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ENVIRONMENT
& HEALTH

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

Re: **Permit Modification Application for PSD Minor Source Status**
Enviva Pellets Northampton, LLC
Garysburg, North Carolina
Northampton County
Permit No.: 10203R05
Facility ID: 6600167

September 28, 2018

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

T +1 225-408 2691
www.ramboll.com

Dear Mr. Willets:

Enclosed please find a North Carolina Department of Environment Quality (NC DEQ) permit application package for a permit modification to reclassify Enviva Pellets Northampton, LLC ("Enviva", "the Northampton plant", or "the facility") (NC DEQ Facility ID #6600167) in Northampton County as a Prevention of Significant Deterioration (PSD) and hazardous air pollutant (HAP) minor source.

The plant currently operates under Air Quality Permit No. 10203R05 issued by the North Carolina Department of Environmental Quality (NCDEQ), Division of Air Quality (DAQ) on March 3, 2017.

Enviva is submitting this permit modification application to reflect planned changes for the Northampton plant. These changes are being implemented to meet new customer softwood percentage and production rate demands and to incorporate significant emission reduction efforts to minimize emissions impacts associated with the project. Because of these changes, the Northampton plant's potential emissions for all criteria pollutants will be less than the PSD major source thresholds of 250 tpy and, thus, the facility will be classified as a PSD minor source. Additionally, the facility will be reclassified as a minor source under the hazardous air pollutant (HAP) program. The facility will continue to be classified as a major source under the Title V program.

Enviva is requesting that the procedures of 15A NCAC 2Q .0504 be applied to this project allowing issuance of a construction and operating permit under 15A NCAC 2D .0300. As required, three (3) copies of the complete permit application package

and an application processing fee in an amount of $947 are enclosed. In addition, Enviva has submitted the required zoning determination documents to both the City of Garysburg and Northampton County departments.

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

Yours sincerely,

Michael Carbon
Managing Principal
Air Sciences

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

Enclosures: Permit Application including Appendices

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

Prepared By
Ramboll US Corporation
Baton Rouge, Louisiana

Project Number
1690009489

Date
September 2018

MODIFICATION APPLICATION FOR PSD MINOR SOURCE STATUS

ENVIVA PELLETS NORTHAMPTON, 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
DENR	Department of Environment and Natural Resources
FSC	Forest Stewardship Council
HAP	Hazardous Air Pollutant
hp	horsepower
ICE	Internal Combustion Engine
lb	Pound
MACT	Maximum Achievable Control Technology
MMBtu	Million British thermal units
NAAQS	National Ambient Air Quality Standards
NCAC	North Carolina Administrative Code
NCASI	National Council for Air and Stream Improvement
NCDEQ	North Carolina Department of Environmental Quality
NESHAP	National Emission Standards for Hazardous Air Pollutants
NNSR	Nonattainment New Source Review
NO_X	Nitrogen Oxides (NO + NO_2)
NSPS	New Source Performance Standards
NSR	New Source Review
NWS	National Weather Service
ODT	Oven Dried Tons
PEFC	Programme for the Endorsement of Forest 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
EPA	US Environmental Protection Agency
VOC	Volatile Organic Compounds
WESP	Wet Electrostatic Precipitator

1. INTRODUCTION

Enviva Pellets Northampton, LLC (Enviva) owns and operates a wood pellet manufacturing plant (referred to herein as "the Northampton plant", "the plant", or "the facility") in Northampton County, North Carolina. The plant currently operates under Air Quality Permit No. 10203R05 issued by the North Carolina Department of Environmental Quality (NCDEQ), Division of Air Quality (DAQ) on March 3, 2017. The plant consists of the following processes: Log Chipper, Bark Hog, Green Wood Hammermills, Rotary Dryer, Dry Hammermills, Pellet Presses and Coolers, Product Loadout operations and other ancillary activities.

The Northampton 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. Additionally, the plant is permitted as a major source of hazardous air pollutants (HAP) due to potential total HAP emissions and maximum individual HAP emissions estimated to remain below the major source threshold of 25 tpy, and 10 tpy, respectively.

Enviva is requesting that the procedures of 15A NCAC 2Q .0504 be utilized for this modification allowing issuance of a construction and operating permit under 15A NCAC 2D .0300. Enviva will thereafter submit a permit application for a Title V Permit Modification within one year after commencement of operations. These changes are being implemented to meet new customer softwood percentage and production rate demands and to incorporate significant emission reduction efforts to minimize emissions impacts associated with the project. Because of the significant emission reductions proposed as part of this modification, the Northampton plant's potential emissions will be less than the PSD and HAP major source thresholds, thus, the facility will be classified as a PSD and HAP minor source. The facility will, however, continue to be classified as a major source under the Title V program.

The following summarizes the proposed changes associated with this modification:

- Increase production rate from 535,260 ODT per year to 781,355 ODT per year and increase softwood processed from a maximum of 30% to a maximum of 80% annually;
- Upgrade existing pellet dies with a new 1500 mm prototype;
- Add a chiller, with air to air heat exchanger, to chill air used in the pellet coolers for product quality purposes;
- Install a new direct wood-fired dryer (ES-DRYER-2) equipped with multiclone separator, WESP, and RTO (CD-DC-2, CD-WESP-2, and CD-RTO-2);
- Add a regenerative thermal oxidizer (CD-RTO-1) to the existing dryer (ES-DRYER-1) following the existing wet electrostatic precipitator (CD-WESP-1). As such, the existing WESP stack will be replaced with the proposed RTO stack;
- Remove two existing closed-loop Green Wood Hammermills currently permitted as re-chippers (ES-RCHP-1 and ES-RCHP-2) and construct five (5) new closed-loop Green Wood Hammermills (ES-GHM-1 through ES-GHM-5) and route the exhaust to the existing wet electrostatic precipitator (CD-WESP-1) and proposed RTO (CD-RTO-1);
- Add a second pre-screener prior to the dry hammermills and a baghouse to control emissions from existing and new pre-screeners (ES-PS-BF);

- Add a second pellet screener and route the exhaust to a baghouse;
- Add chip reclaim automation by adding up to three truck tippers and a chip stacker reclaimer, and removing most front-end loader usage;
- Add two (2) new dry hammermills (ES-DSHM-1 and ES-DSHM-2) dedicated to dry shavings and route exhaust to a proposed new wet scrubber and RCO/RTO;
- Route Pellet Cooler exhausts through a new wet scrubber to the Dry Hammermills which will exhaust through another new wet scrubber and Regenerative Catalytic Oxidizer (RCO) (CD-RCO-1) that can also operate as a Regenerative Thermal Oxidizer (RTO) to control emissions from the Pellet Coolers, Dry Hammermills, and proposed Dry Shavings Hammermills. Additionally, add four double duct burners (IES-DDB-5 through IES-DDB-8) to the associated Pellet Cooler and Dry Hammermill duct work to reduce the risk of moisture condensation; Add an additive silo (IES-ADD) and accompanying baghouse (CD-ADD-BF);
- Add a Propane Vaporizer (IES-PVAP) for RTOs/RCO;
- Add four (4) double duct burners (IES-DDB-1 through IES-DDB-4), two per dryer line on the exhaust and recirculation ducts, to reduce the risk of moisture condensation.;
- Add dryer and furnace bypass stacks (ES-DRYERBYP-1, ES-DRYERBYP-2, ES-FURNACEBYP-1, ES-FURNACEBYP-2);
- Add a mobile fuel diesel storage tank (IES-TK-3);
- Replace the TLO Bucket Elevator Belt & Buckets;
- Upgrade the Pellet Mill Fines Bin Screw and Pellet Screener;
- Replace the Dryer Furnace Fuel Surge Bin; and
- Replace Green Hammermill Wear Plates and upgrade Green Hammermill hydraulics.

In addition to the changes proposed above, Enviva also proposes the following reconciliations:

- Reconcile log chipper emissions (IES-CHIP-1) into electric powered wood chipper source ID (IES-EPWC);
- Incorporate emission points associated with the use of Dry Shavings (Dry Shavings Handling, Dry Shavings Baghouse, Dry Shavings Silo);
- Re-name the currently permitted dryer (ES-DRYER) and associated control devices to dryer line 1 (ES-DRYER-1), multiclone separator (CD-DC-1), and WESP (CD-WESP-1);
- Remove bark hog and debarker from IES-GWHS and permit as separate sources (IES-BARK and IES-DEBARK, respectively);
- Remove sources associated with the bagging system. These include ES-BSC-1 through ES-BSC-3, ES-BSS-1 and ES-BSS-2, and ES-BSB-1 and ES-BSB-2;
- Correct source IDs for the diesel storage tanks from IS-TK-1 and IS-TK-2 to IES-TK-1 and IES-TK-2;
- Correct source ID for dry line hopper from ES-DLH to IES-DLH reflect updated status as an insignificant activity;

- Correct source ID for dry wood handling from IES-DWH to ES-DWH;
- Remove Nuisance Dust System (ES-NDS); and
- Re-name the currently permitted Pellet Fines Bin (ES-PFB-1) and associated bin vent filter (CD-PFB-BV) to Pellet Cooler HP Fines Relay System (ES-PCHP) and baghouse (ES-PCHP-BF);

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. Finally, the completed air permit application forms are included in Appendix D.

2. PROCESS DESCRIPTION

Enviva manufactures wood pellets for use as a renewable fuel for energy generation and industrial customers. Enviva's customers use wood pellets in place of coal, significantly reducing emissions of pollutants such as lifecycle 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: http://www.envivabiomass.com/sustainability/wood-sourcing/responsible-wood-supply-program/

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

2.1 Green Wood Handling and Storage (IES-GWHS)

"Green" (i.e., fresh cut) wood is delivered to the plant via trucks as either pre-chipped wood or unchipped logs from commercial harvesting for on-site chipping. Pre-chipped wood will be screened to remove oversize material which goes to the furnace fuel pile. Logs will be debarked, chipped, and sized in the, debarker (IES-DEBARK), chipper (IES-EWPC) and green wood hammermills (ES-GHM-1 through 5). Chipped wood for drying is conveyed to a chipped wood storage pile and bark is conveyed to a bark fuel storage pile. All transfer points and storage piles are captured by the green wood handling and storage (IES-GWHS).

2.2 Debarking (IES-DEBARK), Chipping (IES-EWPC), Bark Hog (IES-BARK), and Green Wood Fuel Storage Bin (IES-GWFB)

Logs will be debarked by the electric-powered rotary drum Debarker (IES-DEBARK) and then sent to the electric powered green wood chipper (IES-EPWC) to chip the wood to specification and routed to Green Wood Storage Piles. Purchased chips received by three (3) truck dumps are also transferred to Green Wood Storage Piles. Bark from the Debarker is hogged and purchased bark/fuel chips from one truck dump or walking floor trailers are transferred to the bark pile. Following storage in the Bark Fuel and Chip Storage Piles, the bark will be transferred to a blend pile and then transferred via walking floor to a covered conveyor, then to an enclosed Green Wood Fuel Storage Bin (ES-GWFB) where the material will be pushed into the furnace.

With this application, Enviva proposes to automate the chip reclaim operations by using up to three (3) truck tippers and a stacker reclaimer, as well as removing most front-end loader

usage. Enviva also plans to install a second walking floor next to the existing one associated with a new fuel blend pile for the new dryer line.

2.3 Green Wood Hammermills (ES-GHM-1 through ES-GHM-5)

With this application, Enviva is proposing to remove the currently permitted re-chippers (IES-RCHP-1 and IES-RCHP2) and construct five (5) new closed-loop green wood hammermills (ES-GHM-1 and ES-GHM-5) and route the exhaust to the existing WESP (CD-WESP-1) and to the proposed new RTO (CD-RTO-1). Prior to drying, chips from the Green Wood Storage Piles will be processed in these Green Wood Hammermills to reduce material to the proper size.

2.4 Dryers (ES-DRYER-1 and ES-DRYER-2)

The existing dryer (ES-DRYER) uses direct contact heat provided to the system via a 153 million British thermal unit per hour (MMBtu/hr) total heat input furnace that uses bark and wood chips as fuel. Green wood is fed into the dryer (ES-DRYER-1) where the moisture content is reduced to the desired level and routed to a multiclone separator (CD-DC-1) in series with wet electrostatic precipitator (CD-WESP-1) for additional particulate, metallic HAP, and hydrogen chloride removal. With this application, Enviva proposes to rename the existing dryer from ES-DRYER to ES-DRYER-1 and equip the existing dryer with a RTO (CD-RTO-1) following the existing WESP (CD-WESP-1). Enviva also proposes to install a new direct contact rotary dryer system (ES-DRYER-2) equipped with a multiclone separator (CD-DC-2), WESP (CD-WESP-2), and RTO (CD-RTO-2) to provide PM, VOC, and HAP emissions control. The new dryer, similar to the existing dryer, will use direct contact heat provided to the system via a 180 million British thermal unit per hour (MMBtu/hr) total heat input furnace that uses bark and fuel chips as fuel.

As the flue gas exits the dryers and begins to cool, wood tar can condense and coat the inner walls of the dryer ducts creating a fire risk. To prevent condensation from occurring and thus reduce the fire risk, each dryer system will include double ducts which will be heated. The duct from the cyclone outlet to the ID fan will be heated by one low-NOx burner with a maximum heat input rating of 1 MMBtu/hr and a second 1 MMBtu/hr low-NOx burner will be used to heat the duct used for exhaust gas recirculation and the WESP. The double duct burners (IES-DDB-1 through IES-DDB-4) will combust natural gas, or propane as back-up, and will exhaust directly to atmosphere.

2.5 Bypass Stacks (ES-DRYERBYP-1, ES-DRYERBYP-2, ES-FURNACEBYP-1, ES-FURNACEBYP-2)

Bypass stacks for each furnace and rotary drum dryer may be used to exhaust hot gases during start-ups (for temperature control) and malfunctions. Specifically, the Furnace Bypass Stacks will be used in the following situations:

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

- **Malfunction:** The furnace itself can abort and open the bypass stack in the event of a malfunction. This may occur as a result of a number of different interlocks such as power failure, dryer ID fan failure, etc. As soon as the furnace aborts it will automatically switch to "idle mode" (defined as operation at up to a maximum heat input rate of 5 MMBtu/hr). The fuel feed is significantly reduced, and the heat input rate drops rapidly.
- **Planned Shutdown:** In the event of a planned shutdown the furnace heat input will be decreased, and all remaining fuel will be moved through the system to prevent a fire during the shutdown period. The remaining fuel will be combusted prior to opening the furnace bypass stack.

Conditions under which the Dryer Bypass Stacks will be used are as follows:

- **Malfunction:** The dryer system can abort due to a number of different interlocks such as power failure, equipment failure, or as a result of a furnace abort. If the RTO goes offline as a result of interlock failure the dryer will immediately abort. This can occur for a number of reasons (e.g., temperature out of range, damper failure, power failure, etc.). Dryer abort may also be triggered if a spark is detected.
- **Planned Shutdown:** During planned shutdowns, as the remaining fuel is combusted by the furnace, the operator will reduce the chip input to the dryer. When only a small amount of chips remains, these will be emptied to clean the dryer drum out. The dryer bypass stack will then be opened, and a purge air fan used to ensure no explosive build-up occurs in the drum. Emissions during this time will be minimal as the furnace and dryer are no longer operating.

Use of the Furnace and Dryer Bypass Stacks for start-up, shutdown, and malfunctions will be limited to 100 hours per year for each dryer line (i.e., 50 hours of furnace bypass at full capacity and 50 hours of dryer bypass at full capacity).

Each furnace may also operate up to 500 hours per year in "idle mode" with emissions routed to the Furnace Bypass Stacks. 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.

2.6 Dried Wood Handling (ES-DWH) and Dry Hammermills (ES-HM-1 through ES-HM-8)

Dried materials from the Dryer product recovery cyclones will be conveyed to screening operations that remove smaller wood particles which bypass the Dry Hammermills. Pre-screening is accomplished with one (1) existing and one (1) proposed new prescreener, both of which will be controlled by a new baghouse. Oversized wood is diverted to one of eight (8) existing Dry Hammermills (ES-HM-1 through ES-HM-8) for further size reduction prior to pelletization. Each Dry Hammermill includes a product recovery cyclone (CD-HM-CYC-1 through CD-HM-CYC-8) which are routed to one of three (3) baghouses (CD-HM-BF-1 through CD-HM-BF-3) for particulate matter control. With this application, Enviva proposes to route the exhaust from the existing dry hammermill baghouses to the proposed new scrubber and RCO/RTO (CD-RCO-1) to control PM, VOC and HAP emissions.

Smaller particles passing through the screens will bypass these hammermills and be pneumatically conveyed directly to the Dry Hammermill product recovery cyclones. Enviva estimates that approximately 15% of the total material leaving the Dryer will bypass the Dry Hammermills and be sent directly to the pelletizing operations. Product from the recovery cyclones is transferred to the hammermills system discharge collection enclosed drag chain conveyor and then to the pellet mill feed silo infeed screw via enclosed drag chain conveyors. These transfer points comprise the Dried Wood Handling (ES-DWH) emission source. Due to updated emission estimates, this source will no longer be considered insignificant and therefore Enviva requests the name be changed from IES-DWH to ES-DWH.

Purchased dry shavings are used to produce wood pellets in addition to green chips or logs, forgoing the drying process and thus minimizing onsite VOC and HAP emissions. Currently the plant receives dry shavings at the bark truck dump where they are moved to an open dry shavings pile via front end loader or are received via walking floor trailer at the pile. Dry shavings are added to the dry line hopper which transfers via dry line feed conveyor to the dry hammermill feed conveyor. This system will remain in use for feeding reclaimed materials after startup of the new dry shavings system. As part of this application, Enviva is proposing to add two new Dry Shavings Hammermills (ES-DSHM-1 and ES-DSHM-2), Dry Shavings Silo (IES-DSS) to store dry shavings used in pellet production and install a Dry Shavings Baghouse (CD-DSS-BF) to control PM emissions. The purchased dry shavings will be unloaded from trucks via a new truck dump into a hopper that feeds material via enclosed conveyors to a bucket elevator that ultimately fills a silo. These transfer points will be part of the Dry Shavings emission source ID (IES-DRYSHAVE). From the silo, the dry shavings will then be transferred via an enclosed conveyor to the proposed new Dry Shavings Hammermills (ES-DSHM-1 and ES-DSHM-2) for additional processing. Milled dry shavings will be transferred via pneumatic conveyance to the pellet mill feed silo where the excess conveyance gas will be controlled via the existing feed mill silo baghouse (ES-PMFS). The dry shavings hammermill exhaust will be routed to the new scrubber and RCO/RTO (CD-RCO-1) for control of VOC and HAP emissions.

2.7 Dry Line Feed Conveyor (ES-DLC-1) and Dry Line Hopper (IES-DLH)

The Dry Line Feed Conveyor introduces pre-dried wood material into the manufacturing process at the point of the hammermill pre-screens. This system consists of a single conveyor feeding material to the pre-screener in feed conveyor. Dry material is fed via front end loader into a feed hopper and metered onto the conveyor belt. Emissions from the transfer of the material from this conveyor belt to the pre-screen infeed system are controlled using the existing hammermill baghouse (CD-HM-BF-3). With this application, Enviva proposes to remove the Nuisance Dust System as the emissions will be included in the Dried Wood Handling emission point.

2.8 Pellet Mill Feed Silo (ES-PMFS) and Pellet Cooler HP Fines Relay System (ES-PCHP)

With this application, Enviva proposes to re-name the pellet fines bin (ES-PFB-1) and associated bin vent filter (CD-PFB-BV) to Pellet Cooler HP Fines Relay System (ES-PCHP) and associated baghouse (CD-PCHP-BF).

Milled wood from the Dry Hammermill product recovery cyclones will be transported by a set of conveyors to the Pellet Mill Feed Silo (ES-PMFS) prior to pelletization. Particulate emissions from the Pellet Mill Feed Silo are controlled by a bin vent filter (CD-PMFS-BV).

Fines from the hammermill pollution control system and screening operation is collected in the pellet fines bin which is controlled by a baghouse (CD-PCHP-BF).

2.9 Additive Handling and Storage (IES-ADD)

With this application, Enviva proposes to add an Additive Silo (IES-ADD) and baghouse (CD-ADD-BF). Additive will be used in the pellet production process to increase the durability of the final product. The additive will be added to milled wood from the Pellet Mill Feed Silo discharge screw conveyor prior to transfer to the Pellet Presses. The additive contains no hazardous chemicals or VOCs.

Bulk additive material will be delivered by truck and pneumatically unloaded into a storage silo equipped with a baghouse to control emissions from air displaced during the loading of additive material to the silo. The additive will then be conveyed via screw conveyor from the storage silo to the milled fiber conveyor which transfers milled wood to the Pellet Presses.

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

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

As previously discussed, Enviva is proposing to upgrade the pellet press dies to a new design. Additionally, Enviva proposes to add a new scrubber to collect the Pellet Cooler exhaust prior to routing the exhaust through the existing Dry Hammermills. The combined Pellet Cooler exhaust and Dry Hammermill exhaust will be routed through the proposed new scrubber and RCO/RTO (CD-RCO-1), as detailed in Section 2.6 above, to control VOC and HAP emissions leaving the pellet coolers.

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

Final product will be conveyed to twelve (12) pellet load-out bins (ES-PB-1 through ES-PB-12) that will feed two (2) pellet truck loadout operations (ES-PL-1 and ES-PL-2). Pellet loadout is accomplished by gravity feed of the pellets through a covered chute to reduce emissions. Atmospheric emissions from pellet loadout will be minimal because dried wood fines will have been removed in the pellet screener, and a slight negative pressure will be maintained in the loadout building as a fire prevention measure to prevent any build-up of dust on surfaces within the building. This slight negative pressure is produced via an induced draft fan that exhausts to the Finished Product Handling baghouse (CD-FPH-BF). This baghouse will control

emissions from Finished Product Handling (ES-FPH) and the twelve (12) Pellet Loadout Bins (ES-PB-1 through ES-PB-12).

2.12 Emergency Generator (IES-GN), Fire Water Pump Engine (IES-FWP), and Diesel Storage Tanks (IES-TK-1 through IES-TK-3)

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.

With this application, Enviva proposes to rename the existing tanks from IS-TK-1 and IS-TK-2 to IES-TK-1 and IES-TK-2. Diesel for the emergency generator will be 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 storage tank of up to 500 gallon capacity (IES-TK-2).

With this application, Enviva proposes to add a third diesel storage tank with a capacity of up to 5,000 gallons (IES-TK-3) for distributing diesel fuel to mobile equipment.

2.13 Propane Vaporizer (IES-PVAP)

With this application, Enviva proposes to add a propane vaporizer. A direct-fired propane vaporizer (IES-PVAP) will be located on-site to vaporize propane gas for combustion by the RTO burners, RCO burners, and double duct burners (IES-DDB-1 through IES-DDB-8).[1] The vaporizer will have a maximum heat input capacity of 1 MMBtu/hr and will combust propane. Propane may be used initially until natural gas service is completed when natural gas will be the primary fuel for all burners and propane may be used as a back-up fuel.

[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 are considered insignificant per 15A NCAC 02Q .0503.

3. POTENTIAL EMISSIONS QUANTIFICATION

The following summarizes the data sources and calculation methodologies used in quantifying potential emissions from the Northampton 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. Please refer to the detailed emission calculations provided in Appendix C for GHG emission estimates.

3.1 Green Wood Handling and Storage (IES-GWHS)

Fugitive PM emissions will result from unloading purchased chips and bark from trucks into hoppers and transfer of these materials to storage piles via conveyors. Fugitive PM emissions from chip and bark transfer operations were calculated based on AP-42 Section 13.2.4, *Aggregate Handling and Storage Piles*.[2] Detailed potential emission calculations are included in Appendix C.

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

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

Particulate emission factors used to quantify emissions from storage pile wind erosion for the four (4) Green Wood Storage Piles and three (3) 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 speed exceeds 12 miles per hour (mph) was determined based on the AERMOD-ready meteorological dataset for the Maxton National Weather Service (NWS) Station provided by DAQ[5]. The mean silt content of 8.4% for unpaved roads at lumber mills from AP-42 Section 13.2.2 was conservatively applied in the absence of site-specific data. 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). NCASI emission factors range from 1.6 to 3.6 pounds (lb) VOC as carbon/acre-day; however, emissions were conservatively based on the maximum emission factor. Detailed potential emission calculations are included in Appendix C.

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[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] Data provided via email to Aubrey Jones (Ramboll) by Matthew Porter (NC DAQ) on July 27, 2017.

3.3 Debarker (IES-DEBARK) and Bark Hog (IES-BARK)

PM emissions occur as a result of log debarking and processing. Potential PM emissions from debarking and the bark hog 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 debarking will be minimal due to the high moisture content of green wood (~50%) and the fact that bark is removed in pieces larger than that which can become airborne. A 90% control efficiency was applied for use of water spray. The Bark Hog is also primarily enclosed, and a 90% control efficiency was applied for partial enclosure. VOC and methanol emissions were quantified based on emission factors for log chipping from AP-42 Section 10.6.3, *Medium Density Fiberboard*.[7] Detailed potential emission calculations for the debarker and bark hog are included in Appendix C.

The Debarker (IES-DEBARK) and Bark Hog (IES-BARK) are considered insignificant activities per 15A NCAC 02Q .0503 due to potential uncontrolled PM emissions less than 5 tpy.

3.4 Chipper (IES-EPWC)

The chipping process will result in emissions of VOC and HAP. VOC and HAP emissions were quantified based on emission factors for log chipping from AP-42 Section 10.6.3, *Medium Density Fiberboard* and AP-42 Section 10.6.4, *Hardboard and Fiberboard*. Detailed emission calculations are included in Appendix C.

The chipper is considered an insignificant activity per 15A NCAC 02Q .0503 due to potential uncontrolled emissions less than 1 lb/hr.

3.5 Green Wood Fuel Storage Bin

Bark will be transferred from the fuel storage piles via a walking floor to a covered conveyor and then to the fully enclosed Fuel Storage Bin. Due to complete enclosure of the Fuel Storage Bin, emissions from transfer of material into the bin were not specifically quantified.

3.6 Dryers (ES-DRYER-1 and ES-DRYER-2) and Green Wood Hammermills (ES-GHM-1 through ES-GHM-5)

Exhaust from the dryers will be routed to two dedicated Multicyclone/WESP/RTO control systems (one for each dryer line) for control of PM, VOC, and HAP. The Green Wood Hammermills will share the existing dryer's WESP/RTO control system for control of PM, VOC, and HAP. Uncontrolled PM, PM less than 10 microns in diameter (PM_{10}), PM less than 2.5 microns in diameter ($PM_{2.5}$) emission factors for green wood combustion were provided by the WESP vendor. Carbon monoxide (CO) emissions generated during green wood combustion are based on data from similar Enviva facilities and information from the NCASI database. Oxides of nitrogen (NO_X) emissions are based on stack test results from similar facilities plus a

[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.

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

20% contingency. Potential emissions of sulfur dioxide (SO_2) from green wood combustion were calculated based on the heat input of the dryer burners and an emission factor for wood combustion from AP-42, Section 1.6, *Wood Residue Combustion in Boilers*. VOC emissions were calculated using an emission factor derived from stack testing conducted at Enviva and other similar wood pellet manufacturing facilities. HAP and toxics air pollutant (TAP) emissions from green wood combustion were calculated based on emission factors from several data sources including stack testing data from other similar facilities, engineering judgement/process knowledge, and emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers*[8]. Detailed potential emission calculations are provided in Appendix C.

Emissions from natural gas and propane combustion by the RTO were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*, AP-42 Section 1.5*, Liquefied Petroleum Gas Combustion,* NC DAQ's Wood Waste Combustion Spreadsheet[9], and emission factors from the South Coast Air Quality Management District's (SCAQMD) Air Emissions Reporting (AER) Tool. Detailed emission calculations are included in Appendix C.

3.6.1 Dryer Bypass (Full Capacity)

Bypass stacks following each furnace and rotary drum dryer will be used to exhaust hot gases during start-up (for temperature control), shutdown, and malfunctions. Potential emissions associated with dryer bypass were calculated based on stack testing data from comparable Enviva facilities with the exception of condensable PM and SO_2 emissions which were calculated based on emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers*. Emissions were based on the full capacity of the furnaces and 50 hours per year per dryer. Detailed potential emission calculations are included in Appendix C.

3.6.2 Furnace Bypass (Full Capacity)

Potential emissions of CO, NO_X, SO_2, PM, VOC, and HAP for furnace bypass conditions were calculated based on emission factors from AP-42 Section 1.6, *Wood Residue Combustion in Boilers*. Filterable PM emissions were calculated based on stack testing data from a comparable Enviva plant. Emissions were based on the full capacity of the furnaces and 50 hours per year per furnace. Detailed potential emission calculations are included in Appendix C.

3.6.3 Furnace Bypass (Idle Mode)

Each 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 5 MMBtu/hr. During this time, emissions will exhaust out of the furnace bypass stacks. 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*. Detailed potential emission calculations are included in Appendix C.

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

[9] 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.

3.6.4 Double Duct Burners (IES-DDB-1 through IES-DDB-8) and Propane Vaporizer (IES-PVAP)

Emissions from natural gas and propane combustion by the double duct burners (IES-DDB-1 through IES-DDB-8) and propane vaporizer (IES-PVAP) were calculated based on AP-42 Section 1.4, *Natural Gas Combustion*, AP-42 Section 1.5*, Liquefied Petroleum Gas Combustion,* NC DAQ's Wood Waste Combustion Spreadsheet, and emission factors from the South Coast Air Quality Management District's (SCAQMD) Air Emissions Reporting (AER) Tool. Detailed emission calculations are included in Appendix C.

Per 15A NCAC 02Q .0503, the double duct burners (IES-DDB-1 through IES-DDB-8) and propane vaporizer (IES-PVAP) are considered insignificant activities because potential uncontrolled emissions are less than 5 tpy.

3.7 Dried Wood Handling (ES-DWH)

As previously described in Section 2, Dried Wood Handling (ES-DWH) will include conveyor transfer points located between the Dryer and Dry Hammermills and the Dry Hammermills and Pellet Mills. Emissions from these transfers will be routed through a baghouse (CD-DWH-BF). Particulate emissions from the baghouse were calculated based on the exhaust flow rate and exit grain loading. Detailed potential emission calculations are provided in Appendix C.

3.8 Dry Shavings Handling (IES-DRYSHAVE), Dry Line Feed Conveyor (ES-DLC-1) and Dry Line Hopper (IES-DLH)

Particulate emissions will occur during unloading of dry shavings walking floor trucks to the dry shavings pile (IES-DRYSHAVE). Potential emissions were calculated based on AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles*.[10] A front end loader fills the Dry Line Hopper (IES-DLH) which feeds the dry line feed conveyor (ES-DLC-1) will introduce pre-dried wood into the process prior to the hammermills and is controlled by one baghouse (CD-HM-BF-3). PM emissions from the baghouse were calculated using the exhaust flow rate and exit grain loading. The exhaust of CD-HM-BF-3 will be routed to the proposed new scrubber and RCO/RTO. Detailed potential emissions calculations are provided in Appendix C.

Emissions from the dry line hopper were calculated using equation 1 in AP-42 Section 13.2.4. Wind speed reduction to 2 mph was added as a control due to the transfer being enclosed. Per 15A NCAC 02Q .0503, the dry line hopper will be re-classified as an insignificant activity due to emissions below 5 tpy. Detailed potential emissions calculations can be found in Appendix C.

3.9 Dry Shavings Handling and Silo (IES-DRYSHAVE-1 and IES-DSS)

Particulate emissions will occur during unloading of dry shavings from the new dry shavings truck dump. Potential emissions were calculated based on AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles*.[10] Dry shavings will be transferred into the new dry shavings silo via an enclosed conveyor and bucket elevator. Because the actual transfer will be enclosed within the silo, wind speed was reduced to 2 mph as a control for this material transfer point.

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

Particulate emissions from the baghouse on the dry shavings silo were calculated based on the exhaust flow rate and exit grain loading. Detailed potential emission calculations are provided in Appendix C.

Per 15A NCAC 02Q .0503, Dry Shavings Handling (IES-DRYSHAVE) and the Dry Shavings Silo (IES-DSS) are considered insignificant activities because potential uncontrolled PM emissions are less than 5 tpy.

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

The Dry Hammermills generate PM, VOC, and HAP emissions during the process of reducing wood chips to the required size. PM emissions from the existing Dry Hammermill cyclones are controlled using baghouses (CD-HM-BF-1 through CD-HM-BF-3). PM emissions from the proposed new Dry Shavings Hammermills (ES-DSHM-1 and ES-DSHM-2) will be controlled using existing baghouses (CD-HM-BF-1 through CD-HM-BF-3). Particulate emissions from each baghouse were calculated using a manufacturer guaranteed exit grain loading rate and the maximum nominal exhaust flow rate of the baghouse. Appendix C summarizes the potential PM emissions from each Dry Hammermill baghouse.

The Dry Hammermill and Dry Shavings Hammermill exhaust will be routed to the proposed new scrubber and RCO/RTO for HAP and VOC control. Detailed calculations are provided in Appendix C for the dry hammermills and dry shavings hammermill.

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

As previously described in Section 2, an induced draft fan will be used to transfer dust generated from a number of enclosed transfer/handling sources around the Dry Hammermill Area to the Pellet Cooler HP Fines Relay System, controlled by a baghouse (CD-PCHP-BF). PM emissions from this baghouse, which will control emissions from ES-PCHP, were calculated based on a manufacturer guaranteed exit grain loading rate and the maximum nominal exhaust flow rate of the baghouse. Potential emission calculations are provided in Appendix C.

3.12 Pellet Mill Feed Silo (ES-PMFS)

The Pellet Mill Feed Silo is equipped with a bin vent filter (CD-PMFS-BV) to control PM emissions associated with silo loading and unloading operations. PM emissions are calculated based on a manufacturer guaranteed exit grain loading rate and the maximum nominal exhaust flow rate of the baghouse. Potential emission calculations are provided in Appendix C.

3.13 Additive Handling and Storage (IES-ADD)

An additive will be used in the pellet production process to increase the durability of the final product. Material will be pneumatically conveyed from the delivery trucks to the storage silo equipped with a baghouse (CD-ADD-BF). PM emissions from the baghouse were calculated based on an exit grain loading rate and the maximum nominal exhaust flow rate of the baghouse. Detailed potential emissions calculations are provided in Appendix C.

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

Pellet Press and Pellet Cooler operations will generate PM, HAP, and VOC emissions during the forming and cooling of wood pellets. The Pellet Mills and Coolers are equipped with six (6) simple cyclones (CD-CLR-1 through CD-CLR-6) followed by a wet scrubber for PM control prior to exhausting through the Dry Hammermills and then through the proposed scrubber and RCO/RTO (CD-RCO-1), following the Dry Hammermill baghouses, for VOC and HAP control. PM emissions from the Pellet Press System (Pellet Mills) and Pellet Coolers were calculated based on a maximum exit grain loading rate and the maximum nominal exhaust flow rate for the proposed scrubber. Enviva also proposes to install a bypass allowing the Pellet Mill and Cooler exhaust to route directly to the proposed new scrubber and RCO/RTO to allow the Pellet Mills to continue to operate when the Dry Hammermills are shut down. Refer to Appendix C for detailed potential PM emissions calculations.

Uncontrolled VOC and HAP emissions at the outlet of the Pellet Cooler wet scrubber were quantified based on stack testing data from comparable Enviva plants and/or engineering judgement/process knowledge, including any appropriate contingency. This includes emissions from both the Pellet Mills and the Pellet Coolers. Controlled emissions were conservatively based on a 95% control efficiency for the RCO/RTO based on vendor data. Detailed calculations are provided in Appendix C.

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

PM emissions result from the transfer of finished product to the Pellet Loadout Bins. PM emissions from transfers associated with Finished Product Handling, Pellet Mill Loadout, and the Pellet Loadout Bins will be controlled by a baghouse (CD-FPH-BF). Potential PM emissions from the baghouse were calculated based on a maximum exit grain loading rate and the maximum nominal exhaust flow rate of the baghouse. Detailed potential emissions calculations are provided in Appendix C.

3.16 Emergency Generator (IES-GN) 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, VOC, and CO emissions from operation of the Emergency Generator and Fire Water Pump Engine were calculated based on emission factors from NSPS Subpart IIII (or 40 CFR 89 where applicable) and the maximum horsepower rating of the engines. Potential SO_2 emissions were calculated based on the fuel sulfur restriction in NSPS Subpart IIII, and by assuming that all the sulfur present in the diesel fuel becomes SO_2 air emissions.[11] Potential VOC and HAP emissions were quantified based on emission factors from AP-42 Section 3.3, *Stationary Internal Combustion Engines*.[12] Annual potential emissions were conservatively calculated based on 500 hours per year.

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

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

The Emergency Generator and Fire Water Pump Engine are considered insignificant activities pursuant to 15A NCAC 02Q .0503. Refer to Appendix C for detailed potential emission calculations.

