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ENVIRONMENT
& HEALTH

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Chief, Permitting Section, Division of Air Quality
NC Department of Environmental Quality
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Raleigh, NC 27699-1641

Received
APR 07 2020
Air Permits Section

Re: Application for Air Quality Permit Modification
Enviva Pellets Sampson, LLC
Faison, North Carolina
Sampson County
Permit No.: 10386R04
Facility ID: 8200152

Dear Mr. Willets:

Date April 2, 2020

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Enclosed please find a North Carolina Department of Environmental Quality (NC DEQ) permit application package for an air quality permit modification for Enviva Pellets Sampson, LLC (Enviva) (NC DEQ Facility ID #8200152) in Sampson County. This permit application is being submitted in accordance with Condition 2.1.A.4.a of Air Quality Permit No. 10386R04 to request authorization to install a regenerative thermal oxidizer (RTO) / regenerative catalytic oxidizer (RCO) to control emissions from the Pellet Mills and Pellet Coolers and for authorization to route exhaust from the Dry Hammermills to either the existing Dryer furnace followed by the wet electrostatic precipitator (WESP) or directly to the WESP (or a combination of the two) followed by the RTO for emissions control.

As part of this application, Enviva is also requesting authorization for the following proposed changes:

- Remove the current throughput limitation on the Dry Hammermills (Condition 2.2.A.1.j);
- Add two (2) natural gas/propane-fired burners, each with a heat input capacity of 2.5 million British thermal units per hour (MMBtu/hr) to heat the dryer system ducts;
- Modifications to optimize operation of the Dryer line RTO (CD-RTO) and increase the permitted heat input of the RTO to allow for injection of natural gas;
- Revise the potential emissions for Dried Wood Handling (ES-DWH) and the Dryer and Green Hammermills (both controlled by CD-RTO) to reflect results from December 2019 compliance testing;
- Increase the heat input of furnace idle mode from 5 MMBtu/hr to 10 MMBtu/hr (ES-FBYPASS);

- Remove dryer bypass from the permit (ES-DBYPASS), and;
- Increase the fraction of PM that is $PM_{2.5}$ for the Finished Product Handling baghouse (CD-FPH-BH).

A significant reduction in facility-wide emissions of volatile organic compounds (VOC) and hazardous air pollutants (HAP) (718 tpy and 128 tpy, respectively) will result from these proposed changes. The Sampson plant as currently permitted is a major source with respect to the Title V Operating Permit Program and New Source Review (NSR) permitting programs because facility-wide potential emissions of one or more criteria pollutants exceed the major source thresholds of 100 tons per year (tpy) and 250 tpy, respectively. 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 25 tpy, and 10 tpy, respectively. Upon implementation of the proposed changes the plant will no longer be a major source with respect to NSR or a major source of HAP.

As required, three (3) copies of the complete permit application package are enclosed. The application processing fee of $988 will be paid electronically through the ePayments System.

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

Yours sincerely,

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Enclosures: Permit Application

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

Prepared By
Ramboll US Corporation
Baton Rouge, Louisiana

Date
April 2020

APPLICATION FOR AIR QUALITY PERMIT MODIFICATION

ENVIVA PELLETS SAMPSON, LLC

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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
SCAMQD	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.

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 application in accordance with Condition 2.1.A.4.a of Air Quality Permit No. 10386R04 to request authorization to install a regenerative thermal oxidizer (RTO) / regenerative catalytic oxidizer (RCO) to control emissions from the Pellet Mills and Pellet Coolers as well as authorization to route the exhaust from the Dry Hammermills to the existing Dryer line wet electrostatic precipitator (WESP) and RTO. A significant reduction in emissions of VOC (718 tpy) and HAP (128 tpy) will occur as a result of controlling emissions from the Dry Hammermills, Pellet Mills, and Pellet Coolers. As discussed below, after installation of these controls, the Sampson plant will be classified as a synthetic minor source for PSD requirements and for HAP emissions.

As part of this submittal, Enviva is also proposing the following changes:

- Remove the current throughput limitation on the Dry Hammermills (Condition 2.2.A.1.j);
- Add two (2) natural gas/propane-fired burners, each with a heat input capacity of 2.5 million British thermal units per hour (MMBtu/hr) to heat the dryer system ducts;
- Modifications to optimize operation of the Dryer line RTO (CD-RTO) and increase the permitted heat input of the RTO to allow for injection of natural gas;
- Revise the potential emissions for Dried Wood Handling (ES-DWH) and the Dryer and Green Hammermills (both controlled by CD-RTO) to reflect results from December 2019 compliance testing;
- Increase the heat input of furnace idle mode from 5 MMBtu/hr to 10 MMBtu/hr (ES-FBYPASS);
- Remove dryer bypass (ES-DBYPASS) from the permit; and
- Increase the fraction of PM that is $PM_{2.5}$ for the Finished Product Handling baghouse (CD-FPH-BH).

The Sampson plant as currently permitted is a major source with respect to the Title V Operating Permit Program and New Source Review (NSR) permitting programs because facility-wide potential emissions of one or more criteria pollutants exceed the major source thresholds of 100 tons per year (tpy) and 250 tpy, respectively. Additionally, the plant is currently considered a major source of hazardous air pollutants (HAP) due to total HAP emissions and maximum individual HAP emissions exceeding the major source thresholds of

25 tpy and 10 tpy respectively. Upon implementation of the proposed changes the plant will no longer be a major source with respect to NSR or a major source of HAP.

