Attachment M

ENVIVA PELLETS HAMLET, LLC • RICHMOND COUNTY, NORTH CAROLINA

PSD AIR QUALITY CONSTRUCTION AND OPERATING PERMIT APPLICATION

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TABLE OF CONTENTS

1. INTRODUCTION

Enviva Pellets Hamlet, LLC (Enviva) is planning to construct and operate a wood pellets manufacturing plant in Richmond County, NC. The proposed wood pellets plant is designed to produce up to 575,000 oven-dried tons (ODT) per year of wood pellets utilizing up to 75% softwood on a 12-month rolling total basis. The proposed plant consists of log chipper, green wood hammermill, bark hog, 175.3 MMBtu/hr dryer, hammermills, pellet presses and coolers, production loading operations and other ancillary activities described in detail in Section 2.0. Construction of the facility is anticipated to begin in 2014.

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 carbon dioxide, 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) and the Programme for the Endorsement of Forest Certifications (PEFC). 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. We pay 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.

1.1. REGULATORY APPLICABILITY

This document comprises an air quality construction and operating permit application for the project. The proposed project triggers PSD review as a new major source of volatile organic compounds (VOCs), and with potential emissions from the project exceeding the PSD Significant Emission Rates (SERs) for nitrogen oxides (NO_x), and particulate matter (PM, also called total suspended particulate [TSP]), particulate matter less than 10 or 2.5 microns in aerodynamic diameter (PM_{10} and $PM_{2.5}$). For each pollutant that is major and exceeds PSD SER, an evaluation of Best Available Control Technology (BACT) to reduce emissions is provided.

Air quality modeling analyses are required for criteria pollutants subject to PSD review, as well as modeling for certain toxic air pollutants (TAPs) in accordance with relevant North Carolina Division of Air Quality's (NC DAQ's) regulations. This application conforms to all permitting requirements and demonstrates that the proposed facility will operate in accordance with those requirements. It should be noted that the project will not cause or contribute to violations of the National and State Ambient Air Quality Standards (NAAQS and SAAQS) and PSD Increments, will not result in adverse impacts to federally protected Class I areas, and will utilize Best Available Control Technology (BACT) for each compound subject to PSD review. In addition to the major regulatory requirements highlighted above, this permitting action will trigger several other state requirements addressed in this application.

1.2. BACT DETERMINATION

Enviva performed BACT analyses for each of the PSD-regulated pollutants and emission units subject to PSD review following the "top-down" approach required by U.S. EPA. The top-down

process begins by ranking all potentially relevant control technologies in descending order of control effectiveness. The most stringent or "top" control option is identified as BACT unless the applicant demonstrates, and the permitting authority in its informed opinion agrees, that energy, environmental, and/or economic impacts justify the conclusion that the most stringent control option does not meet the definition of BACT. Where the top option is not determined to be BACT, the next most stringent alternative is evaluated in the same manner. This process continues until BACT is determined. BACT evaluations are provided in Section 4 of this report.

1.3. AIR QUALITY ANALYSIS

The air dispersion modeling and other air quality analyses required under PSD are provided in Section 5 of this report. Following NCDAQ policy, Trinity Consultants (Trinity), on behalf of Enviva, submitted a dispersion modeling protocol describing the proposed methodologies and data resources for the project.[1] The protocol included a description of the proposed facility, an overview of the required PSD and State-only modeling analyses, and a description of the methodology proposed to be used in those modeling analyses. The analyses discussed included evaluations of National Ambient Air Quality Standards (NAAQS), PSD Increment, additional impacts analyses for visibility and non-air quality impacts, as well as the ambient impact assessment of toxic air pollutant (TAP) emissions. The protocol was approved by NCDAQ, with limited comments on January 6, 2014.[2]

The modeling analyses demonstrate that the project will not cause or contribute to an exceedance of any National Ambient Air Quality Standards (NAAQS) or Class II PSD Increment requirements. An additional impacts analysis is also included in Section 5.