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

The storage of diesel in on-site storage tanks will generate emissions of VOC. VOC emissions from the three (3) Diesel Storage Tanks were calculated using EPA's TANKS 4.0 software based on actual tank characteristics (e.g., orientation, dimensions, etc.) and potential annual throughput. VOC emissions from the storage tanks are below 5 tpy and thus, per 15A NCAC 02Q .0503 they are listed as insignificant sources in the permit. Refer to Appendix C for detailed potential emission calculations.

3.18 Paved Roads

Fugitive PM emissions will occur as a result of trucks and employee vehicles traveling on paved roads on the Northampton plant property. Emission factors were calculated based on Equation 2 from AP-42 Section 13.2.1, *Paved Roads*[13] using the mean silt loading for quarries (8.2 g/m^2) 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. Refer to Appendix C for detailed potential emissions calculations.

3.19 Unpaved Roads

Fugitive PM emissions will occur as a result of trucks and employee vehicles traveling on unpaved roads on the Northampton plant property. Emission factors were calculated based on Equation 1a from AP-42 Section 13.2.2, *Unpaved Roads*[14] 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. Refer to Appendix C for detailed potential emissions calculations.

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

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

4. STATE AND FEDERAL PERMITTING APPLICABILITY

The Enviva Northampton plant is potentially subject to numerous 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 Northampton 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 an existing stationary source located in an area where concentrations of a "criteria pollutant"[15] exceed the National Ambient Air Quality Standard (NAAQS) for that pollutant. PSD permitting requirements apply to stationary sources located in an area where concentrations of criteria pollutants do not exceed a NAAQS.

The Northampton plant is in Northampton County which is classified as attainment or unclassifiable for all criteria pollutants.[16] The Northampton plant is currently permitted as a PSD major source because facility-wide potential emissions of one or more criteria pollutants have previously been estimated to exceed the major source threshold of 250 tpy. Enviva is submitting this permit application to authorize construction to meet new customer softwood percentage and production rate demands and to incorporate significant emission reduction efforts to minimize emissions impacts associated with the project. Because of these changes, the Northampton plant's potential emissions for all criteria pollutants will be less than the PSD major source thresholds of 250 tpy and, thus, the facility will be classified as a PSD minor source. A comparison of the currently permitted PTE to the proposed PTE after incorporating the changes proposed in this application is provided in Table 4.1.

[15] 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.

[16] 40 CFR 81.334

Table 4-1. Change in Potential to Emit

Emissions Scenario	CO (tpy)	NO_X (tpy)	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	VOC (tpy)	CO_2e (tpy)	Total HAPs (tpy)
Proposed PTE[1]	176.73	143.37	209.57	139.73	84.56	37.01	135.07	369,261.02	20.88
Previous PTE	61.88	126.57	128.84	121.79	93.79	19.20	456.40	162,292.20	37.82
Change in PTE	**+114.85**	**+16.8**	**+80.73**	**+17.94**	**-9.23**	**+17.81**	**-321.33**	**+206,968.82**	**-16.94**

1. Proposed PTE (excluding fugitive emission sources) from Appendix C, Tables 2 and 3.

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 Northampton 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. Currently, the plant is considered a major source of HAP due to total HAP emissions exceeding the major source thresholds of 25 tpy. However, the emission reductions proposed as part of this modification will result in a net decrease in HAP emissions. After the project is completed, the Northampton plant will be a minor source of HAP.

4.2 North Carolina Permitting Program

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

5. REGULATORY APPLICABILITY

The Northampton plant will be 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 and Fire Water Pump Engine are 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 Propane Vaporizer and double duct burners each have a maximum heat input of 1 MMBtu/hr and are not steam generating units; therefore, NSPS Subpart Dc does not apply.

5.1.3 40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

NSPS Subpart IIII applies to owners or operators of compression ignition (CI) internal combustion engines (ICE) manufactured after April 1, 2006 that are not fire pump engines, and fire pump engines manufactured after July 1, 2006. The 350 bhp Emergency Generator and 300 bhp Fire Water Pump Engine at the Northampton plant will be subject to NSPS Subpart IIII.

5.2 National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP) regulate HAP emissions and are applicable to certain major and area sources of HAP. NESHAP can be found in 40 CFR Part 63 and have been incorporated by reference in 15A NCAC 02D .1111. As previously discussed, the Northampton plant will be a minor source of HAP due to facility-wide total HAP emissions being below 25 tpy and maximum individual HAP emissions below 10 tpy. Please refer to 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 Northampton plant has sources subject to Subpart ZZZZ of this part and thus, Subpart A is also applicable 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 Northampton plant will not be subject to 112(g) since they will be a minor source of HAP.

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 that will be manufactured at the Northampton plant will 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 will not be bound together with resin or other chemical agent. Further, the Northampton facility will not be a major source of HAPs following the changes proposed. As such, this regulation is not applicable.

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

Subpart ZZZZ applies to reciprocating internal combustion engines (RICE) located at 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 Northampton plant's Emergency Generator and emergency Fire Water Pump Engine will both be classified as emergency RICE under Subpart ZZZZ. Further, the engines will both be classified as new sources, as they will be constructed after June 12, 2006.

New or reconstructed CI engines with ratings less than or equal to 500 bhp located at an area source of HAP, including the plant's 350 bhp Emergency Generator and 300 bhp Fire Water Pump Engine, are 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.

5.2.5 40 CFR 63 Subpart DDDDD – NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters

Subpart DDDDD, also referred to as the Boiler MACT, provides emission standards for boilers and process heaters located at major sources of HAP emissions. The rule defines a process heater in §63.7575 as an enclosed device using a controlled flame, and the unit's primary purpose is to transfer heat indirectly to a process material (liquid, gas, or solid) or to a heat transfer material (e.g., glycol or a mixture of glycol and water) for use in a process unit, instead of generating steam. The Northampton plant's dryers will each be heated by a wood-fired furnace burner system; however, the furnace burner systems will provide direct heating of the wood chips, not indirect. As such, Subpart DDDDD does not apply to the wood-fired furnace burner systems.

As previously discussed, a Propane Vaporizer will be used to convert liquid propane to a gas for combustion by the RTO burners, RCO burners, and burners for the dryer double ducts. The vaporizer will be used to heat liquid propane which is a fuel and not a process material or heat transfer material. As such, the Propane Vaporizer is not a process heater and Subpart DDDDD does not apply.

Burners will be used to heat the dryer double ducts; however, these burners will provide direct heating of the ducts. As such, Subpart DDDDD does not apply.

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 thresholds. A CAM plan is required to be submitted with the initial Title V operating permit application for emission units whose post-controlled emissions exceed the major source thresholds (i.e., large pollutant-specific emission units [PSEU]).[17] 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.[18]

The Dryers (ES-DRYER-1 and ES-DRYER-2) and five (5) Green Wood Hammermills (ES-GHM-1 through ES-GHM-5) are each subject to a PM emission limit under 15A NCAC 02D .0515 and will utilize a WESP (CD-WESP-1 and CD-WESP-2) to meet this limit. However, combined, the Dryers and Green Wood Hammermills post-controlled PM emissions are below the major source threshold. The exhaust from both the Dryers and Green Wood Hammermills will be controlled by RTOs (CD-RTO-1 and CD-RTO-2) following the WESP; however, the RTO will not be installed to meet a specific emission limit but rather to reduce the plant's potential VOC emissions below the PSD major source threshold. There is no other applicable VOC limit for the Dryers or Green Wood Hammermills. As such, a CAM plan is not required for VOC. A CAM

[17] §64.5(a)

[18] §64.5(b)

plan for PM is required to be submitted for the Dryers and Green Wood Hammermills with the initial Title V permit renewal application.

The Pellet Coolers (ES-CLR-1 through ES-CLR-6) are also subject to a PM emission limit under 15A NCAC 02D .0515 and will utilize six (6) individual high efficiency cyclones to meet this limit. Post-controlled PM emissions will be below the major source threshold. A scrubber and RCO/RTO (CD-RCO-1) will be installed to control VOC from the Pellet Mills and Pellet Coolers; however, the RCO/RTO will not be installed to meet a specific emission limit but rather to reduce the plant's potential VOC emissions below the PSD major source threshold. There is no other applicable VOC limit for the Pellet Coolers. As such, a CAM plan is not required for VOC. A CAM plan for PM will be submitted for the Pellet Press System and Pellet Coolers (ES-CLR-1 through ES-CLR-6) with the initial Title V permit renewal application.

All other emission units at the Northampton plant have pre-controlled emissions below the major source threshold and/or do not use a control device as defined in §64.1. For those with control devices, the post-controlled emissions are below the major source threshold and thus, if CAM is applicable, it will not need to be addressed until the first Title V permit renewal application.

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. Propane, which is a regulated substance under Subpart F of this rule, will be stored at the Northampton facility to be used as a fuel for the RTO burners, RCO burners, and dryer system double duct burners. Per §68.126, substances used as a fuel or held for sale as a fuel at a retail facility are excluded from all provisions; therefore, an RMP is not required for the Northampton facility.

5.5 North Carolina Administrative Code

The Northampton plant sources will be subject to regulations contained within 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 <u>indirect</u> 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 Dryers will each be heated by a wood-fired furnace burner system; however, the furnace burner systems provide <u>direct</u> 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 emission sources subject to permitting are regulated under 15A NCAC 02D .0515. This regulation limits particulate emissions based on process throughput using the

equation $E = 4.10 \times P^{0.67}$, for process rates (P) less than 30 tons per hour (tph), and $E=55 \times P^{0.11}-40$ for process rates greater than or equal to 30 tph. All emissions from PM sources at the Northampton plant will either be negligible or controlled by cyclones, baghouses, a scrubber, 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 Northampton Emission Points

Emission Point ID	Source Description	Control Device	Process Weight Input Rate (tph)	Allowable Emission Rate (lb/hr)
ES-DRYER-1	One (1) 153 MMBtu/hr Wood-fired Direct	CD-DC-1; CD-WESP-1; CD-RTO-1	136	54.4
ES-DRYER-2	One (1) 180 MMBtu/hr Wood-fired Direct	CD-DC-2; CD-WESP-2; CD-RTO-2	136	54.4
ES-DWH	Dried Wood Handling	CD-DWH-BF	175	57.1
IES-GWHS	Green Wood Handling and Storage	N/A	400	66.3
IES-DLH	Dry Line Hopper	N/A	171	56.8
IES-DRYSHAVE and IES-DRYSHAVE-1	Dry Shavings Handling and Storage	N/A	142	54.8
IES-DSS	Dry Shaving Silo	CD-DSS-BF	48	44.2
ES-DSHM-1 and ES-DSHM-2	Dry Shavings Hammermills	CD-DSHM-BF; CD-WS-1; CD-RCO-1	25	35.8
IES-EPWC	Electric Powered Green Wood Chipper	N/A	239	60.4
ES-GHM-1 through ES-GHM-5	Green Hammermills 1 through 5	CD-DC-1; CD-WESP-1; CD-RTO-1	299	63.0
IES-BARK	Bark Hog	N/A	63	46.8
IES-DEBARK	Debarker	N/A	210	59.0
ES-HM-1 through ES-HM-8	Dry Hammermills 1 through 8	CD-HM-CYC-1 through	152	55.6

		CD-HM-CYC-8; CD-HM-BF-1 through CD-HM-BF-3; CD-WS-1; CD-RCO-1		
ES-PS-1 and ES-PS-2	Dry Hammermill Prescreeners 1 and 2	CD-PS-BF	175	57.1
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BV	152	55.6
ES-CLR-1 through ES-CLR-6	Pellet Press and Coolers 1 through 6	CD-CLR-1 through CD-CLR-6; CD-WS-1; CD-RCO-1	152	55.6
ES-PCHP	Pellet Cooler HP Fines Relay System	CD-PCHP-BF	10	19.0
IES-ADD	Additive Handling and Storage	CD-ADD-BF	20	30.5
ES-FPH; ES-PB-1 through ES-PB-12; ES-PL-1 and ES-PL-2	Finished Product Handling; Twelve pellet loadout bins; Pellet mill load-out 1 and 2	CD-FPH-BV	152	55.6

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) will use ultra-low sulfur diesel, the Dryer furnace burner systems will combust bark and wood chips, and the RTOs and RCO will utilize natural gas or propane, 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 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. Based on the relatively low emissions from fugitive dust sources, Enviva does not believe a fugitive dust control plan is necessary.

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 the modification results in a net increase in emissions or ambient concentration as determined in 15A NCAC 02D .1106 and 15A NCAC 02Q .0709 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 if such emissions exceed the levels set forth in 15A NCAC 02Q .0711. Air Toxics Modeling was performed for this facility 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 and methodologies used in completing the TAP air quality analysis for the Northampton plant.

6.1 State Requirements

Dispersion modeling was conducted for each TAP with post-project facility-wide potential emissions in excess of its 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;[19] and
- EPA's *AERMOD Implementation Guide* (Revised April 17, 2018).

6.2 Acceptable Ambient Levels

Enviva conducted air dispersion modeling for 13 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. 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 for the most recent year of meteorological data available (2017) and maximum concentrations were compared to the AALs.

[19] 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			0.09			11.0	No
Acetaldehyde	24.1			6.8			**Yes**
Acrolein	16.1			0.020			**Yes**
Ammonia	0.26			0.68			No
Arsenic			5.7			0.053	**Yes**
Benzene			884			8.1	**Yes**
Benzo(a)pyrene			0.34			2.2	No
Beryllium			0.28			0.28	**Yes**
Cadmium			1.89			0.37	**Yes**
Carbon Tetrachloride			5.0			460	No
Chlorine	0.26	6.3		0.23	0.79		**Yes**
Chlorobenzene		0.2637			46		No
Chloroform			2.0			290	No
Chromic acid (Chromium VI)		0.0048			0.013		No
Di(2-ethylhexyl)phthalate (DEHP)		3.76×10^{-4}			0.63		No
Ethylene dichloride (1,2-dichloroethane)			3.2			260	No
Formaldehyde	20.7			0.040			**Yes**
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8			1.31×10^{-6}			5.10×10^{-3}	No
n-Hexane	0.148			23			No
Hydrogen chloride (hydrochloric acid)	6.33			0.18			**Yes**
Manganese & Compounds		12.79			0.63		**Yes**
Mercury, vapor		0.03			0.013		**Yes**
Methyl chloroform (1,1,1 trichloroethane)	1.03×10^{-2}	0.248		64.0	250		No
Methyl ethyl ketone	4.50×10^{-5}	0.001		22.4	78.0		No
Xylene	1.50×10^{-3}	0.036		16.4	57.0		No
Methylene chloride	1.39×10^{-3}		21.1	0.39		1,600	No
Nickel		0.268			0.13		**Yes**
Pentachlorophenol	1.70×10^{-5}	4.08×10^{-4}		0.0064	0.063		No
Perchloroethylene (tetrachloroethylene)			4.2			13,000	No
Phenol	8.4			0.24			**Yes**
Polychlorinated biphenyls			9.07×10^{-4}			5.6	No
Styrene	0.016			2.7			No
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-			9.57×10^{-7}			2.00×10^{-4}	No
Toluene	0.002	0.06		14.4	98.0		No
Trichloroethylene			3.3			4,000	No
Trichlorofluoromethane (CFC 111)	3.41×10^{-4}			140			No
Vinyl chloride			2.0			26.0	No

6.3 Model Selection

Enviva utilized the latest version of the AERMOD model (Version 18081). AERMOD is the EPA-approved air dispersion model for near-field (within 50 km) modeling analyses. AERMOD was run using default regulatory options.

6.4 Receptor Grid and Elevation Data

A resolution of 25 meters was used for receptors along the ambient boundary and a nested Cartesian grid extending approximately 10 km from the center of the plant was modeled using the following resolutions:

- 100-meter resolution extending approximately 500 m from the property boundary; and
- 500-meter resolution between approximately 500 m and approximately 10 km from the property boundary.

Modeled concentrations were reviewed to ensure that the maximum concentration was captured with 100 m resolution.

Receptor elevations, in addition to source and building elevations, were determined using the AERMAP terrain pre-processor. Hill height parameters required by AERMOD are also calculated by AERMAP. Elevations were based on 1/3 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 E.

6.5 Meteorological Data

Enviva utilized AERMOD-ready meteorological data processed by NC DAQ for the Rocky Mount National Weather Service (NWS) surface station (ID: 93759) and upper air data from the Newport NWS Station (ID: 93768) for the period 2012-2016.[20] The meteorological data were processed by NC DAQ using version 18081 of AERMET. The base elevation for the Rocky Mount surface station was set to 48.8 m.[21] The meteorological data files are provided in Appendix E for reference.

6.6 Modeled Sources and Release Parameters

As previously described in Section 2, there are several different operating scenarios for the Northampton plant dryers and furnaces. Normal operation was modeled to assess compliance with the AALs as it results in the maximum annual potential emissions. Use of the dryer and furnace bypass stacks occurs intermittently, and the frequency and duration are minimized to the extent possible, as previously described in Section 2.5.

Table 6-2 presents a summary of the modeled sources and associated release parameters. The emergency generator and fire water pump are subject to 40 CFR 63 Subpart ZZZZ and

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

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

are therefore exempt from toxics permitting requirements per 15A NCAC 02Q .0702(a)(27)(B). These sources were excluded from 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 F.

6.6.1 Point Sources

Each modeled source has a defined stack and was thus represented as a point source. The duct burner stacks will have rain caps and were modeled using the POINTCAP option in accordance with the *AERMOD Implementation Guide*.[22] Modeled stack parameters are summarized in Table 6-2 below.

Table 6-2. Summary of Modeled Source Parameters

Model ID	Source Type	UTM Easting[1] (m)	UTM Northing[1] (m)	Stack Height (m)	Exhaust Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
RTO1	POINT	266,018.70	4,042,780.20	28.66	352.59	7.58	3.05
RTO2	POINT	266,023.34	4,042,695.01	28.61	388.71	23.88	1.63
RCO	POINT	266,025.18	4,042,863.93	27.43	362.04	15.15	2.34
DWH	POINT	266,054.30	4,042,862.43	18.31	Ambient	5.63	0.40
PVAP	POINT	266,036.30	4,042,727.09	3.05	449.82	18.11	0.15
DB1	POINTCAP	266,032.87	4,042,801.89	3.05	449.82	18.11	0.15
DB2	POINTCAP	266,044.72	4,042,829.62	3.05	449.82	18.11	0.15
DB3	POINTCAP	266,016.15	4,042,742.63	3.05	449.82	18.11	0.15
DB4	POINTCAP	266,026.31	4,042,746.65	3.05	449.82	18.11	0.15
DB5	POINTCAP	266,070.76	4,042,919.37	3.05	449.82	18.11	0.15
DB6	POINTCAP	266,071.60	4,042,864.76	3.05	449.82	18.11	0.15
DB7	POINTCAP	266,031.39	4,042,855.66	3.05	449.82	18.11	0.15
DB8	POINTCAP	266,004.72	4,042,858.41	3.05	449.82	18.11	0.15

1. Coordinates reflect NAD83, UTM Zone 18.

6.7 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

[22] EPA. *AERMOD Implementation Guide*. Revised April 17, 2018.

heights for all sources at the Northampton plant are less than 65 meters and were thus modeled using actual stack heights.

6.8 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 Northampton plant were evaluated for downwash effects on each modeled point source. BPIP input and output files are included in Appendix E.

6.9 Modeling Results

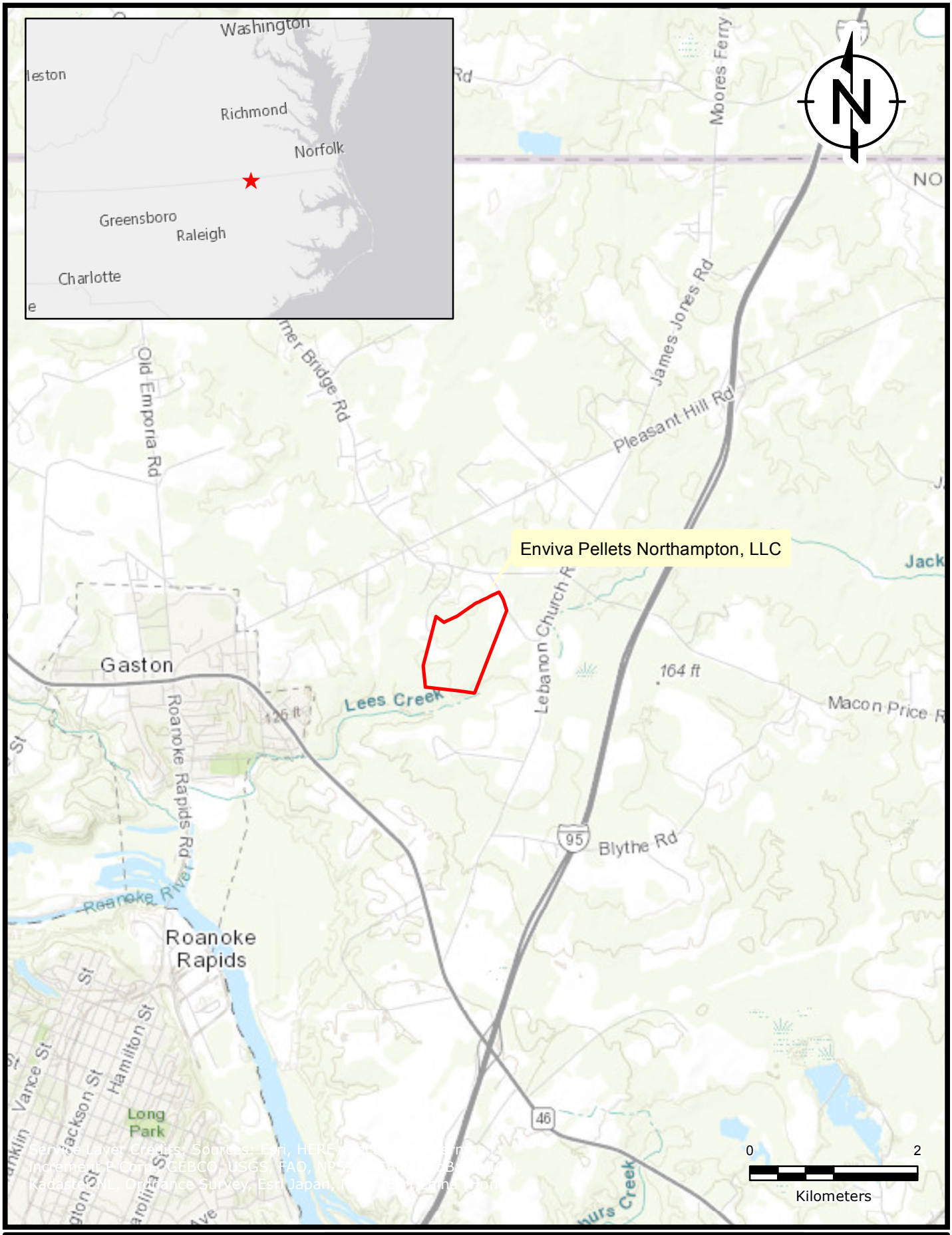
As shown in Table 6-3 below, modeled concentrations for each of the 13 TAPs are less than 50% of the AAL based on 2017 meteorological data. As such, the Northampton plant will not cause an exceedance of the AAL for any TAP and no further modeling is required. AERMOD input and output files are provided in Appendix E.

Table 6-3. Comparison of Maximum Modeled Concentrations from 2017 to the AALs

Pollutant	Averaging Period	UTM Easting[1] (m)	UTM Northing[1] (m)	Modeled Concentration (µg/m³)	AAL (µg/m³)	Percent of AAL (%)
Acetaldehyde	1-hour	266167.00	4042616.00	0.60	27,000	0.002%
Acrolein	1-hour	265,879.90	4,043,255.60	0.49	80	0.62%
Arsenic	Annual	266,220.00	4,043,046.20	2.00E-05	2.10E-03	0.95%
Benzene	Annual	266,102.70	4,042,770.10	0.030	0.12	21.6%
Beryllium[2]	Annual	266,220.00	4,043,046.20	1.03E-06	4.10E-03	0.025%
Cadmium Metal	Annual	266,102.70	4,042,770.10	3.00E-05	5.50E-03	0.55%
Chlorine	1-hour	266,267.00	4,042,516.00	0.23	900	0.025%
	24-hour	265,865.30	4,042,508.50	0.09	37.5	0.23%
Formaldehyde	1-hour	266,092.90	4,042,747.00	13.8	150	9.22%
Hydrochloric acid	1-hour	266,267.00	4,042,516.00	0.55	700	0.078%
Manganese	24-hour	265,865.30	4,042,508.50	0.012	31	0.040%
Mercury	24-hour	265,865.30	4,042,508.50	5.00E-05	0.6	0.008%
Nickel	24-hour	265,865.30	4,042,508.50	4.40E-04	6	0.007%
Phenol	1-hour	265,879.90	4,043,255.60	0.25	950	0.026%

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

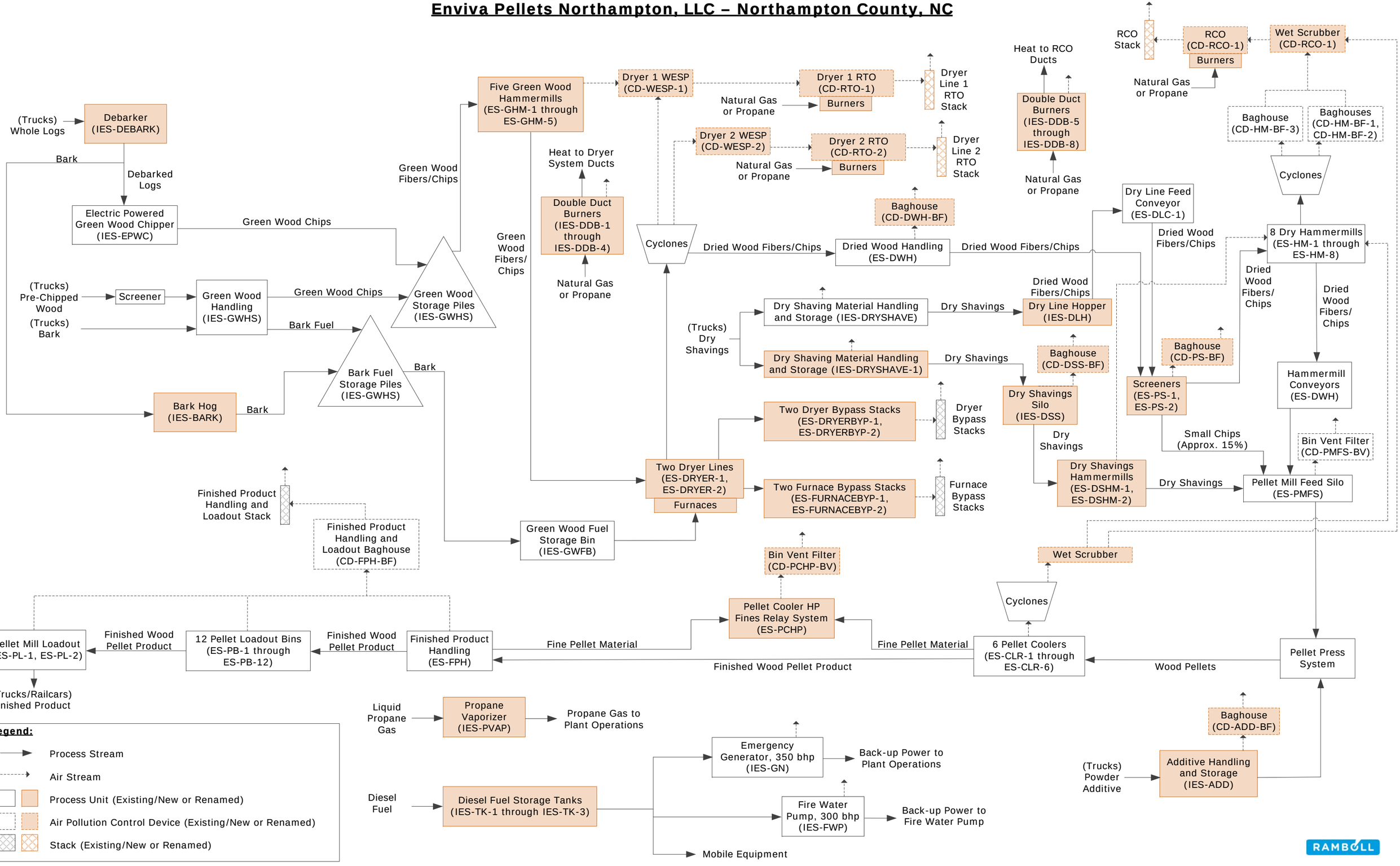
Site Location Map
Enviva Pellets Northampton, LLC
Garysburg, Northampton County, North Carolina

FIGURE
1

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

APPENDIX B
PROCESS FLOW DIAGRAM

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



APPENDIX C
POTENTIAL EMISSIONS CALCULATIONS

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

Emission Unit ID	Source Description	Control Device ID	Control Device Description	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	Total VOC (tpy)	CO_{2e} (tpy)
ES-GHM-1 through ES-GHM-5	Green Hammermills 1 through 5	CD-DC-1; CD-WESP-1; CD-RTO-1	Multiclone; WESP; RTO	78.32	62.78	33.29	33.29	33.29	16.75	16.04	160,424.01
ES-DRYER-1	Dryer #1										
ES-DRYERBYP-1	Dryer #1 Bypass	--	--	0.54	0.66	1.33	1.33	1.33	0.10	0.35	801.54
ES- FURNACEBYP-1	Furnace #1 Bypass	--	--	3.05	1.12	2.93	2.85	2.77	0.13	0.09	1,063.48
IES-DDB-1 and -2	Dryer #1 Double Duct Burners	--	--	0.72	0.62	0.07	0.07	0.07	0.01	0.10	1,219.07
ES-DRYER-2	Dryer #2	CD-DC-2; CD-WESP-2; CD-RTO-2	Multiclone; WESP; RTO	78.13	62.55	33.29	33.29	33.29	19.71	12.89	184,716.95
ES-DRYERBYP-2	Dryer #2 Bypass	--	--	0.54	0.66	1.56	1.56	1.56	0.11	0.35	942.99
ES- FURNACEBYP-2	Furnace #2 Bypass	--	--	3.45	1.27	3.32	3.24	3.16	0.13	0.10	1,204.93
IES-DDB-3 and -4	Dryer #2 Double Duct Burners	--	--	0.72	0.62	0.07	0.07	0.07	0.01	0.10	1,219.07
IES-PVAP	Propane Vaporizer	--	--	0.36	0.62	0.03	0.03	0.03	0.003	0.05	609.53
ES-CLR-1 through ES-CLR-6	Pellet Coolers 1 through 6	CD-CLR-1 through CD-CLR-6; CD-HM-CYC-1 through CD-HM-CYC-8; CD-HM-BF-1 through CD-HM-BF-3; CD-WS-1 and -2; CD-DSHM-BF; CD-RCO-1	Simple Cyclones; High Efficiency Cyclones; Baghouses; Wet Scrubbers; RCO	8.54	10.17	62.45	33.99	2.29	0.05	45.26	14,435.21
ES-HM-1 through ES-HM-8; ES-DLC-1	Dry Hammermills 1 through 8; Dry Line Feed Conveyor										
ES-DSHM-1 and ES-DSHM-2	Dry Shavings Hammermills 1 and 2										
IES-DDB-5 through -8	RCO Double Duct Burners	--	--	1.44	1.24	0.13	0.13	0.13	0.01	0.19	2,438.13
ES-DWH	Dried Wood Handling	CD-DWH-BF	Baghouse	--	--	0.23	0.23	0.23	--	48.53	--
ES-PS-1 and -2	Dry Hammermill Prescreeners 1 and 2	CD-PS-BF	Baghouse	--	--	2.57	2.57	2.57	--	--	--
ES-PCHP	Pellet Cooler HP Fines Relay System	CD-PCHP-BF	Baghouse	--	--	0.54	0.54	0.54	--	--	--
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BV	Bin Vent Filter	--	--	0.38	0.38	0.38	--	--	--
ES-FPH; ES-PB-1 through ES-PB-12; ES-PL-1 and ES-PL-2	Finished Product Handling; Twelve pellet loadout bins; Pellet mill load-out 1 and 2	CD-FPH-BV	Baghouse	--	--	5.33	4.85	0.09	--	--	--
IES-ADD	Additive Handling and Storage	CD-ADD-BF	Baghouse	--	--	3.31E-03	3.31E-03	3.31E-03	--	--	--
IES-DLH	Dry Line Hopper	--	--	--	--	0.02	0.01	0.001	--	--	--
IES-DRYSHAVE and IES-DRYSHAVE-1	Dry Shaving Material Handling and Storage	--	--	--	--	0.57	0.28	0.042	--	0.19	--
IES-DSS	Dry Shaving Silo	CD-DSS-BF	Baghouse	--	--	0.54	0.54	0.54	--	--	--
IES-GWHS	Green Wood Handling and Storage	--	--	--	--	16.32	8.35	1.22	--	8.30	--
IES-EPWC	Electric Powered Green Wood Chipper	--	--	--	--	--	--	--	--	1.95	--
IES-BARK	Bark Hog	--	--	--	--	0.47	0.26	--	--	0.59	--
IES-DEBARK	Debarker	--	--	--	--	0.78	0.43	--	--	--	--
IES-GWFB[1]	Green Wood Fuel Bin	--	--	--	--	--	--	--	--	--	--
IES-GN	Emergency Generator	--	--	0.50	0.58	0.03	0.03	0.03	0.001	0.002	100.21
IES-FWP	Fire Water Pump	--	--	0.43	0.49	0.02	0.02	0.02	0.001	0.001	85.90
IES-TK-1	Diesel Storage Tank for Emergency Generator	--	--	--	--	--	--	--	--	5.75E-04	--
IES-TK-2	Diesel Storage Tank for Fire Water Pump	--	--	--	--	--	--	--	--	1.60E-04	--
IES-TK-3	Mobile Fuel Diesel Storage Tank	--	--	--	--	--	--	--	--	3.33E-03	--
--	Haul Road Emissions	--	--	--	--	43.31	11.41	0.923	--	--	--
			Total Emissions:	**176.73**	**143.37**	**209.57**	**139.73**	**84.56**	**37.01**	**135.07**	**369,261.02**
			Total Excluding Fugitives[2]:	**176.73**	**143.37**	**149.37**	**119.70**	**82.37**	**37.01**	**126.58**	**369,261.02**
			PSD Major Source Threshold:	**250**	**250**	**250**	**250**	**250**	**250**	**250**	**--**
			Major Source?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**--**

Notes:

1. Bark is transferred from the raw wood chip storage pile by walking floor to covered conveyors which transfer the material into the fully enclosed Green Wood Fuel Storage Bin. There are no emissions expected from transfer of material into the bin.
2. Fugitive emissions are not included in comparison against the major source threshold because the facility is not on the list of 28 source categories in 40 CFR 52.21.