Section 2 outlines the proposed permit revisions, and a process description for sources impacted by the proposed changes is provided in Section 3. Methodologies used to quantify potential emissions are summarized in Section 4. Section 5 describes the applicability of federal and state permitting programs. Section 6 includes a detailed applicability analysis of both federal and state regulations. 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. Note that forms and calculations are only included for sources impacted by the proposed changes.

2. REQUESTED PERMIT REVISIONS

Enviva requests that the procedures of 15A North Carolina Administrative Code (NCAC) 2Q .0504 be utilized for this modification, allowing issuance of a construction and operating permit under 15A NCAC 2Q .0300. This application is being submitted to request authorization to implement emission controls for the Dry Hammermills and the Pellet Mills and Pellet Coolers in accordance with Condition 2.1.A.4.a of Air Quality Permit No. 10386R04, and for authorization to implement several other proposed changes for existing sources/equipment.

The following summarizes the proposed permit revisions:

- Control of volatile organic compound (VOC), HAP, and particulate matter emissions from the Dry Hammermills.

  Enviva proposes to implement an air flow recirculation process to route a portion of the exhaust from each Dry Hammermill back to the front end of the respective Dry Hammermill. All exhaust gases ultimately exiting the Dry Hammermill baghouses will be routed to a quench duct and then to either the Dryer (ES-DRYER-1) furnace followed by the WESP (CD-WESP-1) or directly to the WESP (or a combination of the two) followed by the RTO (CD-RTO-1) for emissions control. The purpose of the quench duct is to protect the RTO by reducing the risk of fire. Operation of the Dry Hammermills will be interlocked with operation of the quench duct (i.e., the quench duct must operate in order for the Dry Hammermills to operate). If flow in the quench duct drops below the safe level, the Dry Hammermills will shut down.

  Total emissions from the Dry Hammermills will still be routed through the existing baghouses. The purpose of the recirculation is to reduce the volume of air that is routed to the downstream control devices (i.e., CD-WESP and CD-RTO).

- Control of VOC and HAP emissions from the Pellet Mills and Pellet Coolers.

  Enviva proposes to install a dedicated RTO/RCO (CD-RCO) to control VOC and HAP emissions from the Pellet Mills and Pellet Coolers. The exhaust from the six (6) existing 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.

- Enviva proposes to remove the current Dry Hammermill throughput limitation of 558,450 oven dried tons (ODT), which represents 85% of the plant's maximum production rate of 657,000 ODT per consecutive 12-month period. With this application, Enviva is proposing to increase the Dry Hammermill throughput to 657,000 ODT per consecutive 12-month period. Emissions increases associated the Dry Hammermill throughput increase are minimal and are completely offset by the significant facility-wide emission reductions resulting from changes proposed in this application.

- Enviva proposes to add two (2) natural gas/propane-fired burners, each with a maximum heat input of 2.5 MMBtu/hr, to heat the dryer system ducts (IES-DDB-1 through IES-DDB-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) on the dryer system will be heated. Potential emissions from the duct burners are

below the thresholds in 15A NCAC 02Q .0503(8) and they are thus considered insignificant activities.

- Enviva is proposing several modifications to optimize operation of the existing Dryer line RTO (CD-RTO) including changing the media to decrease the differential pressure, enlarging the ductwork and poppet valves to allow for more air flow, addition of two (2) canisters with combustion zone and additional burners. Enviva is also requesting authorization for injection of natural gas into the RTO which will reduce the amount of combustion air added to the RTO, thereby increasing fuel efficiency and reducing generation of nitrogen oxides (NO_X). The heat input of the RTO will be increased from 32 MMBtu/hr to 45.2 MMBtu/hr as a result of the additional burners and natural gas injection.
- Enviva proposes to revise the potential emissions for Dried Wood Handling (ES-DWH) and the Dryer and Green Hammermills (both controlled by CD-RTO) to reflect results from December 2019 compliance testing.
- Enviva proposes to increase the heat input of furnace idle mode from 5 MMBtu/hr to 10 MMBtu/hr (ES-FBYPASS). Enviva has determined that 5 MMBtu/hr is insufficient for maintaining a flame in the furnace.
- Enviva proposes to remove dryer bypass (ES-DBYPASS) from the permit because venting of emissions through the dryer bypass stack only occurs in the event of a malfunction. Malfunctions are infrequent and unpredictable and cannot be permitted because they are, by definition, unplanned events, and;
- Enviva proposes to increase the fraction of PM that is $PM_{2.5}$ for the Finished Product Handling baghouse (CD-FPH-BH). The permit application submitted in August of 2014 incorrectly calculated $PM_{2.5}$ emissions as 0.35% of PM emissions. This results in an exit grain loading rate that is cleaner than ambient air and would require a sampling run of over 100 hours to quantify [0.000014 grains per standard cubic feet (gr/scf)]. Enviva has not been able to find any documentation to support a value of 0.35% and, given that this results in a concentration that is cleaner than ambient air, Enviva believes this value was used in error. Based on a review of National Council for Air and Stream Improvement, Inc. (NCASI) particle size distribution data for similar baghouses used in the wood products industry, Enviva has determined that the correct fraction of PM that is $PM_{2.5}$ is 40%. As such, Enviva is revising the potential emissions for the Finished Production Handling baghouse to reflect an exit grain loading rate of 0.0016 gr/scf (filterable only).

