Opacity	15A NCAC 02D .0521	N/A	N/A	N/A	N/A
		HAPs	40 CFR Part 63 Subpart ZZZZ	N/A	Comply with the NSPS requirements above and no other requirements apply.	Comply with the NSPS requirements above and no other requirements apply.	Annual Compliance Certification
Furnace Bypass	ES-FBYPASS	PM	15A NCAC 02D .0515	N/A	Comply with the process weight limitation.	N/A	N/A
		VOC, CO, NO_x, $PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0317		Limit hours of furnace bypass to 50 per year for cold start-ups. Limit heat input during cold start-up to no more than 37.6 MMBtu/hr. Limit duration of cold start-up to 8 hours or less. Limit hours of operation in idle mode to 500 hours per year. Limit heat input during idle to 10 MMBtu/hr.	Written or electronic log of monthly hours operation in cold start-up and idle mode and actual emissions (facility-wide 12-month rolling basis).	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements. Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal". If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

FORM E4

EMISSION SOURCE COMPLIANCE SCHEDULE

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **E4**

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.) **ES-HM-1 through ES-HM-8**

B. Identify applicable requirement for which compliance is not achieved:
Condition 2.2 A.1.b of Air Permit No. 10386R04 - $PM_{2.5}$ BACT limit
Enviva is currently in discussions with DAQ because this limit was based on erroneous data supplied to DAQ.

C. Narrative description of how compliance will be achieved with this applicable requirements:
To be determined based on discussions with DAQ. Upon implementation of the changes proposed in the April 2020 permit modification application, the Sampson plant will no longer be a major source with respect to the PSD permitting program and this limit will no longer apply.

D. Detailed Schedule of Compliance:

Step(s)	Date Expected
To be determined based on discussions with DAQ.	**TBD**

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

F. Starting date of submittal of progress reports: **TBD**

Attach Additional Sheets As Necessary

FORM E4

EMISSION SOURCE COMPLIANCE SCHEDULE

REVISED 09/22/16 | **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** | **E4**

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.) **ES-CLR-1 through ES-CLR-6**

B. Identify applicable requirement for which compliance is not achieved:
Condition 2.2 A.1.b of Air Permit No. 10386R04 - PM and PM_{10} BACT limits
Enviva is currently in discussions with DAQ because these limits were based on erroneous data supplied to DAQ.

C. Narrative description of how compliance will be achieved with this applicable requirements:
To be determined based on discussions with DAQ. Upon implementation of the changes proposed in the April 2020 permit modification application, the Sampson plant will no longer be a major source with respect to the PSD permitting program and these limits will no longer apply.

D. Detailed Schedule of Compliance:

Step(s)	Date Expected
To be determined based on discussions with DAQ.	**TBD**

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

F. Starting date of submittal of progress reports: **TBD**

Attach Additional Sheets As Necessary

FORM E5

TITLE V COMPLIANCE CERTIFICATION (Required)

EVISED 09/22/16 | NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate | E5

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

SITE NAME: Enviva Pellets Sampson, LLC

SITE ADDRESS: 5 Connector Road, US 117

CITY, NC : Faison, NC

COUNTY: Sampson

PERMIT NUMBER : N/A

CERTIFIES THAT (Check the appropriate statement(s):

- ☐ 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.

[signature] Date: 10-1-2020

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

Ken McBride, Plant Manager

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

Attach Additional Sheets As Necessary

Received
OCT 0 2 2020
Air Permits Section

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 Hammermills**	EMISSION SOURCE ID NO: **ES-GHM-1, 2, 3**
OPERATING SCENARIO 1 OF 1	CONTROL DEVICE ID NO(S): **CD-WESP and CD-RTO**
	EMISSION POINT (STACK) ID NO(S): **EP-1**

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

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

☐ Coal,wood,oil, gas, other burner (Form B1)	☐ Woodworking (Form B4)	☐ 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: **2016**	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **West Salem Machinery #4888SP**	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: **Green Hammermills**	EMISSION SOURCE ID NO: **ES-GHM-1, 2, 3**
	CONTROL DEVICE ID NO(S): **CD-WESP and 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 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: **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 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 burner system followed by product recovery cyclones. Particulate matter and metallic-HAP emissions are removed utilizing a wet electrostatic precipitator (WESP) and VOC and organic HAP are controlled by a regenerative thermal oxidizer (RTO) downstream of the WESP.

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: **2016** — DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: **Teal Sales Inc. 24' x 80' Single Pass Drum Dryer** — 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 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 and 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**	**30**	

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 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-GHM-1 through -3, and ES-DHM-1 through 8**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROL NO. **1** OF **2** UNITS (ES-DRYER-1)
	POSITION IN SERIES OF CONTROL NO. **1** OF **2** UNITS (ES-GHM-1 through
	POSITION IN SERIES OF CONTROL NO. **2** OF **3** UNITS (ES-DHM-1 through
MANUFACTURER: **Teal Sales, Inc.**	MODEL NO.
OPERATING SCENARIO:	
OPERATING SCENARIO: ___1___ OF ___1___	P.E. SEAL REQUIRED (PER 2Q .0112)? ☐ YES ☑ NO

DESCRIBE CONTROL SYSTEM:
Emissions from the Dryer, Green Hammermills, and Dry Hammermills are controlled by the WESP. The WESP reduces emissions of PM, metal HAP, and HCl to the atmosphere.

EQUIPMENT SPECIFICATIONS	GAS DISTRIBUTION GRIDS: ☑ YES ☐ NO
TYPE: ☑ WET ☐ DRY	☑ SINGLE-STAGE ☐ TWO-STAGE
TOTAL COLLECTION PLATE AREA (FT^2): **29,904**	NO. FIELDS **2** NO. COLLECTOR PLATES PER FIELD: **567 tubes**
COLLECTOR PLATE SIZE (FT): LENGTH: WIDTH:	SPACING BETWEEN COLLECTOR PLATES (INCHES): **12" hextube**
TOTAL DISCHARGE ELECTRODE LENGTH (FT): **19"-0"**	GAS VISCOSITY (POISE): **2.054E-04 Poise**
NUMBER OF DISCHARGE ELECTRODES: **567**	NUMBER OF COLLECTING ELECTRODE RAPPERS: **none**
MAXIMUM INLET AIR FLOW RATE (ACFM): **117,000**	PARTICLE MIGRATION VELOCITY (FT/SEC): **0.234**
MINIMUM GAS TREATMENT TIME (SEC): **2.3**	BULK PARTICLE DENSITY (LB/FT^3): **45 lb/cr. Ft.**
FIELD STRENGTH (VOLTS) CHARGING: **83kVA** COLLECTING: **N/A**	CORONA POWER (WATTS/1000 CFM): **4000**
ELECTRICAL USAGE (KW/HOUR): **141.5**	
CLEANING PROCEDURES: ☐ RAPPING ☐ PLATE VIBRATING ☑ WASHING ☐ OTHER	
OPERATING PARAMETERS PRESSURE DROP (IN. H20): MIN **2"** MAX **2"**	WARNING ALARM? ☐ YES ☑ NO
RESISTIVITY OF POLLUTANT (OHM-CM): **N/A**	GAS CONDITIONING ☑ YES ☐ NO TYPE OF AGENT (IF YES):
INLET GAS TEMPERATURE (°F): **240 °F nominal**	OUTLET GAS TEMPERATURE (°F): **180 °F Nominal**
VOLUME OF GAS HANDLED (ACFM): **117,000**	INLET MOISTURE PERCENT: MIN **40%** MAX **50%**

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

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

POLLUTANT(S) COLLECTED:	$PM / PM_{10} / PM_{2.5}$			
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**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DRYER, ES-GHM-1 through -3, ES-DHM-1 through -8**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROLS NO. **2** OF **2** UNITS (ES-DRYER-1)
	POSITION IN SERIES OF CONTROLS NO. **2** OF **2** UNITS (ES-GHM-1 through 3)
	POSITION IN SERIES OF CONTROLS NO. **3** OF **3** UNITS (ES-DHM-1 through 8)

MANUFACTURER: **TSI, Inc.**	MODEL NO:
OPERATING SCENARIO:	
1 OF 1	

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

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

CATALYST MASKING AGENT IN AIR STREAM ☐ HALOGEN ☐ SILICONE ☐ PHOSPHOROUS COMPOUND ☐ HEAVY METAL ☐ SULFUR COMPOUND ☐ OTHER (SPECIFY) _____ ☐ NONE

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

SCFM THROUGH CATALYST:

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

POLLUTANT(S) COLLECTED:	**VOC**	**HAP**		
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**95** %	**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	OUTLET TEMPERATURE (°F): MIN MAX
INLET TEMPERATURE (°F): MIN MAX	RESIDENCE TIME (SECONDS):
INLET AIR FLOW RATE (ACFM): (SCFM):	COMBUSTION TEMPERATURE (°F):
COMBUSTION CHAMBER VOLUME (FT^3):	INLET MOISTURE CONTENT (%):
% EXCESS AIR:	CONCENTRATION (ppmv) INLET OUTLET
AUXILIARY FUEL USED: **Natural Gas and/or Propane**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **45.2**

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: **Furnace Bypass**	EMISSION SOURCE ID NO: **ES-FBYPASS**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO __1__ OF __1__	EMISSION POINT (STACK) ID NO(S): **EP-28**

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

A bypass stack following the furnace (ES-FBYPASS) is used to exhaust hot gases during startup, shutdown, and malfunctions and during periods of furnace "idle mode" (defined as furnace heat input up to 10 MMBtu/hr). Furnace bypass during a cold start-up begins with the establishment of a flame in the fuel bed in the furnace and ends at the point the furnace temperature reaches 600°F and emissions are routed to the dryer for control by the WESP and RTO, with total start-up time not to exceed 8 hours for each cold start-up. The purpose of operation in "idle mode" is to maintain the temperature of the fire brick lining the furnace which may be damaged if it cools too rapidly. Operation in "idle mode" also significantly reduces the amount of time required to restart the dryer. The furnace may operate up to 500 hr/yr in "idle mode" and may remain in an idle state for up to 24 contiguous hours.

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: **2016**	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Teal Sales Inc. 24' x 80' Single Pass Drum Dryer**	EXPECTED OP. SCHEDULE: **_24__** HR/DAY **_7___** DAY/WK **_52__** WK/YR **(normal o**
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 B1

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

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

EMISSION SOURCE DESCRIPTION: **Furnace Bypass**	EMISSION SOURCE ID NO: **ES-FBYPASS**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-28**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): **37.6 (cold start-up), 10 MMBtu/hr (idle mode)**

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 ☐ DRY BED	☐ UNCONTROLLED ☐ CONTROLLED	☐ UNCONTROLLED ☐ CONTROLLED	☐ UNCONTROLLED ☐ FLYASH REINJECTION ☐ NO FLYASH REINJECTION	☐ CIRCULATING ☐ RECIRCULATING

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)
Cold Start-up: Bark/Wet Wood	**tons**	**30**	**4.00**
Furnace Idle: Bark/Wet Wood	**tons**	**30**	**1.00**

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: **Dried Wood Handling**	EMISSION SOURCE ID NO: **ES-DWH**
OPERATING SCENARIO ___1___ OF ___1___	CONTROL DEVICE ID NO(S): **CD-DWH-BH-1 and -2**
	EMISSION POINT (STACK) ID NO(S): **EP-25 and EP-26**

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: **2016**	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.:	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								

See Emission Calculations in Appendix D

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

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-25 and EP-26**

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**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DWH**
EMISSION POINT (STACK) ID NO(S): **EP-25**	POSITION IN SERIES OF CONTROLS NO. **1** OF **2** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO

DESCRIBE CONTROL SYSTEM:
One of two (2) baghouses used to create a slight negative pressure on the dried wood handling operations. The baghouses collects dust from the air volume present in the dried wood handling.

	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** %	**99** %	**99** %	%
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:	GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3): **12-17**	INLET TEMPERATURE (^oF): **Ambient**	
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF)	
INLET AIR FLOW RATE (ACFM): **1,000**	FILTER OPERATING TEMP (^oF):	
NO. OF COMPARTMENTS:	NO. OF BAGS PER COMPARTMENT: **2**	LENGTH OF BAG (IN.): **552**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.):
TOTAL FILTER SURFACE AREA (FT^2): **377**	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:
Fans pull air from the conveyor leading from the dryer to the DHM island, transporting dried wood.

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: **CD-DWH-BH-2**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DWH**
EMISSION POINT (STACK) ID NO(S): **EP-26**	POSITION IN SERIES OF CONTROLS NO. **2** OF **2** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO

DESCRIBE CONTROL SYSTEM:
One of two (2) baghouses used to create a slight negative pressure on the dried wood handling operations. The baghouses collects dust from the air volume present in the dried wood handling.

POLLUTANTS COLLECTED:	PM	PM-10	PM-2.5	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**99** %	**99** %	**99** %	%
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:	GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3): **12-17**	INLET TEMPERATURE (°F): **Ambient**	
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (°F)	
INLET AIR FLOW RATE (ACFM): **1,000**	FILTER OPERATING TEMP (°F):	
NO. OF COMPARTMENTS:	NO. OF BAGS PER COMPARTMENT: 2	LENGTH OF BAG (IN.): **552**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.):
TOTAL FILTER SURFACE AREA (FT^2): **377**	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:
Fans pull air from the conveyor leading from the dryer to the DHM island, transporting dried wood.

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 Conveyor**	EMISSION SOURCE ID NO: **ES-HMC**
OPERATING SCENARIO ___1___ OF ___1___	CONTROL DEVICE ID NO(S): **CD-HMC-BH**
	EMISSION POINT (STACK) ID NO(S): **EP-24**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Conveying system for transfer of material to 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)	☐ 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: **2016**	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.:	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	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: **Hammermill 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-24**

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

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM 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-24**	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 bagfilter controls particulate from the dry hammermill conveying system.

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_2O): MIN: MAX: **3"**	GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3): **12**	INLET TEMPERATURE (°F): **120**	
POLLUTANT LOADING RATE: 0.004 ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (°F) **100**	
INLET AIR FLOW RATE (ACFM): **1500**	FILTER OPERATING TEMP (°F): **N/A**	
NO. OF COMPARTMENTS: **1**	NO. OF BAGS PER COMPARTMENT: 40	LENGTH OF BAG (IN.): **72**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **6**
TOTAL FILTER SURFACE AREA (FT^2): **377**	AIR TO CLOTH RATIO: **3.97**	
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: **Eight (8) Dry 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 operating in parallel.

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: **2016** — DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: **West Salem Machinery Model #4460S** — 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 Attachment 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 Attachment 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 Attachment 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-HM-1 thru 8**
Eight (8) Dry Hammermills	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 operating in parallel.

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 (8) dry hammermill cyclones.

	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** %	**99** %	**99** %	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See calculations in Attachment D**			

PRESSURE DROP (IN H_20): MIN: MAX: **6"** GAUGE? ☑ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-05**	INLET TEMPERATURE (°F): **120**	
POLLUTANT LOADING RATE: **0.1** gr/cf in ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (°F) **100**	
INLET AIR FLOW RATE (ACFM): **15,000**	FILTER OPERATING TEMP (°F): **N/A**	
NO. OF COMPARTMENTS: **1**	NO. OF BAGS PER COMPARTMENT: **164**	LENGTH OF BAG (IN.): **120**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **5.75**
TOTAL FILTER SURFACE AREA (FT^2): **2,168**	AIR TO CLOTH RATIO: **6.90**	
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

PARTICLE SIZE DISTRIBUTION

SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1	**See calculations in Appendix D.**	
1-10		
10-25		
25-50		
50-100		
>100		
	TOTAL = 100	

DESCRIBE INCOMING AIR STREAM:
The air stream contains wood dust particles. Larger particles are removed by the upstream cyclone for product recovery.

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-PMFS**
Pellet Mill Feed Silo	CONTROL DEVICE ID NO(S): **CD-PMFS-BH**
OPERATING SCENARIO ___1___ OF ___1___	EMISSION POINT (STACK) ID NO(S): **EP-6**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
The pellet mill feed silo stores dried milled wood prior to transport to the pellet mills.