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

Description	HAP	CD-RTO-1 (tpy)	ES-DRYER BYP-1 (tpy)	ES-FURNACE BYP-1 (tpy)	ES-DDB-1 and -2 (tpy)	CD-RTO-2 (tpy)	ES-DRYER BYP-2 (tpy)	ES-FURNACE BYP-2 (tpy)	ES-DDB-3 and -4 (tpy)	ES-PVAP (tpy)	CD-RCO-1 (tpy)	ES-DDB-5 through -8 (tpy)	ES-DWH (tpy)	IES-GN (tpy)	IES-FWP (tpy)	IES-EPWC (tpy)	IES-BARK (tpy)	Total (tpy)	Major Source?
Acetaldehyde	Y	9.04E-01	2.98E-01	4.21E-03	1.31E-07	8.22E-01	2.98E-01	4.77E-03	1.31E-07	-	6.52E-01	2.61E-07	-	4.70E-04	4.03E-04	-	-	2.98E+00	No
Acrolein	Y	6.89E-01	1.95E-01	2.03E-02	1.55E-07	5.37E-01	1.95E-01	2.30E-02	1.55E-07	-	1.18E+00	3.09E-07	-	5.67E-05	4.86E-05	-	-	2.84E+00	No
Formaldehyde	Y	9.58E-01	2.54E-01	2.23E-02	1.31E-02	9.11E-01	2.54E-01	2.53E-02	1.31E-02	6.57E-03	4.05E-01	2.63E-02	3.28E-01	7.23E-04	6.20E-04	-	-	3.22E+00	No
Methanol	Y	8.76E-01	1.86E-01	-	-	5.12E-01	1.86E-01	-	-	-	5.69E-01	-	7.62E-01	-	-	3.91E-01	1.17E-01	3.60E+00	No
Phenol	Y	3.26E-01	1.02E-01	2.59E-04	-	2.81E-01	1.02E-01	2.93E-04	-	-	5.53E-01	-	-	-	-	-	-	1.37E+00	No
Propionaldehyde	Y	2.00E-01	6.82E-02	3.10E-04	-	1.88E-01	6.82E-02	3.51E-04	-	-	5.56E-01	-	-	-	-	-	-	1.08E+00	No
Acetophenone	Y	5.36E-08	1.22E-08	1.62E-08	-	6.31E-08	1.44E-08	1.84E-08	-	-	-	-	-	-	-	-	-	1.78E-07	No
Ammonia	N	4.40E-01	-	-	2.75E-02	4.40E-01	-	-	2.75E-02	-	2.69E-01	5.50E-02	-	-	-	-	-	1.26E+00	No
Antimony and compounds	Y	3.84E-04	3.02E-05	4.01E-05	-	4.52E-04	3.56E-05	4.54E-05	-	-	-	-	-	-	-	-	-	9.87E-04	No
Arsenic	Y	1.10E-03	8.42E-05	1.12E-04	1.72E-06	1.28E-03	9.90E-05	1.27E-04	1.72E-06	-	1.68E-05	3.44E-06	-	-	-	-	-	2.83E-03	No
Benzene	Y	1.70E-01	-	-	6.22E-03	1.82E-01	-	-	6.22E-03	3.11E-03	6.10E-02	1.24E-02	-	5.71E-04	4.90E-04	-	-	4.42E-01	No
Benzo(a)pyrene	Y	4.37E-05	9.95E-06	1.32E-05	1.03E-08	5.14E-05	1.17E-05	1.50E-05	1.03E-08	-	1.01E-07	2.06E-08	-	2.39E-05	9.87E-08	-	-	1.69E-04	No
Beryllium	Y	5.51E-05	4.21E-06	5.58E-06	1.03E-07	6.45E-05	4.95E-06	6.33E-06	1.03E-07	-	1.01E-06	2.06E-07	-	-	-	-	-	1.42E-04	No
1,3-Butadiene	Y	-	-	-	-	-	-	-	-	-	-	-	-	2.39E-05	2.05E-05	-	-	4.45E-05	No
Cadmium	Y	3.50E-04	1.57E-05	2.08E-05	9.45E-06	3.86E-04	1.85E-05	2.36E-05	9.45E-06	-	9.26E-05	1.89E-05	-	-	-	-	-	9.45E-04	No
Carbon tetrachloride	Y	7.54E-04	1.72E-04	2.28E-04	-	8.87E-04	2.03E-04	2.59E-04	-	-	-	-	-	-	-	-	-	2.50E-03	No
Chlorine	Y	5.29E-01	3.02E-03	4.01E-03	-	6.23E-01	3.56E-03	4.54E-03	-	-	-	-	-	-	-	-	-	1.17E+00	No
Chlorobenzene	Y	5.53E-04	1.26E-04	1.67E-04	-	6.50E-04	1.49E-04	1.90E-04	-	-	-	-	-	-	-	-	-	1.84E-03	No
Chloroform	Y	4.69E-04	-	-	-	5.52E-04	-	-	-	-	-	-	-	-	-	-	-	1.02E-03	No
Chromium VI	Y	3.62E-04	-	-	1.20E-05	3.92E-04	-	-	1.20E-05	-	1.18E-04	2.40E-05	-	-	-	-	-	9.21E-04	No
Chromium–Other compounds	Y	8.50E-04	6.69E-05	1.07E-04	-	1.00E-03	7.88E-05	1.21E-04	-	-	-	-	-	-	-	-	-	2.22E-03	No
Cobalt compounds	Y	3.16E-04	2.49E-05	3.30E-05	-	3.72E-04	2.93E-05	3.74E-05	-	-	7.07E-06	-	-	-	-	-	-	8.19E-04	No
Dichlorobenzene	Y	1.65E-04	-	-	1.03E-05	1.65E-04	-	-	1.03E-05	-	1.01E-04	2.06E-05	-	-	-	-	-	4.72E-04	No
Dichloroethane, 1,2-	Y	4.86E-04	1.11E-04	1.47E-04	-	5.72E-04	1.31E-04	1.67E-04	-	-	-	-	-	-	-	-	-	1.61E-03	No
Dichloropropane, 1,2-	Y	5.53E-04	1.26E-04	1.67E-04	-	6.50E-04	1.49E-04	1.90E-04	-	-	-	-	-	-	-	-	-	1.84E-03	No
Dinitrophenol, 2,4-	Y	3.02E-06	6.89E-07	9.14E-07	-	3.55E-06	8.10E-07	1.04E-06	-	-	-	-	-	-	-	-	-	1.00E-05	No
Di(2-ethylhexyl)phthalate	Y	7.87E-07	1.80E-07	1.80E-07	-	9.26E-07	2.12E-07	2.70E-07	-	-	-	-	-	-	-	-	-	2.56E-06	No
Ethyl benzene	Y	5.19E-04	1.19E-04	1.57E-04	-	6.11E-04	1.40E-04	1.78E-04	-	-	-	-	-	-	-	-	-	1.72E-03	No
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	N	3.00E-10	-	-	-	3.53E-10	-	-	-	-	-	-	-	-	-	-	-	6.53E-10	No
Hexane	Y	2.47E-01	-	-	1.55E-02	2.47E-01	-	-	1.55E-02	-	1.51E-01	3.09E-02	-	-	-	-	-	7.08E-01	No
Indeno(1,2,3-cd)pyrene	Y	2.47E-07	-	-	1.55E-08	2.47E-07	-	-	1.55E-08	-	1.51E-07	3.09E-08	-	-	-	-	-	7.08E-07	No
Hydrochloric acid	Y	1.27E+00	7.27E-02	9.64E-02	-	1.50E+00	8.55E-02	1.09E-01	-	-	-	-	-	-	-	-	-	3.14E+00	No
Lead	Y	2.40E-03	-	-	4.29E-06	2.81E-03	-	-	4.29E-06	-	4.21E-05	8.59E-06	-	-	-	-	-	5.27E-03	No
Manganese	Y	7.78E-02	6.12E-03	8.12E-03	3.26E-06	9.15E-02	7.20E-03	7.20E-03	3.26E-06	-	3.20E-05	6.53E-06	-	-	-	-	-	1.98E-01	No
Mercury	Y	2.06E-04	1.34E-05	1.78E-05	2.23E-06	2.36E-04	1.58E-05	2.01E-05	2.23E-06	-	2.19E-05	4.47E-06	-	-	-	-	-	5.39E-04	No
Methyl bromide	Y	2.51E-04	5.74E-05	7.61E-05	-	2.96E-04	6.75E-05	8.63E-05	-	-	-	-	-	-	-	-	-	8.34E-04	No
Methyl chloride	Y	3.85E-04	8.80E-05	1.17E-04	-	4.53E-04	1.04E-04	1.32E-04	-	-	-	-	-	-	-	-	-	1.28E-03	No
Methyl ethyl ketone	N	9.05E-05	-	-	-	1.06E-04	-	-	-	-	-	-	-	-	-	-	-	1.97E-04	No
3-Methylchloranthrene	Y	2.47E-07	-	-	1.55E-08	2.47E-07	-	-	1.55E-08	-	1.51E-07	3.09E-08	-	-	-	-	-	7.08E-07	No
Methylene chloride	Y	4.86E-03	-	-	-	5.72E-03	-	-	-	-	-	-	-	-	-	-	-	1.06E-02	No
Naphthalene	Y	1.71E-03	3.71E-04	4.92E-04	5.24E-06	2.00E-03	4.37E-04	5.58E-04	5.24E-06	-	5.13E-05	1.05E-05	-	-	-	-	-	5.64E-03	No
Nickel	Y	1.89E-03	1.26E-04	1.67E-04	1.80E-05	2.17E-03	1.49E-04	1.90E-04	1.80E-05	-	1.77E-04	3.61E-05	-	-	-	-	-	4.95E-03	No
Nitrophenol, 4-	Y	1.84E-06	4.21E-07	5.58E-07	-	2.17E-06	4.95E-07	6.33E-07	-	-	-	-	-	-	-	-	-	6.12E-06	No
Pentachlorophenol	Y	8.54E-07	1.95E-07	2.59E-07	-	1.01E-06	2.30E-07	2.93E-07	-	-	-	-	-	-	-	-	-	2.84E-06	No
Perchloroethylene	Y	6.37E-04	1.45E-04	1.93E-04	-	7.49E-04	1.71E-04	2.19E-04	-	-	-	-	-	-	-	-	-	2.11E-03	No
Phosphorus metal, yellow or white	Y	1.31E-03	1.03E-04	1.37E-04	-	1.54E-03	1.22E-04	1.55E-04	-	-	-	-	-	-	-	-	-	3.37E-03	No
Polychlorinated biphenyls	Y	1.37E-07	3.12E-08	4.14E-08	-	1.61E-07	3.67E-08	4.69E-08	-	-	-	-	-	-	-	-	-	4.53E-07	No
Polycyclic Organic Matter	Y	7.70E-03	4.78E-04	6.34E-04	3.50E-04	8.07E-03	5.63E-04	7.19E-04	3.50E-04	1.75E-04	3.43E-03	7.01E-04	-	1.03E-04	8.82E-05	-	-	2.34E-02	No
Selenium compounds	Y	1.39E-04	1.07E-05	1.42E-05	2.06E-07	1.63E-04	1.26E-05	1.61E-05	2.06E-07	-	2.02E-06	4.12E-07	-	-	-	-	-	3.59E-04	No
Styrene	Y	3.18E-02	-	-	-	3.74E-02	-	-	-	-	-	-	-	-	-	-	-	6.93E-02	No
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	1.44E-10	3.29E-11	4.36E-11	-	1.70E-10	3.87E-11	4.95E-11	-	-	-	-	-	-	-	-	-	4.78E-10	No
Toluene	Y	9.70E-04	-	-	2.92E-05	1.06E-03	-	-	2.92E-05	-	2.86E-04	5.84E-05	-	2.51E-04	2.15E-04	-	-	2.90E-03	No
Trichloroethane, 1,1,1-	Y	5.19E-04	1.19E-04	1.57E-04	-	6.11E-04	1.40E-04	1.78E-04	-	-	-	-	-	-	-	-	-	1.72E-03	No
Trichloroethylene	Y	5.03E-04	1.15E-04	1.15E-04	-	5.91E-04	1.35E-04	1.73E-04	-	-	-	-	-	-	-	-	-	1.63E-03	No
Trichlorofluoromethane	N	6.87E-04	-	-	-	8.08E-04	-	-	-	-	-	-	-	-	-	-	-	1.50E-03	No
Trichlorophenol, 2,4,6-	Y	3.69E-07	8.42E-08	1.12E-07	-	4.34E-07	9.90E-08	1.27E-07	-		-	-	-	-	-	-	-	1.22E-06	No
Vinyl chloride	Y	3.02E-04	6.89E-05	9.14E-05	-	3.55E-04	8.10E-05	1.04E-04	-	-	-	-	-	-	-	-	-	1.00E-03	No
Xylene	Y	4.19E-04	-	-	-	4.93E-04	-	-	-	-	-	-	-	1.75E-04	1.50E-04	-	-	1.24E-03	No
TOTAL HAP		**6.31**	**1.19**	**0.16**	**0.04**	**5.96**	**1.20**	**0.18**	**0.04**	**0.01**	**4.13**	**0.07**	**1.09**	**2.37E-03**	**2.03E-03**	**0.39**	**0.12**	**20.88**	No

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

Calculation Basis

Annual Dried Wood Throughput of Dryer	390,628 ODT/year
Max. Hourly Dried Wood Throughput of Dryer	70.83 ODT/hr
Burner Heat Input	153.0 MMBtu/hr
Percent Hardwood	20.0%
Percent Softwood	80.0%
Annual Operation	8,760 hr/yr
Annual Heat Input	1,340,280 MMBtu/yr
Number of RTO Burners	4
RTO Burner Rating	8 MMBtu/hr
Number of Duct Burners	2
Duct Burner Rating	1 MMBtu/hr
RTO Control Efficiency	97.50%

Potential Criteria Emissions

Pollutant	Biomass Emission Factor	Units	Emission Factor Source	Uncontrolled Emissions		Controlled Emissions	
				Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)
CO	0.4	lb/ODT	Note 1	--	--	28.33	78.1
NO_X	14.280	lb/hr	Note 1	--	--	14.28	62.5
$PM/PM_{10}/PM_{2.5}$ (Filterable + Condensable)	7.6	lb/hr	Note 3	--	--	7.60	33.3
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6[2]	--	--	3.83	16.8
Total VOC (as propane)	2.640	lb/ODT	Note 4	186.99	515.6	4.67	12.9

Notes:

[1] CO emissions based on data from similar Enviva facilities and information from NCASI database.
NOx emissions based on stack test results from similar facility plus 20% contingency.

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

[3] Particulate emission factor is based on data from similar Enviva facilities.

[4] VOC emission factor based on source test data for similar pellet manufacturing facilities and represents uncontrolled emissions.

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

Calculation Basis

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

Potential VOC Emissions

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

Notes:

1. The max hourly throughput is based on the maximum capacity for the 2 existing green hammermills ratioed up to reflect 3 additional hammermills (i.e. 119.4 tph * 5/2).
2. Emission factors were derived based on stack testing data from comparable Enviva facilities and/or engineering judgement and include contingency. The emission factors represent uncontrolled emissions.

Thermal Generated Potential Criteria Pollutant Emissions

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

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	8.2E-02	lb/MMBtu[1]	0.04	0.19
NO_X	9.8E-02	lb/MMBtu[1]	0.05	0.23

Notes:

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

Abbreviations:

CAS - chemical abstract service
HAP - hazardous air pollutant
hr - hour
lb - pound
NC - North Carolina
ODT - oven dried tons
RTO - Regenerative Thermal Oxidizer
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

Table 3c
Potential HAP and TAP Emissions
Dryer #1 and Green Hammermills (ES-DRYER-1, ES-GHM-1 through ES-GHM-5, CD-RTO-1)
Enviva Pellets Northampton, LLC

Calculation Basis

Annual Dried Wood Throughput of Dryer	390,628	ODT/year
Max. Hourly Dried Wood Throughput of Dryer	70.83	ODT/hr
Burner Heat Input	153.0	MMBtu/hr
Percent Hardwood	20.0%	
Percent Softwood	80.0%	
Annual Operation	8,760	hr/yr
Annual Heat Input	1,340,280	MMBtu/yr
Number of RTO Burners	4	
RTO Burner Rating	8	MMBtu/hr
RTO Control Efficiency	97.50%	

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Dryer Burner - Biomass Source								
Acetaldehyde	Y	Y	Y	1.7E-01	lb/ODT	1	0.30	0.82
Acrolein	Y	Y	Y	1.1E-01	lb/ODT	1	0.19	0.54
Formaldehyde	Y	Y	Y	1.4E-01	lb/ODT	1	0.25	0.70
Methanol	Y	N	Y	1.0E-01	lb/ODT	1	0.19	0.51
Phenol	Y	Y	Y	5.8E-02	lb/ODT	1	0.10	0.28
Propionaldehyde	Y	N	Y	3.9E-02	lb/ODT	1	0.07	0.19
Acetophenone	Y	N	Y	3.2E-09	lb/MMBtu	2,3	1.2E-08	5.4E-08
Antimony and compounds	Y	N	N	7.9E-06	lb/MMBtu	2,4	8.8E-05	3.8E-04
Arsenic	Y	Y	N	2.2E-05	lb/MMBtu	2,4	2.4E-04	1.1E-03
Benzene	Y	Y	Y	4.2E-03	lb/MMBtu	2,3	1.6E-02	7.0E-02
Benzo(a)pyrene	Y	Y	Y	2.6E-06	lb/MMBtu	2,3	9.9E-06	4.4E-05
Beryllium	Y	Y	N	1.1E-06	lb/MMBtu	2,4	1.2E-05	5.3E-05
Cadmium	Y	Y	N	4.1E-06	lb/MMBtu	2,4	4.5E-05	2.0E-04
Carbon tetrachloride	Y	Y	Y	4.5E-05	lb/MMBtu	2,3	1.7E-04	7.5E-04
Chlorine	Y	Y	N	7.9E-04	lb/MMBtu	2,9	1.2E-01	5.3E-01
Chlorobenzene	Y	Y	Y	3.3E-05	lb/MMBtu	2,3	1.3E-04	5.5E-04
Chloroform	Y	Y	Y	2.8E-05	lb/MMBtu	2,3	1.1E-04	4.7E-04
Chromium VI	-[5]	Y	N	3.5E-06	lb/MMBtu	2,4,5	3.9E-05	1.7E-04
Chromium–Other compounds	Y	N	N	1.8E-05	lb/MMBtu	2,4	1.9E-04	8.5E-04
Cobalt compounds	Y	N	N	6.5E-06	lb/MMBtu	2,4	7.2E-05	3.2E-04
Dichloroethane, 1,2-	Y	Y	Y	2.9E-05	lb/MMBtu	2,3	1.1E-04	4.9E-04
Dichloropropane, 1,2-	Y	N	Y	3.3E-05	lb/MMBtu	2,3	1.3E-04	5.5E-04
Dinitrophenol, 2,4-	Y	N	Y	1.8E-07	lb/MMBtu	2,3	6.9E-07	3.0E-06
Di(2-ethylhexyl)phthalate	Y	Y	Y	4.7E-08	lb/MMBtu	2,3	1.8E-07	7.9E-07
Ethyl benzene	Y	N	Y	3.1E-05	lb/MMBtu	2,3	1.2E-04	5.2E-04
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	N	Y	Y	1.8E-11	lb/MMBtu	2,3	6.8E-11	3.0E-10
Hydrochloric acid	Y	Y	N	1.9E-02	lb/MMBtu	2,6	2.9E-01	1.3E+00
Lead	Y	N	N	4.8E-05	lb/MMBtu	2,4	5.3E-04	2.3E-03
Manganese	Y	Y	N	1.6E-03	lb/MMBtu	2,4	1.8E-02	7.8E-02
Mercury	Y	Y	N	3.5E-06	lb/MMBtu	2,4	3.9E-05	1.7E-04
Methyl bromide	Y	N	Y	1.5E-05	lb/MMBtu	2,3	5.7E-05	2.5E-04
Methyl chloride	Y	N	Y	2.3E-05	lb/MMBtu	2,3	8.8E-05	3.9E-04
Methyl ethyl ketone	N	Y	Y	5.4E-06	lb/MMBtu	2,3	2.1E-05	9.0E-05
Methylene chloride	Y	Y	Y	2.9E-04	lb/MMBtu	2,3	1.1E-03	4.9E-03
Naphthalene	Y	N	Y	9.7E-05	lb/MMBtu	2,3	3.7E-04	1.6E-03
Nickel	Y	Y	N	3.3E-05	lb/MMBtu	2,4	3.7E-04	1.6E-03
Nitrophenol, 4-	Y	N	Y	1.1E-07	lb/MMBtu	2,3	4.2E-07	1.8E-06
Pentachlorophenol	Y	Y	N	5.1E-08	lb/MMBtu	2	2.0E-07	8.5E-07
Perchloroethylene	Y	Y	N	3.8E-05	lb/MMBtu	2	1.5E-04	6.4E-04
Phosphorus metal, yellow or white	Y	N	N	2.7E-05	lb/MMBtu	2,4	3.0E-04	1.3E-03
Polychlorinated biphenyls	Y	Y	Y	8.2E-09	lb/MMBtu	2,3	3.1E-08	1.4E-07
Polycyclic Organic Matter	Y	N	N	1.3E-04	lb/MMBtu	2	4.8E-04	2.1E-03
Selenium compounds	Y	N	N	2.8E-06	lb/MMBtu	2,4	3.1E-05	1.4E-04
Styrene	Y	Y	Y	1.9E-03	lb/MMBtu	2,3	7.3E-03	3.2E-02
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	Y	8.6E-12	lb/MMBtu	2,3	3.3E-11	1.4E-10
Toluene	Y	Y	Y	3.0E-05	lb/MMBtu	2,3	1.1E-04	5.0E-04
Trichloroethane, 1,1,1-	Y	Y	N	3.1E-05	lb/MMBtu	2	1.2E-04	5.2E-04
Trichloroethylene	Y	Y	Y	3.0E-05	lb/MMBtu	2,3	1.1E-04	5.0E-04
Trichlorofluoromethane	N	Y	Y	4.1E-05	lb/MMBtu	2,3	1.6E-04	6.9E-04
Trichlorophenol, 2,4,6-	Y	N	Y	2.2E-08	lb/MMBtu	2,3	8.4E-08	3.7E-07
Vinyl chloride	Y	Y	Y	1.8E-05	lb/MMBtu	2,3	6.9E-05	3.0E-04
Xylene	Y	Y	Y	2.5E-05	lb/MMBtu	2,3	9.6E-05	4.2E-04
					Total HAP Emissions (related to biomass)		**1.56**	**5.05**
					Total TAP Emissions (related to biomass)		**1.30**	**4.34**

Table 3c
Potential HAP and TAP Emissions
Dryer #1 and Green Hammermills (ES-DRYER-1, ES-GHM-1 through ES-GHM-5, CD-RTO-1)
Enviva Pellets Northampton, LLC

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
RTO - Natural Gas/Propane Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	7	7.5E-07	3.3E-06
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	7	5.0E-07	2.2E-06
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	7	4.8E-07	2.1E-06
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	7	5.6E-07	2.5E-06
Ammonia	N	Y	N	3.2	lb/MMscf	7	1.0E-01	4.4E-01
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	7	7.5E-08	3.3E-07
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	7	6.3E-06	2.7E-05
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	8	2.3E-02	1.0E-01
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	7	3.8E-08	1.6E-07
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	7	3.8E-08	1.6E-07
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	7	3.8E-07	1.6E-06
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	7	3.5E-05	1.5E-04
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	7	4.4E-05	1.9E-04
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Cobalt	Y	N	N	8.4E-05	lb/MMscf	7	2.6E-06	1.2E-05
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	7	3.8E-08	1.6E-07
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	7	3.8E-05	1.6E-04
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	7	9.4E-08	4.1E-07
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	7	8.8E-08	3.8E-07
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	8	4.8E-02	2.1E-01
Hexane	Y	Y	Y	1.8	lb/MMscf	7	5.6E-02	2.5E-01
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Lead	Y	N	N	5.0E-04	lb/MMscf	7	1.6E-05	6.9E-05
Manganese	Y	Y	N	3.8E-04	lb/MMscf	7	1.2E-05	5.2E-05
Mercury	Y	Y	N	2.6E-04	lb/MMscf	7	8.2E-06	3.6E-05
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	7	1.9E-05	8.4E-05
Nickel	Y	Y	N	2.1E-03	lb/MMscf	7	6.6E-05	2.9E-04
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	8	1.3E-03	5.6E-03
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	7	5.3E-07	2.3E-06
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	7	1.6E-07	6.9E-07
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	7	7.5E-07	3.3E-06
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	7	1.1E-04	4.7E-04
Total HAP Emissions (related to natural gas/propane)							**0.13**	**0.56**
Total TAP Emissions (related to natural gas/propane)							**0.21**	**0.46**

Notes:

1. Emission factor derived based on stack testing data from comparable Enviva facilities and/or engineering judgement and include contingency. The emission factors represent uncontrolled emissions.
2. Emission factors (criteria and HAP/TAP) for wood combustion in a stoker boiler from NCDAQ Wood Waste Combustion Spreadsheet/AP-42, Fifth Edition, Volume 1, Chapter 1.6 - Wood Residue Combustion in Boilers, 09/03.
3. The control efficiency of 97.5% for the RTO is applied to all VOC hazardous and toxic pollutants.
4. The control efficiency of the wet electrostatic precipitator (WESP) for filterable particulate matter is applied to all metal hazardous and toxic pollutants from the dryer and duct burners. Actual design filterable efficiency is estimated to 96.4%, but 92.75% is assumed for toxics permitting.

   WESP Control Efficiency for metal HAP 92.8%
5. Chromium VI is a subset of chromium compounds, which is accounted for separately as a HAP. As such, Chromium VI is only calculated as a TAP.
6. The WESP employs a caustic solution in its operation in which hydrochloric acid will have high water solubility. This caustic solution will neutralize the acid and effectively control it by 90%, per conversation on October 18, 2011 with Steven A. Jaasund, P.E. of Lundberg Associates, a manufacturer of WESPs.

   WESP HCl Control Efficiency 90.00%
7. Emission factors for natural gas combustion are from NCDAQ Natural Gas Combustion Spreadsheet and AP-42, Fifth Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion, 07/98. The emission factors for acetaldehyde, acrolein, and ammonia are cited in the NCDAQ spreadsheet as being sourced from the USEPA's WebFIRE database.
8. The RTO burners can fire either natural gas or propane; Propane is worst-case for these HAP emissions. Emission factors for propane combustion from the South Coast Air Quality Management District's Air Emissions Reporting Tool for external combustion equipment fired with LPG.
9. It was assumed that chlorine is not oxidized in the RTO.

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
NC - North Carolina
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

Table 3d
Potential Emissions
Dryer #1 Bypass (ES-DRYERBYP-1) (Full Capacity)[1]
Enviva Pellets Northampton, LLC

Calculation Basis

Hourly Throughput[1]	70.83 ODT/hr
Hourly Heat Input Capacity	153 MMBtu/hr
Annual Heat Input Capacity	7,650 MMBtu/yr
Hours of Operation[1]	50 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions per Dryer Line

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	21.4	lb/hr[2]	21.4	0.54
NO_X	26.3	lb/hr[2]	26.3	0.66
SO_2	0.025	lb/MMBtu[3]	3.83	0.096
VOC	14.0	lb/hr[2]	14.0	0.35
$PM/PM_{10}/PM_{2.5}$ Condensable	0.017	lb/MMBtu[4]	2.60	0.065
$PM/PM_{10}/PM_{2.5}$ Filterable	0.33	lb/MMBtu[5]	50.5	1.26
Total $PM/PM_{10}/PM_{2.5}$			53.1	1.33

Notes:

1. During startup and shutdown (for temperature control) or malfunction, excess emissions can be vented out either the dryer bypass stacks or the furnace bypass stacks. Use of the bypass stacks is limited to 2 hours in any 24-hour period and 50 hours per 12-month rolling period for each dryer line. As the feed to the dryer is typically stopped during shutdown and malfunction events, the hourly throughput is equal to the annual average of the dryer feed rate.
2. CO, NO_X, and VOC emission rates based on data from a comparable Enviva facility.
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 condensable PM based on AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.
5. Uncontrolled filterable PM emission factor is based on testing at a comparable Enviva facility.

Table 3d
Potential Emissions
Dryer #1 Bypass (ES-DRYERBYP-1) (Full Capacity)[1]
Enviva Pellets Northampton, LLC

Potential HAP Emissions per Dryer Line

Pollutant	Emission Factor	Units	Footnote	Potential Emissions[1]	
				Max (lb/hr)	Annual (tpy)
Acetaldehyde	0.168	lb/ODT	2	11.9	0.30
Acrolein	0.110	lb/ODT	2	7.79	0.195
Formaldehyde	0.144	lb/ODT	2	10.16	0.25
Methanol	0.105	lb/ODT	2	7.43	0.19
Phenol	0.058	lb/ODT	2	4.08	0.10
Propionaldehyde	0.039	lb/ODT	2	2.73	0.068
Acetophenone	3.2E-09	lb/MMBtu	3	4.90E-07	1.22E-08
Antimony and compounds	7.9E-06	lb/MMBtu	3	1.21E-03	3.02E-05
Arsenic	2.2E-05	lb/MMBtu	3	3.37E-03	8.42E-05
Benzo(a)pyrene	2.6E-06	lb/MMBtu	3	3.98E-04	9.95E-06
Beryllium	1.1E-06	lb/MMBtu	3	1.68E-04	4.21E-06
Cadmium	4.1E-06	lb/MMBtu	3	6.27E-04	1.57E-05
Carbon tetrachloride	4.5E-05	lb/MMBtu	3	6.89E-03	1.72E-04
Chlorine	7.9E-04	lb/MMBtu	3	1.21E-01	3.02E-03
Chlorobenzene	3.3E-05	lb/MMBtu	3	5.05E-03	1.26E-04
Chromium–Other compounds	1.8E-05	lb/MMBtu	3	2.68E-03	6.69E-05
Cobalt compounds	6.5E-06	lb/MMBtu	3	9.95E-04	2.49E-05
Dinitrophenol, 2,4-	1.8E-07	lb/MMBtu	3	2.75E-05	6.89E-07
Di(2-ethylhexyl)phthalate	4.7E-08	lb/MMBtu	3	7.19E-06	1.80E-07
Ethyl benzene	3.1E-05	lb/MMBtu	3	4.74E-03	1.19E-04
Dichloroethane, 1,2-	2.9E-05	lb/MMBtu	3	4.44E-03	1.11E-04
Hydrochloric acid	1.9E-02	lb/MMBtu	3	2.91E+00	7.27E-02
Lead	4.8E-05	lb/MMBtu	3	7.34E-03	1.84E-04
Manganese	1.6E-03	lb/MMBtu	3	2.45E-01	6.12E-03
Mercury	3.5E-06	lb/MMBtu	3	5.36E-04	1.34E-05
Methyl bromide	1.5E-05	lb/MMBtu	3	2.30E-03	5.74E-05
Methyl chloride	2.3E-05	lb/MMBtu	3	3.52E-03	8.80E-05
Trichloroethane, 1,1,1-	3.1E-05	lb/MMBtu	3	4.74E-03	1.19E-04
Naphthalene	9.7E-05	lb/MMBtu	3	1.48E-02	3.71E-04
Nickel	3.3E-05	lb/MMBtu	3	5.05E-03	1.26E-04
Nitrophenol, 4-	1.1E-07	lb/MMBtu	3	1.68E-05	4.21E-07
Pentachlorophenol	5.1E-08	lb/MMBtu	3	7.80E-06	1.95E-07
Perchloroethylene	3.8E-05	lb/MMBtu	3	5.81E-03	1.45E-04
Phosphorus metal, yellow or white	2.7E-05	lb/MMBtu	3	4.13E-03	1.03E-04
Polychlorinated biphenyls	8.2E-09	lb/MMBtu	3	1.25E-06	3.12E-08
Polycyclic Organic Matter	1.3E-04	lb/MMBtu	3	1.91E-02	4.78E-04
Dichloropropane, 1,2-	3.3E-05	lb/MMBtu	3	5.05E-03	1.26E-04
Selenium compounds	2.8E-06	lb/MMBtu	3	4.28E-04	1.07E-05
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	8.6E-12	lb/MMBtu	3	1.32E-09	3.29E-11
Trichloroethylene	3.0E-05	lb/MMBtu	3	4.59E-03	1.15E-04
Trichlorophenol, 2,4,6-	2.2E-08	lb/MMBtu	3	3.37E-06	8.42E-08
Vinyl chloride	1.8E-05	lb/MMBtu	3	2.75E-03	6.89E-05
			Total HAP Emissions	**47.5**	**1.19**

Notes:

1. During dryer bypass emissions are not controlled by the WESP and RTO; however, combustion in the furnace still results in a reduction in organic HAP emission rates.
2. Organic HAP emissions rates were derived based on stack testing data from other similar Enviva plants and/or engineering judgement.
3. Emission factors for wood combustion in a stoker boiler from AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
kg - kilogram
lb - pound
MMBtu - Million British thermal units
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

Reference:

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

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

Calculation Basis

Hourly Heat Input Capacity	153 MMBtu/hr
Annual Heat Input Capacity	7,650 MMBtu/yr
Hours of Operation[1]	50 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions per Dryer Line

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	0.60	lb/MMBtu[2]	91.8	2.30
NO_X	0.22	lb/MMBtu[2]	33.66	0.84
SO_2	0.025	lb/MMBtu[2]	3.83	0.096
VOC	0.017	lb/MMBtu[2]	2.60	0.065
Total $PM/PM_{10}/PM_{2.5}$	0.58	lb/MMBtu[2]	88.3	2.21

Notes:

1. During startup and shutdown (for temperature control) or malfunction, excess emissions can be vented out either the dryer bypass stacks or the furnace bypass stacks. Use of the bypass stacks is limited to 2 hours in any 24-hour period and 50 hours per 12-month rolling period for each dryer line.
2. CO, NO_X, SO_2, PM, and VOC emission rates based on AP-42, Chapter 1.6 - Wood Residue Combustion in Boilers, 09/03 for bark/bark and wet wood/wet wood-fired boilers. VOC emission factor excludes formaldehyde.