3. PROCESS DESCRIPTION

Enviva manufactures wood pellets for use as a renewable fuel for energy generation and industrial customers. Enviva's customers use wood pellets in place of coal, significantly reducing emissions of pollutants such as lifecycle carbon dioxide (CO_2)/greenhouse gases (GHGs), mercury, arsenic and lead. The company is dedicated to improving the environmental profile of energy generation while promoting sustainable forestry in the southeastern United States. Enviva holds certifications from the Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), Programme for the Endorsement of Forest Certification (PEFC), and Sustainable Biomass Program (SBP). Enviva requires that all suppliers adhere to state-developed "Best Management Practices" (BMPs) in their activities to protect water quality and sensitive ecosystems. In addition, Enviva is implementing an industry leading "track and trace" system to further ensure that all fiber resources come from responsible harvests. Enviva pays particular attention to: land use change, use and effectiveness of BMPs, wetlands, biodiversity, and certification status. All of this combined ensures that Enviva's forestry activities contribute to healthy forests both today and in the future. A detailed description of Enviva's Responsible Wood Supply Program can be found at: https://www.envivabiomass.com/sustainability/responsible-sourcing/responsible-sourcing-policy/

The following sections provide a 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.

3.1 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 WESP/RTO control system (CD-WESP/CD-RTO) to control PM, VOC, and HAP emissions. Processed wood is then conveyed to a single rotary Dryer system (ES-DRYER). Direct contact heat is provided to the system via a 250.4 MMBtu/hr furnace burner system 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 which includes the vent 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. Potential emissions from the RTO stack have been revised to reflect results from December 2019 compliance testing. Additional detail is provided in Section 4.1.

3.2 Dried Wood Handling (ES-DWH)

There are several conveyor 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). Potential emissions from the baghouses have been revised to reflect results from December 2019 compliance testing. Additional detail is provided in Section 4.4.

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

Dried wood chips from the Dryer product 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 Dry Hammermills (ES-HM-1 through 8) for further size reduction prior to pelletization. Note, upon removal of the Dry Hammermill throughput limitation, 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). Dust generated from transfer operations around the screening operation is diverted to the Dry Hammermill Area filtration system (ES-HMA).

Enviva proposes to implement an air flow recirculation process to route a portion of the exhaust from each Dry Hammermill back into the front end of the respective Dry Hammermill. All exhaust gases ultimately exiting the Dry Hammermill baghouses will be routed to a quench duct and then to either the Dryer (ES-DRYER-1) furnace followed by the WESP (CD-WESP-1), directly to the WESP, or a combination of the two, followed by the RTO (CD-RTO-1) for emissions control. The purpose of the quench duct is to protect the RTO by reducing the risk of fire. Operation of the Dry Hammermills will be interlocked with operation of the quench duct (i.e., the quench duct must operate in order for the Dry Hammermills to operate). If flow in the quench duct drops below the safe level, the Dry Hammermills will shut down.

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

Sized wood from the Dry Hammermills is mechanically compressed through Pellet Mills. Exhaust from the twelve (12) Pellet Mills and Pellet Mill conveyors are currently vented through the cooler aspiration cyclones and then to the atmosphere. No resin or other chemical binding agents are needed for pelletization.

Formed pellets are discharged into one of six (6) Pellet Coolers (ES-CLR-1 through ES-CLR-6). 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 described in Section 2, Enviva is proposing to install a dedicated RTO/RCO (CD-RCO) to control VOC and HAP emissions from the Pellet Mills and Pellet Coolers. The exhaust from the six (6) existing 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 Cooler 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).

3.5 Furnace Bypass – Idle Mode (ES-FBYPASS)

Direct heat is provided to the dryer via a 250.4 MMBtu/hr wood-fired furnace. During normal operations, emissions from wood combustion in the furnace are controlled by the WESP (CD-WESP) and RTO (CD-RTO). The furnace may also operate up to 500 hours per year in "idle mode" with emissions routed to the furnace bypass stack. "Idle mode" was previously defined as operation up to a maximum heat input rate of 5 MMBtu/hr. With this application, Enviva is proposing to increase the maximum heat input for furnace idle mode to 10 MMBtu/hr after determining that 5 MMBtu/hr is insufficient to maintain a flame in the furnace. The purpose of operation in idle mode is to maintain the temperature of the fire

brick lining in 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.

3.6 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) will be heated. The duct from the cyclone outlet to the ID fan will be 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 will be used to heat the duct used for exhaust gas recirculation and the WESP. The burners will combust natural gas, with propane as back-up, and will 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.

3.7 Finished Product Handling 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 as a fire prevention measure to prevent any build-up of dust on surfaces within the building. The Finished Production 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.

