RAMBOLL

ENVIRONMENT
& HEALTH

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

Re: **Title V Permit Renewal and Modification Application**
Enviva Pellets Ahoskie, LLC
Ahoskie, North Carolina
Hertford County
Permit No.: 10121T04
Facility ID: 4600107

August 28, 2020

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Dear Mr. Willets:

Enclosed please find a North Carolina Department of Environment Quality (NCDEQ) application package for renewal of the Title V permit and modifications proposed for Enviva Pellets Ahoskie, LLC ("Enviva", "the Ahoskie plant", or "the facility") (NCDEQ Facility ID 4600107) in Hertford County. The facility currently operates under Air Quality Permit No. 10121T04 issued by the NCDEQ, Division of Air Quality (DAQ) on June 6, 2016. The proposed modifications are being implemented to meet new customer softwood percentage and production rate demands and to implement significant emission reductions at the facility.

The Ahoskie plant is currently permitted as a major source with respect to the Title V and New Source Review (NSR) permitting programs because potential facility-wide emissions of one or more criteria pollutants are estimated to exceed the major source thresholds of 100 tons per year (tpy) and 250 tpy, respectively. The plant is currently permitted as a minor source of hazardous air pollutants (HAP). As a result of the significant emission reductions being proposed as part of this modification, the Ahoskie plant's potential emissions will be less than the Prevention of Significant Deterioration (PSD) major source threshold; thus, the facility will be classified as a minor source for PSD. The facility will continue to be classified as a major source under the Title V program and will remain a minor source of HAP.

With this application, Enviva is proposing the following modifications:

- Increase production rate from 481,800 oven dried tons (ODT) per year to 630,000 ODT per year;
- Adjust percentage of softwood processed to a facility-wide maximum of 100% annually;
- Reconfigure the wood yard area as follows: add three (3) truck tippers, add one (1) fresh reclaim hopper and one (1) mixed reclaim hopper, add automation including a stacker/reclaimer system to reduce manual handling using frontend loaders, include new conveyor drop

points/material transfers, remove existing conveyor drop points/material transfers, remove the existing electric powered green wood chipper (IES-CHP1) and the existing debarker, and update emissions to reflect the proposed changes. The existing ID for green wood handling and storage will be renamed from IES-GWHS to ES-GWHS;

- Add three (3) green hammermills for a total of four (4) green hammermills (ES-GHM-1 through ES-GHM-4) and route the green hammermills exhaust to the inlet duct of the existing wet electrostatic precipitator (CD-WESP) and proposed RTO (CD-RTO). The existing green hammermill will be renamed from IES-CHP2 to ES-GHM-1;
- Add a regenerative thermal oxidizer (CD-RTO) to the existing dryer (ES-DRYER) following the existing WESP (CD-WESP). The existing WESP stack will be replaced with the proposed RTO stack (CD-RTO);
- Add two (2) double duct burners (IES-DDB-1 and IES-DDB-2), one on the dryer duct from the cyclone outlet to the ID fan and the other on the dryer duct for exhaust gas recirculation to the WESP to reduce the risk of fire;
- Incorporate the existing dryer and furnace bypass stacks and associated emissions (ES-FURNACEBYP) into the permit;
- Update the source ID for dried wood handling from IES-DWH to ES-DWH;
- Add two (2) dry hammermills (ES-DHM-6 and ES-DHM-7) and two (2) associated material collection cyclones and route the exhaust from ES-DHM-6 to existing fabric filter CD-DHM-FF1 and the exhaust from ES-DHM-7 to existing fabric filter CD-DHM-FF2;
- Control emissions of volatile organic compounds (VOC) and HAPs from the existing and proposed new dry hammermills by routing a portion of the exhaust from each dry hammermill back to the front end of the dry hammermill. All exhaust gases ultimately exiting the dry hammermills will be routed to either the dryer (ES-DRYER) furnace, the dryer WESP (CD-WESP), or a combination of the two prior to entering the dryer RTO (CD-RTO) for control;
- Addition of additive handling and storage to the list of insignificant activities (IES-ADD);
- Remove the existing insignificant emissions source pellet press system (IES-PP) from the permit because emissions from the transfer of material from pellet mills to the pellet mills collection conveyor are included in the pellet cooler (ES-CLR1 through ES-CLR6) exhaust;
- Add two (2) pellet mills, one (1) pellet cooler (ES-CLR6), and one (1) simple cyclone (CD-CLR-4) and route exhaust from all existing and new pellet mills, pellet coolers, multicyclones, and simple cyclones to a proposed quench duct, followed by a proposed RTO/RCO (CD-RCO);
- Include the dry shavings system ID (IES-DRYSHAVE) to recognize emissions associated with the receipt and handling of dry shavings;
- Include the existing dry shavings hammermill and associated material recovery cyclone as an emission source (ES-DSHM). A portion of the dry shavings hammermill exhaust is recirculated back to the front of the dry shavings hammermill. The remaining exhaust is routed to the dried

wood day silo (ES-DWDS). ES-DWDS exhausts to bin filter vent (CD-DWDS-BV) which will be routed to the pellet mill/pellet cooler proposed quench duct and RTO/RCO (CD-RCO);

- Upsize the finished product handling pellet screen to accommodate the proposed production increase;
- Add two (2) existing diesel storage tanks (IES-TK-3 and IES-TK-4). IES-TK-3 is used to fill mobile equipment in the wood yard and the fire pump diesel engine tank (IES-TK-2). IES-TK-4 is used to provide fuel for front-end loaders and other facility equipment;
- Add a compressed natural gas (CNG) terminal (IES-CNGT) as a backup to the natural gas supply for the proposed RTO (CD-RTO), RTO/RCO (CD-RCO), and double duct burners (IES-DDB-1 and IES-DDB-2);
- Rename source IDs for the diesel storage tanks from IST-1 and IST-2 to IES-TK-1 and IES-TK-2;
- Remove the hammermill area from source ID ES-DHM-5 and create a separate source ID, dust control system (ES-DCS), to reflect the emissions that are not attributable to the dry hammermill 5 (ES-DHM-5); and
- Update criteria pollutant and HAP emissions factors.

Enviva is submitting this Title V renewal and modification application pursuant to the requirements of 15A NCAC 02Q .0513 (Permit Renewal and Expiration) and 15A NCAC 02Q .0516 (Significant Permit Modification) and in accordance with the procedures of 15A NCAC 2Q .0501(c)(1). As required, three (3) copies of the complete permit renewal/modification application package and an application processing fee for a permit modification in the amount of $988 will be submitted via electronic payment. In addition, Enviva has submitted the required zoning determination documents to the Town of Ahoskie Planning and Zoning Administrator. A copy of the submitted zoning consistency determination request is included as an appendix to the application.

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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cc: Yana Kravtsova (Enviva)
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Enclosures: Permit Application including Appendices

Prepared for
Enviva Pellets Ahoskie, LLC
Hertford County, North Carolina

Prepared By
Ramboll US Corporation
Baton Rouge, Louisiana

Project Number
1690014763-009

Date
August 2020

TITLE V RENEWAL AND MODIFICATION APPLICATION FOR PSD MINOR SOURCE STATUS

ENVIVA PELLETS AHOSKIE, LLC

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APPENDICES

ACRONYMS AND ABBREVIATIONS

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

ACRONYMS AND ABBREVIATIONS (Continued)

$PM_{2.5}$	Particulate Matter Less Than 2.5 Micrometers in Aerodynamic Diameter
PM_{10}	Particulate Matter Less Than 10 Micrometers in Aerodynamic Diameter
PSD	Prevention of Significant Deterioration
PSEU	Pollutant-Specific Emission Unit
RICE	Reciprocating Internal Combustion Engine
RCO	Regenerative Catalytic Oxidizer
RTO	Regenerative Thermal Oxidizer
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SFI	Sustainable Forestry Initiative
TAP	Toxic Air Pollutant
TCO	Thermal Catalytic Oxidizer
tph	tons per hour
tpy	tons per year
VOC	Volatile Organic Compounds
WESP	Wet Electrostatic Precipitator

1. INTRODUCTION

Enviva Pellets Ahoskie, LLC (Enviva) owns and operates a wood pellet manufacturing plant (referred to herein as "the Ahoskie plant", "the plant", or "the facility") in Hertford County, North Carolina. The plant currently operates under Air Quality Permit No. 10121T04 issued by the North Carolina Department of Environmental Quality (NCDEQ), Division of Air Quality (DAQ) on June 6, 2016. The plant consists of the following processes: Log Chipper, Bark Hog, Green Hammermill, Rotary Dryer, Dry Hammermills, Pellet Mills and Coolers, Product Loadout operations and other ancillary activities.

The Ahoskie plant is currently permitted as a major source with respect to the Title V and New Source Review (NSR) permitting programs because potential facility-wide emissions of one or more criteria pollutants were estimated to exceed the major source thresholds of 100 tons per year (tpy) and 250 tpy, respectively. The plant is currently permitted as a minor source of hazardous air pollutants (HAP).

Enviva is submitting this renewal and modification application pursuant to the requirements of 15A NCAC 02Q .0513 (Permit Renewal and Expiration) and 15A NCAC 02Q .0516 (Significant Permit Modification) and in accordance with the procedures of 15A NCAC 2Q .0501(c)(1). The proposed modifications are being implemented to meet new customer softwood percentage and production rate demands and to significantly reduce emissions from the facility. Because of the emission reductions proposed as part of this modification, the Ahoskie plant's potential emissions will be less than the Prevention of Significant Deterioration (PSD) major source threshold; thus, the facility will be classified as a PSD minor source. The facility will continue to be classified as a major source under the Title V program and remain a minor source of HAP.

The following summarizes the proposed changes associated with this permit renewal and modification application:

- Increase production rate from 481,800 oven dried tons (ODT) per year to 630,000 ODT per year;
- Adjust percent of softwood processed to a facility-wide maximum of 100% annually;
- Reconfigure the wood yard area as follows: add three (3) truck tippers, add one (1) fresh reclaim hopper and one (1) mixed reclaim hopper, add automation including a stacker/reclaimer system to reduce manual handling using frontend loaders, include new conveyor drop points/material transfers, remove existing conveyor drop points/material transfers, remove the existing electric powered green wood chipper (IES-CHP1) and the existing debarker, and update emissions to reflect the proposed changes. The existing ID for green wood handling and storage will be renamed from IES-GWHS to ES-GWHS;
- Add three (3) green hammermills for a total of four (4) green hammermills (ES-GHM-1 through ES-GHM-4) and route the green hammermills exhaust to the inlet duct of the existing wet electrostatic precipitator (CD-WESP) and proposed RTO (CD-RTO). The existing green hammermill will be renamed from IES-CHP2 to ES-GHM-1;
- Add a regenerative thermal oxidizer (CD-RTO) to the existing dryer (ES-DRYER) following the existing WESP (CD-WESP). The existing WESP stack will be replaced with the proposed RTO stack (CD-RTO);

- Add two (2) double duct burners (IES-DDB-1 and IES-DDB-2), one on the dryer duct from the cyclone outlet to the ID fan and the other on the dryer duct for exhaust gas recirculation to the WESP to reduce the risk of fire;
- Incorporate the existing dryer and furnace bypass stacks and associated emissions (ES-FURNACEBYP) into the permit;
- Update the source ID for dried wood handling from IES-DWH to ES-DWH;
- Add two (2) dry hammermills (ES-DHM-6 and ES-DHM-7) and two (2) associated material collection cyclones and route the exhaust from ES-DHM-6 to existing fabric filter CD-DHM-FF1 and the exhaust from ES-DHM-7 to existing fabric filter (CD-DHM-FF2);
- Control emissions of volatile organic compounds (VOC) and HAPs from the existing and proposed new dry hammermills by routing a portion of the exhaust from each dry hammermill back to the front end of the dry hammermill. All exhaust gases ultimately exiting the dry hammermills will be routed to either the dryer (ES-DRYER) furnace, the dryer WESP (CD-WESP), or a combination of the two, prior to entering the dryer RTO (CD-RTO) for control;
- Addition of additive handling and storage to the list of insignificant activities (IES-ADD);
- Remove the existing insignificant emissions source pellet press system (IES-PP) from the permit, as emissions from the transfer of material from pellet mills to the pellet mills collection conveyor are included in the pellet cooler (ES-CLR1 through ES-CLR6) exhaust;
- Add two (2) pellet mills, one (1) pellet cooler (ES-CLR6), and one (1) simple cyclone (CD-CLR-4) and route exhaust from all existing and new pellet mills, pellet coolers, multicyclones, and simple cyclones to a proposed quench duct, followed by a proposed RTO/RCO (CD-RCO);
- Include the dry shavings system ID (IES-DRYSHAVE) to recognize emissions associated with the receipt and handling of dry shavings;
- Include the existing dry shavings hammermill and associated material recovery cyclone as an emission source (ES-DSHM). A portion of the dry shavings hammermill exhaust is recirculated back to the front of the dry shavings hammermill. The remaining exhaust is routed to the dried wood day silo (ES-DWDS). ES-DWDS exhausts to bin filter vent (CD-DWDS-BV) which will be routed to the pellet mill/pellet cooler proposed quench duct and RTO/RCO (CD-RCO);
- Upsize the finished product handling pellet screen to accommodate the proposed production increase;
- Add two (2) existing diesel storage tanks (IES-TK-3 and IES-TK-4). IES-TK-3 is used to fill mobile equipment in the wood yard and the fire pump diesel engine tank (IES-TK-2). IES-TK-4 is used to provide fuel for front-end loaders and other facility equipment;
- Add a compressed natural gas (CNG) terminal (IES-CNGT) as a backup to the natural gas supply for the proposed RTO (CD-RTO), RTO/RCO (CD-RCO), and double duct burners (IES-DDB-1 and IES-DDB-2);
- Rename source IDs for the diesel storage tanks from IST-1 and IST-2 to IES-TK-1 and IES-TK-2;

- Remove the hammermill area from source ID ES-DHM-5 and create a separate source ID, dust control system (ES-DCS), to reflect emissions that are not attributable to dry hammermill 5 (ES-DHM-5); and
- Update criteria pollutant and HAP emissions factors.

A description of the process is provided in Section 2 and methodologies used to quantify potential emissions are summarized in Section 3. Section 4 describes the applicability of federal and state permitting programs. Section 5 includes a detailed applicability analysis of both federal and state regulations. Section 6 includes the Air Toxics Modeling Analysis. Appendix A includes an Area Map, Appendix B includes the Process Flow Diagram, Appendix C includes the Potential Emission Calculations, Appendix D includes the completed Permit Application Forms, Appendix E includes the Compliance Assurance Monitoring (CAM) Plans, Appendix F includes Supporting Documentation for TAP Modeling Analysis, and Appendix G includes the Modeled Source Layout. A copy of the submitted zoning consistency determination request is included in Appendix H.

2. PROCESS DESCRIPTION

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

The following sections provide a description of the Ahoskie plant process. An area map and process flow diagram are provided in Appendices A and B, respectively.

2.1 Green Wood Handling and Storage (ES-GWHS), Bark Hog (IES-BARK), and Green Wood Fuel Storage Bin (IES-GWFB)

"Green" (i.e., fresh cut) pre-chipped wood and bark are delivered to the plant via trucks from commercial harvesting and chipping operations and removed from the trucks using four (4) truck tippers. Oversized green wood material is removed from the pre-chipped wood and is transferred to the bark fuel storage pile for use in the furnace as fuel. Pre-chipped wood for drying is transferred by front end loader to the green wood storage piles and/or mixed wood storage pile. From the storage piles, the pre-chipped wood is placed into either the fresh reclaim hopper or the mixed reclaim hopper for processing in the green hammermills.

Purchased bark is removed from trucks using a truck tipper and the bark is then transferred by front end loader to the bark fuel storage pile for use as furnace fuel. The bark and oversized green wood material are placed into the bark reclaimer hopper for transfer through the fuel screener where oversized material is separated and hogged in the bark hog (IES-BARK) prior to being utilized as fuel. Following the fuel screener and bark hog, the bark and wood chips are transferred to an enclosed green wood fuel storage bin (IES-GWFB) where the material is pushed into the furnace. All transfer points and storage piles associated with the wood yard are captured by the green wood handling and storage source (ES-GWHS).

Pre-dried wood, also referred to as Dry Shavings, is received by truck, unloaded by a truck tipper, transferred to storage and processing by front end loader.

2.2 Green Hammermills (ES-GHM-1 through ES-GHM-4)

Prior to drying, chips from the green softwood and/or mixed wood storage piles will be processed in the green hammermills to reduce material to the proper size. In this application, Enviva is requesting approval to construct and operate three (3) new green hammermills (for a total of four (4) units) at the Ahoskie plant. Also, pursuant to this application, Enviva is

requesting to remove the existing green hammermill (IES-CHP2) from the Insignificant Activities List and include all green hammermills as emissions sources (ES-GHM-1 through ES-GHM-4). Emissions from the green hammermills will be routed for control to the existing dryer WESP (CD-WESP) and the proposed dryer RTO (CD-RTO).

2.3 Dryer (ES-DRYER) and Double Duct Burners (IES-DDB-1 and IES-DDB-2)

The existing dryer (ES-DRYER) uses direct contact heat provided to the system via a 175.3 million British thermal unit per hour (MMBtu/hr) total heat input furnace that uses bark and oversized wood chips as fuel.

Green wood is fed into the dryer where moisture content is reduced to the desired level and routed to a simple cyclone for material recovery. Exhaust from the cyclone is routed to the existing dryer WESP (CD-WESP) for particulate, metallic HAP, and hydrogen chloride removal.

In order to reduce VOC and HAP emissions from the dryer and other sources, the Ahoskie plant is proposing to construct and operate a RTO (CD-RTO). The dryer RTO will receive the exhaust from the existing dryer WESP (CD-WESP) to control VOC and HAP emissions generated during drying operations. Pursuant to this application, the dryer RTO (CD-RTO) will also receive exhaust from the green hammermill and dry hammermill operations (refer to Sections 2.2 and 2.5 for additional details).

As exhaust gas exits the dryer and begins to cool, wood tar (i.e., pitch) can condense and coat the inner walls of the dryer ducts creating a risk of fire. To prevent build-up of pitch and thus reduce the risk of fire, the two dryer 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 low-NO_x burner with a maximum heat input rating of 2.5 MMBtu/hr. A second 2.5 MMBtu/hr low-NO_x burner will be used to heat the duct used for exhaust gas recirculation to the WESP. The double duct burners (IES-DDB-1 and IES-DDB-2) will combust natural gas and will exhaust directly to atmosphere.

2.4 Furnace Bypass Stack (ES-FURNACEBYP) and Dryer Bypass Stack

Bypass stacks for the dryer and furnace may be used to exhaust hot gases during start-ups (for temperature control), shutdowns, and malfunctions. Specifically, the furnace bypass stack (ES-FURNACEBYP) will be used in the following situations:

- **Cold Start-ups:** The furnace bypass stack is used when the furnace is started up from a cold shutdown until the refractory is sufficiently heated and can sustain operations at a low level (approximately 15% of the maximum heat input rate). The bypass stack is then closed, and the furnace is slowly brought up to a normal operating rate. Use of the furnace bypass stack for cold start-ups will be limited to 50 hours per year at 26.3 MMBtu/hr. Diesel fuel may be used as an accelerant for cold start-ups. The amount used per event is typically 15 – 30 gallons and the annual usage is typically 100 – 200 gallons. Emissions resulting from diesel usage during cold start-ups are insignificant.
- **Idle mode:** The furnace may also operate up to 500 hours per year in idle mode with emissions routed to the furnace bypass stack. The purpose of operation in idle mode is to maintain the temperature of the fire brick lining the furnace which may be damaged if it cools too rapidly. Operation in "idle mode" also significantly reduces the amount of time required to restart the furnace. Use of the furnace bypass stack for idle mode will be limited to 500 hours per year at 15 MMBtu/hr.
- **Planned Shutdown:** In the event of a planned shutdown, the furnace heat input is decreased and all remaining fuel is moved through the system to prevent a fire. The

remaining fuel is combusted prior to opening the furnace bypass stack. The furnace bypass stack is not utilized until after the furnace achieves an idle state (15 MMBtu/hr or less). Until this time, emissions continue to be controlled by the WESP and RTO.

- **Malfunction:** The furnace automatically aborts to the bypass stack in the event of a malfunction. Aborts may be triggered by failsafe interlocks associated with the furnace or dryer and emissions control systems or utility supply systems (i.e., electricity, compressed air, water/fire protection). As soon as the furnace aborts it automatically switches to "idle mode" (defined as operation at up to a maximum heat input rate of 15 MMBtu/hr), the fuel feed is stopped, and the heat input rate drops rapidly.

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

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

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

2.5 Dried Wood Handling (ES-DWH), Dry Hammermills (ES-DHM-1 through ES-DHM-7), and Dust Control System (ES-DCS)

Dried wood from the dryer material recovery cyclone is conveyed to the dry hammermills via the dried wood handling system. The dried wood handling emission source (ES-DWH) consists of partially enclosed conveyor systems, conveyor transfer points along the post-dryer conveyance system, an enclosed screener, and dry hammermill surge bins. Due to updated emissions estimates, this source will no longer be considered insignificant and therefore Enviva requests the ID be changed from IES-DWH to ES-DWH.

Dried wood is routed to one of seven (7) dry hammermills (ES-DHM-1 through ES-DHM-7) for further size reduction prior to pelletization. The Ahoskie plant is currently permitted to operate five (5) dry hammermills; however, Enviva is requesting authorization to construct and operate two (2) additional dry hammermills with this application. Each existing and proposed

dry hammermill includes an associated material recovery cyclone that is routed to one of three (3) baghouses (CD-DHM-FF1 through CD-DHM-FF3) for particulate matter (PM) control. The exhaust from ES-DHM-6 will be routed to existing fabric filter CD-DHM-FF1 and the exhaust from ES-DHM-7 will be routed to existing fabric filter CD-DHM-FF2.

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

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

Milled wood from the dry hammermill material recovery cyclones is transferred to the enclosed dry hammermill system discharge collection drag chain conveyor, then to the pellet mill feed silo infeed drag chain conveyor, and then to the pellet mill feed silo infeed screw conveyor. The dust control system (ES-DCS) collects PM from the dry hammermill area, including some dust from the underside of the post-dryer conveyor system. The collected material is routed to the existing dry hammermill baghouse, CD-DHM-FF3. Enviva is creating the dust control system source (ES-DCS) to reflect emissions associated with the dry hammermill area currently permitted in source (ES-DHM-5). The hammermill area should thus be removed from source ES-DHM-5.

2.6 Pellet Mill Feed Silo (ES-PMFS)

As previously noted, milled wood from the dry hammermill material recovery cyclones is transferred via a set of conveyors to the pellet mill feed silo (ES-PMFS) prior to pelletization. Particulate emissions from the pellet mill feed silo are controlled by a baghouse (CD-PMFS-BV).

2.7 Additive Handling and Storage (IES-ADD)

Additive may be used in pellet production to act as a lubricant for the dies and increase the durability of the final product. Additive is currently received in 2,000 pound (lb) supersacks and emptied into a hopper. The additive is transferred from the hopper via an enclosed screw conveyor and is added to milled wood from the pellet mill feed silo discharge screw conveyor prior to transfer to the pellet mills. Because of the minimal particulate matter emissions, the additive Handling and Storage (IES-ADD) activities are an insignificant activity. The additive contains no hazardous chemicals or VOCs.

2.8 Pellet Mills and Pellet Coolers (ES-CLR1 through ES-CLR6)

Milled wood is mechanically compacted through presses in the pellet mills. Pursuant to this application, exhaust from the pellet mills and pellet mill conveyors will be vented through the pellet cooler aspiration material recovery cyclones (CD-CLR-C1 through CD-CLR-C4) and pollutant controls as described below, and then to the atmosphere.

Formed pellets are currently discharged into one of five (5) pellet coolers (ES-CLR1 through ES-CLR5). With this application, Enviva is proposing to install two (2) additional pellet mills and one (1) pellet cooler (ES-CLR6) for a total of twelve (12) pellet mills and six (6) pellet coolers. Similar to the existing pellet coolers, one (1) simple cyclone (CD-CLR-C4) is being proposed to receive the air stream from the two (2) new pellet mills and one (1) new pellet cooler (ES-CLR6). Following the material recovery cyclones (CD-CLR-C1 through CD-CLR-C4), the captured material is conveyed to a rotary feeder to the high pressure blow line (HPBL) that routes the material to the pellet mill feed silo (ES-PMFS). All exhaust from the pellet mills and pellet coolers is proposed to be routed to a quench duct and RTO/RCO (CD-RCO) to reduce VOC and HAP emissions prior to venting to the atmosphere. The quench duct is considered inherent process equipment that is required for the RTO/RCO (CD-RCO) to operate safely (reduce the risk of fire). A safety interlock will be installed to cease operation of the pellet mills and coolers if a minimum flow rate is not maintained or the RTO/RCO is not ready for operation. The RTO/RCO will operate in catalytic mode with thermal mode as a back-up during catalyst cleaning.

2.9 Dry Shavings Handling and Storage (IES-DRYSHAVE), Dried Wood Day Silo (ES-DWDS), and Dry Shavings Hammermill (ES-DSHM)

In addition to green chips, purchased dry wood and shavings are used to produce pellets, forgoing the green hammermill and drying processes and thus minimizing on-site VOC and HAP emissions. The purchased dry wood/shavings are unloaded from trucks via a truck tipper. The purchased dry wood/shavings are transported via frontend loader to a covered storage pile from which they are fed to a dedicated dry shavings hammermill (ES-DSHM). The milled purchased dry wood/shavings exiting the dedicated dry shavings hammermill are conveyed to a rotary valve where the material enters the HPBL for transfer to the dried wood day silo (ES-DWDS). Emissions from loading and unloading of the silo are controlled by the dry wood day silo bin vent filter (CD-DWDS-BV). From the dried wood day silo, the milled dry shavings are transferred to the pellet mill feed silo (ES-PMFS) for further processing.

Pursuant to this application, Enviva is requesting to include the existing dry shavings handling and storage source (IES-DRYSHAVE) and the existing dry shavings hammermill (ES-DSHM) in the permit. Currently, exhaust from the dry shavings hammermill is routed to a material recovery cyclone. A portion of the cyclone exhaust is recirculated back to the front of the dry shavings hammermill (ES-DSHM) and the remainder of the exhaust gases are routed to the dried wood day silo (ES-DWDS) that is controlled by the dry wood day silo bin vent filter (CD-DWDS-BV). Pursuant to this application, Enviva is proposing to route the dry wood day silo bin vent filter (CD-DWDS-BV) exhaust stream to the proposed quench duct and RTO/RCO (CD-RCO) to reduce VOC and HAP emissions from the dry shavings hammermill (ES-DSHM).

2.10 Finished Product Handling (ES-FPH), Fines Bin (ES-FB), Pellet Loadout (ES-PL1 and ES-PL2) and Truck Loadout Bin (ES-TLB)

Following the pellet coolers, pellets are conveyed to finished product handling (ES-FPH) where the final product is conveyed across a pellet screener, onto a collection conveyor, and then to

a bucket elevator where it is dropped through pipe chutes onto a belt that feeds the truck loadout bin (ES-TLB). From the bin, pellets are gravity fed onto two (2) transfer belts per loading station which transfer pellets to a shuttle belt that drops pellets into trucks through one of two (2) covered chutes (ES-PL1 and ES-PL2). Finished product handling (ES-FPH), truck loadout bin (ES-TLB), and pellet loadout (ES-PL1 and ES-PL2) emissions are vented into the finished product handling baghouse (CD-FPH-BF) as a fire prevention measure to prevent any build-up of dust on surfaces within the finished product handling building. Fines from the finished product handling baghouse (CD-FPH-BF) are directed through an air lock to the HPBL and pneumatically transferred to the fines bin (ES-FB) which is controlled by a separate baghouse (CD-FB-BV). Collected fines are reintroduced into the pellet production process.

2.11 Emergency Generator (IES-EG), Fire Water Pump Engine (IES-FWP), and Diesel Storage Tanks (IES-TK-1, IES-TK-2, IES-TK-3, and IES-TK-4)

The plant has a 350 brake horsepower (bhp) diesel-fired emergency generator (IES-GN) for emergency operations and a 300 bhp diesel-fired fire water pump engine (IES-FWP). Aside from maintenance and readiness testing, the generator and fire water pump engines are only utilized for emergency operations.

The plant also includes several diesel storage tanks. With this application, Enviva proposes to rename two (2) existing tanks that are in the permit from IST-1 and IST-2 to IES-TK-1 and IES-TK-2 and add two (2) other existing diesel storage tanks to the permit (IES-TK-3 and IES-TK-4). Diesel for the existing emergency generator (IES-EG) is stored in a tank of up to 2,500 gallons capacity (IES-TK-1) and diesel for the fire water pump engine is stored in a tank of up to 500 gallon capacity (IES-TK-2). IES-TK-3 (up to 600 gallon capacity) is used to fill mobile equipment in the wood yard and the fire pump diesel engine tank (IES-TK-2). IES-TK-4 (up to 1,000 gallon capacity) is used to provide fuel for front-end loaders and other facility equipment.

2.12 Compressed Natural Gas (CNG) Terminal (IES-CNGT)

With this application, Enviva is proposing to add a compressed natural gas (CNG) terminal (IES-CNGT). CNG will serve as a backup fuel to the primary fuel, natural gas, which will be used for combustion by the burners in the dryer RTO (CD-RTO), the pellet cooler RTO/RCO (CD-RCO), and the two double duct burners (IES-DDB-1 and IES-DDB-2).[1] Note that there are no quantifiable emissions from this source and it is therefore classified as an insignificant activity in accordance with 15A NCAC 02Q.0503(8).

[1] Any activity whose emissions would not violate any applicable emissions standard and whose potential emissions of criteria pollutants before air control devices are each no more than 5 tpy and whose potential uncontrolled HAP emissions are each below 1,000 pounds per year are considered insignificant per 15A NCAC 02Q .0503(8).

3. POTENTIAL EMISSIONS QUANTIFICATION

The following summarizes the data sources and calculation methodologies used to quantify potential emissions from the Ahoskie plant. Detailed potential emissions calculations are provided in Appendix C. Note that Enviva has quantified potential greenhouse gas (GHG) emissions from all applicable emissions sources; however, GHG emission are not discussed in detail below. Detailed emission calculations for GHG emissions are provided in Appendix C.

3.1 Green Wood Handling and Storage (ES-GWHS)

Particulate emissions will occur during chip and bark receiving, conveying, and handling operations. Fugitive PM emissions from chip and bark transfer operations were calculated based on AP-42 Section 13.2.4, *Aggregate Handling and Storage Piles*.[2] Detailed potential emission calculations are provided in Appendix C.

3.2 Green Wood Storage Piles and Bark Fuel Storage Piles (ES-GWHS)

Particulate emission factors used to quantify potential emissions from storage pile wind erosion of the green wood storage piles and bark fuel storage piles were calculated based on USEPA's *Control of Open Fugitive Dust Sources*.[3] The number of days with rainfall greater than 0.01 inch was obtained from AP-42 Section 13.2.2, *Unpaved Roads*[4], and the percentage of time that wind speeds exceeds 12 miles per hour (mph) was determined based on meteorological data from Northampton, North Carolina. The conservative mean silt content of 8.4% for unpaved roads at lumber mills from AP-42 Section 13.2.2 was applied in the absence of site-specific data. The exposed surface area of the pile was calculated based on worst-case pile dimensions.

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

3.3 Bark Hog (IES-BARK)

PM emissions occur as a result of bark processing. Potential PM emissions from the bark hog (IES-BARK) were quantified based on emission factors from EPA's *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants* for Source Classification Code (SCC) 3-07-008-01 (Log Debarking).[6] All PM was assumed to be larger than 2.5 microns in diameter. PM emissions from the bark hog are minimal due to the high moisture content of green wood (~50%). VOC and methanol emissions were quantified based

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

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

[4] USEPA AP-42 Section 13.2.2, *Unpaved Roads* (11/06).

[5] NCASI. Technical Bulletin No. 700. Preliminary Investigation of Releases of Volatile Organic Compounds from Wood Residual Storage Piles. October 1995.

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

on emission factors for log chipping from AP-42 Section 10.6.3, *Medium Density Fiberboard*.[7] Detailed potential emission calculations for the bark hog are provided in Appendix C.

3.4 Green Wood Fuel Storage Bin (IES-GWFB)

Bark is transferred from the fuel storage piles via a walking floor to a covered conveyor and then to the fully enclosed green wood fuel storage bin (IES-GWFB). Due to complete enclosure of the green wood fuel storage bin (IES-GWFB), emissions from transfer of material into the bin were not specifically quantified.