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

Potential HAP Emissions per Dryer Line

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
Acetaldehyde	8.30E-04	lb/MMBtu	1	1.27E-01	3.17E-03
Acrolein	4.00E-03	lb/MMBtu	1	6.12E-01	1.53E-02
Formaldehyde	4.40E-03	lb/MMBtu	1	6.73E-01	1.68E-02
Phenol	5.10E-05	lb/MMBtu	1	7.80E-03	1.95E-04
Propionaldehyde	6.10E-05	lb/MMBtu	1	9.33E-03	2.33E-04
Acetophenone	3.2E-09	lb/MMBtu	1	4.90E-07	1.22E-08
Antimony and compounds	7.9E-06	lb/MMBtu	1	1.21E-03	3.02E-05
Arsenic	2.2E-05	lb/MMBtu	1	3.37E-03	8.42E-05
Benzo(a)pyrene	2.6E-06	lb/MMBtu	1	3.98E-04	9.95E-06
Beryllium	1.1E-06	lb/MMBtu	1	1.68E-04	4.21E-06
Cadmium	4.1E-06	lb/MMBtu	1	6.27E-04	1.57E-05
Carbon tetrachloride	4.5E-05	lb/MMBtu	1	6.89E-03	1.72E-04
Chlorine	7.9E-04	lb/MMBtu	1	1.21E-01	3.02E-03
Chlorobenzene	3.3E-05	lb/MMBtu	1	5.05E-03	1.26E-04
Chromium–Other compounds	2.1E-05	lb/MMBtu	1	3.21E-03	8.03E-05
Cobalt compounds	6.5E-06	lb/MMBtu	1	9.95E-04	2.49E-05
Dinitrophenol, 2,4-	1.8E-07	lb/MMBtu	1	2.75E-05	6.89E-07
Di(2-ethylhexyl)phthalate	4.7E-08	lb/MMBtu	1	7.19E-06	1.80E-07
Ethyl benzene	3.1E-05	lb/MMBtu	1	4.74E-03	1.19E-04
Dichloroethane, 1,2-	2.9E-05	lb/MMBtu	1	4.44E-03	1.11E-04
Hydrochloric acid	1.9E-02	lb/MMBtu	1	2.91E+00	7.27E-02
Lead	4.8E-05	lb/MMBtu	1	7.34E-03	1.84E-04
Manganese	1.6E-03	lb/MMBtu	1	2.45E-01	6.12E-03
Mercury	3.5E-06	lb/MMBtu	1	5.36E-04	1.34E-05
Methyl bromide	1.5E-05	lb/MMBtu	1	2.30E-03	5.74E-05
Methyl chloride	2.3E-05	lb/MMBtu	1	3.52E-03	8.80E-05
Trichloroethane, 1,1,1-	3.1E-05	lb/MMBtu	1	4.74E-03	1.19E-04
Naphthalene	9.7E-05	lb/MMBtu	1	1.48E-02	3.71E-04
Nickel	3.3E-05	lb/MMBtu	1	5.05E-03	1.26E-04
Nitrophenol, 4-	1.1E-07	lb/MMBtu	1	1.68E-05	4.21E-07
Pentachlorophenol	5.1E-08	lb/MMBtu	1	7.80E-06	1.95E-07
Perchloroethylene	3.8E-05	lb/MMBtu	1	5.81E-03	1.45E-04
Phosphorus metal, yellow or white	2.7E-05	lb/MMBtu	1	4.13E-03	1.03E-04
Polychlorinated biphenyls	8.2E-09	lb/MMBtu	1	1.25E-06	3.12E-08
Polycyclic Organic Matter	1.3E-04	lb/MMBtu	1	1.91E-02	4.78E-04
Dichloropropane, 1,2-	3.3E-05	lb/MMBtu	1	5.05E-03	1.26E-04
Selenium compounds	2.8E-06	lb/MMBtu	1	4.28E-04	1.07E-05
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	8.6E-12	lb/MMBtu	1	1.32E-09	3.29E-11
Trichloroethylene	3.0E-05	lb/MMBtu	1	4.59E-03	1.15E-04
Trichlorophenol, 2,4,6-	2.2E-08	lb/MMBtu	1	3.37E-06	8.42E-08
Vinyl chloride	1.8E-05	lb/MMBtu	1	2.75E-03	6.89E-05
Total HAP Emissions (Biomass Combustion)				**4.81**	**0.12**

Notes:

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

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

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

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

Calculation Basis

Hourly Heat Input Capacity	5 MMBtu/hr
Annual Heat Input Capacity	2,500 MMBtu/yr
Hours of Operation[1]	500 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions per Dryer Line

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	0.60	lb/MMBtu[2]	3.00	0.75
NO_X	0.22	lb/MMBtu[2]	1.10	0.28
SO_2	0.025	lb/MMBtu[2]	0.13	0.031
VOC	0.017	lb/MMBtu[2]	0.085	0.021
Total PM	0.58	lb/MMBtu[2]	2.89	0.72
Total PM_{10}	0.52	lb/MMBtu[2]	2.59	0.65
Total $PM_{2.5}$	0.45	lb/MMBtu[2]	2.24	0.56

Notes:

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

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

Potential HAP Emissions per Dryer Line

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
Acetaldehyde	8.30E-04	lb/MMBtu	1	4.15E-03	1.04E-03
Acrolein	4.00E-03	lb/MMBtu	1	2.00E-02	5.00E-03
Formaldehyde	4.40E-03	lb/MMBtu	1	2.20E-02	5.50E-03
Phenol	5.10E-05	lb/MMBtu	1	2.55E-04	6.38E-05
Propionaldehyde	6.10E-05	lb/MMBtu	1	3.05E-04	7.63E-05
Acetophenone	3.2E-09	lb/MMBtu	1	1.60E-08	4.00E-09
Antimony and compounds	7.9E-06	lb/MMBtu	1	3.95E-05	9.88E-06
Arsenic	2.2E-05	lb/MMBtu	1	1.10E-04	2.75E-05
Benzo(a)pyrene	2.6E-06	lb/MMBtu	1	1.30E-05	3.25E-06
Beryllium	1.1E-06	lb/MMBtu	1	5.50E-06	1.38E-06
Cadmium	4.1E-06	lb/MMBtu	1	2.05E-05	5.13E-06
Carbon tetrachloride	4.5E-05	lb/MMBtu	1	2.25E-04	5.63E-05
Chlorine	7.9E-04	lb/MMBtu	1	3.95E-03	9.88E-04
Chlorobenzene	3.3E-05	lb/MMBtu	1	1.65E-04	4.13E-05
Chromium–Other compounds	2.1E-05	lb/MMBtu	1	1.05E-04	2.63E-05
Cobalt compounds	6.5E-06	lb/MMBtu	1	3.25E-05	8.13E-06
Dinitrophenol, 2,4-	1.8E-07	lb/MMBtu	1	9.00E-07	2.25E-07
Bis(2-ethylhexyl)phthalate	4.7E-08	lb/MMBtu	1	2.35E-07	5.88E-08
Ethyl benzene	3.1E-05	lb/MMBtu	1	1.55E-04	3.88E-05
Dichloroethane, 1,2-	2.9E-05	lb/MMBtu	1	1.45E-04	3.63E-05
Hydrochloric acid	1.9E-02	lb/MMBtu	1	9.50E-02	2.38E-02
Lead	4.8E-05	lb/MMBtu	1	2.40E-04	6.00E-05
Manganese	1.6E-03	lb/MMBtu	1	8.00E-03	2.00E-03
Mercury	3.5E-06	lb/MMBtu	1	1.75E-05	4.38E-06
Methyl bromide	1.5E-05	lb/MMBtu	1	7.50E-05	1.88E-05
Methyl chloride	2.3E-05	lb/MMBtu	1	1.15E-04	2.88E-05
Trichloroethane, 1,1,1-	3.1E-05	lb/MMBtu	1	1.55E-04	3.88E-05
Naphthalene	9.7E-05	lb/MMBtu	1	4.85E-04	1.21E-04
Nickel	3.3E-05	lb/MMBtu	1	1.65E-04	4.13E-05
Nitrophenol, 4-	1.1E-07	lb/MMBtu	1	5.50E-07	1.38E-07
Pentachlorophenol	5.1E-08	lb/MMBtu	1	2.55E-07	6.38E-08
Perchloroethylene	3.8E-05	lb/MMBtu	1	1.90E-04	4.75E-05
Phosphorus metal, yellow or white	2.7E-05	lb/MMBtu	1	1.35E-04	3.38E-05
Polychlorinated biphenyls	8.2E-09	lb/MMBtu	1	4.08E-08	1.02E-08
Polycyclic Organic Matter	1.3E-04	lb/MMBtu	1	6.25E-04	1.56E-04
Dichloropropane, 1,2-	3.3E-05	lb/MMBtu	1	1.65E-04	4.13E-05
Selenium compounds	2.8E-06	lb/MMBtu	1	1.40E-05	3.50E-06
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	8.6E-12	lb/MMBtu	1	4.30E-11	1.08E-11
Trichloroethene	3.0E-05	lb/MMBtu	1	1.50E-04	3.75E-05
Trichlorophenol, 2,4,6-	2.2E-08	lb/MMBtu	1	1.10E-07	2.75E-08
Vinyl chloride	1.8E-05	lb/MMBtu	1	9.00E-05	2.25E-05
Total HAP Emissions (Biomass Combustion)				**0.16**	**0.039**

Notes:

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

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
kg - kilogram
lb - pound
MMBtu - Million British thermal units
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

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

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

Duct Burner Inputs

Duct Burner Rating	1 MMBtu/hr
Number of Duct Burners	2
Annual Operation	8,760 hr/yr

Potential Criteria Pollutant Emissions:

Potential Criteria Pollutant Emissions - Natural Gas Combustion

Pollutant	Emission Factor	Units	Emission Factor Source	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
CO	84.0	lb/MMscf	Note 1	0.16	0.72
NO_X	50.0	lb/MMscf	Note 2	0.10	0.43
SO_2	0.60	lb/MMscf	Note 1	0.0012	0.005
VOC	5.50	lb/MMscf	Note 1	0.01	0.05
$PM/PM_{10}/PM_{2.5}$ Condensable	5.70	lb/MMscf	Note 1	0.01	0.05
$PM/PM_{10}/PM_{2.5}$ Filterable	1.90	lb/MMscf	Note 1	0.004	0.02
Total $PM/PM_{10}/PM_{2.5}$				0.015	0.065

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

Potential Criteria Pollutant Emissions - Propane Combustion

Pollutant	Emission Factor[3]	Units	Emission Factor Source	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
CO	7.50	lb/Mgal	Note 3	0.16	0.72
NO_X	6.50	lb/Mgal	Note 4	0.14	0.62
SO_2	0.054	lb/Mgal	Note 3,5	0.001	0.005
VOC	1.00	lb/Mgal	Note 3	0.02	0.10
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	Note 3	0.01	0.05
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	Note 3	0.004	0.02
Total $PM/PM_{10}/PM_{2.5}$				0.015	0.067

Notes:

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

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

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Duct Burners - Natural Gas/Propane Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	1	4.7E-08	2.1E-07
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	1	3.1E-08	1.4E-07
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	1	3.0E-08	1.3E-07
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	1	3.5E-08	1.5E-07
Ammonia	N	Y	N	3.2	lb/MMscf	1	6.3E-03	2.7E-02
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	1	4.7E-09	2.1E-08
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	1	3.9E-07	1.7E-06
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	2	1.4E-03	6.2E-03
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	1	2.4E-09	1.0E-08
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	1	2.4E-09	1.0E-08
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	1	2.4E-08	1.0E-07
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	1	2.2E-06	9.4E-06
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	1	2.7E-06	1.2E-05
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Cobalt	Y	N	N	8.4E-05	lb/MMscf	1	1.6E-07	7.2E-07
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	1	2.4E-09	1.0E-08
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	1	2.4E-06	1.0E-05
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	1	5.9E-09	2.6E-08
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	1	5.5E-09	2.4E-08
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	2	3.0E-03	1.3E-02
Hexane	Y	Y	Y	1.8	lb/MMscf	1	3.5E-03	1.5E-02
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Lead	Y	N	N	5.0E-04	lb/MMscf	1	9.8E-07	4.3E-06
Manganese	Y	Y	N	3.8E-04	lb/MMscf	1	7.5E-07	3.3E-06
Mercury	Y	Y	N	2.6E-04	lb/MMscf	1	5.1E-07	2.2E-06
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	1	1.2E-06	5.2E-06
Nickel	Y	Y	N	2.1E-03	lb/MMscf	1	4.1E-06	1.8E-05
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	8	8.0E-05	3.5E-04
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	1	3.3E-08	1.5E-07
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	1	9.8E-09	4.3E-08
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	1	4.7E-08	2.1E-07
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	1	6.7E-06	2.9E-05
Total HAP Emissions (related to natural gas/propane)							**0.008**	**0.035**
Total TAP Emissions (related to natural gas/propane)							**0.01**	**0.056**

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

Notes:

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

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

Abbreviations:

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
NC - North Carolina
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

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

Calculation Basis

Annual Dried Wood Throughput of Dryer	390,628 ODT/year
Max. Hourly Dried Wood Throughput of Dryer	70.83 ODT/hr
Burner Heat Input	180.0 MMBtu/hr
Percent Hardwood	20.0%
Percent Softwood	80.0%
Annual Operation	8,760 hr/yr
Annual Heat Input	1,576,800 MMBtu/yr
Number of RTO Burners	4
RTO Burner Rating	8 MMBtu/hr
Number of Duct Burners	2
Duct Burner Rating	1 MMBtu/hr
RTO Control Efficiency	97.50%

Potential Criteria Emissions

Pollutant	Biomass Emission Factor	Units	Emission Factor Source	Uncontrolled Emissions		Controlled Emissions	
				Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)
CO	0.4	lb/ODT	Note 1	--	--	28.33	78.1
NO_X	14.280	lb/hr	Note 1	--	--	14.28	62.5
$PM/PM_{10}/PM_{2.5}$ (Filterable + Condensable)	7.6	lb/hr	Note 3	--	--	7.60	33.3
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6[2]	--	--	4.50	19.7
Total VOC (as propane)	2.640	lb/ODT	Note 4	186.99	515.6	4.67	12.9

Notes:

[1] CO emissions based on data from similar Enviva facilities and information from NCASI database.
NOx emissions based on stack test results from similar facility plus 20% contingency.

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

[3] Particulate emission factor is based on data from similar Enviva facilities.

[4] VOC emission factor based on source test data for similar pellet manufacturing facilities and represents uncontrolled emissions.

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

Calculation Basis

Annual Dried Wood Throughput of Dryer	390,628	ODT/year
Max. Hourly Dried Wood Throughput of Dryer	70.83	ODT/hr
Burner Heat Input	180.0	MMBtu/hr
Percent Hardwood	20.0%	
Percent Softwood	80.0%	
Annual Operation	8,760	hr/yr
Annual Heat Input	1,576,800	MMBtu/yr
Number of RTO Burners	4	
RTO Burner Rating	8	MMBtu/hr
RTO Control Efficiency	97.50%	

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Biomass Source								
Acetaldehyde	Y	Y	Y	1.7E-01	lb/ODT	1	0.30	0.82
Acrolein	Y	Y	Y	1.1E-01	lb/ODT	1	0.19	0.54
Formaldehyde	Y	Y	Y	1.4E-01	lb/ODT	1	0.25	0.70
Methanol	Y	N	Y	1.0E-01	lb/ODT	1	0.19	0.51
Phenol	Y	Y	Y	5.8E-02	lb/ODT	1	0.10	0.28
Propionaldehyde	Y	N	Y	3.9E-02	lb/ODT	1	0.07	0.19
Acetophenone	Y	N	Y	3.2E-09	lb/MMBtu	2,3	1.4E-08	6.3E-08
Antimony and compounds	Y	N	N	7.9E-06	lb/MMBtu	2,4	1.0E-04	4.5E-04
Arsenic	Y	Y	N	2.2E-05	lb/MMBtu	2,4	2.9E-04	1.3E-03
Benzene	Y	Y	Y	4.2E-03	lb/MMBtu	2,3	1.9E-02	8.3E-02
Benzo(a)pyrene	Y	Y	Y	2.6E-06	lb/MMBtu	2,3	1.2E-05	5.1E-05
Beryllium	Y	Y	N	1.1E-06	lb/MMBtu	2,4	1.4E-05	6.3E-05
Cadmium	Y	Y	N	4.1E-06	lb/MMBtu	2,4	5.4E-05	2.3E-04
Carbon tetrachloride	Y	Y	Y	4.5E-05	lb/MMBtu	2,3	2.0E-04	8.9E-04
Chlorine	Y	Y	N	7.9E-04	lb/MMBtu	2,9	1.4E-01	6.2E-01
Chlorobenzene	Y	Y	Y	3.3E-05	lb/MMBtu	2,3	1.5E-04	6.5E-04
Chloroform	Y	Y	Y	2.8E-05	lb/MMBtu	2,3	1.3E-04	5.5E-04
Chromium VI	-[5]	Y	N	3.5E-06	lb/MMBtu	2,4,5	4.6E-05	2.0E-04
Chromium–Other compounds	Y	N	N	1.8E-05	lb/MMBtu	2,4	2.3E-04	1.0E-03
Cobalt compounds	Y	N	N	6.5E-06	lb/MMBtu	2,4	8.5E-05	3.7E-04
Dichloroethane, 1,2-	Y	Y	Y	2.9E-05	lb/MMBtu	2,3	1.3E-04	5.7E-04
Dichloropropane, 1,2-	Y	N	Y	3.3E-05	lb/MMBtu	2,3	1.5E-04	6.5E-04
Dinitrophenol, 2,4-	Y	N	Y	1.8E-07	lb/MMBtu	2,3	8.1E-07	3.5E-06
Di(2-ethylhexyl)phthalate	Y	Y	Y	4.7E-08	lb/MMBtu	2,3	2.1E-07	9.3E-07
Ethyl benzene	Y	N	Y	3.1E-05	lb/MMBtu	2,3	1.4E-04	6.1E-04
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	N	Y	Y	1.8E-11	lb/MMBtu	2,3	8.1E-11	3.5E-10
Hydrochloric acid	Y	Y	N	1.9E-02	lb/MMBtu	2,6	3.4E-01	1.5E+00
Lead	Y	N	N	4.8E-05	lb/MMBtu	2,4	6.3E-04	2.7E-03
Manganese	Y	Y	N	1.6E-03	lb/MMBtu	2,4	2.1E-02	9.1E-02
Mercury	Y	Y	N	3.5E-06	lb/MMBtu	2,4	4.6E-05	2.0E-04
Methyl bromide	Y	N	Y	1.5E-05	lb/MMBtu	2,3	6.8E-05	3.0E-04
Methyl chloride	Y	N	Y	2.3E-05	lb/MMBtu	2,3	1.0E-04	4.5E-04
Methyl ethyl ketone	N	Y	Y	5.4E-06	lb/MMBtu	2,3	2.4E-05	1.1E-04
Methylene chloride	Y	Y	Y	2.9E-04	lb/MMBtu	2,3	1.3E-03	5.7E-03
Naphthalene	Y	N	Y	9.7E-05	lb/MMBtu	2,3	4.4E-04	1.9E-03
Nickel	Y	Y	N	3.3E-05	lb/MMBtu	2,4	4.3E-04	1.9E-03
Nitrophenol, 4-	Y	N	Y	1.1E-07	lb/MMBtu	2,3	5.0E-07	2.2E-06
Pentachlorophenol	Y	Y	N	5.1E-08	lb/MMBtu	2	2.3E-07	1.0E-06
Perchloroethylene	Y	Y	N	3.8E-05	lb/MMBtu	2	1.7E-04	7.5E-04
Phosphorus metal, yellow or white	Y	N	N	2.7E-05	lb/MMBtu	2,4	3.5E-04	1.5E-03
Polychlorinated biphenyls	Y	Y	Y	8.2E-09	lb/MMBtu	2,3	3.7E-08	1.6E-07
Polycyclic Organic Matter	Y	N	N	1.3E-04	lb/MMBtu	2	5.6E-04	2.5E-03
Selenium compounds	Y	N	N	2.8E-06	lb/MMBtu	2,4	3.7E-05	1.6E-04
Styrene	Y	Y	Y	1.9E-03	lb/MMBtu	2,3	8.6E-03	3.7E-02
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	Y	Y	Y	8.6E-12	lb/MMBtu	2,3	3.9E-11	1.7E-10
Toluene	Y	Y	Y	3.0E-05	lb/MMBtu	2,3	1.4E-04	5.9E-04
Trichloroethane, 1,1,1-	Y	Y	N	3.1E-05	lb/MMBtu	2	1.4E-04	6.1E-04
Trichloroethylene	Y	Y	Y	3.0E-05	lb/MMBtu	2,3	1.4E-04	5.9E-04
Trichlorofluoromethane	N	Y	Y	4.1E-05	lb/MMBtu	2,3	1.8E-04	8.1E-04
Trichlorophenol, 2,4,6-	Y	N	Y	2.2E-08	lb/MMBtu	2,3	9.9E-08	4.3E-07
Vinyl chloride	Y	Y	Y	1.8E-05	lb/MMBtu	2,3	8.1E-05	3.5E-04
Xylene	Y	Y	Y	2.5E-05	lb/MMBtu	2,3	1.1E-04	4.9E-04
						Total HAP Emissions (related to biomass)	**1.64**	**5.40**
						Total TAP Emissions (related to biomass)	**1.39**	**4.69**

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

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
RTO - Natural Gas/Propane Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	7	7.5E-07	3.3E-06
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	7	5.0E-07	2.2E-06
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	7	4.8E-07	2.1E-06
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	7	5.6E-07	2.5E-06
Ammonia	N	Y	N	3.2	lb/MMscf	7	1.0E-01	4.4E-01
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	7	7.5E-08	3.3E-07
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	7	6.3E-06	2.7E-05
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	8	2.3E-02	1.0E-01
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	7	3.8E-08	1.6E-07
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	7	3.8E-08	1.6E-07
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	7	3.8E-07	1.6E-06
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	7	3.5E-05	1.5E-04
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	7	4.4E-05	1.9E-04
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Cobalt	Y	N	N	8.4E-05	lb/MMscf	7	2.6E-06	1.2E-05
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	7	3.8E-08	1.6E-07
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	7	3.8E-05	1.6E-04
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	7	9.4E-08	4.1E-07
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	7	8.8E-08	3.8E-07
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	8	4.8E-02	2.1E-01
Hexane	Y	Y	Y	1.8	lb/MMscf	7	5.6E-02	2.5E-01
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	7	5.6E-08	2.5E-07
Lead	Y	N	N	5.0E-04	lb/MMscf	7	1.6E-05	6.9E-05
Manganese	Y	Y	N	3.8E-04	lb/MMscf	7	1.2E-05	5.2E-05
Mercury	Y	Y	N	2.6E-04	lb/MMscf	7	8.2E-06	3.6E-05
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	7	1.9E-05	8.4E-05
Nickel	Y	Y	N	2.1E-03	lb/MMscf	7	6.6E-05	2.9E-04
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	8	1.3E-03	5.6E-03
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	7	5.3E-07	2.3E-06
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	7	1.6E-07	6.9E-07
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	7	7.5E-07	3.3E-06
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	7	1.1E-04	4.7E-04
Total HAP Emissions (related to natural gas/propane)							**0.13**	**0.56**
Total TAP Emissions (related to natural gas/propane)							**0.21**	**0.46**

Notes:

1. Emission factor derived based on stack testing data from comparable Enviva facilities and/or engineering judgement and include contingency. The emission factors represent uncontrolled emissions.
2. Emission factors (criteria and HAP/TAP) for wood combustion in a stoker boiler from NCDAQ Wood Waste Combustion Spreadsheet/AP-42, Fifth Edition, Volume 1, Chapter 1.6 - Wood Residue Combustion in Boilers, 09/03.
3. The control efficiency of 97.5% for the RTO is applied to all VOC hazardous and toxic pollutants
4. The control efficiency of the wet electrostatic precipitator (WESP) for filterable particulate matter is applied to all metal hazardous and toxic pollutants from the dryer and duct burners. Actual design filterable efficiency is estimated to 96.4%, but 92.75% is assumed for toxics permitting.

   WESP Control Efficiency for metal HAP 92.8%
5. Chromium VI is a subset of chromium compounds, which is accounted for separately as a HAP. As such, Chromium VI is only calculated as a TAP.
6. The WESP employs a caustic solution in its operation in which hydrochloric acid will have high water solubility. This caustic solution will neutralize the acid and effectively control it by 90%, per conversation on October 18, 2011 with Steven A. Jaasund, P.E. of Lundberg Associates, a manufacturer of WESPs.

   WESP HCl Control Efficiency 90.00%
7. Emission factors for natural gas combustion are from NCDAQ Natural Gas Combustion Spreadsheet and AP-42, Fifth Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion, 07/98. The emission factors for acetaldehyde, acrolein, and ammonia are cited in the NCDAQ spreadsheet as being sourced from the USEPA's WebFIRE database.
8. The RTO burners can fire either natural gas or propane; Propane is worst-case for these HAP emissions. Emission factors for propane combustion from the South Coast Air Quality Management District's Air Emissions Reporting Tool for external combustion equipment fired with LPG.
9. It was assumed that chlorine is not oxidized in the RTO.

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

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
NC - North Carolina
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

Table 4c
Potential Emissions
Dryer #2 Bypass (ES-DRYERBYP-2) (Full Capacity)[1]
Enviva Pellets Northampton, LLC

Calculation Basis

Hourly Throughput	70.83 ODT/hr
Hourly Heat Input Capacity	180 MMBtu/hr
Annual Heat Input Capacity	9,000 MMBtu/yr
Hours of Operation[1]	50 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions per Dryer Line

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	21.4	lb/hr[2]	21.4	0.54
NO_X	26.3	lb/hr[2]	26.3	0.66
SO_2	0.025	lb/MMBtu[3]	4.50	0.113
VOC	14.0	lb/hr[2]	14.0	0.35
$PM/PM_{10}/PM_{2.5}$ Condensable	0.017	lb/MMBtu[4]	3.06	0.077
$PM/PM_{10}/PM_{2.5}$ Filterable	0.33	lb/MMBtu[5]	59.4	1.49
Total $PM/PM_{10}/PM_{2.5}$			62.5	1.56

Notes:

1. During startup and shutdown (for temperature control) or malfunction, excess emissions can be vented out either the dryer bypass stacks or the furnace bypass stacks. Use of the bypass stacks is limited to 2 hours in any 24-hour period and 50 hours per 12-month rolling period for each dryer line. As the feed to the dryer is typically stopped during shutdown and malfunction events, the hourly throughput is equal to the annual average of the dryer feed rate.
2. CO, NO_X, and VOC emission rates based on data from a comparable Enviva facility.
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 condensable PM based on AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.
5. Uncontrolled filterable PM emission factor is based on testing at a comparable Enviva facility.

Table 4c
Potential Emissions
Dryer #2 Bypass (ES-DRYERBYP-2) (Full Capacity)[1]
Enviva Pellets Northampton, LLC

Potential HAP Emissions per Dryer Line

Pollutant	Emission Factor	Units	Footnote	Potential Emissions[1]	
				Max (lb/hr)	Annual (tpy)
Acetaldehyde	0.168	lb/ODT	2	11.9	0.30
Acrolein	0.110	lb/ODT	2	7.79	0.19
Formaldehyde	0.144	lb/ODT	2	10.16	0.25
Methanol	0.105	lb/ODT	2	7.43	0.19
Phenol	0.058	lb/ODT	2	4.08	0.10
Propionaldehyde	0.039	lb/ODT	2	2.73	0.068
Acetophenone	3.2E-09	lb/MMBtu	3	5.76E-07	1.44E-08
Antimony and compounds	7.9E-06	lb/MMBtu	3	1.42E-03	3.56E-05
Arsenic	2.2E-05	lb/MMBtu	3	3.96E-03	9.90E-05
Benzo(a)pyrene	2.6E-06	lb/MMBtu	3	4.68E-04	1.17E-05
Beryllium	1.1E-06	lb/MMBtu	3	1.98E-04	4.95E-06
Cadmium	4.1E-06	lb/MMBtu	3	7.38E-04	1.85E-05
Carbon tetrachloride	4.5E-05	lb/MMBtu	3	8.10E-03	2.03E-04
Chlorine	7.9E-04	lb/MMBtu	3	1.42E-01	3.56E-03
Chlorobenzene	3.3E-05	lb/MMBtu	3	5.94E-03	1.49E-04
Chromium–Other compounds	1.8E-05	lb/MMBtu	3	3.15E-03	7.88E-05
Cobalt compounds	6.5E-06	lb/MMBtu	3	1.17E-03	2.93E-05
Dinitrophenol, 2,4-	1.8E-07	lb/MMBtu	3	3.24E-05	8.10E-07
Di(2-ethylhexyl)phthalate	4.7E-08	lb/MMBtu	3	8.46E-06	2.12E-07
Ethyl benzene	3.1E-05	lb/MMBtu	3	5.58E-03	1.40E-04
Dichloroethane, 1,2-	2.9E-05	lb/MMBtu	3	5.22E-03	1.31E-04
Hydrochloric acid	1.9E-02	lb/MMBtu	3	3.42E+00	8.55E-02
Lead	4.8E-05	lb/MMBtu	3	8.64E-03	2.16E-04
Manganese	1.6E-03	lb/MMBtu	3	2.88E-01	7.20E-03
Mercury	3.5E-06	lb/MMBtu	3	6.30E-04	1.58E-05
Methyl bromide	1.5E-05	lb/MMBtu	3	2.70E-03	6.75E-05
Methyl chloride	2.3E-05	lb/MMBtu	3	4.14E-03	1.04E-04
Trichloroethane, 1,1,1-	3.1E-05	lb/MMBtu	3	5.58E-03	1.40E-04
Naphthalene	9.7E-05	lb/MMBtu	3	1.75E-02	4.37E-04
Nickel	3.3E-05	lb/MMBtu	3	5.94E-03	1.49E-04
Nitrophenol, 4-	1.1E-07	lb/MMBtu	3	1.98E-05	4.95E-07
Pentachlorophenol	5.1E-08	lb/MMBtu	3	9.18E-06	2.30E-07
Perchloroethylene	3.8E-05	lb/MMBtu	3	6.84E-03	1.71E-04
Phosphorus metal, yellow or white	2.7E-05	lb/MMBtu	3	4.86E-03	1.22E-04
Polychlorinated biphenyls	8.2E-09	lb/MMBtu	3	1.47E-06	3.67E-08
Polycyclic Organic Matter	1.3E-04	lb/MMBtu	3	2.25E-02	5.63E-04
Dichloropropane, 1,2-	3.3E-05	lb/MMBtu	3	5.94E-03	1.49E-04
Selenium compounds	2.8E-06	lb/MMBtu	3	5.04E-04	1.26E-05
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	8.6E-12	lb/MMBtu	3	1.55E-09	3.87E-11
Trichloroethylene	3.0E-05	lb/MMBtu	3	5.40E-03	1.35E-04
Trichlorophenol, 2,4,6-	2.2E-08	lb/MMBtu	3	3.96E-06	9.90E-08
Vinyl chloride	1.8E-05	lb/MMBtu	3	3.24E-03	8.10E-05
Total HAP Emissions				**48.10**	**1.20**

Notes:

1. During dryer bypass emissions are not controlled by the WESP and RTO; however, combustion in the furnace still results in a reduction in organic HAP emission rates.
2. Organic HAP emissions rates were derived based on stack testing data from other similar Enviva plants and/or engineering judgement.
3. Emission factors for wood combustion in a stoker boiler from AP-42, Section 1.6 - Wood Residue Combustion in Boilers, 09/03.

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
kg - kilogram
lb - pound
MMBtu - Million British thermal units
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

Reference:

Table 4c
Potential Emissions
Dryer #2 Bypass (ES-DRYERBYP-2) (Full Capacity)[1]
Enviva Pellets Northampton, LLC

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

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

Calculation Basis

Hourly Heat Input Capacity	180 MMBtu/hr
Annual Heat Input Capacity	9,000 MMBtu/yr
Hours of Operation[1]	50 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions per Dryer Line

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	0.60	lb/MMBtu[2]	108.0	2.70
NO_X	0.22	lb/MMBtu[2]	39.60	0.99
SO_2	0.025	lb/MMBtu[2]	4.50	0.113
VOC	0.017	lb/MMBtu[2]	3.06	0.077
Total $PM/PM_{10}/PM_{2.5}$	0.58	lb/MMBtu[2]	103.9	2.60

Notes:

1. During startup and shutdown (for temperature control) or malfunction, excess emissions can be vented out either the dryer bypass stacks or the furnace bypass stacks. Use of the bypass stacks is limited to 2 hours in any 24-hour period and 50 hours per 12-month rolling period for each dryer line.
2. CO, NO_X, SO_2, PM, and VOC emission rates based on AP-42, Chapter 1.6 - Wood Residue Combustion in Boilers, 09/03 for bark/bark and wet wood/wet wood-fired boilers. VOC emission factor excludes formaldehyde.

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

Potential HAP Emissions per Dryer Line

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
Acetaldehyde	8.30E-04	lb/MMBtu	1	1.49E-01	3.74E-03
Acrolein	4.00E-03	lb/MMBtu	1	7.20E-01	1.80E-02
Formaldehyde	4.40E-03	lb/MMBtu	1	7.92E-01	1.98E-02
Phenol	5.10E-05	lb/MMBtu	1	9.18E-03	2.30E-04
Propionaldehyde	6.10E-05	lb/MMBtu	1	1.10E-02	2.75E-04
Acetophenone	3.2E-09	lb/MMBtu	1	5.76E-07	1.44E-08
Antimony and compounds	7.9E-06	lb/MMBtu	1	1.42E-03	3.56E-05
Arsenic	2.2E-05	lb/MMBtu	1	3.96E-03	9.90E-05
Benzo(a)pyrene	2.6E-06	lb/MMBtu	1	4.68E-04	1.17E-05
Beryllium	1.1E-06	lb/MMBtu	1	1.98E-04	4.95E-06
Cadmium	4.1E-06	lb/MMBtu	1	7.38E-04	1.85E-05
Carbon tetrachloride	4.5E-05	lb/MMBtu	1	8.10E-03	2.03E-04
Chlorine	7.9E-04	lb/MMBtu	1	1.42E-01	3.56E-03
Chlorobenzene	3.3E-05	lb/MMBtu	1	5.94E-03	1.49E-04
Chromium–Other compounds	2.1E-05	lb/MMBtu	1	3.78E-03	9.45E-05
Cobalt compounds	6.5E-06	lb/MMBtu	1	1.17E-03	2.93E-05
Dinitrophenol, 2,4-	1.8E-07	lb/MMBtu	1	3.24E-05	8.10E-07
Di(2-ethylhexyl)phthalate	4.7E-08	lb/MMBtu	1	8.46E-06	2.12E-07
Ethyl benzene	3.1E-05	lb/MMBtu	1	5.58E-03	1.40E-04
Dichloroethane, 1,2-	2.9E-05	lb/MMBtu	1	5.22E-03	1.31E-04
Hydrochloric acid	1.9E-02	lb/MMBtu	1	3.42E+00	8.55E-02
Lead	4.8E-05	lb/MMBtu	1	8.64E-03	2.16E-04
Manganese	1.6E-03	lb/MMBtu	1	2.88E-01	7.20E-03
Mercury	3.5E-06	lb/MMBtu	1	6.30E-04	1.58E-05
Methyl bromide	1.5E-05	lb/MMBtu	1	2.70E-03	6.75E-05
Methyl chloride	2.3E-05	lb/MMBtu	1	4.14E-03	1.04E-04
Trichloroethane, 1,1,1-	3.1E-05	lb/MMBtu	1	5.58E-03	1.40E-04
Naphthalene	9.7E-05	lb/MMBtu	1	1.75E-02	4.37E-04
Nickel	3.3E-05	lb/MMBtu	1	5.94E-03	1.49E-04
Nitrophenol, 4-	1.1E-07	lb/MMBtu	1	1.98E-05	4.95E-07
Pentachlorophenol	5.1E-08	lb/MMBtu	1	9.18E-06	2.30E-07
Perchloroethylene	3.8E-05	lb/MMBtu	1	6.84E-03	1.71E-04
Phosphorus metal, yellow or white	2.7E-05	lb/MMBtu	1	4.86E-03	1.22E-04
Polychlorinated biphenyls	8.2E-09	lb/MMBtu	1	1.47E-06	3.67E-08
Polycyclic Organic Matter	1.3E-04	lb/MMBtu	1	2.25E-02	5.63E-04
Dichloropropane, 1,2-	3.3E-05	lb/MMBtu	1	5.94E-03	1.49E-04
Selenium compounds	2.8E-06	lb/MMBtu	1	5.04E-04	1.26E-05
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	8.6E-12	lb/MMBtu	1	1.55E-09	3.87E-11
Trichloroethylene	3.0E-05	lb/MMBtu	1	5.40E-03	1.35E-04
Trichlorophenol, 2,4,6-	2.2E-08	lb/MMBtu	1	3.96E-06	9.90E-08
Vinyl chloride	1.8E-05	lb/MMBtu	1	3.24E-03	8.10E-05
Total HAP Emissions (Biomass Combustion)				**5.66**	**0.14**

Notes:

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

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
lb - pound
MMBtu - Million British thermal units
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

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

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

Calculation Basis

Hourly Heat Input Capacity	5 MMBtu/hr
Annual Heat Input Capacity	2,500 MMBtu/yr
Hours of Operation[1]	500 hr/yr

Potential Criteria Pollutant and Greenhouse Gas Emissions per Dryer Line

Pollutant	Emission Factor	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	0.60	lb/MMBtu[2]	3.00	0.75
NO_X	0.22	lb/MMBtu[2]	1.10	0.28
SO_2	0.025	lb/MMBtu[2]	0.13	0.031
VOC	0.017	lb/MMBtu[2]	0.085	0.021
Total PM	0.58	lb/MMBtu[2]	2.89	0.72
Total PM_{10}	0.52	lb/MMBtu[2]	2.59	0.65
Total $PM_{2.5}$	0.45	lb/MMBtu[2]	2.24	0.56

Notes:

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

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

Potential HAP Emissions per Dryer Line

Pollutant	Emission Factor	Units	Footnote	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
Acetaldehyde	8.30E-04	lb/MMBtu	1	4.15E-03	1.04E-03
Acrolein	4.00E-03	lb/MMBtu	1	2.00E-02	5.00E-03
Formaldehyde	4.40E-03	lb/MMBtu	1	2.20E-02	5.50E-03
Phenol	5.10E-05	lb/MMBtu	1	2.55E-04	6.38E-05
Propionaldehyde	6.10E-05	lb/MMBtu	1	3.05E-04	7.63E-05
Acetophenone	3.2E-09	lb/MMBtu	1	1.60E-08	4.00E-09
Antimony and compounds	7.9E-06	lb/MMBtu	1	3.95E-05	9.88E-06
Arsenic	2.2E-05	lb/MMBtu	1	1.10E-04	2.75E-05
Benzo(a)pyrene	2.6E-06	lb/MMBtu	1	1.30E-05	3.25E-06
Beryllium	1.1E-06	lb/MMBtu	1	5.50E-06	1.38E-06
Cadmium	4.1E-06	lb/MMBtu	1	2.05E-05	5.13E-06
Carbon tetrachloride	4.5E-05	lb/MMBtu	1	2.25E-04	5.63E-05
Chlorine	7.9E-04	lb/MMBtu	1	3.95E-03	9.88E-04
Chlorobenzene	3.3E-05	lb/MMBtu	1	1.65E-04	4.13E-05
Chromium–Other compounds	2.1E-05	lb/MMBtu	1	1.05E-04	2.63E-05
Cobalt compounds	6.5E-06	lb/MMBtu	1	3.25E-05	8.13E-06
Dinitrophenol, 2,4-	1.8E-07	lb/MMBtu	1	9.00E-07	2.25E-07
Di(2-ethylhexyl)phthalate	4.7E-08	lb/MMBtu	1	2.35E-07	5.88E-08
Ethyl benzene	3.1E-05	lb/MMBtu	1	1.55E-04	3.88E-05
Dichloroethane, 1,2-	2.9E-05	lb/MMBtu	1	1.45E-04	3.63E-05
Hydrochloric acid	1.9E-02	lb/MMBtu	1	9.50E-02	2.38E-02
Lead	4.8E-05	lb/MMBtu	1	2.40E-04	6.00E-05
Manganese	1.6E-03	lb/MMBtu	1	8.00E-03	2.00E-03
Mercury	3.5E-06	lb/MMBtu	1	1.75E-05	4.38E-06
Methyl bromide	1.5E-05	lb/MMBtu	1	7.50E-05	1.88E-05
Methyl chloride	2.3E-05	lb/MMBtu	1	1.15E-04	2.88E-05
Trichloroethane, 1,1,1-	3.1E-05	lb/MMBtu	1	1.55E-04	3.88E-05
Naphthalene	9.7E-05	lb/MMBtu	1	4.85E-04	1.21E-04
Nickel	3.3E-05	lb/MMBtu	1	1.65E-04	4.13E-05
Nitrophenol, 4-	1.1E-07	lb/MMBtu	1	5.50E-07	1.38E-07
Pentachlorophenol	5.1E-08	lb/MMBtu	1	2.55E-07	6.38E-08
Perchloroethylene	3.8E-05	lb/MMBtu	1	1.90E-04	4.75E-05
Phosphorus metal, yellow or white	2.7E-05	lb/MMBtu	1	1.35E-04	3.38E-05
Polychlorinated biphenyls	8.2E-09	lb/MMBtu	1	4.08E-08	1.02E-08
Polycyclic Organic Matter	1.3E-04	lb/MMBtu	1	6.25E-04	1.56E-04
Dichloropropane, 1,2-	3.3E-05	lb/MMBtu	1	1.65E-04	4.13E-05
Selenium compounds	2.8E-06	lb/MMBtu	1	1.40E-05	3.50E-06
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	8.6E-12	lb/MMBtu	1	4.30E-11	1.08E-11
Trichloroethylene	3.0E-05	lb/MMBtu	1	1.50E-04	3.75E-05
Trichlorophenol, 2,4,6-	2.2E-08	lb/MMBtu	1	1.10E-07	2.75E-08
Vinyl chloride	1.8E-05	lb/MMBtu	1	9.00E-05	2.25E-05
Total HAP Emissions (Biomass Combustion)				**0.16**	**0.039**

Notes:

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

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
HAP - hazardous air pollutant
hr - hour
kg - kilogram
lb - pound
MMBtu - Million British thermal units
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

Reference:

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

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

Duct Burner Inputs

Duct Burner Rating	1 MMBtu/hr
Number of Duct Burners	2
Annual Operation	8,760 hr/yr

Potential Criteria Pollutant Emissions:

Potential Criteria Pollutant Emissions - Natural Gas Combustion

Pollutant	Emission Factor	Units	Emission Factor Source	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
CO	84.0	lb/MMscf	Note 1	0.16	0.72
NO_X	50.0	lb/MMscf	Note 2	0.10	0.43
SO_2	0.60	lb/MMscf	Note 1	0.0012	0.005
VOC	5.50	lb/MMscf	Note 1	0.01	0.05
$PM/PM_{10}/PM_{2.5}$ Condensable	5.70	lb/MMscf	Note 1	0.01	0.05
$PM/PM_{10}/PM_{2.5}$ Filterable	1.90	lb/MMscf	Note 1	0.004	0.02
Total $PM/PM_{10}/PM_{2.5}$				0.015	0.065

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

Potential Criteria Pollutant Emissions - Propane Combustion

Pollutant	Emission Factor	Units	Emission Factor Source	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
CO	7.50	lb/Mgal	Note 3	0.16	0.72
NO_X	6.50	lb/Mgal	Note 4	0.14	0.62
SO_2	0.054	lb/Mgal	Note 3,5	0.001	0.005
VOC	1.00	lb/Mgal	Note 3	0.02	0.10
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	Note 3	0.01	0.05
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	Note 3	0.004	0.02
Total $PM/PM_{10}/PM_{2.5}$				0.015	0.067

Notes:

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

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

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Duct Burners - Natural Gas/Propane Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	1	4.7E-08	2.1E-07
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	1	3.1E-08	1.4E-07
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	1	3.0E-08	1.3E-07
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	1	3.5E-08	1.5E-07
Ammonia	N	Y	N	3.2	lb/MMscf	1	6.3E-03	2.7E-02
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	1	4.7E-09	2.1E-08
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	1	3.9E-07	1.7E-06
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	2	1.4E-03	6.2E-03
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	1	2.4E-09	1.0E-08
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	1	2.4E-09	1.0E-08
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	1	2.4E-08	1.0E-07
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	1	2.2E-06	9.4E-06
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	1	2.7E-06	1.2E-05
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Cobalt	Y	N	N	8.4E-05	lb/MMscf	1	1.6E-07	7.2E-07
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	1	2.4E-09	1.0E-08
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	1	2.4E-06	1.0E-05
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	1	5.9E-09	2.6E-08
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	1	5.5E-09	2.4E-08
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	2	3.0E-03	1.3E-02
Hexane	Y	Y	Y	1.8	lb/MMscf	1	3.5E-03	1.5E-02
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	1	3.5E-09	1.5E-08
Lead	Y	N	N	5.0E-04	lb/MMscf	1	9.8E-07	4.3E-06
Manganese	Y	Y	N	3.8E-04	lb/MMscf	1	7.5E-07	3.3E-06
Mercury	Y	Y	N	2.6E-04	lb/MMscf	1	5.1E-07	2.2E-06
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	1	1.2E-06	5.2E-06
Nickel	Y	Y	N	2.1E-03	lb/MMscf	1	4.1E-06	1.8E-05
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	8	8.0E-05	3.5E-04
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	1	3.3E-08	1.5E-07
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	1	9.8E-09	4.3E-08
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	1	4.7E-08	2.1E-07
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	1	6.7E-06	2.9E-05
Total HAP Emissions (related to natural gas/propane)							**0.008**	**0.035**
Total TAP Emissions (related to natural gas/propane)							**0.01**	**0.056**

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

Notes:

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

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

Abbreviations:

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
NC - North Carolina
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

Table 5
Potential Emissions
Propane Vaporizer (IES-PVAP)
Enviva Pellets Northampton, LLC

Calculation Basis

Heat Content[1]	91.5	MMBtu/10^3 gal propane
Hours of Operation	8,760	hr/yr
Vaporizer Heat Input[2]	1.00	MMBtu/hr

Notes:

1. Propane heat content from AP-42 Section 1.5 - Liquefied Petroleum Gas Production, 7/08, Table 1.5-1, footnote a.
2. Heat input based on information provided by Enviva in August 2018.