4. POTENTIAL EMISSIONS QUANTIFICATION

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

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

Exhaust from the Dryer and Green Wood Hammermills is routed to a WESP/RTO (CD-WESP/CD-RTO) control system for control of particulate matter, VOC, and hazardous air pollutants (HAPs). 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 updated to reflect results of the Sampson December 2019 compliance test plus an appropriate contingency based on engineering judgement. 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*[1]. VOC emissions were calculated using an emission factor derived from process information and an appropriate contingency based on engineering judgement. HAP and toxics air pollutant (TAP) emissions from green 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 as burner fuel and injection gas[2] were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*[3], AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion*[4], NC DAQ's Wood Waste Combustion Spreadsheet[5], and emission factors from the South Coast Air Quality Management District's (SCAQMD) Air Emissions Reporting (AER) Tool. After direct natural gas injection and proposed RTO optimization efforts, the maximum heat input of the RTO will be 45.2 MMBtu/hr based on both the heat input of the RTO burners and direct natural gas injection. Detailed emission calculations are included in Appendix D.

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

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

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

[2] Natural Gas Injection in an RTO is a way of reducing the amount of combustion air added to an RTO thereby increasing fuel efficiency and reducing NOx generation.

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

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

[5] 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.

Uncontrolled VOC, HAP, and TAP emissions at the outlet of the Dry Hammermill baghouses (CD-HM-BH1 through BH8) were quantified based on results of the Sampson 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*[6], 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, both as burner fuel and direct gas injection[7], were estimated using emission factors from AP-42 Section 1.4, *Natural Gas Combustion*, and AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion*[8]. 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.

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

Pellet Mills and Pellet Cooler operations generate particulate matter, VOC, HAP, and TAP emissions during the forming and cooling of wood pellets. The twelve (12) Pellet Mills and six (6) Coolers are equipped with six (6) simple cyclones (CD-CLR-1 through CD-CLR-6) which will exhaust through the proposed 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 the Sampson 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 of the Sampson 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*[9], 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 gas injection were estimated using emission factors from AP-42 Section 1.4, *Natural Gas Combustion*, and AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion.*[10,11] 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 Appendix D.

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

[7] As previously described in Section 3, natural gas injection in an RTO is a way of reducing the amount of combustion air added to an RTO, thereby increasing fuel efficiency and reducing NOx generation.

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

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

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

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

4.4 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 the Sampson December 2019 compliance test and include an appropriate contingency based on engineering judgement. Detailed potential emission calculations are provided in Appendix D.

4.5 Furnace Bypass - Idle Mode (ES-FBYPASS)

The furnace may operate up to 500 hours per year in "idle mode" during which emissions will exhaust out of the furnace bypass stack (ES-FURNACEBYP). Potential emissions of CO, NO_X, SO_2, PM, VOC, and HAP were calculated based on emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers*[12] and a heat input of 10 MMBtu/hr for the furnace. 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. Detailed potential emission calculations are included in Appendix D.

4.6 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-4) were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*[13], AP-42 Section 1.5, *Liquefied Petroleum Gas Combustion*[14], and emission factors from the South Coast Air Quality Management District's (SCAQMD) Air Emissions Reporting (AER) Tool.[15] Detailed emission calculations are included in Appendix D.

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

4.7 Pellet Loadout Bins (ES-PB1 through 4), Finished Product Handling (ES-FPH), and Pellet Mill Loadouts (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 based on a maximum exit grain loading rate and the maximum nominal exhaust flow rate of the baghouse. As discussed in Section 2, the fraction of PM that is $PM_{2.5}$ has been updated from 0.35% to 40% based on a review of NCASI particle size distribution data for similar baghouses used in the wood products industry. Detailed potential emissions calculations are provided in Appendix D.

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

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

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

[15] 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

5. 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 proposed permit modifications.

5.1 Federal Permitting Programs

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

5.1.1 New Source Review

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

NNSR permitting requirements apply to new or existing stationary sources located in an area where concentrations of a "criteria pollutant"[16] 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.[17] The Sampson plant is an existing major PSD source; however, upon implementation of the proposed controls for the Dry Hammermills, Pellet Mills, and Pellet Coolers presented in this application the plant will no longer be a major PSD source.

5.1.2 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

[16] 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.

[17] 40 CFR 81.334

emissions and maximum individual HAP emissions exceeding the major source thresholds of 25 tpy, and 10 tpy, respectively. Upon implementation of the proposed controls for the Dry Hammermills, Pellet Mills, and Pellet Coolers presented in this 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.

5.2 North Carolina Permitting Program

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

6. REGULATORY APPLICABILITY

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

6.1 New Source Performance Standards

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

6.1.1 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 not applicable to any of the sources impacted by this application because they are not subject to any source-specific subparts under 40 CFR 60.

6.1.2 40 CFR Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

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

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

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

6.2 National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP) regulate HAP emissions and 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 changes proposed in this application the plant will be an area source of HAP.

6.2.1 40 CFR 63 Subpart A – General Provisions

All sources subject to a NESHAP are subject to the general requirements under Subpart A unless excluded by the source-specific subpart. Subpart A includes requirements for initial notification, performance testing, recordkeeping, monitoring, and reporting. Subpart A is not applicable to any of the sources impacted by this application because they will not be subject to a source-specific subpart under 40 CFR 63. Subpart A is applicable to the existing Emergency Generator and Fire Water Pump because they are subject to Subpart ZZZZ. Although the Emergency Generator and Fire Water Pump will not be modified as part of this

application the applicable requirements under Subpart ZZZZ will change as a result of the plant being reclassified as an area source of HAP. Additional detail is provided below.