3.5 Dryer (ES-DRYER), Green Hammermills (ES-GHM-1 through ES-GHM-4), Dry Hammermills (ES-DHM-1 through ES-DHM-7), and the Dust Control System (ES-DCS)

Exhaust from the dryer will be routed to a WESP and RTO (CD-RTO) for control of PM, VOC, and HAP. The green hammermills will share the dryer's existing WESP and proposed RTO for control of PM, VOC, and HAP. For potential-to-emit emissions estimates, green hammermill emissions are accounted for under the dryer WESP and RTO (CD-RTO). Exhaust from the dry hammermills and dust control system (ES-DCS), which also includes aspiration from the underside of the post-dryer conveyor system, will also be controlled by the dryer WESP and the proposed RTO (CD-RTO). Emissions from the dry hammermills and dust control system are therefore also accounted for under the dryer RTO (CD-RTO). Emissions of CO, NOx, VOC, and PM are based on emission factors developed from process knowledge and engineering judgment. 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*. HAP and toxics air pollutant (TAP) emissions were calculated based on emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers,*[8] and factors based on process knowledge and engineering judgment.

Emissions of CO and NO_X generated during thermal oxidization of VOC in the dry hammermill exhaust stream by the RTO were calculated based on AP-42 Section 1.4, *Natural Gas Combustion* and the maximum high heating value of the anticipated VOC constituents.[9]

Emissions from natural gas combustion by the RTO were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*[10] and NC DAQ's Wood Waste Combustion Spreadsheet.[11] Detailed emission calculations are provided in Appendix C.

3.6 Furnace Bypass - Cold Start-up (ES-FURNACEBYP)

Potential emissions of CO, NO_X, SO_2, PM, VOC, and HAP for furnace and dryer bypass during cold start-up were calculated based on emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers*.[12] Emissions were based on a maximum heat input value of 26.3 MMBtu/hr for the furnace and 50 hours per year of operation. As previously described in Section 2, during cold start-ups emissions may be released through the dryer bypass stack for

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

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

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

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

[11] 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.

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

approximately 10 minutes during transition from the furnace bypass stack to the WESP and RTO. Emissions during these brief transition periods are insignificant and are not separately quantified to avoid double-counting, as they are already included under the 50 hours per year of furnace bypass during cold start-up.

Diesel fuel may be used as an accelerant for cold start-ups; however, as the amount used per event is typically 15 – 30 gallons and the annual usage is typically 100 – 200 gallons, emissions resulting from the use of diesel fuel are insignificant and are not included in the ES-FURNACEBYP emission estimates. Detailed potential emission calculations are provided in Appendix C.

3.7 Furnace Bypass - Idle Mode (ES-FURNACEBYP)

The furnace will operate up to 500 hours per year in "idle mode", which is defined as operation up to a maximum heat input rate of 15 MMBtu/hr. During this time, emissions will exhaust out of the furnace bypass stack. 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*.[13] As previously described in Section 2, as the furnace ramps up from idle mode to normal operation, emissions may be released through the dryer bypass stack for approximately 10 minutes during transition from the furnace bypass stack to the WESP and RTO. Emissions during these brief transition periods are insignificant and are not separately quantified to avoid double-counting, as they are already included under the 500 hours per year of furnace bypass during idle mode. Detailed potential emission calculations are provided in Appendix C.

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

Emissions from natural gas combustion by the double duct burners (IES-DDB-1 and IES-DDB-2) were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*[14] and NC DAQ's Wood Waste Combustion Spreadsheet.[15]

Per 15A NCAC 02Q .0503(8), the double duct burners (IES-DDB-1 and IES-DDB-2) are considered insignificant activities because potential uncontrolled criteria pollutant emissions are less than 5 tpy and potential uncontrolled HAP emissions are each less than 1,000 pounds per year (lb/yr). Detailed emission calculations are provided in Appendix C.

3.9 Dried Wood Handling (ES-DWH)

As previously described in Section 2, dried wood handling (ES-DWH) consists of partially enclosed conveyor systems, conveyor transfer points located along the post-dryer conveyance system, and a dry hammermill surge bin. Particulate emissions from dried wood handling material transfer points were calculated using AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles*.[10] Emissions of VOC and HAP were calculated based on emission factors derived from process knowledge and engineering judgment. Detailed potential emission calculations are provided in Appendix C.

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[13] Ibid.

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

[15] 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.

3.10 Dry Shavings Reception, Handling, and Silo (IES-DRYSHAVE)

Particulate emissions will occur during unloading of dry shavings from the dry shavings truck tipper and dry shavings handling and storage activities (IES-DRYSHAVE). Potential emissions from dry shavings transfer activities associated with IES-DRYSHAVE were calculated based on AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles*.[16] Detailed potential emission calculations are provided in Appendix C.

3.11 Pellet Mill Feed Silo (ES-PMFS)

The pellet mill feed silo is equipped with a baghouse (CD-PMFS-BV) to control PM emissions associated with silo loading and unloading operations. PM emissions are calculated based on an exit grain loading rate and the exhaust flow rate of the bin vent. Detailed potential emission calculations are provided in Appendix C.

3.12 Additive Handling and Storage (IES-ADD)

An additive may be used in the pellet production process to increase the durability of the final product. As discussed in Section 2, additive is currently received in 2,000 lb supersacks and emptied into a hopper. Potential PM emissions from emptying supersacks into a hopper were calculated based on AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles*.[17]. Additive Handling and Storage (IES-ADD) is considered an insignificant activity per 15A NCAC 02Q .0503(8) because potential uncontrolled PM emissions are less than 5 tpy. Detailed potential emissions calculations are provided in Appendix C.

3.13 Dry Shavings Hammermill (ES-DSHM), Dried Wood Day Silo (ES-DWDS), and Pellet Mills and Pellet Coolers (ES-CLR1 through ES-CLR6)

The dry shavings hammermill (ES-DSHM), which processes purchased dry shavings prior to conveyance and storage in the dried wood day silo (ES-DWDS), generates PM, HAP, and VOC emissions. The dry shavings are combined with dried milled wood and are processed in the pellet mills and pellet coolers (ES-CLR1 through ES-CLR6).

The pellet mills and pellet coolers (ES-CLR1 through ES-CLR6) generate PM, HAP, and VOC emissions during the forming and cooling of wood pellets. The two (2) existing multicyclones (CD-CLR-C1 and CD-CLR-C2) each control emissions from four (4) pellet mills and two (2) pellet coolers (ES-CLR1 through 4). An existing simple cyclone (CD-CLR-C3) controls emissions from an additional two (2) pellet mills and one (1) pellet cooler (ES-CLR5). Pursuant to this application, a new simple cyclone will be installed (CD-CLR-C4) to control PM emissions from the two (2) new pellet mills and new pellet cooler (ES-CLR6).

The exhaust streams from the pellet mills and pellet coolers (ES-CLR1 through ES-CLR6), as well as exhaust from the dry shavings hammermill (ES-DSHM), via the dried wood day silo (ES-DWDS), will be routed to a quench duct and then to an RTO/RCO (CD-RCO) for VOC and HAP control. The quench duct is considered inherent process equipment that is required to be installed for the RTO/RCO (CD-RCO) to operate safely (reduce the risk of fire) and is not a control device. A safety interlock will be installed to cease operation of the pellet mills and coolers if a minimum quench flowrate is not maintained. PM, VOC, and HAP/TAP emissions from the pellet mills, pellet coolers, the dry shavings hammermill, and the dried wood day silo were quantified at the outlet of the RTO/RCO (CD-RCO) based on process knowledge and engineering judgment. Controlled VOC and HAP/TAP emissions were conservatively based on

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

[17] Ibid.

process information and an appropriate contingency based on engineering judgement. The RTO/RCO will primarily operate in catalytic mode with thermal mode as a back-up during catalyst cleaning; however, the destruction efficiency of the control device is comparable in either mode of operation. Detailed calculations are provided in Appendix C.

3.14 Fines Bin (ES-FB), Truck Loadout Bin (ES-TLB), Pellet Loadout (ES-PL1 and ES-PL2), and Finished Product Handling (ES-FPH)

PM emissions from transfers associated with finished product handling (ES-FPH), the truck loadout bin (ES-TLB), and the pellet loadout (ES-PL1 and ES-PL2) are controlled by the finished product handling baghouse (CD-FPH-BF). Fines from the finished product handling baghouse (CD-FPH-BF) are directed to the fines bin (ES-FB) which is controlled by a baghouse (CD-FB-BV). Potential PM emissions were calculated based on an exit grain loading rate and the exhaust flow rate for each baghouse. Detailed potential emissions calculations are provided in Appendix C.

3.15 Emergency Generator (IES-EG) and Fire Water Pump Engine (IES-FWP)

Operation of the emergency generator and fire water pump generates emissions of criteria pollutants and HAP. Potential PM, NO_X, and CO emissions from operation of the emergency generator were calculated based on applicable emission standards from 40 CFR 60 Subpart IIII (or 40 CFR 89 where applicable) and the maximum horsepower rating of the engine. NO_X emissions were conservatively based on the emission standard for NO_X + non-methane hydrocarbon (NMHC). Potential SO_2 emissions were calculated based on the fuel sulfur restriction in 40 CFR 60 Subpart IIII, assuming that all of the sulfur present in the diesel fuel is emitted as SO_2.[18] Potential VOC and HAP emissions from both engines, as well as potential PM, NO_X, CO, and SO_2 emissions from the fire water pump engine, were quantified based on emission factors from AP-42 Section 3.3, *Stationary Internal Combustion Engines*.[19] Annual potential emissions were conservatively calculated based on 500 hours per year.

The emergency generator and fire water pump engine are considered insignificant activities pursuant to 15A NCAC 02Q .0503(8). Detailed potential emission calculations are provided in Appendix C.

3.16 Diesel Storage Tanks (IES-TK-1, IES-TK-2, IES-TK-3, and IES-TK-4)

The storage of diesel in on-site storage tanks generates emissions of VOC. VOC emissions from the four (4) diesel storage tanks were calculated using AP-42, Chapter 7 based on actual tank characteristics (e.g., orientation, dimensions, etc.) and potential annual throughput. VOC emissions from each storage tank are below 5 tpy and thus, per 15A NCAC 02Q .0503, they are considered insignificant activities. Detailed potential emission calculations are provided in Appendix C.

3.17 Haul Roads

Fugitive PM emissions occur as a result of trucks and employee vehicles traveling on paved and unpaved roads on the Ahoskie plant property. Emission factors for paved roads were calculated based on Equation 2 from AP-42 Section 13.2.1, *Paved Roads*[20] using the mean silt loading for quarries (8.2 g/m^2) and 120 days with rainfall greater than 0.01 inch based on

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

[19] USEPA AP-42 Section 3.3, *Stationary Internal Combustion Engines* (10/96).

[20] USEPA AP-42 Section 13.2.1, *Paved Roads* (01/11).

Figure 13.2.1-2. Emission factors for unpaved roads were calculated based on Equation 1a from AP-42 Section 13.2.2, *Unpaved Roads*[21] using a surface material silt content (8.4%) and 120 days with rainfall greater than 0.01 inch based on Figure 13.2.1-2. A 90% control efficiency was applied for water/dust suppression activities. This control efficiency is based on data from the *Air Pollution Engineering Manual* of the Air and Waste Management Association. Detailed potential emissions calculations are provided in Appendix C.

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

4. STATE AND FEDERAL PERMITTING APPLICABILITY

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

4.1 Federal Permitting Programs

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

4.1.1 New Source Review

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

NNSR permitting requirements apply to new or existing stationary sources located in an area where concentrations of a "criteria pollutant"[22] 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.

The Ahoskie plant is located in Hertford County, which is classified as attainment or unclassifiable for all criteria pollutants.[23] The Ahoskie plant is currently permitted as a PSD major source because facility-wide potential emissions of VOC are above the major source threshold of 250 tpy. Enviva is submitting this application for renewal of the Title V permit and to request authorization for various changes required to meet new customer softwood percentage and production rate demands and to significantly reduce emissions from the facility. The Ahoskie plant will become a synthetic minor source with respect to PSD following implementation of the changes proposed in this application. A comparison of the currently permitted potential to emit (PTE) to the proposed PTE after implementation of the changes proposed in this application is provided in Table 4-1.

[22] 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.

[23] 40 CFR 81.334

Table 4-1. Comparison of Facility-wide Potential Emissions (Excluding Fugitives)

Emissions Scenario	CO (tpy)	NO_X (tpy)	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	VOC (tpy)	CO_2e (tpy)
Proposed PTE	150.84	147.39	63.12	60.79	52.65	19.52	140.26	228,456
Previous PTE	45.09	183.98	129.66	129.63	129.63	19.20	391.60	162,292
Change in PTE	+105.75	-36.59	-66.54	-68.84	-76.98	+0.32	-251.34	+66,164

4.1.2 Title V Operating Permit Program

The federal Title V Operating Permit program is promulgated in 40 CFR Part 70 and is implemented in North Carolina via 15A NCAC 2Q .0500. The Ahoskie plant is, and will remain, a major source with respect to the Title V Operating Permit Program because facility-wide emissions of one or more criteria pollutants exceed the major source threshold of 100 tpy. The Ahoskie plant is currently permitted as a minor source of HAP and will continue to be so following the proposed changes. Enviva is submitting this application for renewal of Title V Permit No. 10121T04 which expires on May 31, 2021. A permit renewal application is required to be submitted at least nine months prior to permit expiration per Condition 3.K of the current permit.[24]

4.2 North Carolina Permitting Program

Title V permitting procedures are included in 15 NCAC 02Q .0500. Specifically, 15A NCAC 02Q .0513 addresses Title V permit renewal and expiration, 15A NCAC 02Q .0516 addresses significant permit modifications, and 15 NCAC 02Q .0501 addresses the requirements for a Title V permit. As Enviva is submitting a Title V renewal application that is proposing a significant modification, a construction and operation permit must be obtained pursuant to the procedures of 15A NCAC 2Q .0501(c)(1) before Enviva can begin construction or make modifications. The required application forms are included as Appendix D.

[24] 15A NCAC 02Q .0513(b) requires submittal of a permit renewal application at least six months before the date of permit expiration.

5. REGULATORY APPLICABILITY

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

5.1 New Source Performance Standards

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

5.1.1 40 CFR 60 Subpart A – General Provisions

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

5.1.2 40 CFR 60 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 proposed double duct burners each have a maximum heat input of 2.5 MMBtu/hr and are not steam generating units; therefore, NSPS Subpart Dc does not apply.

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

NSPS Subpart Kb applies to volatile organic liquid (VOL) storage tanks that were constructed after July 23, 1984, have a maximum storage capacity greater than or equal to 75 m^3 (19,813 gal), and meet the following criteria:[25]

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

The Ahoskie plant includes four (4) diesel storage tanks. These tanks are not subject to NSPS Subpart Kb, as the storage capacity of each tank is less than 19,813 gal, and diesel has a maximum true vapor pressure less than 2.2 psia.

5.1.4 40 CFR 60 Subpart CCCC – Standards of Performance for Commercial and Industrial Solid Waste Incineration Units

NSPS Subpart CCCC regulates emissions from commercial and industrial solid waste incineration (CISWI) units. A CISWI unit combusts a solid waste meeting the definition under §241.2. The Ahoskie plant's dryer is heated by a furnace which combusts bark and wood chips 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

[25] 40 CFR 60.110b(a)-(b)

not solid waste. As such, the furnace is not considered a CISWI unit, and Subpart CCCC does not apply.

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

Subpart IIII applies to owners or operators of compression ignition (CI) internal combustion engines (ICE) manufactured after April 1, 2006 that are not fire pump engines, and fire pump engines manufactured after July 1, 2006. The 350 bhp emergency generator at the Ahoskie plant is subject to NSPS Subpart IIII. The 300 bhp fire water pump engine was manufactured in March of 1999 and therefore is not subject to the requirements of this subpart.

The emergency generator must meet the emission standards for new nonroad CI engines in Table 1 to §89.112 for engines with a displacement less than 30 liters per cylinder and a maximum power rating greater than 37 kW as required by §60.4205(b) and §60.4202(a)(2).

The emergency generator is operated for no more than 100 hours per year for the purposes of maintenance and readiness checks [§60.4211(f)(2)] and combusts ultra-low sulfur diesel (15 ppm) as required by §60.4207(b) and specified in §80.510(b)(1)(i). Enviva operates and maintains the emergency generator engine in accordance with the manufacturer's emission-related written instructions and will not change any emissions-related settings other than those that are permitted by the manufacturer [§60.4211(a)(1) and (2)]. Enviva purchased a certified engine and installed and configured the emergency generator engine according to the manufacturer's emission-related specifications as required by §60.4211(c).

5.2 National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP) regulate HAP emissions and apply to certain major and area sources of HAP. NESHAP can be found in 40 CFR Part 63 and have been incorporated by reference in 15A NCAC 02D .1111. As previously discussed, the Ahoskie plant will continue to be permitted as a minor source of HAP due to potential facility-wide total HAP emissions below 25 tpy, and maximum individual HAP emissions below 10 tpy. Please refer to potential emission calculations provided in Appendix C.

5.2.1 40 CFR 63 Subpart A – General Provisions

All sources subject to a NESHAP are subject to the general requirements under Subpart A unless excluded by the source-specific subpart. Subpart A includes requirements for initial notification, performance testing, recordkeeping, monitoring, and reporting. The emergency generator and fire water pump are subject to Subpart ZZZZ of this part (applicability discussed below) and thus, Subpart A also applies to these sources.

5.2.2 40 CFR 63 Subpart B – Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Section 112(g)

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

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

Subpart DDDD regulates HAP emissions from plywood and composite wood products (PCWP) manufacturing facilities located at major sources of HAPs. A PCWP manufacturing facility is defined in §63.2292 as one that manufactures plywood and/or composite wood products by bonding wood material or agricultural fiber to form a panel, engineered wood product, or other product defined in §63.2292. Further, an engineered wood product is defined as a product made with wood elements that are bound together with resin, such as laminated strand lumber and glue-laminated beams. The wood pellets manufactured at the Ahoskie plant do not meet the definition for any of the PCWP products defined in §63.2292 as being subject to Subpart DDDD. Specifically, the wood pellets are not an engineered wood product, as they are not bound together with resin or other chemical agent. Further, the Ahoskie facility is permitted as a minor source of HAP and will remain a minor source of HAPs. As such, this regulation does not apply.

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

Subpart ZZZZ applies to reciprocating internal combustion engines (RICE) located at 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 Ahoskie plant's emergency generator and emergency fire water pump engine are classified as emergency RICE under Subpart ZZZZ. Further, the emergency generator engine is classified as a new source, as it was constructed after June 12, 2006. The emergency fire water pump engine is classified as an existing source as it was constructed before June 12. 2006.

Because the plant's 350 bhp emergency generator is classified as a new or reconstructed CI engine with a rating less than or equal to 500 bhp located at an area source of HAP, it is only subject to the requirement to comply with the applicable provisions of NSPS Subpart IIII, per §63.6590(c)(1), and no further requirements apply under Subpart ZZZZ.

The plant's 300 bhp emergency fire water pump engine is classified as an existing emergency stationary reciprocating internal combustion engine less than 500 bhp and is subject to different requirements under Subpart ZZZZ. The fire water pump engine must be equipped with a non-resettable hour meter and may be operated for no more than 100 hours per year for the purposes of maintenance and readiness checks [§63.6440(f)(4)]. The fire water pump engine and after-treatment control device (if any) must be operated and maintained according to the manufacturer's emission-related written instructions or the facility must develop a maintenance plan that provides to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions [§63.6625(e)]. Oil and filter changes, as well as air cleaner, hoses, and belts inspection and replacement must be conducted as specified in Table 2d to Subpart ZZZZ of Part 63.

5.2.5 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 furnace and duct burners do not meet the Subpart JJJJJJ definition of a boiler; therefore, Subpart JJJJJ is not applicable.

5.3 Compliance Assurance Monitoring

Compliance Assurance Monitoring (CAM) under 40 CFR Part 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 threshold. 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]).[26] 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.[27] As this is the first Title V renewal application for the facility, CAM requirements are addressed below and in the attached CAM Plans included as Appendix E.

The dry hammermills (ES-DHM-1 through ES-DHM-7) are subject to a PM emission limit under 15A NCAC 02D .0515 and will utilize the WESP (CD-WESP) to meet this limit. Although the dry hammermills' (ES-DHM-1 through ES-DHM-7) exhaust is routed through three (3) individual baghouses (CD-DHM-FF1 through CD-DHM-FF3), upon implementation of the proposed dry hammermill recirculation, the baghouses will not be required to comply with the PM emission limit under 15A NCAC 02D .0515. Although PM emissions will still be controlled by the baghouses, control by the WESP alone will ensure compliance with the PM emission limit. Because pre-controlled emissions from the dry hammermills exceed the major source threshold, they are subject to CAM for PM. There is no applicable VOC emission limit for the dry hammermills. As such, a CAM plan is not required for VOC.

The existing and proposed pellet mills and pellet coolers (ES-CLR1 through ES-CLR6) are also subject to a PM emission limit under 15A NCAC 02D .0515 and utilize multicyclones and a simple cyclone to meet this limit. The dry shavings hammermill (ES-DSHM) is also subject to a PM emission limit under 15A NCAC 02D .0515 and utilizes a bin vent filter (CD-DWDS-BV) to meet this limit. Pre-controlled emissions from each of these sources exceed the major source threshold; therefore, these sources are each subject to CAM for PM.

A RTO/RCO (CD-RCO) will be installed to control VOC emissions from the pellet mills, pellet coolers, and dry shavings hammermill; however, the RTO/RCO will not be installed to meet a specific emission limit but rather to reduce the plant's potential VOC and HAP emissions. The quench duct that is proposed to be installed upstream of the RTO/RCO is considered inherent process equipment and is being installed for safety purposes to reduce the risk of fire in the RTO/RCO. As such, it is not considered a control device. There is no applicable VOC emission limit for the pellet mills, pellet coolers, and dry shavings hammermill. As such, a CAM plan is not required for VOC.

The Finished Product Handling baghouse (CD-FPH-BF) controls PM emissions from Finished Product Handling (ES-FPH), the Truck Loadout Bin (ES-TLB), and the two (2) Pellet Loadouts (ES-PL1 and ES-PL2). The baghouse is required to achieve compliance with the applicable PM emission limits under 15A NCAC 02D .0515 and pre-controlled emissions from each of these

[26] §64.5(a)
[27] §64.5(b)

sources exceed the major source threshold. As such, each of these sources is subject to CAM for PM.

PM emissions from the Fines Bin are controlled by a baghouse (CD-FB-BV) which is required to achieve compliance with the applicable PM emission limit under 15A NCAC 02D .0515. Since pre-controlled emissions from the Fines Bin exceed the major source threshold, this source is also subject to CAM for PM.

The existing and proposed green hammermills (ES-GHM-1 through ES-GHM-4) are each subject to a PM emission limit under 15A NCAC 02D .0515; however, pre-controlled emissions from each green hammermill are less than the applicable PM emission limit. As such, the green hammermills are not subject to CAM.

All other emission units at the Ahoskie plant have pre-controlled emissions below the major source threshold and/or do not use a control device as defined in 40 CFR 64.1 to achieve compliance with an emission limit. Thus, CAM is not applicable to any other emission sources.

5.4 Chemical Accident Prevention Provisions

The Chemical Accident Prevention Provisions, promulgated in 40 CFR Part 68, provide requirements for the development of risk management plans (RMP) for regulated substances. Applicability of RMP requirements is based on the types and amounts of chemicals stored at a facility. Natural gas will be stored at the Ahoskie facility to be used as a fuel for the RTO and RCO burners and dryer system double duct burners. However, per 68.126, substances used as a fuel or held for sale as a fuel at a retail facility are excluded from all provisions; therefore, an RMP is not required for the Ahoskie facility.

5.5 North Carolina Administrative Code

The Ahoskie plant sources are subject to regulations contained in 15A NCAC 02D and 02Q. Potentially applicable regulations are addressed in the following sections.

5.5.1 15A NCAC 02D .0504 Particulates from Wood Burning Indirect Heat Exchangers

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

5.5.2 15A NCAC 02D .0515 Particulates from Miscellaneous Industrial Processes

PM emissions from all stacks, outlets, and vents are regulated under 15A NCAC 02D .0515. This regulation limits particulate emissions resulting from any industrial process for which no other emission control standards are applicable. Allowable emission rates (E) are calculated to three significant figures based on process throughput using the equation $E = 4.10 \times P^{0.67}$, for process rates (P) less than 30 tons per hour (tph), and $E=55 \times P^{0.11}-40$ for process rates greater than or equal to 30 tph. Emissions from each PM source at the Ahoskie plant will either be negligible or controlled by cyclones, baghouses, or a WESP, and thus, will comply with this requirement. The process weight limit for each emission point is summarized in Table 5-1 below.

Table 5-1. Process Weight Limits for Ahoskie Emission Points

Emission Point ID	Source Description	Control Device	Process Weight Input Rate (tph)	Allowable Emission Rate (lb/hr)
ES-DRYER	One (1) 175.3 MMBtu/hr Wood-fired Direct	CD-WESP; CD-RTO	121	53.2
IES-DDB-1 and -2	Dryer Line Double Duct Burners	N/A	121	53.2
ES-FURNACEBYP	Furnace Bypass Stack	N/A	121	53.2
ES-DWH	Dried Wood Handling	N/A	70	47.7
ES-GWHS	Green Wood Handling and Storage	N/A	150	55.4
IES-DRYSHAVE	Dry Shavings Handling and Storage	N/A	50	44.6
ES-GHM-1 through ES-GHM-4	Green Hammermills 1 through 4	CD-WESP; CD-RTO;	121	53.2
IES-BARK	Bark Hog	N/A	20	30.6
ES-DHM-1 through ES-DHM-7	Dry Hammermills 1 through 7	CD-DHM-FF1 through CD-DHM-FF4; CD-WESP; CD-RTO	70	47.7
IES-DWDS	Dried Wood Day Silo	CD-DWDS-BV; CD-RCO	14	24.0
ES-DSHM	Dry Shavings Hammermill	CD-DWDS-BV; CD-RCO	14	24.0
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BV	84	49.5
ES-CLR1 through ES-CLR6	Pellet Mills and Coolers 1 through 6	CD-CLR-C1 through CD-CLR-C4; CD-RCO	84	49.5
ES-FB	Fines Bin	CD-FB-BV	4	10.3
IES-ADD	Additive Handling and Storage	CD-ADD-BF	25	35.4

Table 5-1. Process Weight Limits for Ahoskie Emission Points

Emission Point ID	Source Description	Control Device	Process Weight Input Rate (tph)	Allowable Emission Rate (lb/hr)
ES-FPH; ES-TLB ES-PL1 and ES-PL2	Finished Product Handling; Truck loadout bin (with 12 bottoms); Two pellet loadouts	CD-FPH-BF	127	53.7

5.5.3 15A NCAC 02D .0516 Sulfur Dioxide Emissions from Combustion Sources

Emissions of SO_2 from combustion sources may not exceed 2.3 pounds of SO_2 per MMBtu input. The emergency generator (IES-EG) and fire water pump (IES-FWP) use ultra-low sulfur diesel, the dryer furnace combusts bark and wood chips, and the RTO and RTO/RCO will utilize natural gas, each of which contain low amounts of sulfur and will result in SO_2 emissions below the limit of 2.3 lb/MMBtu.

5.5.4 15A NCAC 02D .0521 Control of Visible Emissions

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

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

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

5.5.5 15A NCAC 02D .0540 Particulate from Fugitive Dust Emission Sources

15A NCAC 02D .0540 requires a fugitive dust control plan to be prepared if ambient monitoring or air dispersion modeling show a violation, or the potential for a violation, of a PM NAAQS, or if NC DAQ observes excess fugitive dust emissions from the facility beyond the property boundary for six (6) minutes in any one hour using EPA Method 22. Enviva complies with all aspects of the most recently approved fugitive dust control plan.

5.5.6 15A NCAC 02D .1100 Control of Toxic Air Pollutant Emissions

15A NCAC 02D .1100 outlines the procedures that must be followed if a TAP permit and associated modeling are required under 15A NCAC 02Q .0700. Under 15A NCAC 02Q .0704(d), a TAP permit application is required to include an evaluation of the TAP emissions from a facility's sources, excluding exempt sources listed in Rule .0702 of this Section. Per NCAC 02Q .0706, the facility shall submit an application that complies with 15A NCAC 02 D .1100 if: (1) the modification results in a net increase in emissions or ambient concentration, as determined in 15A NCAC 02Q .0709 and 15A NCAC 02D .1106 respectively, of any toxic air pollutant that the facility was emitting before the modification; or (2) emissions of any toxic air pollutant that the facility was not emitting before the modification exceed the levels set forth in 15A NCAC 02Q .0711. Air toxics modeling was performed for the Ahoskie plant as part of this application and is discussed in Section 6 below.

6. TOXICS MODELING ANALYSIS

A TAP permit application is required to include an evaluation of TAP emissions from a facility's sources, excluding exempt sources listed under 15A NCAC 02Q .0702(a)(18). 15A NCAC 02D .1100 outlines the procedures that must be followed if a TAP permit and associated modeling is required under 15A NCAC 02Q .0700. The following sections outline the data sources, methodologies, and results from the modeling analysis conducted in accordance with 15A NCAC 02Q .0700.

6.1 State Requirements

Dispersion modeling was conducted for each TAP with post-project facility-wide potential emissions in excess of the respective Toxic Permitting Emission Rate (TPER). The analysis was conducted consistent with the following state and federal guidance documents:

- NC DAQ's *Guidelines for Evaluating the Air Quality Impacts of Toxic Pollutants in North Carolina* (May 2018);
- North Carolina's *PSD Modeling Guidance* (January 6, 2012);
- EPA's Guideline on Air Quality Models 40 CFR 51, Appendix W (Revised, January 17, 2017), herein referred to as Appendix W;[28] and
- EPA's *AERMOD Implementation Guide* (Revised August 2019).

6.2 Acceptable Ambient Levels

Enviva conducted air dispersion modeling for 9 TAPs with emissions in excess of the TPER thresholds in 15A NCAC 02Q .0711 to demonstrate compliance with the Acceptable Ambient Levels (AALs) in 15A NCAC 02D .1100. The AALs are in place to ensure that emissions from a facility do not adversely affect human health. A comparison of facility-wide potential emissions to the TPERs is provided in Table 6-1 below.

Modeling for each TAP was conducted using the most recent year of meteorological data available (2018) and maximum concentrations were compared to the AALs.

[28] Appendix W was revised on December 17, 2016 (Federal Register Vol. 82, No. 10); however, on January 26, 2017 the effective date of the final rule was delayed until March 21, 2017 (Federal Register Vol. 82, No. 16). On March 20, 2017 the effective date of the final rule was further delayed to May 22, 2017 (Federal Register Vol. 82, No. 52), upon which it became effective.

Table 6-1. Comparison to Toxic Air Pollutant Permitting Emission Rates

Pollutant	Potential Emissions			TPER (2Q .0711)			Modeling Required?
	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	
1,3-Butadiene			0.089			11.0	No
Acetaldehyde	0.38			6.8			No
Acrolein	0.76			0.020			**Yes**
Ammonia	0.20			0.68			No
Arsenic			1.99			0.053	**Yes**
Benzene			363			8.1	**Yes**
Benzo(a)pyrene			0.22			2.2	No
Beryllium			0.10			0.28	No
Cadmium			0.96			0.37	**Yes**
Carbon Tetrachloride			3.85			460	No
Chlorine	0.17	4.11		0.23	0.79		**Yes**
Chlorobenzene		0.040			46		No
Chloroform			2.40			290	No
Chromic acid (Chromium VI)		0.0063			0.013		No
Di(2-ethylhexyl)phthalate (DEHP)		$5.65x10^{-5}$			0.63		No
Ethylene dichloride (1,2-dichloroethane)			2.48			260	No
Formaldehyde	1.28			0.040			**Yes**
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8			1.24			$5.10x10^{-3}$	**Yes**
n-Hexane		2.73			23		No
Hydrogen chloride (hydrochloric acid)	0.87			0.18			**Yes**
Manganese & Compounds		1.92			0.63		**Yes**
Mercury, vapour		0.0046			0.013		No
Methyl chloroform (1,1,1 trichloroethane)	0.0016	0.037		64.0	250		No
Methyl ethyl ketone	$2.70x10^{-4}$	0.0065		22.4	78.0		No
Xylene	0.0025	0.061		16.4	57.0		No
Methylene chloride	0.015		24.8	0.39		1,600	No
Nickel		0.043			0.13		No
Pentachlorophenol	$2.55x10^{-6}$	$6.13x10^{-5}$		0.0064	0.063		No
Perchloroethylene (tetrachloroethylene)			3.25			13,000	No
Phenol	0.13			0.24			No
Polychlorinated biphenyls			$6.97x10^{-4}$			5.6	No
Styrene	0.095			2.7			No
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-			$7.36x10^{-7}$			$2.00x10^{-4}$	No
Toluene	0.048	1.16		14.4	98.0		No
Trichloroethylene			2.57			4,000	No
Trichlorofluoromethane (CFC 111)	$2.05x10^{-3}$			140			No
Vinyl chloride			1.50			26.0	No

6.3 Model Selection

Enviva utilized the latest version of the AERMOD model (Version 19191). AERMOD is the EPA-approved air dispersion model for near-field (within 50 km) modeling analyses. AERMOD was run using regulatory default options.