1.4. APPLICATION ORGANIZATION

Six copies of the application have been provided along with the $13,837 permit application processing fee. This application is comprised of the following:

- Section 1 provides an Executive Summary,
- Section 2 provides a project description and discusses air emissions,
- Section 3 discusses regulatory applicability,
- Section 4 summarizes the BACT analysis,
- Section 5 summarizes the air dispersion modeling analysis,
- Appendix A contains air permit application forms,
- Appendix B presents air emissions calculations,
- Appendix C contains the required local zoning consistency determination,
- Appendix D contains BACT tables,
- Appendix E contains modeling plots,
- Appendix F contains PSD modeling flowchart,
- Appendix G contains the regional source inventory, and
- Appendix H contains the electronic modeling files.

[1] Letter from Jonathan Hill (Trinity) to Mark Cuilla (NCDAQ) dated December 17, 2013.
[2] Letter from Tom Anderson (NCDAQ) to Jonathan Hill (Trinity) dated January 6, 2014.

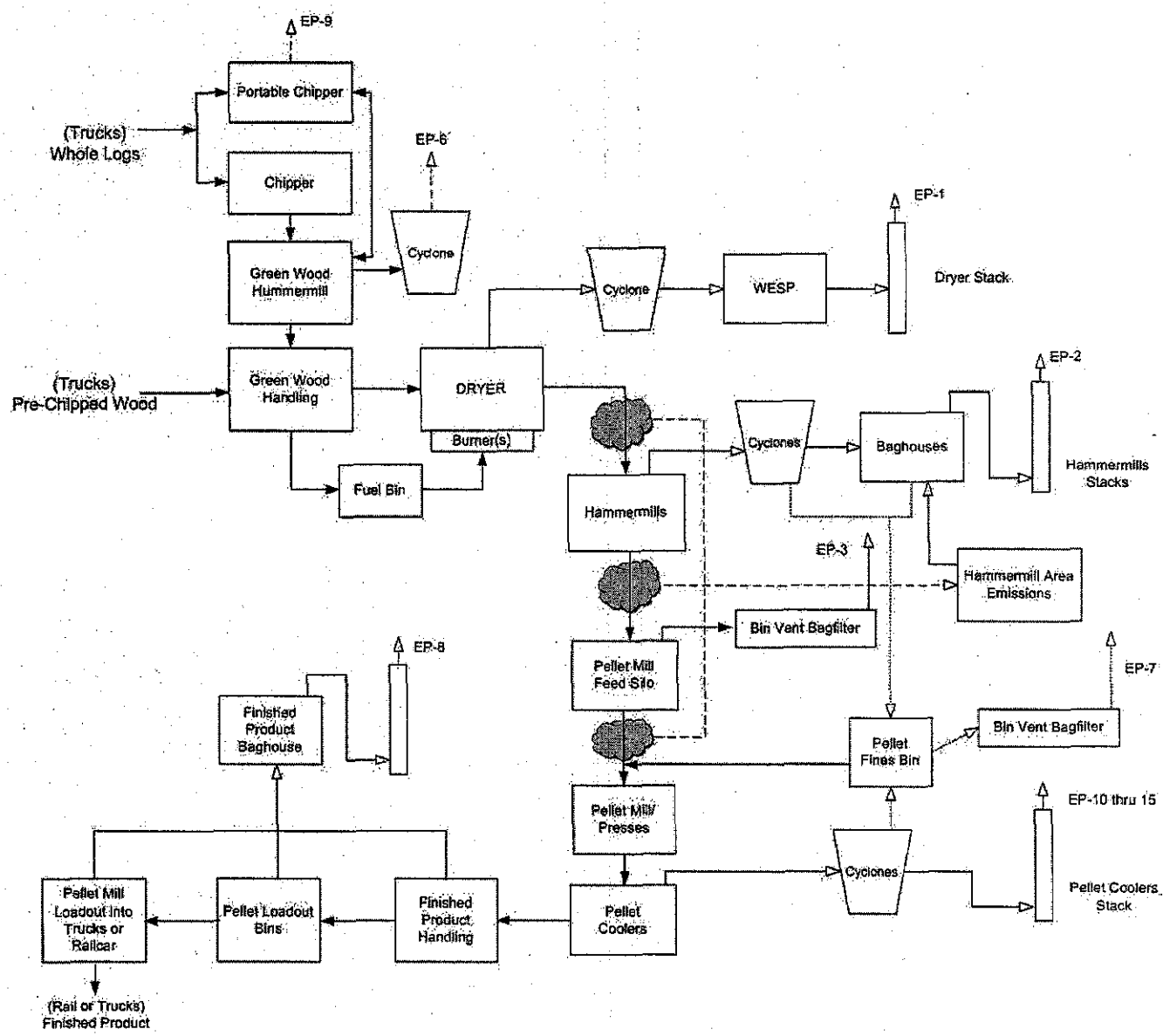
2. PROCESS DESCRIPTION AND AIR EMISSIONS

The proposed wood pellets plant is designed to produce up to 575,000 oven-dried tons (ODT) per year of wood pellets utilizing up to 75% softwood on a 12-month rolling total basis. This section discusses the Hamlet Plant's pelletizing process and associated air emissions for the proposed plant, which consists of the following:

- Green wood handling and sizing operations;
- Green wood fuel storage bin;
- Log debarker;
- Log bark hog;
- Log chipper;
- Two (2) green wood hammermills;
- Portable chipper;
- Eight (8) dry wood hammermills controlled by eight cyclones and three fabric filtration systems;
- Hammermill area emissions controlled by a hammermill fabric filter;
- A pellet mill feed silo controlled by bin vent filter;
- Twelve (12) wood pellet presses and six (6) pellet coolers controlled via cyclones;
- One 175.3 MMBtu/hr green wood direct-fired dryer system with pollution control equipment consisting of a three simple cyclones and wet electrostatic precipitator (WESP) for particulate matter abatement;
- Finished product storage and loading controlled by a fabric filter;
- Pellet fines bin controlled via a bin vent filter;
- Dried wood handling operations;
- Three (3) diesel storage tanks;
- Emergency electric generator; and
- Fire water pump.

Detailed air emissions calculations are presented for each source discussed in this section in Appendix B. A process flow diagram is presented in Figure 2-1.

Figure 2-1. Process Flow Diagram