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

Clean Air Act (CAA) Section 112(g)(2)(B) requires that a new or reconstructed stationary source that does not belong to a regulated "source category" for which a NESHAP has been promulgated must control emissions to levels that reflect "maximum achievable control technology" (MACT). Because Wood Pellet Manufacturing Plants are not a regulated source category under 40 CFR 63, the Sampson plant previously underwent a case-by-case MACT analysis pursuant to Subpart B. However, the plant will no longer be a major source for HAP emissions following implementation of controls for the Dry Hammermills, Pellet Mills, and Pellet Coolers proposed in this 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.[18] 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 emit HAP below the major source thresholds.[19] The HAP limits must be legally and practically enforceable.

Requirements to install, maintain, and operate the controls proposed as part of this application will be incorporated into the Sampson plant's permit and will ensure that the facility becomes and remains a minor source of HAP. 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 proposed controls for the Dry Hammermills, Pellet Mills, and Pellet Coolers.

6.2.3 40 CFR 63 Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines

Subpart ZZZZ applies to reciprocating internal combustion engines (RICE) located at a major or 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 existing Emergency Generator and emergency 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 applicability of these requirements does not

[18] 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.

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

change as a result of the reclassification of the Sampson plant from a major source to an area source.

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

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

6.3 Compliance Assurance Monitoring

Compliance Assurance Monitoring (CAM) under 40 CFR 64 applies to emission units located at a Title V major source that use a control device to achieve compliance with an emission limit and whose pre-controlled emissions exceed the major source thresholds. A CAM plan is required to be submitted with the initial Title V operating permit application for emission units whose post-controlled emissions exceed the major source thresholds (i.e., large pollutant-specific emission units [PSEU]).[20] 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.[21]

CAM will potentially be applicable to sources at the Sampson plant; however, no emission units have post-controlled emissions above major source thresholds. 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.

6.4 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 impacted by this application are addressed in the following sections.

6.4.1 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.

6.4.2 15A NCAC 02D .0512 Particulates from Wood Products Finishing Plants

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

6.4.3 15A NCAC 02D .0515 Particulates from Miscellaneous Industrial Processes

PM emissions from all industrial processes subject to permitting and for which no other emission control standards are applicable are regulated under 15A NCAC 02D .0515. This

[20] §64.5(a)

[21] §64.5(b)

regulation limits particulate emissions based on process throughput using the equation $E = 4.10 \times P^{0.67}$, for process rates (P) less than or equal to 30 tons per hour (tph) and $E=55 \times P^{0.11}-40$ for process rates greater than 30 tph.

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

6.4.4 15A NCAC 02D .0516 Sulfur Dioxide Emissions from Combustion Sources

Emissions of SO_2 from combustion sources cannot exceed 2.3 pounds of SO_2 per MMBtu input. The existing RTO (CD-RTO) and proposed RTO/RCO are natural gas-fired and the proposed double duct burners will fire natural gas with propane as a back-up. These fuels both contain low amounts of sulfur and will result in SO_2 emissions well below the limit of 2.3 lb/MMBtu.

6.4.5 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.

6.4.6 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.

A significant reduction in TAP emissions will occur as a result of controlling emissions from the Dry Hammermills, Pellet Mills, and Pellet Coolers (42.2 tpy). As such, Enviva does not believe an updated TAP modeling analysis is required for the proposed changes. Previous TAP modeling showed concentrations well below the Acceptable Ambient Levels (AALs).[22]

[22] 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)
- ☑ Responsible Official/Authorized Contact Signature
- ☑ Appropriate Number of Copies of Application
- ☑ 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: **Matt Cutshall, Director Manufacturing**	Name/Title: **William Simon, EHS Manager**
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.: **864-554-3560** Fax No.:	Primary Phone No.: **910-375-6365** Fax No.:
Secondary Phone No.:	Secondary Phone No.:
Email Address: **Matt.Cutshall@envivabiomass.com**	Email Address: **William.Simon@envivabiomass.com**
Facility/Inspection Contact:	***Permit/Technical Contact:***
Name/Title: **William Simon, EHS Manager**	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.: **910-375-6365** Fax No.:	Primary Phone No.: **984-789-3628** Fax No.:
Secondary Phone No.:	Secondary Phone No.:
Email Address: **William.Simon@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

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): Matt Cutshall — Title: Director Manufacturing
X Signature (Blue ink) — Date: 3/31/20

