SECTION 5
MODELING REQUIREMENTS

5. PSD AND STATE AIR TOXICS MODELING REQUIREMENTS

This section of the application addresses the dispersion modeling analyses that are required as part of the PSD review.

Following NCDAQ policy, Trinity, on behalf of Enviva, submitted a dispersion modeling protocol describing the proposed methodologies and data resources for the project.[34] 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 September 13, 2013.[35] The remaining sections summarize the modeling requirements and methodologies and present the results of the analyses. The results demonstrate that the proposed project will not cause or contribute to a modeled violation of any federal or state pollutant standard.

5.1. PROJECT LOCATION AND CLASSIFICATION

Figure E-1 provides a map of the area surrounding the Sampson property. The approximate central Universal Transverse Mercator (UTM) coordinates of the facility are 756.7 kilometers (km) east and 3,890.2 km north in Zone 17 (NAD 83). A detailed site layout showing the locations of all modeled sources and structures is included in Figure E-2.

For modeling purposes, the appropriate urban/rural land use classification for the area was determined using the Auer technique, which is recommended in the *Guideline on Air Quality Models.* In accordance with this technique, the area within a 3-km radius of the facility was identified on US Geological Survey (USGS) topographic maps and was delineated by land use type. More than 50 percent of the surrounding land use can be classified as undeveloped rural (i.e., Auer's A4 classification), therefore the area is classified as rural.

5.2. PSD APPLICABILITY

Part C of Title I of the Clean Air Act, 42 U.S.C. §§7470-7492, is the statutory basis for the PSD program. U.S. EPA has codified PSD definitions, applicability, and requirements in 40 CFR Part 51.166. PSD is one component of the federal New Source Review (NSR) permitting program applicable in areas that are designated in attainment of the NAAQS. Sampson County, in which the proposed facility will be located, is currently designated as unclassifiable or in attainment for all criteria pollutants.[36]

As discussed in Section 3, PSD review will be triggered for NO_X, CO, PM, PM_{10}, and $PM_{2.5}$. PSD is also triggered for VOC but no modeling requirements presently exist for that criteria pollutant.

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[34] Letter from Jonathan Hill (Trinity) to Mark Cuilla (NCDAQ) dated August 5, 2013.
[35] Letter from Tom Anderson (NCDAQ) to Jonathan Hill (Trinity) dated August 13, 2013.
[36] 40 CFR §81.334

5.3. SECONDARY $PM_{2.5}$ FORMATION

The AERMOD model, the preferred dispersion model for near-field analyses, does not currently include chemical transformation algorithms required in order to address the formation of secondary $PM_{2.5}$. The Draft Guidance for $PM_{2.5}$ Permit Modeling provides guidance on how applicants should address secondary $PM_{2.5}$ in the context of a PSD modeling analysis. The PSD SERs for NO_X and SO_2 ($PM_{2.5}$ precursors) are utilized to determine whether a proposed source or modification will contribute sufficient quantities of precursor emissions requiring consideration. In the draft guidance document, EPA proposed four "assessment" cases outlining what air quality analysis, if any, is required to demonstrate compliance with the $PM_{2.5}$ NAAQS.

The proposed project falls under Assessment Case 3, with direct $PM_{2.5}$ emissions and NO_X emissions greater than the respective SERs. This case requires that both primary and secondary $PM_{2.5}$ impacts be addressed. Per the Guidance, an applicant can account for the impact of precursor emissions on secondary $PM_{2.5}$ formation in a completely qualitative manner, through the use a hybrid of qualitative and quantitative assessment using existing technical work, or through a full quantitative photochemical grid modeling approach.

The only continuous source of precursor emissions at the facility will be the wood dryer. At facilities such as wood pellet mills, $PM_{2.5}$ impacts are very localized in nature (along or very near the fenceline) and are generally dominated by the ambient/near-ambient release sources (e.g. hammermills, pellet coolers) which do not emit precursor pollutants. Further, the maximum impacts resulting from the dryer and other particulate emission sources are not typically collocated in time or space. In addition to the qualitative reasoning above, the modeled impacts presented in Tables 5-10 through 5-11 are below any NAAQS or increment standards such that negligible impacts from secondary formation do not alter the conclusions presented in the results sections. As such, Enviva asserts that a quantitative assessment of secondary $PM_{2.5}$ formation does not need to be included in this modeling evaluation.