2.1. GREEN WOOD HANDLING AND SIZING, FUEL STORAGE BIN, AND STORAGE PILES

"Green" (i.e., wet) wood will be delivered to the facility via trucks as either pre-chipped wood or unchipped low grade wood fiber; tops, limbs, and logs from commercial thinning for on-site chipping. Pre-chipped wood will be screened and oversized chips will undergo additional chipping. Unchipped wood will be debarked and chipped to specification for drying in the on-site electric-powered debarker (IES-DEBARK-1), chipper (ES-CHIP-1), and two green wood hammermills (ES-GHM-1, ES-GHM-2) as required. Chipped wood for drying is conveyed to a chipped wood storage pile while bark is conveyed to a bark fuel storage pile (IES-GWFB).

Green wood and bark contains a high moisture content approaching 50 percent by weight. Therefore, green wood handling and sizing, fuel storage bin, and storage piles have negligible emissions and are included on the insignificant activities list. Representative drop point emission calculations using AP-42 Section 13.2.3 for Aggregate Handling are attached in Appendix B for green wood handling and sizing to demonstrate that these emissions are negligible.

Fugitive particulate emissions from chipped wood storage piles are quantified in Appendix B. Emission factors were developed based on surface area of the piles in accordance with U.S. EPA guidance for active storage pile fugitive emissions.[3] These factors provide estimates of PM emissions due to wind erosion at the surface of each storage pile based on the annual frequency of high wind speeds (> 12 mph).

In addition to particulate matter emission, volatile organic compounds are also emitted from the storage pile. Emission factors were obtained from a National Council for Air and Stream Improvement (NCASI) document provided by SC DHEC for the calculation of fugitive VOC emissions from woody biomass storage piles. Emission factors ranged from 1.6 to 3.6 lb VOC as carbon/acre-day. Enviva chose to employ the maximum emission factor to be conservative. Emission factors are provided in pounds of carbon per surface area of the pile. Detailed calculations are included in Appendix B.

2.2. DEBARKING, CHIPPING, GREEN WOOD HAMMERMILLING, PORTABLE CHIPPER, AND BARK HOG

Bark is removed from unchipped wood prior to chipping in rotary drum debarkers. There are no current AP-42 emission factors or other emission factors available for debarkers, and visual observation of these units in operation at other Enviva plants indicate that emissions are negligible due to the high moisture content of bark and the wind break provided by the drums.