6.4 Receptor Grid and Elevation Data

A resolution of 25 meters was used for receptors along the ambient boundary and a Cartesian grid extending approximately 2 km from the center of the plant was modeled using a resolution of 100-meters. Modeled concentrations were reviewed to ensure that the maximum concentration was captured with the 2 km grid.

Receptor elevations, in addition to source and building elevations, were determined using the latest version of the AERMAP terrain pre-processor (Version 18081). Hill height parameters required by AERMOD are also calculated by AERMAP. Elevations were based on 1 arc-second National Elevation Dataset (NED) from the U.S. Geological Survey (USGS). AERMAP input and output files and a copy of the NED file are provided in Appendix F.

6.5 Meteorological Data

Enviva utilized AERMOD-ready meteorological data processed by NC DAQ for the Elizabeth City National Weather Service (NWS) surface station (ID: 14786) and upper air data from the Newport NWS station (ID: 93768) for the period 2014-2018.[29] The meteorological data were processed by NC DAQ using version 18081 of AERMET. The base elevation for the Elizabeth City surface station was set to 4.0 m.[30] The meteorological data files are provided in Appendix F for reference.

6.6 Modeled Operating Conditions

As previously described in Section 2, there are several different operating conditions for the Ahoskie plant dryer line. Modeling was conducted to address the various operating conditions.

6.6.1 Normal Operation

Normal operation was modeled with all sources operating at their maximum capacity using their maximum hourly emission rate for each TAP. During normal operation, emissions from the dryer/furnace, green hammermills, and dry hammermills are controlled by the WESP and RTO.

6.6.2 Furnace Bypass – Cold Start-ups and Planned Shutdown

The furnace bypass stack (ES-FURNACEBYP) may be used to exhaust hot gases during cold start-ups (for temperature control), planned shutdowns, and malfunctions.[31] The furnace bypass stack will be used for no more than 50 hours per year for cold start-ups and planned shutdown.

During cold start-ups, the furnace bypass stack is used until the refractory is sufficiently heated and can sustain operations at a low level (approximately 15% of the maximum heat input rate). The furnace bypass stack is then closed, and the furnace is slowly brought up to a

[29] https://deq.nc.gov/about/divisions/air-quality/air-quality-permits/modeling-meteorology/meteorological-data

[30] https://files.nc.gov/ncdeq/Air%20Quality/permits/mets/ProfileBaseElevations_2018.pdf

[31] Venting at full capacity only occurs in the event of a malfunction. When the furnace aborts as a result of a malfunction, the fuel feed is significantly reduced, and the heat input rate drops rapidly as the furnace quickly transitions to "idle mode". Malfunctions are infrequent and unpredictable and are not required to be assessed as part of this analysis.

normal operating rate. The duration of a cold start-up is typically between 8 to 12 hours and there are generally two (2) cold start-ups per year.

In the event of a planned dryer shutdown, the dryer throughput and furnace heat input are decreased. Dryer raw material input ceases, and all remaining material is moved through the system to prevent a fire. On shutdown of the dryer, the furnace operating rate quickly approaches idle state (i.e., 15 MMBtu/hr). As such, emissions during planned shutdowns are minimal.

Enviva modeled cold start-up, which is worst-case between cold start-up and planned shutdown, because the furnace bypass stack is not utilized during a planned shutdown until after the furnace achieves an idle state. Until this time, emissions continue to be controlled by the WESP and RTO. With the exception of the green hammermills and dry hammermills, all other sources could potentially operate during dryer line cold start-ups and planned shutdowns. Therefore, these sources were modeled operating at their maximum capacity, consistent with the normal operation scenario.

Enviva modeled the maximum hourly emission rate that will occur during the 12-hour cold start-up period for the furnace. This maximum emission rate is calculated based on 15% of the maximum heat input of the furnace (i.e., 26.3 MMBtu/hr). Emissions slowly increase over the 12-hour cold start-up period as the furnace heat input is slowly increased up to 15% of maximum capacity. At that time, the furnace is then tied into the dryer and emissions are routed to the WESP and RTO.

6.6.3 Furnace Bypass – Idle Mode

Each furnace may also operate up to 500 hours per year in "idle mode" with emissions routed to the furnace bypass stack (ES-FURNACEBYP). "Idle mode" is defined as operation up to a maximum heat input rate of 15 MMBtu/hr. 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 (i.e. avoid a cold start-up).

Enviva conducted modeling to evaluate the impact of furnace "idle mode" operation. The maximum hourly emission rate for furnace "idle mode" was used for all pollutants/averaging periods. All other sources, with the exception of the green hammermills, dryer, and dry hammermills, will remain operational during furnace bypass and were modeled operating at their maximum capacity, consistent with the normal operation condition.

6.6.4 Dryer Bypass

The dryer bypass stack is used when the furnace is started up from a cold shutdown and when the furnace transitions from idle mode to normal operation. Emissions are vented through the dryer bypass stack for approximately 10 minutes as exhaust flow is transitioned from the furnace bypass stack to the WESP and RTO. The dryer is not operational during this time and emissions are due solely to combustion of fuel in the furnace. Since each event only lasts for approximately 10 minutes, occurs infrequently, and emissions are already accounted for under the furnace bypass stack cold start-up and idle emission estimates, the dryer bypass stack was not modeled.

6.7 Modeled Sources and Release Parameters

Tables 6-2 and 6-3 summarize the modeled sources and associated release parameters. The emergency generator and fire water pump are subject to 40 CFR 63 Subpart ZZZZ and are

therefore exempt from toxics permitting requirements per 15A NCAC 02Q .0702(a)(27)(B). Nevertheless, these sources were conservatively included in the modeling analysis.

Modeled emission rates are consistent with the emission rates provided in the potential emissions calculations in Appendix C. A figure showing the modeled layout is provided in Appendix G.

6.7.1 Point Sources

Each source that has a defined stack was represented as a point source. All stacks at the Ahoskie plant are vertical and unobstructed. Modeled stack parameters are summarized in Table 6-2 below.

Table 6-2. Summary of Modeled Point Source Parameters

Model ID	Description	UTM Easting[1] (m)	UTM Northing[1] (m)	Stack Height (m)	Exhaust Temp. (K)	Exit Velocity (m/s)	Stack Diameter (m)
RTO	CD-RTO which controls the Furnace/Dryer, Green Hammermills, Dry Hammermills, and Dust Control System	323,532.60	4,015,567.62	27.48	397.04	11.10	3.05
EG	Emergency Generator	323,550.60	4,015,538.00	3.05	919.82	78.30	0.13
FWP	Fire Water Pump	323,616.10	4,015,462.00	2.44	954.00	109.19	0.10
FBYP_I	Furnace Bypass Idle Mode	323,536.43	4,015,565.89	62.30	616.48	1.11	1.52
FBYP_S	Furnace Bypass - Cold Start-up	323,536.43	4,015,565.89	62.30	588.71	1.98	1.52
DB1	Duct Burner 1	323,515.68	4,015,525.91	20.73	449.82	13.97	0.25
DB2	Duct Burner 2	323,516.54	4,015,523.39	20.73	449.82	13.97	0.25
RCO	CD-RCO which controls the Pellet Mill/Coolers, Dry Shavings Hammermill, Dried Wood Day Silo	323,659.50	4,015,530.25	27.48	366.48	17.48	1.91

1. Coordinates reflect NAD83, UTM Zone 18.

6.7.2 Area Sources

The elevated temperature of wood chips exiting the dryer may result in TAP continuing to volatilize as the material is transferred to the dry hammermills via the dryer collection conveyor and hammermill infeed conveyor. Dried wood handling emissions were modeled

using area sources characterizing these two conveyors. Modeled release parameters are summarized in Table 6-3 below.

Table 6-3. Summary of Modeled Area Source Parameters

Model ID	Description	Release Height (m)	No. Vertices	Initial Vertical Dimension (m)
DWH1	Dryer Collection Conveyor	17.8	4	0
DWH2	Hammermill Infeed Conveyor	25.1	4	0

6.8 GEP Stack Height Analysis

EPA has promulgated regulations that limit the maximum stack height that may be used in a modeling analysis to no more than Good Engineering Practice (GEP) stack height. The purpose of this requirement is to prevent the use of excessively tall stacks to reduce the modeled concentrations of a pollutant. GEP stack height is impacted by the heights of nearby structures. In general, the minimum value for GEP stack height is 65 meters. The stack heights for all sources at the Ahoskie plant are less than 65 meters and were thus modeled using actual stack heights.

6.9 Building Downwash

The AERMOD model incorporates Plume Rise Modeling Enhancements (PRIME) to account for downwash. The direction-specific building downwash dimensions used as inputs were determined by the latest version (04274) of the Building Profile Input Program, PRIME (BPIP PRIME.) BPIP PRIME uses building downwash algorithms incorporated into AERMOD to account for the plume dispersion effects of the aerodynamic wakes and eddies produced by buildings and structures. On-site structures at the Ahoskie plant were evaluated for downwash effects on each modeled point source. BPIP input and output files are included in Appendix F.

6.10 Modeling Results

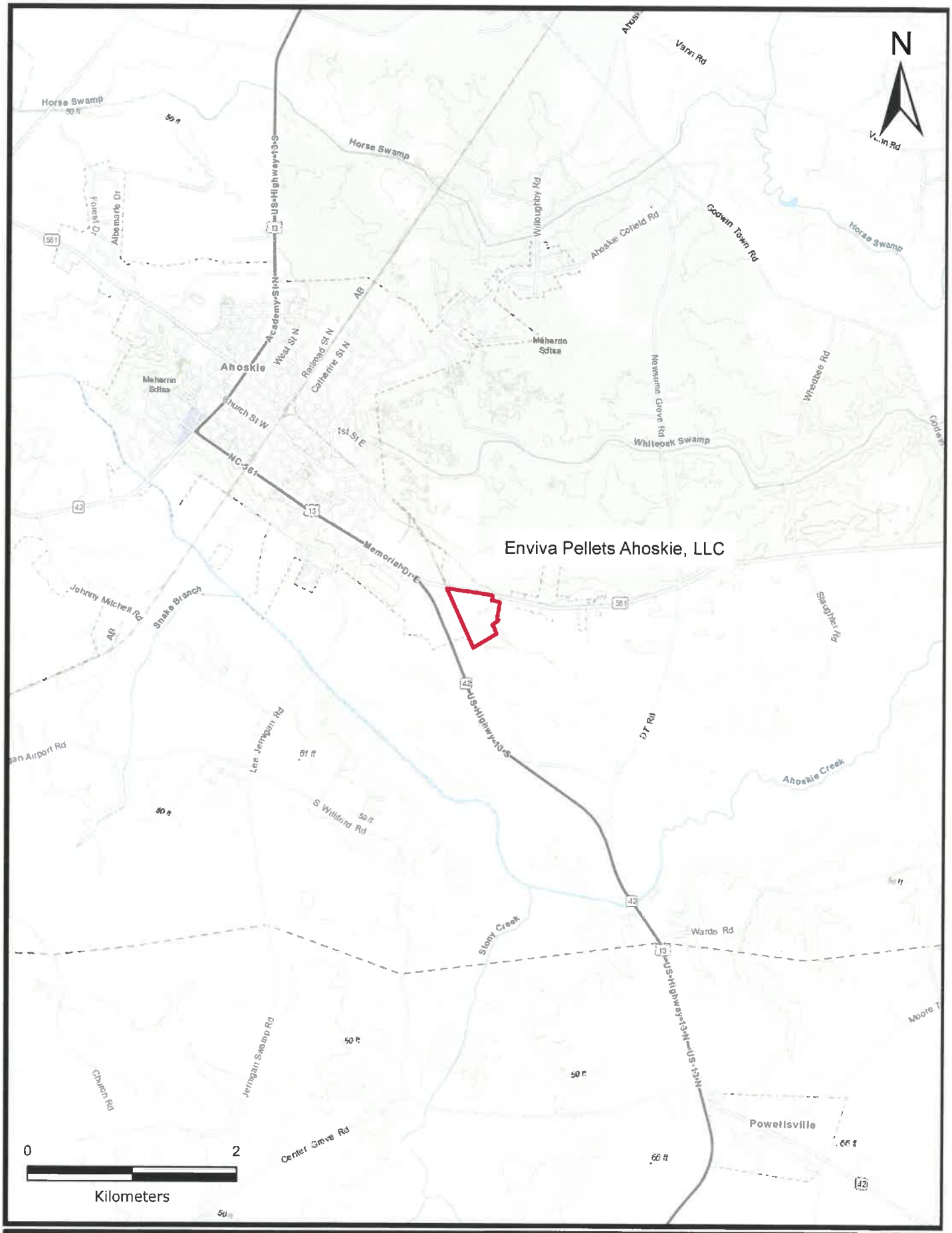
As shown in Table 6-4 below, modeled concentrations using the most recent year of meteorological data for each of the 9 TAPs are significantly less than 50% of the AAL. As such, the Ahoskie plant will not cause an exceedance of the AAL for any TAP and no further modeling is required. AERMOD input and output files are provided in Appendix F.

Table 6-4. Comparison of Maximum Modeled Concentrations to the AALs

Pollutant	Averaging Period	Source Group	UTM Easting[1] (m)	UTM Northing[1] (m)	Modeled Concentration (µg/m³)	AAL (µg/m³)	Percent of AAL (%)
Acrolein	1-hour	NORM	323,393	4,015,582	1.42	80	1.78%
		BYP_I	323,373	4,015,627	0.34		0.42%
		BYP_S	323,373	4,015,627	0.34		0.42%
Arsenic[2]	Annual	NORM	323,706	4,015,512	1.04E-05	2.10E-03	0.50%
		BYP_I	323,800	4,016,100	8.51E-06		0.41%
		BYP_S	323,800	4,016,100	1.25E-05		0.59%
Benzene	Annual	NORM	323,706	4,015,512	0.0018	0.12	1.51%
		BYP_I	323,800	4,016,100	0.0016		1.30%
		BYP_S	323,800	4,016,100	0.0023		1.93%
Cadmium Metal[2]	Annual	NORM	323,629	4,015,803	7.52E-06	5.50E-03	0.14%
		BYP_I	323,653	4,015,799	4.98E-06		0.091%
		BYP_S	323,653	4,015,799	5.11E-06		0.093%
Chlorine	1-hour	NORM	323,404	4,015,559	0.42	900	0.046%
		BYP_I	323,900	4,015,100	0.014		0.0016%
		BYP_S	323,400	4,014,800	0.016		0.0018%
	24-hour	NORM	323,414	4,015,536	0.29	37.5	0.79%
		BYP_I	324,100	4,015,400	0.0029		0.0078%
		BYP_S	324,100	4,015,400	0.0044		0.012%
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8[2]	Annual	NORM	323,706	4,015,512	6.85E-06	7.60E-05	9.01%
		BYP_I	323,800	4,016,100	5.90E-07		0.78%
		BYP_S	323,800	4,016,100	8.80E-07		1.16%
Formaldehyde	1-hour	NORM	323,393	4,015,582	2.76	150	1.84%
		BYP_I	323,465	4,015,422	1.33		0.88%
		BYP_S	323,465	4,015,422	1.33		0.88%
Hydrochloric acid	1-hour	NORM	323,404	4,015,559	0.25	700	0.036%
		BYP_I	323,900	4,015,100	0.34		0.049%
		BYP_S	323,400	4,014,800	0.39		0.055%
Manganese	24-hour	NORM	323,414	4,015,536	0.030	31	0.096%
		BYP_I	324,100	4,015,400	0.0059		0.019%
		BYP_S	324,100	4,015,400	0.0090		0.029%

1. Coordinates reflect NAD83, UTM Zone 18.
2. Concentrations in the AERMOD output files are in units of nanograms per cubic meter.

APPENDIX A
AREA MAP



RAMBOLL

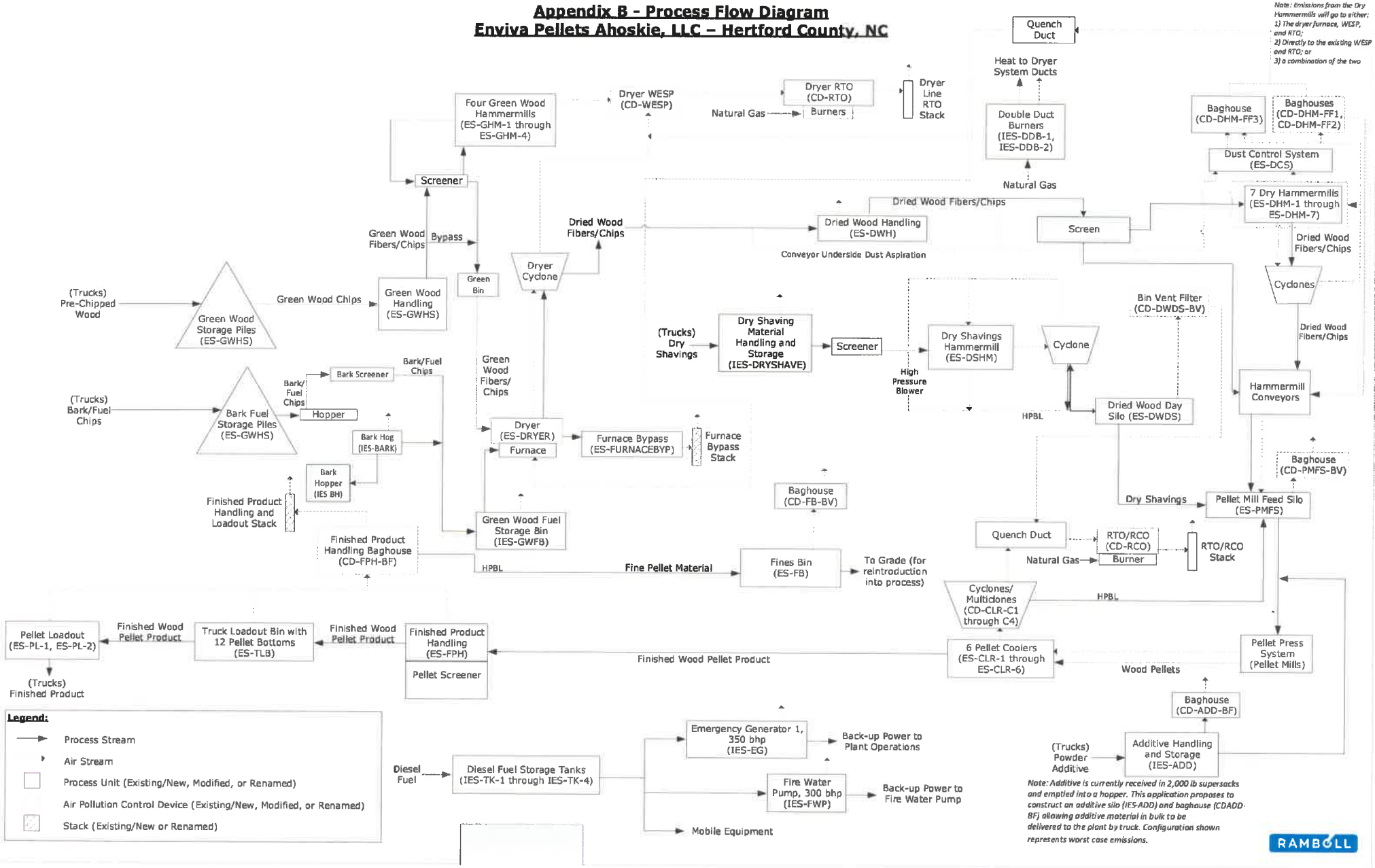
Area Map
Enviva Pellets Ahoskie, LLC
Ahoskie, Hertford County, North Carolina

FIGURE
1

DRAFTED BY: ARJ | DATE: 4/7/2020 | PROJECT: 1690016258

APPENDIX B
PROCESS FLOW DIAGRAM

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



APPENDIX C
POTENTIAL EMISSIONS CALCULATIONS

Table 1
Summary of Facility-wide Criteria Pollutant and CO2e Potential Emissions
Enviva Pellets Ahoskie, LLC

Emission Unit ID	Source Description	Control Device ID	Control Device Description	CO (tpy)	NOx (tpy)	TSP (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	Total VOC (tpy)	CO_{2e} (tpy)
ES-DRYER	Dryer	CD-WESP; CD-RTO	WESP; RTO	137	133	34.3	34.3	34.3	19.2	88.1	214,500
ES-GHM-1 through -4	Green Wood Hammermills 1 through 4										
ES-DHM-1 through -7 ES-DCS	Dry Hammermills 1 through 7; Dust Control System	CD-DHM-FF1 through FF3; CD-WESP; CD-RTO	Baghouses; WESP; RTO								
ES-FURNACEBYP	Furnace Bypass Stack	--	--	2.64	0.97	2.54	2.28	1.97	0.110	0.075	924
IES-DDB-1 and -2	Dryer Line Double Duct Burners	--	--	1.80	1.07	0.16	0.16	0.16	0.013	0.12	2,582
ES-CLR1 through 6	Pellet Mills 1 through 12 and Pellet Coolers 1 through 6	CD-CLR-C1 through C4; CD-RCO	Multicyclones; Cyclones; RTO/RCO	8.21	9.77	8.51	8.51	8.51	0.051	35.6	10,263
ES-DSHM	Dry Shavings Hammermill	CD-DWDS-BV; CD-RCO	Bin Vent Filter; RTO/RCO								
ES-DWDS	Dried Wood Day Silo	CD-DWDS-BV; CD-RCO	Bin Vent Filter; RTO/RCO								
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BV	Baghouse	--	--	0.82	0.82	0.82	--	--	--
ES-FPH; ES-TLB; ES-PL1 and 2	Finished Product Handling; Twelve Truck Pellet Loadout Bins; Pellet Loadout 1 and 2	CD-FPH-BF	Baghouse	--	--	13.3	12.1	5.33	--	--	--
ES-FB	Fines Bin	CD-FB-BV	Baghouse	--	--	1.35	1.35	1.35	--	--	--
ES-DWH	Dried Wood Handling	--	--	--	--	0.072	0.034	0.0051	--	15.8	--
IES-ADD	Additive Handling and Storage	--	--	--	--	2.65E-04	1.25E-04	1.89E-05	--	--	--
ES-GWHS	Green Wood Handling and Storage	--	--	--	--	9.41	4.70	0.71	--	6.20	--
IES-GWFB[1]	Green Wood Fuel Storage Bin	--	--	--	--	--	--	--	--	--	--
IES-DRYSHAVE	Dry Shavings Handling and Storage	--	--	--	--	0.024	0.012	0.0017	--	--	--
IES-BARK	Electric Powered Bark Hog	--	--	--	--	1.83	1.01	--	--	0.229	--
IES-EG	Emergency Generator	--	--	0.50	0.58	0.029	0.029	0.029	0.0010	0.22	101
IES-FWP	Fire Water Pump	--	--	0.50	2.33	0.17	0.17	0.17	0.15	0.19	86.3
IES-TK-1	Diesel Storage Tank for Emergency Generator	--	--	--	--	--	--	--	--	2.70E-04	--
IES-TK-2	Diesel Storage Tank for Fire Water Pump	--	--	--	--	--	--	--	--	1.50E-05	--
IES-TK-3	Diesel Storage Tank #3 (600 Gallon)	--	--	--	--	--	--	--	--	5.00E-05	--
IES-TK-4	Diesel Storage Tank #4 (1,000 Gallon)	--	--	--	--	--	--	--	--	8.00E-05	--
IES-CNGT[1]	Compressed Natural Gas Terminal	--	--	--	--	--	--	--	--	--	--
--	Haul Roads	--	--	--	--	107.7	30.24	3.18	--	--	--
			Total Emissions:	**150.84**	**147.39**	**180.23**	**95.74**	**56.54**	**19.52**	**146.46**	**228,456**
			Total Excluding Fugitives:	**150.84**	**147.39**	**63.12**	**60.79**	**52.65**	**19.52**	**140.26**	**228,456**
			PSD Major Source Threshold:	**250**	**250**	**250**	**250**	**250**	**250**	**250**	**--**

Notes:
[1] No quantifiable emissions. Considered insignificant activity per 15A NCAC 02Q .0503(8).

Table 2
Summary of Facility-wide HAP Potential Emissions
Enviva Pellets Ahoskie, LLC

Description	NC TAP	HAP	CD-RTO (tpy)	ES-FURNACEBYP-1 (tpy)	IES-DDB-1 and -2 (tpy)	CD-RCO (tpy)	ES-DWH (tpy)	IES-EG (tpy)	IES-FWP (tpy)	IES-BARK (tpy)	Total (tpy)	Major Source?
Acetaldehyde	Y	Y	5.25E-01	3.66E-03	3.26E-07	9.39E-01	1.33E-01	4.70E-04	4.03E-04	-	1.60E+00	No
Acrolein	Y	Y	1.77E+00	1.76E-02	3.86E-07	8.26E-01	-	5.67E-05	4.86E-05	-	2.61E+00	No
Formaldehyde	Y	Y	3.65E+00	1.94E-02	1.61E-03	9.59E-01	1.19E-01	7.23E-04	6.20E-04	-	4.75E+00	No
Methanol	N	Y	2.07E+00	-	-	2.99E-01	2.44E-01	-	-	4.57E-02	2.66E+00	No
Phenol	Y	Y	1.88E-01	2.25E-04	-	3.63E-01	-	-	-	-	5.52E-01	No
Propionaldehyde	N	Y	9.51E+00	2.69E-04	-	1.76E-01	3.91E-02	-	-	-	9.73E+00	No
Acetophenone	N	Y	1.23E-07	1.41E-08	-	-	-	-	-	-	1.37E-07	No
Ammonia	Y	N	5.46E-01	-	6.87E-02	2.72E-01	-	-	-	-	8.86E-01	No
Antimony & compounds	N	Y	3.03E-04	3.48E-05	-	-	-	-	-	-	3.38E-04	No
Arsenic & compounds	Y	Y	8.79E-04	9.70E-05	4.29E-06	1.70E-05	-	-	-	-	9.97E-04	No
Benzene	Y	Y	1.62E-01	1.85E-02	4.51E-05	1.79E-04	-	5.71E-04	4.90E-04	-	1.81E-01	No
Benzo(a)pyrene	Y	Y	1.00E-04	1.15E-05	2.58E-08	1.02E-07	-	1.15E-07	9.87E-08	-	1.12E-04	No
Beryllium	Y	Y	4.43E-05	4.85E-06	2.58E-07	1.02E-06	-	-	-	-	5.04E-05	No
1,3-Butadiene	Y	Y	-	-	-	-	-	2.39E-05	2.05E-05	-	4.45E-05	No
Cadmium	Y	Y	3.45E-04	1.81E-05	2.36E-05	9.35E-05	-	-	-	-	4.80E-04	No
Carbon tetrachloride	Y	Y	1.73E-03	1.98E-04	-	-	-	-	-	-	1.93E-03	No
Chlorine	Y	Y	6.07E-01	3.48E-03	-	-	-	-	-	-	6.10E-01	No
Chlorobenzene	Y	Y	1.27E-03	1.45E-04	-	-	-	-	-	-	1.41E-03	No
Chloroform	Y	Y	1.07E-03	1.23E-04	-	-	-	-	-	-	1.20E-03	No
Chromium VI	Y	Y	3.73E-04	1.54E-05	3.01E-05	1.19E-04	-	-	-	-	5.38E-04	No
Chromium-Other compounds	N	Y	6.72E-04	7.71E-05	-	-	-	-	-	-	7.49E-04	No
Cobalt compounds	N	Y	2.64E-04	2.86E-05	1.80E-06	7.14E-06	-	-	-	-	3.01E-04	No
Dichlorobenzene	Y	Y	2.05E-04	-	2.58E-05	1.02E-04	-	-	-	-	3.32E-04	No
Dichloroethane, 1,2-	Y	Y	1.11E-03	1.28E-04	-	-	-	-	-	-	1.24E-03	No
Dichloropropane, 1,2-	N	Y	1.27E-03	1.45E-04	-	-	-	-	-	-	1.41E-03	No
Dinitrophenol, 2,4-	N	Y	6.91E-06	7.93E-07	-	-	-	-	-	-	7.70E-06	No
Di(2-ethylhexyl)phthalate	Y	Y	1.80E-06	2.07E-07	-	-	-	-	-	-	2.01E-06	No
Ethyl benzene	N	Y	1.19E-03	1.37E-04	-	-	-	-	-	-	1.33E-03	No
Hexachlorodibenzo-p-dioxin	Y	N	6.14E-04	7.05E-06	-	-	-	-	-	-	6.21E-04	No
Hexane	Y	Y	3.07E-01	-	3.86E-02	1.53E-01	-	-	-	-	4.99E-01	No
Hydrochloric acid	Y	Y	3.66E-01	8.37E-02	-	-	-	-	-	-	4.50E-01	No
Lead and lead compounds	Y	Y	1.93E-03	2.12E-04	1.07E-05	4.25E-05	-	-	-	-	2.19E-03	No
Manganese & compounds	Y	Y	6.15E-02	7.05E-03	8.16E-06	3.23E-05	-	-	-	-	6.86E-02	No
Mercury	Y	Y	1.79E-04	1.54E-05	5.58E-06	2.21E-05	-	-	-	-	2.22E-04	No
Methyl bromide	N	Y	5.76E-04	6.61E-05	-	-	-	-	-	-	6.42E-04	No
Methyl chloride	N	Y	8.83E-04	1.01E-04	-	-	-	-	-	-	9.84E-04	No
Methyl ethyl ketone	Y	N	2.07E-04	2.38E-05	-	-	-	-	-	-	2.31E-04	No
Methylene chloride	N	Y	1.11E-02	1.28E-03	-	-	-	-	-	-	1.24E-02	No
Naphthalene	N	Y	3.83E-03	4.28E-04	1.31E-05	5.19E-05	-	-	-	-	4.32E-03	No
Nickel	Y	Y	1.62E-03	1.45E-04	4.51E-05	1.79E-04	-	-	-	-	1.99E-03	No
Nitrophenol, 4-	N	Y	4.22E-06	4.85E-07	-	-	-	-	-	-	4.71E-06	No
Pentachlorophenol	Y	Y	1.96E-06	2.25E-07	-	-	-	-	-	-	2.18E-06	No
Perchloroethylene	Y	Y	1.46E-03	1.67E-04	-	-	-	-	-	-	1.63E-03	No
Phosphorus metal, yellow or white	N	Y	1.04E-03	1.19E-04	-	-	-	-	-	-	1.16E-03	No
Polychlorinated biphenyls	Y	Y	3.13E-07	3.59E-08	-	-	-	-	-	-	3.49E-07	No
Polycyclic Organic Matter	N	Y	5.86E-03	5.50E-04	1.50E-05	5.94E-05	-	1.03E-04	8.82E-05	-	6.67E-03	No
Selenium compounds	N	Y	1.12E-04	1.23E-05	5.15E-07	2.04E-06	-	-	-	-	1.26E-04	No
Styrene	Y	Y	7.29E-02	8.37E-03	-	-	-	-	-	-	8.13E-02	No
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	3.30E-10	3.79E-11	-	-	-	-	-	-	3.68E-10	No
Toluene	Y	Y	3.59E-02	4.05E-03	7.30E-05	2.89E-04	-	2.51E-04	2.15E-04	-	4.08E-02	No
Trichloroethane, 1,1,1-	Y	Y	1.19E-03	1.37E-04	-	-	-	-	-	-	1.33E-03	No
Trichloroethylene	Y	Y	1.15E-03	1.32E-04	-	-	-	-	-	-	1.28E-03	No
Trichlorofluoromethane	Y	N	1.57E-03	1.81E-04	-	-	-	-	-	-	1.75E-03	No
Trichlorophenol, 2,4,6-	N	Y	8.45E-07	9.70E-08	-	-	-	-	-	-	9.42E-07	No
Vinyl chloride	Y	Y	6.91E-04	7.93E-05	-	-	-	-	-	-	7.70E-04	No
Xylene	Y	Y	9.60E-04	1.10E-04	-	-	-	1.75E-04	1.50E-04	-	1.39E-03	No
Total HAP Emissions (tpy)			**19.4**	**0.17**	**0.041**	**3.72**	**0.54**	**0.0024**	**0.0020**	**0.046**	**23.9**	**No**
Maximum Individual HAP			**Propionaldehyde**	**Hydrochloric acid**	**Hexane**	**Formaldehyde**	**Methanol**	**Formaldehyde**	**Formaldehyde**	**Methanol**	**Propionaldehyde**	--
Maximum Individual HAP Emissions (tpy)			**9.51**	**0.084**	**0.039**	**0.96**	**0.24**	**7.23E-04**	**6.20E-04**	**0.046**	**9.73**	**No**
Total TAP (tpy)			**8.30**	**0.17**	**0.11**	**3.51**	**0.25**	**0.0023**	**0.0019**	**0**	**12.3**	**No**

Table 3a
Potential Emissions from Dryer Line RTO Stack (CD-RTO)
Enviva Pellets Ahoskie, LLC

Calculation Basis

Annual Throughput of Dryer	550,000	ODT/year
Max. Hourly Throughput of Dryer	62.8	ODT/hr
Burner Heat Input	175.3	MMBtu/hr
Annual Heat Input	1,535,628	MMBtu/yr
Annual Throughput of GHMs and DHMs	550,000	ODT/yr
Hourly Throughput of GHMs and DHMs	62.8	ODT/hr
Annual Operation	8,760	hr/yr
Total RTO Heat Input	40	MMBtu/hr
RTO Control Efficiency	95	%
WESP Control Efficiency	95	%

Total Potential Emissions at RTO Stack

Pollutant	Potential Emissions[1] (lb/hr)	(tpy)
CO	31.3	137.2
NO_X	30.3	132.7
SO_2	4.38	19.2
VOC	20.1	88.1
Total PM	7.83	34.3
Total PM_{10}	7.83	34.3
Total $PM_{2.5}$	7.83	34.3
CO_2e	48,973	214,500
Total HAP	4.42	19.36
Total TAP	1.90	8.31

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

Potential Criteria Pollutant and Greenhouse Gas Emissions - Furnace/Dryer, Green Hammermills, and Dry Hammermills

Pollutant	Controlled Emission Factor	Units	Potential Emissions from Furnace/Dryer, GHMs, and DHMs[1] (lb/hr)	(tpy)
CO	0.50	lb/ODT[2]	31.2	136.6
NO_X	0.48	lb/ODT[2]	30.1	132.0
SO_2	0.025	lb/MMBtu[3]	4.38	19.2
Total VOC as Propane	0.32	lb/ODT[2]	20.1	88.1
$PM/PM_{10}/PM_{2.5}$ (Filterable + Condensable)	0.12	lb/ODT[2]	7.83	34.3
CO_2	780	lb/ODT[4]	48,973	214,500

Notes:
1. Exhaust from the dryer is routed to twin cyclones for material recovery purposes then to a WESP and RTO for control of VOC, HAP, and particulates.
2. Emission factor based on process information and an appropriate contingency based on engineering judgement.
3. No emission factor is provided in AP-42, Section 10.6.2 for SO_2 for rotary dryers. Enviva has conservatively calculated SO_2 emissions based on AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.
4. Emission factor for CO_2 from AP-42, Section 10.6.1 for rotary dryer with RTO control device. Enviva has conservatively calculated the CO_2 emissions using the hardwood emission factor because the dryer at the Ahoskie plant will use a combination of hardwood and softwood and the hardwood emission factor is greater than the softwood emission factor.