5.4. PSD MODELING ANALYSES

Trinity has prepared this modeling analysis to demonstrate that the Sampson plant does not cause or contribute to exceedances of the NAAQS or PSD Increment, as applicable, for NO_X, CO, PM_{10}, and $PM_{2.5}$ and that no other adverse impacts at Class I areas are attributable to the proposed facility. The dispersion modeling analyses were conducted in accordance with the following guidance documents:

- U.S. EPA's *Guideline on Air Quality Models* 40 CFR 51, Appendix W (Revised, November 9, 2005)
- U.S. EPA's *AERMOD Implementation Guide* http://www.epa.gov/scram001/7thconf/aermod/aermod_implmtn_guide_19March2009.pdf
- U.S. EPA's *New Source Review Workshop Manual* (Draft, October, 1990)
- U.S. EPA, Office of Air Quality Planning and Standards, Memorandum from Mr. Tyler Fox to Regional Air Division Directors. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard* (March 1, 2011)
- U.S. EPA, Office of Air Quality Planning and Standards, *Guidance for $PM_{2.5}$ Permit Modeling* (May 20, 2014)

- North Carolina's *PSD Modeling Guidance* (January 6, 2012)
- North Carolina's *Guidelines for Evaluating the Air Quality Impacts of Toxic Air Pollutants in North Carolina* (February 2014)

A standard PSD air quality modeling analysis is conducted in three (3) principal steps. A flow chart of the overall PSD modeling process is included in Appendix F. Each of the steps for completing the Class II Area modeling analysis; the Significance Analysis, the NAAQS Analysis, and the PSD Increment Analysis, are described below.

5.5. SIGNIFICANCE ANALYSIS

The Significance Analysis is conducted to determine whether the emissions associated with the proposed new construction project could cause a significant impact upon the area surrounding the facility. "Significant" impacts are defined by ambient concentration thresholds commonly referred to as the Significant Impact Levels (SIL). Table 5-1 lists the SIL, NAAQS, and PSD Increments for all relevant NSR regulated pollutants for this project.

If the highest modeled ambient concentrations for a pollutant for all averaging periods are less than the applicable SIL when emissions from only the project are modeled, then further analyses (NAAQS and PSD Increment) are not required for that pollutant. If, however, modeled impacts are greater than the SIL for any averaging period, a full NAAQS and PSD Increment analysis is required for that pollutant and averaging period to demonstrate that the project neither causes nor contributes to any exceedances. The geographic extent to which significant impacts occur is used to define the significantly impacted receptors within which compliance with the NAAQS and PSD Increments must be demonstrated.

Table 5-1. PSD Modeling Thresholds and Standards

Pollutant	Averaging Period	PSD SIL (μg/m³)	Primary and Secondary NAAQS (μg/m³)	Class II PSD Increment (μg/m³)	Significant Monitoring Concentration (μg/m³)
NO_2	1-hour	10[1]	188 (100 ppb)[2]	--	--
	Annual	1	100 (0.053 ppm)[3]	25	14
CO	1-Hour	2,000	40,000	--	--
	8-Hour	500	10,000	--	575
PM_{10}	24-hour	5	150[4]	30	10
	Annual	1	N/A	17	--
$PM_{2.5}$	24-hour	1.2[5]	35	9[5]	--[6]
	Annual	0.3[5]	12	4[5]	--

1 Until EPA develops and promulgates a 1-hr NO_2 SIL for the recently promulgated NO_2 1-hr NAAQS, NCDAQ has adopted an interim 1-hr NO_2 SIL of 10 ug/m3. The 10 ug/m3 SIL was developed by the Northeast States for Coordinated Air Use Management (NESCAUM) and is based on the ratio of the existing 1-hr CO SIL to the 1-hr CO NAAQS.

2 The 3-year average of the 98th percentile of the daily maximum 1-hr average.

3 Annual arithmetic average.

4 Not to be exceeded more than three times in 3 consecutive years.

5 On January 22, 2013, the U.S. Court of Appeals for the District of Columbia Circuit vacated two provisions in EPA's PSD regulations containing SILs for $PM_{2.5}$. (*Sierra Club v. EPA*, No. 10-1413 (D.C. Circuit), 2013 WL 216018). The court decision does not preclude the use of SILs for $PM_{2.5}$, but requires that EPA correct the error in the SIL regulations for $PM_{2.5}$ at 51.166(k)(2) and 51.166(k)(2). In the interim, the EPA states that permitting authorities may continue to apply SILs for $PM_{2.5}$ to support a PSD permitting decision, but permitting authorities should take care to ensure that SILs are not used in a manner that is inconsistent with the requirements of Section 165(a)(3) of the CAA.