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: **2016**	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Mast Lepley 30'x68' wood fuel storage silo**	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	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 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: **Pellet Mill Feed Silo**	EMISSION SOURCE ID NO: **ES-PMFS**
	CONTROL DEVICE ID NO(S): **CD-PMFS-BH**
OPERATING SCENARIO: _____1_____ OF _____1_____	EMISSION POINT(STACK) ID NO(S): **EP-6**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
The pellet mill feed silo stores dried milled wood prior to transport to the pellet mills.

MATERIAL STORED: **Dried ground wood**				DENSITY OF MATERIAL (LB/FT3): **40**	
CAPACITY	CUBIC FEET:			TONS:	
DIMENSIONS (FEET)	HEIGHT: **70**	DIAMETER: **46.6**	***(OR)***	LENGTH: WIDTH: HEIGHT:	
ANNUAL PRODUCT THROUGHPUT (TONS)		ACTUAL:		MAXIMUM DESIGN CAPACITY:	

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

NO. FILL TUBES:	
MAXIMUM ACFM:	

MATERIAL IS UNLOADED TO: **Pellet Mill/Presses**

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM 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-PMFS-BH**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-PMFS**
EMISSION POINT (STACK) ID NO(S): **EP-6**	POSITION IN SERIES OF CONTROLS NO. **1** OF **1** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO

DESCRIBE CONTROL SYSTEM:
A baghouse is used to create a slight negative pressure on the Pellet Mill Feed Silo. The baghouse collects dust from the air volume present in the silo. The baghouse is sized to offset the air displacement created by the material feed to the silo.

	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: **4"** GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-06**	INLET TEMPERATURE (°F): **Ambient**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (°F) **Ambient**
INLET AIR FLOW RATE (ACFM): **2,444**	FILTER OPERATING TEMP (°F): **N/A**

NO. OF COMPARTMENTS: **1**	NO. OF BAGS PER COMPARTMENT: **1**	LENGTH OF BAG (IN.): **120**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **5.875**
TOTAL FILTER SURFACE AREA (FT^2): **377**	AIR TO CLOTH RATIO: **6**	

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

PARTICLE SIZE DISTRIBUTION

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

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

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: **Pellet Mills and Pellet Coolers**	EMISSION SOURCE ID NO: **ES-CLR-1 through 6**
OPERATING SCENARIO **1** OF **1**	CONTROL DEVICE ID NO(S): **CD-CLR-1 through 6, CD-RCO**
	EMISSION POINT (STACK) ID NO(S): **EP-29**

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: **2016**	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Bliss 14-393-6A Cooler**	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 Attachment 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 Attachment 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 Attachment 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: **Pellet Mills and Pellet Coolers**	EMISSION SOURCE ID NO: **ES-CLR-1 through 6**
	CONTROL DEVICE ID NO(S): **CD-CLR-1 through 6, CD-RCO**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-29**

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 C4

CONTROL DEVICE (CYCLONE, MULTICYCLONE, OR OTHER MECHANICAL)

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

CONTROL DEVICE ID NO: **CD-CLR-1 through 6**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-CLR-1 through 6**
EMISSION POINT (STACK) ID NO(S): **EP-29**	POSITION IN SERIES OF CONTROLS NO. **1** OF **2** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2Q .0112)? ☐ YES ☑ NO

DESCRIBE CONTROL SYSTEM:
Exhaust from the Pellet Mills and Pellet Coolers are routed through six (6) identical high efficiency cyclones. Each Pellet Cooler vents to a dedicated cyclone. The cyclones operate under negative pressure. A new RTO/RCO will be installed downstream of the existing cyclones 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.

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

PRESSURE DROP (IN. H_2O): ____ MIN **6.0"** MAX	
INLET TEMPERATURE (°F): ____ MIN ____ MAX **Ambient**	OUTLET TEMPERATURE (°F): ____ MIN MAX **Ambient**
INLET AIR FLOW RATE (ACFM): **16,746 each**	BULK PARTICLE DENSITY (LB/FT^3): **2.86E-05**
POLLUTANT LOADING RATE (GR/FT^3): **0.2**	

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

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

DESCRIBE INCOMING AIR STREAM:
The cyclones are used to capture particulates from the pellet mills and coolers.

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:
None

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

Attach Additional Sheets As Necessary

FORM C3
CONTROL DEVICE (THERMAL OR CATALYTIC)

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

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

CONTROL DEVICE ID NO: **CD-RCO**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-CLR-1 through -6**
EMISSION POINT (STACK) ID NO(S): **EP-29**	POSITION IN SERIES OF CONTROLS NO. **2** OF **2** UNITS
MANUFACTURER: **TBD**	MODEL NO: **TBD**
OPERATING SCENARIO:	
1 OF **1**	

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

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

CATALYST MASKING AGENT IN AIR STREAM ☐ HALOGEN ☐ SILICONE ☐ PHOSPHOROUS COMPOUND ☐ HEAVY METAL ☐ SULFUR COMPOUND ☐ OTHER (SPECIFY) _____ ☐ NONE

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

SCFM THROUGH CATALYST:

DESCRIBE CONTROL SYSTEM, INCLUDING RELATION TO OTHER CONTROL DEVICES AND SOURCES, AND ATTACH DIAGRAM OF SYSTEM:
Emissions leaving the Pellet Cooler cyclones will enter the RTO/RCO prior to being emitted to the atmosphere. A quench system will be installed between the cyclones and the RTO/RCO to protect the RTO/RCO.

POLLUTANT(S) COLLECTED:	**VOC**	**HAP**		
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**95** %	**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	OUTLET TEMPERATURE (°F): MIN MAX
INLET TEMPERATURE (°F): MIN MAX	RESIDENCE TIME (SECONDS):
INLET AIR FLOW RATE (ACFM): (SCFM):	COMBUSTION TEMPERATURE (°F):
COMBUSTION CHAMBER VOLUME (FT^3):	INLET MOISTURE CONTENT (%):
% EXCESS AIR:	CONCENTRATION (ppmv) INLET OUTLET
AUXILIARY FUEL USED: **Natural Gas and/or Propane**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **19.8**

DESCRIBE MAINTENANCE PROCEDURES:
TBD

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Pellet Cooler HP Fines Relay System**	EMISSION SOURCE ID NO: **ES-PCHP**
	CONTROL DEVICE ID NO(S): **CD-PCHP-BH**
OPERATING SCENARIO ___1___ OF ___1___	EMISSION POINT (STACK) ID NO(S): **EP-23**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Two high pressure blowers collect fines from the pellet cooler discharge cyclones (ES-PCHP) and convey them to the cooler high pressure fines filter (CD-PCHP-BH). Solids separated by the filter (CD-PCHP-BH) are returned to the dry hammermill conveying system (ES-HMC) and process air is discharged to atmosphere (ES-PCHP).

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: **2016**	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Western Pneumatics Inc. Part# 18542D400**	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 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: **Pellet Cooler HP Fines Relay System**	EMISSION SOURCE ID NO: **ES-PCHP**
	CONTROL DEVICE ID NO(S): **CD-PCHP-BH**
OPERATING SCENARIO: ___1___ OF ___1___	EMISSION POINT(STACK) ID NO(S): **EP-23**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Two high pressure blowers collect fines from the pellet cooler discharge cyclones (ES-PCHP) and convey them to the cooler high pressure fines filter (CD-PCHP-BH). Solids separated by the filter (CD-PCHP-BH) are returned to the dry hammermill conveying system (ES-HMC) and process air is discharged to atmosphere (ES-PCHP).

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

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

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:

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-PCHP-BH**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-PCHP**
EMISSION POINT (STACK) ID NO(S): **EP-23**	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 high pressure blowers collect fines from the pellet cooler discharge cyclones (ES-PCHP) and convey them to the cooler high pressure fines filter (CD-PCHP-BH). Solids separated by the filter (CD-PCHP-BH) are returned to the dry hammermill conveying system (ES-HMC) and process air is discharged to atmosphere (ES-PCHP).

	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 calculation in Appendix D**			

PRESSURE DROP (IN H_2O): MIN: MAX: **4"** GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-05**	INLET TEMPERATURE (°F): **Ambient**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (°F) **Ambient**
INLET AIR FLOW RATE (ACFM): **1,000**	FILTER OPERATING TEMP (°F): **N/A**

NO. OF COMPARTMENTS: **1**	NO. OF BAGS PER COMPARTMENT: **1**	LENGTH OF BAG (IN.): **120**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **5.875**
TOTAL FILTER SURFACE AREA (FT^2): **942**	AIR TO CLOTH RATIO: **6**	

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 particulate emissions.

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: **Finished Product Handling/Pellet Loadout Bins/Pellet Loadout**	EMISSION SOURCE ID NO: **ES-FPH, ES-PB1 thru 4** **ES-PL1 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 DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):

Finished pellets are conveyed to four (4) pellet loadout bins (PB-1, 2, 3, 4) that feed two (2) pellet loadout operations (ES-PL-1, -2). Pellet Loadout is accomplished by gravity feed of the pellets into trucks through two (2) covered chutes that automatically telescope upward during the loadout process to maintain constant contact with product as it is loaded to prevent emissions. A slight negative pressure is maintained near the loadout area inside of the loadout building as a fire prevention measure to prevent any build-up of dust on surfaces within the building. Trucks are covered immediately after loading. Emissions from the feed conveyor, Finished Product Handling, transfer of pellets to the Pellet Loadout Bins, and the truck loadout operations are all controlled by the Finished Product Handling baghouse (CD-FPH-BH).

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: **2016**	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Agra Industries Inc.**	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**	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):
Collection of pellet feed conveyor, pellet storage, and transfer to pellet loadout spouts and loadout area.

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 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: **Four (4) Pellet Loadout Bins**	EMISSION SOURCE ID NO: **ES-PB1 through 4**
	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
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 trucks through either of the two (2) truck loadout chutes.

MATERIAL STORED: **Pellet Product**				DENSITY OF MATERIAL (LB/FT3): **40**	
CAPACITY	CUBIC FEET:			TONS: 1,200 (total for all four bins)	
DIMENSIONS (FEET)	HEIGHT:	DIAMETER: **12**	***(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:

MAXIMUM ACFM: **750 each**

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 B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: **Pellet Loadout 1 and 2**	EMISSION SOURCE ID NO: **ES-PL-1 and PL-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):
Final product is loaded into trucks using two (2) pellet loadout chutes.

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM 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 through 4, ES-PL1 and 2**
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 emissions from Finished Product Handling (ES-FPH), the four (4) Pellet Loadout Bins (ES-PB-1 through ES-PB-4) and Truck Loadout Operations (ES-PL-1 and ES-PL-2).

	PM	PM-10	PM-2.5	
POLLUTANTS COLLECTED:	PM	PM-10	PM-2.5	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**99** %	**99** %	**99** %	%
CONTROL DEVICE EFFICIENCY:			%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):	**See calculation in Appendix D**			

PRESSURE DROP (IN H_2O): MIN: MAX: **6"**	GAUGE? ☑ YES ☐ NO	Warning Alarm ☑ Yes	☐ No
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-05**	INLET TEMPERATURE (°F): **120**		
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (°F) **100**		
INLET AIR FLOW RATE (ACFM): **8,500**	FILTER OPERATING TEMP (°F): **N/A**		
NO. OF COMPARTMENTS: **1**	NO. OF BAGS PER COMPARTMENT:	LENGTH OF BAG (IN.): **144**	
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **5.75**	
TOTAL FILTER SURFACE AREA (FT^2): **4,842**	AIR TO CLOTH RATIO: **7.30**		
DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE	FILTER MATERIAL: ☐ WOVEN ☑ FELTED		

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

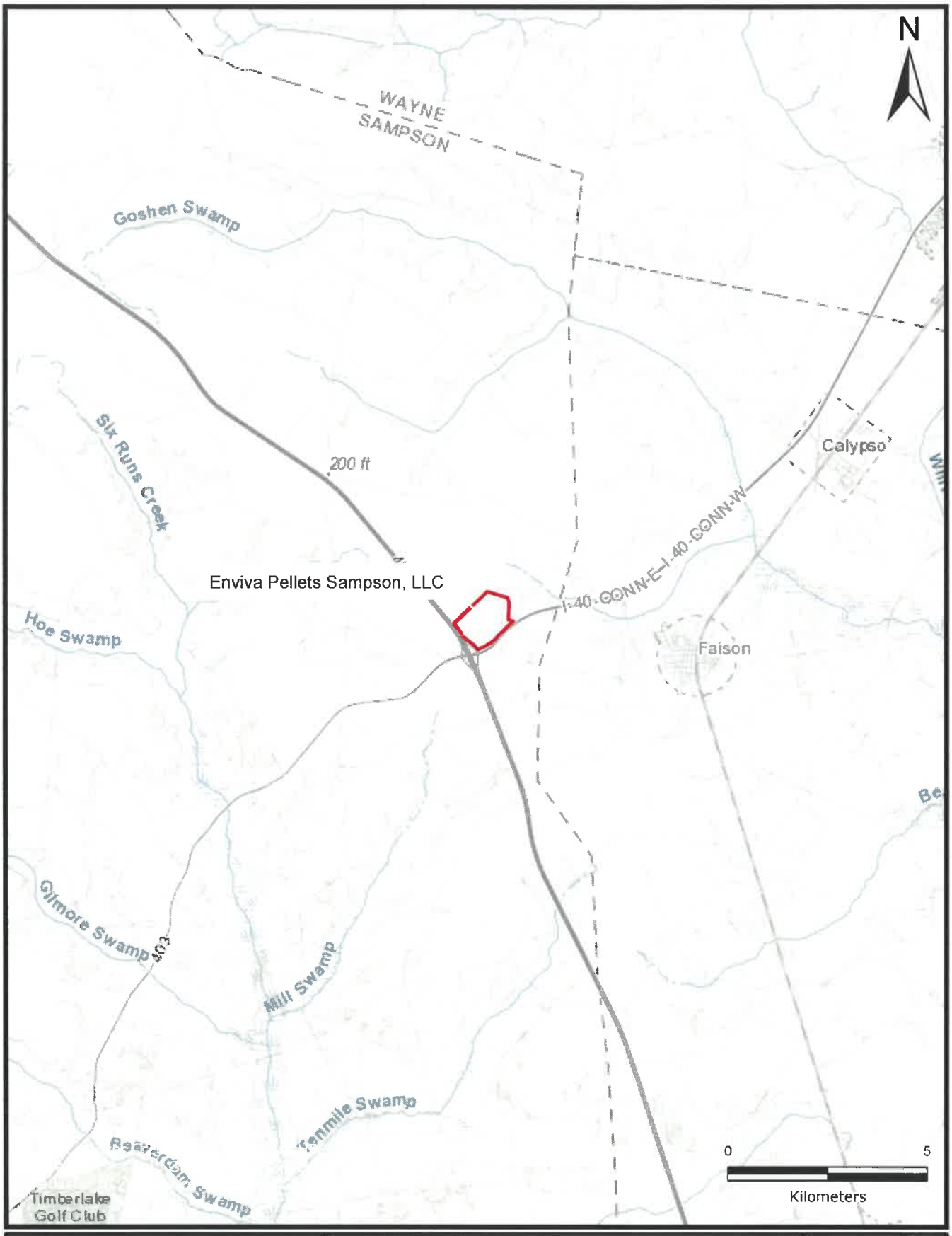
SIZE (MICRONS)	WEIGHT % OF TOTAL	CUMULATIVE %
0-1	**See calculations in Appendix D**	
1-10		
10-25		
25-50		
50-100		
>100		
	TOTAL = 100	