Thermally Generated Potential Criteria Pollutant Emissions from Combustion of VOC from Dry Hammermills

Maximum high heating value of VOC constituents	0.018 MMBtu/lb
Uncontrolled VOC emissions from DHMs	84.1 lb/hr
Hourly Heat input of uncontrolled VOC emissions	1.56 MMBtu/hr
Uncontrolled VOC emissions from DHMs	368 tpy
Annual Heat input of uncontrolled VOC emissions	13,631 MMBtu/yr

Pollutant	Emission Factor	Units	Potential Emissions (lb/hr)	(tpy)
CO	0.082	lb/MMBtu[1]	0.13	0.56
NO_X	0.10	lb/MMBtu[1]	0.15	0.67

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.

Table 3a
Potential Emissions from Dryer Line RTO Stack (CD-RTO)
Enviva Pellets Ahoskie, LLC

Potential HAP Emissions

Pollutant	HAP	NC TAP	Emission Factor	Units	Footnote	Potential Emissions	
						(lb/hr)	(tpy)
Furnace Biomass Combustion, Drying, Green Hammermills, and Dry Hammermills[6]							
Acetaldehyde	Y	Y	1.91E-03	lb/ODT	1	0.12	0.53
Acrolein	Y	Y	6.42E-03	lb/ODT	1	0.40	1.77
Formaldehyde	Y	Y	1.33E-02	lb/ODT	1	0.83	3.65
Methanol	Y	N	7.52E-03	lb/ODT	1	0.47	2.07
Phenol	Y	Y	6.84E-04	lb/ODT	1	0.043	0.19
Propionaldehyde	Y	N	3.46E-02	lb/ODT	1	2.17	9.51
Acetophenone	Y	N	3.20E-09	lb/MMBtu	2,3	2.80E-08	1.23E-07
Antimony & Compounds	Y	N	7.90E-06	lb/MMBtu	2,4	6.92E-05	3.03E-04
Arsenic & Compounds	Y	Y	2.20E-05	lb/MMBtu	2,4	1.93E-04	8.45E-04
Benzene	Y	Y	4.20E-03	lb/MMBtu	2,3	3.68E-02	1.61E-01
Benzo(a)pyrene	Y	Y	2.60E-06	lb/MMBtu	2,3	2.28E-05	9.98E-05
Beryllium	Y	Y	1.10E-06	lb/MMBtu	2,4	9.64E-06	4.22E-05
Cadmium	Y	Y	4.10E-06	lb/MMBtu	2,4	3.59E-05	1.57E-04
Carbon tetrachloride	Y	Y	4.50E-05	lb/MMBtu	2,3	3.94E-04	1.73E-03
Chlorine	Y	Y	7.90E-04	lb/MMBtu	2	1.38E-01	6.07E-01
Chlorobenzene	Y	Y	3.30E-05	lb/MMBtu	2,3	2.89E-04	1.27E-03
Chloroform	Y	Y	2.80E-05	lb/MMBtu	2,3	2.45E-04	1.07E-03
Chromium VI	-[7]	Y	3.50E-06	lb/MMBtu	2,4	3.07E-05	1.34E-04
Chromium-Other compounds	Y	N	1.75E-05	lb/MMBtu	2,4	1.53E-04	6.72E-04
Cobalt compounds	Y	N	6.50E-06	lb/MMBtu	2,4	5.70E-05	2.50E-04
Dichloroethane, 1,2-	Y	Y	2.90E-05	lb/MMBtu	2,3	2.54E-04	1.11E-03
Dichloropropane, 1,2-	Y	N	3.30E-05	lb/MMBtu	2,3	2.89E-04	1.27E-03
Dinitrophenol, 2,4-	Y	N	1.80E-07	lb/MMBtu	2,3	1.58E-06	6.91E-06
Di(2-ethylhexyl)phthalate	Y	Y	4.70E-08	lb/MMBtu	2,3	4.12E-07	1.80E-06
Ethyl benzene	Y	N	3.10E-05	lb/MMBtu	2,3	2.72E-04	1.19E-03
Hexachlorodibenzo-p-dioxin	N	Y	1.60E-05	lb/MMBtu	2,3	1.40E-04	6.14E-04
Hydrochloric acid	Y	Y	1.33E-03	lb/ODT	1,5	8.36E-02	3.66E-01
Lead and Lead compounds	Y	N	4.80E-05	lb/MMBtu	2,4	4.21E-04	1.84E-03
Manganese & compounds	Y	Y	1.60E-03	lb/MMBtu	2,4	1.40E-02	6.14E-02
Mercury	Y	Y	3.50E-06	lb/MMBtu	2,4	3.07E-05	1.34E-04
Methyl bromide	Y	N	1.50E-05	lb/MMBtu	2,3	1.31E-04	5.76E-04
Methyl chloride	Y	N	2.30E-05	lb/MMBtu	2,3	2.02E-04	8.83E-04
Methyl ethyl ketone	N	Y	5.40E-06	lb/MMBtu	2,3	4.73E-05	2.07E-04
Methylene chloride	Y	Y	2.90E-04	lb/MMBtu	2,3	2.54E-03	1.11E-02
Naphthalene	Y	N	9.70E-05	lb/MMBtu	2,3	8.50E-04	3.72E-03
Nickel	Y	Y	3.30E-05	lb/MMBtu	2,4	2.89E-04	1.27E-03
Nitrophenol, 4-	Y	N	1.10E-07	lb/MMBtu	2,3	9.64E-07	4.22E-06
Pentachlorophenol	Y	Y	5.10E-08	lb/MMBtu	2,3	4.47E-07	1.96E-06
Perchloroethylene	Y	Y	3.80E-05	lb/MMBtu	2,3	3.33E-04	1.46E-03
Phosphorus Metal, Yellow or White	Y	N	2.70E-05	lb/MMBtu	2,4	2.37E-04	1.04E-03
Polychlorinated biphenyls	Y	Y	8.15E-09	lb/MMBtu	2,3	7.14E-08	3.13E-07
Polycyclic Organic Matter	Y	N	1.25E-04	lb/MMBtu	2,3	1.09E-03	4.79E-03
Selenium compounds	Y	N	2.80E-06	lb/MMBtu	2,4	2.45E-05	1.07E-04
Styrene	Y	Y	1.90E-03	lb/MMBtu	2,3	1.67E-02	7.29E-02
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	8.60E-12	lb/MMBtu	2,3	7.54E-11	3.30E-10
Toluene	Y	Y	9.20E-04	lb/MMBtu	2,3	8.06E-03	3.53E-02
Trichloroethane, 1,1,1-	Y	Y	3.10E-05	lb/MMBtu	2,3	2.72E-04	1.19E-03
Trichloroethylene	Y	Y	3.00E-05	lb/MMBtu	2,3	2.63E-04	1.15E-03
Trichlorofluoromethane	N	Y	4.10E-05	lb/MMBtu	2,3	3.59E-04	1.57E-03
Trichlorophenol, 2,4,6-	Y	N	2.20E-08	lb/MMBtu	2,3	1.93E-07	8.45E-07
Vinyl chloride	Y	Y	1.80E-05	lb/MMBtu	2,3	1.58E-04	6.91E-04
Xylene	Y	Y	2.50E-05	lb/MMBtu	2,3	2.19E-04	9.60E-04
					Total HAP Emissions:	**4.35**	**19.0**
					Total TAP Emissions:	**1.70**	**7.46**

Notes:

1. Emission factor based on process information and an appropriate contingency based on engineering judgement.
2. Emission factors for wood combustion in a stoker boiler from AP-42 Section 1.6 - Wood Residue Combustion in Boilers, 09/03.
3. A control efficiency of 95% for the RTOs is applied to all organic HAP for those emission factors that are not derived from Enviva stack test data. This is the expected control efficiency of the RTO.
4. A 95% control efficiency for the wet electrostatic precipitator (WESP) is applied to all metal HAP based on expected control efficiency for the WESP.
5. The WESP will employ 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.
6. The emissions from the Green Hammermills and Dry Hammermills will be routed through the Dryer Line WESP and RTO.
7. 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.

Table 3a
Potential Emissions from Dryer Line RTO Stack (CD-RTO)
Enviva Pellets Ahoskie, LLC

Potential HAP Emissions - RTO Burners

Pollutant	HAP	NC TAP	Emission Factor[1]	Units	Potential Emissions	
					(lb/hr)	(tpy)
RTO Natural Gas Combustion						
2-Methylnaphthalene	Y	N	2.40E-05	lb/MMscf	9.34E-07	4.09E-06
3-Methylchloranthrene	Y	N	1.80E-06	lb/MMscf	7.01E-08	3.07E-07
7,12-Dimethylbenz(a)anthracene	Y	N	1.60E-05	lb/MMscf	6.23E-07	2.73E-06
Acenaphthene	Y	N	1.80E-06	lb/MMscf	7.01E-08	3.07E-07
Acenaphthylene	Y	N	1.80E-06	lb/MMscf	7.01E-08	3.07E-07
Ammonia	N	Y	3.2	lb/MMscf	1.25E-01	5.46E-01
Anthracene	Y	N	2.40E-06	lb/MMscf	9.34E-08	4.09E-07
Arsenic & Compounds	Y	Y	2.00E-04	lb/MMscf	7.78E-06	3.41E-05
Benz(a)anthracene	Y	N	1.80E-06	lb/MMscf	7.01E-08	3.07E-07
Benzene	Y	Y	2.10E-03	lb/MMscf	8.17E-05	3.58E-04
Benzo(a)pyrene	Y	Y	1.20E-06	lb/MMscf	4.67E-08	2.05E-07
Benzo(b)fluoranthene	Y	N	1.80E-06	lb/MMscf	7.01E-08	3.07E-07
Benzo(g,h,i)perylene	Y	N	1.20E-06	lb/MMscf	4.67E-08	2.05E-07
Benzo(k)fluoranthene	Y	N	1.80E-06	lb/MMscf	7.01E-08	3.07E-07
Beryllium	Y	Y	1.20E-05	lb/MMscf	4.67E-07	2.05E-06
Cadmium	Y	Y	1.10E-03	lb/MMscf	4.28E-05	1.88E-04
Chromium VI	Y	N	1.40E-03	lb/MMscf	5.45E-05	2.39E-04
Chrysene	Y	N	1.80E-06	lb/MMscf	7.01E-08	3.07E-07
Cobalt compounds	Y	N	8.40E-05	lb/MMscf	3.27E-06	1.43E-05
Dibenzo(a,h)anthracene	Y	N	1.20E-06	lb/MMscf	4.67E-08	2.05E-07
Dichlorobenzene	Y	Y	1.20E-03	lb/MMscf	4.67E-05	2.05E-04
Fluoranthene	Y	N	3.00E-06	lb/MMscf	1.17E-07	5.11E-07
Fluorene	Y	N	2.80E-06	lb/MMscf	1.09E-07	4.77E-07
Hexane	Y	Y	1.80	lb/MMscf	7.01E-02	3.07E-01
Indeno(1,2,3-cd)pyrene	Y	N	1.80E-06	lb/MMscf	7.01E-08	3.07E-07
Lead and Lead compounds	Y	N	5.00E-04	lb/MMscf	1.95E-05	8.52E-05
Manganese & compounds	Y	Y	3.80E-04	lb/MMscf	1.48E-05	6.48E-05
Mercury	Y	Y	2.60E-04	lb/MMscf	1.01E-05	4.43E-05
Naphthalene	Y	N	6.10E-04	lb/MMscf	2.37E-05	1.04E-04
Nickel	Y	Y	2.10E-03	lb/MMscf	8.17E-05	3.58E-04
Phenanthrene	Y	N	1.70E-05	lb/MMscf	6.62E-07	2.90E-06
Pyrene	Y	N	5.00E-06	lb/MMscf	1.95E-07	8.52E-07
Selenium Compounds	Y	N	2.40E-05	lb/MMscf	9.34E-07	4.09E-06
Toluene	Y	Y	3.40E-03	lb/MMscf	1.32E-04	5.80E-04
				Total HAP Emissions	**0.071**	**0.31**
				Total TAP Emissions	**0.20**	**0.85**

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 factor for ammonia is cited in the NCDAQ spreadsheet as being sourced from the USEPA's WebFIRE database. Acetaldehyde, acrolein, and formaldehyde are not included in this table because emissions of these pollutants resulting from RTO fuel combustion are already reflected in the lb/ODT emission factors.

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
GHM - Green Hammermill
HAP - hazardous air pollutant
hr - hour
kg - kilogram
lb - pound
Mgal - thousand gallons
MMBtu - Million British thermal units
MMscf - Million standard cubic feet
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried short tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

References:

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

Table 3b
Potential Emissions from Furnace Bypass (Cold Start-up)
Enviva Pellets Ahoskie, LLC

Calculation Basis

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

Potential Criteria Pollutant and Greenhouse Gas Emissions - Furnace Bypass Cold Start-up

Pollutant	Emission Factor	Units	Potential Emissions	
			(lb/hr)	(tpy)
CO	0.60	lb/MMBtu[1]	15.8	0.39
NO_X	0.22	lb/MMBtu[1]	5.78	0.14
SO_2	0.025	lb/MMBtu[1]	0.66	0.016
VOC	0.017	lb/MMBtu[1]	0.45	0.011
Total PM	0.58	lb/MMBtu[1]	15.2	0.38
Total PM_{10}	0.52	lb/MMBtu[1]	13.6	0.34
Total $PM_{2.5}$	0.45	lb/MMBtu[1]	11.8	0.29
CO_2	93.8	kg/MMBtu[2]	5,438	136
CH_4	0.0072	kg/MMBtu[2]	0.42	0.010
N_2O	0.0036	kg/MMBtu[2]	0.21	0.0052
CO_2e			5,510	138

Notes:

1. 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-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. VOC emission factor excludes formaldehyde.
2. Emission factors for biomass combustion from Table C-1 and C-2 of 40 CFR Part 98 and Global Warming Potentials from Table A-1.

Table 3b
Potential Emissions from Furnace Bypass (Cold Start-up)
Enviva Pellets Ahoskie, LLC

Potential HAP Emissions - Furnace Bypass Cold Start-up

Pollutant	HAP	NC TAP	Emission Factor[1]	Units	Potential Emissions	
					(lb/hr)	(tpy)
Acetaldehyde	Y	Y	8.30E-04	lb/MMBtu	2.18E-02	5.46E-04
Acrolein	Y	Y	4.00E-03	lb/MMBtu	1.05E-01	2.63E-03
Formaldehyde	Y	Y	4.40E-03	lb/MMBtu	1.16E-01	2.89E-03
Phenol	Y	Y	5.10E-05	lb/MMBtu	1.34E-03	3.35E-05
Propionaldehyde	Y	N	6.10E-05	lb/MMBtu	1.60E-03	4.01E-05
Acetophenone	Y	N	3.20E-09	lb/MMBtu	8.41E-08	2.10E-09
Antimony & Compounds	Y	N	7.90E-06	lb/MMBtu	2.08E-04	5.19E-06
Arsenic & Compounds	Y	Y	2.20E-05	lb/MMBtu	5.78E-04	1.45E-05
Benzene	Y	Y	4.20E-03	lb/MMBtu	1.10E-01	2.76E-03
Benzo(a)pyrene	Y	Y	2.60E-06	lb/MMBtu	6.84E-05	1.71E-06
Beryllium	Y	Y	1.10E-06	lb/MMBtu	2.89E-05	7.23E-07
Cadmium	Y	Y	4.10E-06	lb/MMBtu	1.08E-04	2.70E-06
Carbon tetrachloride	Y	Y	4.50E-05	lb/MMBtu	1.18E-03	2.96E-05
Chlorine	Y	Y	7.90E-04	lb/MMBtu	2.08E-02	5.19E-04
Chlorobenzene	Y	Y	3.30E-05	lb/MMBtu	8.68E-04	2.17E-05
Chloroform	Y	Y	2.80E-05	lb/MMBtu	7.36E-04	1.84E-05
Chromium VI	-[2]	Y	3.50E-06	lb/MMBtu	9.20E-05	2.30E-06
Chromium-Other compounds	Y	N	1.75E-05	lb/MMBtu	4.60E-04	1.15E-05
Cobalt compounds	Y	N	6.50E-06	lb/MMBtu	1.71E-04	4.27E-06
Dichloroethane, 1,2-	Y	Y	2.90E-05	lb/MMBtu	7.63E-04	1.91E-05
Dichloropropane, 1,2-	Y	N	3.30E-05	lb/MMBtu	8.68E-04	2.17E-05
Dinitrophenol, 2,4-	Y	N	1.80E-07	lb/MMBtu	4.73E-06	1.18E-07
Di(2-ethylhexyl)phthalate	Y	Y	4.70E-08	lb/MMBtu	1.24E-06	3.09E-08
Ethyl benzene	Y	N	3.10E-05	lb/MMBtu	8.15E-04	2.04E-05
Hexachlorodibenzo-p-dioxin	N	Y	1.60E-06	lb/MMBtu	4.21E-05	1.05E-06
Hydrochloric acid	Y	Y	1.90E-02	lb/MMBtu	5.00E-01	1.25E-02
Lead and Lead compounds	Y	N	4.80E-05	lb/MMBtu	1.26E-03	3.16E-05
Manganese & compounds	Y	Y	1.60E-03	lb/MMBtu	4.21E-02	1.05E-03
Mercury	Y	Y	3.50E-06	lb/MMBtu	9.20E-05	2.30E-06
Methyl bromide	Y	N	1.50E-05	lb/MMBtu	3.94E-04	9.86E-06
Methyl chloride	Y	N	2.30E-05	lb/MMBtu	6.05E-04	1.51E-05
Methyl ethyl ketone	N	Y	5.40E-06	lb/MMBtu	1.42E-04	3.55E-06
Methylene chloride	Y	Y	2.90E-04	lb/MMBtu	7.63E-03	1.91E-04
Naphthalene	Y	N	9.70E-05	lb/MMBtu	2.55E-03	6.38E-05
Nickel	Y	Y	3.30E-05	lb/MMBtu	8.68E-04	2.17E-05
Nitrophenol, 4-	Y	N	1.10E-07	lb/MMBtu	2.89E-06	7.23E-08
Pentachlorophenol	Y	Y	5.10E-08	lb/MMBtu	1.34E-06	3.35E-08
Perchloroethylene	Y	Y	3.80E-05	lb/MMBtu	9.99E-04	2.50E-05
Phosphorus Metal, Yellow or White	Y	N	2.70E-05	lb/MMBtu	7.10E-04	1.77E-05
Polychlorinated biphenyls	Y	Y	8.15E-09	lb/MMBtu	2.14E-07	5.35E-09
Polycyclic Organic Matter	Y	N	1.25E-04	lb/MMBtu	3.28E-03	8.20E-05
Selenium compounds	Y	N	2.80E-06	lb/MMBtu	7.36E-05	1.84E-06
Styrene	Y	Y	1.90E-03	lb/MMBtu	5.00E-02	1.25E-03
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	8.60E-12	lb/MMBtu	2.26E-10	5.65E-12
Toluene	Y	Y	9.20E-04	lb/MMBtu	2.42E-02	6.05E-04
Trichloroethane, 1,1,1-	Y	Y	3.10E-05	lb/MMBtu	8.15E-04	2.04E-05
Trichloroethylene	Y	Y	3.00E-05	lb/MMBtu	7.89E-04	1.97E-05
Trichlorofluoromethane	N	Y	4.10E-05	lb/MMBtu	1.08E-03	2.70E-05
Trichlorophenol, 2,4,6-	Y	N	2.20E-08	lb/MMBtu	5.78E-07	1.45E-08
Vinyl chloride	Y	Y	1.80E-05	lb/MMBtu	4.73E-04	1.18E-05
Xylene	Y	Y	2.50E-05	lb/MMBtu	6.57E-04	1.64E-05
				Total HAP Emissions:	**1.02**	**0.025**
				Total TAP Emissions:	**1.01**	**0.025**

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.

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
kg - kilogram
lb - pound
MMBtu - Million British thermal units
NC - North Carolina
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried short tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
TAP - Toxic Air Pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

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

Table 3c
Potential Emissions from Furnace Bypass (Idle Mode)
Enviva Pellets Ahoskie, LLC

Calculation Basis

Avg. and Max. Hourly Heat Input Capacity[1]	15 MMBtu/hr
Annual Heat Input Capacity	7,500 MMBtu/yr
Hours of Operation[1]	500 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions - Furnace Bypass "Idle Mode"

Pollutant	Emission Factor	Units	Potential Emissions	
			(lb/hr)	(tpy)
CO	0.60	lb/MMBtu[2]	9.00	2.25
NO_X	0.22	lb/MMBtu[2]	3.30	0.83
SO_2	0.025	lb/MMBtu[2]	0.38	0.094
VOC	0.017	lb/MMBtu[2]	0.255	0.064
Total PM	0.58	lb/MMBtu[2]	8.66	2.16
Total PM_{10}	0.52	lb/MMBtu[2]	7.76	1.94
Total $PM_{2.5}$	0.45	lb/MMBtu[2]	6.71	1.68
CO_2	93.8	kg/MMBtu[3]	3,102	775
CH_4	0.0072	kg/MMBtu[3]	0.238	0.060
N_2O	0.0036	kg/MMBtu[3]	0.119	0.030
CO_2e			3,143	786

Notes:

1. The furnace may operate in idle mode for up to 500 hr/yr.
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-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 from Table C-1 and C-2 of 40 CFR Part 98 and Global Warming Potentials from Table A-1.

Table 3c
Potential Emissions from Furnace Bypass (Idle Mode)
Enviva Pellets Ahoskie, LLC

Potential HAP Emissions - Furnace Bypass "Idle Mode"

Pollutant	HAP	NC TAP	Emission Factor[1]	Units	Potential Emissions	
					(lb/hr)	(tpy)
Acetaldehyde	Y	Y	8.30E-04	lb/MMBtu	1.25E-02	3.11E-03
Acrolein	Y	Y	4.00E-03	lb/MMBtu	6.00E-02	1.50E-02
Formaldehyde	Y	Y	4.40E-03	lb/MMBtu	6.60E-02	1.65E-02
Phenol	Y	Y	5.10E-05	lb/MMBtu	7.65E-04	1.91E-04
Propionaldehyde	Y	N	6.10E-05	lb/MMBtu	9.15E-04	2.29E-04
Acetophenone	Y	N	3.20E-09	lb/MMBtu	4.80E-08	1.20E-08
Antimony & Compounds	Y	N	7.90E-06	lb/MMBtu	1.19E-04	2.96E-05
Arsenic & Compounds	Y	Y	2.20E-05	lb/MMBtu	3.30E-04	8.25E-05
Benzene	Y	Y	4.20E-03	lb/MMBtu	6.30E-02	1.58E-02
Benzo(a)pyrene	Y	Y	2.60E-06	lb/MMBtu	3.90E-05	9.75E-06
Beryllium	Y	Y	1.10E-06	lb/MMBtu	1.65E-05	4.13E-06
Cadmium	Y	Y	4.10E-06	lb/MMBtu	6.15E-05	1.54E-05
Carbon tetrachloride	Y	Y	4.50E-05	lb/MMBtu	6.75E-04	1.69E-04
Chlorine	Y	Y	7.90E-04	lb/MMBtu	1.19E-02	2.96E-03
Chlorobenzene	Y	Y	3.30E-05	lb/MMBtu	4.95E-04	1.24E-04
Chloroform	Y	Y	2.80E-05	lb/MMBtu	4.20E-04	1.05E-04
Chromium VI	-[2]	Y	3.50E-06	lb/MMBtu	5.25E-05	1.31E-05
Chromium-Other compounds	Y	N	1.75E-05	lb/MMBtu	2.63E-04	6.56E-05
Cobalt compounds	Y	N	6.50E-06	lb/MMBtu	9.75E-05	2.44E-05
Dichloroethane, 1,2-	Y	Y	2.90E-05	lb/MMBtu	4.35E-04	1.09E-04
Dichloropropane, 1,2-	Y	N	3.30E-05	lb/MMBtu	4.95E-04	1.24E-04
Dinitrophenol, 2,4-	Y	N	1.80E-07	lb/MMBtu	2.70E-06	6.75E-07
Di(2-ethylhexyl)phthalate	Y	Y	4.70E-08	lb/MMBtu	7.05E-07	1.76E-07
Ethyl benzene	Y	N	3.10E-05	lb/MMBtu	4.65E-04	1.16E-04
Hexachlorodibenzo-p-dioxin	N	Y	1.60E-06	lb/MMBtu	2.40E-05	6.00E-06
Hydrochloric acid	Y	Y	1.90E-02	lb/MMBtu	2.85E-01	7.13E-02
Lead and Lead compounds	Y	N	4.80E-05	lb/MMBtu	7.20E-04	1.80E-04
Manganese & compounds	Y	Y	1.60E-03	lb/MMBtu	2.40E-02	6.00E-03
Mercury	Y	Y	3.50E-06	lb/MMBtu	5.25E-05	1.31E-05
Methyl bromide	Y	N	1.50E-05	lb/MMBtu	2.25E-04	5.63E-05
Methyl chloride	Y	N	2.30E-05	lb/MMBtu	3.45E-04	8.63E-05
Methyl ethyl ketone	N	Y	5.40E-06	lb/MMBtu	8.10E-05	2.03E-05
Methylene chloride	Y	Y	2.90E-04	lb/MMBtu	4.35E-03	1.09E-03
Naphthalene	Y	N	9.70E-05	lb/MMBtu	1.46E-03	3.64E-04
Nickel	Y	Y	3.30E-05	lb/MMBtu	4.95E-04	1.24E-04
Nitrophenol, 4-	Y	N	1.10E-07	lb/MMBtu	1.65E-06	4.13E-07
Pentachlorophenol	Y	Y	5.10E-08	lb/MMBtu	7.65E-07	1.91E-07
Perchloroethylene	Y	Y	3.80E-05	lb/MMBtu	5.70E-04	1.43E-04
Phosphorus Metal, Yellow or White	Y	N	2.70E-05	lb/MMBtu	4.05E-04	1.01E-04
Polychlorinated biphenyls	Y	Y	8.15E-09	lb/MMBtu	1.22E-07	3.05E-08
Polycyclic Organic Matter	Y	N	1.25E-04	lb/MMBtu	1.87E-03	4.68E-04
Selenium compounds	Y	N	2.80E-06	lb/MMBtu	4.20E-05	1.05E-05
Styrene	Y	Y	1.90E-03	lb/MMBtu	2.85E-02	7.13E-03
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	8.60E-12	lb/MMBtu	1.29E-10	3.23E-11
Toluene	Y	Y	9.20E-04	lb/MMBtu	1.38E-02	3.45E-03
Trichloroethane, 1,1,1-	Y	Y	3.10E-05	lb/MMBtu	4.65E-04	1.16E-04
Trichloroethylene	Y	Y	3.00E-05	lb/MMBtu	4.50E-04	1.13E-04
Trichlorofluoromethane	N	Y	4.10E-05	lb/MMBtu	6.15E-04	1.54E-04
Trichlorophenol, 2,4,6-	Y	N	2.20E-08	lb/MMBtu	3.30E-07	8.25E-08
Vinyl chloride	Y	Y	1.80E-05	lb/MMBtu	2.70E-04	6.75E-05
Xylene	Y	Y	2.50E-05	lb/MMBtu	3.75E-04	9.38E-05
				Total HAP Emissions:	**0.58**	**0.145**
				Total TAP Emissions:	**0.58**	**0.144**

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.

Abbreviations:
CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
kg - kilogram
lb - pound
MMBtu - Million British thermal units
NC - North Carolina
NO_x - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried short tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
TAP - Toxic Air Pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

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

Table 4
Potential Emissions from Double Duct Burners (IES-DDB-1 and -2)
Enviva Pellets Ahoskie, LLC

Duct Burner Inputs

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

Potential Criteria Pollutant Emissions - Natural Gas Combustion

Pollutant	Emission Factor	Units	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	0.118
$PM/PM_{10}/PM_{2.5}$ Condensable	5.70	lb/MMscf	1	0.028	0.122
$PM/PM_{10}/PM_{2.5}$ Filterable	1.90	lb/MMscf	1	0.0093	0.041
			Total $PM/PM_{10}/PM_{2.5}$	0.037	0.16
CO_2	120,000	lb/MMscf	1	588	2,576
CH_4	2.30	lb/MMscf	1	0.0113	0.049
N_2O[2]	0.64	lb/MMscf	1,2	0.0031	0.014
CO_2e	--	--	3	589	2,582

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 and N_2O assume burners are low-NO_x burners.
3. CO_2e emissions were estimated based on the Global Warming Potentials listed in Table A-1 of 40 CFR 98 Subpart A.