Emission estimates for the chipper and bark hog are based on limited emission factors available for wood chipping. As shown in the attached emissions calculations (Appendix B), VOC emissions from these sources are calculated using emission factors from AP-42 Section 10.6.3 emission factors for hardwood chipping emissions. Methanol emissions are also calculated using factors from AP-42, Sections 10.6.3 and 10.6.4. Particulate matter (PM) emissions will be negligible from

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

the green wood chipper (ES-CHIP-1) because the exhaust is directed downward towards the ground.

VOC emission estimates for the green wood hammermills (ES-GHM-1 and 2) are based on AP-42 Section 10.6.2 emission factors. PM emissions from the green wood hammermills will be combined into a single stack and controlled via a cyclone. Particulate emissions from the green wood hammermills are based on air flow rate and a cyclone outlet particulate matter grain loading factor of 0.020 gr/ft3.

In addition to the main chipper (ES-CHIP-1), a portable green wood chipper (ES-CHIP-2) may be used at the site periodically. This chipper may either be a rental unit or a unit owned by Enviva and may either be electric-powered or a diesel-fired unit of up to 1,300 brake horsepower. Only emissions from engine combustion were included in Appendix B, since chipping emissions have already been accounted for by the main chipper and the portable chipper will only be used periodically. Per vendor specifications, criteria emissions factors are consistent with NSPS Subpart IIII Tier 2 engines. Hazardous air pollutant (HAP) emission factors are obtained from AP-42 Section 3.3.

2.3. WOOD DRYER (ES-DRYER)

Green wood is conveyed to a single rotary dryer system. Direct contact heat is provided to the system via a 175.3 MMBtu/hr total heat input burner system using bark and wood chips as fuel. Air emissions are controlled by three identical simple cyclones to capture bulk particulate matter. Emissions from each of the cyclones are combined into a common duct and are routed to the wet electrostatic precipitator (WESP) for additional particulate, metal HAP, and hydrogen chloride removal.

Criteria pollutant emissions are calculated using a combination of AP-42 emission factors and existing stack testing results from Enviva's Ahoskie facility. The reader should refer to detailed footnotes in Appendix B for details of the origin of each factor.

HAP and TAP emissions were calculated from combustion of wood in the dryer using AP-42 Section 1.6 and control of metal HAP emissions via the WESP. In addition to HAP and TAP emissions from combustion of wood in the dryer, HAPs and TAPs are also released during the drying of wood. Emission factors for green, direct wood-fired softwood were obtained from AP-42, Section 10.6.2. To account for hardwood HAP and TAP emissions, factors were conservatively calculated by taking the AP-42 HAP factors for 100% softwood (green) and multiplying by the ratio of the total listed VOC emission factors for hardwood and softwood (0.24 / 4.7).

2.4. DRIED AND SIZED WOOD HANDLING (IES-DWH)

Dried materials are transferred from the dryer via conveyors to screening operations that remove smaller size wood particles prior to transfer into hammermills for further size reduction prior to pelletization. Smaller particles passing through the screens are diverted to the hammermill discharge conveyor, while oversized wood is diverted to the hammermills. Dust generated from transfer operations around the screening operation is diverted to the hammermill area filtration system, which is described in the following subsection. There are several other transfer points comprising an insignificant emission source designated as "IES-DWH", dried and sized wood

handling, located between the dryer and hammermills that are completely enclosed with no emissions.

2.5. HAMMERMILLS (ES-HM-1 THROUGH 8)

Prior to pelletization, dried materials are reduced to the appropriate size needed for pelletization using eight hammermills operating in parallel. A conveyor system receives the ground wood from the hammermills and sends it to the pellet mill feed silo.

Particulate emissions from each of the eight hammermills are controlled using cyclones, which are subsequently controlled by fabric filters. The first three cyclones are directed to hammermill filter HM-BF1. The second three cyclones are directed to hammermill filter HM-BF2. The last two cyclones are directed to hammermill filter HM-BF-3. Appendix B summarizes the emissions from each hammermill bagfilter system. Particulate matter emissions from each bagfilter are calculated using a manufacturer guaranteed grain loading factor for the wood particulates and the maximum nominal stack flow rate.