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



RAMBOLL

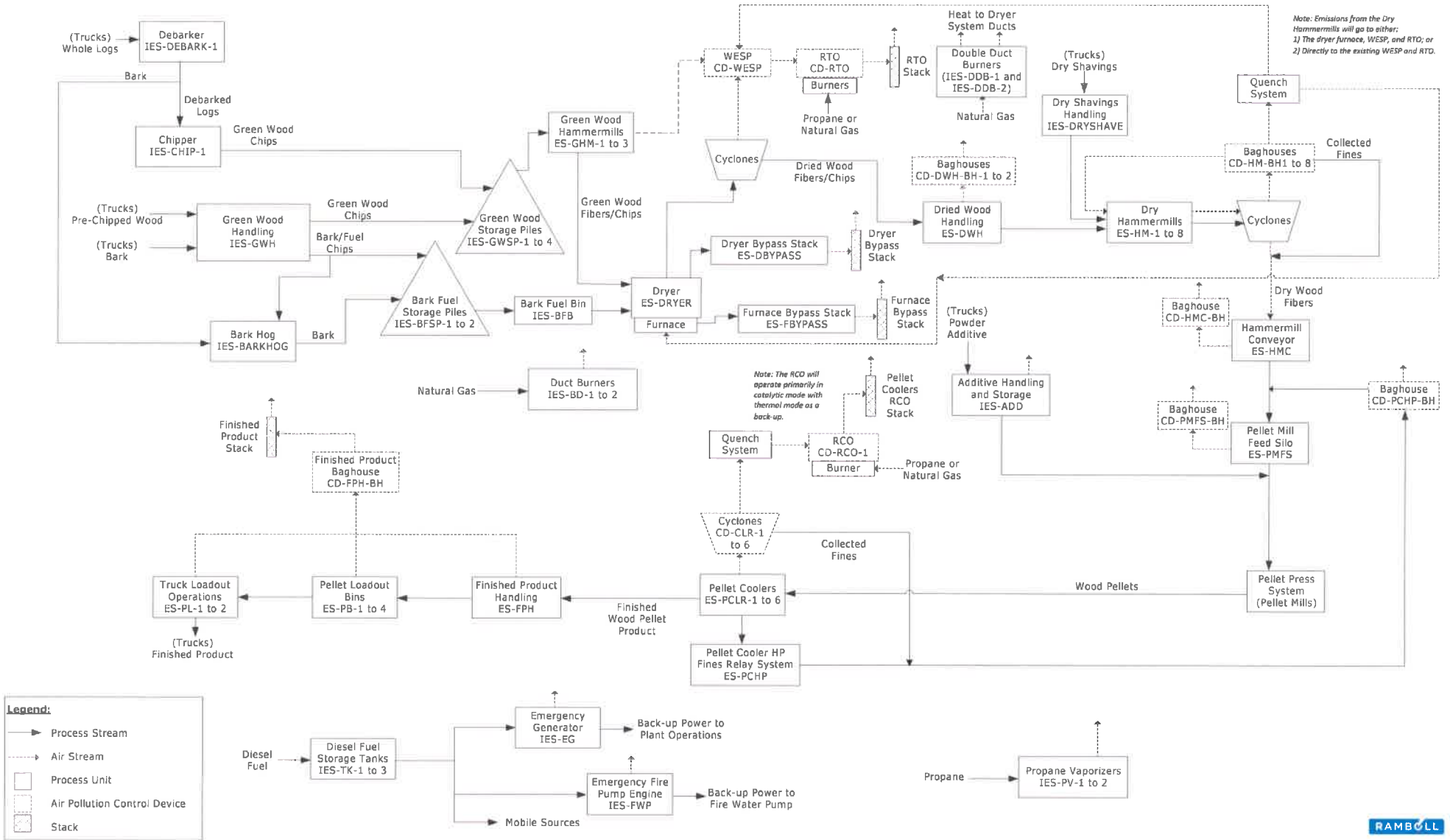
Area Map
Enviva Pellets Sampson, LLC
Sampson County, North Carolina

FIGURE
1

DRAFTED BY: ARJ | DATE: 3/13/2020 | PROJECT: 1690016258

APPENDIX C
PROCESS FLOW DIAGRAM

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



APPENDIX D
POTENTIAL EMISSIONS CALCULATIONS

Table 1
Calculation Inputs
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Operational Data	
Green Hammermills, Dryers, Dry Hammermills, Pellet Mills, and Pellet Coolers	
Short-Term Throughput (ODT/hr)	120
Annual Throughput (ODT/yr)	657,000
Hours of Operation (Hr/yr)	8,760
Softwood Composition	100%

Table 2
Summary of Facility-wide Criteria Pollutant and CO_2e Potential Emissions
Enviva Pellets Sampson, LLC
Faison, Sampson 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	--	--	--	--	--	--	--	--	1.64	--
IES-BARKHOG	Bark Hog	--	--	--	--	0.24	0.13	0.13	--	0.30	--
ES-DRYER	250.4 MMBtu/hr wood-fired direct heat drying system	CD-WESP; CD-RTO	WESP; RTO	93.8	93.8	37.6	34.8	31.7	27.4	60.8	256,230
ES-GHM-1 through 3	Three (3) Green Wood Hammermills										
ES-HM-1 through 8	Eight (8) Dry Hammermills										
ES-FBYPASS	Furnace Bypass	--	--	2.06	0.76	1.98	1.78	1.54	0.086	0.058	721
IES-DDB-1 and -2	Double Duct Burners	--	--	1.80	1.56	0.17	0.17	0.17	0.013	0.24	3,048
ES-HMC	Hammermill Conveying System	CD-HMC-BH	One (1) baghouse	--	--	0.23	0.23	0.23	--	--	--
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BH	One (1) baghouse	--	--	0.37	0.37	0.37	--	--	--
ES-CLR-1 through 6	Twelve Pellet Mills and Six (6) Pellet Coolers	CD-CLR-1 through 6; CD-RCO	Six (6) simple cyclones (one on each cooler); RCO/RTO	8.26	13.7	191	47.2	12.2	0.051	37.7	12,069
ES-PCHP	Pellet Cooler HP Fines Relay System	CD-PCHP-BH	One (1) baghouse	--	--	0.47	0.47	0.47	--	--	--
ES-FPH	Finished Product Handling	CD-FPH-BH	One (1) baghouse	--	--	1.28	1.16	0.51	--	--	--
ES-PB-1 through 4	Four (4) Pellet Loadout Bins										
ES-PL-1 and 2	Two (2) Pellet Mill Loadouts										
ES-DWH	Dried wood handling operations	CD-DWH-BH-1 through -2	Two (2) baghouses	--	--	0.30	0.30	0.30	--	14.3	--
IES-ADD	Additive Handling and Storage	--	--	--	--	3.67E-04	1.74E-04	2.63E-05	--	--	--
IES-GWH	Green wood handling operations	--	--	--	--	0.081	0.038	0.0058	--	--	--
IES-TK-1	2,500 gal diesel storage tank	--	--	--	--	--	--	--	--	3.32E-04	--
IES-TK-2	500 gal diesel storage tank	--	--	--	--	--	--	--	--	6.79E-05	--
IES-TK-3	3,000 gal diesel storage tank	--	--	--	--	--	--	--	--	0.0014	--
IES-GWSP-1 through 4	Green wood storage piles	--	--	--	--	15.4	7.68	1.15	--	6.87	--
IES-BFSP-1 and 2	Bark fuel storage piles	--	--	--	--	0.64	0.32	0.048	--	0.29	--
IES-DRYSHAVE	Dry shavings material handling	--	--	--	--	0.054	0.025	0.0039	--	--	--
IES-DEBARK-1	Debarker	--	--	--	--	1.13	0.62	0.62	--	--	--
IES-BFB[1]	Bark fuel bin	--	--	--	--	--	--	--	--	--	--
IES-EG	689 hp diesel-fired emergency generator	--	--	1.03	1.17	0.059	0.059	0.059	0.0019	0.114	204
IES-FWP	131 hp diesel-fired fire water pump	--	--	0.070	0.18	0.0092	0.0092	0.0092	4.79E-04	0.0081	50.4
--	Paved Roads	--	--	--	--	16.4	3.27	0.80	--	--	--
IES-PV-1 and 2	Two (2) 1 MMBtu/hr Propane Vaporizers	--	--	0.72	1.24	0.067	0.067	0.067	0.0052	0.096	1,223
			Total Emissions:	**108**	**112**	**268**	**98.7**	**50.4**	**27.6**	**122**	**273,545**
			Total Excluding Fugitives[2]:	**108**	**112**	**234**	**86.8**	**47.8**	**27.6**	**114**	**273,545**

Notes:

1. Bark fuel is transferred by walking floor to covered conveyors to fully enclosed bark fuel bin to pusher(s) into furnace. Therefore, there are no emissions expected from the bin.
2. 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 Sources
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
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compounds

Table 3
Summary of Facility-wide HAP Potential Emissions
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Pollutant	HAP	NC TAP	CD-RTO[1] (tpy)	ES-FBYPASS (tpy)	IES-DDB-1 and -2 (tpy)	CD-RCO[2] (tpy)	IES-EG (tpy)	IES-FWP (tpy)	ES-DWH (tpy)	IES-CHIP-1 (tpy)	IES-BARKHOG (tpy)	IES-PV-2 and 2 (tpy)	Total (tpy)
Acetaldehyde	Y	Y	2.03	2.9E-03	3.3E-07	0.14	3.1E-05	1.8E-04	--	--	--	--	2.17
Acetophenone	Y	Y	1.8E-07	1.1E-08	--	--	--	--	--	--	--	--	1.9E-07
Acrolein	Y	Y	2.07	1.4E-02	3.9E-07	0.83	9.8E-06	2.1E-05	--	--	--	--	2.91
Ammonia	N	Y	0.62	--	0.069	0.27	--	--	--	--	--	--	0.96
Antimony & Compounds	Y	N	6.3E-04	2.7E-05	--	--	--	--	--	--	--	--	6.6E-04
Arsenic & Compounds	Y	Y	1.8E-03	7.6E-05	4.3E-06	1.7E-05	--	--	--	--	--	--	0.0019
Benzo(a)pyrene	Y	Y	1.4E-04	8.9E-06	2.6E-08	1.0E-07	3.2E-07	4.3E-08	--	--	--	--	1.5E-04
Benzene	Y	Y	0.37	1.4E-02	0.016	0.062	0.0010	2.1E-04	--	--	--	6.22E-03	0.47
Beryllium	Y	Y	9.0E-05	3.8E-06	2.6E-07	1.0E-06	--	--	--	--	--	--	9.5E-05
Butadiene, 1,3-	Y	Y	--	--	--	--	--	9.0E-06	--	--	--	--	9.0E-06
Cadmium	Y	Y	5.4E-04	1.4E-05	2.4E-05	9.4E-05	--	--	--	--	--	--	6.7E-04
Carbon tetrachloride	Y	Y	2.5E-03	1.5E-04	--	--	--	--	--	--	--	--	0.0026
Chlorine	Y	Y	0.87	2.7E-03	--	--	--	--	--	--	--	--	0.87
Chlorobenzene	Y	Y	1.8E-03	1.1E-04	--	--	--	--	--	--	--	--	0.0019
Chloroform	Y	Y	1.5E-03	9.6E-05	--	--	--	--	--	--	--	--	0.0016
Chromium VI	.[3]	Y	5.5E-04	1.2E-05	3.0E-05	1.2E-04	--	--	--	--	--	--	7.1E-04
Chromium-Other compds	Y	N	1.4E-03	6.0E-05	--	--	--	--	--	--	--	--	0.0015
Cobalt compounds	Y	N	5.2E-04	2.2E-05	1.8E-06	7.1E-06	--	--	--	--	--	--	5.5E-04
Dichlorobenzene	Y	Y	2.3E-04	--	2.6E-05	1.0E-04	--	--	--	--	--	--	3.6E-04
Dichloroethane, 1,2-	Y	Y	1.6E-03	1.0E-04	--	--	--	--	--	--	--	--	0.0017
Dichloropropane, 1,2-	Y	N	1.8E-03	1.1E-04	--	--	--	--	--	--	--	--	0.0019
Dinitrophenol, 2,4-	Y	N	9.9E-06	6.2E-07	--	--	--	--	--	--	--	--	1.0E-05
Di(2-ethylhexyl)phthalate	Y	Y	2.6E-06	1.6E-07	--	--	--	--	--	--	--	--	2.7E-06
Ethyl benzene	Y	N	1.7E-03	1.1E-04	--	--	--	--	--	--	--	--	0.0018
Formaldehyde	Y	Y	1.97	1.5E-02	0.033	0.64	0.0001	2.7E-04	0.07	--	--	0.013	2.74
Hexachlorodibenzo-p-dioxin	N	Y	8.8E-05	5.5E-06	--	--	--	--	--	--	--	--	9.32E-05
Hexane	Y	Y	0.35	--	0.039	0.15	--	--	--	--	--	--	0.54
Hydrochloric acid	Y	Y	2.08	6.5E-02	--	--	--	--	--	--	--	--	2.15
Lead and Lead Compounds	Y	N	3.8E-03	1.7E-04	1.1E-05	4.3E-05	--	--	--	--	--	--	0.0040
Manganese & Compounds	Y	Y	0.13	5.5E-03	8.2E-06	3.2E-05	--	--	--	--	--	--	0.13
Mercury	Y	Y	3.3E-04	1.2E-05	5.6E-06	2.2E-05	--	--	--	--	--	--	3.7E-04
Methanol	Y	N	2.28	--	--	3.94	--	--	0.16	0.33	0.060	--	6.77
Methyl bromide	Y	N	8.2E-04	5.2E-05	--	--	--	--	--	--	--	--	8.7E-04
Methyl chloride	Y	N	1.3E-03	7.9E-05	--	--	--	--	--	--	--	--	0.0013
Methyl ethyl ketone	N	Y	3.0E-04	1.9E-05	--	--	--	--	--	--	--	--	0.0003
Methylene chloride	Y	Y	0.016	1.0E-03	--	--	--	--	--	--	--	--	0.017
Naphthalene	Y	N	0.005	3.3E-04	1.3E-05	5.4E-05	1.6E-04	1.9E-05	--	--	--	--	0.0060
Nickel	Y	Y	3.0E-03	1.1E-04	4.5E-05	1.8E-04	--	--	--	--	--	--	0.0034
Nitrophenol, 4-	Y	N	6.0E-06	3.8E-07	--	--	--	--	--	--	--	--	6.4E-06
Pentachlorophenol	Y	Y	5.6E-05	1.8E-07	--	--	--	--	--	--	--	--	5.6E-05
Perchloroethylene	Y	Y	0.042	1.3E-04	--	--	--	--	--	--	--	--	0.042
Phenol	Y	Y	1.41	1.8E-04	--	0.41	--	--	--	--	--	--	1.82
Phosphorus Metal, Yellow or White	Y	N	2.1E-03	9.3E-05	--	--	--	--	--	--	--	--	0.0022
Polychlorinated Biphenyls	Y	Y	4.5E-07	2.8E-08	--	--	--	--	--	--	--	--	4.7E-07
Polycyclic Organic Matter	Y	N	0.15	4.3E-04	8.8E-04	3.5E-03	2.6E-04	3.9E-05	--	--	--	3.50E-04	0.15
Propionaldehyde	Y	N	1.69	2.1E-04	--	0.18	--	--	6.9E-02	--	--	--	1.94
Selenium Compounds	Y	N	2.2E-04	9.6E-06	5.2E-07	2.0E-06	--	--	--	--	--	--	2.3E-04
Styrene	Y	Y	0.10	6.5E-03	--	--	--	--	--	--	--	--	0.11
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	4.7E-10	3.0E-11	--	--	--	--	--	--	--	--	5.0E-10
Toluene	Y	Y	5.1E-02	3.2E-03	7.3E-05	2.9E-04	3.5E-04	9.4E-05	--	--	--	--	0.0551
Trichloroethane, 1,1,1-	Y	Y	0.034	1.1E-04	--	--	--	--	--	--	--	--	0.034
Trichloroethylene	Y	Y	1.6E-03	1.0E-04	--	--	--	--	--	--	--	--	0.0017
Trichlorofluoromethane	N	Y	2.2E-03	1.4E-04	--	--	--	--	--	--	--	--	0.0024
Trichlorophenol, 2,4,6-	Y	N	1.2E-06	7.6E-08	--	--	--	--	--	--	--	--	1.3E-06
Vinyl Chloride	Y	Y	9.9E-04	6.2E-05	--	--	--	--	--	--	--	--	1.0E-03
Xylene	Y	Y	1.4E-03	8.6E-05	--	--	2.4E-04	6.5E-05	--	--	--	--	0.0018
Total HAP Emissions[4] (tpy)	**--**	**--**	**15.7**	**0.13**	**0.088**	**6.36**	**0.0020**	**8.88E-04**	**0.30**	**0.33**	**0.060**	**0.020**	**23.0**
Maximum Individual HAP (tpy)	--	--	**Methanol**	**Hydrochloric acid**	**Hexane**	**Methanol**	**Benzene**	**Formaldehyde**	**Methanol**	**Methanol**	**Methanol**	**Formaldehyde**	**Methanol**
Maximum Individual HAP Emissions (tpy	**--**	**--**	**2.28**	**0.065**	**0.039**	**3.94**	**0.0010**	**2.71E-04**	**0.16**	**0.33**	**0.060**	**0.013**	**6.77**

Notes:
1. Includes emissions from the dryer (ES-DRYER), green hammermills (ES-GHM-1 through 3), and dry hammermills (ES-HM-1 through -8) as well as emissions from RTO fuel usage (maximum between natural gas and propane).
2. Includes emissions from the Pellet Mills and Pellet Coolers (ES-CLR-1 through -6) as well as emissions from RTO/RCO fuel usage (maximum between natural gas and propane).
3. Chromium VI is a subset of chromium compounds, which is accounted for separately as a HAP. As such, Chromium VI is only calculated as a TAP.
4. 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.