Table 4
Potential Emissions from Double Duct Burners (IES-DDB-1 and -2)
Enviva Pellets Ahoskie, LLC

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	Emission Factor[1]	Units	Potential Emissions	
					(lb/hr)	(tpy)
Natural Gas Combustion						
2-Methylnaphthalene	Y	N	2.40E-05	lb/MMscf	1.18E-07	5.15E-07
3-Methylchloranthrene	Y	N	1.80E-06	lb/MMscf	8.82E-09	3.86E-08
7,12-Dimethylbenz(a)anthracene	Y	N	1.60E-05	lb/MMscf	7.84E-08	3.44E-07
Acenaphthene	Y	N	1.80E-06	lb/MMscf	8.82E-09	3.86E-08
Acenaphthylene	Y	N	1.80E-06	lb/MMscf	8.82E-09	3.86E-08
Acetaldehyde	Y	Y	1.52E-05	lb/MMscf	7.45E-08	3.26E-07
Acrolein	Y	Y	1.80E-05	lb/MMscf	8.82E-08	3.86E-07
Ammonia	N	Y	3.20E+00	lb/MMscf	1.57E-02	6.87E-02
Anthracene	Y	N	2.40E-06	lb/MMscf	1.18E-08	5.15E-08
Arsenic & Compounds	Y	Y	2.00E-04	lb/MMscf	9.80E-07	4.29E-06
Benz(a)anthracene	Y	N	1.80E-06	lb/MMscf	8.82E-09	3.86E-08
Benzene	Y	Y	2.10E-03	lb/MMscf	1.03E-05	4.51E-05
Benzo(a)pyrene	Y	Y	1.20E-06	lb/MMscf	5.88E-09	2.58E-08
Benzo(b)fluoranthene	Y	N	1.80E-06	lb/MMscf	8.82E-09	3.86E-08
Benzo(g,h,i)perylene	Y	N	1.20E-06	lb/MMscf	5.88E-09	2.58E-08
Benzo(k)fluoranthene	Y	N	1.80E-06	lb/MMscf	8.82E-09	3.86E-08
Beryllium	Y	Y	1.20E-05	lb/MMscf	5.88E-08	2.58E-07
Cadmium	Y	Y	1.10E-03	lb/MMscf	5.39E-06	2.36E-05
Chromium VI	Y	N	1.40E-03	lb/MMscf	6.86E-06	3.01E-05
Chrysene	Y	N	1.80E-06	lb/MMscf	8.82E-09	3.86E-08
Cobalt compounds	Y	N	8.40E-05	lb/MMscf	4.12E-07	1.80E-06
Dibenzo(a,h)anthracene	Y	N	1.20E-06	lb/MMscf	5.88E-09	2.58E-08
Dichlorobenzene	Y	Y	1.20E-03	lb/MMscf	5.88E-06	2.58E-05
Fluoranthene	Y	N	3.00E-06	lb/MMscf	1.47E-08	6.44E-08
Fluorene	Y	N	2.80E-06	lb/MMscf	1.37E-08	6.01E-08
Formaldehyde	Y	Y	0.075	lb/MMscf	3.68E-04	1.61E-03
Hexane	Y	Y	1.80	lb/MMscf	8.82E-03	3.86E-02
Indeno(1,2,3-cd)pyrene	Y	N	1.80E-06	lb/MMscf	8.82E-09	3.86E-08
Lead and Lead compounds	Y	N	5.00E-04	lb/MMscf	2.45E-06	1.07E-05
Manganese & compounds	Y	Y	3.80E-04	lb/MMscf	1.86E-06	8.16E-06
Mercury	Y	Y	2.60E-04	lb/MMscf	1.27E-06	5.58E-06
Naphthalene	Y	N	6.10E-04	lb/MMscf	2.99E-06	1.31E-05
Nickel	Y	Y	2.10E-03	lb/MMscf	1.03E-05	4.51E-05
Phenanthrene	Y	N	1.70E-05	lb/MMscf	8.33E-08	3.65E-07
Pyrene	Y	N	5.00E-06	lb/MMscf	2.45E-08	1.07E-07
Selenium Compounds	Y	N	2.40E-05	lb/MMscf	1.18E-07	5.15E-07
Toluene	Y	Y	3.40E-03	lb/MMscf	1.67E-05	7.30E-05
				Total HAP Emissions:	**0.0093**	**0.041**
				Total TAP Emissions:	**0.025**	**0.11**

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.

Abbreviations:

CAS - chemical abstract service
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 short 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

References:

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

Table 5
Pellet Mill/Pellet Cooler, Dry Shavings Hammermill, and Dried Wood Day Silo Potential Emissions at Outlet of RTO/RCO Stack (CD-RCO)
Enviva Pellets Ahoskie, LLC

Calculation Basis

PM/PC Hourly Throughput	74.8 ODT/hr
PM/PC Annual Throughput	630,000 ODT/yr
DSHM Hourly Throughput	12 ODT/hr
DSHM Annual Throughput	100,000 ODT/yr
Hours of Operation	8,760 hr/yr
RTO/RCO Burner Rating	20 MMBtu/hr
RTO/RCO Control Efficiency	95.0 %

Total Potential Emissions at RTO/RCO Stack

Pollutant	Potential Emissions[1]	
	(lb/hr)	(tpy)
CO	1.88	8.21
NO_x	2.24	9.8
SO_2	0.012	0.051
VOC	8.45	35.6
Total PM	2.01	8.5
Total PM_{10}	2.01	8.5
Total $PM_{2.5}$	2.01	8.5
CO_2e	2,343	10,263
Total HAP	0.88	3.72
Total TAP	0.83	3.51

Notes:
1. Total emissions from the Pellet Mills, Pellet Coolers, Dry Shavings Hammermill and natural gas combustion by the RTO/RCO (injection gas and burner fuel). Detailed calculations are provided below.

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

Pollutant	HAP	NC TAP	Controlled Emission Factor[1]	Potential Emissions	
			(lb/ODT)	(lb/hr)	(tpy)
Acetaldehyde	Y	Y	2.92E-03	0.22	0.92
Acrolein	Y	Y	2.52E-03	0.19	0.79
Formaldehyde	Y	Y	3.00E-03	0.22	0.95
Methanol	Y	N	8.83E-04	0.066	0.28
Phenol	Y	Y	1.09E-03	0.082	0.34
Propionaldehyde	Y	N	5.16E-04	0.039	0.16
			Total HAP Emissions	**0.82**	**3.44**
			Total TAP Emissions	**0.71**	**3.00**
Total VOC			0.10	7.53	31.7
$PM/PM_{10}/PM_{2.5}$ (Filterable + Condensable)			0.017	1.28	5.39

Notes:
1. Emission factor based on process information and an appropriate contingency based on engineering judgement.

Table 5
Pellet Mill/Pellet Cooler, Dry Shavings Hammermill, and Dried Wood Day Silo Potential Emissions at Outlet of RTO/RCO Stack (CD-RCO)
Enviva Pellets Ahoskie, LLC

Potential PM, VOC, and HAP Emissions from Dry Shavings Hammermill

Pollutant	HAP	NC TAP	Controlled Emission Factor[1]	Potential Emissions	
			(lb/ODT)	(lb/hr)	(tpy)
Acetaldehyde	Y	Y	3.80E-04	0.0046	0.019
Acrolein	Y	Y	6.40E-04	0.0077	0.032
Formaldehyde	Y	Y	2.70E-04	0.0032	0.014
Methanol	Y	N	4.13E-04	0.0050	0.021
Phenol	Y	Y	3.96E-04	0.0048	0.0198
Propionaldehyde	Y	N	2.64E-04	0.0032	0.013
			Total HAP Emissions	**0.028**	**0.12**
			Total TAP Emissions	**0.020**	**0.084**
Total VOC			0.067	0.80	3.35
$PM/PM_{10}/PM_{2.5}$ (Filterable + Condensable)			0.033	0.40	1.66

Notes:
1. Emission factor based on process information and an appropriate contingency based on engineering judgement.

Potential Particulate Emissions from Dried Wood Day Silo Bin Vent (CD-DWDS-BV)

Pollutant	Exhaust Flow Rate[1]	Exit Grain Loading[2,3]	Potential Emissions	
	(cfm)	(gr/cf)	(lb/hr)	(tpy)
PM (Filterable + Condensable)	2,186	0.01	0.187	0.82
PM_{10} (Filterable + Condensable)			0.187	0.82
$PM_{2.5}$ (Filterable + Condensable)			0.187	0.82

Notes:
1. Inlet flow rate (cfm) was obtained from previous permit application. The exit flowrate was conservatively assumed to be the same as the inlet flowrate.
2. Pollutant loading based on data from other Enviva facilities.
3. No speciation data is available for $PM_{10}/PM_{2.5}$. Therefore, it is conservatively assumed to be equal to total PM.

Thermally Generated Potential Criteria Pollutant Emissions from Combustion of VOC from Dry Shavings Hammermill, Pellet Mills, and Pellet Coolers

Maximum high heating value of VOC constituents	0.018 MMBtu/lb
Uncontrolled VOC emissions	167 lb/hr
Heat input of uncontrolled VOC emissions	3.08 MMBtu/hr
Uncontrolled VOC emissions	702 tons/yr
Heat input of uncontrolled VOC emissions	25,958 MMBtu/yr

Pollutant	Emission Factor[1]	Units	Potential Emissions	
			(lb/hr)	(tpy)
CO	0.082	lb/MMBtu	0.25	1.07
NO_X	0.10	lb/MMBtu	0.30	1.27

Potential Criteria Pollutant and Greenhouse Gas Emissions - RTO/RCO Burners

Pollutant	Emission Factor[1]	Units	Potential Emissions	
			(lb/hr)	(tpy)
RTO/RCO Burners - Natural Gas Combustion				
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	0.11	0.47
$PM/PM_{10}/PM_{2.5}$ Filterable	1.86E-03	lb/MMBtu	0.037	0.16
$PM/PM_{10}/PM_{2.5}$ Condensable	5.59E-03	lb/MMBtu	0.11	0.48
Total $PM/PM_{10}/PM_{2.5}$			0.15	0.65
CO_2	118	lb/MMBtu	2,329	10,203
CH_4	2.25E-03	lb/MMBtu	0.045	0.20
N_2O	2.16E-03	lb/MMBtu	0.043	0.19
CO_2e			2,343	10,263

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.

Table 5
Pellet Mill/Pellet Cooler, Dry Shavings Hammermill, and Dried Wood Day Silo Potential Emissions at Outlet of RTO/RCO Stack (CD-RCO)
Enviva Pellets Ahoskie, LLC

Potential HAP Emissions - RTO/RCO Burners

Pollutant	HAP	NC TAP	Emission Factor[1]	Units	Potential Emissions	
					(lb/hr)	(tpy)
RTO/RCO Burners - Natural Gas Combustion						
2-Methylnaphthalene	Y	N	2.40E-05	lb/MMscf	4.66E-07	2.04E-06
3-Methylchloranthrene	Y	N	1.80E-06	lb/MMscf	3.49E-08	1.53E-07
7,12-Dimethylbenz(a)anthracene	Y	N	1.60E-05	lb/MMscf	3.11E-07	1.36E-06
Acenaphthene	Y	N	1.80E-06	lb/MMscf	3.49E-08	1.53E-07
Acenaphthylene	Y	N	1.80E-06	lb/MMscf	3.49E-08	1.53E-07
Acrolein	Y	Y	1.80E-05	lb/MMscf	3.49E-07	1.53E-06
Ammonia	N	Y	3.2	lb/MMscf	6.21E-02	2.72E-01
Anthracene	Y	N	2.40E-06	lb/MMscf	4.66E-08	2.04E-07
Arsenic & Compounds	Y	Y	2.00E-04	lb/MMscf	3.88E-06	1.70E-05
Benz(a)anthracene	Y	N	1.80E-06	lb/MMscf	3.49E-08	1.53E-07
Benzene	Y	Y	2.10E-03	lb/MMscf	4.08E-05	1.79E-04
Benzo(a)pyrene	Y	Y	1.20E-06	lb/MMscf	2.33E-08	1.02E-07
Benzo(b)fluoranthene	Y	N	1.80E-06	lb/MMscf	3.49E-08	1.53E-07
Benzo(g,h,i)perylene	Y	N	1.20E-06	lb/MMscf	2.33E-08	1.02E-07
Benzo(k)fluoranthene	Y	N	1.80E-06	lb/MMscf	3.49E-08	1.53E-07
Beryllium	Y	Y	1.20E-05	lb/MMscf	2.33E-07	1.02E-06
Cadmium	Y	Y	1.10E-03	lb/MMscf	2.14E-05	9.35E-05
Chromium VI	Y	N	1.40E-03	lb/MMscf	2.72E-05	1.19E-04
Chrysene	Y	N	1.80E-06	lb/MMscf	3.49E-08	1.53E-07
Cobalt compounds	Y	N	8.40E-05	lb/MMscf	1.63E-06	7.14E-06
Dibenzo(a,h)anthracene	Y	N	1.20E-06	lb/MMscf	2.33E-08	1.02E-07
Dichlorobenzene	Y	Y	1.20E-03	lb/MMscf	2.33E-05	1.02E-04
Fluoranthene	Y	N	3.00E-06	lb/MMscf	5.82E-08	2.55E-07
Fluorene	Y	N	2.80E-06	lb/MMscf	5.44E-08	2.38E-07
Hexane	Y	Y	1.80	lb/MMscf	3.49E-02	1.53E-01
Indeno(1,2,3-cd)pyrene	Y	N	1.80E-06	lb/MMscf	3.49E-08	1.53E-07
Lead and Lead compounds	Y	N	5.00E-04	lb/MMscf	9.71E-06	4.25E-05
Manganese & compounds	Y	Y	3.80E-04	lb/MMscf	7.38E-06	3.23E-05
Mercury	Y	Y	2.60E-04	lb/MMscf	5.05E-06	2.21E-05
Naphthalene	Y	N	6.10E-04	lb/MMscf	1.18E-05	5.19E-05
Nickel	Y	Y	2.10E-03	lb/MMscf	4.08E-05	1.79E-04
Phenanthrene	Y	N	1.70E-05	lb/MMscf	3.30E-07	1.45E-06
Pyrene	Y	N	5.00E-06	lb/MMscf	9.71E-08	4.25E-07
Selenium Compounds	Y	N	2.40E-05	lb/MMscf	4.66E-07	2.04E-06
Toluene	Y	Y	3.40E-03	lb/MMscf	6.60E-05	2.89E-04
				Total HAP Emissions:	**0.035**	**0.15**
				Total TAP Emissions:	**0.10**	**0.43**

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 acrolein and ammonia are cited in the NCDAQ spreadsheet as being sourced from the USEPA's WebFIRE database. Formaldehyde and acetaldehyde are not included in this table because emissions of these pollutants resulting from RTO/RCO fuel combustion are already reflected in the controlled lb/ODT emission factors.

Abbreviations:

Btu - British thermal units
CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
NO_x - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried short tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RCO - regenerative catalytic oxidizer
RTO - regenerative thermal oxidizer
scf - standard cubic feet
SO_2 - sulfur dioxide
TAP - Toxic Air Pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

References:

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

Table 6
Potential Emissions from Bark Hog (IES-BARK)
Enviva Pellets Ahoskie, LLC

Calculation Basis

Annual Throughput	91,406	ODT/yr[1]
Hourly Throughput	10.4	ODT/hr[1]
Approximate Moisture Content	50%	

Pollutant	Emission Factor		Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
VOC as propane[2]	5.00E-03	lb/ODT	0.05	0.23
PM[3]	2.00E-02	lb/ton	0.42	1.83
PM_{10}[3]	1.10E-02	lb/ton	0.23	1.01
Methanol[4]	1.00E-03	lb/ODT	0.01	0.05

Notes:

[1] Annual throughput calculated based on 100% of the estimated Annual Dryer Heat Input, assuming 4,200 Btu/lb HHV (wet) and 50% Moisture. Maximum hourly throughput based on maximum fuel usage for the furnace.

[2] Emission factor for VOC as propane is from AP-42, Section 10.6.3., Medium Density Fiberboard, 08/02, Table 7.

[3] Particulate matter emission factors from the EPA document titled *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants*. Source Classification Code 3-07-008-01 (Log Debarking). All PM is assumed to be larger than 2.5 microns.

[4] Emission factor obtained from available emissions factors for chippers in AP-42 Section 10.6.3, Medium Density Fiberboard, 08/02, Table 7 and Section 10.6.4, Hardboard and Fiberboard, 10/02, Table 9.

References:

EPA. AP-42, Section 10.6.3, Medium Density Fiberboard, 08/02.

EPA. AP-42, Section 10.6.4, Hardboard and Fiberboard, 10/02.

EPA. AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants. March 1990.

Abbreviations:

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

Table 7
Potential Emissions from Dried Wood Handling (ES-DWH)
Enviva Pellets Ahoskie, LLC

Calculation Basis

Hourly Throughput[1]	63 ODT/hr
Annual Throughput[1]	550,000 ODT/yr

Potential VOC and HAP Pollutant Emissions

Pollutant	Emission Factor[2] (lb/ODT)	Potential Emissions	
		Hourly (lb/hr)	Annual (tpy)
Formaldehyde	4.32E-04	0.027	0.119
Propionaldehyde	1.42E-04	0.009	0.039
Methanol	8.88E-04	0.056	0.24
Acetaldehyde	4.84E-04	0.030	0.13
Total HAP Emissions		**0.12**	**0.54**
Total VOC (as propane)	0.057	3.61	15.8

Notes:

1. Hourly and annual throughputs assumed to be equal to the dryer throughput.
2. Emission factors based on process information and an appropriate contingency based on engineering judgement.

Abbreviations:

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

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

Emission Unit ID	Source Description	Control Device ID	Control Device Description	Exhaust Flow Rate[1]	Exit Grain Loading[2]	Annual Operation	Particulate Speciation		Potential Emissions					
									PM		PM_{10}		$PM_{2.5}$	
				(cfm)	(gr/cf)	(hours)	PM_{10} (% of PM)	$PM_{2.5}$ (% of PM)	Hourly (lb/hr)	Annual (tpy)	Hourly (lb/hr)	Annual (tpy)	Hourly (lb/hr)	Annual (tpy)
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BV	One (1) baghouse[3]	2,186	0.01	8,760	100%	100%	0.187	0.82	0.187	0.82	0.187	0.82
ES-FB	Fines Bin	CD-FB-BV	One (1) baghouse[3]	3,600	0.01	8,760	100%	100%	0.31	1.35	0.31	1.35	0.31	1.35
ES-FPH; ES-TLB; ES-PL1 and PL2	Finished Product Handling; Twelve truck pellet loadout bins; Pellet load-out 1 and 2	CD-FPH-BF	One (1) baghouse[4,5]	35,500	0.01	8,760	91%	40%	3.04	13.33	2.77	12.13	1.217	5.331

Notes:

1. For esisting sources, filter, vent, and cyclone inlet flow rates (cfm) were obtained from previous permit application. The exit flowrate was conservatively assumed to be the same as the inlet flowrate.
2. Pollutant loading based on previous permit applications.
3. No speciation data is available for $PM_{10}/PM_{2.5}$. Therefore, it is conservatively assumed to be equal to total PM.
4. Finished product handling PM_{10} speciation based on AP-42 factors for wet wood combustion (Section 1.6) controlled by a mechanical separator. Since the particle size of particulate matter from a pellet cooler is anticipated to be larger than flyash, this factor is believed to be a conservative indicator of speciation.
5. Finished product handling $PM_{2.5}$ speciation based on review of NCASI data for similar baghouses in the wood products industry.

Abbreviations:

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

Table 9
Potential Emissions from Material Handling
Enviva Pellets Ahoskie, LLC

Source	Transfer Activity[1]	Control	Control Description	Number of Drop Points	Material Moisture Content	PM Emission Factor[1]	PM_{10} Emission Factor[1]	$PM_{2.5}$ Emission Factor[1]	Potential Throughput[2]		Potential PM Emissions		Potential PM_{10} Emissions		Potential $PM_{2.5}$ Emissions	
					(%)	(lb/ton)	(lb/ton)	(lb/ton)	(tph)	(tpy)	Hourly (lb/hr)	Annual (tpy)	Hourly (lb/hr)	Annual (tpy)	Hourly (lb/hr)	Annual (tpy)
ES-GWHS	Purchased Bark unloading via Truck Tipper	--	--	1	48%	3.74E-05	1.77E-05	2.68E-06	100	182,500	3.74E-03	3.41E-03	1.77E-03	1.61E-03	2.68E-04	2.44E-04
	Drop Points via FEL/Conveying from Bark Pile to Dryer Furnace	--	--	4	48%	3.74E-05	1.77E-05	2.68E-06	21	182,500	3.14E-03	1.36E-02	1.48E-03	6.45E-03	2.25E-04	9.77E-04
	Green Wood Chips unloading via Truck Tippers	--	--	4	48%	3.74E-05	1.77E-05	2.68E-06	440	1,100,000	6.58E-02	8.22E-02	3.11E-02	3.89E-02	4.71E-03	5.89E-03
	Drops Points via FEL/Conveying from Chip Pile to Dryer	--	--	8	48%	3.74E-05	1.77E-05	2.68E-06	150	1,100,000	4.48E-02	1.64E-01	2.12E-02	7.78E-02	3.21E-03	1.18E-02
ES-DWH	Dryer Discharge to Outfeed Conveyor	Enclosed	Reduction to 2 mph mean wind speed	1	10%	7.56E-05	3.58E-05	5.41E-06	70	632,500	5.27E-03	2.39E-02	2.49E-03	1.13E-02	3.78E-04	1.71E-03
	Dryer Outfeed Conveyors to Silo Feed/Silo Bypass	Enclosed	Reduction to 2 mph mean wind speed	1	10%	7.56E-05	3.58E-05	5.41E-06	70	632,500	5.27E-03	2.39E-02	2.49E-03	1.13E-02	3.78E-04	1.71E-03
	Conveyor to Hammermill Surge Bin drop into HM Surge Bin	Enclosed	Reduction to 2 mph mean wind speed	1	10%	7.56E-05	3.58E-05	5.41E-06	70	632,500	5.27E-03	2.39E-02	2.49E-03	1.13E-02	3.78E-04	1.71E-03
IES-ADD	Additive Handling and Storage	--	--	1	10%	3.36E-04	1.59E-04	2.41E-05	25	1,575	8.40E-03	2.65E-04	3.97E-03	1.25E-04	6.02E-04	1.89E-05
IES-DRYSHAVE	Dry Shavings unloading via Truck Tipper	--	--	1	14%	2.10E-04	9.92E-05	1.50E-05	50	116,279	1.05E-02	1.22E-02	4.96E-03	5.77E-03	7.51E-04	8.73E-04
	Dry Shavings Drop from Storage to Conveyor	--	--	1	14%	2.10E-04	9.92E-05	1.50E-05	20	116,279	4.20E-03	1.22E-02	1.98E-03	5.77E-03	3.00E-04	8.73E-04
									Total Emissions:		**0.16**	**0.36**	**0.074**	**0.17**	**0.011**	**0.026**

Notes:

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

$$E = k\,(0.0032)\,(U/5)^{1.3} \times (M/2)^{1.4}$$

where:

E = emission factor (lb/ton)

k = particle size multiplier (dimensionless) for PM 0.74

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

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

U = mean wind speed (mph) 6.3

U = mean wind speed (mph) for enclosed drops 2

M = material moisture content (%)

[2] Throughputs represent green weight of materials, calculated based on listed material moisture contents.

References:

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

Abbreviations:

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

Table 10
Potential Emissions from Storage Pile Wind Erosion (ES-GWHS)
Enviva Pellets Ahoskie, LLC

Source	Description	PM Emission Factor[1]		VOC Emission Factor[2]		Pile Width	Pile Length	Pile Height	Exposed Surface Area of Pile[3]	Potential PM Emissions		Potential PM_{10} Emissions		Potential $PM_{2.5}$ Emissions		Potential VOC Emissions (as propane)[4]	
		(lb/day /acre)	(lb/hr/ft²)	(lb/day /acre)	(lb/hr/ft²)	(ft)	(ft)	(ft)	(ft²)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
ES GWHS	Green Wood Chip Storage Pile 1	6.48	6.2E-06	3.60	3.4E-06	300	350	20	157,200	0.98	4.27	0.49	2.14	0.073	0.320	0.66	2.89
	Green Wood Chip Storage Pile 2	6.48	6.2E-06	3.60	3.4E-06	200	400	20	124,800	0.77	3.39	0.39	1.70	0.058	0.254	0.52	2.30
	Bark Storage Pile	6.48	6.2E-06	3.60	3.4E-06	150	40	20	16,320	0.10	0.44	0.051	0.22	0.008	0.033	0.069	0.30
	Mixing Storage Pile	6.48	6.2E-06	3.60	3.4E-06	200	150	20	38,446	0.238	1.04	0.119	0.522	0.0179	0.0783	0.1615	0.707
									Total Emissions:	**2.09**	**9.15**	**1.04**	**4.57**	**0.157**	**0.69**	**1.41**	**6.20**

Notes:

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

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

where:		
s, silt content of wood chips (%):	8.4	s - silt content (%) for lumber sawmills (mean) from AP-42, Section 13.2.2 - Unpaved Roads, 11/06, Table 13.2.2-1
p, number of days with rainfall greater than 0.01 inch:	120	Based on AP-42, Section 13.2.2 - Unpaved Roads, 11/06, Figure 13.2.1-2.
f (time that wind exceeds 5.36 m/s - 12 mph) (%):	9.8	Based on meteorological data averaged for 2007-2011 for Northampton, NC.
PM_{10}/TSP ratio:	50%	PM_{10} is assumed to equal 50% of TSP based on U.S. EPA Control of Open Fugitive Dust Sources, Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988.
$PM_{2.5}$/TSP ratio:	7.5%	$PM_{2.5}$ is assumed to equal 7.5 % of TSP U.S. EPA Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors. November 2006.

[2] VOC emission factor obtained from NCASI Technical Bulletin No. 700, *A Preliminary Investigation of Releases of Volatile Organic Compounds from Wood Residual Storage Piles* for the calculation of fugitive VOC emissions from Douglas Fir wood storage piles. Emission factors ranged from 1.6 to 3.6 lb C/acre-day. The maximum emission factor has conservatively been selected.

[3] The surface area for rectangular piles is calculated as [2*H*L+2*W*H+L*W] + 20% to consider the sloping pile edges.

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

Abbreviations:

EPA - Environmental Protection Agency
ft - feet
ft² - square feet
lb - pound
mph - miles per hour
NCASI - National Council for Air and Stream Improvement, Inc.
NWS - National Weather Service
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
tpy - tons per year
TSP - Total Suspended Particulate
yr - year
VOC - volatile organic compound

References:

EPA. AP-42, Section 13.2.2 - Unpaved Roads, 11/06.
U.S. EPA. Control of Open Fugitive Dust Sources, Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988.
U.S. EPA. Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors. November 2006.
NCASI. Technical Bulletin No. 700. Preliminary Investigation of Releases of Volatile Organic Compounds from Wood Residual Storage Piles. October 1995.

Table 11
Potential Emissions from Emergency Generator (IES-EG) and Fire Water Pump (IES-FWP)
Enviva Pellets Ahoskie, LLC

Emergency Generator - Emissions (IES-EG)

Equipment and Fuel Characteristics

Engine Output	0.26 MW
Engine Power	350 hp (brake)
Hours of Operation	500 hr/yr[1]
Heating Value of Diesel	19,300 Btu/lb
Power Conversion	7,000 Btu/hr/hp

Criteria Pollutant and Greenhouse Gas Emissions

Pollutant	Emission Factor	Units	Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
TSP	0.20	g/kW-hr (2)	0.12	0.03
PM_{10}	0.20	g/kW-hr (2)	0.12	0.03
$PM_{2.5}$	0.20	g/kW-hr (2)	0.12	0.03
NO_x	4.00	g/kW-hr (5)	2.30	0.58
SO_2	15	ppmw (3)	3.81E-03	0.00
CO	3.50	g/kW-hr (2)	2.01	0.50
VOC (NMHC)	2.47E-03	lb/hp-hr (4)	0.86	0.22
CO_2	1.15	lb/hp-hr (4)	402.50	100.63

Hazardous Air Pollutant Emissions

Pollutant	Emission Factor	Units	Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
Acetaldehyde	5.37E-06	lb/hp-hr (4)	1.88E-03	4.70E-04
Acrolein	6.48E-07	lb/hp-hr (4)	2.27E-04	5.67E-05
Benzene	6.53E-06	lb/hp-hr (4)	2.29E-03	5.71E-04
Benzo(a)pyrene	1.32E-09	lb/hp-hr (4)(6)	4.61E-07	1.15E-07
1,3-Butadiene	2.74E-07	lb/hp-hr (4)	9.58E-05	2.39E-05
Formaldehyde	8.26E-06	lb/hp-hr (4)	2.89E-03	7.23E-04
Polycyclic Organic Matter	1.18E-06	lb/hp-hr (4)	4.12E-04	1.03E-04
Toluene	2.86E-06	lb/hp-hr (4)	1.00E-03	2.51E-04
Xylene	2.00E-06	lb/hp-hr (4)	6.98E-04	1.75E-04
Maximum Individual HAP (Formaldehyde):			2.89E-03	7.23E-04
Total HAP:			9.49E-03	2.37E-03

Notes:

[1] NSPS Subpart IIII allows for only 100 hr/yr of non-emergency operation of this engine. The potential annual emissions for the emergency generator are conservatively based on 500 hr/yr. Emergency operation is not limited.

[2] Emissions standards from NSPS Subpart IIII for emergency engines with a maximum power rating greater than 50 horsepower [§60.4202(a)(2)].

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

[4] Emission factor obtained from AP-42 Section 3.3, Tables 3.3-1 Table 3.3-2. Emission factors were converted from lb/MMBtu to lb/hp-hr using a brake-specific fuel consumption of 7,000 Btu/hp-hr per AP-42 Section 3.3.

[5] Emission standard for NOx+NMHC (Non-Methane Hydrocarbons) from NSPS Subpart IIII is used to calculate emissions of NO_x. Conservatively assumed entire limit is attributable to NO_x.

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

Table 11
Potential Emissions from Emergency Generator (IES-EG) and Fire Water Pump (IES-FWP)
Enviva Pellets Ahoskie, LLC

Firewater Pump Emissions (IES-FWP)

Equipment and Fuel Characteristics

Engine Output	0.22 MW
Engine Power	300 hp
Hours of Operation	500 hr/yr[1]
Heating Value of Diesel	19,300 Btu/lb
Power Conversion	7,000 Btu/hr/hp

Criteria Pollutant and Greenhouse Gas Emissions

Pollutant	Emission Factor	Units	Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
TSP	2.20E-03	lb/hp-hr (2)	0.66	0.17
PM_{10}	2.20E-03	lb/hp-hr (2)	0.66	0.17
$PM_{2.5}$	2.20E-03	lb/hp-hr (2)	0.66	0.17
NO_x	3.10E-02	lb/hp-hr (2)	9.30	2.33
SO_2	2.05E-03	lb/hp-hr (2)	0.62	0.15
CO	6.68E-03	lb/hp-hr (2)	2.00	0.50
VOC (NMHC)	2.47E-03	lb/hp-hr (2)	0.74	0.19
CO_2	1.15	lb/hp-hr (2)	345	86.25

Hazardous Air Pollutant Emissions

Pollutant	Emission Factor	Units	Potential Emissions	
			Hourly (lb/hr)	Annual (tpy)
Acetaldehyde	5.37E-06	lb/hp-hr (2)	1.61E-03	4.03E-04
Acrolein	6.48E-07	lb/hp-hr (2)	1.94E-04	4.86E-05
Benzene	6.53E-06	lb/hp-hr (2)	1.96E-03	4.90E-04
Benzo(a)pyrene	1.32E-09	lb/hp-hr (2)(3)	3.95E-07	9.87E-08
1,3-Butadiene	2.74E-07	lb/hp-hr (2)	8.21E-05	2.05E-05
Formaldehyde	8.26E-06	lb/hp-hr (2)	2.48E-03	6.20E-04
Polycyclic Organic Matter	1.18E-06	lb/hp-hr (2)	3.53E-04	8.82E-05
Toluene	2.86E-06	lb/hp-hr (2)	8.59E-04	2.15E-04
Xylene	2.00E-06	lb/hp-hr (2)	5.99E-04	1.50E-04
Maximum Individual HAP (Formaldehyde):			**2.48E-03**	**6.20E-04**
Total HAP:			**8.13E-03**	**2.03E-03**

Notes:

[1] NESHAP Subpart ZZZZ allows for only 100 hr/yr of non-emergency operation of this engine. The potential annual emissions for the fire water pump are conservatively based on 500 hr/yr. Emergency operation is not limited.

[2] Emission factor obtained from AP-42 Section 3.3, Tables 3.3-1 Table 3.3-2. HAP emission factors were converted from lb/MMBtu to lb/hp-hr using a brake-specific fuel consumption of 7,000 Btu/hp-hr per AP-42 Section 3.3.

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

References:

EPA. AP-42, Section 3.3 - Gasoline and Diesel Industrial Engines, 10/96.

Table 12
Potential Emissions from Diesel Storage Tanks
Enviva Pellets Ahoskie, LLC

Source ID	Description	Design Volume	Working Volume[1]	Tank Dimensions		Orientation	Throughput	Turnovers	VOC Emissions[2]	
				Diameter	Height/ Length					
		(gal)	(gal)	(ft)	(ft)		(gal/yr)		(lb/hr)	(tpy)
IES-TK-1	Emergency Generator Fuel Storage Tank	2,500	1,250	6.0	12.0	Vertical	8,813	3.5	6.2E-05	2.7E-04
IES-TK-2	Fire Pump Fuel Storage Tank	500	250	3.0	10.0	Horizontal	7,554	15.1	3.4E-06	1.5E-05
IES-TK-3	Diesel Storage Tank #3	600	300	4.0	6.5	Horizontal	100,000	166.7	1.1E-05	5.0E-05
IES-TK-4	Diesel Storage Tank #4	1,000	500	4.0	10.5	Horizontal	150,000	300.0	1.8E-05	8.0E-05
								Total Emissions:	**9.5E-05**	**4.2E-04**

Notes:

1. Working volume conservatively assumed to be 50% of tank design volume because tanks will not be full at all times.
2. Emissions based on AP-42, Chapter 7.

Abbreviations:

EPA - Environmental Protection Agency
ft - feet
gal - gallon
lb - pound
yr - year
VOC - volatile organic compound

References:

EPA. AP-42, Section 7.1 - Organic Liquid Storage Tanks, 11/19.