Attach Additional Sheets As Necessary

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

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SECTION AA1 - APPLICATION FOR NON-TITLE V PERMIT RENEWAL

_____ (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

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

EMISSION SOURCE ID NO.	EMISSION SOURCE DESCRIPTION	CONTROL DEVICE ID NO.	CONTROL DEVICE DESCRIPTION
Equipment To Be ADDED By This Application (New, Previously Unpermitted, or Replacement)			
IES-DDB-1 and 2	Double Duct Burners	N/A	
Existing Permitted Equipment To Be MODIFIED By This Application			
ES-Dryer	250.4 MMBtu/hr wood-fired direct heat drying system	CD-WESP	Wet Electrostatic Precipitator
		CD-RTO	Regenerative Thermal Oxidation
ES- GHM-1 through 3	Three (3) Green Hammermills	CD-WESP	Wet Electrostatic Precipitator
		CD-RTO	Regenerative Thermal Oxidation
ES-HM-1 through 8	Eight (8) Dry Hammermills	CD-HM-BH-1 to 8	Baghouses
		CD-WESP	Wet Electrostatic Precipitator
		CD-RTO	Regenerative Thermal Oxidation
ES-CLR-1 through 6	Twelve (12) Pellet Mills and Six (6) Pellet Coolers	CD-CLR-1	Simple cyclone
		CD-CLR-2	Simple cyclone
		CD-CLR-3	Simple cyclone
		CD-CLR-4	Simple cyclone
		CD-CLR-5	Simple cyclone
		CD-CLR-6	Simple cyclone
		CD-RCO (new)	Regenerative Thermal Oxidation / Regenerative Catalytic Oxidation
ES-FBYPASS	Furnace Bypass	N/A	
ES-DWH	Dried Wood Handling Operations	CD-DWH-BH-1 and 2	Baghouses
ES-FPH	Finished Product Handling	CD-FPH-BH	Baghouse
ES-PB-1 through 4	Four (4) Pellet Loadout Bins		
ES-PL-1 and 2	Two (2) Pellet Loadouts		
Equipment To Be DELETED By This Application			

112(r) APPLICABILITY INFORMATION — A 3

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

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

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	689 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

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:	23 MARCH 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

Attach Additional Sheets As Necessary

Received
APR 07 2020
Air Permits Section

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

REVISED 09/22/16 | NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate | E2

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 Dry Hammermills, Pellet Mills, and Pellet Coolers.				

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 Dry Hammermills and Pellet Mills and Coolers.**	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	$PM/PM_{10}/PM_{2.5}$	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, and variance from manufacturer's recommendation.	Any maintenance performed on the cyclones/baghouses within 30 days of a written request by DAQ. Semi-annual progress report and annual compliance certification.
		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.	Semi-annual progress report and annual compliance certification.
Pellet Fines Bin & Hammermill Area	ES-PFB & ES-HMA	$PM/PM_{10}/PM_{2.5}$	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/bagfilter integrity.	Written or electronic log of date and time of each inspection, results of inspection and maintenance, and variance from manufacturer's recommendation.	Any maintenance performed on the cyclones/baghouses within 30 days of a written request by DAQ. Semi-annual progress report and annual compliance certification.
		HAPs	Section 112(g) Case-by-Case MACT		Use of PM control technologies and maintenance of equipment in accordance with manufacturer's specifications and/or standard industry practices.	N/A	N/A
		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.	Semi-annual progress report and annual compliance certification.

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, and corrections made.	Submit results of any maintenance performed on the baghouse within 30 days of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		$PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0308(a)		Monthly actuals emissions.	Written or electronic log of actual emissions (facility-wide 12-month rolling basis).	Make log of facility-wide 12-month rolling actual emissions available to DAQ upon request.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal". 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 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 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, 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 Recirculation	ES-PCR	$PM/PM_{10}/PM_{2.5}$	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, and variance from manufacturer's recommendation.	Any maintenance performed on the cyclones/baghouses within 30 days of a written request by DAQ. Semi-annual progress report and annual compliance certification.
		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.	Semi-annual progress report and annual compliance certification.
Pellet Sampling Transfer Bin	ES-PSTB	$PM/PM_{10}/PM_{2.5}$	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, and variance from manufacturer's recommendation.	Any maintenance performed on the cyclones/baghouses within 30 days of a written request by DAQ. Semi-annual progress report and annual compliance certification.
		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.	Semi-annual progress report and annual compliance certification.
Hammermill Conveyor	ES-HMC-1	$PM/PM_{10}/PM_{2.5}$	15A NCAC 02D .0515	Bin vent filter	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, and variance from manufacturer's recommendation.	Any maintenance performed on the cyclones/baghouses within 30 days of a written request by DAQ. Semi-annual progress report and annual compliance certification.
		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.	Semi-annual progress report and annual compliance certification.
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, 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 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 this 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 this 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)

REVISED 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
- ☑ 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 of responsible company official (REQUIRED, USE BLUE INK) Date: 3/31/20

Matt Cutshall, Director Manufacturing

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

Attach Additional Sheets As Necessary

Received
APR 07 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 DETAIL THE 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)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☑ Other (Form B9)

START CONSTRUCTION DATE: **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 Wood 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). A regenerative thermal oxidizer (RTO) will be added following the WESP to provide further VOC and HAP removal.

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 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 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 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 (SO_2)							
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) hammermills.

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

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

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

DESCRIBE CONTROL SYSTEM:
Eight (8) baghouses are utilized for emission control on the eight (8) dry hammermill cyclones.

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 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:	95 %	%	%	%
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: **Pellet Presses and Pellet Coolers**	EMISSION SOURCE ID NO: **ES-CLR1 through 6**
OPERATING SCENARIO 1 OF 1	CONTROL DEVICE ID NO(S): **CD-CLR-1 through 6**
	EMISSION POINT (STACK) ID NO(S): **EP-29 (new)**

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 Presses 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 (new)**

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 (new)**	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.

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 presses and coolers. Each cyclone is ducted to a discharge stack.