Potential Criteria Pollutant Emissions

Pollutant	Emission Factor [1]	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	7.5	lb/10^3 gal	0.08	0.36
NO_X	13.0	lb/10^3 gal	0.14	0.62
SO_2[2]	0.05	lb/10^3 gal	0.001	0.003
TOC	1.0	lb/10^3 gal	0.01	0.05
$PM/PM_{10}/PM_{2.5}$[3]	0.70	lb/10^3 gal	0.01	0.03

Notes:

1. Emission factors obtained from AP 42 1.5, Liquefied Petroleum Gas Production, 10/96, Table 1.5-1.
2. AP 42 1.5, Liquefied Petroleum Gas Production, 10/96, Table 1.5-1 provides an SO_2 emission factor of 0.10S, where S equals the sulfur content of the fuel. The national sulfur fuel content for LPG of 0.54 grains/100 ft^3 as assigned by EPA was used (Source: A National Methodology and Emission Inventory for Residential Fuel Combustion).
3. All particulate matter was conservatively assumed to be less than 2.5 microns in size.

Potential HAP Emissions

Pollutant	CAS No.	Emission Factor[1]	Potential Emissions	
		(lb/MMBtu)	Max (lb/hr)	Annual (tpy)
Benzene	71-43-2	7.1E-04	7.10E-04	3.11E-03
Formaldehyde	50-00-0	1.5E-03	1.50E-03	6.57E-03
PAHs		4.0E-05	4.0E-05	1.75E-04
Total HAP Emissions			**0.002**	**0.010**

Notes:

1. Emission factors for propane combustion from the South Coast Air Quality Management District's Air Emissions Reporting Tool for external combustion equipment fired with LPG.

Abbreviations:

Btu - British thermal unit
CAS - chemical abstract service
CH_4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
CO_2e - carbon dioxide equivalent
g - gram
gal - gallon
HAP - hazardous air pollutant
hp - horsepower
hr - hour
kg - kilogram
kW - kilowatt
lb - pound
MW - megawatt
MMBtu - Million British thermal units
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PAH - polycyclic aromatic hydrocarbon
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
POM - polycyclic organic matter
SO_2 - sulfur dioxide
tpy - tons per year
VOC - volatile organic compound
yr - year

References:

Advanced Environmental Interface, Inc. (1998). General Permits for Emergency Engines. INSIGHTS, 98-2, 3.
AP-42 Chapter 3.3, Stationary Internal Combustion Engines, 10/96.

Table 6a
Potential VOC and HAP Emissions
Pellet Coolers (ES-CLR-1 through ES-CLR-6)
Enviva Pellets Northampton, LLC

Calculation Basis

Annual Throughput	781,255 ODT/yr
Hourly Throughput	144 ODT/hr
Hours of Operation	8,760 hr/yr
Number of Burners	2 burners
RCO/RTO Burner Rating	9.8 MMBtu/hr
RCO/RTO Control Efficiency	95.0%

Pellet Cooler and Pellet Mill Potential Process VOC and HAP Emissions

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

Notes:

1. Emission factors were derived based on stack testing data from comparable Enviva facilities and/or engineering judgement and include contingency. The emission factors represent uncontrolled emissions.
2. A 95.0% control efficiency is applied to the potential emissions for the RCO.
Emissions from the pellet mills and pellet coolers will be controlled by an RCO that will operate primarily in catalytic mode with thermal (RTO) mode as a backup. The RTO and RCO modes have the same control efficiency so there will be no impact on emissions when operating in thermal mode.

Thermal Generated Potential Criteria Pollutant Emissions

Maximum high heating value of VOC constituents	1.8E-02 MMBtu/lb
Uncontrolled VOC emissions[1]	632 tons/yr
Heat input of uncontrolled VOC emissions	23,391 MMBtu/yr

Pollutant	Emission Factor[2]	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	8.2E-02	lb/MMBtu	0.22	0.96
NO_X	9.8E-02	lb/MMBtu	0.26	1.15

Natural Gas Combustion Potential Criteria Pollutant Emissions

Pollutant	Emission Factor[2]	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	8.2E-02	lb/MMBtu	1.6	7.07
NO_X	9.8E-02	lb/MMBtu	1.9	8.42
SO_2	5.9E-04	lb/MMBtu	1.2E-02	0.05
VOC	5.4E-03	lb/MMBtu	0.11	0.46
Total PM	7.5E-03	lb/MMBtu	0.15	0.64
Total PM_{10}	7.5E-03	lb/MMBtu	0.15	0.64
Total $PM_{2.5}$	7.5E-03	lb/MMBtu	0.15	0.64

Potential Criteria Pollutant Emissions - Propane Combustion

Pollutant	Emission Factor[3]	Units	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
CO	7.50	lb/Mgal	1.61	7.04
NO_X	6.50	lb/Mgal	1.39	6.10
SO_2	0.054	lb/Mgal	0.01	0.05
VOC	1.00	lb/Mgal	0.21	0.94
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	0.11	0.47
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	0.04	0.19
Total $PM/PM_{10}/PM_{2.5}$			0.15	0.66

Table 6a
Potential VOC and HAP Emissions
Pellet Coolers (ES-CLR-1 through ES-CLR-6)
Enviva Pellets Northampton, LLC

Natural Gas Combustion Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Natural Gas Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	4	4.6E-07	2.0E-06
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	4	3.5E-08	1.5E-07
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	4	3.1E-07	1.3E-06
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	4	3.5E-08	1.5E-07
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	4	3.5E-08	1.5E-07
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	4	2.9E-07	1.3E-06
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	4	3.5E-07	1.5E-06
Ammonia	N	Y	N	3.2	lb/MMscf	4	0.06	0.27
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	4	4.6E-08	2.0E-07
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	4	3.8E-06	1.7E-05
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	4	3.5E-08	1.5E-07
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	5	1.4E-02	6.1E-02
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	4	2.3E-08	1.0E-07
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	4	3.5E-08	1.5E-07
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	4	2.3E-08	1.0E-07
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	4	3.5E-08	1.5E-07
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	4	2.3E-07	1.0E-06
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	4	2.1E-05	9.3E-05
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	4	2.7E-05	1.2E-04
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	4	3.5E-08	1.5E-07
Cobalt Compounds	Y	N	N	8.4E-05	lb/MMscf	4	1.6E-06	7.1E-06
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	4	2.3E-08	1.0E-07
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	4	2.3E-05	1.0E-04
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	4	5.8E-08	2.5E-07
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	4	5.4E-08	2.4E-07
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	5	2.9E-02	1.3E-01
Hexane	Y	Y	Y	1.8	lb/MMscf	4	3.5E-02	0.15
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	4	3.5E-08	1.5E-07
Lead	Y	N	N	5.0E-04	lb/MMscf	4	9.6E-06	4.2E-05
Manganese	Y	Y	N	3.8E-04	lb/MMscf	4	7.3E-06	3.2E-05
Mercury	Y	Y	N	2.6E-04	lb/MMscf	4	5.0E-06	2.2E-05
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	4	1.2E-05	5.1E-05
Nickel	Y	Y	N	2.1E-03	lb/MMscf	4	4.0E-05	1.8E-04
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	5	7.8E-04	3.4E-03
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	4	3.3E-07	1.4E-06
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	4	9.6E-08	4.2E-07
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	4	4.6E-07	2.0E-06
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	4	6.5E-05	2.9E-04
Total HAP Emissions (natural gas combustion)							**0.079**	**0.35**
Total TAP Emissions (natural gas combustion)							**0.13**	**0.55**

Notes:

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

Abbreviations:

CAS - chemical abstract service
HAP - hazardous air pollutant
hr - hour
lb - pound
NC - North Carolina
ODT - oven dried tons
RCO - regenerative catalytic oxidizer
RTO - regenerative thermal oxidizer
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

Table 6b
Potential VOC and HAP Emissions
Dry Hammermills (ES-HM-1 through ES-HM-8)
Enviva Pellets Northampton, LLC

Calculation Basis

Total Plant Throughput	781,255	ODT/yr
% of Total Throughput to the Hammermills	85%	
Hours of Operation	8760	hr/yr

Hammermills Annual Throughput	664,067	ODT/yr
Hammermills Hourly Throughput	144	ODT/hr
Control Efficiency[1]	95.0%	

Potential VOC and HAP Emissions

Pollutant	CAS No.	HAP	NC TAP	VOC	Emission Factor[2] (lb/ODT)	Potential Emissions Max (lb/hr)	Potential Emissions Annual (tpy)
Acetaldehyde	75-07-0	Y	Y	Y	0.0073	0.05	0.12
Acrolein	107-02-8	Y	Y	Y	0.0092	0.07	0.15
Formaldehyde	50-00-0	Y	Y	Y	0.0071	0.05	0.12
Methanol	67-56-1	Y	N	Y	0.0071	0.05	0.12
Phenol	108-95-2	Y	Y	Y	0.0028	0.02	0.05
Propionaldehyde	123-38-6	Y	N	Y	0.0124	0.09	0.21
					Total HAP Emissions	**0.33**	**0.76**
					Total TAP Emissions	**0.19**	**0.44**
Total VOC (as propane)	--		--	Y	0.77	5.51	12.70

Thermal Generated Potential Criteria Pollutant Emissions

Maximum high heating value of VOC constituents	1.8E-02 MMBtu/lb
Uncontrolled VOC emissions	254 tons/yr
Heat input of uncontrolled VOC emissions	9,396 MMBtu/yr

Pollutant	Emission Factor[3]	Units	Potential Emissions Max (lb/hr)	Potential Emissions Annual (tpy)
CO	8.2E-02	lb/MMBtu	0.09	0.39
NO_X	9.8E-02	lb/MMBtu	0.11	0.46

Notes:

1. Emissions from the dry hammermills are controlled by the RCO with estimated control efficiency of 95.0%.
2. Emission factors were derived based on stack testing data from comparable Enviva facilities and/or engineering judgement and include contingency. The emission factors represent uncontrolled emissions.
3. CO and NOx emission factors are from AP-42, Fifth Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion, 07/98 for small boilers.

Abbreviations:

CAS - chemical abstract service
HAP - hazardous air pollutant
hr - hour
lb - pound
NC - North Carolina
ODT - oven dried tons
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

Table 6c
Potential VOC and HAP Emissions
Dry Shavings Hammermills (ES-DSHM-1 and -2)
Enviva Pellets Northampton, LLC

Calculation Basis

Hammermills Hourly Throughput	24	ODT/hr
Hammermills Annual Throughput	210,240	ODT/yr
Control Efficiency[1]	95.0%	

Potential VOC and HAP Emissions

Pollutant	CAS No.	HAP	NC TAP	VOC	Emission Factor[2] (lb/ODT)	Potential Emissions Max (lb/hr)	Potential Emissions Annual (tpy)
Acetaldehyde	75-07-0	Y	Y	Y	0.0073	0.009	0.04
Acrolein	107-02-8	Y	Y	Y	0.0092	0.011	0.05
Formaldehyde	50-00-0	Y	Y	Y	0.0071	0.009	0.04
Methanol	67-56-1	Y	N	Y	0.0071	0.009	0.04
Phenol	108-95-2	Y	Y	Y	0.0028	0.003	0.01
Propionaldehyde	123-38-6	Y	N	Y	0.0124	0.015	0.07
Total HAP Emissions						**0.06**	**0.24**
Total TAP Emissions						**0.03**	**0.14**
Total VOC (as propane)	--		--	Y	0.765	0.92	4.02

Thermal Generated Potential Criteria Pollutant Emissions

Maximum high heating value of VOC constituents	1.8E-02	MMBtu/lb
Uncontrolled VOC emissions	80	tons/yr
Heat input of uncontrolled VOC emissions	2,975	MMBtu/yr

Pollutant	Emission Factor[3]	Units	Potential Emissions Max (lb/hr)	Potential Emissions Annual (tpy)
CO	8.2E-02	lb/MMBtu	0.03	0.12
NO_X	9.8E-02	lb/MMBtu	0.03	0.15

Notes:

1. Exhaust from the two drying sahvings hammermills will be routed to the RCO at the pellet building, which controls VOC and HAP emissions with a 95.0% control efficiency.
2. Emission factors were derived based on stack testing data from comparable Enviva facilities and/or engineering judgement and include contingency. The emission factors represent uncontrolled emissions.
3. CO and NOx emission factors are from AP-42, Fifth Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion, 07/98 for small boilers.

Abbreviations:

CAS - chemical abstract service
HAP - hazardous air pollutant
hr - hour
lb - pound
NC - North Carolina
ODT - oven dried tons
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
yr - year

Table 6d
Potential Emissions
RCO Double Duct Burners (IES-DDB-5 through -8)
Enviva Pellets Northampton, LLC

Duct Burner Inputs

Duct Burner Rating	1	MMBtu/hr
Number of Duct Burners	4	
Annual Operation	8,760	hr/yr

Potential Criteria Pollutant Emissions:

Potential Criteria Pollutant Emissions - Natural Gas Combustion

Pollutant	Emission Factor	Units	Emission Factor Source	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
CO	84.0	lb/MMscf	Note 1	0.33	1.44
NO_X	50.0	lb/MMscf	Note 2	0.20	0.86
SO_2	0.60	lb/MMscf	Note 1	0.0024	0.010
VOC	5.50	lb/MMscf	Note 1	0.02	0.09
$PM/PM_{10}/PM_{2.5}$ Condensable	5.70	lb/MMscf	Note 1	0.02	0.10
$PM/PM_{10}/PM_{2.5}$ Filterable	1.90	lb/MMscf	Note 1	0.007	0.03
Total $PM/PM_{10}/PM_{2.5}$				0.030	0.131

Table 6d
Potential Emissions
RCO Double Duct Burners (IES-DDB-5 through -8)
Enviva Pellets Northampton, LLC

Potential Criteria Pollutant Emissions - Propane Combustion

Pollutant	Emission Factor[3]	Units	Emission Factor Source	Potential Emissions	
				Max (lb/hr)	Annual (tpy)
CO	7.50	lb/Mgal	Note 3	0.33	1.44
NO_X	6.50	lb/Mgal	Note 4	0.28	1.24
SO_2	0.054	lb/Mgal	Note 3,5	0.002	0.010
VOC	1.00	lb/Mgal	Note 3	0.04	0.19
$PM/PM_{10}/PM_{2.5}$ Condensable	0.50	lb/Mgal	Note 3	0.02	0.10
$PM/PM_{10}/PM_{2.5}$ Filterable	0.20	lb/Mgal	Note 3	0.009	0.04
Total $PM/PM_{10}/PM_{2.5}$				0.031	0.134

Notes:

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

Table 6d
Potential Emissions
RCO Double Duct Burners (IES-DDB-5 through -8)
Enviva Pellets Northampton, LLC

Potential HAP and TAP Emissions

Pollutant	HAP	NC TAP	VOC	Emission Factor	Units	Footnote	Potential Emissions	
							Max (lb/hr)	Annual (tpy)
Duct Burners - Natural Gas/Propane Source								
2-Methylnaphthalene	Y	N	Y	2.4E-05	lb/MMscf	1	9.4E-08	4.1E-07
3-Methylchloranthrene	Y	N	Y	1.8E-06	lb/MMscf	1	7.1E-09	3.1E-08
7,12-Dimethylbenz(a)anthracene	Y	N	Y	1.6E-05	lb/MMscf	1	6.3E-08	2.7E-07
Acenaphthene	Y	N	Y	1.8E-06	lb/MMscf	1	7.1E-09	3.1E-08
Acenaphthylene	Y	N	Y	1.8E-06	lb/MMscf	1	7.1E-09	3.1E-08
Acetaldehyde	Y	Y	Y	1.5E-05	lb/MMscf	1	6.0E-08	2.6E-07
Acrolein	Y	Y	Y	1.8E-05	lb/MMscf	1	7.1E-08	3.1E-07
Ammonia	N	Y	N	3.2	lb/MMscf	1	1.3E-02	5.5E-02
Anthracene	Y	N	Y	2.4E-06	lb/MMscf	1	9.4E-09	4.1E-08
Arsenic	Y	Y	N	2.0E-04	lb/MMscf	1	7.8E-07	3.4E-06
Benz(a)anthracene	Y	N	Y	1.8E-06	lb/MMscf	1	7.1E-09	3.1E-08
Benzene	Y	N	Y	7.1E-04	lb/MMBtu	2	2.8E-03	1.2E-02
Benzo(a)pyrene	Y	Y	Y	1.2E-06	lb/MMscf	1	4.7E-09	2.1E-08
Benzo(b)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	1	7.1E-09	3.1E-08
Benzo(g,h,i)perylene	Y	N	Y	1.2E-06	lb/MMscf	1	4.7E-09	2.1E-08
Benzo(k)fluoranthene	Y	N	Y	1.8E-06	lb/MMscf	1	7.1E-09	3.1E-08
Beryllium	Y	Y	N	1.2E-05	lb/MMscf	1	4.7E-08	2.1E-07
Cadmium	Y	Y	N	1.1E-03	lb/MMscf	1	4.3E-06	1.9E-05
Chromium VI	Y	N	N	1.4E-03	lb/MMscf	1	5.5E-06	2.4E-05
Chrysene	Y	N	Y	1.8E-06	lb/MMscf	1	7.1E-09	3.1E-08
Cobalt	Y	N	N	8.4E-05	lb/MMscf	1	3.3E-07	1.4E-06
Dibenzo(a,h)anthracene	Y	N	Y	1.2E-06	lb/MMscf	1	4.7E-09	2.1E-08
Dichlorobenzene	Y	Y	Y	1.2E-03	lb/MMscf	1	4.7E-06	2.1E-05
Fluoranthene	Y	N	Y	3.0E-06	lb/MMscf	1	1.2E-08	5.2E-08
Fluorene	Y	N	Y	2.8E-06	lb/MMscf	1	1.1E-08	4.8E-08
Formaldehyde	Y	Y	Y	1.5E-03	lb/MMBtu	2	6.0E-03	2.6E-02
Hexane	Y	Y	Y	1.8	lb/MMscf	1	7.1E-03	3.1E-02
Indeno(1,2,3-cd)pyrene	Y	N	Y	1.8E-06	lb/MMscf	1	7.1E-09	3.1E-08
Lead	Y	N	N	5.0E-04	lb/MMscf	1	2.0E-06	8.6E-06
Manganese	Y	Y	N	3.8E-04	lb/MMscf	1	1.5E-06	6.5E-06
Mercury	Y	Y	N	2.6E-04	lb/MMscf	1	1.0E-06	4.5E-06
Naphthalene	Y	N	Y	6.1E-04	lb/MMscf	1	2.4E-06	1.0E-05
Nickel	Y	Y	N	2.1E-03	lb/MMscf	1	8.2E-06	3.6E-05
Polycyclic Organic Matter	Y	N	N	4.0E-05	lb/MMBtu	8	1.6E-04	7.0E-04
Phenanthrene	Y	N	Y	1.7E-05	lb/MMscf	1	6.7E-08	2.9E-07
Pyrene	Y	N	Y	5.0E-06	lb/MMscf	1	2.0E-08	8.6E-08
Selenium compounds	Y	N	N	2.4E-05	lb/MMscf	1	9.4E-08	4.1E-07
Toluene	Y	Y	Y	3.4E-03	lb/MMscf	1	1.3E-05	5.8E-05
Total HAP Emissions (related to natural gas/propane)							**0.016**	**0.071**
Total TAP Emissions (related to natural gas/propane)							**0.03**	**0.112**

Table 6d
Potential Emissions
RCO Double Duct Burners (IES-DDB-5 through -8)
Enviva Pellets Northampton, LLC

Notes:

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

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

Abbreviations:

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
NC - North Carolina
NO_X - nitrogen oxides
N_2O - nitrous oxide
ODT - oven dried tons
PM - particulate matter
PM_{10} - particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$ - particulate matter with an aerodynamic diameter of 2.5 microns or less
RTO - regenerative thermal oxidizer
SO_2 - sulfur dioxide
TAP - toxic air pollutant
tpy - tons per year
VOC - volatile organic compound
WESP - wet electrostatic precipitator
yr - year

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

Calculation Basis

Hourly Throughput[1]	142 ODT/hr
Annual Throughput[1]	781,255 ODT/yr

Potential Criteria Pollutant Emissions

Pollutant	Emission Factor (lb/ODT)	Potential Emissions	
		Max (lb/hr)	Annual (tpy)
Formaldehyde	8.4E-04	0.119	0.33
Methanol	2.0E-03	0.28	0.76
Total HAP Emissions		**0.40**	**1.09**
VOC as carbon[2]	0.10	14.3	39.5
VOC as propane[3]	0.12	17.6	48.5

Notes:

1. Hourly and annual throughputs assumed to be the same as dry hammermill throughput.
2. Emission factors derived from NCASI's Wood Products Database (February 2013) for dry wood handling operations at an OSB mill, mean emission factors. The emission factors were converted from lb/MSF (3/8") to lb/ODT using the typical density and moisture content of an OSB panel.
3. VOC as propane = (1.22 x VOC as carbon) + formaldehyde.

Abbreviations:

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

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

Emission Unit ID	Source Description	Control Device ID	Control Device Description	Exhaust Flow Rate[1]	Exit Grain Loading[2]	Annual Operation	Particulate Speciation		Potential Emissions					
									PM		PM_{10}		$PM_{2.5}$	
				(cfm)	(gr/cf)	(hours)	PM_{10} (% of PM)	$PM_{2.5}$ (% of PM)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)
ES-HM-1 through 3	Dry Hammermills 1 through 3	CD-HM-BF-1	One (1) existing baghouse and one (1) new wet scrubber[3,4]	45,000	0.004	8760	100%	1.7%	1.54	6.76	1.54	6.76	0.03	0.11
ES-HM-4 through 6	Dry Hammermills 4 through 6	CD-HM-BF-2	One (1) existing baghouse and one (1) new wet scrubber[3,4]	45,000	0.004	8760	100%	1.7%	1.54	6.76	1.54	6.76	0.03	0.11
ES-HM-7 and 8; ES-NDS; ES-DLC-1	Dry Hammermills 7 through 8; Dry Line Feed Conveyor	CD-HM-BF-3	One (1) existing baghouse and one (1) new wet scrubber[3,4]	45,000	0.004	8760	100%	1.7%	1.54	6.76	1.54	6.76	0.03	0.11
ES-PS-1 and -2	Dry Hammermill Prescreeners 1 and 2	CD-PS-BF	One (1) baghouse[5]	17,100	0.004	8760	100%	100%	0.59	2.57	0.59	2.57	0.59	2.57
ES-PCHP	Pellet Cooler HP Fines Relay System	CD-PCHP-BF	One (1) baghouse[5]	3,600	0.004	8760	100%	100%	0.12	0.54	0.12	0.54	0.12	0.54
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BV	Bin Vent Filter[5]	2,500	0.004	8760	100%	100%	0.09	0.38	0.09	0.38	0.09	0.38
ES-CLR-1	Pellet Cooler	CD-CLR-1	One (1) existing Cyclone and one new wet scrubber[6]	17,100	0.01	8760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.05	0.21
ES-CLR-2	Pellet Cooler	CD-CLR-2	One (1) existing Cyclone and one new wet scrubber[6]	17,100	0.01	8760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.05	0.21
ES-CLR-3	Pellet Cooler	CD-CLR-3	One (1) existing Cyclone and one new wet scrubber[6]	17,100	0.01	8760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.05	0.21
ES-CLR-4	Pellet Cooler	CD-CLR-4	One (1) existing Cyclone and one new wet scrubber[6]	17,100	0.01	8760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.05	0.21
ES-CLR-5	Pellet Cooler	CD-CLR-5	One (1) existing Cyclone and one new wet scrubber[6]	17,100	0.01	8760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.05	0.21
ES-CLR-6	Pellet Cooler	CD-CLR-6	One (1) existing Cyclone and one new wet scrubber[6]	17,100	0.01	8760	26.1%	3.2%	1.47	6.42	0.38	1.68	0.05	0.21
ES-DWH	Dried Wood Handling	CD-DWH-BF	One (1) baghouse[6]	1,500	0.004	8760	100%	100%	0.05	0.23	0.05	0.23	0.05	0.23
ES-DSHM-1 and -2	Dry shavings Hammermills 1 and 2	CD-DSHM-BF	Three (3) existing DHM/HMA baghouses, one (1) new wet scrubber[6]	20,000	0.004	8760	100%	1.7%	0.69	3.00	0.69	3.00	0.01	0.05
ES-FPH; ES-PB-1 through 12; ES-PL-1 and -2	Finished Product Handling; Twelve pellet loadout bins; Pellet mill load-out 1 and 2	CD-FPH-BV	One (1) baghouse[4,7]	35,500	0.004	8760	91%	2%	1.22	5.33	1.11	4.85	0.02	0.09
IES-DSS	Dry Shavings Silo	CD-DSS-BF	One (1) baghouse[5]	3,600	0.004	8760	100%	100%	0.12	0.54	0.12	0.54	1.2E-01	0.54
IES-ADD	Additive Handling and Storage	CD-ADD-BF	One (1) baghouse[5]	1,652	0.004	117	100%	100%	0.057	0.00	0.057	0.00	0.057	0.00

Notes:

1. Filter, Vent, and Cyclone inlet flow rate (cfm) provided by design engineering firm (Mid-South Engineering Co.). The exit flowrate was conservataively assumed to be the same as the inlet flowrate.
2. Pollutant loading provided by Aircon. For Pellet Coolers, pollutant loading based on data from other Enviva facilities reflecting addition of either a WESP or baghouse.
3. No speciation data is available for PM_{10}. Therefore, it is conservatively assumed to be equal to total PM.
4. Dry Hammermills and finished product handling $PM_{2.5}$ speciation based on April 2014 Enviva Southampton $PM_{2.5}$ speciation tests.
5. No speciation data is available for PM_{10}/$PM_{2.5}$. Therefore, it is conservatively assumed to be equal to total PM.
6. Pellet cooler PM_{10}/$PM_{2.5}$ speciation based on data for similar Enviva facility.
7. 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.
8. Exhaust flow and grain loading for the Dry Shavings Hammermill Baghouse was estimated based on the flow and loading for the existing dry hammermills.

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

Source	Transfer Activity[1]	Control	Control Description	Number of Drop Points	Material Moisture Content	PM Emission Factor[2]	PM_{10} Emission Factor[2]	$PM_{2.5}$ Emission Factor[2]	Potential Throughput[3]		Potential PM Emissions		Potential PM_{10} Emissions		Potential $PM_{2.5}$ Emissions	
					(%)	(lb/ton)	(lb/ton)	(lb/ton)	(tph)	(tpy)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)
IES-GWHS	Material feed conveyance system to dryer burner fuel storage bin	--	--	4	48%	3.7E-05	1.8E-05	2.7E-06	30	252,692	4.5E-03	1.9E-02	2.1E-03	8.9E-03	3.2E-04	1.4E-03
	Material feed conveyance system to raw wood chip storage pile	--	--	1	48%	3.7E-05	1.8E-05	2.7E-06	400	1,502,414	1.5E-02	2.8E-02	7.1E-03	1.3E-02	1.1E-03	2.0E-03
	Material feed conveyance system to dryer burner	--	--	0	45%	4.1E-05	1.9E-05	2.9E-06	30	545,455	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Material feed conveyance system to rotary drum wood dryer	--	--	0	48%	3.7E-05	1.8E-05	2.7E-06	300	1,652,655	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Material feed conveyance system to fuel storage piles	--	--	3	45%	4.1E-05	1.9E-05	2.9E-06	30	238,909	3.7E-03	1.5E-02	1.7E-03	6.9E-03	2.6E-04	1.0E-03
IES-DLH	Drop point for dry line transfer from dry line hopper to dry line feed conveyor	Enclosed	Reduction to 2 mph mean wind speed	1	17%	3.6E-05	1.7E-05	2.6E-06	170.7	941,271	6.1E-03	1.7E-02	2.9E-03	8.0E-03	4.4E-04	1.2E-03
IES-DRYSHAVE and IES-DRYSHAVE-1	Existing dry shaving walking floor truck dump	--	--	1	8.0%	4.6E-04	2.2E-04	3.3E-05	48.0	219,000	2.2E-02	5.0E-02	1.0E-02	2.4E-02	1.6E-03	3.6E-03
	Existing dry shaving loader to hopper and hopper conveyor to conveyor to DHM	Enclosed	Reduction to 2 mph mean wind speed	2	8.0%	1.0E-04	4.9E-05	7.4E-06	141.7	750,000	2.9E-02	7.7E-02	1.4E-02	3.7E-02	2.1E-03	5.5E-03
	New dry shavings truck dump	--	--	1	8.0%	4.6E-04	2.2E-04	3.3E-05	48.0	219,000	2.2E-02	5.0E-02	1.0E-02	2.4E-02	1.6E-03	3.6E-03
	New dry shaving bucket elevator	Enclosed	Reduction to 2 mph mean wind speed	1	8.0%	1.0E-04	4.9E-05	7.4E-06	48.0	219,000	5.0E-03	1.1E-02	2.3E-03	5.4E-03	3.6E-04	8.1E-04
										Total Emissions:	**1.08E-01**	**2.68E-01**	**5.09E-02**	**1.27E-01**	**7.70E-03**	**1.92E-02**

Notes:

1. These dry wood handling emissions are representative of the fugitive emissions at the site.

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

where:

E	= emission factor (lb/ton)	
k	= particle size multiplier (dimensionless) for PM	0.74
k	= particle size multiplier (dimensionless) for PM_{10}	0.35
k	= particle size multiplier (dimensionless) for $PM_{2.5}$	0.053
U	= mean wind speed (mph)	6.3
U	= mean wind speed (mph) for enclosed drop points	2

3. Throughputs represent dry weight of materials, calculated based on listed material moisture contents. Throughput for dry shaving material handling is based on comparable Enviva facilities.

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 9b
Potential Emissions from Wood Storage Pile Wind Erosion
Enviva Pellets Northampton, LLC

Source	Description	PM Emission Factor[1]		VOC Emission Factor[2]		Pile Width / Diamter	Pile Length	Pile Height	Outer Surface Area of Pile[3]	Potential PM Emissions		Potential PM_{10} Emissions		Potential $PM_{2.5}$ Emissions		Potential VOC Emissions as propane[4]	
		(lb/day/acre)	(lb/hr/ft^2)	(lb/day/acre)	(lb/hr/ft^2)	(ft)	(ft)	(ft)	(ft^2)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)	Max (lb/hr)	Annual (tpy)
IES-DRYSHAVE and IES-DRYSHAVE-1	Dry Shaving Storage Pile	8.6	8.2E-06	3.6	3.4E-06	100	--	25	10,537	0.09	0.4	0.04	0.2	0.007	0.03	0.04	0.2
IES-GWHS	Green Wood Storage Pile No. 1	8.6	8.2E-06	3.6	3.4E-06	155	--	72	30,907	0.25	1.1	0.13	0.6	0.019	0.08	0.13	0.6
	Green Wood Storage Pile No. 2	8.6	8.2E-06	3.6	3.4E-06	350	400	25	213,000	1.75	7.7	0.88	3.8	0.131	0.58	0.89	3.9
	Green Wood Storage Pile No. 3	8.6	8.2E-06	3.6	3.4E-06	150	150	25	45,000	0.37	1.6	0.19	0.8	0.028	0.12	0.19	0.8
	Green Wood Storage Pile No. 4	8.6	8.2E-06	3.6	3.4E-06	200	200	25	72,000	0.59	2.6	0.30	1.3	0.044	0.19	0.30	1.3
	Bark Fuel Storage Pile No. 1	8.6	8.2E-06	3.6	3.4E-06	150	150	25	45,000	0.37	1.62	0.185	0.81	2.8E-02	0.122	0.189	0.83
	Bark Fuel Storage Pile No. 2	8.6	8.2E-06	3.6	3.4E-06	100	200	25	42,000	0.345	1.513	0.173	0.757	2.6E-02	1.1E-01	0.176	0.773
	Bark Fuel Storage Pile No. 3	8.6	8.2E-06	3.6	3.4E-06	50	--	25	3,332	0.027	0.120	0.014	0.060	2.1E-03	9.0E-03	0.014	0.061
									Total Emissions:	**3.80**	**16.64**	**1.90**	**8.32**	**0.28**	**1.25**	**1.94**	**8.50**

Notes:

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

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

where:

s, silt content of wood chips (%):	8.4	s - silt content (%) for lumber sawmills (mean) from AP-42, Section 13.2.2 - Unpaved Roads, 11/06, Table 13.2.2-1
p, number of days with rainfall greater than 0.01 inch:	110	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) (%):	12.5	Based on meteorological data averaged for 2012-2016 for Maxton, NC National Weather Service (NWS) Station
PM_{10}/TSP ratio:	50%	PM_{10} is assumed to equal 50% of TSP based on U.S. EPA Control of Open Fugitive Dust Sources, Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988.
$PM_{2.5}$/TSP ratio:	7.5%	$PM_{2.5}$ is assumed to equal 7.5 % of TSP U.S. EPA Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors. November 2006.