Table 4
Green Wood Handling
IES-GWH
Enviva Pellets Sampson, LLC
Faison, Sampson 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)
IES-GWH	Purchased Bark/Fuel Chips Transfer to Outdoor Storage Area	1	48%	4.97E-05	2.35E-05	3.56E-06	25	81,640	1.2E-03	2.0E-03	5.9E-04	9.6E-04	8.9E-05	1.5E-04
	Purchased Wood Chips to Outdoor Storage Area	4	42%	6.00E-05	2.84E-05	4.30E-06	69	328,500	1.7E-02	3.9E-02	7.8E-03	1.9E-02	1.2E-03	2.8E-03
	Processed Wood Chips to Outdoor Storage Area	2	42%	6.00E-05	2.84E-05	4.30E-06	138	328,500	1.6E-02	2.0E-02	7.8E-03	9.3E-03	1.2E-03	1.4E-03
	Chip Truck Dump to Hoppers	2	42%	6.00E-05	2.84E-05	4.30E-06	69	328,500	8.3E-03	2.0E-02	3.9E-03	9.3E-03	5.9E-04	1.4E-03
								Total Emissions:	**4.3E-02**	**8.1E-02**	**2.0E-02**	**3.8E-02**	**3.0E-03**	**5.8E-03**

Notes:

1. These green wood handling emissions are representative of the fugitive emissions at the site. Note there may be multiple drop points for each type but as shown these emissions will be negligible.
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. Throughputs represent dry weight of materials, calculated based on listed material moisture contents. Hourly purchased bark throughput based on bark hog hourly throughput. Hourly purchased wood chip throughput based on weight of chips delivered to the facility. Hourly processed wood chip throughput based on log chipping hourly throughput.

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

Table 5
Storage Pile Wind Erosion
IES-GWSP-1 through 4, and IES-BFSP-1 and 2
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Source	Description	PM Emission Factor[1]		VOC Emission Factor[2]		Pile Width	Pile Length	Pile Height	Outer Surface Area of Pile[3]	Potential PM Emissions		Potential PM_{10} Emissions		Potential $PM_{2.5}$ Emissions		Potential VOC Emissions as propane[4]	
		(lb/day/acre)	($lb/hr/ft^2$)	(lb/day/acre)	($lb/hr/ft^2$)	(ft)	(ft)	(ft)	(ft^2)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
IES-GWSP-1	Green Wood Storage Pile No. 1	9.8	9.4E-06	3.6	3.4E-06	100	310	30	66,720	0.63	2.7	0.31	1.4	4.7E-02	0.21	0.28	1.2
IES-GWSP-2	Green Wood Storage Pile No. 2	9.8	9.4E-06	3.6	3.4E-06	100	310	30	66,720	0.63	2.7	0.31	1.4	4.7E-02	0.21	0.28	1.2
IES-GWSP-3	Green Wood Storage Pile No. 3	9.8	9.4E-06	3.6	3.4E-06	220	310	30	120,000	1.1	4.9	0.56	2.5	8.5E-02	0.37	0.50	2.2
IES-GWSP-4	Green Wood Storage Pile No. 4	9.8	9.4E-06	3.6	3.4E-06	220	310	30	120,000	1.1	4.9	0.56	2.5	8.5E-02	0.37	0.50	2.2
IES-BFSP-1	Bark Fuel Storage Pile No. 1	9.8	9.4E-06	3.6	3.4E-06	60	100	15	12,960	0.12	0.53	6.1E-02	0.27	9.1E-03	4.0E-02	5.4E-02	0.24
IES-BFSP-2	Bark Fuel Storage Pile No. 2	9.8	9.4E-06	3.6	3.4E-06	25	25	15	2,550	2.4E-02	0.10	1.2E-02	5.2E-02	1.8E-03	7.9E-03	1.1E-02	4.7E-02
									Total Emissions:	**3.7**	**16**	**1.8**	**8.0**	**0.27**	**1.2**	**1.6**	**7.2**

Notes:

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

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

where:	s, silt content of wood chips (%):	8.4	s - silt content (%) for lumber sawmills (mean) from AP-42, Section 13.2.2 - Unpaved Roads, 11/06, Table 13.2.2-1
	p, number of days with rainfall greater than 0.01 inch:	120	Based on AP-42, Section 13.2.2 - Unpaved Roads, 11/06, Figure 13.2.1-2.
	f (time that wind exceeds 5.36 m/s - 12 mph) (%):	14.8	Based on meteorological data averaged for 2007-2011 for Sampson, NC.
	PM_{10}/TSP ratio:	50%	PM_{10} is assumed to equal 50% of TSP based on U.S. EPA Control of Open Fugitive Dust Sources, Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988.
	$PM_{2.5}$/TSP ratio:	7.5%	$PM_{2.5}$ is assumed to equal 7.5 % of TSP U.S. EPA Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors. November 2006.

2. Emission factors obtained from NCASI document provided by the South Carolina Department of Health and Environmental Control (DHEC) for the calculation of fugitive VOC emissions from Douglas Fir wood storage piles. Emission factors ranged from 1.6 to 3.6 lb C/acre-day. Enviva chose to employ the maximum emission factor for purposes of conservatism.
3. The surface area is calculated as [2*H*L+2*W*H+L*W] + 20% to consider the sloping pile edges. Length and width based on proposed site design with a conservative height.
4. Emissions are calculated in tons of carbon per year by the following formula:

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

   Emission factor converted from as carbon to as propane by multiplying by 1.22.

Abbreviations:

EPA - Environmental Protection Agency
ft - feet
ft^2 - square feet
lb - pound
mph - miles per hour
NC - North Carolina
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
TSP - total suspended particulate
yr - year
VOC - volatile organic compound

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

Calculation Basis

Hourly Throughput[1]	275 ton/hr
Annual Throughput[1]	1,133,325 ton/yr

Potential Criteria Pollutant Emissions

Source	Pollutant	Emission Factor (lb/ton)	Potential Emissions	
			(lb/hr)	(tpy)
IES-DEBARK-1	TSP[2]	2.0E-02	0.55	1.1
	PM_{10}[2]	1.1E-02	0.30	0.62

Notes:

1. Hourly bark hog throughput data provided by Enviva (email from Kai Simonsen dated 12/21/17). Annual throughput of logs delivered for debarking, as reported for log chipping. Per 12/21/17 email from Enviva, 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. PM emissions are assumed to be controlled due to the debarker being partially enclosed (assumed 90% control).

Abbreviations:

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

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

Calculation Basis

Hourly Throughput[1]	50 ton/hr, wet
	25 ODT/hr
Annual Throughput[2]	119,455 ODT/yr
	238,909 ton/yr, wet
Approx. Moisture Content[1]	50% of total weight

Potential Criteria Pollutant Emissions

Pollutant	Emission Factor	Potential Emissions	
		(lb/hr)	(tpy)
THC as carbon[3]	4.1E-03 lb/ODT	0.10	0.24
VOC as propane[4]	5.0E-03 lb/ODT	0.13	0.30
Methanol[3]	1.0E-03 lb/ODT	2.5E-02	6.0E-02
TSP[5]	2.0E-02 lb/ton	0.10	0.24
PM_{10}[5]	1.1E-02 lb/ton	5.5E-02	0.13

Notes:

1. Hourly bark hog throughput data and approximate moisture content provided by Enviva (email from Kai Simonsen dated 12/21/17).
2. Maximum throughput assumes similar bark hog usage is proportional to the amount of log chipping that occurs for maximum pellet ODT and maximum 75% purchase of greenwood from logs.
3. 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.
4. Emission factor for VOC as propane is from AP-42, Section 10.6.3., Medium Density Fiberboard, 08/02, Table 7. VOC as propane = (1.22 x THC) + formaldehyde - (acetone+methane+methylene chloride). A value of zero is used for specified compounds where no emission factor is available or where the emission factor is reported only as "BDL" as indicated in AP-42, Section 10.6.3.
5. 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

Table 8
Log Chipping Potential Emissions
IES-CHIP-1
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Calculation Basis

Hourly Throughput[1]	275 ton/hr, wet
	138 ODT/hr
Maximum Pellet Production	657,000 ODT/yr

Potential Criteria Pollutant Emissions

Pollutant	Emission Factor	Potential Emissions	
		(lb/hr)	(tpy)
THC as carbon[2]	4.1E-03 lb/ODT	0.56	1.3
VOC as propane[3]	5.0E-03 lb/ODT	0.69	1.6
Methanol[2]	1.0E-03 lb/ODT	0.14	0.33

Notes:

1. Hourly chipper throughput data provided by Enviva (email from Kai Simonsen dated 12/21/17).
2. 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.
3. Emission factor for VOC as propane is from AP-42, Section 10.6.3., Medium Density Fiberboard, 08/02, Table 7. VOC as propane = (1.22 x THC) + formaldehyde - (acetone+methane+methylene chloride). A value of zero is used for specified compounds where no emission factor is available or where the emission factor is reported only as "BDL" as indicated in AP-42, Section 10.6.3.

Abbreviations:

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

Table 9
Dryer, Green Hammermill, and Dry Hammermill Potential Emissions at Outlet of RTO Stack
ES-DRYER, ES-GHM-1 through -3, and ES-HM-1 through -8 (CD-WESP, CD-RTO)
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Calculation Basis

Hourly Throughput	120 ODT/hr
Annual Throughput	657,000 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
Total RTO/RCO Heat Input	45.2 MMBtu/hr
RTO Fuel Type	Natural Gas or Propane
RTO control efficiency	95%
WESP control efficiency	92.75%

Total Potential Emissions at RTO Stack

Pollutant	Potential Emissions[1]	
	(lb/hr)	(tpy)
CO	34.3	93.8
NO_X	34.3	93.8
SO_2	6.26	27.4
VOC	22.2	60.8
Total PM	13.5	37.6
Total PM_{10}	12.5	34.8
Total $PM_{2.5}$	11.5	31.7
CO_2e	93,600	256,230
Total HAP	5.10	15.7
Total TAP	3.76	12.2

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

Potential Criteria Pollutant and Greenhouse Gas Emissions from Dryer/Furnace, Green Hammermills, and RTO Fuel Combustion

Pollutant	Emission Factor	Units	Potential Emissions[1]	
			(lb/hr)	(tpy)
CO	0.28	lb/ODT[2]	34.2	93.5
NO_X	0.28	lb/ODT[2]	34.1	93.5
SO_2	0.025	lb/MMBtu[3]	6.26	27.4
VOC	0.15	lb/ODT[4]	18.5	50.6
PM (Filterable + Condensable)	0.11	lb/ODT[5]	13.2	36.3
PM_{10} (Filterable + Condensable)	0.10	lb/ODT[5]	12.2	33.5
$PM_{2.5}$ (Filterable + Condensable)	0.095	lb/ODT[5]	11.4	31.2
CO_2	780	lb/ODT[6]	93,600	256,230

Notes:
1. Exhaust from the dryer (ES-DRYER), green hammermills (ES-GHM-1 through -3), and dry Hammermills (ES-HM-1 through -8) are routed to a WESP and then RTO for control of VOC and particulates. Additional emissions resulting from the dry hammermills are shown in the tables below.
2. Emission factor based on Sampson December 2019 compliance test average results plus 50% contingency.
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. VOC emission factor was derived based on process information and an appropriate contingency based on engineering judgement.
5. Emission factor based on Sampson December 2019 compliance test average results plus 20% contingency.
6. 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 Sampson uses a combination of hardwood and softwood and the hardwood emission factor is greater than the softwood emission factor.

Table 9
Dryer, Green Hammermill, and Dry Hammermill Potential Emissions at Outlet of RTO Stack
ES-DRYER, ES-GHM-1 through -3, and ES-HM-1 through -8 (CD-WESP, CD-RTO)
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Potential VOC Emissions from Dry Hammermills

Pollutant	Controlled Emission Factor	Units	Potential Emissions[1]	
			Hourly (lb/hr)	Annual (tpy)
VOC	0.031	lb/ODT[2]	3.73	10.2

Notes:
1. VOC emissions from the dry hammermill baghouses (ES-DHM-1 through 8) will be controlled by the RTO (CD-RTO).
2. Emission factor based on Sampson December 2019 compliance test average result, adjusted for pine percentage plus 20% contingency.

Potential Particulate Emissions from Dry Hammermills

Pollutant	Exhaust Flow Rate[1]	Exit Grain Loading[2,3]	Potential Emissions[4]	
	(cfm)	(gr/cf)	(lb/hr)	(tpy)
PM (Filterable)	120,000	0.004	0.30	1.31
PM_{10} (Filterable)		0.004	0.30	1.31
$PM_{2.5}$ (Filterable)		0.0016	0.12	0.52

Notes:
1. Total flow rate (scfm) from all 8 dry hammermill baghouses (CD-HM-BH1 through -BH8). Individual control device flowrate of 15,000 scfm was provided by design engineering firm (Mid-South Engineering Co.).
2. No speciation data is available for PM_{10}. Therefore, it is conservatively assumed to be equal to total PM.
3. $PM_{2.5}$ speciation (40% of total PM) based on a review of NCASI particle size distribution data for similar baghouses used in the wood products industry.
4. A 92.75% control efficiency is applied for the WESP (CD-WESP).

Thermally Generated Potential Criteria Pollutant Emissions from Dry Hammermills[1]

Maximum high heating value of VOC constituents	0.018 MMBtu/lb
Uncontrolled VOC emissions	204 tons/yr
Uncontrolled VOC emissions	75 lb/hr
Heat input of uncontrolled VOC emissions	7,552 MMBtu/yr
Heat input of uncontrolled VOC emissions	1.38 MMBtu/hr

Pollutant	Emission Factor[2]	Units	Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
CO	0.082	lb/MMBtu	0.11	0.31
NO_X	0.10	lb/MMBtu	0.14	0.37

Notes:
1. Emissions of CO and NO_X will be generated during combustion of VOC emissions by the RTO.
2. 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.