Table 13a
Potential Fugitive PM Emissions from Paved Roads
Enviva Pellets Ahoskie, LLC

Vehicle Activity	Distance Traveled per Roundtrip[1] (ft)	Trips Per Day[2]	Daily VMT	Events Per Year (days)	Empty Truck Weight (lb)	Loaded Truck Weight (lb)	Average Truck Weight (ton)	Annual VMT	PM Emission Factor[3] (lb/VMT)	PM_{10} Emission Factor[3] (lb/VMT)	$PM_{2.5}$ Emission Factor[3] (lb/VMT)	Potential PM Emissions (lb/day)	Potential PM Emissions (tpy)	Potential PM_{10} Emissions (lb/day)	Potential PM_{10} Emissions (tpy)	Potential $PM_{2.5}$ Emissions (lb/day)	Potential $PM_{2.5}$ Emissions (tpy)
Chip Delivery to Truck Tippers 1, 2, and 3	2,260	101	43	365	40,480	92,480	33.2	15,779	2.44	0.49	0.12	10.6	1.93	2.11	0.39	0.52	0.09
Chip Delivery to Truck Tipper No. 4	1,850	101	35	365	40,480	92,480	33.2	12,917	2.44	0.49	0.12	8.64	1.58	1.73	0.32	0.42	0.077
Dry Shavings Delivery to Truck Dump	2,115	12	5	365	40,480	65,000	26.4	1,754	1.93	0.39	0.09	0.93	0.17	0.19	0.034	0.046	0.008
Bark Fuel Delivery to Fuel Truck Dump	1,740	26	9	365	40,960	92,960	33.5	3,127	2.46	0.49	0.12	2.11	0.38	0.42	0.077	0.10	0.019
Pellet Truck to Pellet Loadout Area (Normal Operations)	2,080	59	23	365	40,480	102,480	35.7	8,483	2.63	0.53	0.13	6.11	1.12	1.22	0.22	0.30	0.05
CNG Fuel Delivery	1,660	4	1	365	40,480	58,480	24.7	459	1.81	0.361	0.089	0.23	0.04	0.05	0.01	0.01	0.002
Employee Car Parking	2,250	75	32	365	4,000	4,000	2.0	11,665	0.14	0.028	0.0068	0.44	0.081	0.089	0.016	0.022	0.0040
											Total Emissions:	**29.0**	**5.30**	**5.80**	**1.06**	**1.42**	**0.26**

Notes:

[1] Distance traveled per round trip was provided by Enviva.

[2] Daily trip counts based on original permit application estimation.

[3] Emission factors calculated based on Equation 2 from AP-42 Section 13.2.1 - Paved Roads, 01/11.

Particulate Emission Factor: $E = k\,(sL)^{0.91} \times (W)^{1.02} * (1-P/4N)$

where:

E = emission factor (lb/ton)		
k = particle size multiplier (dimensionless) for PM	0.011	
k = particle size multiplier (dimensionless) for PM_{10}	0.0022	
k = particle size multiplier (dimensionless) for $PM_{2.5}$	0.00054	
sL - mean road surface silt loading from AP-42 Table 13.2.1-3 for quarries (g/m^2)	8.2	
P - No. days with rainfall greater than 0.01 inch	120	Per AP-42, Section 13.2.1, Figure 13.2.1-2
N = number of days in the averaging period		

[4] Potential emissions calculated from appropriate emission factor times vehicle miles traveled with control efficiency of 90% for water / dust suppression activities followed by sweeping. Per Table 5 in Chapter 4 of the Air Pollution Engineering Manual, Air and Waste Management Association, page 141. Control efficiency (%) = 96-0.263*V, where V is the number of vehicle passes since application of water.

References:

EPA. AP-42, Section 13.2.1 - Paved Roads, 01/11.

Air Pollution Engineering Manual, Air and Waste Management Association.

Abbreviations:

ft - feet
hr - hour
lb - pound
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
tpy - tons per year
yr - year
VMT - vehicle miles traveled
VOC - volatile organic compound

Table 13b
Potential Fugitive PM Emissions from Unpaved Roads
Enviva Pellets Ahoskie, LLC

Vehicle Activity	Distance Traveled per Roundtrip[1] (ft)	Trips Per Day[1]	Daily VMT	Events Per Year (days)	Empty Truck Weight (lb)	Loaded Truck Weight (lb)	Average Truck Weight (ton)	Annual VMT
Pellet Truck Delivery to Pellet Loadout Area	940	59	11	365	40,480	102,480	35.7	3,834
Chip Delivery to Truck Tipper No. 4	1,224	101	23	365	40,480	92,480	33.2	8,546
Dry Shavings Delivery to Truck Dump	940	12	2	365	40,480	65,000	26.4	780
Bark Fuel Delivery to Fuel Truck Dump	320	26	2	365	40,960	92,960	33.5	575
CNG Fuel Delivery	490	4	0.4	365	40,480	58,480	24.74	135
Front End Loaders Transferring Softwood Chips	1,035	915	179	--	56,375	67,903	31.1	37,406
Front End Loaders Transferring Hardwood Chips	633	915	110	--	56,375	67,903	31.1	22,868
Front End Loaders Transferring Mixed Chips	380	915	66	--	56,375	67,903	31.1	13,735
Front End Loaders Transferring Dry Shavings	500	640	61	--	56,375	60,125	29.1	5,873
Front End Loaders Transferring Bark	2,229	500	211	--	56,375	65,975	30.6	16,052
							247	**109,803**

Notes:

1. Distance traveled per round trip and daily trip counts were provided by Enviva.

Emission Calculations Unpaved Roads:

Pollutant	Empirical Constant (k)[1]	Silt Content (S)[2]	Particle Constant a[1]	Particle Constant b[1]	Emission Factor[3]	Potential Emissions[4]
	(lb/VMT)	(%)	(-)	(-)	(lb/VMT)	(tpy)
PM	4.9	8.4	0.7	0.45	18.6	102
PM_{10}	1.5	8.4	0.9	0.45	5.32	29.2
$PM_{2.5}$	0.15	8.4	0.9	0.45	0.53	2.92

Notes:

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

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

   k = particle size multiplier for particle size range and units of interest
   E = size-specific emission factor (lb/VMT)
   s = surface material silt content (%)
   W = mean vehicle weight (tons)
   P=number of days with at least 0.01 in of precipitation during the averaging period =
   = 120 Per AP-42, Section 13.2.1, Figure 13.2.2-1
4. Potential emissions calculated from appropriate emission factor times vehicle miles traveled with control efficiency of 90% for water / dust suppression activities.

References:

EPA. AP-42, Section 13.2.2 - Unpaved Roads, 11/06.

Abbreviations:

ft - feet
hr - hour
lb - pound
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
tpy - tons per year
yr - year
VMT - vehicle miles traveled
VOC - volatile organic compound

APPENDIX D
PERMIT APPLICATION FORMS

FORM A

GENERAL FACILITY INFORMATION

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NOTE- APPLICATION WILL NOT BE PROCESSED WITHOUT THE FOLLOWING:

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

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

Received SEP 01 2020 Air Permits Section

GENERAL INFORMATION

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

CONTACT INFORMATION

Responsible Official/Authorized Contact:	*Invoice Contact:*
Name/Title: Curtis Hall, Plant Manager	Name/Title: Jared Wald, EHS Manager
Mailing Address Line 1: 142 N.C. Route 561 East	Mailing Address Line 1: 142 N.C. Route 561 East
Mailing Address Line 2:	Mailing Address Line 2:
City: Ahoskie State: NC Zip Code: 27910	City: Ahoskie State: NC Zip Code: 27910
Primary Phone No.: (252) 209-6032 ext. 2210 Fax No.:	Primary Phone No.: (252) 676-6791 Fax No.:
Secondary Phone No.:	Secondary Phone No.:
Email Address: curtis.hall@envivabiomass.com	Email Address: jared.wald@envivabiomass.com
Facility/Inspection Contact:	***Permit/Technical Contact:***
Name/Title: Jared Wald, EHS Manager	Name/Title: Kai Simonsen, Air Permit Engineer
Mailing Address Line 1: 142 N.C. Route 561 East	Mailing Address Line 1: 4242 Six Forks Road, Suite 1050
Mailing Address Line 2:	Mailing Address Line 2:
City: Ahoskie State: NC Zip Code: 27910	City: Raleigh State: NC Zip Code: 27609
Primary Phone No.: (252) 676-6791 Fax No.:	Primary Phone No.: 984-789-3628 Fax No.:
Secondary Phone No.:	Secondary Phone No.:
Email Address: jared.wald@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. 4600107

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

Current/Previous Air Permit No. 10121T04 Expiration Date: 05/31/2021

Facility Coordinates: Latitude: 36 degrees, 16 minutes, 7.7 seconds Longitude: 76 degrees, 57 minutes, 51.95 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): Curtis Hall | Title: Plant Manager

X Signature(Blue Ink): Curtis Hall | Date: 8-28-2020

Attach Additional Sheets As Necessary | Page 1 of 1

Received SEP 01 2020 Air Permits Section

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

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

SECTION AA1 - APPLICATION FOR NON-TITLE V PERMIT RENEWAL

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

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

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

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

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

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

SECTION AA2- APPLICATION FOR TITLE V PERMIT RENEWAL

In accordance with the provisions of Title 15A 2Q .0513, the responsible official of **Enviva Pellets Ahoskie, LLC** (Company Name) hereby formally requests renewal of Air Permit No. **10121T04** (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)			
ES-GHM-2 through ES-GHM-4	Three (3) Green Hammermills (new)	CD-WESP	Wet Electrostatic Precipitator
		CD-RTO (new)	Regenerative Thermal Oxidizer
ES-DHM-6	One (1) Dry Hammermill (new)	ES-DHM-FF1	Baghouse
		CD-WESP	Wet Electrostatic Precipitator
		CD-RTO (new)	Regenerative Thermal Oxidizer
ES-DHM-7	One (1) Dry Hammermill (new)	ES-DHM-FF2	Baghouse
		CD-WESP	Wet Electrostatic Precipitator
		CD-RTO (new)	Regenerative Thermal Oxidizer
ES-FURNACEBYP	Furnace Bypass Stack (previously unpermitted)	N/A	N/A
ES-CLR6	Two (2) Pellet Mills (new) One (1) Pellet Cooler (new)	CD-CLR-C4 (new)	One (1) Simple cyclone
		CD-RCO (new)	Regenerative Thermal Oxidizer/ Regenerative Catalytic Oxidizer
ES-DSHM	Dry Shavings Hammermill (previously unpermitted)	CD-DWDS-BV	Bin Vent Filter
		CD-RCO (new)	Regenerative Thermal Oxidizer/ Regenerative Catalytic Oxidizer
IES-DRYSHAVE	Dry Shavings Handling and Storage (previously unpermitted)	N/A	N/A
IES-ADD	Additive Handling and Storage (previously unpermitt	N/A	N/A
IES-DDB-1 and IES-DDB-2	Dryer Line Double Duct Burners (new)	N/A	N/A
IES-CNGT	Compressed Natural Gas Terminal	N/A	N/A
IES-TK-3	Diesel Storage Tank #3 (600 gallon) (previously unpermitted)	N/A	N/A
IES-TK-4	Diesel Storage Tank #4 (1,000 gallon) (previously unpermitted)	N/A	N/A
Existing Permitted Equipment To Be MODIFIED By This Application			
ES-GWHS	Green Wood Handling and Storage (rename from IES-GWHS to ES-GWHS)	N/A	N/A
ES-DWH	Dried Wood Handling (rename from IES-DWH to ES-DWH)	N/A	N/A
ES-GHM-1	Green Hammermill (modified/rename from IES-CHP2 to ES-GHM-1)	CD-WESP	Wet Electrostatic Precipitator
		CD-RTO (new)	Regenerative Thermal Oxidizer
ES-DRYER	Dryer (modified)	CD-WESP	Wet Electrostatic Precipitator
		CD-RTO (new)	Regenerative Thermal Oxidizer
ES-DWDS	Dried Wood Day Silo (modified)	CD-DWDS-BV	Baghouse
		CD-RCO (new)	Regenerative Catalytic Oxidizer
ES-CLR1 through ES-CLR5	Ten (10) Pellet Mills (modified) Five (5) Pellet Coolers (modified)	CD-CLR-C1 through CD-CLR-C3	Two (2) Multicyclone systems and One (1) Simple cyclone
		CD-RCO (new)	Regenerative Thermal Oxidizer/ Regenerative Catalytic Oxidizer
ES-DHM-1 through ES-DHM- 5	Five (5) Dry Hammermills (modified)	CD-DHM-FF1 through CD-DHM-FF3	Baghouse
		CD-WESP	Wet Electrostatic Precipitator
		CD-RTO (new)	Regenerative Thermal Oxidizer
ES-DCS	Dust Control System (rename from Hammermill Area)	CD-DHM-FF3	Baghouse
		CD-RTO (new)	Wet Electrostatic Precipitator
			Regenerative Thermal Oxidizer
IES-TK-1	Diesel Storage Tank for Emergency Generator (2,500 gallon) (rename from IST-1 to IES-TK-1)	N/A	N/A
IES-TK-2	Diesel Storage Tank for Fire Water Pump (500 gallon) (rename from IST-2 to IES-TK-2)	N/A	N/A
Equipment To Be DELETED By This Application			
IES-CHP1	Electric powered green wood chipper and debarker	N/A	N/A
IES-PP	Pellet Press System	N/A	N/A

112(r) APPLICABILITY INFORMATION — A3

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

If No, please specify in detail how your facility avoided applicability: **Enviva Pellets Ahoskie, LLC 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	HAZARDOUS CHEMICAL	MAXIMUM INTENDED

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 C		
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 C		

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 C				

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. Diesel Storage Tank for Emergency Generator IES-TK-1 (renamed - previously IST-1)	2,500 gallons	15A NCAC 02Q .0503(8) - low emissions, see Appendix C
2. Diesel Storage Tank for Fire Water Pump IES-TK-2 (renamed - previously IST-2)	500 gallons	15A NCAC 02Q .0503(8) - low emissions, see Appendix C
3. Electric Powered Bark Hog IES-BARK	22,852 ODT/yr	15A NCAC 02Q .0503(8) - low emissions, see Appendix C
4. Green Wood Fuel Storage Bin IES-GWFB	10.4 tph	15A NCAC 02Q .0503(8) - no quantifiable emissions
5. Dry Shavings Handling and Storage IES-DRYSHAVE	100,000 ODT/yr	15A NCAC 02Q .0503(8) - low emissions, see Appendix C
6. Additive Handling and Storage IES-ADD	25 tph	15A NCAC 02Q .0503(8) - low emissions, see Appendix C
7. Emergency Generator IES-EG	350 bhp	15A NCAC 02Q .0503(8) - low emissions, see Appendix C
8. Fire Water Pump IES-FWP	300 bhp	15A NCAC 02Q .0503(8) - low emissions, see Appendix C
9. Dryer Line Double Duct Burners IES-DDB-1 and IES-DDB-2	(2) @ 2.5 MMBtu/hr	15A NCAC 02Q .0503(8) - low emissions, see Appendix C
10. Diesel Storage Tank #3 IES-TK-3	600 gallons	15A NCAC 02Q .0503(8) - low emissions, see Appendix C
11. Diesel Storage Tank #4 IES-TK-4	1,000 gallons	15A NCAC 02Q .0503(8) - low emissions, see Appendix C
12. Compressed Natural Gas Terminal IES-CNGT	NA	15A NCAC 02Q .0503(8) - no quantifiable emissions

Attach Additional Sheets As Necessary

FORM D5

TECHNICAL ANALYSIS TO SUPPORT PERMIT APPLICATION

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

(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)

NAME: Russell Kemp, MS, PE

DATE: 27 APRIL 2020

COMPANY: REUS Engineers, P.C.

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

TELEPHONE: (678) 388-1654

SIGNATURE:

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

Appendix C with emission calculations

Application Narrative

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

PLACE NORTH CAROLINA SEAL HERE

Received
SEP 01 2020
Air Permits Section

Attach Additional Sheets As Necessary

FORM E1

TITLE V GENERAL INFORMATION

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

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

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

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

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

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

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

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

Comments:

Attach Additional Sheets As Necessary

FORM E2
EMISSION SOURCE APPLICABLE REGULATION LISTING

EMISSION SOURCE ID NO.	EMISSION SOURCE DESCRIPTION	OPERATING SCENARIO INDICATE PRIMARY (P) OR ALTERNATIVE (A)	POLLUTANT	APPLICABLE REGULATION
See attached table following Form E3 for a summary of regulatory requirements and associated compliance requirements				

Attach Additional Sheets As Necessary

FORM E3
EMISSION SOURCE COMPLIANCE METHOD

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

Emission Source ID NO.:	Regulated Pollutant: **Particulate Matter**
ES-GHM-1 through ES-GHM-4; ES-DHM-1 through ES-DHM-7; ES-CLR-1 through ES-CLR-6; ES-DSHM	Applicable Regulation: **15A NCAC 02D.0515**
Alternative Operating Scenario (AOS) NO:	

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

MONITORING REQUIREMENTS

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

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

Describe Monitoring Device Type: **See Appendix E - CAM Plans**

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 Ahoskie, LLC

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Dryer, Green Hammermills 1 through 4, Dry Hammermills 1 through 7, Dust Control System	ES-DRYER, ES-GHM-1 through ES-GHM-4, ES-DHM-1 through ES-DHM-C7, ES-DCS	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 internal inspections of bagfilters' structural integrity. Annual inspections of WESP including, but not limited to, visual check of critical components, checks for any equipment that does not alarm when de-energized, checks for signs of plugging in the hopper and gas distribution equipment, and replacement of broken equipment as required. Annual inspection of the heat transfer medium and associated inlet/outlet valves on the RTO. Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ).	Written or electronic log of WESP secondary voltage and current, date/time/result of inspections and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the WESP or RTO within 30 days, or other length of time specified by DAQ, of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		VOC, CO, NO_X, $PM/PM_{10}/PM_{2.5}$	15A NCAC 02Q .0317		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ). Maintain 3-hour block average temperature for all fireboxes comprising the RTO at or above the minimum average temperature established in the most recent performance test. Daily monitoring of minimum secondary voltage and current for the WESP. Limit throughput to 550,000 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, 3-hour block average temperature for all fireboxes comprising the RTO, daily WESP secondary voltage and current, date/time/result of inspections and maintenance, 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, or other length of time specified by DAQ, of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		SO_2	15A NCAC 02D .0516		None required because inherently low sulfur content of wood fuel achieves compliance.		
		HAP	15A NCAC 02Q .0508(f)		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ). Maintain 3-hour block average temperature for all fireboxes comprising the RTO at or above the minimum average temperature established in the most recent performance test. Daily monitoring of minimum secondary voltage and current for the WESP. Limit throughput to 550,000 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, 3-hour block average temperature for all fireboxes comprising the RTO, daily WESP secondary voltage and current, date/time/result of inspections and maintenance, 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, or other length of time specified by DAQ, of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		Opacity	15A NCAC 02D .0521		Monthly visible emissions observation for "normal" opacity and shall not be more than 20 percent opacity when averaged over a six-minute period. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Dry Hammermills 1 through 7	ES-DHM-1 through ES-DHM-7	PM	40 CFR Part 64	RTO	Refer to CAM plan included in Appendix E of this application.		
Pellet Mills 1 through 12 and Pellet Coolers 1 through 6, Dry Shavings Hammermill, and Dry Wood Day Silo	ES-CLR-1 through ES-CLR-6, ES-DSHM, ES-DWDS	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 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, or other length of time specified by DAQ, 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 630,000 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 combustion chamber temperature. Written or electronic log of date/time/result of inspections and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the cyclones and RTO/RCO within 30 days, or other length of time specified by DAQ, of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		HAP	15A NCAC 02Q .0508(f)		Initial and periodic stack testing (at least annually unless a longer duration is approved by DAQ). Limit pellet production to 630,000 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. Written or electronic log of date/time/result of inspections and maintenance, results of each inspection, results of maintenance on control devices, any variance from manufacturers' recommendations, if any, and corrections made.	Submit written report of test results not later than 30 days after sample collection, unless an extension is granted by DAQ under 15A NCAC 02D .2602(f)(4). Submit results of any maintenance performed on the RTO/RCO within 30 days, or other length of time specified by DAQ, of a written request by DAQ. Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		Opacity	15A NCAC 02D .0521		Monthly visible emissions observation for "normal" opacity and shall not be more than 20 percent opacity when averaged over a six-minute period. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
Pellet Mills and Pellet Coolers, Dry Shavings Hammermill	ES-CLR-1 through ES-CLR-6	PM	40 CFR Part 64	RTO/RCO	Refer to CAM plans included in Appendix E of this application.		

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Pellet Mill Feed Silo	ES-PMFS	PM	15A NCAC 02D .0515	Bin Vent Filter	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.	Submit results of any maintenance performed on the baghouse within 30 days, or other length of time specified by DAQ, of a written request by DAQ.
		Opacity	15A NCAC 02D .0521		Monthly visible emissions observation for "normal" opacity and shall not be more than 20 percent opacity when averaged over a six-minute period. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
Finished Product Handling, Twelve Truck Pellet Loadout Bins, Pellet Loadout 1 and 2	ES-FPH, ES-TLB, ES-PL1 and ES-PL2	PM	15A NCAC 02D .0515	Baghouse	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.	Submit results of any maintenance performed on the baghouse within 30 days, or other length of time specified by DAQ, of a written request by DAQ.
			40 CFR Part 64		Refer to CAM plans included in Appendix E of this application.		
		Opacity	15A NCAC 02D .0521		Monthly visible emissions observation for "normal" opacity and shall not be more than 20 percent opacity when averaged over a six-minute period. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
Fines Bin	ES-FB	PM	15A NCAC 02D .0515	Bin Vent Filter	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.	Submit results of any maintenance performed on the baghouse within 30 days, or other length of time specified by DAQ, of a written request by DAQ.
			40 CFR Part 64		Refer to CAM plan included in Appendix E of this application.		
		Opacity	15A NCAC 02D .0521		Monthly visible emissions observation for "normal" opacity and shall not be more than 20 percent opacity when averaged over a six-minute period. 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.
Green Wood Handling and Storage, Dried Wood Handling, Additive Handling and Storage, Dry Shavings Handling and Storage, Electric Powered Bark Hog, Dryer Line Double Duct Burners	ES-GWHS, ES-DWH, IES-ADD, IES-DRYSHAVE,IES-BARK, IES-DDB-1 and IES-DDB-2	PM	15A NCAC 02D .0515	None	Comply with the process weight limitation.	N/A	N/A
Furnace Bypass	ES-FURNACEBYP	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 26.3 MMBtu/hr. Limit hours of operation in idle mode to 500 hours per year. Limit heat input during idle to 15 MMBtu/hr.	Written or electronic log of monthly hours operation in cold start-up and idle mode.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		Opacity	15A NCAC 02D .0521		Monthly visible emissions observation for "normal" during operation. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Emergency Generator	IES-EG	PM, CO, NO_x, NMHC, SO_2	40 CFR Part 60 Subpart IIII	N/A	All requirements are outlined in the regulation, including the following: use certified emergency engines, operate less than 100 hours per year for non-emerency use, operate according to manufacturers procedures, use fuel oil with fuel content of no more than 15 ppmw sulfur and cetane index of at least 40, install non-resettable hour meter.	Maintain records of engine certification, fuel certifications and hours/year of operation of each engine.	N/A
		SO_2	15A NCAC 02D .0516	N/A	Not required because inherently low sulfur content of fuel achieves compliance.		
		Opacity	15A NCAC 02D .0521	N/A	Monthly visible emissions observation for "normal" opacity during operation (only applicable if equipment is operated) and shall not be more than 20 percent opacity when averaged over a six-minute period. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		HAPs	40 CFR Part 63 Subpart ZZZZ	N/A	Comply with the NSPS requirements. No other requirements apply.	Comply with the NSPS requirements. No other requirements apply.	N/A
Firewater Pump	IES-FWP	SO_2	15A NCAC 02D .0516	N/A	Not required because inherently low sulfur content of fuel achieves compliance.		
		Opacity	15A NCAC 02D .0521	N/A	Monthly visible emissions observation for "normal" opacity during operation (only applicable if equipment is operated) and shall not be more than 20 percent opacity when averaged over a six-minute period. If above normal, corrective action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	Submit summary report of monitoring and recordkeeping activities semi-annually (on or before Jan 30th and July 30th). Identify all instances of deviations from permit requirements.
		HAPs	40 CFR Part 63 Subpart ZZZZ	N/A	All requirements are outlined in the regulation, including the following: operate less than 100 hours per year for non-emerency use, operate according to manufacturers procedures, install non-resettable hour meter, perform maintenance and inspections as required.	Maintain records of maintenance conducted and hours/year of operation of each engine.	N/A

FORM E4
EMISSION SOURCE COMPLIANCE SCHEDULE

COMPLIANCE STATUS WITH RESPECT TO ALL APPLICABLE REQUIREMENTS

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

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

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

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

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

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

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

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

_____

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

_____

D. Detailed Schedule of Compliance:

Step(s)	Date Expected

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

_____

F. Starting date of submittal of progress reports: _____

Attach Additional Sheets As Necessary

FORM E5

TITLE V COMPLIANCE CERTIFICATION (Required)

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

SITE NAME: Enviva Pellets Ahoskie, LLC

SITE ADDRESS: 142 N.C. Route 561 East

CITY, NC : Ahoskie, North Carolina

COUNTY: Hertford

PERMIT NUMBER : 10121T04

CERTIFIES THAT (Check the appropriate statement(s):

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

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

Curtis Hall — **Date:** 8-28-2020

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

Curtis Hall, Plant Manager

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

Attach Additional Sheets As Necessary

FORM E6
COMPLIANCE ASSURANCE MONITORING (CAM) PLAN (4 pages)

For CAM-affected emission units, the applicant must submit additional information in the form of a CAM Plan as required under 40 CFR 64.

For information about the CAM rule and this form, please refer to 40 CFR 64 and 15A NCAC 2D .0614.
Additional information (including guidance documents may be found at the following URLs:
https://www3.epa.gov/ttn/emc/cam.html
https://deq.nc.gov/about/divisions/air-quality/air-quality-enforcement/compliance-assurance-monitoring

SOURCE INFORMATION

1.	**Facility Name:**	Enviva Pellets Ahoskie, LLC
2.	**Permit Number:**	10121T04
3.	**Date Form Prepared:**	22-Jun-20

BASIS OF CAM SUBMITTAL

4. Mark the appropriate box below as to why this CAM Plan is being submitted as part of this application:

☑ **Renewal Application:** ALL Emission Units (Pollutant Specific Emission Units [PSEUs] considered separately with respect to EACH regulated air pollutant) for which a CAM Plan has NOT yet been approved needs to be addressed in this CAM Plan submittal.
See Renewal Procedures per 15 A NCAC 2Q .0513.

☐ **Initial Application (Submitted after 4/20/1998):** Only large PSEUs (PSEUs with potential post control device emissions of an applicable regulated air pollutant that are equal to or greater than major source threshold levels) need to be addressed in this CAM Plan submittal.
See Initial Application Procedures per 15A NCAC 2Q .0505(1).

☐ **Significant Modification to Large PSEUs:** Only large PSEUs (PSEUs with potential post control device emissions of an applicable regulated air pollutant that are equal to or greater than major source threshold levels) being modified after 4/20/1998 need to be addressed in this CAM Plan submittal. For large PSEUs with an approved CAM Plan, only address the appropriate monitoring requirements affected by the significant modification.
See Significant Modification Procedures per 15 A NCAC 2Q .0516.

CAM APPLICABILITY DETERMINATION

5. To determine CAM applicability, a PSEU must meet ALL of the following criteria (If not, then the remainder of this form need not be completed):

A. The PSEU is located at a major source;
B. The PSEU is subject to an emission limitation or standard for the applicable regulated air pollutant that is NOT exempt;
List of EXEMPT Emission Limitations or Standards below OR as provided in 15A NCAC 2Q .0614(b)(1):
- NSPS (40 CFR Part 60) or NESHAP (40 CFR Part 61 and 63) proposed after 11/15/1990.
- Stratospheric ozone protection requirements.
- Acid Rain program requirements.
- Emission limitations or standards for which a Title V permit specifies a continuous compliance determination method, as defined in the CAM rule (40 CFR 64.1), Continuous Compliance Determination Method.
- An emission cap that meets the requirements specified in 40 CFR 70.4(b)(12).

*If the PSEU is subject to both **Exempt** and **Not Exempt** emission standards for the same pollutant, then the facility is required to determine the CAM applicability for **Not Exempt** **emission** standards.*

C. The PSEU uses an add-on control device to achieve compliance with an emission limitation or standard;
D. The PSEU has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than major source threshold levels; **and**
E. The PSEU is **NOT** an exempt backup utility power emission unit that is municpally owned and appropriately documentd as provided in 15A NCAC 2D .0614(b)(2).

BACKGROUND DATA AND INFORMATION

6. **Complete the following table for ALL PSEUs that need to be addressed in this CAM Plan submittal. This section is to be used to provide background data and information for each PSEU in order to supplement the submittal requirements specified in 40 CFR 64.4. If additional space is needed, please attach and label additional sheets as appropriate.**

PSEU Designation	PSEU Description	Pollutant	Control Device	[a] Emission Limitation OR Standard	[b] Monitoring Requirement
See CAM Plans in Appendix E					

[a] Indicate the emission limitation or standard for any applicable requirement that constitutes an emisson limitation, emission standard, or standard of performance. Examples of emission limitations or standards may include a permitted emission limitation, applicable regulations, work practices, process or control device parameters, or other forms of specific design, equipment, operational or maintenance requirements.

[b] Indicate the monitoring requirements for the control device that are required by an applicable regulation or permit condition.

[a] CAM MONITORING APPROACH CRITERIA				E6-3
7. **Complete this section for EACH PSEU and for each affected pollutant that needs to be addressed in this CAM Plan submittal. This section may be copied as needed for each PSEU. This section is to be used to provide monitoring data and information for EACH indicator selected for EACH PSEU in order to meet the monitoring design criteria specified in 40 CFR 64.3 and 64.4. If more than two indicators are being selected for a PSEU or if additional space is need, attach and label with the apprtopriate PSEU designation, pollutant, and indicator Nos.**				
	PSEU DESIGNATION	POLLUTANT	[b] INDICATOR NO. 1	[b] INDICATOR NO. 2
	See CAM Plans in Appendix E			
7a.	General Criteria Describe the monitoring approach used to measure the indicators.			
	[c] Establish the appropriate indicator range or the procedures for establishing the indicator range which provides a reasonable assurance of compliance			
	[d] Provide Quality Improvement Plan (QIP) Threshold levels.			
7b.	Performance criteria Provide the Specification for Obtaining Representative Data (*Such as detector location and installation specifications*).			
	Provide Quality Assurance and Quality Control (QA/QC) Practices that are adequate to ensure the continuing validity of the data, considering manufacturerer's recommendations			
	[e] Provide the Monitoring Frequency			
	Provide the Data Collection Procedures that will be used			
	Provide the Data Averaging Period for the purpose of determining whether an excursion or exceedance has occurred.			

[a] If a Continuous Emission Monitoring System (CEMS), Continuous Opacity Monitoring System (COMS), or Predictive Emission Monitoring System (PEMS) is used, then this section need not be completed **ONLY** for the CEMS, COMS, or PEMS, **EXCEPT** that the Special Criteria Information of 40 CFR 64.3(d) must be provided. Special Criteria Information may be provided on a separate sheet.

[b] Describe all indicators to be monitored which satisfy 40 CFR 64.3(a). Indicators of emission control performance for the control device and associated capture system may include measured or predicted emissions (including visible emissions or opacity), process and control device operating parameters that affect control device (and capture system) efficiency or emission rates, or recorded findings of inspection and maintenance activities.

[c] Indicator ranges may be based on a single maximum or minimum value or at multiple levels that are relevant to distinctly different operating conditions, expressed as a function of process variables, expressed as maintaining the applicable indicator in a particular operational status or designated condition, or established as interdependent between more than one indicator. In addition, unless specifically stated otherwise by an applicable requirement, the owner or operator shall monitor the indicators to detect any **bypass** of the control deivce (or capture system) to the atmosphere.

[d] The QIP threshold is based on the number of excursions identified in a reporting period. (Example: if the historical monitoring data for a facility indicates that the indicator range was exceeded 10 times in a 6-month period, the threshold could be established at no more than 10 excursions outside the indicator range during a 6-month reporting period.) The threshold levels also could be established based on the duration of excursions as a percentage of operating time.

[e] At a minimum, the owner of a large PSEU must collect four or more data values equally spaced over each hour and average the values. All other PSEUs must collect data **at least once** per 24-hour period *or possibly* ***more*** to provide reasonable assurance of compliance over the anticipated range of operating conditions.