2. Emission factors obtained from NCASI document provided by the South Carolina Department of Health and Environmental Control (DHEC) for the calculation of fugitive VOC emissions from Douglas Fir wood storage piles. Emission factors ranged from 1.6 to 3.6 lb C/acre-day. Enviva chose to employ the maximum emission factor for purposes of conservatism.

3. The surface area for rectangular piles is calculated as [2*H*L+2*W*H+L*W] + 20% to consider the sloping pile edges. Pile dimensions were provided by Enviva.
The surface area for circular piles is calculated as [∏*R*(R^2+H^2)$^{0.5}$] + 20% to consider the sloping pile edges. Diameter and height were provided by Enviva.

4. Emissions are calculated in tons of carbon per year by the following formula:
tons C/year = 5 acres * 365 days * 1.6 lb C/acre-day / 2000 lb/ton
Emission factor converted from as carbon to as propane by multiplying by 1.22.

Abbreviations:

EPA - Environmental Protection Agency
ft - feet
ft^2 - square feet
lb - pound
mph - miles per hour
NC - North Carolina
NCASI - National Council for Air and Stream Improvement, Inc.
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

Table 10
Potential Emissions
Electric Powered Green Wood Chipper (IES-EPWC)
Enviva Pellets Northampton, LLC

Calculation Basis

Annual Throughput of Chipper	781,255	tons/year (dry wood)[1]
Short Term Throughput	119.40	tons/hr (dry wood)[1]
Approximate Moisture Content	50%	of total weight

Pollutant	Emission Factor		Emissions	
			Max (lb/hr)	Annual (tpy)
THC as Carbon[2]	0.0041	lb/ODT	0.49	1.60
VOC as propane[3]	0.0050	lb/ODT	**0.60**	**1.95**
Methanol[2]	0.0010	lb/ODT	**0.12**	**0.39**

Notes:

[1] The hourly and annual throughputs used for the chipper are conservatively assumed to be the same as the throughput of the dryer (note that 50% of the dryer throughput normally comes from purchased chips).

[2] Emission factor obtained from available emissions factors for chippers in AP-42 Section 10.6.3, Medium Density Fiberboard, 08/02, Table 7 and Section 10.6.4, Hardboard and Fiberboard, 10/02, Tables 7 and 9. Emission factors for THC and Methanol are the same across all three tables.

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

Table 11
Potential Emissions
Bark Hog (IES-BARK)
Enviva Pellets Northampton, LLC

Calculation Basis

Annual Throughput of Bark Hog	234,377	tons/year (dry wood)[1]
Short-term Throughput of Bark Hog	31.50	tons/hr (dry wood)[1]
Approximate Moisture Content	50%	of total weight

Pollutant	Emission Factor		Emissions	
			Max (lb/hr)	Annual (tpy)
THC as Carbon[2]	0.0041	lb/ODT	0.13	0.48
VOC as propane[3]	0.0050	lb/ODT	0.16	0.59
PM[4]	0.02	lb/ton	0.13	0.47
PM_{10}[4]	0.011	lb/ton	0.07	0.26
Methanol[2]	0.0010	lb/ODT	0.03	0.12

Notes:

[1] The annual throughput used for the bark hog is 30% of the annual throughput of the facility. The short-term throughput is 15% of maximum hourly capacity of the debarker.

[2] Emission factor obtained from available emissions factors for chippers in AP-42 Section 10.6.3, Medium Density Fiberboard, 08/02, Table 7 and Section 10.6.4, Hardboard and Fiberboard, 10/02, Tables 7 and 9. Emission factors for THC and Methanol are the same across all three tables.

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

[4] Particulate matter emission factors from the USEPA document titled *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants. Source Classification Code 3-07-008-01 (Log Debarking)*. All PM is assumed to be larger than 2.5 microns. PM emissions are assumed to be controlled due to the bark hog being partially enclosed (assumed 90% control).

Table 12
Potential Emissions
Debarker (IES-DEBARK)
Enviva Pellets Northampton, LLC

Calculation Basis

Hourly Throughput[1]	210 ton/hr
Annual Throughput[1]	781,255 ton/yr

Potential Criteria Pollutant Emissions

Source	Pollutant	Emission Factor (lb/ton)	Potential Emissions	
			Max (lb/hr)	Annual (tpy)
IES-DEBARK	TSP[2]	2.0E-02	0.42	0.78
	PM_{10}[2]	1.1E-02	0.23	0.43

Notes:

1. The annual throughput used for the debarker is equal to the annual throughput of the dryers. The short-term throughput is based upon the maximum capacity of the debarker.
2. Particulate matter emission factors from the USEPA document titled *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants.* Source Classification Code 3-07-008-01 (Log Debarking). All PM is assumed to be larger than 2.5 microns in diameter. PM emissions are assumed to be controlled due to the use of water spray and the bark hog being partially enclosed (assumed 90% control).

Abbreviations:

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

Table 13
Potential Emissions
Emergency Generator (IES-GN) and Fire Water Pump (IES-FWP)
Enviva Pellets Northampton, LLC

Emergency Generator Emissions

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 Emissions

Pollutant	Category	Emission Factor	Units	Emissions	
				Max lb/hr	Annual tpy
TSP	PSD	4.41E-04	lb/kW-hr (2)	0.12	2.88E-02
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	0.12	2.88E-02
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	0.12	2.88E-02
NO_x	PSD	8.82E-03	lb/kW-hr (5)	2.30	5.75E-01
SO_2	PSD	15	ppmw (3)	3.81E-03	9.52E-04
CO	PSD	7.72E-03	lb/kW-hr (2)	2.01	5.03E-01
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	6.15E-03	1.54E-03

Hazardous Air Pollutant Emissions

Pollutant	Category	Emission Factor	Units	Emissions	
				Max lb/hr	Annual tpy
Acetaldehyde	HAP	5.37E-06	lb/hp-hr (4)	1.88E-03	4.70E-04
Acrolein	HAP	6.48E-07	lb/hp-hr (4)	2.27E-04	5.67E-05
Benzene	HAP	6.53E-06	lb/hp-hr (4)	2.29E-03	5.71E-04
Benzo(a)pyrene[6]	HAP	1.32E-09	lb/hp-hr (4)	4.61E-07	1.15E-07
1,3-Butadiene	HAP	2.74E-07	lb/hp-hr (4)	9.58E-05	2.39E-05
Formaldehyde	HAP	8.26E-06	lb/hp-hr (4)	2.89E-03	7.23E-04
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	4.12E-04	1.03E-04
Toluene	HAP	2.86E-06	lb/hp-hr (4)	1.00E-03	2.51E-04
Xylenes	HAP	2.00E-06	lb/hp-hr (4)	6.98E-04	1.75E-04
			Highest HAP (Formaldehyde)	2.89E-03	7.23E-04
			Total HAPs	9.49E-03	2.37E-03

Notes:

[1] NSPS allows for only 100 hrs/yr of non-emergency operation of these engines (not the 500 hours shown). The PTE for the emergency generator is based on 500 hr/yr, though, because the regs allow non-emergency operation and EPA guidance is 500 hr/yr for emergency generators.

[2] Emissions factors from NSPS Subpart IIII (or 40 CFR 89.112 where applicable) in compliance with post-2009 construction.

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

[4] Emission factor obtained from AP-42 Section 3.3, Tables 3.3-1 Table 3.3-2.

[5] Emission factor for NOx is listed as NOx and NMHC (Non-Methane Hydrocarbons or VOC) in Table 4 of NSPS Subpart IIII. Conservatively assumed entire limit attributable to NOx.

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

Table 13
Potential Emissions
Emergency Generator (IES-GN) and Fire Water Pump (IES-FWP)
Enviva Pellets Northampton, LLC

Firewater Pump Emissions

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 Emissions

Pollutant	Category	Emission Factor	Units	Emissions	
				Max lb/hr	Annual tpy
TSP	PSD	4.41E-04	lb/kW-hr (2)	0.10	2.47E-02
PM_{10}	PSD	4.41E-04	lb/kW-hr (2)	0.10	2.47E-02
$PM_{2.5}$	PSD	4.41E-04	lb/kW-hr (2)	0.10	2.47E-02
NO_x	PSD	8.82E-03	lb/kW-hr (5)	1.97	4.93E-01
SO_2	PSD	15	ppmw (3)	3.26E-03	8.16E-04
CO	PSD	7.72E-03	lb/kW-hr (2)	1.73	4.32E-01
VOC (NMHC)	PSD	2.51E-03	lb/MMBtu (4)	5.27E-03	1.32E-03

Hazardous Air Pollutant Emissions

Pollutant	Category	Emission Factor	Units	Emissions	
				Max lb/hr	Annual tpy
Acetaldehyde	HAP	5.37E-06	lb/hp-hr (4)	1.61E-03	4.03E-04
Acrolein	HAP	6.48E-07	lb/hp-hr (4)	1.94E-04	4.86E-05
Benzene	HAP	6.53E-06	lb/hp-hr (4)	1.96E-03	4.90E-04
Benzo(a)pyrene[6]	HAP	1.32E-09	lb/hp-hr (4)	3.95E-07	9.87E-08
1,3-Butadiene	HAP	2.74E-07	lb/hp-hr (4)	8.21E-05	2.05E-05
Formaldehyde	HAP	8.26E-06	lb/hp-hr (4)	2.48E-03	6.20E-04
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	3.53E-04	8.82E-05
Toluene	HAP	2.86E-06	lb/hp-hr (4)	8.59E-04	2.15E-04
Xylenes	HAP	2.00E-06	lb/hp-hr (4)	5.99E-04	1.50E-04
			Highest HAP (Formaldehyde)	2.48E-03	6.20E-04
			Total HAPs	8.13E-03	2.03E-03

Notes:

[1] NSPS allows for only 100 hrs/yr of non-emergency operation of these engines (not the 500 hours shown). The PTE for the emergency generator is based on 500 hr/yr, though, because the regs allow non-emergency operation and EPA guidance is 500 hr/yr for emergency generators.

[2] Emissions factors from NSPS Subpart IIII (or 40 CFR 89.112 where applicable) in compliance with post-2009 construction.

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

[4] Emission factor obtained from AP-42 Section 3.3, Tables 3.3-1 Table 3.3-2.

[5] Emission factor for NOx is listed as NOx and NMHC (Non-Methane Hydrocarbons or VOC) in Table 4 of NSPS Subpart IIII. Conservatively assumed entire limit attributable to NOx.

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

Table 14
Potential Emissions
Diesel Storage Tanks (IES-TK-1 through IES-TK-3)
Enviva Pellets Northampton, LLC

Source ID	Description	Design Volume[1]	Working Volume[2]	Tank Dimensions[5]		Orientation	Throughput[3]	Turnovers	VOC Emissions[4]	
				Diameter	Height / Length					
		(gal)	(gal)	(ft)	(ft)		(gal/yr)		(lb/hr)	(tpy)
IES-TK-1	Emergency Generator Fuel Storage Tank[2]	2,500	1,250	6.0	12	Horizontal	8,803	7.0	1.3E-04	5.8E-04
IES-TK-2	Fire Pump Fuel Storage Tank[2]	500	250	3.0	10.0	Horizontal	7,554	30.2	3.7E-05	1.6E-04
IES-TK-3	Mobile Fuel Diesel Storage Tank	5,000	2,500	6.0	23.7	Horizontal	200,000	80.0	7.6E-04	3.3E-03
								Total Emissions:	**9.3E-04**	**4.1E-03**

Notes:

1. Conservative design specifications.
2. Working volume conservatively assumed to be 50% of tank design volume because tanks will not be full at all times.
3. Throughput for IES-TK-1 and IES-TK-2 based on fuel consumption provided by Enviva and 500 hours of operation per year. Throughput for IES-TK-3 provided by Enviva.
4. Emissions calculated using EPA TANKS 4.0 software. A minimum tank length for the TANKS program of 5 feet was used to estimate the emissions for IES-TK-2.
5. IES-TK-3 length was estimated based on the capacity of the tank and the diameter.

Abbreviations:

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

Table 15a
Potential Fugitive PM Emissions from Paved Roads
Enviva Pellets Northampton, 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	PM Emission Factor[2] (lb/VMT)	PM_{10} Emission Factor[2] (lb/VMT)	$PM_{2.5}$ Emission Factor[2] (lb/VMT)	Potential PM Emissions[3] (lb/day)	Potential PM Emissions[3] (tpy)	Potential PM_{10} Emissions[3] (lb/day)	Potential PM_{10} Emissions[3] (tpy)	Potential $PM_{2.5}$ Emissions[3] (lb/day)	Potential $PM_{2.5}$ Emissions[3] (tpy)
Bark Delivery - Dumper	2,800	11	6	365	41,000	81,000	30.5	2,134	2.24	0.45	0.11	1.31	0.24	0.26	0.05	0.06	0.01
Bark Delivery - Self Unload	3,730	11	8	365	41,000	81,000	30.5	2,842	2.24	0.45	0.11	1.74	0.32	0.35	0.06	0.09	0.02
Log Delivery to Crane Storage Area	2,800	93	49	365	40,400	85,400	31.5	18,004	2.31	0.46	0.11	11.39	2.08	2.28	0.42	0.56	0.10
Log Delivery to Log Storage Area	2,800	93	49	365	40,400	85,400	31.5	18,004	2.31	0.46	0.11	11.39	2.08	2.28	0.42	0.56	0.10
Purchased Chip Delivery	2,800	114	61	365	41,000	91,000	33.0	22,095	2.42	0.48	0.12	14.68	2.68	2.94	0.54	0.72	0.13
Additive Delivery	2,000	0.26	0.1	365	41,000	91,000	33.0	36	2.42	0.48	0.12	0.02	0.00	0.00	0.00	0.00	0.00
Pellet Truck Delivery to Pellet Loadout Area (Normal Operations)	3,730	86	61	365	41,000	91,000	33.0	22,182	2.42	0.48	0.12	14.73	2.69	2.95	0.54	0.72	0.13
Dry Shavings	3,730	32	23	365	41,000	77,000	29.5	8,251	2.16	0.43	0.11	4.89	0.89	0.98	0.18	0.24	0.04
Contractor Vehicle	2,000	18	7	365	4,000	4,000	2.0	2,462	0.14	0.03	0.01	0.09	0.02	0.02	0.00	0.00	0.00
Employee Car Parking	2,000	68	26	365	4,000	4,000	2.0	9,470	0.14	0.03	6.8E-03	0.36	0.07	0.07	0.01	0.02	0.00
											Total Emissions:	**60.60**	**11.06**	**12.12**	**2.21**	**2.97**	**0.54**

Notes:

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

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

where:

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

3. 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.

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 B-15b
Potential Fugitive PM Emissions from Unpaved Roads
Enviva Pellets Northampton, 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
Log Delivery to Crane Storage Area	2,000	93	35	365	40,400	85,400	31.5	12,860
Log Delivery to Log Storage Area	2,000	93	35	365	40,400	85,400	31.5	12,860
Purchased Chip Delivery	7,000	114	151	365	41,000	91,000	33.0	55,238
Bark Delivery - Dumper	7,000	11	15	365	41,000	81,000	30.5	5,334
Additive Delivery	500	0.26	0.02	365	41,000	91,000	33.0	9
							32.4	**86,300**

Notes:

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

Emission Calculations Unpaved Roads:

Pollutant	Emeperical Constant (k)[1]	Silt Content (S)[2]	Particle Constant a[1]	Particle Constant b[1]	Emission Factor[3]	Potential Emissions[4]
	(lb/VMT)	(%)	(-)	(-)	(lb/VMT)	(tpy)
PM	4.9	8.4	0.7	0.45	7.47	32.25
PM_{10}	1.5	8.4	0.9	0.45	2.13	9.19
$PM_{2.5}$	0.15	8.4	0.9	0.45	0.21	0.92

Notes:

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

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

k = particle size multiplier for particle size range and units of interest
E = size-specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)
P=number of days with at least 0.01 in of precipitation during the averaging period =
= 120 Per AP-42, Section 13.2.1, Figure 13.2.1-2 (Northampton, VA).

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

Abbreviations:

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

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

Operating Data:

Dryer-1 Heat Input	153.0	MMBtu/hr
Annual Heat Input	1,344,946	MMBtu/yr
Duct Burner 1 Heat Input	1	MMBtu/hr
Number of Burners	2	
Operating Schedule	8,760	hrs/yr
Dryer 1 Bypass Heat Input	153	MMBtu/hr
Operating Schedule	50	hrs/yr
Dryer-2 Heat Input	180.0	MMBtu/hr
Annual Heat Input	1,576,800	MMBtu/yr
Duct Burner 2 Heat Input	1	MMBtu/hr
Number of Burners	2	
Operating Schedule	8,760	hrs/yr
Dryer 2 Bypass Heat Input	180	MMBtu/hr
Operating Schedule	50	hrs/yr
RTO-1 Heat Input	32.0	MMBtu/hr
Operating Schedule	8,760	hrs/yr
Furnace 1 Bypass Heat Input	153	MMBtu/hr
Operating Schedule	50	hrs/yr
Furnace 1 Idle Heat Input	5	MMBtu/hr
Operating Schedule	500	hrs/yr
RTO-2 Heat Input	32.0	MMBtu/hr
Operating Schedule	8,760	hrs/yr
Furnace 2 Bypass Heat Input	180	MMBtu/hr
Operating Schedule	50	hrs/yr
Furnace 2 Idle Heat Input	5	MMBtu/hr
Operating Schedule	500	hrs/yr
RCO-1 Heat Input	207,458.0	MMBtu/yr
Operating Schedule	8,760	hrs/yr
Duct Burners 3 and 4 Heat Input	1	MMBtu/hr
Number of Burners	4	
Operating Schedule	8,760	hrs/yr
Propane Vaporizer Heat Input	1	MMBtu/hr
Operating Schedule	8,760	hrs/yr
Emergency Generator Output	350	bhp
Operating Schedule	500	hrs/yr
Power Conversion	7,000	Btu/hr/hp
Energy Input	2.450	MMBtu/hr
Fire Water Pump Output	300	bhp
Operating Schedule	500	hrs/yr
Power Conversion	7,000	Btu/hr/hp
Energy Input	2.100	MMBtu/hr

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

Emission Unit ID	Fuel Type	Emission Factors from Table C-1 (kg/MMBtu)[1, 2]			Tier 1 Emissions (short tons)[2]			
		CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	Total CO_2e
ES-DRYER-1	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	139,061.64	267	1,590	140,919
DDB-1	Propane	62.87	7.50E-02	1.79E-01	1214.16	1.45	3.45	1,219
Dryer 1 Bypass	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	790.98	1.52	9.05	802
ES-DRYER-2	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	163,034.40	313	1,865	165,212
DDB-2	Propane	62.87	7.50E-02	1.79E-01	1214.16	1.45	3.45	1,219
Dryer 2 Bypass	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	930.56	1.79	10.64	943
ES-RTO-1	Propane	62.87	7.50E-02	1.79E-01	19426.62	23.17	55.25	19,505
Furnace 1 Bypass	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	790.98	1.52	9.05	802
Furnace 1 Idle	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	258.49	0.50	2.96	262
ES-RTO-2	Propane	62.87	7.50E-02	1.79E-01	19426.62	23.17	55.25	19,505
Furnace 2 Bypass	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	930.56	1.79	10.64	943
Furnace 2 Idle	Wood and Wood Residuals	93.80	1.80E-01	1.07E+00	258.49	0.50	2.96	262
ES-RCO-1	Propane	62.87	7.50E-02	1.79E-01	14377.17	17.15	40.89	14,435
DDB-3 and -4	Propane	62.87	7.50E-02	1.79E-01	2428.33	2.90	6.91	2,438
ES-PVAP	Propane	62.87	7.50E-02	1.79E-01	607.08	0.72	1.73	610
ES-GN	No. 2 Fuel Oil (Distillate)	73.96	7.50E-02	1.79E-01	100	1.01E-01	2.41E-01	100
ES-FWP	No. 2 Fuel Oil (Distillate)	73.96	7.50E-02	1.79E-01	86	8.68E-02	2.07E-01	86

[1] Emission factors from Table C-1 and C-2 of GHG Reporting Rule. Emission factors for methane and N_2O already multiplied by their respective GWPs of 25 and 298.
[2] As per VADEQ guidance, VADEQ has adopted the GHG Biomass Deferral Rule which excludes CO_2 emissions from biomass combustion.

APPENDIX D
PERMIT APPLICATION FORMS

FORM A

GENERAL FACILITY INFORMATION

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

NOTE- APPLICATION WILL NOT BE PROCESSED WITHOUT THE FOLLOWING:

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

GENERAL INFORMATION

Legal Corporate/Owner Name:	**Enviva Pellets Northampton, LLC**
Site Name:	**Enviva Pellets Northampton, LLC**
Site Address (911 Address) Line 1:	**874 Lebanon Church Road**
Site Address Line 2:	
City: **Garysburg**	State: **NC**
Zip Code: **27866**	County: **Northampton**

CONTACT INFORMATION

Responsible Official/Authorized Contact:		***Invoice Contact:***	
Name/Title:	**Royal Smith, Vice President Operations**	Name/Title:	**Joe Harrell, Corporate Environmental Health & Safety Manager**
Mailing Address Line 1:	**7200 Wisconsin Avenue**	Mailing Address Line 1:	**142 N.C. Route 561 East**
Mailing Address Line 2:	**Suite 1000**	Mailing Address Line 2:	
City: **Bethesda** State: **MD** Zip Code:	**20814**	City: **Ahoskie** State: **NC** Zip Code:	**27910**
Primary Phone No.:	**(240) 482-3770**	Primary Phone No.:	**(252) 209-6032**
Fax No.:		Fax No.:	
Secondary Phone No.:		Secondary Phone No.:	
Email Address:	**Royal.Smith@envivabiomass.com**	Email Address:	**Joe.Harrell@envivabiomass.com**
Facility/Inspection Contact:		***Permit/Technical Contact:***	
Name/Title:	**Heath Lucy, Environmental Health & Safety Manager**	Name/Title:	**Joe Harrell, Corporate Environmental Health & Safety Manager**
Mailing Address Line 1:	**874 Lebanon Church Road**	Mailing Address Line 1:	**142 N.C. Route 561 East**
Mailing Address Line 2:		Mailing Address Line 2:	
City: **Garysburg** State: **NC** Zip Code:	**27866**	City: **Ahoskie** State: **NC** Zip Code:	**27910**
Primary Phone No.:	**(910) 318-2743**	Primary Phone No.:	**(252) 209-6032**
Fax No.:		Fax No.:	
Secondary Phone No.:		Secondary Phone No.:	
Email Address:	**Heath.Lucy@envivabiomass.com**	Email Address:	**Joe.Harrell@envivabiomass.com**

APPLICATION IS BEING MADE FOR

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

FACILITY CLASSIFICATION AFTER APPLICATION (Check Only One)

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

FACILITY (Plant Site) INFORMATION

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

	Facility ID No. **6600167**
Primary SIC/NAICS Code: **2499 (Wood Products, Not Elsewhere Classified)**	Current/Previous Air Permit No. **10203R05** Expiration Date: **February 28, 2025**
Facility Coordinates: Latitude: **36.5025**	Longitude: **-77.6135**
Does this application contain confidential data? ☐ YES ☑ NO	***If yes, please contact the DAQ Regional Office prior to submitting this application.*** (See Instructions)

PERSON OR FIRM THAT PREPARED APPLICATION

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

SIGNATURE OF RESPONSIBLE OFFICIAL/AUTHORIZED CONTACT

Name (typed): Royal Smith	Title: Vice President Operations
X Signature(Blue Ink):	Date: 9-24-18

Attach Additional Sheets As Necessary

FORMs A2, A3

EMISSION SOURCE LISTING FOR THIS APPLICATION - A2

112r APPLICABILITY INFORMATION - A3

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

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

EMISSION SOURCE ID NO.	EMISSION SOURCE DESCRIPTION	CONTROL DEVICE ID NO.	CONTROL DEVICE DESCRIPTION
Equipment To Be ADDED By This Application (New, Previously Unpermitted, or Replacement)			
ES-GHM-1 through ES-GHM-5	Five (5) Green Wood Hammermills (new)	CD-WESP-1	Wet Electrostatic Precipitator
		CD-RTO-1 (new)	Regenerative Thermal Oxidizer
ES-DRYER-2	Green Wood Direct-Fired Rotary Dryer System (new)	CD-WESP-2 (new)	Wet Electrostatic Precipitator
		CD-RTO-2 (new)	Regenerative Thermal Oxidizer
ES-DRYERBYP-1	Dryer #1 Bypass	N/A	N/A
ES-FURNACEBYP-1	Furnace #1 Bypass	N/A	N/A
ES-DRYERBYP-2	Dryer #2 Bypass	N/A	N/A
ES-FURNACEBYP-2	Furnace #2 Bypass	N/A	N/A
IES-ADD	Additive Handling and Storage (new)	CD-ADD-BF (new)	Baghouse
ES-PCHP	Pellet Cooler HP Fines Relay System (new)	ES-PCHP-BF	Baghouse
ES-DSHM-1 and ES-DHM-2	Two (2) Dry Shavings Hammermills (new)	CD-RCO-1 (new)	Recuperative Catalytic Oxidizer
IES-DRYSHAVE-1	Dry Shaving Material Handling and Storage (new)	N/A	N/A
IES-DSS	Dry Shavings Silo (new)	CD-DSS-BF (new)	Baghouse
IES-TK3	One diesel storage tank (5,000 gallon capacity) (new)	N/A	N/A
IES-Bark	Bark Hog (renamed/new)	N/A	N/A
IES-Debark	Debarker (renamed/new)	N/A	N/A
IES-DDB-1 through IES-DDB-4	Dryer Line Double Duct Burners (new)	N/A	N/A
IES-DDB-5 through IES-DDB-8	RCO System Double Duct Burners (new)	N/A	N/A
IES-PVAP	Liquid Propane Vaporizer (new)	N/A	N/A
Existing Permitted Equipment To Be MODIFIED By This Application			
ES-DRYER-1	Green Wood Direct-Fired Rotary Dryer System (modified)	CD-WESP-1	Wet Electrostatic Precipitator
		CD-RTO-1 (new)	Regenerative Thermal Oxidizer
ES-CLR-1 through ES-CLR-6	Six (6) Pellet Coolers (modified)	CD-CLR-1 through CD-CLR-6	Baghouses (one per pellet cooler)
		CD-RCO-1 (new)	Recuperative Catalytic Oxidizer
ES-HM-1 through 8	Eight (8) Dry Hammermills (modified)	CD-HM-BH-1 through CD-HM-BH-8	Baghouses (one per hammermill)
		CD-RCO-1 (new)	Recuperative Catalytic Oxidizer
ES-PFB	Pellet Fines Bin (renamed to ES-PCHP)	CD-PFB-BF	Baghouse
ES-PMFS	Pellet Mill Feed Silo (modified)	CD-PMFS-BV	Baghouse
ES-FPH	Finished Product Handling (modified)	CD-FPH-BF	Baghouse
ES-PB-1 through ES-PB-12	Pellet Loadout Bins (modified)		
ES-PL-1 through ES-PL-2	Pellet Loadout 1 and 2 (modified)		
ES-DWH	Dried Wood Handling (re-named to ES-DWH and modified)	CD-DWH-BF	Baghouse
Equipment To Be DELETED By This Application			
IES-RCHP-1 and IES-RCHIP 2	Two electric powered wood re-chippers (renamed to ES-GHM-1 and ES-GHM-2)	N/A	N/A
ES-NDS	Nuisance Dust System (removed)	CD-HM-BF-3 (remains)	N/A

112(r) APPLICABILITY INFORMATION **A 3**

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

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

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	LEVEL (1, 2, or 3)	HAZARDOUS CHEMICAL	MAXIMUM INTENDED INVENTORY (LBS)

Attach Additional Sheets As Necessary

FORM D1

FACILITY-WIDE EMISSIONS SUMMARY

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

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

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

					Modeling Required ?	
TOXIC AIR POLLUTANT EMITTED	CAS NO.	lb/hr	lb/day	lb/year	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. Green Wood Handling and Storage Operations IES-GWHS	Varies	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
2. Bark Hog IES-BARK	234377 ODT/yr	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
4. Emergency Generator Diesel Fuel Storage Tank IES-TK1	2,500 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
5. Firewater Pump Engine Diesel Fuel Storage Tank IES-TK2	500 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
6. Mobile Sources Diesel Fuel Storage Tank IES-TK3	5,000 gallons	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
8. Debarker IES-DEBARK	781255 ODT/yr	15A NCAC 02Q .0503(8)-negligible emissions, see Appendix C
9. Green Wood Fuel Bin IES-GWFB	13.93 ODT/hr	15A NCAC 02Q .0503(8)-no quantifiable emissions
10. Dry Line Hopper IES-DLH	10 ODT/hr	15A NCAC 02Q .0503(8)-negligible emissions
13. Dry Shaving Material Handling IES-DRYSHAVE, IES-DRYSHAVE-1	Varies	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
15. Electric Powered Green Wood Chipper IES-EPWC	781255 ODT/yr	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
16. Additive Handling and Storage IES-ADD	2344 ODT/yr	15A NCAC 02Q .0503(8)-negligible emissions, see Appendix C
17. Diesel-Fired Emergency Generator IES-GN	350 bhp	15A NCAC 02Q .0503(8)-low emissions, see Appendix C
18. Diesel-Fired Fire Water Pump IES-FWP	300 bhp	15A NCAC 02Q .0503(8)-low emissions, see Appendix C

Attach Additional Sheets As Necessary

FORM D5

TECHNICAL ANALYSIS TO SUPPORT PERMIT APPLICATION

REVISED 09/22/16 | NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate | D5

PROVIDE DETAILED TECHNICAL CALCULATIONS TO SUPPORT ALL EMISSION, CONTROL, AND REGULATORY DEMONSTRATIONS MADE IN THIS APPLICATION. INCLUDE A COMPREHENSIVE PROCESS FLOW DIAGRAM AS NECESSARY TO SUPPORT AND CLARIFY CALCULATIONS AND ASSUMPTIONS. ADDRESS THE FOLLOWING SPECIFIC ISSUES ON SEPARATE PAGES:

A **SPECIFIC EMISSIONS SOURCE (EMISSION INFORMATION) (FORM B and B1 through B9) -** SHOW CALCULATIONS USED, INCLUDING EMISSION FACTORS, MATERIAL BALANCES, AND/OR OTHER METHODS FROM WHICH THE POLLUTANT EMISSION RATES IN THIS APPLICATION WERE DERIVED. INCLUDE CALCULATION OF POTENTIAL BEFORE AND, WHERE APPLICABLE, AFTER CONTROLS. CLEARLY STATE ANY ASSUMPTIONS MADE AND PROVIDE ANY REFERENCES AS NEEDED TO SUPPORT MATERIAL BALANCE CALCULATIONS.

B **SPECIFIC EMISSION SOURCE (REGULATORY INFORMATION)(FORM E2 - TITLE V ONLY) -** PROVIDE AN ANALYSIS OF ANY REGULATIONS APPLICABLE TO INDIVIDUAL SOURCES AND THE FACILITY AS A WHOLE. INCLUDE A DISCUSSION OUTING METHODS (e.g. FOR TESTING AND/OR MONITORING REQUIREMENTS) FOR COMPLYING WITH APPLICABLE REGULATIONS, PARTICULARLY THOSE REGULATIONS LIMITING EMISSIONS BASED ON PROCESS RATES OR OTHER OPERATIONAL PARAMETERS. PROVIDE JUSTIFICATION FOR AVOIDANCE OF ANY FEDERAL REGULATIONS (PREVENTION OF SIGNIFICANT DETERIORATION (PSD), NEW SOURCE PERFORMANCE STANDARDS (NSPS), NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS), TITLE V), INCLUDING EXEMPTIONS FROM THE FEDERAL REGULATIONS WHICH WOULD OTHERWISE BE APPLICABLE TO THIS FACILITY. SUBMIT ANY REQUIRED INFORMATION TO DOCUMENT COMPLIANCE WITH ANY REGULATIONS. INCLUDE EMISSION RATES CALCULATED IN ITEM "A" ABOVE, DATES OF MANUFACTURE, CONTROL EQUIPMENT, ETC. TO SUPPORT THESE CALCULATIONS.

C **CONTROL DEVICE ANALYSIS (FORM C and C1 through C9) -** PROVIDE A TECHNICAL EVALUATION WITH SUPPORTING REFERENCES FOR ANY CONTROL EFFICIENCIES LISTED ON SECTION C FORMS, OR USED TO REDUCE EMISSION RATES IN CALCULATIONS UNDER ITEM "A" ABOVE. INCLUDE PERTINENT OPERATING PARAMETERS (e.g. OPERATING CONDITIONS, MANUFACTURING RECOMMENDATIONS, AND PARAMETERS AS APPLIED FOR IN THIS APPLICATION) CRITICAL TO ENSURING PROPER PERFORMANCE OF THE CONTROL DEVICES). INCLUDE AND LIMITATIONS OR MALFUNCTION POTENTIAL FOR THE PARTICULAR CONTROL DEVICES AS EMPLOYED AT THIS FACILITY. DETAIL PROCEDURES FOR ASSURING PROPER OPERATION OF THE CONTROL DEVICE INCLUDING MONITORING SYSTEMS AND MAINTENANCE TO BE PERFORMED.

D **PROCESS AND OPERATIONAL COMPLIANCE ANALYSIS - (FORM E3 - TITLE V ONLY) -** SHOWING HOW COMPLIANCE WILL BE ACHIEVED WHEN USING PROCESS, OPERATIONAL, OR OTHER DATA TO DEMONSTRATE COMPLIANCE. REFER TO COMPLIANCE REQUIREMENTS IN THE REGULATORY ANALYSIS IN ITEM "B" WHERE APPROPRIATE. LIST ANY CONDITIONS OR PARAMETERS THAT CAN BE MONITORED AND REPORTED TO DEMONSTRATE COMPLIANCE WITH THE APPLICABLE REGULATIONS.

E **PROFESSIONAL ENGINEERING SEAL -** PURSUANT TO 15A NCAC 2Q .0112 "APPLICATION REQUIRING A PROFESSIONAL ENGINEERING SEAL," A PROFESSIONAL ENGINEER REGISTERED IN NORTH CAROLINA SHALL BE REQUIRED TO SEAL TECHNICAL PORTIONS OF THIS APPLICATION FOR NEW SOURCES AND MODIFICATIONS OF EXISTING SOURCES. (SEE INSTRUCTIONS FOR FURTHER APPLICABILITY).