Table 9
Dryer, Green Hammermill, and Dry Hammermill Potential Emissions at Outlet of RTO Stack
ES-DRYER, ES-GHM-1 through -3, and ES-HM-1 through -8 (CD-WESP, CD-RTO)
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							(lb/hr)	(tpy)
Furnace Biomass Combustion, Dryer, Green Hammermills, and Dry Hammermills								
Acetaldehyde	Y	Y	Y	6.17E-03	lb/ODT	1	0.74	2.03
Acrolein	Y	Y	Y	6.30E-03	lb/ODT	1	0.76	2.07
Formaldehyde	Y	Y	Y	5.08E-03	lb/ODT	1	0.61	1.67
Methanol	Y	N	Y	6.93E-03	lb/ODT	1	0.83	2.28
Phenol	Y	Y	Y	4.28E-03	lb/ODT	1	0.51	1.41
Propionaldehyde	Y	N	Y	5.14E-03	lb/ODT	1	0.62	1.69
Acetophenone	Y	N	Y	3.20E-09	lb/MMBtu	2,3	4.01E-08	1.75E-07
Antimony & Compounds	Y	N	N	7.90E-06	lb/MMBtu	2,4	1.43E-04	6.28E-04
Arsenic & Compounds	Y	Y	N	2.20E-05	lb/MMBtu	2,4	3.99E-04	1.75E-03
Benzene	Y	Y	Y	4.20E-03	lb/MMBtu	2,3	5.26E-02	2.30E-01
Benzo(a)pyrene	Y	Y	Y	2.60E-06	lb/MMBtu	2,3	3.26E-05	1.43E-04
Beryllium	Y	Y	N	1.10E-06	lb/MMBtu	2,4	2.00E-05	8.75E-05
Cadmium	Y	Y	N	4.10E-06	lb/MMBtu	2,4	7.44E-05	3.26E-04
Carbon tetrachloride	Y	Y	Y	4.50E-05	lb/MMBtu	2,3	5.63E-04	2.47E-03
Chlorine	Y	Y	N	7.90E-04	lb/MMBtu	2	1.98E-01	8.66E-01
Chlorobenzene	Y	Y	Y	3.30E-05	lb/MMBtu	2,3	4.13E-04	1.81E-03
Chloroform	Y	Y	Y	2.80E-05	lb/MMBtu	2,3	3.51E-04	1.54E-03
Chromium VI	-[6]	Y	N	3.50E-06	lb/MMBtu	2,4	6.35E-05	2.78E-04
Chromium-Other compds	Y	N	N	1.75E-05	lb/MMBtu	2,4	3.18E-04	1.39E-03
Cobalt compounds	Y	N	N	6.50E-06	lb/MMBtu	2,4	1.18E-04	5.17E-04
Dichloroethane, 1,2-	Y	Y	Y	2.90E-05	lb/MMBtu	2,3	3.63E-04	1.59E-03
Dichloropropane, 1,2-	Y	N	Y	3.30E-05	lb/MMBtu	2,3	4.13E-04	1.81E-03
Dinitrophenol, 2,4-	Y	N	Y	1.80E-07	lb/MMBtu	2,3	2.25E-06	9.87E-06
Di(2-ethylhexyl)phthalate	Y	Y	Y	4.70E-08	lb/MMBtu	2,3	5.88E-07	2.58E-06
Ethyl benzene	Y	N	Y	3.10E-05	lb/MMBtu	2,3	3.88E-04	1.70E-03
Hexachlorodibenzo-p-dioxin	N	Y	Y	1.60E-06	lb/MMBtu	2,3	2.00E-05	8.77E-05
Hydrochloric acid	Y	Y	N	1.90E-02	lb/MMBtu	2,6	4.76E-01	2.08E+00
Lead and Lead compounds	Y	N	N	4.80E-05	lb/MMBtu	2,4	8.71E-04	3.82E-03
Manganese & compounds	Y	Y	N	1.60E-03	lb/MMBtu	2,4	2.90E-02	1.27E-01
Mercury	Y	Y	N	3.50E-06	lb/MMBtu	2,4	6.35E-05	2.78E-04
Methyl bromide	Y	N	Y	1.50E-05	lb/MMBtu	2,3	1.88E-04	8.23E-04
Methyl chloride	Y	N	Y	2.30E-05	lb/MMBtu	2,3	2.88E-04	1.26E-03
Methyl ethyl ketone	N	Y	Y	5.40E-06	lb/MMBtu	2,3	6.76E-05	2.96E-04
Methylene chloride	Y	Y	Y	2.90E-04	lb/MMBtu	2,3	3.63E-03	1.59E-02
Naphthalene	Y	N	Y	9.70E-05	lb/MMBtu	2,3	1.21E-03	5.32E-03
Nickel	Y	Y	N	3.30E-05	lb/MMBtu	2,4	5.99E-04	2.62E-03
Nitrophenol, 4-	Y	N	Y	1.10E-07	lb/MMBtu	2,3	1.38E-06	6.03E-06
Pentachlorophenol	Y	Y	N	5.10E-08	lb/MMBtu	2	1.28E-05	5.59E-05
Perchloroethylene	Y	Y	N	3.80E-05	lb/MMBtu	2	9.52E-03	4.17E-02
Phosphorus Metal, Yellow or White	Y	N	N	2.70E-05	lb/MMBtu	2,4	4.90E-04	2.15E-03
Polychlorinated biphenyls	Y	Y	Y	8.15E-09	lb/MMBtu	2,3	1.02E-07	4.47E-07
Polycyclic Organic Matter	Y	N	N	1.25E-04	lb/MMBtu	2	3.13E-02	1.37E-01
Selenium compounds	Y	N	N	2.80E-06	lb/MMBtu	2,4	5.08E-05	2.23E-04
Styrene	Y	Y	Y	1.90E-03	lb/MMBtu	2,3	2.38E-02	1.04E-01
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	Y	8.60E-12	lb/MMBtu	2,3	1.08E-10	4.72E-10
Toluene	Y	Y	Y	9.20E-04	lb/MMBtu	2,3	1.15E-02	5.05E-02
Trichloroethane, 1,1,1-	Y	Y	N	3.10E-05	lb/MMBtu	2	7.76E-03	3.40E-02
Trichloroethylene	Y	Y	Y	3.00E-05	lb/MMBtu	2,3	3.76E-04	1.65E-03
Trichlorofluoromethane	N	Y	Y	4.10E-05	lb/MMBtu	2,3	5.13E-04	2.25E-03
Trichlorophenol, 2,4,6-	Y	N	Y	2.20E-08	lb/MMBtu	2,3	2.75E-07	1.21E-06
Vinyl chloride	Y	Y	Y	1.80E-05	lb/MMBtu	2,3	2.25E-04	9.87E-04
Xylene	Y	Y	Y	2.50E-05	lb/MMBtu	2,3	3.13E-04	1.37E-03
						Total HAP Emissions:	**4.92**	**14.9**
						Total TAP Emissions:	**3.44**	**10.75**

Table 9
Dryer, Green Hammermill, and Dry Hammermill Potential Emissions at Outlet of RTO Stack
ES-DRYER, ES-GHM-1 through -3, and ES-HM-1 through -8 (CD-WESP, CD-RTO)
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							(lb/hr)	(tpy)
RTO Burners - Natural Gas/Propane Combustion								
2-Methylnaphthalene	Y	N	Y	2.40E-05	lb/MMscf	7	1.06E-06	4.66E-06
3-Methylchloranthrene	Y	N	Y	1.80E-06	lb/MMscf	7	7.98E-08	3.49E-07
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.60E-05	lb/MMscf	7	7.09E-07	3.11E-06
Acenaphthene	Y	N	Y	1.80E-06	lb/MMscf	7	7.98E-08	3.49E-07
Acenaphthylene	Y	N	Y	1.80E-06	lb/MMscf	7	7.98E-08	3.49E-07
Acetaldehyde	Y	Y	Y	1.52E-05	lb/MMscf	7	6.74E-07	2.95E-06
Acrolein	Y	Y	Y	1.80E-05	lb/MMscf	7	7.98E-07	3.49E-06
Ammonia	N	Y	N	3.2	lb/MMscf	7	1.42E-01	6.21E-01
Anthracene	Y	N	Y	2.40E-06	lb/MMscf	7	1.06E-07	4.66E-07
Arsenic & Compounds	Y	Y	N	2.00E-04	lb/MMscf	7	8.86E-06	3.88E-05
Benz(a)anthracene	Y	N	Y	1.80E-06	lb/MMscf	7	7.98E-08	3.49E-07
Benzene	Y	Y	Y	7.10E-04	lb/MMBtu	8	3.21E-02	1.41E-01
Benzo(a)pyrene	Y	Y	Y	1.20E-06	lb/MMscf	7	5.32E-08	2.33E-07
Benzo(b)fluoranthene	Y	N	Y	1.80E-06	lb/MMscf	7	7.98E-08	3.49E-07
Benzo(g,h,i)perylene	Y	N	Y	1.20E-06	lb/MMscf	7	5.32E-08	2.33E-07
Benzo(k)fluoranthene	Y	N	Y	1.80E-06	lb/MMscf	7	7.98E-08	3.49E-07
Beryllium	Y	Y	N	1.20E-05	lb/MMscf	7	5.32E-07	2.33E-06
Cadmium	Y	Y	N	1.10E-03	lb/MMscf	7	4.87E-05	2.14E-04
Chromium VI	Y	N	N	1.40E-03	lb/MMscf	7	6.20E-05	2.72E-04
Chrysene	Y	N	Y	1.80E-06	lb/MMscf	7	7.98E-08	3.49E-07
Cobalt	Y	N	N	8.40E-05	lb/MMscf	7	3.72E-06	1.63E-05
Dibenzo(a,h)anthracene	Y	N	Y	1.20E-06	lb/MMscf	7	5.32E-08	2.33E-07
Dichlorobenzene	Y	Y	Y	1.20E-03	lb/MMscf	7	5.32E-05	2.33E-04
Fluoranthene	Y	N	Y	3.00E-06	lb/MMscf	7	1.33E-07	5.82E-07
Fluorene	Y	N	Y	2.80E-06	lb/MMscf	7	1.24E-07	5.43E-07
Formaldehyde	Y	Y	Y	1.51E-03	lb/MMBtu	8	6.83E-02	2.99E-01
Hexane	Y	Y	Y	1.8	lb/MMscf	7	7.98E-02	3.49E-01
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.80E-06	lb/MMscf	7	7.98E-08	3.49E-07
Lead	Y	N	N	5.00E-04	lb/MMscf	7	2.22E-05	9.70E-05
Manganese	Y	Y	N	3.80E-04	lb/MMscf	7	1.68E-05	7.38E-05
Mercury	Y	Y	N	2.60E-04	lb/MMscf	7	1.15E-05	5.05E-05
Naphthalene	Y	N	Y	6.10E-04	lb/MMscf	7	2.70E-05	1.18E-04
Nickel	Y	Y	N	2.10E-03	lb/MMscf	7	9.31E-05	4.08E-04
Polycyclic Organic Matter	Y	Y	Y	4.00E-05	lb/MMBtu	8,9	1.81E-03	7.92E-03
Phenanthrene	Y	N	Y	1.70E-05	lb/MMscf	7	7.53E-07	3.30E-06
Pyrene	Y	N	Y	5.00E-06	lb/MMscf	7	2.22E-07	9.70E-07
Selenium	Y	N	N	2.40E-05	lb/MMscf	7	1.06E-06	4.66E-06
Toluene	Y	Y	Y	3.40E-03	lb/MMscf	7	1.51E-04	6.60E-04
						Total HAP Emissions:	**0.18**	**0.80**
						Total TAP Emissions:	**0.32**	**1.42**

Notes:

1. Emission factors derived based on Sampson December 2019 compliance test, process information, and an appropriate contingency based on engineering judgement. Emission factors represent controlled emissions.
2. Emission factors for wood combustion in a stoker boiler from NCDAQ Wood Waste Combustion Spreadsheet/AP-42, Fifth Edition, Volume 1, Chapter 1.6 - Wood Residue Combustion in Boilers, 09/03.
3. The control efficiency of 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 chromium compounds, which is accounted for separately as a HAP. As such, Chromium VI is only calculated as a TAP.
6. The WESP employs a caustic solution in its operation in which hydrochloric acid will have high water solubility. This caustic solution will neutralize the acid and effectively control it by 90%, per conversation on October 18, 2011 with Steven A. Jaasund, P.E. of Lundberg Associates, a manufacturer of WESPs.
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 from SCAQMD's AER Reporting 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.

Table 9
Dryer, Green Hammermill, and Dry Hammermill Potential Emissions at Outlet of RTO Stack
ES-DRYER, ES-GHM-1 through -3, and ES-HM-1 through -8 (CD-WESP, CD-RTO)
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Abbreviations:

HAP - hazardous air pollutant
hr - hour
lb - pound
LPG - liquefied petroleum gas
MMBtu - Million British thermal units
NCDAQ - North Carolina Division of Air Quality
CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
cf - cubic feet
cfm - cubic feet per minute
gr - grain
kg - kilogram
NO_X - nitrogen oxides
N_2O - nitrous oxide
NCASI - National Council for Air and Stream Improvement, Inc.
RTO - regenerative thermal oxidizer
ODT - oven dried tons
PAH - polycyclic aromatic hydrocarbons
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
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
SCAQMD - South Coast Air Quality Management District
SO_2 - sulfur dioxide
yr - year

Table 10a
Potential Emissions from Furnace and Dryer Bypass (Cold Start-up)[1]
ES-FBYPASS and ES-DYBPASS
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Calculation Basis

Hourly Heat Input Capacity	37.6 MMBtu/hr
Annual Heat Input Capacity	1,878 MMBtu/yr
Hours of Operation[1]	50 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions

Pollutant	Emission Factor	Units	Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
CO	0.60	lb/MMBtu[2]	22.5	0.56
NO_X	0.22	lb/MMBtu[2]	8.26	0.21
SO_2	0.025	lb/MMBtu[2]	0.94	0.023
VOC	0.017	lb/MMBtu[2]	0.64	0.016
Total PM	0.58	lb/MMBtu[2]	21.7	0.54
Total PM_{10}	0.52	lb/MMBtu[2]	19.4	0.49
Total $PM_{2.5}$	0.45	lb/MMBtu[2]	16.8	0.42
CO_2	93.8	kg/MMBtu[3]	7,767	194
CH_4	0.0072	kg/MMBtu[3]	0.596	0.015
N_2O	0.0036	kg/MMBtu[3]	0.298	0.0075
CO_2e			7,871	197

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. CO, NO_X, SO_2, PM, PM_{10}, $PM_{2.5}$, and VOC emission rates based on AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03 for bark/bark and wet wood/wet wood-fired boilers. PM, PM_{10}, and $PM_{2.5}$ factors equal to the sum of the filterable and condensible factors from Table 1.6-1.
3. Emission factors for biomass combustion from Table C-1 and C-2 of 40 CFR Part 98 and Global Warming Potentials from Table A-1.