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 (new)**	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: **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 DETAIL THE 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 12 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 c**

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	☐ 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)
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: **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 shoots 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. 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								

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
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: **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 transfer points, pellet screening operations, and pellet conveying.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**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 12, 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

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 C								

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. The baghouses collects dust from the air volume present in the dried wood handling.**

	PM	PM-10	PM-2.5	
POLLUTANTS COLLECTED:				
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**99** %	**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
- ☐ 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:
Fans pull air from the conveyor leading from the dryer to the DHM island, transporting dried wood.

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. The baghouses collects dust from the air volume present in the dried wood handling.**

	PM	PM-10	PM-2.5	
POLLUTANTS COLLECTED:				
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	**99** %	**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	

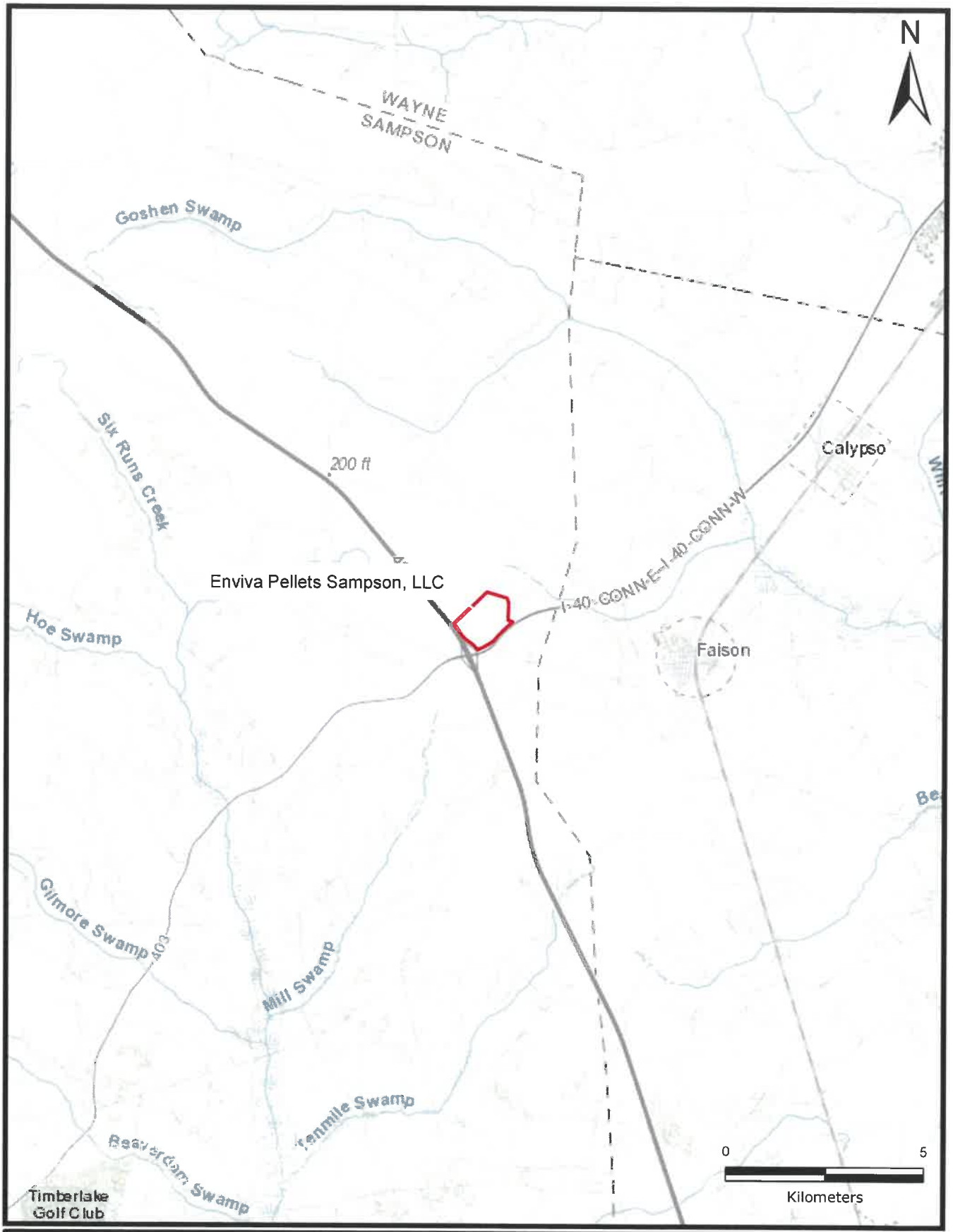
ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

COMMENTS:

Attach Additional Sheets As Necessary

APPENDIX B
PROCESS FLOW DIAGRAM

APPENDIX C
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 D
POTENTIAL EMISSIONS CALCULATIONS

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

Operational Data	
Green Hammermills, Dryers, 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%
Dry Hammermills	
Short-Term Throughput (ODT/hr)	120
Annual Throughput (ODT/yr)[1]	657,000
Hours of Operation (Hr/yr)	8,760
Softwood Composition	100%

Notes:

1. 100% of raw material will be processed by the dry hammermills.