RATIONALE AND JUSTIFICATION

E6-4

8. **Complete this section for EACH PSEU and for each affected pollutant that needs to be addressed in this CAM Plan submittal. This section *may be copied as needed*. Use this section to provide monitoring data and information for EACH indicator selected for EACH PSEU in order to meet the monitoring design criteria specified in 40 CFR 64.3 and 64.4. If more than two indicators are being selected for a PSEU or if additional speace is needed, attach additional sheets and label with the appropriate PSEU designation, pollutant, and indicator Nos.**

PSEU DESIGNATION	POLLUTANT
	Particulate Matter

9. INDICATORS AND THE MONITORING APPROACH: Provide the rationale and justification for the selection of the indicators and the monitoring approach used to measure the indicators. Also provide any data suporting the rationale and justification. Explain the reasons for any differences between the verification of operational status or the quality assurance and control practices proposed and the manufacturer's recommendations. (If additional space is needed, attach and label with the appropirate PSEU designation and pollutant).

See CAM Plans in Appendix E

10. **INDICATOR RANGES:** Provide the rationale and justification for the selection of the indicator ranges. The rationale and justification shall indicate how **EACH** indicator range was selected by either a Compliance or Performance Test, a Test Plan and Schedule, or by Engineering Assessments. Depending on which method is being used for each indicator range, include the specific information required below for that specific indicator range. (If additional space is needed, attach and label with the appropriate PSEU designation and pollutant):

- COMPLIANCE or PERFORMANCE TEST (Indicator ranges determined from control device operating parameter data obtained during a compliance or performance test conducted under regulatory specified conditions or under conditions representative of maximum potential emissions under anticipated operating conditions. Such data may be supplemented by engineering assessments and manufacturer's recommendations). The rationale and justification shall **include** a summary of the compliance or performance test results that were used to determine the indicator range and documentation indicating that no changes have taken place that could result in a significant change in the control system perfomrnace or the selected indicator ranges since the compliance or performante test was conducted and approved by DAQ.
- TEST PLAN AND SCHEDULE (Indicator ranges will be determined from a proposed implementation plan and schedule for installing, testing, and performing any other appropriate activities prior to use of the monitoring). The rationale and justification shall **include** the proposed implementation plan and schedule that will provide for use of the monitoring as expeditiously as practical after approval of this CAM Plan, but in no case shall the schedule for completing installation and beginning operation of the minitoring exceed 180 days after approval.
- ENGINEERING ASSESSMENTS (Indicator ranges or the procedures for establishing indicator ranges are determined from engineering assessments and other data, such as manufacturer's design criteria and historical monitoring data, because factors specific to the type of monitoring, control device, or PSEU make compliance or performance testing unnecessary). The rationale and justification shall **include** documentaion demonstrating that compliance testing is not required to establish the indicator range.

RATIONALE AND JUSTIFICATION:

See CAM Plans in Appendix E

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 Handling and Storage**	EMISSION SOURCE ID NO: **ES-GWHS**
	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-15**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips and bark are delivered to the plant via trucks. The green wood handling and storage emission source (ES-GWHS) represents all green wood chip and bark transfer points and storage piles.

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

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

N/A

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

N/A

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

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

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-GWHS**
Green Wood Handling and Storage	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-15**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips and bark fuel are delivered to the plant via trucks. The green wood handling and storage emission source (ES-GWHS) represents all green wood chip and bark transfer points and storage piles.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Green Wood Materials (per emission point)	**tons (wet)**	**400**	**NA**

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 B
SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Green Hammermills**	EMISSION SOURCE ID NO: **ES-GHM-1, 2, 3, 4**
	CONTROL DEVICE ID NO(S): **CD-WESP, CD-RTO**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-18**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Prior to drying, chips from the green wood storage piles will be processed in the green hammermills to reduce material to the proper size.

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

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

START CONSTRUCTION DATE:	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **GHM-1: N/A; GHM-2, 3, 4: TBD**	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

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

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: **Green Hammermills**	EMISSION SOURCE ID NO: **ES-GHM-1, 2, 3, 4**
	CONTROL DEVICE ID NO(S): **CD-WESP, CD-RTO**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-18**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Prior to drying, chips from the green wood storage piles will be processed in the green hammermills to reduce material to the proper size.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Green Wood	**ODT**	**63**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Dryer (Green Wood Direct-Fired 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-18**

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 175.3 MMBtu/hr furnace. Air emissions will be controlled utilizing an existing wet electrostatic precipitator (CD-WESP) for particulate removal. VOC and organic HAP emissions will be controlled by a new regenerative thermal oxidizer (CD-RTO). A bypass stack for the dryer furnace (ES-FURNACEBYP) will be used to exhaust hot gases during cold startup and idle-mode.

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

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

START CONSTRUCTION DATE:	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Teaford**	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR
IS THIS SOURCE SUBJECT ☐ NSPS (SUBPARTS?):	☐ NESHAP (SUBPARTS?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%** MAR-MAY **25%** JUN-AUG **25%** SEP-NOV **25%**	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

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

Attach Additional Sheets As Necessary

FORM B1

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

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

EMISSION SOURCE DESCRIPTION: **Dryer (Green Wood Direct-Fired 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-18**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

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

WOOD-FIRED BURNER

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

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

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

FUEL FEED METHOD: **Air Swept Fuel Feeders** HEAT TRANSFER MEDIA: ☐ STEAM ☑ AIR ☐ OTHER (DESCRIBE) _____

COAL-FIRED BURNER

TYPE OF BOILER — IF OTHER DESCRIBE:

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

OIL/GAS-FIRED BURNER

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

OTHER FUEL-FIRED BURNER

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

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Wet Wood	**tons (wet)**	**20.9**	

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

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

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: **Seven (7) Dry Hammermills**	EMISSION SOURCE ID NO: **ES-DHM-1 through ES-DHM-7**
	CONTROL DEVICE ID NO(S): **CD-DHM-FF1 through CD-DHM-FF3, CD-WESP, CD-RTO**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-18**

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

Dried materials are reduced to appropriate size needed for pelletizing using seven (7) dry hammermills (5 existing and 2 new DHMs being proposed in this application). Each dry hammermill includes a material recovery cyclone that is routed to one of three (3) baghouses (CD-DHM-FF1 through CD-DHM-FF3) for particulate matter control.

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

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

START CONSTRUCTION DATE:	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Bliss, Model 44-60 (ES-DHM-1 thru ES-DHM-5); TBD (ES-DHM-6 and -7)**	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR
IS THIS SOURCE SUBJECT T ☐ NSPS (SUBPARTS?):	NESHAP (SUBPARTS?):

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE O 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 C

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT	CAS NO.	SOURCE O 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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

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

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-DHM-1 through ES-DHM-7**
Seven (7) Dry Hammermills	CONTROL DEVICE ID NO(S): **CD-DHM-FF1 through CD-DHM-FF3, CD-WESP, CD-RTO**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-18**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Dried materials are reduced to appropriate size needed for pelletizing using seven (7) dry hammermills (5 existing and 2 new DHMs being proposed in this application). Each dry hammermill includes a material recovery cyclone that is routed to one of three (3) baghouses (CD-DHM-FF1 through CD-DHM-FF3) for particulate matter control.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**ODT**	**63**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: **CD-DHM-FF1 through CD-DHM-FF3**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DHM-1 through ES-DHM-7**
EMISSION POINT (STACK) ID NO(S): **EP-18**	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:
Three (3) baghouses are utilized for emission control after the exiting seven (7) dry hammermill material recovery cyclones. Hammermills 1, 2, and 6 vent to CD-DHM-FF1, Hammermills 3, 4, and 7 vent through CD-DHM-FF2, and Hammermill 5 and the Dust Control System vent through CD-DHM-FF3. Emissions from the baghouses will then be routed to a quench duct and either the Dryer furnace, the Dryer WESP (CD-WESP), or a combination of the two prior to control by CD-RTO. Refer to the control device forms associated with CD-RTO or Process Flow Diagram for more information.

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

PRESSURE DROP (IN H_20): MIN: MAX: **8"** GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-05**	INLET TEMPERATURE (°F): MIN MAX
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (°IMIN MAX
INLET AIR FLOW RATE (ACFM): **20,000 (CD-DHM-FF1 and FF2); 20,000 (CD-DHM-FF3)**	FILTER OPERATING TEMP (°F): **N/A**

NO. OF COMPARTMENTS:	NO. OF BAGS PER COMPARTMENT:	LENGTH OF BAG (IN.):
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.):
TOTAL FILTER SURFACE AREA (FT^2): **6,333 each**	AIR TO CLOTH RATIO: **6**	

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:

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE INCOMING AIR STREAM:
The air stream contains wood dust 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 ES-GHM-4, ES-DHM-1 through ES-DHM-7**
EMISSION POINT (STACK) ID NO(S): **EP-18**	POSITION IN SERIES OF CONTROL NO. **1** OF **2** UNITS **(ES-DRYER & ES-GHM-1 thru ES-GHM-4)**
	POSITION IN SERIES OF CONTROL NO. **2** OF **3** UNITS **(ES-DHM-1 thru 7)**
MANUFACTURER: **Lundberg E-Tube 115719**	MODEL NO. **Lundberg E-Tube 115719**
OPERATING SCENARIO:	
OPERATING SCENARIO: **1** OF **1**	P.E. SEAL REQUIRED (PER 2Q .0112)? ☐ YES ☐ NO

DESCRIBE CONTROL SYSTEM:
Emissions from the Dryer and Green Hammermills will be controlled by the WESP through a common duct for additional PM, metallic HAP, and HCl removal. Emissions from the Dry Hammermills (ES-DHM-1 through ES-DHM-7) will be routed to three (3) baghouses (CD-DHM-FF1 through CD-DHM-FF3), a quench duct, and either the Dryer furnace, the Dryer WESP (CD-WESP), or a combination of the two prior to control by CD-RTO.

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: **232 tubes**
COLLECTOR PLATE SIZE (FT): LENGTH: WIDTH:	SPACING BETWEEN COLLECTOR PLATES (INCHES): **12" hextube**
TOTAL DISCHARGE ELECTRODE LENGTH (FT): **18"**	GAS VISCOSITY (POISE): **2.054E-04 Poise**
NUMBER OF DISCHARGE ELECTRODES: **464**	NUMBER OF COLLECTING ELECTRODE RAPPERS: **none**
MAXIMUM INLET AIR FLOW RATE (ACFM): **190,487**	PARTICLE MIGRATION VELOCITY (FT/SEC): **0.234**
MINIMUM GAS TREATMENT TIME (SEC): **2.3**	BULK PARTICLE DENSITY (LB/FT^3): **45 lb/cu. Ft.**
FIELD STRENGTH (VOLTS) CHARGING: **83 kV** COLLECTING: **N/A**	CORONA POWER (WATTS/1000 CFM): **4000**
ELECTRICAL USAGE (KW/HOUR): **116**	
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): **178 nominal**	OUTLET GAS TEMPERATURE (°F): **178 nominal**
VOLUME OF GAS HANDLED (ACFM): **192,123**	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 %	95 %	95 %	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL AFTER CONTROL EMISSION RATE (LB/HR)	**See Emission Calculations in Appendix C**			

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE STARTUP PROCEDURES: **TBD**

DESCRIBE MAINTENANCE PROCEDURES: **TBD**

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM

NaOH (Sodium Hydroxide)

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

COMMENTS: **A 95% control efficiency for the wet electrostatic precipitator (CD-WESP-1) is applied to all metal HAP based on expected control efficiency for the WESP.**

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 ES-GHM-4, ES-DHM-1 through ES-DHM-7**
EMISSION POINT (STACK) ID NO(S): **EP-18**	POSITION IN SERIES OF CONTROLS NO. **2** OF **2** UNITS **(ES-DRYER)**
	POSITION IN SERIES OF CONTROLS NO. **2** OF **2** UNITS **(ES-GHM-1 thru ES-GHM-4)**
	POSITION IN SERIES OF CONTROLS NO. **3** OF **3** UNITS **(ES-DHM-1 thru ES-DHM-7)**
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 STRE ☐ 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:

CD-RTO controls emissions from the Furnace/Dryer (ES-DRYER) and Green Hammermills (ES-GHM-1 through -4). Emissions from the Dry Hammermills (ES-DHM-1 through ES-DHM-7) will be routed to three (3) baghouses (CD-DHM-FF1 through CD-DHM-FF3), followed by a quench duct and then to either the dryer furnace (ES-DRYER), the dryer WESP (CD-WESP), or a combination of the two, before entering the RTO (CD-RTO). The purpose of the quench duct is to protect the RTO by reducing the risk of fire. Interlocks will be installed to cease operation of the dry hammermills if a minimum flow rate is not maintained in the quench duct or if the furnace/WESP/RTO system ceases normal operation. The furnace is not a control device and has no impact on estimated potential to emit. The WESP will provide a reduction in PM and metallic HAP and the RTO will provide a reduction in VOC and organic HAP/TAP emissions. The highest pollutant inlet loading to control devices will occur when the furnace and dryer are operating at maximum capacity with all dry hammermill exhaust routed to the inlet of the furnace. At all times 100% of the Dry Hammermill exhaust will be controlled by a baghouse, WESP, and RTO.

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

PRESSURE DROP (IN. H_2C MIN MAX **TBD**	OUTLET TEMPERATURE (°F): **TBD** MIN **TBD** MAX
INLET TEMPERATURE (°F) MIN MAX **TBD**	RESIDENCE TIME (SECONDS): **TBD**
INLET AIR FLOW RATE (ACFM): **TBD** (SCFM): **TBD**	COMBUSTION TEMPERATURE (°F): **TBD**
COMBUSTION CHAMBER VOLUME (FT^3): **TBD**	INLET MOISTURE CONTENT (%): **TBD**
% EXCESS AIR: **TBD**	CONCENTRATION (ppmv) **TBD** INLET **TBD** OUTLET
AUXILIARY FUEL USED: **Natural Gas**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **39.7**

DESCRIBE MAINTENANCE PROCEDURES:

TBD - ceramic media will be cleaned out as needed by performing high temperature bake-outs and/or washed out by water.

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM:

N/A

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-FURNACEBYP**
Furnace Bypass Stack	CONTROL DEVICE ID NO(S):
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-17**

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

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

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

- ☑ Coal,wood,oil, gas, other burner (Form B1)
- ☐ 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:	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.:	EXPECTED OP. SCHEDULE: NA HR/DAY NA DAY/WK NA WK/

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

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 C

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

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

Attach Additional Sheets As Necessary

FORM B1

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

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

EMISSION SOURCE DESCRIPTION: Furnace Bypass Stack	EMISSION SOURCE ID NO: **ES-FURNACEBYP**
	CONTROL DEVICE ID NO(S):
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-17**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): **26.3**

WOOD-FIRED BURNER

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

PERCENT MOISTURE OF FUEL: ~50%

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

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

COAL-FIRED BURNER

TYPE OF BOILER — IF OTHER DESCRIBE:

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

OIL/GAS-FIRED BURNER

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

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

OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: _____

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

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

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

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

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-DWH**
Dried Wood Handling	CONTROL DEVICE ID NO(S):
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-16**

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

Dried wood from the dryer material recovery cylcone is conveyed to the dry hammermills via the dried wood handling system. The dried wood handling emission source (ES-DWH) consists of partially enclosed conveyor systems, conveyor transfer points along the post-dryer conveyance system, an enclosed screener, and dry hammermill surge bins.

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

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

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

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

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

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-DWH**
Dried Wood Handling	CONTROL DEVICE ID NO(S):
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-16**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Dried Wood Handling (ES-DWH) includes partially enclosed conveyor systems and conveyor transfer points along the post dryer conveyance system.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Dried Wood	**ODT**	**62.8**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: ES-DSHM
Dry Shavings Hammermill	CONTROL DEVICE ID NO(S): **CD-DWDS-BV, CD-RCO**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-19**

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

Dry shavings are reduced to the appropriate size needed for pelletizing using a dry shavings hammermill. Currently, exhaust from the dry shavings hammermill is routed to a material recovery cyclone. A portion of the exhaust from the cyclone is recirculated back to the front of the dry shavings hammermill and the remainder of the exhaust gases are routed to the dried wood day silo (ES-DWDS) that is controlled by the dried wood day silo bin vent filter (CD-DWDS-BV). Pursuant to this application, Enviva is proposing to route the dried wood day silo bin vent filter (CD-DWDS-BV) exhaust stream to the proposed quench duct and RTO/RCO (CD-RCO) to reduce VOC and HAP emissions from the dry shavings hammermill. The quench duct is considered inherent process equipment that is required for the RTO/RCO (CD-RCO) to operate safely (reduce the risk of fire) and is not a control device.

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

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

START CONSTRUCTION DATE:	DATE MANUFACTURED:
TBD	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

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

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: ES-DSHM
Dry Shavings Hammermill	CONTROL DEVICE ID NO(S): CD-DWDS-BV, CD-RCO
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-19

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Dry shavings are reduced to the appropriate size needed for pelletizing using a dry shavings hammermill. Currently, exhaust from the dry shavings hammermill is routed to a material recovery cyclone. A portion of the exhaust from the cyclone is recirculated back to the front of the dry shavings hammermill and the remainder of the exhaust gases are routed to the dried wood day silo (ES-DWDS) that is controlled by the dried wood day silo bin vent filter (CD-DWDS-BV). Pursuant to this application, Enviva is proposing to route the dried wood day silo bin vent filter (CD-DWDS-BV) exhaust stream to the proposed quench duct and RTO/RCO (CD-RCO) to reduce VOC and HAP emissions from the dry shavings hammermill.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dry Shavings	ODT	12	N/A

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B
SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Dried Wood Day Silo**	EMISSION SOURCE ID NO: **ES-DWDS**
	CONTROL DEVICE ID NO(S): **CD-DWDS-BV, CD-RCO**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-19**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Stores dry shavings used in pellet production. PM emissions will be controlled by the Dried Wood Day Silo Bin Vent (CD-DWDS-BV) and then routed to a quench duct and the new RTO/RCO (CD-RCO) for VOC/HAP reductions prior to being emitted into the atmosphere.

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

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

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

IS THIS SOURCE SUBJECT ☐ 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 C

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

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

Attach Additional Sheets As Necessary

FORM B6
EMISSION SOURCE (STORAGE SILO/BINS)

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

EMISSION SOURCE DESCRIPTION: **Dried Wood Day Silo**	EMISSION SOURCE ID NO: **ES-DWDS**
	CONTROL DEVICE ID NO(S): **CD-DWDS-BV, CD-RCO**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): **EP-19**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Stores dry shavings used in pellet production. PM emissions will be controlled by the Dried Wood Day Silo Bin Vent (CD-DWDS-BV) and then routed to a quench duct and the new RTO/RCO (CD-RCO) for VOC/HAP reductions prior to being emitted into the atmosphere.

MATERIAL STORED: **Dry Shavings**				DENSITY OF MATERIAL (LB/FT3): **40**		
CAPACITY	CUBIC FEET: 4400			TONS: 88		
DIMENSIONS (FEET)	HEIGHT:	DIAMETER:	***(OR)***	LENGTH:	WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY: **100,000 ODT**		

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

NO. FILL TUBES:
MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Pneumatic

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): **13.3**

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): **13.3**

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-DWDS-BV**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DSHM, ES-DWDS**			
EMISSION POINT (STACK) ID NO(S): **EP-19**	POSITION IN SERIES OF CONTROLS	NO. **1** OF **2**	UNITS (ES-DWDS)	
	POSITION IN SERIES OF CONTROLS	NO. **2** OF **3**	UNITS (ES-DSHM)	
OPERATING SCENARIO:				
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES	☐ NO		

DESCRIBE CONTROL SYSTEM:
The bin vent filter (CD-DWDS-BV) will control emissions from the dry shavings hammemrill and Dried Wood Day silo. The exhaust from the bin vent filter (CD-DWDS-BV) will be routed to a quench duct and the new RTO/RCO (CD-RCO) for VOC/HAP reductions prior to being emitted into the atmosphere.

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

PRESSURE DROP (IN H_2O): MIN:	MAX: **4"**	GAUGE? ☑ YES	☐ NO
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-06**	INLET TEMPERATURE (°F): MIN	MAX **Ambient**	
POLLUTANT LOADING RATE: **0.01** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (°f MIN	MAX **Ambient**	
INLET AIR FLOW RATE (ACFM): **2,186**	FILTER OPERATING TEMP (°F): **N/A**		
NO. OF COMPARTMENTS:	NO. OF BAGS PER COMPARTMENT:	LENGTH OF BAG (IN.):	
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: **5.8**		
DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE	FILTER MATERIAL: ☐ WOVEN	☐ FELTED	

DESCRIBE CLEANING PROCEDURES

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

PARTICLE SIZE DISTRIBUTION

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

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Pellet Mill Feed Silo**	EMISSION SOURCE ID NO: **ES-PMFS**
	CONTROL DEVICE ID NO(S): **CD-PMFS-BV**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-5**

DESCRIBE IN DETAIL THE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):

The pellet mill feed silo stores dried, milled wood prior to transfer to the pellet mills. Emissions from air displaced during loading and unloading of the silo are controlled by a baghouse.

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:	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)	See Emission Calculations in Appendix C						
PARTICULATE MATTER<10 MICRONS (PM_{10})							
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)							
SULFUR DIOXIDE (SO2)							
NITROGEN OXIDES (NOx)							
CARBON MONOXIDE (CO)							
VOLATILE ORGANIC COMPOUNDS (VOC)							
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

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

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

Attach Additional Sheets As Necessary

FORM B6
EMISSION SOURCE (STORAGE SILO/BINS)

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

EMISSION SOURCE DESCRIPTION: **Pellet Mill Feed Silo**	EMISSION SOURCE ID NO: **ES-PMFS**
	CONTROL DEVICE ID NO(S): **CD-PMFS-BV**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): **EP-5**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
The pellet mill feed silo stores dried, milled wood prior to transport to the pellet mills. Emissions from air displaced during silo loading and unloading are controlled by a baghouse.

MATERIAL STORED: **Dried, milled wood fiber**				DENSITY OF MATERIAL (LB/FT3): **40**		
CAPACITY	CUBIC FEET: **4,778**			TONS: **95.6**		
DIMENSIONS (FEET)	HEIGHT:	DIAMETER:	***(OR)***	LENGTH:	WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY:		

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

NO. FILL TUBES:
MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:
Conveyors for transfer to the pellet mills

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Gravity feed to conveyor

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): **84**

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): **84**

COMMENTS:
Silo is sized to provide 2 hours of capacity in the event of dryer downtime (84 tph x 2 hours)

Attach Additional Sheets As Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: **CD-PMFS-BV**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-PMFS**
EMISSION POINT (STACK) ID NO(S): **EP-5**	POSITION IN SERIES OF CONTROLS NO. **1** OF **1** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:
A baghouse is used to create a slight negative pressure on the Pellet Mill Feed Silo. The baghouse collects dust from the air displaced during silo loading and unloading.

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

PRESSURE DROP (IN H_20): MIN: MAX: **4"** GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3):	INLET TEMPERATURE (°F): MIN MAX **Ambient**
POLLUTANT LOADING RATE: **0.01** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (° MIN MAX **Ambient**
INLET AIR FLOW RATE (ACFM): **2,186**	FILTER OPERATING TEMP (°F): **N/A**

NO. OF COMPARTMENTS:	NO. OF BAGS PER COMPARTMENT: **N/A**	LENGTH OF BAG (IN.): **N/A**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **N/A**

TOTAL FILTER SURFACE AREA (FT^2): **377**	AIR TO CLOTH RATIO: **5.8**
DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE	FILTER MATERIAL: ☐ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES

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

PARTICLE SIZE DISTRIBUTION

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

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-CLR1 through ES-CLR6**
Twelve (12) Pellet Mills and Six (6) Pellet Coolers	CONTROL DEVICE ID NO(S): **CD-CLR-C1 through CD-CLR-C4, CD-RCO**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-19**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Six (6) pellet coolers (5 existing and 1 new being proposed in this application) follow the twelve (12) pellet mills (10 existing and 2 new being proposed in this application) 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:	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Bliss (ES-CLR1 through 4), Kahl (ES-CLR5)**	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR
IS THIS SOURCE SUBJECT T ☐ NSPS (SUBPARTS?):	☐ NESHAP (SUBPARTS?):

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

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

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

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: **Twelve (12) Pellet Mills and six (6) Pellet Coolers** **(ES-CLR-1 through ES-CLR-5 are existing - ES-CLR-6 will be new)**	EMISSION SOURCE ID NO: **ES-CLR1 through ES-CLR6** CONTROL DEVICE ID NO(S): **CD-CLR-C1 through CD-CLR-C4, CD-RCO**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-19**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Six (6) pellet coolers (5 existing and 1 new being proposed in this application) follow the twelve (12) pellet mills (10 existing and 2 new being proposed in this application) to cool the newly formed pellets down to an acceptable storage temperature. Similar to the existing pellet cooler 5 (ES-CLR-5) and pollutant control configuration, one (1) simple cyclone (CD-CLR-C4) is being proposed for installation to receive the airstream from the new pellet cooler (ES-CLR-6). Exhaust from the cyclones (i.e. Pellet Mills and Pellet Coolers) will then be routed to a quench duct and new RTO/RCO (CD-RCO) for further emissions reduction prior to being emitted to the atmosphere. The quench duct is inherent process equipment required for safe operation of the RTO/RCO (i.e., fire prevention) and is not a control device.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Wood Pellets	**ODT**	**74.8**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C4
CONTROL DEVICE (CYCLONE, MULTICYCLONE, OR OTHER MECHANICAL)

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

CONTROL DEVICE ID NO: **CD-CLR-C1 and CD-CLR-C2**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-CLR1 through ES-CLR4**
EMISSION POINT (STACK) ID NO(S): **EP-19**	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:
A multicyclone (CD-CLR-C1) controls emissions from four (4) pellet mills and two (2) pellet coolers (ES-CLR1 and 2), a second multicyclone (CD-CLR-C2) also controls emissions from four (4) pellet mills and two (2) pellet coolers (ES-CLR3 and 4). The exhaust from the two (2) multicyclones will be routed to a quench duct and new RTO/RCO (CD-RCO) for VOC/HAP reduction prior to being emitted into the atmosphere. The quench duct will be inherent process equipment required for safe operation of the RTO/RCO (i.e., fire prevention) and is not a control device.

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

PRESSURE DROP (IN. H_2O): ___ MIN **6"** MAX	
INLET TEMPERATURE (°F): ___ MIN *Ambient* MAX	OUTLET TEMPERATURE (°F): ___ MIN *Ambient* MAX
INLET AIR FLOW RATE (ACFM): **13,750 per cooler (55,000 total)**	BULK PARTICLE DENSITY (LB/FT^3): **3E-06**
POLLUTANT LOADING RATE (GR/FT^3):	

SETTLING CHAMBER	**CYCLONE**			**MULTICYCLONE**
LENGTH (INCHES):	INLET VELOCITY (FT/SEC):		☐ CIRCULAR ☐ RECTANGLE	NO. TUBES: **2**
WIDTH (INCHES):	*DIMENSIONS (INCHES) See instructions*		*IF WET SPRAY UTILIZED*	DIAMETER OF TUBES: **43"**
HEIGHT (INCHES):	H:	Dd:	LIQUID USED:	HOPPER ASPIRATION SYSTEM?
VELOCITY (FT/SEC.):	W:	Lb:	FLOW RATE (GPM):	☐ YES ☑ NO
NO. TRAYS:	De:	Lc:	MAKE UP RATE (GPM):	LOUVERS?
NO. BAFFLES:	D:	S:		☐ YES ☑ NO
	TYPE OF CYCLONE ☐ CONVENTIONAL		☑ HIGH EFFICIENCY	☐ OTHER

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

DESCRIBE INCOMING AIR STREAM:
Combined exhaust from pellet mills and pellet coolers

PARTICLE SIZE DISTRIBUTION

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

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

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

Attach Additional Sheets As Necessary

FORM 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-C3 and CD-CLR-C4**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-CLR5 and ES-CLR6**
EMISSION POINT (STACK) ID NO(S): **EP-19**	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 (1) simple cyclone (CD-CLR-C3) controls emissions from two (2) pellet mills and one (1) pellet cooler (ES-CLR5). As part of this project Enviva is proposing to install two (2) new pellet mills and one new pellet cooler (ES-CLR6) that will be controlled by a new simple cyclone (CD-CLR-C4). The exhaust from the two (2) simple cyclones will be routed to a quench duct and new RTO/RCO (CD-RCO) for VOC/HAP reduction prior to being emitted into the atmosphere. The quench duct will be inherent process equipment required for safe operation of the RTO/RCO (i.e., fire prevention) and is not a control device.

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

PRESSURE DROP (IN. H_20):	MIN	6"	MAX
INLET TEMPERATURE (°F):	MIN	Ambient	MAX
OUTLET TEMPERATURE (°F):	MIN	Ambient	MAX
INLET AIR FLOW RATE (ACFM): **13,750**			
BULK PARTICLE DENSITY (LB/FT^3): **3E-06**			
POLLUTANT LOADING RATE (GR/FT^3):			

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

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

DESCRIBE INCOMING AIR STREAM:
Combined exhaust from pellet mills and pellet coolers

PARTICLE SIZE DISTRIBUTION

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

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

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

Attach Additional Sheets As Necessary

FORM C3
CONTROL DEVICE (THERMAL OR CATALYTIC)

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

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

CONTROL DEVICE ID NO: **CD-RCO**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-CLR-1 through ES-CLR-6, ES-DSHM**
EMISSION POINT (STACK) ID NO(S): **EP-19**	POSITION IN SERIES OF CONTROLS NO. 2 OF 2 UNITS **(ES-CLR-1 through -7)**
	POSITION IN SERIES OF CONTROLS NO. 3 OF 3 UNITS **(ES-DSHM)**
	POSITION IN SERIES OF CONTROLS NO. 2 OF 2 UNITS **(ES-DWDS)**

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 STRI ☐ HALOGEN ☐ SILICONE ☐ PHOSPHOROUS COMPOUND ☐ HEAVY METAL ☐ SULFUR COMPOUND ☑ OTHER (SPECIFY) **TBD** ☐ NONE

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

SCFM THROUGH CATALYST: **TBD**

Emissions from the Pellet Coolers (ES-CLR-1 thru ES-CLR-7) are routed to the pellet cooler cyclones (CD-CLR-C1 through CD-CLR-C4) and then to a quench duct and the new RTO/RCO (CD-RCO). Emissions from the Dry Shavings Hammermill (ES-DSHM) are routed to a cyclone (CD-DSHM-C) and to the Dried Wood Day Silo (ES-DWDS). Emission from the Dried Wood Day Silo (ES-DWDS) are routed through a bin vent (CD-DWDS-BV) and then to a quench duct and the new RTO/RCO

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

PRESSURE DROP (IN. H_2O MIN MAX **TBD**	OUTLET TEMPERATURE (°F): **TBD** MIN **TBD** MAX
INLET TEMPERATURE (°F MIN MAX **TBD**	RESIDENCE TIME (SECONDS): **TBD**
INLET AIR FLOW RATE (ACFM): **TBD** (SCFM): **TBD**	COMBUSTION TEMPERATURE (°F): **TBD**
COMBUSTION CHAMBER VOLUME (FT^3): **TBD**	INLET MOISTURE CONTENT (%): **TBD**
% EXCESS AIR: **TBD**	CONCENTRATION (ppmv) **TBD** INLET **TBD** OUTLET
AUXILIARY FUEL USED: **Natural Gas**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **20**

DESCRIBE MAINTENANCE PROCEDURES:
TBD

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Finished Product Handling, Truck Loadout Bin, Pellet Loadouts**	EMISSION SOURCE ID NO: **ES-FPH, ES-TLB, ES-PL1 and ES-PL2**
	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-9**

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

Following the pellet coolers, pellets are conveyed to finished product handling (ES-FPH) where the final product is conveyed across a pellet screener, onto a collection conveyor, and then to a bucket elevator where it is dropped through pipe chutes onto a belt that feeds the truck loadout bin (ES-TLB). From the bin, pellets are gravity fed onto two (2) transfer belts per loading station which transfer pellets to a shuttle belt that drops pellets into trucks through two (2) covered chutes (ES-PL1 and ES-PL2). Finished product handling (ES-FPH), truck loadout bin (ES-TLB), and pellet loadout (ES-PL1 and ES-PL2) emissions are vented into the finished product handling baghouse (CD-FPH-BF) as a fire prevention measure to prevent any build-up of dust on surfaces within the finished product handling building. Fines from the finished product handling baghouse (CD-FPH-BF) are directed through an air lock to the high pressure blow line (HPBL) and pneumatically transferred to the fines bin (ES-FB) which is controlled by a separate baghouse (CD-FB-BV). Collected fines are reintroduced into the pellet production process.

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

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

START CONSTRUCTION DATE:	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Aircon Model # 13.6 RAW 268-10**	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR
IS THIS SOURCE SUBJECT ☐ NSPS (SUBPARTS?):	☐ NESHAP (SUBPARTS?):

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

See Emission Calculations in Appendix C

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

N/A

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

N/A

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

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

Attach Additional Sheets As Necessary

FORM 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: **Truck Loadout Bin**	EMISSION SOURCE ID NO: **ES-TLB**
	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): **EP-9**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Final product is conveyed to the truck loadout bin (ES-TLB) that feeds the pellet loadout (ES-PL1 and ES-PL2). Emissions are controlled by the finished product handling baghouse (CD-FPH-BF).