Table 10a
Potential Emissions from Furnace and Dryer Bypass (Cold Start-up)
ES-FBYPASS and ES-DYBPASS
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Potential HAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor[1]	Units	Potential Emissions	
						Hourly (lb/hr)	Annual (tpy)
Acetaldehyde	Y	Y	Y	8.30E-04	lb/MMBtu	3.12E-02	7.79E-04
Acrolein	Y	Y	Y	4.00E-03	lb/MMBtu	1.50E-01	3.76E-03
Formaldehyde	Y	Y	Y	4.40E-03	lb/MMBtu	1.65E-01	4.13E-03
Phenol	Y	Y	Y	5.10E-05	lb/MMBtu	1.92E-03	4.79E-05
Propionaldehyde	Y	N	Y	6.10E-05	lb/MMBtu	2.29E-03	5.73E-05
Acetophenone	Y	N	Y	3.20E-09	lb/MMBtu	1.20E-07	3.00E-09
Antimony & Compounds	Y	N	N	7.90E-06	lb/MMBtu	2.97E-04	7.42E-06
Arsenic & Compounds	Y	Y	N	2.20E-05	lb/MMBtu	8.26E-04	2.07E-05
Benzene	Y	Y	Y	4.20E-03	lb/MMBtu	1.58E-01	3.94E-03
Benzo(a)pyrene	Y	Y	Y	2.60E-06	lb/MMBtu	9.77E-05	2.44E-06
Beryllium	Y	Y	N	1.10E-06	lb/MMBtu	4.13E-05	1.03E-06
Cadmium	Y	Y	N	4.10E-06	lb/MMBtu	1.54E-04	3.85E-06
Carbon tetrachloride	Y	Y	Y	4.50E-05	lb/MMBtu	1.69E-03	4.23E-05
Chlorine	Y	Y	N	7.90E-04	lb/MMBtu	2.97E-02	7.42E-04
Chlorobenzene	Y	Y	Y	3.30E-05	lb/MMBtu	1.24E-03	3.10E-05
Chloroform	Y	Y	Y	2.80E-05	lb/MMBtu	1.05E-03	2.63E-05
Chromium VI	-[2]	Y	N	3.50E-06	lb/MMBtu	1.31E-04	3.29E-06
Chromium-Other compds	Y	N	N	1.75E-05	lb/MMBtu	6.57E-04	1.64E-05
Cobalt compounds	Y	N	N	6.50E-06	lb/MMBtu	2.44E-04	6.10E-06
Dichloroethane, 1,2-	Y	Y	Y	2.90E-05	lb/MMBtu	1.09E-03	2.72E-05
Dichloropropane, 1,2-	Y	N	Y	3.30E-05	lb/MMBtu	1.24E-03	3.10E-05
Dinitrophenol, 2,4-	Y	N	Y	1.80E-07	lb/MMBtu	6.76E-06	1.69E-07
Di(2-ethylhexyl)phthalate	Y	Y	Y	4.70E-08	lb/MMBtu	1.77E-06	4.41E-08
Ethyl benzene	Y	N	Y	3.10E-05	lb/MMBtu	1.16E-03	2.91E-05
Hexachlorodibenzo-p-dioxin	N	Y	Y	1.60E-06	lb/MMBtu	6.01E-05	1.50E-06
Hydrochloric acid	Y	Y	N	1.90E-02	lb/MMBtu	7.14E-01	1.78E-02
Lead and Lead compounds	Y	N	N	4.80E-05	lb/MMBtu	1.80E-03	4.51E-05
Manganese & compounds	Y	Y	N	1.60E-03	lb/MMBtu	6.01E-02	1.50E-03
Mercury	Y	Y	N	3.50E-06	lb/MMBtu	1.31E-04	3.29E-06
Methyl bromide	Y	N	Y	1.50E-05	lb/MMBtu	5.63E-04	1.41E-05
Methyl chloride	Y	N	Y	2.30E-05	lb/MMBtu	8.64E-04	2.16E-05
Methyl ethyl ketone	N	Y	Y	5.40E-06	lb/MMBtu	2.03E-04	5.07E-06
Methylene chloride	Y	Y	Y	2.90E-04	lb/MMBtu	1.09E-02	2.72E-04
Naphthalene	Y	N	Y	9.70E-05	lb/MMBtu	3.64E-03	9.11E-05
Nickel	Y	Y	N	3.30E-05	lb/MMBtu	1.24E-03	3.10E-05
Nitrophenol, 4-	Y	N	Y	1.10E-07	lb/MMBtu	4.13E-06	1.03E-07
Pentachlorophenol	Y	Y	N	5.10E-08	lb/MMBtu	1.92E-06	4.79E-08
Perchloroethylene	Y	Y	N	3.80E-05	lb/MMBtu	1.43E-03	3.57E-05
Phosphorus Metal, Yellow or White	Y	N	N	2.70E-05	lb/MMBtu	1.01E-03	2.54E-05
Polychlorinated biphenyls	Y	Y	Y	8.15E-09	lb/MMBtu	3.06E-07	7.65E-09
Polycyclic Organic Matter	Y	N	N	1.25E-04	lb/MMBtu	4.69E-03	1.17E-04
Selenium compounds	Y	N	N	2.80E-06	lb/MMBtu	1.05E-04	2.63E-06
Styrene	Y	Y	Y	1.90E-03	lb/MMBtu	7.14E-02	1.78E-03
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	Y	8.60E-12	lb/MMBtu	3.23E-10	8.08E-12
Toluene	Y	Y	Y	9.20E-04	lb/MMBtu	3.46E-02	8.64E-04
Trichloroethane, 1,1,1-	Y	Y	N	3.10E-05	lb/MMBtu	1.16E-03	2.91E-05
Trichloroethylene	Y	Y	Y	3.00E-05	lb/MMBtu	1.13E-03	2.82E-05
Trichlorofluoromethane	N	Y	Y	4.10E-05	lb/MMBtu	1.54E-03	3.85E-05
Trichlorophenol, 2,4,6-	Y	N	Y	2.20E-08	lb/MMBtu	8.26E-07	2.07E-08
Vinyl chloride	Y	Y	Y	1.80E-05	lb/MMBtu	6.76E-04	1.69E-05
Xylene	Y	Y	Y	2.50E-05	lb/MMBtu	9.39E-04	2.35E-05
Total HAP Emissions (biomass combustion)						**1.45**	**0.036**
Total TAP Emissions (biomass combustion)						**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.
2. Chromium VI is a subset of chromium compounds, which is accounted for separately as a HAP. As such, Chromium VI is only calculated as a TAP.

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Table 10a
otential Emissions from Furnace and Dryer Bypass (Cold Start-up)
ES-FBYPASS and ES-DYBPASS
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
kg - kilogram
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
tpy - tons per year
VOC - volatile organic compound
yr - year

Table 10b
Potential Emissions from Furnace and Dryer Bypass (Idle Mode)[1]
ES-FBYPASS and ES-DBYPASS
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Calculation Basis

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

Potential Criteria Pollutant and Greenhouse Gas Emissions

Pollutant	Emission Factor	Units	Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
CO	0.60	lb/MMBtu[2]	6.00	1.50
NO_x	0.22	lb/MMBtu[2]	2.20	0.55
SO_2	0.025	lb/MMBtu[2]	0.25	0.063
VOC	0.017	lb/MMBtu[2]	0.17	0.043
Total PM	0.58	lb/MMBtu[2]	5.77	1.44
Total PM_{10}	0.52	lb/MMBtu[2]	5.17	1.29
Total $PM_{2.5}$	0.45	lb/MMBtu[2]	4.47	1.12
CO_2	93.8	kg/MMBtu[3]	2,068	517
CH_4	0.0072	kg/MMBtu[3]	0.16	0.040
N_2O	0.0036	kg/MMBtu[3]	0.079	0.020
CO_2e			2,096	524

Notes:

1. The furnace can operate up to 500 hours per year in "idle mode" using the furnace bypass stack. Idle mode is defined as operation at up to a maximum heat input rate of 10 MMBtu/hr.
2. CO, NO_x, SO_2, PM, PM_{10}, $PM_{2.5}$, and VOC emission rates based on AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03 for bark/bark and wet wood/wet wood-fired boilers. PM, PM_{10}, and $PM_{2.5}$ factors equal to the sum of the filterable and condensable factors from Table 1.6-1.
3. Emission factors for biomass combustion (dryer) from Table C-1 and C-2 of 40 CFR Part 98 and Global Warming Potentials from Table A-1.

Table 10b
Potential Emissions from Furnace and Dryer Bypass (Idle Mode)
ES-FBYPASS and ES-DBYPASS
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Potential HAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor[1]	Units	Potential Emissions	
						Hourly (lb/hr)	Annual (tpy)
Acetaldehyde	Y	Y	Y	8.30E-04	lb/MMBtu	8.30E-03	2.08E-03
Acrolein	Y	Y	Y	4.00E-03	lb/MMBtu	4.00E-02	1.00E-02
Formaldehyde	Y	Y	Y	4.40E-03	lb/MMBtu	4.40E-02	1.10E-02
Phenol	Y	Y	Y	5.10E-05	lb/MMBtu	5.10E-04	1.28E-04
Propionaldehyde	Y	N	Y	6.10E-05	lb/MMBtu	6.10E-04	1.53E-04
Acetophenone	Y	N	Y	3.20E-09	lb/MMBtu	3.20E-08	8.00E-09
Antimony & Compounds	Y	N	N	7.90E-06	lb/MMBtu	7.90E-05	1.98E-05
Arsenic & Compounds	Y	Y	N	2.20E-05	lb/MMBtu	2.20E-04	5.50E-05
Benzene	Y	Y	Y	4.20E-03	lb/MMBtu	4.20E-02	1.05E-02
Benzo(a)pyrene	Y	Y	Y	2.60E-06	lb/MMBtu	2.60E-05	6.50E-06
Beryllium	Y	Y	N	1.10E-06	lb/MMBtu	1.10E-05	2.75E-06
Cadmium	Y	Y	N	4.10E-06	lb/MMBtu	4.10E-05	1.03E-05
Carbon tetrachloride	Y	Y	Y	4.50E-05	lb/MMBtu	4.50E-04	1.13E-04
Chlorine	Y	Y	N	7.90E-04	lb/MMBtu	7.90E-03	1.98E-03
Chlorobenzene	Y	Y	Y	3.30E-05	lb/MMBtu	3.30E-04	8.25E-05
Chloroform	Y	Y	Y	2.80E-05	lb/MMBtu	2.80E-04	7.00E-05
Chromium VI	-[2]	Y	N	3.50E-06	lb/MMBtu	3.50E-05	8.75E-06
Chromium-Other compds	Y	N	N	1.75E-05	lb/MMBtu	1.75E-04	4.38E-05
Cobalt compounds	Y	N	N	6.50E-06	lb/MMBtu	6.50E-05	1.63E-05
Dichloroethane, 1,2-	Y	Y	Y	2.90E-05	lb/MMBtu	2.90E-04	7.25E-05
Dichloropropane, 1,2-	Y	N	Y	3.30E-05	lb/MMBtu	3.30E-04	8.25E-05
Dinitrophenol, 2,4-	Y	N	Y	1.80E-07	lb/MMBtu	1.80E-06	4.50E-07
Di(2-ethylhexyl)phthalate	Y	Y	Y	4.70E-08	lb/MMBtu	4.70E-07	1.18E-07
Ethyl benzene	Y	N	Y	3.10E-05	lb/MMBtu	3.10E-04	7.75E-05
Hexachlorodibenzo-p-dioxin	N	Y	Y	1.60E-06	lb/MMBtu	1.60E-05	4.00E-06
Hydrochloric acid	Y	Y	N	1.90E-02	lb/MMBtu	1.90E-01	4.75E-02
Lead and Lead compounds	Y	N	N	4.80E-05	lb/MMBtu	4.80E-04	1.20E-04
Manganese & compounds	Y	Y	N	1.60E-03	lb/MMBtu	1.60E-02	4.00E-03
Mercury	Y	Y	N	3.50E-06	lb/MMBtu	3.50E-05	8.75E-06
Methyl bromide	Y	N	Y	1.50E-05	lb/MMBtu	1.50E-04	3.75E-05
Methyl chloride	Y	N	Y	2.30E-05	lb/MMBtu	2.30E-04	5.75E-05
Methyl ethyl ketone	N	Y	Y	5.40E-06	lb/MMBtu	5.40E-05	1.35E-05
Methylene chloride	Y	Y	Y	2.90E-04	lb/MMBtu	2.90E-03	7.25E-04
Naphthalene	Y	N	Y	9.70E-05	lb/MMBtu	9.70E-04	2.43E-04
Nickel	Y	Y	N	3.30E-05	lb/MMBtu	3.30E-04	8.25E-05
Nitrophenol, 4-	Y	N	Y	1.10E-07	lb/MMBtu	1.10E-06	2.75E-07
Pentachlorophenol	Y	Y	N	5.10E-08	lb/MMBtu	5.10E-07	1.28E-07
Perchloroethylene	Y	Y	N	3.80E-05	lb/MMBtu	3.80E-04	9.50E-05
Phosphorus Metal, Yellow or White	Y	N	N	2.70E-05	lb/MMBtu	2.70E-04	6.75E-05
Polychlorinated biphenyls	Y	Y	Y	8.15E-09	lb/MMBtu	8.15E-08	2.04E-08
Polycyclic Organic Matter	Y	N	N	1.25E-04	lb/MMBtu	1.25E-03	3.13E-04
Selenium compounds	Y	N	N	2.80E-06	lb/MMBtu	2.80E-05	7.00E-06
Styrene	Y	Y	Y	1.90E-03	lb/MMBtu	1.90E-02	4.75E-03
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	Y	8.60E-12	lb/MMBtu	8.60E-11	2.15E-11
Toluene	Y	Y	Y	9.20E-04	lb/MMBtu	9.20E-03	2.30E-03
Trichloroethane, 1,1,1-	Y	Y	N	3.10E-05	lb/MMBtu	3.10E-04	7.75E-05
Trichloroethylene	Y	Y	Y	3.00E-05	lb/MMBtu	3.00E-04	7.50E-05
Trichlorofluoromethane	N	Y	Y	4.10E-05	lb/MMBtu	4.10E-04	1.03E-04
Trichlorophenol, 2,4,6-	Y	N	Y	2.20E-08	lb/MMBtu	2.20E-07	5.50E-08
Vinyl chloride	Y	Y	Y	1.80E-05	lb/MMBtu	1.80E-04	4.50E-05
Xylene	Y	Y	Y	2.50E-05	lb/MMBtu	2.50E-04	6.25E-05
Total HAP Emissions (biomass combustion)						**0.39**	**0.097**
Total TAP Emissions (biomass combustion)						**0.38**	**0.096**

Notes:

1. Emission factors for wood combustion in a stoker boiler from AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.
2. Chromium VI is a subset of chromium compounds, which is accounted for separately as a HAP. As such, Chromium VI is only calculated as a TAP.

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Table 10b
Potential Emissions from Furnace and Dryer Bypass (Idle Mode)
ES-FBYPASS and ES-DBYPASS
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
kg - kilogram
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
tpy - tons per year
VOC - volatile organic compound
yr - year

Table 11
Potential Emissions from Double Duct Burners
IES-DDB-1 and -2
Enviva Pellets Sampson, LLC
Faison, Sampson 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 Combustion

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Hourly (lb/hr)	Annual (tpy)
CO	84.0	lb/MMscf	1	0.41	1.80
NO_X	50.0	lb/MMscf	2	0.25	1.07
SO_2	0.60	lb/MMscf	1	0.0029	0.013
VOC	5.50	lb/MMscf	1	0.027	0.12
$PM/PM_{10}/PM_{2.5}$ Condensable	5.70	lb/MMscf	1	0.028	0.12
$PM/PM_{10}/PM_{2.5}$ Filterable	1.90	lb/MMscf	1	0.0093	0.041
Total $PM/PM_{10}/PM_{2.5}$				0.037	0.16
CO_2	53.1	kg/MMBtu	3	585	2,562
CH_4	0.0010	kg/MMBtu	3	0.011	0.048
N_2O	0.0001	kg/MMBtu	3	0.0011	0.0048
CO_2e			3	585	2,564

Potential Criteria Pollutant and Greenhouse Gas Emissions - Propane Combustion

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Hourly (lb/hr)	Annual (tpy)
CO	7.50	lb/Mgal	4	0.41	1.80
NO_X	6.50	lb/Mgal	5	0.36	1.56
SO_2	0.054	lb/Mgal	4,6	0.0030	0.013
VOC	1.00	lb/Mgal	4	0.055	0.24
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	4	0.027	0.12
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	4	0.011	0.048
Total $PM/PM_{10}/PM_{2.5}$				0.038	0.17
CO_2	62.9	kg/MMBtu	3	693	3,035
CH_4	0.0030	kg/MMBtu	3	0.033	0.14
N_2O	0.0006	kg/MMBtu	3	0.0066	0.029
CO_2e			3	696	3,048

Notes:

1. Emission factors for natural gas combustion from AP-42 Section 1.4 - Natural Gas Combustion, 07/98. Natural gas heating value of 1,020 Btu/scf assumed per AP-42.
2. Emission factors for NO_X assume burners are low-NO_X burners, per email from Kai Simonsen (Enviva) on August 8, 2018.
3. Emission factors for natural gas or propane combustion 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. Propane heating value of 91.5 MMBtu/Mgal assumed per AP-42 Section 1.5.
5. 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
6. 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 11
Potential Emissions from Double Duct Burners
IES-DDB-1 and -2
Enviva Pellets Sampson, LLC
Faison, Sampson 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

Table 12
Dried Wood Handling Potential Emissions
ES-DWH
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Calculation Basis

Hourly Throughput[1]	120 ODT/hr
Annual Throughput[1]	657,000 ODT/yr

Potential Criteria Pollutant Emissions

Pollutant	Emission Factor[2] (lb/ODT)	Potential Emissions	
		(lb/hr)	(tpy)
Formaldehyde	2.16E-04	0.026	0.071
Propionaldehyde	2.10E-04	0.025	0.069
Methanol	4.92E-04	0.059	0.16
Total HAP Emissions		**0.11**	**0.30**
Total VOC	0.044	5.22	14.3

Notes:

1. Hourly and annual throughputs assumed to be the same as dryer throughput.
2. Emission factors are based on Sampson December 2019 compliance test average results plus 20% contingency. 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 13
Dry Shavings Material Handling
IES-DRYSHAVE
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Source	Transfer Activity	Number of Drop Points	Material Moisture Content[1]	PM Emission Factor[2]	PM_{10} Emission Factor[2]	$PM_{2.5}$ Emission Factor[2]	Potential Throughput[3,4]		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)
IES-DRYSHAVE	Dry Shavings Material Handling - Truck dump to truck dumpe	1	10%	4.5E-04	2.1E-04	3.2E-05	25	219,000	1.1E-02	4.9E-02	5.3E-03	2.3E-02	8.0E-04	3.5E-03
	Dry Shavings Material Handling - Bucket elevator to silo [5]	1	10%	4.5E-04	2.1E-04	3.2E-05	25	219,000	1.1E-03	4.9E-03	5.3E-04	2.3E-03	8.0E-05	3.5E-04
								Total Emissions:	**1.2E-02**	**5.4E-02**	**5.8E-03**	**2.5E-02**	**8.8E-04**	**3.9E-03**

Notes:

1. Moisture content for dry shavings based on information provided by Enviva.
2. Emission factor calculation based on formula from AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, Equation 13.2.1, (11/06).

where:

E = emission factor (lb/ton)	
k = particle size multiplier (dimensionless) for PM	0.74
k = particle size multiplier (dimensionless) for PM_{10}	0.35
k = particle size multiplier (dimensionless) for $PM_{2.5}$	0.053
U = mean wind speed (mph)	7.85

3. Hourly throughput based on a maximum of 25 ton/hr transfer rate pounds of dry shaving material.
4. Annual throughput based on maximum daily throughput of 600 tons/day and 365 day/yr of operation.
5. Bucket elevator to silo material handling transfer point emissions associate a 90% control efficiency due to the enclosed nature of the silo (San Diego County, 1993).