VOC, HAP, and TAP emissions are calculated using AP-42 factors, adjusted to account for the ratio of emissions as shown in Appendix B.

2.6. HAMMERMILL AREA EMISSIONS (ES-HMA)

An induced draft fan is used to transfer dust generated from a number of enclosed transfer/handling sources around the hammermill to one of the three hammermill bagfilters (CD-HM-BF3). The sources controlled by this bagfilter include, but are not limited to, the following:

- Emissions from the seventh and eighth hammermill;
- Hammermills infeed and distribution transfer;
- Pellet cooler transfer (particulate emissions from pellet cooler cyclones large enough to drop out of entrainment) & pellet screening;
- Hammermill pre-screen feeder emissions; and
- Pellet screen fines cyclone.

Emissions from this bagfilter are calculated assuming a manufacturer guaranteed grain loading factor for the wood particulates and the maximum nominal stack flow rate.

2.7. PELLET MILL FEED SILO (ES-PMFS) AND PELLET MILL FINES BIN (ES-PFB)

Sized wood from the hammermills is transported on a set of conveyors to the pellet mill feed silo prior to pelletization. Particulate emissions from the pellet mill feed silo bin vent filter are calculated assuming a manufacturer guaranteed grain loading factor and the maximum nominal stack flow rate.

Fine pellet material from the hammermill pollution control system and screening operation is collected in the pellet fines bin which is controlled by a bin vent baghouse. Particulate emissions from the baghouse are calculated assuming a manufacturer guaranteed grain loading factor and the maximum nominal stack flow rate.

2.8. PELLET PRESS SYSTEM PELLET COOLERS (ES-CLR-1 THROUGH 6)

Dried ground wood is mechanically compacted in the presence of water in several screw presses in the Pellet Press System. Exhaust from the Pellet Press and Pellet Presses conveyors are vented to through the cooler aspiration cyclones and then to the atmosphere. No chemical binding agents are needed for pelletization.

Formed pellets are discharged into one of six pellet coolers. 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 cyclones operating in parallel prior to discharge to the atmosphere.

Particulate matter emissions from each cyclone are calculated assuming a maximum grain loading factor for the wood particulates and the maximum nominal stack flow rate. VOC, HAP, and TAP emissions are calculated like the hammermills using AP-42 factors. Please see Appendix B for a detailed discussion.

2.9. FINISHED PRODUCT HANDLING AND LOADOUT

Final product is conveyed to rail loadout pellet bins (ES-PB) that feed railcar loadout operations (ES-PL), or, alternately can also load trucks if needed. Emissions from the Pellet Loadout Bins are controlled by a bagfilter. Pellet Loadout is accomplished by gravity feed of the pellets through a covered chute to reduce emissions. Emissions to the atmosphere from conveyance from the Pellet Loadout Bins are minimal because dried wood fines have been removed in the pellet screener, and a slight negative pressure is maintained in the loadout building as a fire prevention measure to prevent any buildup of dust on surfaces within the building. Slight negative pressure is produced via an induced draft fan that exhausts to the same bagfilter (CD-FPH) that controls minor dust emissions from loading of the Pellet Loadout Bins.

Particulate emissions from finished product handling and loadout are calculated assuming a manufacturer guaranteed grain loading factor and the maximum nominal stack flow rate for the bagfilter.

2.10. EMERGENCY GENERATOR, FIRE WATER PUMP, AND FUEL OIL STORAGE TANKS

The plant will utilize a 250 brake horsepower emergency generator for emergency operations and a 250 brake horsepower fire water pump engine. All engines will combust diesel fuel. Aside from maintenance and readiness testing, the generator and fire water pump engines will only be utilized for emergency operations. Diesel for the emergency generator will be stored in a storage tank of up to 2,500 gallons capacity and diesel for the fire water pump will be stored in a storage tank of up to 1,000 gallons capacity. There will also be a storage tank of up to 2,500 gallons that is used for fueling mobile equipment at the site. Emissions from all fuel oil storage tanks are insignificant and these units are categorically exempt from construction permitting requirements.