MATERIAL STORED: **Pellets**				DENSITY OF MATERIAL (LB/FT3): **40**		
CAPACITY	CUBIC FEET:			TONS:		
DIMENSIONS (FEET)	HEIGHT:	DIAMETER:	***(OR)***	LENGTH:	WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY **630,000 ODT**		

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: **Two Pellet Loadouts**	EMISSION SOURCE ID NO: **ES-PL1 and ES-PL2**
	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-9**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Pellet loadout is accomplished by gravity feed of the pellets through one of two (2) covered chutes (ES-PL1 and ES-PL2). Emissions are controlled by the finished product handling baghouse (CD-FPH-BF).

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
TYPE	UNITS		
Wood Pellets	**ODT**	**120.0**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B9
EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-FPH**
Finished Product Handling	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-9**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Collection of transfer points, pellet screening operations, and pellet conveying. Emissions are controlled by the finished product handling baghouse (CD-FPH-BF).

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Wood Pellets	**ODT**	**120.0**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: **CD-FPH-BF**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-FPH, ES-TLB, ES-PL1 and ES-PL2**
EMISSION POINT (STACK) ID NO(S): **EP-9**	POSITION IN SERIES OF CONTROLS NO. **1** OF **1** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

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

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

PRESSURE DROP (IN H_2O): MIN: MAX: **6"** GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-06**	INLET TEMPERATURE (°F): MIN MAX **120° F**
POLLUTANT LOADING RATE: **0.01** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (° MIN MAX **100° F**
INLET AIR FLOW RATE (ACFM): **35,500**	FILTER OPERATING TEMP (°F):

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.): **4,842**
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
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

PARTICLE SIZE DISTRIBUTION

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

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B
SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Fines Bin**	EMISSION SOURCE ID NO: **ES-FB**
	CONTROL DEVICE ID NO(S): **CD-FB-BV**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-8**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Fine pellet material from Finished Product Handling (ES-FPH) is collected by the Fines System and conveyed to the Fines Bin (ES-FB) which is controlled by a baghouse (CD-FB-BV).

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

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

START CONSTRUCTION DATE:	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Aircon/CAR 36-6**	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

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

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

Attach Additional Sheets As Necessary

FORM 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: **Fines Bin**	EMISSION SOURCE ID NO: **ES-FB**
	CONTROL DEVICE ID NO(S): **CD-FB-BV**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): **EP-8**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Fines from Finished Product Handling (ES-FPH) are collected by the Fines System and conveyed to the Fines Bin (ES-FB) which is controlled by a baghouse (CD-FB-BV).

MATERIAL STORED: **Wood Fines**				DENSITY OF MATERIAL (LB/FT3): **40**	
CAPACITY	CUBIC FEET: **2,200**			TONS:	
DIMENSIONS (FEET)	HEIGHT: **97.3**	DIAMETER: **12**	***(OR)***	LENGTH:	WIDTH: HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY: **31,500 ODT**	

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

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 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-FB-BV**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-FB**
EMISSION POINT (STACK) ID NO(S): **EP-8**	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:
Fines from Finished Product Handling (ES-FPH) are collected by the Fines System and conveyed to the Fines Bin (ES-FB) which is controlled by a baghouse (CD-FB-BV).

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

PRESSURE DROP (IN H_2O): MIN: MAX: **TBD** GAUGE? ☑ YES ☐ NO	
BULK PARTICLE DENSITY (LB/FT^3): **3.14E-06**	INLET TEMPERATURE (°F): MIN MAX **Ambient**
POLLUTANT LOADING RATE: **0.01** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (° MIN MAX **Ambient**
INLET AIR FLOW RATE (ACFM): **3,600**	FILTER OPERATING TEMP (°F): **N/A**

NO. OF COMPARTMENTS:	NO. OF BAGS PER COMPARTMENT: **N/A**	LENGTH OF BAG (IN.): **N/A**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **N/A**
TOTAL FILTER SURFACE AREA (FT^2): **325**	AIR TO CLOTH RATIO: **11.08**	

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

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

PARTICLE SIZE DISTRIBUTION

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

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

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 E
CAM PLANS

Compliance Assurance Monitoring
Enviva Pellets Ahoskie, LLC
Dry Hammermills 1 through 7 (ES-DHM-1 through ES-DHM-7)

I. Background

A. Emissions Unit

Description:	Dry Hammermills 1 through 7
Identification:	ES-DHM-1 through ES-DHM-7
Facility:	Enviva Pellets Ahoskie, LLC Ahoskie, Hertford County, NC

B. Applicable Regulation, Emission Limit, and Monitoring Requirements

Regulation No.:	15A North Carolina Administrative Code (NCAC) 02D.0515
Emission limits:	
Particulate matter:	47.7 lb/hr
Monitoring requirements:	Visible emissions, WESP secondary voltage and current

C. Control Technology

Wet Electrostatic Precipitator (CD-WESP)

II. Monitoring Approach

The key elements of the monitoring approach are presented in Table 1 below.

Table 1. Monitoring Approach for Dry Hammermills 1 through 7

I. Indicator	Visible emissions	Secondary Voltage and Current
Measurement Approach	Visible emissions will be monitored weekly using EPA Reference Method 22 procedures.	Continuous monitoring of secondary voltage and current through the precipitator using a voltmeter/ammeter and averaged daily.
II. Indicator Range	Visible emissions above normal determined in accordance with Reference Method 22, trigger enhanced monitoring, or corrective action.[1]	An excursion is defined as a daily average measurement that is below 20 kV secondary voltage or 200 mA secondary current.
III. Performance Criteria A. Data Representativeness	Visible observations will be made at the emission point to the atmosphere [at the outlet of the RTO (CD-RTO)].	Voltmeter/ammeter installed per manufacture's specifications.
B. Verification of Operational Status	NA	Operation verified during observation.
C. QA/QC Practices and Criteria	The observer will be familiar with Reference Method 22 and follow Method 22 procedures.	Confirm the voltmeter and ammeter read zero when the unit is not operating. Calibrate units annually. Annual internal inspection of the WESP including visual checks for critical components, checks for any equipment that does not alarm when de-energized to ensure it is operational, and replacement of broken equipment as necessary.
D. Monitoring Frequency	A 6-minute Method 22 observation will be performed weekly.	Secondary voltage and current through the precipitator are monitored continuously.
E. Data Collection Procedure	The visible emissions observation will be documented by the observer and records of the observation will be retained for five years.	Average secondary voltage and current through the precipitator are recorded daily, and records will be retained for five years.
F. Averaging Period	Observation period not less than 6 minutes.	Daily Average.

1. If visible emissions that are not normal are observed using Reference Method 22, EPA Reference Method 9 can be used to determine compliance with the 20% opacity limit or corrective action may be taken.

III. Justification

A. Background

The pollutant-specific emissions units are the Dry Hammermills (ES-DHM-1 through ES-DHM-7) and the regulated pollutant is particulate matter (PM). ES-DHM-1 through ES-DHM-7 vent to a product recovery cyclone that is routed to one of three (3) baghouses (CD-DHM-FF1 through CD-DHM-FF3) for particulate matter control. An air flow recirculation process will be implemented to route a portion of the exhaust from each dry hammermill cyclone back into the front end of the respective dry hammermill to reduce fresh intake air and thus decrease the volume of air that is routed to the downstream control devices. The reduced dry hammermill exhaust will be routed to baghouses, followed by a quench duct and then to either the dryer furnace (ES-DRYER), the dryer WESP (CD-WESP), or a combination of the two, before entering the RTO (CD-RTO). Interlocks will be installed to cease operation of the dry hammermills if a minimum flow rate is not maintained in the quench duct or if the furnace/WESP/RTO system ceases normal operation.

At all times 100% of the dry hammermill exhaust will be controlled by a baghouse, WESP, and RTO. The furnace is not a control device. The WESP will provide a reduction in PM and metallic hazardous air pollutant (HAP) and the RTO will provide a reduction in VOC and organic HAP/TAP emissions. The highest pollutant inlet loading to the control devices will occur when the furnace and dryer are operating at maximum capacity with all dry hammermill exhaust routed to the inlet of the furnace. The quench system is considered inherent process equipment that is required to safely operate the RTO (i.e., reduce fire risk) and is not a control device. It should be noted that upon implementation of the proposed dry hammermill recirculation the baghouses will not be required to achieve compliance with the PM emission limit under 15A NCAC 02D .0515. Although PM emissions will still be controlled by the baghouses, control by the WESP will result in sufficient reduction to ensure compliance with the PM emission limit.

B. Rationale for Selection of Performance Indicators

The following parameters will be monitored:

i. Visible emissions at RTO outlet

ii. WESP Secondary Voltage and Current

Visible emissions is selected as one of the performance indicators that ensure proper operation of the control device (WESP) so that compliance with the 15A NCAC 02D.0515 Particulate Matter emission limit is achieved. Visible emissions are relatively easy to monitor and is a good indicator of performance changes in particulate matter control devices. Visible emission observations using Reference Method 22 is an acceptable indicator used to ensure compliance with many NSPS regulations.

Secondary voltage and current are also selected as indicators for WESP performance. Secondary voltage and current are used to measure the power input to the WESP and are recommended parameters by WESP manufactures in evaluating performance and proper operation of a WESP.

C. Rationale for Selection of Indicator Ranges

Visible emission observations at the outlet of the RTO (CD-RTO) are performed weekly using EPA Reference Method 22 procedures. Visible emissions above normal determined in accordance with Reference Method 22, trigger enhanced monitoring, or corrective action. The presence of visible emissions that are above normal indicates non-routine operation of the control equipment requiring corrective action.

Secondary voltage and current through the precipitator are monitored continuously using a voltmeter and ammeter, respectively. An excursion is defined as a daily averaged measurement that is below 20 kV secondary voltage or 200 mA current. The indicator values for the WESP were established during compliance testing for the 15A NCAC 02D.0515 emission limit on the dryer (ES-DRYER). These values will be re-verified during future compliance testing.

Compliance Assurance Monitoring
Enviva Pellets Ahoskie, LLC
Pellet Mills 1 through 12 and Pellet Coolers 1 through 6 (ES-CLR1 through ES-CLR6)

IV. Background

A. Emissions Unit

Description:	Pellet Mills and Pellet Coolers
Identification:	ES-CLR1 through ES-CLR6
Facility:	Enviva Pellets Ahoskie, LLC Ahoskie, Hertford County, NC

B. Applicable Regulation, Emission Limit, and Monitoring Requirements

Regulation No.:	15A NCAC 02D.0515
Emission limits:	
Particulate matter:	48.6 lb/hr
Monitoring requirements:	Visible emissions, Quench Duct Inlet Water Flow Rate

C. Control Technology

Multicyclones (CD-CLR-C1 and CD-CLR-C2) and simple cyclones (CD-CLR-C3 and CD-CLR-C4)

V. Monitoring Approach

The key elements of the monitoring approach are presented in Table 2 below.

Table 2. Monitoring Approach for Pellet Mills and Pellet Coolers

I. Indicator	Visible emissions	Quench Duct Inlet Water Flow Rate
Measurement Approach	Visible emissions will be monitored weekly using EPA Reference Method 22 procedures.	Quench duct inlet water flow rate will be monitored continuously.
II. Indicator Range	Visible emissions above normal determined in accordance with Reference Method 22, trigger enhanced monitoring, or corrective action.[1]	An excursion is defined as a quench duct flow rate that drops below the minimum allowable flow rate established for operation. If the flow rate to the quench duct drops below the minimum flow rate (to be established by testing), the pellet mills and pellet coolers automatically shut down via an interlock triggering an inspection, corrective action, and a reporting requirement.
III. Performance Criteria A. Data Representativeness	Visible observations will be made at the emission point [at the outlet of the RTO/RCO (CD-RCO)].	Quench duct water flow rate will be measured at the inlet to the quench duct using a flow meter.
B. Verification of Operational Status	NA	Operation verified during observation.
C. QA/QC Practices and Criteria	The observer will be familiar with Reference Method 22 and follow Method 22 procedures.	Flow meter will be observed daily and calibrated annually.
D. Monitoring Frequency	A 6-minute Method 22 observation will be performed weekly.	Quench duct water flow rate will be monitored continuously.
E. Data Collection Procedure	The visible emissions observation will be recorded and retained on site for five years.	Flow rate will be recorded daily, and records will be retained for five years.
F. Averaging Period	Observation period not less than 6 minutes.	None.

1. If visible emissions that are not normal are observed using Reference Method 22, EPA Reference Method 9 can be used to determine compliance with the 20% opacity limit or corrective action may be taken

VI. Justification

A. Background

The pollutant-specific emissions units are Pellet Mills 1 through 12 and Pellet Coolers 1 through 6 (ES-CLR1 through ES-CLR6) and the regulated pollutant is PM. The existing and proposed pellet mills and pellet coolers (ES-CLR1 through ES-CLR6) are subject to a PM emission limit under 15A NCAC 02D .0515 and utilize four (4) individual high efficiency cyclones to meet this limit. A quench duct and RTO/RCO (CD-RCO) will be installed to receive exhaust from the high efficiency cyclones; however, the RTO/RCO will not be installed to meet a specific emission limit but rather to reduce the plant's potential volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions. Note, the quench duct is considered inherent process equipment and is being installed for safety purposes to reduce the risk of fire. As such, it is not considered a control device.

B. Rationale for Selection of Performance Indicators

The following parameters will be monitored:

i. Visible emissions at RTO/RCO outlet

ii. Quench Duct Inlet Water Flow Rate

Visible emissions is selected as one of the performance indicators that ensure proper operation of the control device (cyclones) so that compliance with the 15A NCAC 02D.0515 Particulate Matter emission limits is achieved. Visible emissions are relatively easy to monitor and is a good indicator of performance changes in particulate control devices. Visible emission observations using Reference Method 22 is an acceptable indicator used to ensure compliance with many NSPS regulations.

The quench duct water flow rate is selected as one of the performance indicators. The quench duct is inherent process equipment that is required to be installed for the RTO/RCO (CD-RCO) to operate safely by reducing the risk of fire. Operation of the pellet mills and coolers will be interlocked with the operation of the quench duct. The quench duct must be operating at or above the minimum flow rate for the pellet mills and coolers to operate.

C. Rationale for Selection of Indicator Ranges

Visible emissions observations at the outlet of the RTO/RCO (CD-RCO) will be conducted weekly using EPA Reference Method 22 procedures. Visible emissions above normal determined in accordance with Reference method 22, trigger enhanced monitoring, or corrective action. The presence of visible emissions that are above normal indicates non-routine operation of the control equipment requiring corrective action.

Quench duct inlet water flow rate will be monitored continuously using a flow meter. An excursion is defined as a quench duct inlet flow rate that drops below the minimum established rate. If the flow rate drops below the minimum flow rate established during testing, the pellet mills and pellet coolers will automatically shut down via an interlock.

Compliance Assurance Monitoring
Enviva Pellets Ahoskie, LLC
Dry Shavings Hammermill (ES-DSHM)

VII. Background

A. Emissions Unit

Description:	Dry Shavings Hammermill
Identification:	ES-DSHM
Facility:	Enviva Pellets Ahoskie, LLC Ahoskie, Hertford County, NC

B. Applicable Regulation, Emission Limit, and Monitoring Requirements

Regulation No.:	15A NCAC 02D.0515
Emission limits:	
Particulate matter:	24.0 lb/hr
Monitoring requirements:	Visible emissions, Quench Duct Inlet Water Flow Rate

C. Control Technology

Bin Vent Filter

VIII. Monitoring Approach

The key elements of the monitoring approach are presented in Table 3 below.

Table 3. Monitoring Approach for Dry Shavings Hammermills

I. Indicator	Visible emissions	Quench Duct Inlet Water Flow Rate
Measurement Approach	Visible emissions will be monitored weekly using EPA Reference Method 22 procedures.	Quench duct inlet water flow rate will be monitored continuously.
II. Indicator Range	Visible emissions above normal determined in accordance with Reference Method 22, trigger enhanced monitoring, or corrective action.[1]	An excursion is defined as a quench duct flow rate that drops below the minimum allowable flow rate established for operation. If the flow rate to the quench duct drops below the minimum flow rate (to be established by testing), the dry shavings hammermill automatically shuts down via an interlock triggering an inspection, corrective action, and a reporting requirement.
III. Performance Criteria A. Data Representativeness	Visible observations will be made at the emission point [at the outlet of the RTO/RCO (CD-RCO)].	Quench duct water flow rate will be measured at the inlet to the quench duct using a flow meter.
B. Verification of Operational Status	NA	Operation verified during observation.
C. QA/QC Practices and Criteria	The observer will be familiar with Reference Method 22 and follow Method 22 procedures.	Flow meter will be observed daily and calibrated annually.
D. Monitoring Frequency	A 6-minute Method 22 observation will be performed weekly.	Quench duct water flow rate will be monitored continuously.
E. Data Collection Procedure	The visible emissions observation will be documented by the observer and records of the observation will be retained for five years.	Flow rate will be recorded daily, and records will be retained for five years.
F. Averaging Period	Observation period not less than 6 minutes.	None.

1. If visible emissions that are not normal are observed using Reference Method 22, EPA Reference Method 9 can be used to determine compliance with the 20% opacity limit or corrective action may be taken.

IX. Justification

A. Background

The pollutant-specific emissions unit is the Dry Shavings Hammermill (ES-DSHM) and the regulated pollutant is PM. The dry shavings hammermill (ES-DSHM) is subject to a PM emission limit under 15A NCAC 02D .0515 and utilizes a bin vent filter (CD-DWDS-BV) to meet this limit. A quench duct and RTO/RCO (CD-RCO) will receive exhaust from the bin vent filter (CD-DWDS-BV); however, the RTO/RCO will not be installed to meet a specific emission limit but rather to reduce the plant's potential VOC and HAP emissions. Note, the quench duct is considered inherent process equipment and is being installed for safety purposes to reduce the risk of fire. As such, it is not considered a control device.

B. Rationale for Selection of Performance Indicators

The following parameters will be monitored:

i. Visible emissions at RTO/RCO outlet

ii. Quench Duct Inlet Water Flow Rate

Visible emissions is selected as one of the performance indicators that ensure proper operation of the control device (cyclones) so that compliance with the 15A NCAC 02D.0515 Particulate Matter emission limits is achieved. Visible emissions are relatively easy to monitor and is a good indicator of performance changes in particulate control devices. Visible emission observation using Reference Method 22 is an acceptable indicator used to ensure compliance with many NSPS regulations.

The quench duct water flow rate is selected as one of the performance indicators. The quench duct is inherent process equipment that is required to be installed for the RTO/RCO (CD-RCO) to operate safely by reducing the risk of fire. Operation of the dry shavings hammermill will be interlocked with the operation of the quench duct. The quench duct must be operating at or above the minimum flow rate for the dry shavings hammermill to operate.

C. Rationale for Selection of Indicator Ranges

Visible emissions observations at the outlet of the RTO/RCO (CD-RCO) will be conducted weekly using EPA Reference Method 22 procedures. Visible emissions above normal determined in accordance with Reference Method 22, trigger enhanced monitoring, or corrective action. The presence of visible emissions that are above normal indicates non-routine operation of the control equipment requiring corrective action.

Quench duct inlet water flow rate will be monitored continuously using a flow meter. An excursion is defined as a quench duct inlet flow rate that drops below the minimum established rate. If the flow rate drops below the minimum flow rate established during testing, the dry shavings hammermill will automatically shut down via an interlock.

Compliance Assurance Monitoring
Enviva Pellets Ahoskie, LLC
Fines Bin (ES-FB)

X. Background

A. Emissions Unit

Description:	Fines Bins
Identification:	ES-FB
Facility:	Enviva Pellets Ahoskie, LLC Ahoskie, Hertford County, NC

B. Applicable Regulation, Emission Limit, and Monitoring Requirements

Regulation No.:	15A NCAC 02D.0515
Emission limits:	
Particulate matter:	10 lb/hr
Monitoring requirements:	Visible emissions

C. Control Technology

Baghouse (CD-FB-BV)

XI. Monitoring Approach

The key elements of the monitoring approach are presented in Table 4 below.

Table 4. Monitoring Approach for Fines Bin

I. Indicator	Visible emissions
Measurement Approach	Visible emissions will be monitored daily using EPA Reference Method 22 procedures.
II. Indicator Range	Visible emissions above normal determined in accordance with Reference Method 22, trigger enhanced monitoring, or corrective action.[1]
III. Performance Criteria A. Data Representativeness	Visible observations will be made at the emission point [at the baghouse exhaust point].
B. Verification of Operational Status	NA
C. QA/QC Practices and Criteria	The observer will be familiar with Reference Method 22 and follow Method 22 procedures.
D. Monitoring Frequency	A 6-minute Method 22 observation will be performed daily.
E. Data Collection Procedure	The visible emissions observation will be documented by the observer and records of the observation will be retained for five years.
F. Averaging Period	Observation period not less than 6 minutes.

1. If visible emissions that are not normal are observed using Reference Method 22, EPA Method 9 can be used to determine compliance with the 20% opacity limit or corrective action may be taken.

XII. Justification

A. Background

The pollutant-specific emissions unit is the Fines bin (ES-FB) and the regulated pollutant is PM. The fines bin (ES-FB) is subject to a PM emission limit under 15A NCAC 02D .0515 and utilizes a baghouse (CD-FB-BV) to meet this limit. Fines from the finished product handling baghouse (CD-FPH-BF) are directed through an air lock to the high pressure blow line and pneumatically transferred to the fines bin (ES-FB) which is controlled by a separate baghouse (CD-FB-BV).

B. Rationale for Selection of Performance Indicator

The following parameter will be monitored:

i. Visible emissions at the baghouse exhaust point

Visible emissions is selected as the performance indicator that ensures proper operation of the control device (baghouse) so that compliance with the 15A NCAC 02D.0515 Particulate Matter emission limit is achieved. Visible emissions is relatively easy to monitor and is a good indicator of performance changes in particulate control devices. Visible emission observations using Reference Method 22 is an acceptable indicator used to ensure compliance with many NSPS regulations.

C. Rationale for Selection of Indicator Range

Visible emissions observations at the baghouse exhaust point will be conducted daily using EPA Reference Method 22 procedures. Visible emissions above normal determined in accordance with Reference Method 22, trigger enhanced monitoring, or corrective action. The presence of visible emissions that are above normal indicates non-routine operation of the baghouse requiring corrective action.

Compliance Assurance Monitoring
Enviva Pellets Ahoskie, LLC
Truck Loadout Bin (ES-TLB), Pellet Loadouts (ES-PL1 and ES-PL2), and Finished Production Handling (ES-FPH)

XIII. Background

A. Emissions Unit

Description:	Truck Loadout Bin
Identification:	ES-TLB
Description:	Pellet Loadouts
Identification:	ES-PL1 and ES-PL2
Description:	Finished Product Handling
Identification:	ES-FPH
Facility:	Enviva Pellets Ahoskie, LLC Ahoskie, Hertford County, NC

B. Applicable Regulation, Emission Limit, and Monitoring Requirements

Regulation No.:	15A NCAC 02D.0515
Emission limits:	
Particulate matter:	53.7 lb/hr (each)
Monitoring requirements:	Visible emissions

C. Control Technology

Baghouse (CD-FPH-BF)

XIV. Monitoring Approach

The key elements of the monitoring approach are presented in Table 5 below.

Table 5. Monitoring Approach for Truck Loadout Bins, Pellet Loadouts, and Finished Product Handling

I. Indicator	Visible emissions
Measurement Approach	Visible emissions will be monitored daily using EPA Reference Method 22 procedures.
II. Indicator Range	Visible emissions above normal determined in accordance with Reference Method 22, trigger enhanced monitoring, or corrective action.[1]
III. Performance Criteria A. Data Representativeness	Visible observations will be made at the emission point [at the baghouse exhaust point].
B. Verification of Operational Status	NA
C. QA/QC Practices and Criteria	The observer will be familiar with Reference Method 22 and follow Method 22 procedures.
D. Monitoring Frequency	A 6-minute Method 22 observation will be performed daily.
E. Data Collection Procedure	The visible emissions observation will be documented by the observer and records of the observation will be retained for five years.
F. Averaging Period	Observation period not less than 6 minutes.

1. If visible emissions that are not normal are observed using Reference Method 22, EPA Reference Method 9 can be used to determine compliance with the 20% opacity limit or corrective action may be taken.

XV. Justification

A. Background

The pollutant-specific emissions units are the Truck Loadout Bin (ES-TLB), Pellet Loadouts (ES-TL1 and ES-TL2), and Finished Product Handling (ES-FPH). Each of these sources are subject to a PM emission limit under 15A NCAC 02D .0515 and utilize a baghouse (CD-FPH-BF) to meet this limit. Following the pellet coolers, pellets are conveyed to Finished Product Handling (ES-FPH) where the final product is conveyed across a pellet screener, onto a collection conveyor, and then to a bucket elevator where it is dropped through pipe chutes onto a belt that feeds the truck loadout bin (ES-TLB). From the bin, pellets are gravity fed onto two (2) transfer which transfer pellets to a shuttle belt that drops pellets into trucks through one of two (2) covered chutes (ES-PL1 and ES-PL2). PM emissions from Finished product handling (ES-FPH), the truck loadout bin (ES-TLB), and pellet loadout (ES-PL1 and ES-PL2) are vented into the finished product handling baghouse (CD-FPH-BF) as a fire prevention measure to prevent any build-up of dust on surfaces within the finished product handling building.

B. Rationale for Selection of Performance Indicator

The following parameter will be monitored:

i. Visible emissions at the baghouse exhaust point

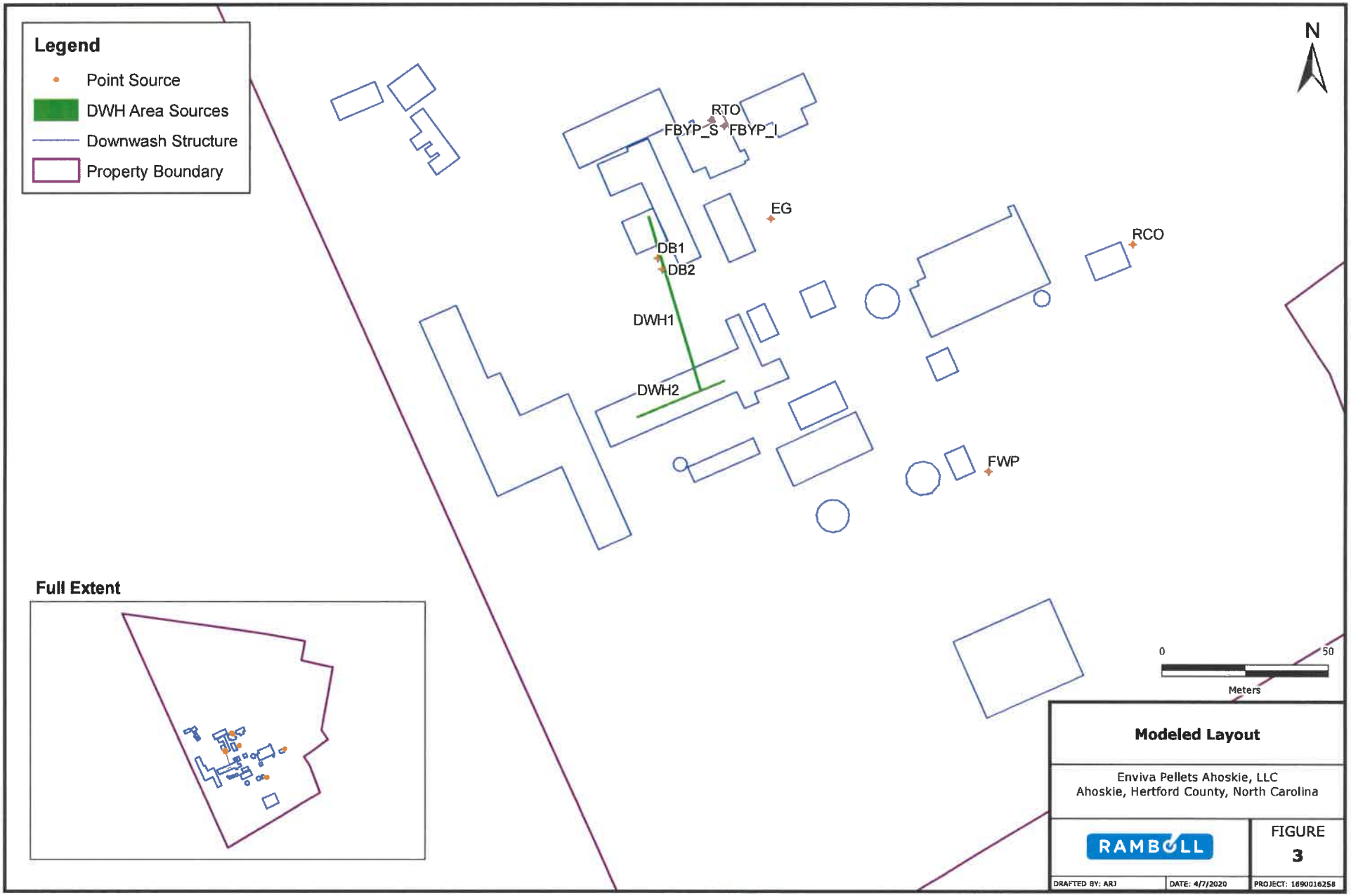
Visible emissions is selected as one of the performance indicators that ensure proper operation of the control device (baghouse) so that compliance with the 15A NCAC 02D.0515 Particulate Matter emission limits is achieved. Visible emissions are relatively easy to monitor and is a good indicator of performance changes in particulate control devices. Visible emission observations using Reference Method 22 is an acceptable indicator used to ensure compliance with many NSPS regulations.

C. Rationale for Selection of Indicator Range

Visible emissions observations at the baghouse exhaust point will be conducted daily using EPA Reference Method 22 procedures. Visible emissions above normal determined in accordance with Reference Method 22, trigger enhanced monitoring, or corrective action. The presence of visible emissions that are above normal indicates non-routine operation of the baghouse requiring corrective action.

APPENDIX F
SUPPORTING DOCUMENTATION FOR TAP MODELING ANALYSIS (USB)

APPENDIX G
MODELED SOURCE LAYOUT


Legend
Point Source
DWH Area Sources
Downwash Structure
Property Boundary
N
RTO
FBYP_S
FBYP_I
EG
RCO
DB1
DB2
DWH1
DWH2
FWP
Full Extent
0
50
Meters
Modeled Layout
Enviva Pellets Ahoskie, LLC
Ahoskie, Hertford County, North Carolina
RAMBOLL
FIGURE
3
DRAFTED BY: ARJ
DATE: 4/7/2020
PROJECT: 1690016258

APPENDIX H
ZONING CONSISTENCY DETERMINATION REQUEST

RAMBOLL

ENVIRONMENT
& HEALTH

August 28, 2020

Tomekia Mitchell-Holloman
Planning & Zoning Administrator
Town of Ahoskie
201 W. Main Street
Ahoskie, N.C. 27910

Dear Madam:

On behalf of Enviva Pellets Ahoskie, LLC (Enviva), I am writing to inform you that Enviva is submitting a permit renewal and modification application for the Ahoskie plant. With this application, Enviva intends to modify the wood pellet manufacturing facility at 142 N.C. Route 561 East in Hertford County Ahoskie, North Carolina. I hereby certify that to the best of my knowledge, the Town of Ahoskie has jurisdiction over the land on which the facility and its appurtenances are to be located.

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

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

Sincerely,

Michael Carbon
Managing Principal

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

Zoning Consistency Determination

Facility Name	Enviva Pellets Ahoskie, LLC
Facility Street Address	142 N.C. Route 561 East
Facility City	Ahoskie
Description of Process	Wood pellet manufacturing facility
SIC/NAICS Code	2499
Facility Contact	Curtis Hall, Plant Manager
Phone Number	(252) 209-6032 ext. 2210
Mailing Address	142 N.C. Route 561 East
Mailing City, State Zip	Ahoskie, NC 27910

Based on the information given above:

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

☐ There are no applicable zoning ordinances for this facility at this time

☐ The proposed operation IS consistent with applicable zoning ordinances

☐ The proposed operation IS NOT consistent with applicable zoning ordinances
(please include a copy of the rules in the package sent to the air quality office)

☐ The determination is pending further information and can not be made at this time

☐ Other:

_____

Agency _____

Name of Designated Official _____

Title of Designated Official _____

Signature _____

Date _____

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

All PSD and Title V Applications

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

Local Programs

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

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

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

Division of Air Quality Regional Offices

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(c) The Commission shall have the power:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

a. Revise and resubmit the application; or

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

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

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

(1) Determining that the permit application is complete;

(2) Requesting additional information to determine completeness;

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

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

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

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