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-HMA	Hammermill Area	CD-PCLP-BH	One (1) baghouse	--	--	0.47	0.47	0.47	--	--	--
ES-PCLP	Pellet Cooler LP Fines Relay System										
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	--	--	0.15	0.15	0.15	--	--	--
ES-PSTB	Pellet Sampling Transfer Bin	CD-PSTB-BH	One (1) baghouse	--	--	0.15	0.15	0.15	--	--	--
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	--
ES-ADD	Additive Handling and Storage	CD-ADD-BH	One (1) baghouse	--	--	0.15	0.15	0.15	--	--	--
IES-GWH	Green wood handling operations	--	--	--	--	0.081	0.038	0.0058	--	--	--
IES-TK-1	2,500 gal diesel storage tank	--	--	--	--	--	--	--	--	5.85E-04	--
IES-TK-2	500 gal diesel storage tank	--	--	--	--	--	--	--	--	1.60E-04	--
IES-TK-3	3,000 gal diesel storage tank	--	--	--	--	--	--	--	--	0.0022	--
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	--	--	0.18	1.51	0.019	0.019	0.019	0.0019	0.019	195
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	--	--	--
			Total Emissions:	**106**	**111**	**268**	**99.0**	**50.7**	**27.6**	**122**	**272,313**
			Total Excluding Fugitives[2]:	**106**	**111**	**234**	**87.1**	**48.1**	**27.6**	**113**	**272,313**

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)	Total (tpy)
Acetaldehyde	Y	Y	2.03	2.9E-03	3.3E-07	0.14	9.2E-04	1.8E-04	--	--	--	2.17
Acetophenone	Y	Y	1.8E-07	1.1E-08	--	--	--	--	--	--	--	1.9E-07
Acrolein	Y	Y	1.23	1.4E-02	3.9E-07	0.83	1.1E-04	2.1E-05	--	--	--	2.07
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	2.3E-07	4.3E-08	--	--	--	1.5E-04
Benzene	Y	Y	0.37	1.4E-02	0.016	0.062	0.0011	2.1E-04	--	--	--	0.46
Beryllium	Y	Y	9.0E-05	3.8E-06	2.6E-07	1.0E-06	--	--	--	--	--	9.5E-05
Butadiene, 1,3-	Y	Y	--	--	--	--	4.7E-05	9.0E-06	--	--	--	5.6E-05
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-05	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	0.0014	2.7E-04	0.07	--	--	2.73
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	1.0E-04	1.9E-05	--	--	--	0.0060
Nickel	Y	Y	3.0E-03	--	4.5E-05	1.8E-04	--	--	--	--	--	0.0033
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	2.0E-04	3.9E-05	--	--	--	0.15
Propionaldehyde	Y	N	0.78	2.1E-04	--	0.18	--	--	6.9E-02	--	--	1.03
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	4.9E-04	9.4E-05	--	--	--	0.0552
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	--	--	3.4E-04	6.5E-05	--	--	--	0.0019
Total HAP Emissions[4] (tpy)	--	--	**13.9**	**0.13**	**0.088**	**6.36**	**0.0047**	**8.88E-04**	**0.30**	**0.33**	**0.060**	**21.2**
Maximum Individual HAP (tpy)	--	--	**Methanol**	**Hydrochloric acid**	**Hexane**	**Methanol**	**Formaldehyde**	**Formaldehyde**	**Methanol**	**Methanol**	**Methanol**	**Methanol**
Maximum Individual HAP Emissions (tpy)	--	--	**2.28**	**0.065**	**0.039**	**3.94**	**0.0014**	**2.71E-04**	**0.16**	**0.33**	**0.060**	**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 4a
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-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	4.47	13.9
Total TAP	3.45	11.3

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 4a
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-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. Exhaust 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 4a

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-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	3.75E-03	lb/ODT	1	0.45	1.23
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	2.39E-03	lb/ODT	1	0.29	0.78
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:	**4.28**	**13.1**
						Total TAP Emissions:	**3.13**	**9.91**

Table 4a
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-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 4a
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-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 4c
Potential Emissions from Dryer Furnace Bypass (Idle Mode)[1]
ES-FBYPASS
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.

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Table 4c
Potential Emissions from Dryer Furnace Bypass (Idle Mode)[1]
ES-FBYPASS
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 metal	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 4c
Potential Emissions from Dryer Furnace Bypass (Idle Mode)[1]
ES-FBYPASS
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 5
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 5
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 6
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.

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

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
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
NCDAQ - North Carolina Division of Air Quality
ODT - oven dried tons
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 7
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 8
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[2, 3, 4]	1,500	0.004	0.004	0.004	0.051	0.23	0.051	0.23	0.051	0.23
ES-HMA	Hammermill Area	CD-PCLP-BH	Baghouse[1, 2, 3]	3,102	0.004	0.004	0.004	0.11	0.47	0.11	0.47	0.11	0.47
ES-PCHP	Pellet Cooler LP Fines Relay System												
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-PCLP	Pellet Cooler HP Fines Relay System	CD-PCHP-BH	Baghouse[1, 2, 3]	1,000	0.004	0.004	0.004	0.034	0.15	0.034	0.15	0.034	0.15
ES-PSTB	Pellet Sampling Transfer Bin	CD-PSTB-BH	Baghouse[1, 2, 3]	1,000	0.004	0.004	0.004	0.034	0.15	0.034	0.15	0.034	0.15
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
ES-ADD	Additive Handling and Storage	CD-ADD-BH	Baghouse[2, 3]	1,000	0.004	0.004	0.004	0.034	0.15	0.034	0.15	0.034	0.15

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