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

(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)

NAME: **Russell Kemp, MS, PE** 19628

DATE: 27 SEPTEMBER 2018

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

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

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

SIGNATURE:

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

Appendix C with emission calculations

Application Narrative

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

PLACE NORTH CAROLINA SEAL HERE

Attach Additional Sheets As Necessary

FORM E1

TITLE V GENERAL INFORMATION

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

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

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

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

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

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

Attach Additional Sheets As Necessary

FORM E3

EMISSION SOURCE COMPLIANCE METHOD

Emission Source ID NO.	Regulated Pollutant
	Applicable Regulation

Alternative Operating Scenario (AOS) NO:

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

MONITORING REQUIREMENTS

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

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

Describe Monitoring Device Type:

Describe Monitoring Location:

Other Monitoring Methods (Describe In Detail): **CAM applicability and, if applicable, submission of CAM plans, will be addressed as part of future Title V operating permit applications.**

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 Northampton, LLC

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Wood-fired Dryers & Green Wood Hammermills	ES-DRYER, ES-DRYER-2 & ES-GHM-1 to ES-GHM-5	$PM/PM_{10}/PM_{2.5}$	15A NCAC 02D .0515	RTO			
		SO_2	15A NCAC 02D .0516		None required because inherently low sulfur content of wood fuel achieves compliance.		
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A
Dry Hammermills	ES-HM-1 to ES-HM-8	$PM/PM_{10}/PM_{2.5}$	15A NCAC 02D .0515	RCO			
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A
Pellet Mill Feed Silo	ES-PMFS	$PM/PM_{10}/PM_{2.5}$	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 of a written request by DAQ.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A

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

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Finished Product Handling	ES-FPH, ES-PB-1 to ES-PB-12, ES-PL-1, ES-PL-2	$PM/PM_{10}/PM_{2.5}$	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 of a written request by DAQ.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A
Pellet Coolers	ES-CLR-1 to ES-CLR-6	$PM/PM_{10}/PM_{2.5}$	15A NCAC 02D .0515	RCO			
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A
Pellet Cooler HP Fines Relay System	ES-PCHP	$PM/PM_{10}/PM_{2.5}$	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 of a written request by DAQ.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A
Dried Wood Handling	ES-DWH	$PM/PM_{10}/PM_{2.5}$	15A NCAC 02D .0515	Baghouses	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 of a written request by DAQ.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A
Additive Handling and Storage	IES-ADD	$PM/PM_{10}/PM_{2.5}$	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 of a written request by DAQ.
		Opacity	15A NCAC 02D .0521		Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A

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

Emission Source Description	ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Emergency Generator	IES-EG	PM, CO, NO_X, NMHC, SO_2	40 CFR Part 60 Subpart IIII	N/A	All requirement are outlined in the regulation, including the following: use certified emergency engines, operate according to manufacturers procedures, use fuel oil with fuel content of no more than 15 ppmw sulfur and cetane index of at least 40, install non-resettable hour meter.	Maintain records of engine certification, fuel certifications and hours/year of operation of each engine.	N/A
		SO_2	15A NCAC 02D .0516	N/A	Non required because inherently low sulfur content of fuel achieves compliance.		
		Opacity	15A NCAC 02D .0521	N/A	Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A
		HAPs	40 CFR Part 63 Subpart ZZZZ	N/A	Comply with the NSPS requirements. No other requirements apply.	Comply with the NSPS requirements. No other requirements apply.	N/A
Fire Water Pump	IES-FWP	PM, CO, NO_X, NMHC, SO_2	40 CFR Part 60 Subpart IIII	N/A	All requirement are outlined in the regulation, including the following: use certified emergency engines, operate according to manufacturers procedures, use fuel oil with fuel content of no more than 15 ppmw sulfur and cetane index of at least 40, install non-resettable hour meter.	Maintain records of engine certification, fuel certifications and hours/year of operation of each engine.	N/A
		SO_2	15A NCAC 02D .0516	N/A	Non required because inherently low sulfur content of fuel achieves compliance.		
		Opacity	15A NCAC 02D .0521	N/A	Monthly visible observation for "normal" opacity. If above normal, correct action or Method 9 observation required.	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of corrective action.	N/A
		HAPs	40 CFR Part 63 Subpart ZZZZ	N/A	Comply with the NSPS requirements. No other requirements apply.	Comply with the NSPS requirements. No other requirements apply.	N/A

FORM E4

EMISSION SOURCE COMPLIANCE SCHEDULE

COMPLIANCE STATUS WITH RESPECT TO ALL APPLICABLE REQUIREMENTS

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

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

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

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

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

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

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

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

_____

_____

_____

_____

_____

_____

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

_____

_____

_____

_____

_____

D. Detailed Schedule of Compliance:

Step(s)	Date Expected

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

_____

F. Starting date of submittal of progress reports: _____

Attach Additional Sheets As Necessary

FORM E5

TITLE V COMPLIANCE CERTIFICATION (Required)

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

SITE NAME: Enviva Pellets Northampton, LLC

SITE ADDRESS: 874 Lebanon Church Road

CITY, NC : Garysburg NC

COUNTY: Northampton

PERMIT NUMBER : 10203R05

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.

Signature of responsible company official (REQUIRED, USE BLUE INK) Date: 9/26/18

Royal Smith, Vice President Operations

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

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **IES-BARK**
Bark Hog	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Bark from the Debarker and purchased bark/chips will be transferred to the Bark Hog (IES-BARK) via conveyor for further processing.

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
		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.

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: **Bark Hog**	EMISSION SOURCE ID NO: **IES-BARK**
	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Bark from the Debarker and purchased bark/chips will be transferred to the Bark Hog (IES-BARK) via conveyor for further processing.

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM 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: **IES-DEBARK**
Debarker	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Logs will be debarked by the electric-powered rotary drum Debarker (IES-DEBARK).

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 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

	SOURCE OF EMISSION	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS)		POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
AIR POLLUTANT EMITTED	FACTOR	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	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

		SOURCE OF EMISSION	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS)		POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
HAZARDOUS AIR POLLUTANT	**CAS NO.**	FACTOR	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
		See Emission Calculations in Appendix C						

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

		SOURCE OF EMISSION	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS		
TOXIC AIR POLLUTANT	**CAS NO.**	FACTOR	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: **Debarker**	EMISSION SOURCE ID NO: **IES-DEBARK**
	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Logs will be debarked by the electric-powered rotary drum Debarker (IES-DEBARK).

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM 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: **IES-EPWC**
Electric Powered Green Wood Chipper	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Logs are debarked and sent to an electric powered green wood chipper.

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: **2013**	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **CEM 112" 15KN SUS Pellet Process**	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

	SOURCE OF EMISSION	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS)		POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
AIR POLLUTANT EMITTED	FACTOR	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	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

		SOURCE OF EMISSION	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS)		POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
HAZARDOUS AIR POLLUTANT	**CAS NO.**	FACTOR	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
		See Emission Calculations in Appendix C						

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

		SOURCE OF EMISSION	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS		
TOXIC AIR POLLUTANT	**CAS NO.**	FACTOR	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: **Electric Powered Green Wood Chipper**	EMISSION SOURCE ID NO: **IES-EPWC**
	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Logs are debarked and sent to an electric powered green wood chipper.

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM 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: **IES-GWHS**
Green Wood Handling and Storage	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

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

Green wood is delivered to the plant via trucks as either pre-chipped wood or unchipped logs from commercial harvesting for on-site chipping. All transfer points and storage piles are captured by the green wood handling and storage emission ID (IES-GWHS).

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
		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.

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: **Green Wood Handling and Storage**	EMISSION SOURCE ID NO: **IES-GWHS**
	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood is delivered to the plant via trucks as either pre-chipped wood or unchipped logs from commercial harvesting for on-site chipping. All transfer points and storage piles are captured by the green wood handling and storage emission ID (IES-GWHS).

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM 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: **IES-GWFB**
Green Wood Fuel Bin	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Following storage in the raw wood storage piles, the bark will be transferred via a walking floor to a covered conveyor, then to a fully enclosed Green Wood Fuel Storage Bin (ES-GWFB).

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 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
		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.

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: **Green Wood Fuel Bin**	EMISSION SOURCE ID NO: **IES-GWFB**
	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT(STACK) ID NO(S): **N/A**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Following storage in the raw wood storage piles, the bark will be transferred via a walking floor to a covered conveyor, then to a fully enclosed Green Wood Fuel Storage Bin (ES-GWFB).

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

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

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

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 Wood Hammermills**	EMISSION SOURCE ID NO: **ES-GHM-1, 2, 3, 4, 5**
	CONTROL DEVICE ID NO(S): **CD-DC-1, CD-WESP-1, CD-RTO-1**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are processed in the green wood hammermills. Refer to the process flow diagram provided in the permit application narrative.

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: **GHM-1, 2: 2013 GHM 3, 4, 5: TBD**	DATE MANUFACTURED: **GHM-1, 2: 2013 GHM 3, 4, 5: TBD**
MANUFACTURER / MODEL NO.: **GHM-1, 2: Williams #490 GHM 3, 4, 5: TBD**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**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
		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 SOUI

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: **Green Wood Hammermills**	EMISSION SOURCE ID NO: **ES-GHM-1, 2, 3, 4, 5**
	CONTROL DEVICE ID NO(S): **CD-WESP-1, CD-RTO-1**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1**

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

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Green Wood	**ODT/hr**	**298.5**	**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: **Green Wood Direct-Fired Dryer System (Dryer #1)**	EMISSION SOURCE ID NO: **ES-DRYER-1**
	CONTROL DEVICE ID NO(S): **CD-DC-1, CD-WESP-1, CD-RTO-1**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1**

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

Green wood is conveyed to a rotary dryer system. Direct contact heat is provided to the system via a 175.3 MMBtu/hr burner system. Air emissions will be controlled utilizing a wet electrostatic precipitator (WESP) for particulate removal. VOC and organic-HAP emissions will be controlled by a regenerative thermal oxidizer (RTO). Bypass stacks following the dryer (ES-DRYERBYP-1) and furnace (ES-FURNACEBYP-1) will be used to exhaust hot gases during startup, shutdown, and malfunctions.

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: **2012**	DATE MANUFACTURED: **2012**
MANUFACTURER / MODEL NO.: **Buettner 5x26R**	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
		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: **Green Wood Direct-Fired Dryer System (Dryer #1)**	EMISSION SOURCE ID NO: **ES-DRYER-1**
	CONTROL DEVICE ID NO(S): **CD-DC-1, CD-WESP-1, CD-RTO-1**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-1**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): **153**

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)

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**	

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-DC-1**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DRYER-1**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROLS NO. **1** OF **3** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2Q .0112)? ☐ YES ☐ NO

DESCRIBE CONTROL SYSTEM :
Three identical cyclones are equipped to control the discharge of the rotary dryer system to capture bulk PM emissions. Emissions from each cyclone are combined into a common duct and are routed to the WESP and RTO. The parameters presented herein are per each cyclone.

POLLUTANT(S) COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**98.5** %	**98.5** %	**98.5** %	%
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 (^oF): _____ MIN **Nominal 400** MAX	OUTLET TEMPERATURE (^oF): _____ MIN **Nominal 400** MAX
INLET AIR FLOW RATE (ACFM): **117,000**	BULK PARTICLE DENSITY (LB/FT^3): **3.43E-05**
POLLUTANT LOADING RATE (GR/FT^3): **0.24**	

SETTLING CHAMBER	**CYCLONE**			**MULTICYCLONE**
LENGTH (INCHES):	INLET VELOCITY (FT/SEC): **95**		☑ 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: **156"**	FLOW RATE (GPM):	☐ YES ☐ NO
NO. TRAYS:	De: **79"**	Lc: **312"**	MAKE UP RATE (GPM):	LOUVERS?
NO. BAFFLES:	D: **156"**	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:
The flue gas from the dryer will be split and distributed through a set of three cyclones before being routed to the WESP and RTO. After the cyclones, the gas stream will be combined into a single duct and directed to the WESP inlet point.

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 C2

CONTROL DEVICE (Electrostatic Precipitator)

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

CONTROL DEVICE ID NO: **CD-WESP-1**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DRYER-1, ES-GHM-1 through ES-GHM-5**
EMISSION POINT (STACK) ID NO(S): **EP-1**	POSITION IN SERIES OF CONTROL NO. **2** OF **3** UNITS
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, dryer double duct burners, Green Wood Hammermills, and three of the Dry Wood Hammermills will be controlled by the WESP through a common duct for additional PM, metallic HAP, and HCl removal.

EQUIPMENT SPECIFICATIONS	GAS DISTRIBUTION GRIDS: ☑ YES ☐ NO
TYPE: ☑ WET ☐ DRY	☑ SINGLE-STAGE ☐ TWO-STAGE
TOTAL COLLECTION PLATE AREA (FT^2): **29,904**	NO. FIELDS **2** NO. COLLECTOR PLATES PER FIELD: **567 tubes**
COLLECTOR PLATE SIZE (FT): LENGTH: **TBD** WIDTH: **TBD**	SPACING BETWEEN COLLECTOR PLATES (INCHES): **12" hextube**
TOTAL DISCHARGE ELECTRODE LENGTH (FT): **19"**	GAS VISCOSITY (POISE): **2.054E-04 Poise**
NUMBER OF DISCHARGE ELECTRODES: **667**	NUMBER OF COLLECTING ELECTRODE RAPPERS: **none**
MAXIMUM INLET AIR FLOW RATE (ACFM): **117,000**	PARTICLE MIGRATION VELOCITY (FT/SEC): **0.234**
MINIMUM GAS TREATMENT TIME (SEC): **2.3**	BULK PARTICLE DENSITY (LB/FT^3): **45 lb/cu. Ft.**
FIELD STRENGTH (VOLTS) CHARGING: **83 kVA** COLLECTIN(**N/A**	CORONA POWER (WATTS/1000 CFM): **4000**
ELECTRICAL USAGE (KW/HOUR): **141.5**	
CLEANING PROCEDURES: ☐ RAPPING ☐ PLATE VIBRATING ☑ WASHING ☐ OTHER _____	

OPERATING PARAMETERS	PRESSURE DROP (IN. H20): MIN MAX	WARNING ALARM? ☑ YES ☐ NO
RESISTIVITY OF POLLUTANT (OHM-CM): **N/A**	GAS CONDITIONING: ☑ YES ☐ NO	TYPE OF AGENT (IF YES):
INLET GAS TEMPERATURE (^oF): **240 nominal**	OUTLET GAS TEMPERATURE (^oF): **180 nominal**	
VOLUME OF GAS HANDLED (ACFM): **117,000**	INLET MOISTURE PERCENT: **40%** MIN **50%** MAX	

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

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

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

NOAH

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

COMMENTS:

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

Attach Additional Sheets As Necessary

FORM C3

CONTROL DEVICE (THERMAL OR CATALYTIC)

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

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

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

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

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

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

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

SCFM THROUGH CATALYST: **TBD**

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

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

PRESSURE DROP (IN. H_2O MIN MAX **TBD**	OUTLET TEMPERATURE (^oF): **TBD** MIN **TBD** MAX
INLET TEMPERATURE (^oF) MIN MAX **TBD**	RESIDENCE TIME (SECONDS): **TBD**
INLET AIR FLOW RATE (ACFM): **TBD** (SCFM): **TBD**	COMBUSTION TEMPERATURE (^oF): **TBD**
COMBUSTION CHAMBER VOLUME (FT^3): **TBD**	INLET MOISTURE CONTENT (%): **TBD**
% EXCESS AIR: **TBD**	CONCENTRATION (ppmv) **TBD** INLET **TBD** OUTLET
AUXILIARY FUEL USED: **Natural Gas**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **32**

DESCRIBE MAINTENANCE PROCEDURES:
TBD

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Green Wood Direct-Fired Dryer System (Dryer #1 Bypass)**	EMISSION SOURCE ID NO: **ES-DRYERBYP-1**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-2**

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 burner system. Air emissions will be controlled utilizing a wet electrostatic precipitator (WESP) for particulate removal. VOC and organic-HAP emissions will be controlled by a regenerative thermal oxidizer (RTO). Bypass stacks following the dryer (ES-DRYERBYP-1) and furnace (ES-FURNACEBYP-1) will be used to exhaust hot gases during startup, shutdown, and malfunctions.

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

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

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

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**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
		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: **Green Wood Direct-Fired Dryer System (Dryer #1 Bypass)**	EMISSION SOURCE ID NO: **ES-DRYERBYP-1**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-2**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): **153**

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)

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**	

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

DESCRIBE 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 burner system. Air emissions will be controlled utilizing a wet electrostatic precipitator (WESP) for particulate removal. VOC and organic-HAP emissions will be controlled by a regenerative thermal oxidizer (RTO). Bypass stacks following the dryer (ES-DRYERBYP-1) and furnace (ES-FURNACEBYP-1) will be used to exhaust hot gases during startup, shutdown, and malfunctions.

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

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

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

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**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
		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: **Green Wood Direct-Fired Dryer System (Furnace #1 Bypass)**	EMISSION SOURCE ID NO: **ES-FURNACEBYP-1**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-3**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): **153**

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	**ODT/hr**	**0.0**	

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**	

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Green Wood Direct-Fired Dryer System (Dryer #2)**	EMISSION SOURCE ID NO: **ES-DRYER-2**
	CONTROL DEVICE ID NO(S): **CD-DC-2, CD-WESP-2, CD-RTO-2**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-4**

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 180 MMBtu/hr burner system. Air emissions will be controlled utilizing a wet electrostatic precipitator (WESP) for particulate removal. VOC and organic-HAP emissions will be controlled by a regenerative thermal oxidizer (RTO). Bypass stacks following the dryer (ES-DRYERBYP-2) and furnace (ES-FURNACEBYP-2) will be used to exhaust hot gases during startup, shutdown, and malfunctions.

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

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

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

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix 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
		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: **Green Wood Direct-Fired Dryer System (Dryer #2)**	EMISSION SOURCE ID NO: **ES-DRYER-2**
	CONTROL DEVICE ID NO(S): **CD-WESP-2, CD-RTO-2**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-4**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

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

WOOD-FIRED BURNER

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

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

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

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

COAL-FIRED BURNER

TYPE OF BOILER IF OTHER DESCRIBE:

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

OIL/GAS-FIRED BURNER

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

OTHER FUEL-FIRED BURNER

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

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)

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**	

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-DC-2**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DRYER-2**
EMISSION POINT (STACK) ID NO(S): **EP-4**	POSITION IN SERIES OF CONTROLS NO. **1** OF **3** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2Q .0112)? ☐ YES ☐ NO

DESCRIBE CONTROL SYSTEM :
Three identical cyclones are equipped to control the discharge of the rotary dryer system to capture bulk PM emissions. Emissions from each cyclone are combined into a common duct and are routed to the WESP and RTO. The parameters presented herein are per each cyclone.

POLLUTANT(S) COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**98.5** %	**98.5** %	**98.5** %	%
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	**TBD** MAX
INLET TEMPERATURE (^oF): _____ MIN	**TBD** MAX
OUTLET TEMPERATURE (^oF): _____ MIN	**TBD** MAX
INLET AIR FLOW RATE (ACFM): **TBD**	BULK PARTICLE DENSITY (LB/FT^3): **TBD**
POLLUTANT LOADING RATE (GR/FT^3): **TBD**	

SETTLING CHAMBER	CYCLONE			MULTICYCLONE
LENGTH (INCHES):	INLET VELOCITY (FT/SEC): **TBD**		☐ 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: **TBD**	FLOW RATE (GPM):	☐ YES ☐ NO
NO. TRAYS:	De: **TBD**	Lc: **TBD**	MAKE UP RATE (GPM):	LOUVERS?
NO. BAFFLES:	D: **TBD**	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:
The flue gas from the dryer will be split and distributed through a set of cyclones before being routed to the WESP and RTO. After the cyclones, the gas stream will be combined into a single duct and directed to the WESP inlet point.

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 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-2**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-DRYER-2**
EMISSION POINT (STACK) ID NO(S): **EP-4**	POSITION IN SERIES OF CONTROL NO. **2** OF **3** UNITS
MANUFACTURER: **TBD**	MODEL NO. **TBD**
OPERATING SCENARIO:	
OPERATING SCENARIO: **1** OF **1**	P.E. SEAL REQUIRED (PER 2Q .0112)? ☑ YES ☑ NO

DESCRIBE CONTROL SYSTEM:
Emissions from the Dryer and dryer double duct burners will be controlled by the WESP through a common duct for additional PM, metallic HAP, and HCl removal.

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

FIELD NO.	NO. OF SETS	CHARGING	EACH TRANSFORMER (kVA)	EACH RECTIFIER Kv Ave/Peak Ma Dc

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

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

COMMENTS:

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

Attach Additional Sheets As Necessary

FORM C3

CONTROL DEVICE (THERMAL OR CATALYTIC)

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

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

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

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

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

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

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

SCFM THROUGH CATALYST: **TBD**

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

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

PRESSURE DROP (IN. H_2O MIN MAX **TBD**	OUTLET TEMPERATURE (^oF): **TBD** MIN **TBD** MAX
INLET TEMPERATURE (^oF MIN MAX **TBD**	RESIDENCE TIME (SECONDS): **TBD**
INLET AIR FLOW RATE (ACFM): **TBD** (SCFM): **TBD**	COMBUSTION TEMPERATURE (^oF): **TBD**
COMBUSTION CHAMBER VOLUME (FT^3): **TBD**	INLET MOISTURE CONTENT (%): **TBD**
% EXCESS AIR: **TBD**	CONCENTRATION (ppmv) **TBD** INLET **TBD** OUTLET
AUXILIARY FUEL USED: **Natural Gas**	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **32**

DESCRIBE MAINTENANCE PROCEDURES:
TBD

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Green Wood Direct-Fired Dryer System (Dryer #2 Bypass)**	EMISSION SOURCE ID NO: **ES-DRYERBYP-2**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-5**

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 180 MMBtu/hr burner system. Air emissions will be controlled utilizing a wet electrostatic precipitator (WESP) for particulate removal. VOC and organic-HAP emissions will be controlled by a regenerative thermal oxidizer (RTO). Bypass stacks following the dryer (ES-DRYERBYP-2) and furnace (ES-FURNACEBYP-2) will be used to exhaust hot gases during startup, shutdown, and malfunctions.

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

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

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

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**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
		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: **Green Wood Direct-Fired Dryer System (Dryer #2 Bypass)**	EMISSION SOURCE ID NO: **ES-DRYERBYP-2**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-5**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

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

WOOD-FIRED BURNER

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

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

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

FUEL FEED METHOD: **N/A**

HEAT TRANSFER MEDIA: ☐ STEAM ☑ AIR ☐ OTHER (DESCRIBE) _____

COAL-FIRED BURNER

TYPE OF BOILER IF OTHER DESCRIBE:

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

OIL/GAS-FIRED BURNER

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

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

OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: _____

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

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

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)

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**	

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

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

Green wood is conveyed to a rotary dryer system. Direct contact heat is provided to the system via a 180 MMBtu/hr burner system. Air emissions will be controlled utilizing a wet electrostatic precipitator (WESP) for particulate removal. VOC and organic-HAP emissions will be controlled by a regenerative thermal oxidizer (RTO). Bypass stacks following the dryer (ES-DRYERBYP-2) and furnace (ES-FURNACEBYP-2) will be used to exhaust hot gases during startup, shutdown, and malfunctions.

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

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

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

IS THIS SOURCE SUBJECT ☐ 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
		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: **Green Wood Direct-Fired Dryer System (Furnace #2 Bypass)**	EMISSION SOURCE ID NO: **ES-FURNACEBYP-2**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-6**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

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

WOOD-FIRED BURNER

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

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

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

FUEL FEED METHOD: **N/A**

HEAT TRANSFER MEDIA: ☐ STEAM ☑ AIR ☐ OTHER (DESCRIBE) _____

COAL-FIRED BURNER

TYPE OF BOILER IF OTHER DESCRIBE:

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

OIL/GAS-FIRED BURNER

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

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

OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: _____

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

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

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)

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**	

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: **Double Duct Burners**	EMISSION SOURCE ID NO: **IES-DDB-1 through IES-DDB-8**
	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

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

Each dryer system will include double ducts which will be heated by four double duct burners (IES-DDB-1 through IES-DDB-4). Additionally, four double duct burners will heat the duct work associated with the Pellet Coolers and Dry Hammermills (IES-DDB-5 through IES-DDB-8). The double duct burners will reduce condensation build-up in the ducts, thereby reducing the risk of fire. The double duct burners will be low NOX burners rated at 1 MMBtu/hr each. The double duct burners will combust natural gas, or propane as back-up, and will exhaust directly to atmosphere.

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
		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.

OMPLETE 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: **Double Duct Burners**	EMISSION SOURCE ID NO: **IES-DDB-1 through IES-DDB-8**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

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

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): **1**

WOOD-FIRED BURNER

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

PERCENT MOISTURE OF FUEL:_____

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

FUEL FEED METHOD: 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: **Natural Gas/Propane** PERCENT MOISTURE: _____

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

TYPE OF FIRING: **Direct** TYPE(S) OF CONTROL(S) (IF ANY): **None**

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Natural Gas or Propane	**MMBtu**	**1.0**	**1.0**

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	SPECIFIC BTU CONTENT	SULFUR CONTENT (% BY WEIGHT)	ASH CONTENT (% BY WEIGHT)
Natural Gas	**1,020 Btu/scf**	**--**	
Propane	**91,500 Btu/gal**	**0.54 grains/100 ft^3**	

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

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

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dried Wood Handling (ES-DWH) will include conveyor transfer points located between the Dryer and Dry Hammermills and the Dry Hammermills and Pellet Mills.

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

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

START CONSTRUCTION DATE:	DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: **Bliss, Model 44-60**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix 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
		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.

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

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

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

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

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Dried Wood Handling (ES-DWH) will include conveyor transfer points located between the Dryer and Dry Hammermills and the Dry Hammermills and Pellet Mills.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**ODT/hr**	**142**	

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

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

DESCRIBE CONTROL SYSTEM:
A bag filter will be utilized for emission control on Dried Wood Handling operations.

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
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: **TBD** GAUGE? ☑ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **TBD**	INLET TEMPERATURE (^oF): MIN	MAX **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN	MAX **TBD**
INLET AIR FLOW RATE (ACFM): **1,500**	FILTER OPERATING TEMP (^oF): **N/A**	
NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: **TBD**	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES: **TBD**	FILTER SURFACE AREA PER CARTRIDGE (FT^2): **TBD**	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **TBD**	AIR TO CLOTH RATIO: **TBD**	

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

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-PS-1 and ES-PS-2**
Prescreeners	CONTROL DEVICE ID NO(S): **CD-PS-BF**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-8**

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

Presecreeners will screen chips: large chips will be sent to the Dry Hammermills for further reduction. Small chips will be sent to the Pellet Mill Feed Silo. Emissions from the prescreeners will route to a baghouse for control of particulates.

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 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
		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.

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: **Prescreeners**	EMISSION SOURCE ID NO: **ES-PS-1 and ES-PS-2**
	CONTROL DEVICE ID NO(S): **CD-PS-BF**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-8**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Presecreeners will screen chips: large chips will be sent to the Dry Hammermills for further reduction. Small chips will be sent to the Pellet Mill Feed Silo. Emissions from the prescreeners will route to a baghouse for control of particulates.

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: **CD-PS-BF**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-PS-1 and ES-PS-2**
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:
A baghouse collects dust from the presecreeners before the dry hammermills.

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
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: **TBD** GAUGE? ☐ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **TBD**	INLET TEMPERATURE (^oF): MIN	MAX **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN	MAX **TBD**
INLET AIR FLOW RATE (ACFM): **17,100**	FILTER OPERATING TEMP (^oF): **N/A**	
NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: **TBD**	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES: **TBD**	FILTER SURFACE AREA PER CARTRIDGE (FT^2): **TBD**	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **TBD**	AIR TO CLOTH RATIO: **TBD**	

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

DESCRIBE CLEANING PROCEDURES

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

DESCRIBE INCOMING AIR STREAM:

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **IES-DLH**
Dry Line Hopper	CONTROL DEVICE ID NO(S): **CD-HM-BF-3, CD-RCO-1**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-9**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dried wood materials are transferred to the Dry Line Conveyor (ES-DLC-1).

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:
2014	**2014**
MANUFACTURER / MODEL NO.: **Enviva Built**	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
		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.

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: **Dry Line Hopper**	EMISSION SOURCE ID NO: **IES-DLH**
	CONTROL DEVICE ID NO(S): **CD-HM-BF-3, CD-RCO-1**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-9**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Dried wood materials are transferred to Dry Line Conveyor (ES-DLC-1).

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Eight (8) Dry Wood Hammermills**	EMISSION SOURCE ID NO: **ES-HM-1 through ES-HM-8**
	CONTROL DEVICE ID NO(S): **CD-HM-CYC-1 through CD-HM-CYC-8, CD-HM-BF-1 through CD-HM-BF-3, CD-RCO-1**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-9**

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

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

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

START CONSTRUCTION DATE: **2012**	DATE MANUFACTURED: **2012**
MANUFACTURER / MODEL NO.: **Bliss, Model 44-60**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix 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
		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.

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: **Eight (8) Dry Wood Hammermills**	EMISSION SOURCE ID NO: **ES-HM-1 through ES-HM-8**
	CONTROL DEVICE ID NO(S): **CD-HM-CYC-1 through CD-HM-CYC-8, CD-HM-BF-1 through CD-HM-BF-3, CD-RCO-1**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-9**

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

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood	**ODT/hr**	**62**	**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-HM-CYC-1 through CD-HM-CYC-8**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-HM-1 through ES-HM-8**
EMISSION POINT (STACK) ID NO(S): **EP-9**	POSITION IN SERIES OF CONTROLS NO. **1** OF **4** UNITS **(ES-HM-1 to 8)**
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2Q .0112)? ☑ YES ☐ NO

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

****Dry Hammermills ES-HM-1 through ES-HM-3 will also be routed to the Pellet Cooler RCO/RTO (CD-RCO-1) after leaving the bag filter (CD-HM-BF-1). Refer to the control device forms associated with ES-CLR-6 for more information.**

POLLUTANT(S) COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**98** %	**98** %	**98** %	%
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 (^oF): ____ MIN **Ambient** MAX	OUTLET TEMPERATURE (^oF): ____ MIN **Ambient** MAX
INLET AIR FLOW RATE (ACFM): **15,000 (each)**	BULK PARTICLE DENSITY (LB/FT^3): **1.43E-03**
POLLUTANT LOADING RATE (GR/FT^3): **10 (inlet)**	

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

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

DESCRIBE INCOMING AIR STREAM:
The material will be pulled through the cyclone under negative pressure. The cyclone will separate the material from the air stream and the air will discharge to an associated bag filter prior to being discharged to the atmosphere via a discaharge stack common to all filters in this area.

PARTICLE SIZE DISTRIBUTION

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

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

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

Attach Additional Sheets As Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: **CD-HM-BF-1 through CD-HM-BF-3**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-HM-1 through ES-HM-8, ES-DLC-1, ES-DSHM-1 and ES-DSHM-2**
EMISSION POINT (STACK) ID NO(S): **EP-9**	POSITION IN SERIES OF CONTROLS** NO. **2** OF **4** UNITS **(ES-HM-1 to 8)**
	POSITION IN SERIES OF CONTROLS** NO. **1** OF **3** UNITS **(ES-DLC-1)**
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:

Three (3) bag filters will be utilized for emission control on eight (8) dry hammermill cyclones and two (2) Dry Shavings Hammermills. Hammermills 1 through 3 vent to CD-HM-BF-1, Hammermills 4 and 5 vent through CD-HM-BF-2, and emissions from Hammermills 7 and 8 vent to the CD-MH-BF-3 along with the Dry Line Feed Conveyor (DLC).

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

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
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: **6"** GAUGE? ☑ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-05**	INLET TEMPERATURE (^oF): MIN	MAX **120**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN	MAX **100**
INLET AIR FLOW RATE (ACFM): **45,000**	FILTER OPERATING TEMP (^oF): **N/A**	

NO. OF COMPARTMENTS: **1**	NO. OF BAGS PER COMPARTMENT: **412**	LENGTH OF BAG (IN.): **144**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **5.75**
TOTAL FILTER SURFACE AREA (FT^2): **6,250**	AIR TO CLOTH RATIO: **7.20**	

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

DESCRIBE CLEANING PROCEDURES

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

DESCRIBE INCOMING AIR STREAM:

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C8

CONTROL DEVICE (WET PARTICULATE SCRUBBER)

REVISED 09/22/16 | **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** | **C8**

CONTROL DEVICE ID NO: **CD-RCO-1**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-HM-1 through ES-HM-8, ES-DLC-1, ES-CLR-1 through ES-CLR-6, ES-DSHM-1 and ES-DSHM-2**
EMISSION POINT ID NO(S): **EP-9**	POSITION IN SERIES OF CONTROLS: NO. **3** OF **4** UNITS **(ES-HM-1 through 8)**
	POSITION IN SERIES OF CONTROLS: NO. **2** OF **3** UNITS **(ES-DLC-1)**
	POSITION IN SERIES OF CONTROLS:** NO. **2** OF **3** UNITS **(ES-CLR-1 through 6)**
OPERATING SCENARIO:	
____**1**___ OF ___**1**____	P.E. SEAL NEEDED (PER 2Q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:

After leaving the bag filters (CD-HM-BF-1 through 3), the emissions from the Dry Hammermills (ES-HM-1 through 8), and ES-DLC-1 will also be routed to the wet scrubber / RCO (CD-RCO-1).

**** After leaving the pellet coolers (ES-CLR-1 through 6), emissions from the pellet coolers will pass through a wet scrubber, and then will be routed to the wet scrubber / RCO (CD-RCO-1). See the forms associated with the pellet coolers for more information.**

POLLUTANT(S) COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**
BEFORE CONTROL EMISSION RATE (LB/HR):			
CAPTURE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %
CONTROL DEVICE EFFICIENCY:	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%
EFFICIENCY DETERMINATION CODE:			
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):			

PRESSURE DROP (IN. H_2O): ___**TBD**___ _____ MAX	
INLET TEMPERATURE (^oF): ____**TBD**__ _____ MAX	OUTLET TEMPERATURE (^oF) ___**TBD**___ MIN ___**TBD**___ MAX
INLET AIR FLOW RATE (ACFM): **TBD**	MOISTURE CONTENT : INLET ____**TBD**__ OUTLET ___**TBD**_____
THROAT VELOCITY (FT/SEC): **TBD**	THROAT TYPE: ☐ FIXED ☐ VARIABLE
TYPE OF SYSTEM: **TBD**	TYPE OF PACKING USED IF ANY: **TBD**
ADDITIVE LIQUID SCRUBBING MEDIUM: **TBD**	PERCENT RECIRCULATED: **TBD**
MINIMUM LIQUID INJECTION RATE (GAL/MIN): **TBD**	

MAKE UP RATE (GAL/MIN): **TBD** FOR ADDITIVE (GAL/MIN): **TBD**

DESCRIBE MAINTENANCE PROCEDURES:

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C3

CONTROL DEVICE (THERMAL OR CATALYTIC)

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

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

CONTROL DEVICE ID NO: **CD-RCO-1**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-HM-1 through ES-HM-8, ES-DLC-1, ES-CLR-1 through ES-CLR-6, ES-DSHM-1 and ES-DSHM-2**
EMISSION POINT (STACK) ID NO(S): **EP-9**	POSITION IN SERIES OF CONTROLS NO. **4** OF **4** UNITS **(ES-HM-1 through 8)**
	POSITION IN SERIES OF CONTROLS NO. **3** OF **3** UNITS **(ES-DLC-1)**
	POSITION IN SERIES OF CONTROLS** NO. **3** OF **3** UNITS **(ES-CLR-1 through 6)**

MANUFACTURER: **TBD**	MODEL NO: **TBD**
OPERATING SCENARIO:	
1 OF **1**	

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

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

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

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

SCFM THROUGH CATALYST: **TBD**

DESCRIBE CONTROL SYSTEM, INCLUDING RELATION TO OTHER CONTROL DEVICES AND SOURCES, AND ATTACH DIAGRAM OF SYSTEM:
After leaving the bag filters (CD-HM-BF-1 through 3), the emissions from the Dry Hammermills (ES-HM-1 through 8), and ES-DLC-1 will also be routed to the wet scrubber / RCO (CD-RCO-1).

**** After leaving the pellet coolers (ES-CLR-1 through 6), emissions from the pellet coolers will pass through a wet scrubber, and then will be routed to the wet scrubber / RCO (CD-RCO-1). See the forms associated with the pellet coolers for more information.**

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

PRESSURE DROP (IN. H_2O MIN	MAX **TBD**
INLET TEMPERATURE (^oF) MIN	MAX **TBD**
INLET AIR FLOW RATE (ACFM): **TBD**	(SCFM): **TBD**
COMBUSTION CHAMBER VOLUME (FT^3): **TBD**	
% EXCESS AIR: **TBD**	
AUXILIARY FUEL USED: **Natural Gas**	
OUTLET TEMPERATURE (^oF): **TBD** MIN	**TBD** MAX
RESIDENCE TIME (SECONDS): **TBD**	
COMBUSTION TEMPERATURE (^oF): **TBD**	
INLET MOISTURE CONTENT (%): **TBD**	
CONCENTRATION (ppmv) **TBD** INLET	**TBD** OUTLET
TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): **9.8**	

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: **Dry Shavings Hammermills**	EMISSION SOURCE ID NO: **ES-DSHM-1 and ES-DSHM-2**
	CONTROL DEVICE ID NO(S): **CD-DSHM-BF, CD-RCO-1**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-9**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Dry shavings are reduced to appropriate size needed for pelletizing using two (2) dry shavings hammermill.

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

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

START CONSTRUCTION DATE: **TBD**	DATE MANUFACTURED: **TBD**
MANUFACTURER / MODEL NO.: **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)	**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
		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.