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

Table 14
Summary of Baghouse and Cyclone Potential Emissions
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Emission Unit ID	Source Description	Control Device ID	Control Device Description	Exhaust Flow Rate	Exit Grain Loading			Potential Emissions					
								PM		PM_{10}		$PM_{2.5}$	
				(cfm)	PM (gr/cf)	PM_{10} (gr/cf)	$PM_{2.5}$ (gr/cf)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
ES-HMC	Hammermill Conveying System	CD-HMC-BH	Baghouse[1, 3, 4]	1,500	0.004	0.004	0.004	0.051	0.23	0.051	0.23	0.051	0.23
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BH	Baghouse[1, 2, 3]	2,444	0.004	0.004	0.004	0.084	0.37	0.084	0.37	0.084	0.37
ES-PCHP	Pellet Cooler HP Fines Relay System	CD-PCHP-BH	Baghouse[1, 2, 3]	3,102	0.004	0.004	0.004	0.106	0.47	0.106	0.47	0.106	0.47
ES-FPH	Finished Product Handling	CD-FPH-BH	Baghouse[1, 5, 6]	8,500	0.004	0.004	0.0016	0.29	1.28	0.27	1.16	0.12	0.51
ES-PB-1 through 4	Four (4) Pellet Loadout Bins												
ES-PL-1 and 2	Two (2) Pellet Mill Loadouts												
ES-DWH	Dried Wood Handling Operations (conveyors)	CD-DWH-BH-1	Baghouse[1, 2, 3]	1,000	0.004	0.004	0.004	0.034	0.15	0.034	0.15	0.034	0.15
		CD-DWH-BH-2	Baghouse[1, 2, 3]	1,000	0.004	0.004	0.004	0.034	0.15	0.034	0.15	0.034	0.15
							Total:	**0.60**	**2.63**	**0.58**	**2.52**	**0.43**	**1.87**

Notes:

1. Control device flow rate (cfm) provided by design engineering firm (Mid-South Engineering Co.).
2. No speciation data is available for PM_{10}. Therefore, it is conservatively assumed to be equal to total PM.
3. No speciation data is available for $PM_{2.5}$. Therefore, it is conservatively assumed to be equal to total PM.
4. Exhaust flow rate provided by the vendor (WPI).
5. Finished product handling PM_{10} speciation (91% of total PM) 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.
6. Finished Product Handling $PM_{2.5}$ speciation (40% of total PM) based on a review of NCASI particle size distribution data for similar baghouses used in the wood products industry.

Abbreviations:

cf - cubic feet
cfm - cubic feet per minute
dcfm - dry 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

Table 15
Pellet Cooler and Pellet Mill Potential Emissions at Outlet of RTO/RCO Stack
ES-CLR-1 through -6 (CD-RCO)
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Calculation Basis

Hourly Throughput	120 ODT/hr
Annual Throughput	657,000 ODT/yr
Hours of Operation	8,760 hr/yr
Total RTO/RCO Heat Input	19.8 MMBtu/hr
RTO/RCO control efficiency	95%

Total Potential Emissions at RTO/RCO Stack

Pollutant	Potential Emissions[1]	
	(lb/hr)	(tpy)
CO	2.04	8.26
NO_X	3.30	13.7
SO_2	0.012	0.051
VOC	13.6	37.7
Total PM	69.8	191
Total PM_{10}	17.1	47.2
Total $PM_{2.5}$	4.37	12.2
CO_2e	2,755	12,069
Total HAP	2.28	6.36
Total TAP	0.82	2.45

Notes:
1. Total emissions from the pellet mills, pellet coolers, and natural gas/propane combustion by the RTO/RCO (gas injection and burner fuel). Detailed calculations are provided below.

Potential PM, VOC, HAP, and TAP Emissions from Pellet Mills and Pellet Coolers

Pollutant	HAP	NC TAP	VOC	Controlled Emission Factor[1]	Potential Emissions[2,3]	
				(lb/ODT)	(lb/hr)	(tpy)
Acetaldehyde	Y	Y	Y	4.2E-04	0.050	0.14
Acrolein	Y	Y	Y	2.5E-03	0.30	0.83
Formaldehyde	Y	Y	Y	1.6E-03	0.19	0.51
Methanol	Y	N	Y	1.2E-02	1.44	3.94
Phenol	Y	Y	Y	1.3E-03	0.15	0.41
Propionaldehyde	Y	N	Y	5.4E-04	0.065	0.18
				Total HAP Emissions	2.20	6.01
				Total TAP Emissions	0.69	1.89
Total VOC	--	--	--	0.11	13.4	36.7
PM (Filterable + Condensable)	--	--	--	0.58	69.6	191
PM_{10} (Filterable + Condensable)	--	--	--	0.14	17.0	46.5
$PM_{2.5}$ (Filterable + Condensable)	--	--	--	0.035	4.22	11.6

Notes:
[1] Emission factors derived based on Sampson December 2019 compliance test, process information, and an appropriate contingency based on engineering judgement. The emission factors represent post-control emissions.

[2] A 95.0% control efficiency is applied to the potential emissions for the RTO/RCO.

[3] Emissions from the pellet mills and pellet coolers will be controlled by an RCO 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 when operating in thermal mode.

Table 15
Pellet Cooler and Pellet Mill Potential Emissions at Outlet of RTO/RCO Stack
ES-CLR-1 through -6 (CD-RCO)
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Thermally Generated Potential Criteria Pollutant Emissions from Pellet Mills and Pellet Coolers[1]

Maximum high heating value of VOC constituents	0.018 MMBtu/lb
Uncontrolled VOC emissions	735 tons/yr
Uncontrolled VOC emissions	268 lb/hr
Heat input of uncontrolled VOC emissions	27,189 MMBtu/yr
Heat input of uncontrolled VOC emissions	4.97 MMBtu/hr

Pollutant	Emission Factor[2]	Units	Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
CO	0.082	lb/MMBtu	0.41	1.12
NO_X	0.10	lb/MMBtu	0.49	1.33

Notes:
1. Emissions of CO and NO_X will be generated during combustion of VOC emissions by the RTO/RCO.
2. 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 Emissions and Greenhouse Gas Emissions - Natural Gas Combustion

Pollutant	Emission Factor[1]	Units	Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
CO	0.082	lb/MMBtu	1.63	7.14
NO_X	0.10	lb/MMBtu	1.94	8.50
SO_2	5.88E-04	lb/MMBtu	0.012	0.051
VOC	5.39E-03	lb/MMBtu	0.107	0.47
Total PM	7.45E-03	lb/MMBtu	0.15	0.65
Total PM_{10}	7.45E-03	lb/MMBtu	0.15	0.65
Total $PM_{2.5}$	7.45E-03	lb/MMBtu	0.15	0.65
CO_2	53.1	kg/MMBtu[2]	2,316	10,145
CH_4	1.00E-03	kg/MMBtu[2]	0.044	0.19
N_2O	1.00E-04	kg/MMBtu[2]	0.0044	0.019
CO_2e			2,319	10,155

Potential Criteria Pollutant and Greenhouse Gas Emissions - Propane Combustion

Pollutant	Emission Factor[3]	Units	Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
CO	7.50	lb/Mgal	1.62	7.11
NO_X	13.0	lb/Mgal	2.81	12.3
SO_2	0.054	lb/Mgal	0.012	0.051
VOC	1.00	lb/Mgal	0.22	0.95
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	0.11	0.47
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	0.043	0.19
Total $PM/PM_{10}/PM_{2.5}$			0.15	0.66
CO_2	62.9	kg/MMBtu[2]	2,744	12,020
CH_4	0.0030	kg/MMBtu[2]	0.13	0.57
N_2O	0.0006	kg/MMBtu[2]	0.026	0.11
CO_2e			2,755	12,069

Table 15
Pellet Cooler and Pellet Mill Potential Emissions at Outlet of RTO/RCO Stack
ES-CLR-1 through -6 (CD-RCO)
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Natural Gas Combustion Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Hourly (lb/hr)	Annual (tpy)
Natural Gas Source								
2-Methylnaphthalene	Y	N	Y	2.40E-05	lb/MMscf	4	4.66E-07	2.04E-06
3-Methylchloranthrene	Y	N	Y	1.80E-06	lb/MMscf	4	3.49E-08	1.53E-07
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.60E-05	lb/MMscf	4	3.11E-07	1.36E-06
Acenaphthene	Y	N	Y	1.80E-06	lb/MMscf	4	3.49E-08	1.53E-07
Acenaphthylene	Y	N	Y	1.80E-06	lb/MMscf	4	3.49E-08	1.53E-07
Acetaldehyde	Y	Y	Y	1.52E-05	lb/MMscf	4	2.95E-07	1.29E-06
Acrolein	Y	Y	Y	1.80E-05	lb/MMscf	4	3.49E-07	1.53E-06
Ammonia	N	Y	N	3.2	lb/MMscf	4	6.21E-02	2.72E-01
Anthracene	Y	N	Y	2.40E-06	lb/MMscf	4	4.66E-08	2.04E-07
Arsenic & Compounds	Y	Y	N	2.00E-04	lb/MMscf	4	3.88E-06	1.70E-05
Benz(a)anthracene	Y	N	Y	1.80E-06	lb/MMscf	4	3.49E-08	1.53E-07
Benzene	Y	N	Y	7.10E-04	lb/MMBtu	5	1.41E-02	6.16E-02
Benzo(a)pyrene	Y	Y	Y	1.20E-06	lb/MMscf	4	2.33E-08	1.02E-07
Benzo(b)fluoranthene	Y	N	Y	1.80E-06	lb/MMscf	4	3.49E-08	1.53E-07
Benzo(g,h,i)perylene	Y	N	Y	1.20E-06	lb/MMscf	4	2.33E-08	1.02E-07
Benzo(k)fluoranthene	Y	N	Y	1.80E-06	lb/MMscf	4	3.49E-08	1.53E-07
Beryllium	Y	Y	N	1.20E-05	lb/MMscf	4	2.33E-07	1.02E-06
Cadmium	Y	Y	N	1.10E-03	lb/MMscf	4	2.14E-05	9.35E-05
Chromium VI	Y	N	N	1.40E-03	lb/MMscf	4	2.72E-05	1.19E-04
Chrysene	Y	N	Y	1.80E-06	lb/MMscf	4	3.49E-08	1.53E-07
Cobalt Compounds	Y	N	N	8.40E-05	lb/MMscf	4	1.63E-06	7.14E-06
Dibenzo(a,h)anthracene	Y	N	Y	1.20E-06	lb/MMscf	4	2.33E-08	1.02E-07
Dichlorobenzene	Y	Y	Y	1.20E-03	lb/MMscf	4	2.33E-05	1.02E-04
Fluoranthene	Y	N	Y	3.00E-06	lb/MMscf	4	5.82E-08	2.55E-07
Fluorene	Y	N	Y	2.80E-06	lb/MMscf	4	5.44E-08	2.38E-07
Formaldehyde	Y	Y	Y	1.50E-03	lb/MMBtu	5	2.97E-02	1.30E-01
Hexane	Y	Y	Y	1.8	lb/MMscf	4	3.49E-02	1.53E-01
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.80E-06	lb/MMscf	4	3.49E-08	1.53E-07
Lead and Lead Compounds	Y	N	N	5.00E-04	lb/MMscf	4	9.71E-06	4.25E-05
Manganese & Compounds	Y	Y	N	3.80E-04	lb/MMscf	4	7.38E-06	3.23E-05
Mercury	Y	Y	N	2.60E-04	lb/MMscf	4	5.05E-06	2.21E-05
Naphthalene	Y	N	Y	6.34E-04	lb/MMscf	4	1.23E-05	5.39E-05
Nickel	Y	Y	N	2.10E-03	lb/MMscf	4	4.08E-05	1.79E-04
Polycyclic Organic Matter	Y	N	N	4.00E-05	lb/MMBtu	5,6	7.92E-04	3.47E-03
Phenanthrene	Y	N	Y	1.70E-05	lb/MMscf	4	3.30E-07	1.45E-06
Pyrene	Y	N	Y	5.00E-06	lb/MMscf	4	9.71E-08	4.25E-07
Selenium compounds	Y	N	N	2.40E-05	lb/MMscf	4	4.66E-07	2.04E-06
Toluene	Y	Y	Y	3.40E-03	lb/MMscf	4	6.60E-05	2.89E-04
				Total HAP Emissions (natural gas combustion)			**0.080**	**0.35**
				Total TAP Emissions (natural gas combustion)			**0.127**	**0.56**

Notes:

1. Emission factors from AP-42, Section 1.4 - Natural Gas Combustion, 07/98. Emission factors converted from lb/MMscf to lb/MMBtu based on assumed heating value of 1,020 Btu/scf for natural gas per AP-42 Section 1.4.
2. Emission factors for natural gas or propane combustion from Table C-1 and C-2 of 40 CFR Part 98 and Global Warming Potentials from Table A-1.
3. 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.
4. 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.
5. The RCO burner can fire either natural gas or propane. Propane is worst-case for these HAP emissions. Emission factors for propane combustion from the South Coast Air Quality Management District's Air Emissions Reporting Tool for external combustion equipment fired with LPG.
6. The PAH emission factor for propane combustion was used to estimate emissions of Polycyclic Organic Matter.

Abbreviations:

cf - cubic feet
cfm - cubic feet per minute
NCDAQ - North Carolina Division of Air Quality
ODT - oven dried tons

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Table 15
Pellet Cooler and Pellet Mill Potential Emissions at Outlet of RTO/RCO Stack
ES-CLR-1 through -6 (CD-RCO)
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

gr - grain
HAP - hazardous air pollutant
hr - hour
kg - kilogram
lb - pound
LPG - liquified petroleum gas
MMBtu - million British thermal units
MMscf - million standard cubic feet
PAH - polycyclic aromatric hydrocarbons
RCO - regenerative catalytic oxidizer
RTO - regenerative thermal oxidizer
TAP - toxic air pollutant
tpy - tons per year
USEPA - U.S. Environmental Protection Agency
VOC - volatile organic compound
yr - year

Table 16
Emergency Generator Potential Emissions
IES-EG
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Calculation Basis

Engine Output	0.45 MW
Horsepower Rating	713 brake hp
Diesel Density[1]	7.1 lb/gal
Hours of Operation	500 hr/yr
Hourly Fuel Consumption[2]	34.8 gal/hr
Energy Input[3]	4.99 MMBtu/hr

Notes:

1. Diesel density from AP-42 Section 3.4 - Large Stationary Diesel and All Stationary Dual-fuel Engines, 10/96, Table 3.4-1, footnote a.
2. Fuel consumption obtained from generator's spec sheet, assuming 100% load.
3. Energy calculated on a brake-specific fuel consumption of 7,000 Btu/hp-hr.

Potential Criteria Pollutant Emissions

Pollutant	Emission Factor	Units	Potential Emissions[1]	
			(lb/hr)	(tpy)
CO	3.50	g/kW-hr (2)	4.10	1.03
NO_X	4.00	g/kW-hr (2)	4.69	1.17
SO_2	15	ppmw (3)	7.41E-03	1.85E-03
VOC	6.4E-04	lb/hp-hr (4)	0.46	0.11
PM	0.20	g/kW-hr (2)	0.23	0.06
PM_{10}	0.20	g/kW-hr (2)	0.23	0.06
$PM_{2.5}$	0.20	g/kW-hr (2)	0.23	0.06
CO_2	74.0	kg/MMBtu(5)	814	203
CH_4	3.0E-03	kg/MMBtu(5)	3.3E-02	8.3E-03
N_2O	6.0E-04	kg/MMBtu(5)	6.6E-03	1.7E-03
CO_2e			817	204

Notes:

1. NSPS allows for only 100 hrs/yr of non-emergency operation of these engines. Potential emissions for the emergency generator are conservatively based on 500 hr/yr at 100% load.
2. Emissions standards from NSPS Subpart IIII for emergency engines with a maximum power rating greater than 50 horsepower [§60.4202(a)(2)]. NO_X emissions are based on combined emission standard for NMHC+NO_X.
3. Sulfur content in accordance with Year 2010 standards of 40 CFR 80.510(c) as required by NSPS Subpart IIII.
4. TOC emission factor from AP-42 Section 3.4, Large Stationary Diesel and All Stationary Dual-Fuel Engines and assumes 91% is nonmethane hydrocarbons per footnote f of Table 3.4-1.
5. Emission factors from Table C-1 and C-2 of 40 CFR Part 98 and Global Warming Potentials from Table A-1.

Table 16
Emergency Generator Potential Emissions
IES-EG
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Potential HAP Emissions

Pollutant	CAS No.	NC TAP	VOC	Emission Factor[1]	Potential Emissions[2]	
				(lb/MMBtu)	(lb/hr)	(tpy)
Acetaldehyde	75-07-0	Y	Y	2.52E-05	1.26E-04	3.14E-05
Acrolein	107-02-8	Y	Y	7.88E-06	3.93E-05	9.83E-06
Benzene	71-43-2	Y	Y	7.76E-04	3.87E-03	9.68E-04
Benzo(a)pyrene	50-32-8	Y	Y	2.57E-07	1.28E-06	3.21E-07
Formaldehyde	50-00-0	Y	Y	7.89E-05	3.94E-04	9.84E-05
Naphthalene	91-20-3	N	Y	1.30E-04	6.49E-04	1.62E-04
Total PAH (POM)[3]	--	N	Y	2.12E-04	1.06E-03	2.65E-04
Toluene	108-88-3	Y	Y	2.81E-04	1.40E-03	3.51E-04
Xylene	1330-20-7	Y	Y	1.93E-04	9.63E-04	2.41E-04
				Total HAP Emissions	**0.0079**	**0.0020**

Notes:

1. Emission factor obtained from AP-42 3.4: Large Stationary Diesel and All Stationary Dual-Fuel Engines Table 3.4-3 and Table 3.4-4.
2. NSPS allows for only 100 hrs/yr of non-emergency operation of these engines. Potential emissions for the emergency generator are conservatively based on 500 hr/yr.
3. The PAH emission factor includes all the PAH compounds listed in AP-42. Emissions for naphthalene and benzo(a)pyrene are also calculated separately. For the purposes of calculating total HAP emissions, the naphthalene and benzo(a)pyrene are not included separately to avoid double counting these emissions.

Abbreviations:

Btu - British thermal unit
CAS - chemical abstract service
CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
g - gram
gal - gallon
HAP - hazardous air pollutant
hp - horsepower
hr - hour
kg - kilogram
kW - kilowatt
lb - pound
NC - North Carolina
MW - megawatt
MMBtu - Million British thermal units
NO_x - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PAH - polycyclic aromatic hydrocarbon
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
SO_2 - sulfur dioxide
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

Table 17
Fire Pump Potential Emissions
IES-FWP
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Calculation Basis

Engine Output	0.10 MW
Horsepower Rating	131 brake hp
Diesel Density[1]	7.1 lb/gal
Hours of Operation	500 hr/yr
Hourly Fuel Consumption	9 gal/hr
Energy Input[2]	1.23 MMBtu/hr

Notes:
1. Diesel density from AP-42 Section 3.4 - Large Stationary Diesel and All Stationary Dual-fuel Engines, 10/96, Table 3.4-1, footnote a.
2. Energy calculated on a fuel consumption basis using an energy factor of 0.137 MMBtu/gal.

Potential Criteria Pollutant Emissions

Pollutant	Emission Factor	Units	Potential Emissions[1] (lb/hr)	Potential Emissions[1] (tpy)
CO[2]	1.3	g/kW-hr	0.28	7.0E-02
NO_X[2]	3.4	g/kW-hr	0.72	0.18
SO_2[3]	15	ppmw	1.9E-03	4.8E-04
VOC[2]	0.15	g/kW-hr	3.2E-02	8.1E-03
PM[2]	0.17	g/kW-hr	3.7E-02	9.2E-03
PM_{10}[2]	0.17	g/kW-hr	3.7E-02	9.2E-03
$PM_{2.5}$[2]	0.17	g/kW-hr	3.7E-02	9.2E-03
CO_2	74	kg/MMBtu[4]	201	50
CH_4	3.0E-03	kg/MMBtu[4]	8.2E-03	2.0E-03
N_2O	6.0E-04	kg/MMBtu[4]	1.6E-03	4.1E-04
CO_2e			202	50

Notes:
1. NSPS allows for only 100 hrs/yr of non-emergency operation of these engines. Potential emissions for the emergency generator are conservatively based on 500 hr/yr.
2. Emissions factors for PM/PM_{10}/$PM_{2.5}$, NO_X, hydrocarbons, and CO obtained from generator's spec sheet.
3. Sulfur content in accordance with Year 2010 standards of 40 CFR 80.510(c) as required by NSPS Subpart IIII.
4. Emission factors from Table C-1 and C-2 of 40 CFR Part 98 and Global Warming Potentials from Table A-1.

Abbreviations:

Btu - British thermal unit
CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
g - gram
gal - gallon
hp - horsepower
hr - hour
kg - kilogram
kW - kilowatt
lb - pound
MW - megawatt
MMBtu - Million British thermal units
NO_X - nitrogen oxides
N_2O - nitrous oxide
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

Table 17
Fire Pump Potential Emissions
IES-FWP
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Potential HAP Emissions

Pollutant	CAS No.	NC TAP	VOC	Emission Factor[1]	Potential Emissions[2]	
				(lb/hp-hr)	(lb/hr)	(tpy)
Acetaldehyde	75-07-0	Y	Y	5.4E-06	7.0E-04	1.8E-04
Acrolein	107-02-8	Y	Y	6.5E-07	8.5E-05	2.1E-05
Benzene	71-43-2	Y	Y	6.5E-06	8.6E-04	2.1E-04
Benzo(a)pyrene	50-32-8	Y	Y	1.3E-09	1.7E-07	4.3E-08
Butadiene, 1,3-	106-99-0	Y	Y	2.7E-07	3.6E-05	9.0E-06
Formaldehyde	50-00-0	Y	Y	8.3E-06	1.1E-03	2.7E-04
Naphthalene	91-20-3	N	Y	5.9E-07	7.8E-05	1.9E-05
Total PAH (POM)[3]	--	N	Y	1.18E-06	1.5E-04	3.9E-05
Toluene	108-88-3	Y	Y	2.9E-06	3.8E-04	9.4E-05
Xylene	1330-20-7	Y	Y	2.0E-06	2.6E-04	6.5E-05
				Total HAP Emissions	**3.6E-03**	**8.9E-04**

Notes:

1. Emission factor obtained from NCDAQ Internal Combustion (Small Gasoline and Diesel Engines) Spreadsheet/AP-42 Section 3.3 - Stationary Internal Combustion Engines, 10/96, Table 3.3-2.
2. NSPS allows for only 100 hrs/yr of non-emergency operation of these engines. Potential emissions for the emergency generator are conservatively based on 500 hr/yr.
3. The PAH emission factor includes all the PAH compounds listed in AP-42. Emissions for naphthalene and benzo(a)pyrene are also calculated separately. For the purposes of calculating total HAP emissions, the naphthalene and benzo(a)pyrene are not included separately to avoid double counting these emissions.

Abbreviations:

CAS - chemical abstract service
HAP - hazardous air pollutant
hp - horsepower
hr - hour
lb - pound
NC - North Carolina
ODT - oven dried tons
PAH - polycyclic aromatic hydrocarbon
POM - polycyclic organic matter
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound

Table 18
Diesel Storage Tanks
IES-TK-1 through 3
Enviva Pellets Sampson, LLC
Faison, Sampson 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	5.3	ft	Dimensions were provided by Enviva
Tank Length	6.0	3.3	18.0	ft	Dimensions were provided by Enviva
Tank Design Volume	1,000	185	3,000	gal	Conservative design specifications
Tank Working Volume	500	92.5	1,500	gal	50% of tank design volume because tanks will not be full at all times
Tank Throughput	17,400	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	11.1	ft	AP-42, Chapter 7 - Equation 1-14 (SQRT(LD/(PI/4)))
Effective Height (H_E)	4.2	2.6	4.2	ft	AP-42, Chapter 7 - Equation 1-15 (PI/4*D)
V_v - Vapor Space Volume	66.2	13.8	201.1	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	2.1	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	414.3	107.1	4,762	bbl/yr	

Table 18
Diesel Storage Tanks
IES-TK-1 through 3
Enviva Pellets Sampson, 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 ($\Delta T_V/T_{LA} + ((\Delta P_V - \Delta P_B)/(P_A - \Delta P_{VA}))$
ΔT_v - Daily Vapor Temperature Range	20.77	20.77	20.77	R	AP-42, Chapter 7 - Equation 1-7 ($0.7*\Delta T_A + 0.02*\alpha*I$)
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 ($0.7*T_{AA} + 0.3T_B + 0.009\alpha*I$)
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 ($T_{AA} + 0.003\alpha I$)
T_{LA} - Daily Average Liquid Surface Temperature	523.0	521.7	521.7	R	AP-42, Chapter 7 - Equation 1-28 ($0.4*T_{AA} + 0.6T_B + 0.005*\alpha*I$)
N - Number of Turnovers	34.8	48.6	133.3	dimensionless	
K_N - Working Loss Turnover (Saturation) Factor	1	0.78	0.39	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	2,326	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	0.55	lbs/yr	AP-42, Chapter 7 - Equation 1-2 ($365 * Vv * Wv * Ke * Ks$)
L_w - Working Loss	0.48	0.098	2.2	lbs/yr	AP-42, Chapter 7 - Equation 1-35 ($V_Q * K_N * K_p * W_V * K_B$)
L_t - Total Loss	0.66	0.14	2.7	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	0.66	0.14	2.7	lbs/yr	
Total VOC Emissions	**3.3E-04**	**6.8E-05**	**0.0014**	**tons/yr**	

Reference:

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

Table 19
Potential Fugitive PM Emissions from Paved Roads
Enviva Pellets Sampson, LLC
Faison, Sampson County, North Carolina

Vehicle Activitiy	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	PM Emission Factor[3] (lb/VMT)	PM_{10} Emission Factor[3] (lb/VMT)	$PM_{2.5}$ Emission Factor[3] (lb/VMT)	Potential PM Emissions[4] (lb/day)	Potential PM Emissions[4] (tpy)	Potential PM_{10} Emissions[4] (lb/day)	Potential PM_{10} Emissions[4] (tpy)	Potential $PM_{2.5}$ Emissions[4] (lb/day)	Potential $PM_{2.5}$ Emissions[4] (tpy)
Logs Delivery to Crane	9,102	60	103.4	365	31,700	87,380	30	37,753	2.2	0.44	0.11	23	4.2	4.5	0.83	1.1	0.20
Logs Delivery to Log Storage Area	9,102	60	103.4	365	31,700	87,380	30	37,753	2.2	0.44	0.11	23	4.2	4.5	0.83	1.1	0.20
Chips Delivery	7,660	95	138	365	30,080	90,060	30	50,305	2.2	0.44	0.11	31	5.6	6.1	1.1	1.5	0.27
Hog Fuel Delivery	7,660	12	17.4	365	30,080	90,060	30	6,354	2.2	0.44	0.11	3.9	0.70	0.77	0.14	0.19	3.5E-02
Pellet Delivery	3,654	66	45.7	365	25,460	87,980	28	16,671	2.1	0.42	0.10	9.6	1.7	1.9	0.35	0.47	8.6E-02
Employee Car Parking	2,400	37	16.8	365	4,000	4,000	2	6,139	0.14	2.8E-02	6.9E-03	0.24	4.3E-02	4.7E-02	8.6E-03	1.2E-02	2.1E-03
											Total Emissions:	**90**	**16**	**18**	**3.27**	**4.4**	**0.80**

Notes:

1. Distance traveled per round trip was estimated based measuring wheel values. Data provided by Joe Harrell (Enviva) via email on May 16, 2017.
2. Daily trip counts provided by Joe Harrell (Enviva) via email on May 16, 2017. Log delivery trips updated assuming a maximum of 75% of greenwood is from logs.
3. Emission factors calculated based on Equation 2 from AP-42 Section 13.2.1 - Paved Roads, 01/11.
   where:

E = emission factor (lb/ton)		
k = particle size multiplier (dimensionless) for PM	0.011	
k = particle size multiplier (dimensionless) for PM_{10}	0.0022	
k = particle size multiplier (dimensionless) for $PM_{2.5}$	0.00054	
sL - mean road surface silt loading from AP-42 Table 13.2.1-3 for quarries (g/m^2)	8.2	
P - No. days with rainfall greater than 0.01 inch	110	Per AP-42, Section 13.2.1, Figure 13.2.1-2 (Sampson County, NC).

4. Potential emissions calculated from appropriate emission factor times vehicle miles traveled with control efficiency of 90% for water / dust suppression activities followed by sweeping. Per Table 5 in Chapter 4 of the Air Pollution Engineering Manual, Air and Waste Management Association, page 141. Control efficiency (%) = 96-0.263*V, where V is the number of vehicle passes since application of water. Use of dry shavings would replace log or chip delivery and thus, dry shaving paved road emissions are assumed to equal those of log or chip delivery if Enviva opts to use dry shavings instead; thus, separate emissions calculations for dry shaving vehicle activity is not needed.

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

Table 20
Potential Emissions from Propane Vaporizers
IES-PV-1 and 2
Enviva Pellets Sampson, LLC
Faison, Sampson 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 tha
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5
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

Table 21
Additive Handling
IES-ADD
Enviva Pellets Sampson, LLC
Faison, Sampson 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	0.19	1,643	8.64E-05	3.67E-04	4.09E-05	1.74E-04	6.19E-06	2.63E-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 0.74
k = particle size multiplier (dimensionless 0.35
k = particle size multiplier (dimensionless 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.