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: **Dry Shavings Hammermill**	EMISSION SOURCE ID NO: **ES-DSHM-1 and ES-DSHM-2**
	CONTROL DEVICE ID NO(S): **CD-HM-BF-1 through CD-HM-BF-3, CD-RCO-1**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-9**

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

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Dried Wood Shavings	**ODT/hr**	**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 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 Coolers**	EMISSION SOURCE ID NO: **ES-CLR-1 through ES-CLR-6**
	CONTROL DEVICE ID NO(S): **CD-CLR-1 through CD-CLR-6, CD-WS-1, CD-RCO-1**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-9**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Six (6) pellet coolers follow the pellet presses 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: **2012**	DATE MANUFACTURED: **2012**
MANUFACTURER / MODEL NO.: **Kahl Press 60-1250**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix 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
		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 B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: **Pellet Coolers**	EMISSION SOURCE ID NO: **ES-CLR-1 through ES-CLR-6**
	CONTROL DEVICE ID NO(S): **CD-CLR-1 through CD-CLR-6, CD-WS-1, CD-RCO-1**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-9**

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

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Wood Pellets	**ODT/hr**	**100**	**N/A**

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C4

CONTROL DEVICE (CYCLONE, MULTICYCLONE, OR OTHER MECHANICAL)

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

CONTROL DEVICE ID NO: **CD-CLR-1 through CD-CLR-6**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-CLR-1 through ES-CLR-6**
EMISSION POINT (STACK) ID NO(S): **EP-9**	POSITION IN SERIES OF CONTROLS NO. **1** OF **4** UNITS
OPERATING SCENARIO:	
1 OF **1**	P.E. SEAL REQUIRED (PER 2Q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM :
Six (6) identical high efficiency cyclones capture bulk PM emissions from six (6) pellet coolers. Each cooler vents to one dedicated cyclone. The cyclones will operate under negative pressure.

POLLUTANT(S) COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
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 (^{0}F): _____ MIN **Ambient** MAX	OUTLET TEMPERATURE (^{0}F): _____ MIN **Ambient** MAX
INLET AIR FLOW RATE (ACFM): **17,100 (each)**	BULK PARTICLE DENSITY (LB/FT^3): **2.86E-05**
POLLUTANT LOADING RATE (GR/FT^3): **0.01 (inlet)**	

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

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

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

PARTICLE SIZE DISTRIBUTION

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

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

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

Attach Additional Sheets As Necessary

FORM C8

CONTROL DEVICE (WET PARTICULATE SCRUBBER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C8**

CONTROL DEVICE ID NO: **CD-WS-1**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-CLR-1 through ES-CLR-6**
EMISSION POINT ID NO(S): **EP-9**	POSITION IN SERIES OF CONTROLS:** NO. **2** OF **4** UNITS
OPERATING SCENARIO:	
___**1**___ OF ___**1**___	P.E. SEAL NEEDED (PER 2Q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:

Exhaust from six (6) identical high efficiency cyclones will be controlled by a wet scrubber (CD-WS-1).

**** Emissions from CD-WS-1 will continue to the wet scrubber/RCO associated with the dry hammermill area (CD-RCO-1). Throughout the forms and text, the control device will be referenced in conjunction with CD-RCO-1 (i.e., as wet scrubber/RCO) for convenience.**

POLLUTANT(S) COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**
BEFORE CONTROL EMISSION RATE (LB/HR):			
CAPTURE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %
CONTROL DEVICE EFFICIENCY:	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%
EFFICIENCY DETERMINATION CODE:			
TOTAL AFTER CONTROL EMISSION RATE (LB/HR):			

PRESSURE DROP (IN. H_20): ___**TBD**___ _____ MAX	
INLET TEMPERATURE (^oF): ____**TBD**___ _____ MAX	OUTLET TEMPERATURE (^oF) ___**TBD**___ MIN ___**TBD**___ MAX
INLET AIR FLOW RATE (ACFM): **TBD**	MOISTURE CONTENT : INLET ____**TBD**___ OUTLET ___**TBD**_____
THROAT VELOCITY (FT/SEC): **TBD**	THROAT TYPE: ☐ FIXED ☐ VARIABLE
TYPE OF SYSTEM: **TBD**	TYPE OF PACKING USED IF ANY: **TBD**
ADDITIVE LIQUID SCRUBBING MEDIUM: **TBD**	PERCENT RECIRCULATED: **TBD**
MINIMUM LIQUID INJECTION RATE (GAL/MIN): **TBD**	

MAKE UP RATE (GAL/MIN): **TBD** FOR ADDITIVE (GAL/MIN): **TBD**

DESCRIBE MAINTENANCE PROCEDURES:

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

PARTICLE SIZE DISTRIBUTION

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

ATTACH A DIAGRAM OF 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: **Dry Shavings Handling**	EMISSION SOURCE ID NO: **IES-DRYSHAVE, IES-DRYSHAVE-1**
	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

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

For IES-DRYSHAVE, purchased dry shavings will be unloaded from trucks into a hopper that feeds material via enclosed conveyors to a bucket elevator that ultimately fills a silo. For IES-DRYSHAVE-1, purchased dry shavings will be unloaded from trucks into a Dry Shavings Silo (IES-DSS) for storage. From there, the dry shavings will be transferred to the Dry Shavings Hammermills (ES-DSHM-1 and ES-DSHM-2). The transfer points associated with dry shavings storage and handling will be part of the Dry Shavings emission source ID (IES-DRYSHAVE).

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: **2014**	DATE MANUFACTURED: **2014**
MANUFACTURER / MODEL NO.: **Enviva Built**	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
		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.

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: **Dry Shavings Handling**	EMISSION SOURCE ID NO: **IES-DRYSHAVE, IES-DRYSHAVE-1**
	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

For IES-DRYSHAVE, purchased dry shavings will be unloaded from trucks into a hopper that feeds material via enclosed conveyors to a bucket elevator that ultimately fills a silo. For IES-DRYSHAVE-1, purchased dry shavings will be unloaded from trucks into a Dry Shavings Silo (IES-DSS) for storage. From there, the dry shavings will be transferred to the Dry Shavings Hammermills (ES-DSHM-1 and ES-DSHM-2). The transfer points associated with dry shavings storage and handling will be part of the Dry Shavings emission source ID (IES-DRYSHAVE).

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

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

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

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

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

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

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**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
		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 SOUI

Attach Additional Sheets As Necessary

FORM B6

EMISSION SOURCE (STORAGE SILO/BINS)

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

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

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

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

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

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

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

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

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
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: **TBD** GAUGE? ☑ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **TBD**	INLET TEMPERATURE (^oF): MIN	MAX **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN	MAX **TBD**
INLET AIR FLOW RATE (ACFM): **3,600**	FILTER OPERATING TEMP (^oF): **N/A**	
NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: **TBD**	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES: **TBD**	FILTER SURFACE AREA PER CARTRIDGE (FT^2): **TBD**	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **TBD**	AIR TO CLOTH RATIO: **TBD**	

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

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **ES-PMFS**
Pellet Mill Feed Silo	CONTROL DEVICE ID NO(S): **CD-PMFS-BV**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-11**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
A pellet press silo stores dried ground wood prior to transport to the pellet presses.

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:
2013	
MANUFACTURER / MODEL NO.:	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR
Laidig 533	

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix 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 FACTOR	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr
		N/A			

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

)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: **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-11**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
A pellet press silo stores dried ground wood prior to transport to the pellet presses.

MATERIAL STORED: **Pellet Mill Feed Material**				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:		

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

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: **CD-PMFS-BV**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-PMFS**
EMISSION POINT (STACK) ID NO(S): **EP-11**	POSITION IN SERIES OF CONTROLS NO. **1** OF **1** UNITS
OPERATING SCENARIO:	
___**1**___ OF ___**1**___	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

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

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
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): **1.43E-06**	INLET TEMPERATURE (^oF): MIN MAX **Ambient**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF MIN MAX **Ambient**
INLET AIR FLOW RATE (ACFM): **2,500**	FILTER OPERATING TEMP (^oF): **N/A**

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

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

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Pellet Cooler HP Fines Relay System**	EMISSION SOURCE ID NO: **ES-PCHP**
	CONTROL DEVICE ID NO(S): **CD-PCHP-BF**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-12**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Fine pellet material from the hammermill pollution control system and screening operation is collected in the pellet cooler high pressure fines relay system which is 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)	☐ 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**	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 FACTOR	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr
		N/A			

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

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

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:	EMISSION SOURCE ID NO: **ES-PCHP**
Pellet Cooler HP Fines Relay System	CONTROL DEVICE ID NO(S): **CD-PCHP-BF**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT(STACK) ID NO(S): **EP-12**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Fine pellet material from the hammermill pollution control system and screening operation is collected in the pellet cooler high pressure fines relay system which is controlled by a baghouse.

MATERIAL STORED: **Fine Pellet Material**				DENSITY OF MATERIAL (LB/FT3): **40**	
CAPACITY	CUBIC FEET: **2,200**			TONS:	
DIMENSIONS (FEET)	HEIGHT:	DIAMETER: **12**	***(OR)***	LENGTH: WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY: **6 tph**	

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

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: **CD-PCHP-BF**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **ES-PCHP**
EMISSION POINT (STACK) ID NO(S): **EP-12**	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 Cooler HP Fines Relay System. The baghouse collects dust from the air volume present in the silo. The baghouse is sized to offset the air displacement created by material feed to the silo.

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
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: **TBD** GAUGE? ☑ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **TBD**	INLET TEMPERATURE (^oF): MIN	MAX **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN	MAX **TBD**
INLET AIR FLOW RATE (ACFM): **3,600**	FILTER OPERATING TEMP (^oF): **N/A**	
NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: **TBD**	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES: **TBD**	FILTER SURFACE AREA PER CARTRIDGE (FT^2): **TBD**	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **TBD**	AIR TO CLOTH RATIO: **TBD**	

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

DESCRIBE CLEANING PROCEDURES

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

DESCRIBE INCOMING AIR STREAM:

The air stream will contain wood dust particles. Larger particles will be removed by the upstream cyclone.

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION: **Finished Product Handling, Pellet Loadout Bins, Pellet Loadout**	EMISSION SOURCE ID NO: **ES-FPH, ES-PB-1 through ES-PB-12, ES-PL-1, ES-PL-2**
	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-13**

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

Pelletizing product is conveyed to pellet loadout bins that feed two pellet loadout operations (ES-PL-1 and ES-PL-2). Emissions from the Pellet Loadout Bins are controlled by a bagfilter (CD-FPH-BF). Pellet Loadout is accomplished by gravity feed of the pellets into trucks through a covered shoot that automatically telescopes upward during the loadout process to maintain constant contact with the product as it is loaded to prevent PM emissions. Although emissions to the atmosphere from conveyance from storage bins are minimal because dried wood fines have been removed in the pellet coolers, a slight negative pressure is maintained in the loadout building as a fire protection measure. The slight negative pressure is produced via an induced draft fan that exhausts to the same bagfilter that controls PM emissions from loading of the pellet press silo. Trucks are also covered immediately after loading.

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

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix 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 FACTOR	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr
		N/A			

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

)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: **Finished Product Handling**	EMISSION SOURCE ID NO: **ES-FPH**
	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-13**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Collection of transfer points, pellet screening operations, and pellet conveying.

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM 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 Loadout Bins**	EMISSION SOURCE ID NO: **ES-PB-1 through ES-PB-12**
	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT(STACK) ID NO(S): **EP-13**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Pellet Loadout Bins are used to store pellets for shipping. Pellets are then loaded from the bins into trucks/trains in one of two pellet loadout areas.

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

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

NO. FILL TUBES:

MAXIMUM ACFM: **750 each**

MATERIAL IS UNLOADED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B9

EMISSION SOURCE (OTHER)

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

EMISSION SOURCE DESCRIPTION: **Pellet Loadout 1 and 2**	EMISSION SOURCE ID NO: **ES-PL-1 and ES-PL-2**
	CONTROL DEVICE ID NO(S): **CD-FPH-BF**
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-13**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Final product is loaded into trucks in one of two pellet loadout areas.

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

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

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

COMMENTS:

Attach Additional Sheets as Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

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

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

	PM	PM_{10}	$PM_{2.5}$	
POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
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: **6"** GAUGE? ☑ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **1.43E-05**	INLET TEMPERATURE (^oF): MIN	MAX **120**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN	MAX **100**
INLET AIR FLOW RATE (ACFM): **35,500**	FILTER OPERATING TEMP (^oF): **N/A**	

NO. OF COMPARTMENTS: **1**	NO. OF BAGS PER COMPARTMENT: **1**	LENGTH OF BAG (IN.): **144**
NO. OF CARTRIDGES:	FILTER SURFACE AREA PER CARTRIDGE (FT^2):	DIAMETER OF BAG (IN.): **5.75**
TOTAL FILTER SURFACE AREA (FT^2): **4,842**	AIR TO CLOTH RATIO: **7.30**	

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

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

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: **Additive Handling and Storage**	EMISSION SOURCE ID NO: **IES-ADD**
	CONTROL DEVICE ID NO(S): **CD-ADD-BF**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-14**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Bulk additive material will be delivered by truck and pneumatically unloaded into a storage silo. The additive will then be conveyed via screw conveyor from the storage silo to the milled fiber conveyor which transfers milled wood to the Pellet Presses. Emissions from additive handling 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)	☐ Woodworking (Form B4)	☐ Manuf. of chemicals/coatings/inks (Form B7)
☐ Int.combustion engine/generator (Form B2)	☐ Coating/finishing/printing (Form B5)	☐ Incineration (Form B8)
☐ Liquid storage tanks (Form B3)	☑ Storage silos/bins (Form B6)	☐ Other (Form B9)

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

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**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
		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 SOUI

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: **Additive Handling and Storage**	EMISSION SOURCE ID NO: **IES-ADD**
	CONTROL DEVICE ID NO(S): **CD-ADD-BF**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT(STACK) ID NO(S): **EP-14**

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Bulk additive material will be delivered by truck and pneumatically unloaded into a storage silo. The additive will then be conveyed via screw conveyor from the storage silo to the milled fiber conveyor which transfers milled wood to the Pellet Presses. Emissions from additive handling are controlled by a baghouse.

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

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

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1

CONTROL DEVICE (FABRIC FILTER)

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

CONTROL DEVICE ID NO: **CD-ADD-BF**	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): **IES-ADD**
EMISSION POINT (STACK) ID NO(S): **EP-14**	POSITION IN SERIES OF CONTROLS NO. **1** OF **1** UNITS
OPERATING SCENARIO:	
___**1**___ OF ___**1**___	P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO

DESCRIBE CONTROL SYSTEM:
The silo baghouse will control air displaced by the loaded additive.

POLLUTANTS COLLECTED:	**PM**	**PM_{10}**	**$PM_{2.5}$**	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	**~99.9** %	**~99.9** %	**~99.9** %	%
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: **TBD** GAUGE? ☑ YES ☐ NO		
BULK PARTICLE DENSITY (LB/FT^3): **TBD**	INLET TEMPERATURE (^oF): MIN	MAX **TBD**
POLLUTANT LOADING RATE: **0.004** ☐ LB/HR ☑ GR/FT^3	OUTLET TEMPERATURE (^oF) MIN	MAX **TBD**
INLET AIR FLOW RATE (ACFM): **1,652**	FILTER OPERATING TEMP (^oF): **N/A**	
NO. OF COMPARTMENTS: **TBD**	NO. OF BAGS PER COMPARTMENT: **TBD**	LENGTH OF BAG (IN.): **TBD**
NO. OF CARTRIDGES: **TBD**	FILTER SURFACE AREA PER CARTRIDGE (FT^2): **TBD**	DIAMETER OF BAG (IN.): **TBD**
TOTAL FILTER SURFACE AREA (FT^2): **TBD**	AIR TO CLOTH RATIO: **TBD**	

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

DESCRIBE CLEANING PROCEDURES

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

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

PARTICLE SIZE DISTRIBUTION

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

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

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **IES-GN**
Emergency Generator (350 bhp)	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-15**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Diesel-fired internal combustion engine to provide power in the case of an emergency.

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

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

START CONSTRUCTION DATE:	DATE MANUFACTURED:
2013	**2013**
MANUFACTURER / MODEL NO.: **Generac SD200**	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR

IS THIS SOURCE SUBJECT ☑ NSPS (SUBPARTS?): **IIII** ☑ NESHAP (SUBPARTS?): **ZZZZ**

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
		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 SOUI

Attach Additional Sheets As Necessary

FORM B2

EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/TURBINES/GENERATORS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B2**

EMISSION SOURCE DESCRIPTION:
Emergency Generator (350 bhp)

EMISSION SOURCE ID NO: **IES-GN**

CONTROL DEVICE ID NO(S): **N/A**

OPERATING SCENARIO: 1 OF 1

EMISSION POINT (STACK) ID NO(S): **EP-15**

ENGINE SERVICE (CHECK ALL THAT APPLY) ☑ EMERGENCY ☐ PEAK SHAVER ☐ SPACE HEAT ☐ OTHER (DESCRIBE): ☐ ELECTRICAL GENERATION

GENERATOR OUTPUT (KW):

ANTICIPATED ACTUAL HOURS OF OPERATION (HRS/YR):

ENGINE OUTPUT (HP):

TYPE ICE: ☐ GASOLINE ENGINE ☑ DIESEL ENGINE UP TO 600 HP ☐ DIESEL ENGINE GREATER THAN 600 HP ☐ DUAL FUEL ENGINE ☐ OTHER (DESCRIBE): _____ (complete below)

ENGINE TYPE ☐ RICH BURN ☐ LEAN BURN

EMISSION REDUCTION MODIFICATIONS ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☐ OTHER _____

OR ☐ STATIONARY GAS TURBINE (complete below) ☐ NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

FUEL: ☐ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE):_____

CYCLE: ☐ COGENERATION ☐ SIMPLE ☐ REGENERATIVE ☐ COMBINED

CONTROLS: ☐ WATER-STEAM INJECTION ☐ UNCONTROLLED ☐ LEAN-PREMIX ☐ OTHER (SPECIFY):_____

ENGINE TYPE: ☐ 2-CYCLE LEAN BURN ☐ 4-CYCLE LEAN ☐ TURBINE ☐ 4-CYCLE RICH BURN ☐ OTHER (DESCRIBE): _____

CONTROLS: ☐ COMBUSTION MODIFICATIONS (DESCRIBE): _____ ☐ NONSELECTIVE CATALYTIC REDUCTION ☐ SELECTIVE CATALYTIC REDUCTION ☐ CLEAN BURN AND PRECOMBUSTION CHAMBE ☐ UNCONTROLLED

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
No. 2 Fuel Oil	**gal**	**6.55**	**6.55**

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	BTU/UNIT	UNITS	SULFUR CONTENT (% BY WEIGHT)
No. 2 Fuel Oil	**19,300**	**lb**	**< 15 ppmw**

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

POLLUTANT	NOX	CO	PM	PM10	VOC	OTHER
EMISSION FACTOR LB/UNIT						
UNIT						

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:
Periodic equipment maintenance will minimize opacity by following manufacturer's specifications or common industry practices.

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: **IES-FWP**
Fire Water Pump (300 bhp)	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-16**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Diesel-fired internal combustion engine to provide water in the case of a fire emergency.

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

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

START CONSTRUCTION DATE:	DATE MANUFACTURED:
2013	
MANUFACTURER / MODEL NO.:	
Clarke/John Deere PE6068L220451	EXPECTED OP. SCHEDULE: **24** HR/DAY **7** DAY/WK **52** WK/YR

IS THIS SOURCE SUBJECT T ☑ NSPS (SUBPARTS?): **IIII** ☑ NESHAP (SUBPARTS?): **ZZZZ**

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
		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 B2

EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/TURBINES/GENERATORS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B2**

EMISSION SOURCE DESCRIPTION:
Fire Water Pump (300 bhp)

EMISSION SOURCE ID NO: **IES-FWP**

CONTROL DEVICE ID NO(S): **N/A**

OPERATING SCENARIO: 1 OF 1

EMISSION POINT (STACK) ID NO(S): **EP-16**

ENGINE SERVICE (CHECK ALL THAT APPLY) ☑ EMERGENCY ☐ PEAK SHAVER ☐ SPACE HEAT ☐ OTHER (DESCRIBE): ☐ ELECTRICAL GENERATION

GENERATOR OUTPUT (KW):

ANTICIPATED ACTUAL HOURS OF OPERATION (HRS/YR):

ENGINE OUTPUT (HP):

TYPE ICE: ☐ GASOLINE ENGINE ☑ DIESEL ENGINE UP TO 600 HP ☐ DIESEL ENGINE GREATER THAN 600 HP ☐ DUAL FUEL ENGINE ☐ OTHER (DESCRIBE): _____ (complete below)

ENGINE TYPE ☐ RICH BURN ☐ LEAN BURN

EMISSION REDUCTION MODIFICATIONS ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☐ OTHER _____

OR ☐ STATIONARY GAS TURBINE (complete below) ☐ NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

FUEL: ☐ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE):_____

CYCLE: ☐ COGENERATION ☐ SIMPLE ☐ REGENERATIVE ☐ COMBINED

CONTROLS: ☐ WATER-STEAM INJECTION ☐ UNCONTROLLED ☐ LEAN-PREMIX ☐ OTHER (SPECIFY):_____

ENGINE TYPE: ☐ 2-CYCLE LEAN BURN ☐ 4-CYCLE LEAN ☐ TURBINE ☐ 4-CYCLE RICH BURN ☐ OTHER (DESCRIBE): _____

CONTROLS: ☐ COMBUSTION MODIFICATIONS (DESCRIBE): _____ ☐ NONSELECTIVE CATALYTIC REDUCTION ☐ SELECTIVE CATALYTIC REDUCTION ☐ CLEAN BURN AND PRECOMBUSTION CHAMBE ☐ UNCONTROLLED

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
No. 2 Fuel Oil	**gal**	**6.55**	**6.55**

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	BTU/UNIT	UNITS	SULFUR CONTENT (% BY WEIGHT)
No. 2 Fuel Oil	**19,300**	**lb**	**< 15 ppmw**

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

POLLUTANT	NOX	CO	PM	PM10	VOC	OTHER
EMISSION FACTOR LB/UNIT						
UNIT						

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:
Periodic equipment maintenance will minimize opacity by following manufacturer's specifications or common industry practices.

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: **Propane Vaporizer**	EMISSION SOURCE ID NO: **IES-PVAP**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-17**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Liquid propane gas-fired propane vaporizer to provide propane gas for Plant operations.

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

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

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

IS THIS SOURCE SUBJECT ☐ 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
		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 SOUI

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: **Propane Vaporizer**	EMISSION SOURCE ID NO: **IES-PVAP**
	CONTROL DEVICE ID NO(S): **N/A**
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): **1**

WOOD-FIRED BURNER

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

PERCENT MOISTURE OF FUEL:_____

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

FUEL FEED METHOD: 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: **Liquid Propane**

TYPE OF BOILER: ☐ UTILITY INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL

TYPE OF FIRING: **Direct** TYPE(S) OF CONTROL(S) (IF ANY): **None**

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Propane	**MMBtu**	**1.0**	**1.0**

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	SPECIFIC BTU CONTENT	SULFUR CONTENT (% BY WEIGHT)	ASH CONTENT (% BY WEIGHT)
Propane	**91,500 Btu/gal**	**0.54 grains/100 ft^3**	

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: **IES-TK-1**
Emergency Generator Fuel Storage Tank	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Diesel storage tank for distributing fuel to the emergency generator.

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 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
		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.

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

Attach Additional Sheets As Necessary

FORM B3

EMISSION SOURCE (LIQUID STORAGE TANK)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B3**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **IES-TK-1**
Emergency Generator Fuel Storage Tank	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO: _____ OF _____	EMISSION POINT (STACK) ID NO(S): **N/A**

EACH STORAGE TANK

DESCRIBE IN DETAIL THE STORAGE TANK (ATTACH FLOW DIAGRAM):
Diesel storage tank for distributing fuel to the emergency generator.

LIQUID STORED: **Diesel**	LIQUID MOLECULAR WEIGHT (LB/LB-MOLE):	
TANK CAPACITY (GAL): **2,500**	VAPOR MOLECULAR WEIGHT (LB/LB-MOLE):	
AVERAGE LIQUID SURFACE TEMPERATURE (F):	VAPOR PRESSURE AT AVE. LIQUID SURFACE TEMP (PSIA):	
	MAX. LIQUID SURFACE TEMP (^{0}F):	MAX. TRUE VAPOR PRESS. (PSIA):
	BREATHER VENT SETTINGS (PSIG) _____ VACUUM _____ PRESSURE	
SHELL DIAMETER (FT): **6**	SHELL CONDITION: ☐ GOOD ☑ POOR	IS TANK HEATED: ☐ YES ☐ NO
SHELL COLOR:	MAXIMUM THROUGHPUT (GAL/YR):	MAXIMUM TURNOVERS PER YEAR:
WORKING VOLUME (GAL): **1,250**	ACTUAL THROUGHPUT (GAL/YR):	ACTUAL TURNOVERS PER YEAR:
MAX. FILLS PER DAY:	MAX. FILLING RATE (GAL/MIN):	MIN. DURATION OF FILL (HR/FILL):

VERTICAL FIXED ROOF TANKS

SHELL HEIGHT (FT):	ROOF TYPE: ☐ CONE ☐ DOME	ROOF HEIGHT (FT):
AVERAGE LIQUID HEIGHT (FT):	ROOF CONDITION: ☐ GOOD ☐ POOR	
MAXIMUM LIQUID HEIGHT (FT):	ROOF COLOR:	

HORIZONTAL TANKS

SHELL LENGTH (FT): **12**	IS TANK UNDERGROUND ?: ☐ YES ☐ NO

FLOATING ROOF TANKS

DESCRIBE PERTINENT TANK DATA SUCH AS DECKS, RIM-SEALS, LIQUID DENSITY @ 60 DEG F:

FOR ALL TANKS - DESCRIBE ANY MONITORING OR WARNING DEVICES (SUCH AS LEAK AND FUME DETECTION INSTRUMENTATION):

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: **IES-TK-2**
Fire Pump Fuel Storage Tank	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Diesel storage tank for distributing fuel to the emergency fire water pump.

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 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
		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.

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

Attach Additional Sheets As Necessary

FORM B3

EMISSION SOURCE (LIQUID STORAGE TANK)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B3**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **IES-TK-2**
Fire Pump Fuel Storage Tank	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO: _____ OF _____	EMISSION POINT (STACK) ID NO(S): **N/A**

EACH STORAGE TANK

DESCRIBE IN DETAIL THE STORAGE TANK (ATTACH FLOW DIAGRAM):
Diesel storage tank for distributing fuel to mobile equipment.

LIQUID STORED: **Diesel**	LIQUID MOLECULAR WEIGHT (LB/LB-MOLE):	
TANK CAPACITY (GAL): **500**	VAPOR MOLECULAR WEIGHT (LB/LB-MOLE):	
AVERAGE LIQUID SURFACE TEMPERATURE (F):	VAPOR PRESSURE AT AVE. LIQUID SURFACE TEMP (PSIA):	
	MAX. LIQUID SURFACE TEMP (^{o}F):	MAX. TRUE VAPOR PRESS. (PSIA):
	BREATHER VENT SETTINGS (PSIG) _____ VACUUM _____ PRESSURE	
SHELL DIAMETER (FT): **3**	SHELL CONDITION: ☐ GOOD ☐ POOR	IS TANK HEATED: ☐ YES ☐ NO
SHELL COLOR:	MAXIMUM THROUGHPUT (GAL/YR):	MAXIMUM TURNOVERS PER YEAR:
WORKING VOLUME (GAL): **250**	ACTUAL THROUGHPUT (GAL/YR):	ACTUAL TURNOVERS PER YEAR:
MAX. FILLS PER DAY:	MAX. FILLING RATE (GAL/MIN):	MIN. DURATION OF FILL (HR/FILL):

VERTICAL FIXED ROOF TANKS

SHELL HEIGHT (FT):	ROOF TYPE: ☐ CONE ☐ DOME	ROOF HEIGHT (FT):
AVERAGE LIQUID HEIGHT (FT):	ROOF CONDITION: ☐ GOOD ☐ POOR	
MAXIMUM LIQUID HEIGHT (FT):	ROOF COLOR:	

HORIZONTAL TANKS

SHELL LENGTH (FT): **10**	IS TANK UNDERGROUND ?: ☐ YES ☐ NO

FLOATING ROOF TANKS

DESCRIBE PERTINENT TANK DATA SUCH AS DECKS, RIM-SEALS, LIQUID DENSITY @ 60 DEG F:

FOR ALL TANKS - DESCRIBE ANY MONITORING OR WARNING DEVICES (SUCH AS LEAK AND FUME DETECTION INSTRUMENTATION):

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: **IES-TK-3**
Mobile Fuel Diesel Storage Tank	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Diesel storage tank for distributing fuel to mobile equipment.

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

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

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

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

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

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix 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
		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.

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

Attach Additional Sheets As Necessary

FORM B3

EMISSION SOURCE (LIQUID STORAGE TANK)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B3**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO: **IES-TK-3**
Mobile Fuel Diesel Storage Tank	CONTROL DEVICE ID NO(S): **None**
OPERATING SCENARIO: _____ OF _____	EMISSION POINT (STACK) ID NO(S): **N/A**

EACH STORAGE TANK

DESCRIBE IN DETAIL THE STORAGE TANK (ATTACH FLOW DIAGRAM):
Diesel storage tank for distributing fuel to mobile equipment.

LIQUID STORED: **Diesel**	LIQUID MOLECULAR WEIGHT (LB/LB-MOLE):	
TANK CAPACITY (GAL): **5,000**	VAPOR MOLECULAR WEIGHT (LB/LB-MOLE):	
AVERAGE LIQUID SURFACE TEMPERATURE (F): **TBD**	VAPOR PRESSURE AT AVE. LIQUID SURFACE TEMP (PSIA):	
	MAX. LIQUID SURFACE TEMP (^{0}F): **TBD**	MAX. TRUE VAPOR PRESS. (PSIA):
	BREATHER VENT SETTINGS (PSIG) _____ VACUUM _____ PRESSURE	
SHELL DIAMETER (FT): **6**	SHELL CONDITION: ☐ GOOD ☐ POOR	IS TANK HEATED: ☐ YES ☐ NO
SHELL COLOR:	MAXIMUM THROUGHPUT (GAL/YR):	MAXIMUM TURNOVERS PER YEAR:
WORKING VOLUME (GAL): **2,500**	ACTUAL THROUGHPUT (GAL/YR):	ACTUAL TURNOVERS PER YEAR:
MAX. FILLS PER DAY:	MAX. FILLING RATE (GAL/MIN):	MIN. DURATION OF FILL (HR/FILL):

VERTICAL FIXED ROOF TANKS

SHELL HEIGHT (FT):	ROOF TYPE: ☐ CONE ☐ DOME	ROOF HEIGHT (FT):
AVERAGE LIQUID HEIGHT (FT):	ROOF CONDITION: ☐ GOOD ☐ POOR	
MAXIMUM LIQUID HEIGHT (FT):	ROOF COLOR:	

HORIZONTAL TANKS

SHELL LENGTH (FT): **23.7**	IS TANK UNDERGROUND ?: ☐ YES ☐ NO

FLOATING ROOF TANKS

DESCRIBE PERTINENT TANK DATA SUCH AS DECKS, RIM-SEALS, LIQUID DENSITY @ 60 DEG F:

FOR ALL TANKS - DESCRIBE ANY MONITORING OR WARNING DEVICES (SUCH AS LEAK AND FUME DETECTION INSTRUMENTATION):

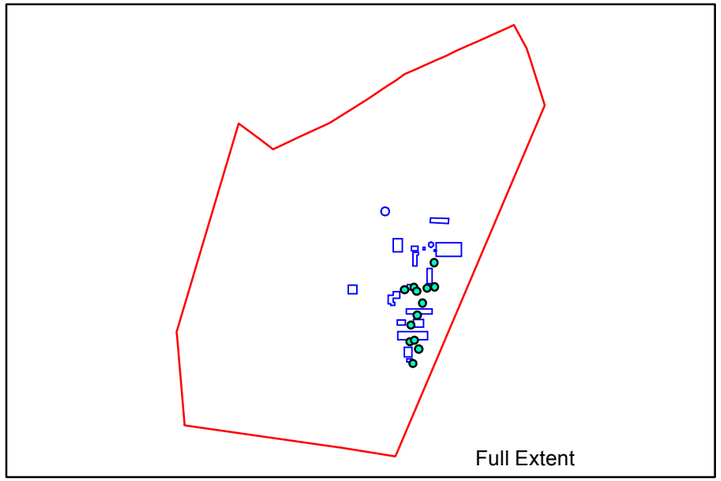
COMMENTS:

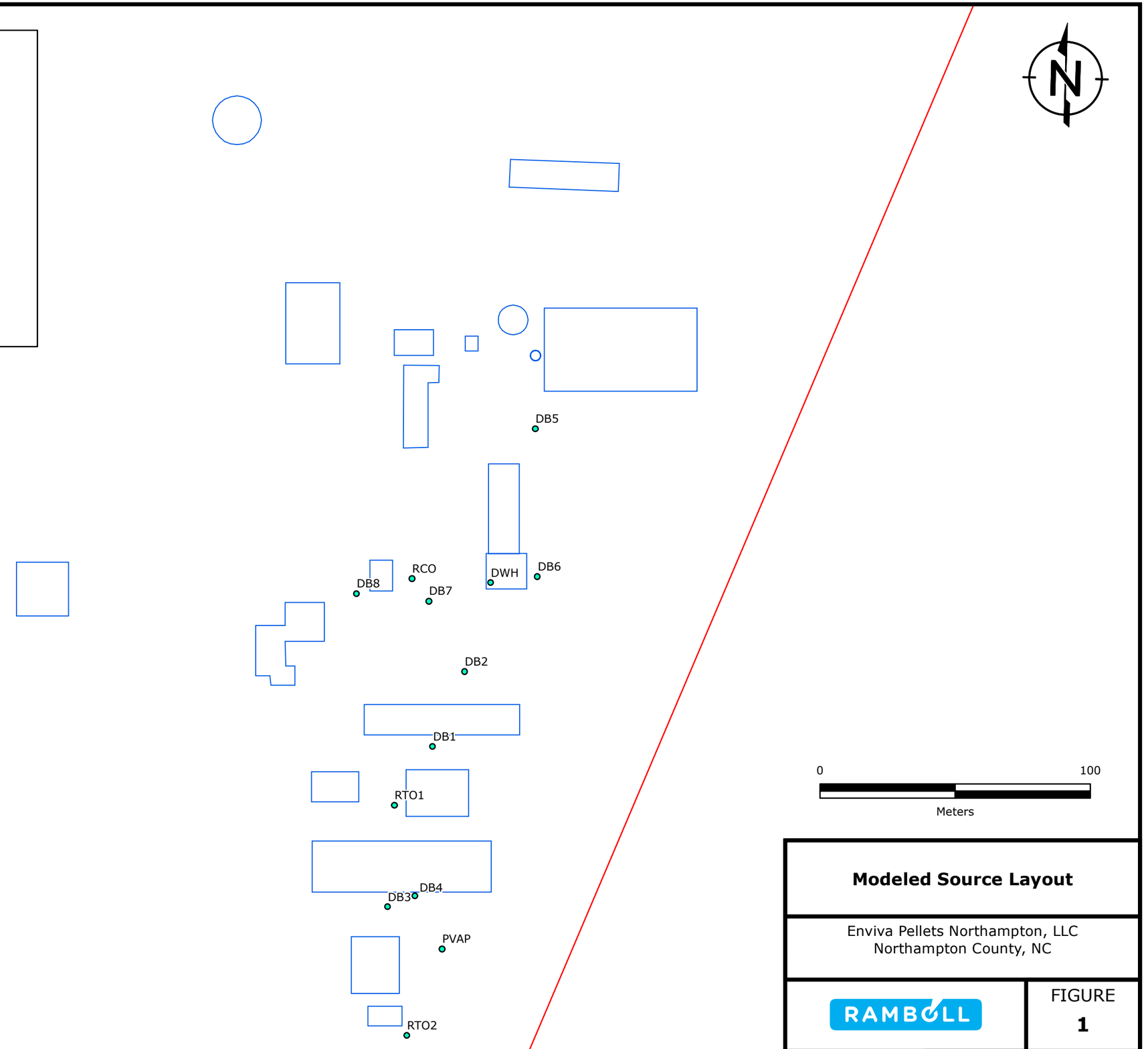
Attach Additional Sheets As Necessary

APPENDIX E
SUPPORTING DOCUMENTATION FOR TAP MODELING ANALYSIS

Appendix E – Supporting Documentation for TAP Modeling Analysis is located on a USB drive provided with this application.

APPENDIX F
MODELED SOURCE LAYOUT





Legend

- Point Source
- Fenceline
- Downwash Structure

Modeled Source Layout

Enviva Pellets Northampton, LLC
Northampton County, NC

RAMBOLL

FIGURE
1

DRAFTED BY: ARJ	DATE: 9/27/2018	PROJECT: 1690009489