6 The $PM_{2.5}$ SMC was vacated on January 22, 2013 (*Sierra Club v. EPA*, No. 10-1413 (D.C. Circuit), 2013 WL 216018).

5.6. AMBIENT MONITORING REQUIREMENTS

In addition to determining whether the applicant can forego further modeling analyses, the PSD Significance Analysis is also used to determine whether the applicant is exempt from ambient monitoring requirements. To determine whether pre-construction monitoring should be considered, the maximum impacts attributable to the proposed project are assessed against significant monitoring concentrations (SMC). The SMC for the applicable averaging periods for NO_x, CO and PM_{10} are listed in Table 5-1. A pre-construction air quality analysis using continuous monitoring data may be required for pollutants subject to PSD review. If either the predicted modeled impact from an emissions increase or the existing ambient concentration is less than the SMC, an applicant may be exempt from pre-construction ambient monitoring. As shown later in this report, ambient impacts exceeded the SMC for PM_{10}. However, given the availability of representative monitoring data in the vicinity of the project, Enviva is proposing to use existing ambient monitor data in lieu of pre-construction monitoring requirements.

The $PM_{2.5}$ SMC was vacated on January 22, 2013 by the U.S. Court of Appeals for the District of Columbia Circuit.[37] Per the *Guidance for $PM_{2.5}$ Permit Modeling*, as a result of the court decision, EPA will not rely on, and advises states with SIP-approved PSD programs not to rely on, the SMC for $PM_{2.5}$ to exempt projects from preconstruction monitoring requirements.[38] However, EPA states that PSD permit applicants can continue to meet pre-construction monitoring requirements by using data from existing monitors that are determined by the permitting authority to be representative of the area surrounding the proposed project. Given the availability of representative monitoring data in the area surrounding the proposed project, Enviva is proposing to use existing ambient monitor data in lieu of pre-construction monitoring requirements.

5.7. BACKGROUND CONCENTRATIONS

If the maximum modeled impacts for a PSD triggering pollutant are greater than the SIL in the Significance Analysis, a NAAQS analysis is required for that pollutant. In the NAAQS analysis, modeled impacts from the facility will be combined with background concentrations, which represent the air quality concentrations due to sources that are not explicitly modeled (e.g., mobile sources, small but local stationary sources, non-regulated fugitive sources, and large but distant sources). Selection of the existing monitoring station data that is "representative" of the ambient air quality in the area surrounding the proposed facility is determined based on the following three criteria: 1) monitor location, 2) data quality, and 3) data currentness. Key considerations based on the monitor location criteria include proximity to the significant impact area of the proposed facility, similarity of emission sources impacting the monitor to the emission sources impacting the airshed surrounding the proposed facility, and the similarity of the land use and land cover (LULC) surrounding the monitor and proposed facility. The data quality criteria refers to the monitor being an approved State and Local Air Monitor (SLAM) or similar monitor type subject to the quality assurance requirements in 40 CFR Part 58 Appendix A. Data currentness refers to the fact that the most recent three complete years of quality assured data are generally preferred.

As shown in Table 5-9, ambient impacts of NO_2, PM_{10}, and $PM_{2.5}$ exceed their respective SILs and thus triggered NAAQS modeling requirements. Table 5-2 presents the background values that were provided by NCDAQ and added to the modeled impacts.[39]

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[37] *Sierra Club v. EPA*, No. 10-1413 (D.C. Circuit), 2013 WL 216018.
[38] U.S. EPA, Office of Air Quality Planning and Standards, *Draft Guidance for PM2.5 Permit Modeling* (March 4, 2013).
[39] Letter from Tom Anderson (NCDAQ) to Jonathan Hill (Trinity) on August 13, 2013.

Table 5-2. Modeled Background Concentrations

Pollutant	Averaging Period	Background Concentration[1] ($\mu g/m^3$)
NO_2	1-Hour	32.1
	Annual	5.3
PM_{10}	24-Hour	25.0
$PM_{2.5}$[2]	24-Hour	19.0
	Annual	7.8

[1] Background Concentrations provided in letter from Tom Anderson (NCDAQ) to Jon Hill (Trinity) on August 13, 2013.

5.8. SIGNIFICANT IMPACT AREA AND NAAQS/PSD INCREMENT INVENTORIES

For any off-site impact calculated in the PSD Significance Analysis that was greater than the SIL for a given pollutant, the radius of the significant impact area (SIA) was determined. The SIA encompasses a circle centered on the facility with a radius extending out to either (1) the farthest location where the emissions increase of a pollutant from the project causes a significant ambient impact (i.e., modeled impact above the SIL on a high first high basis) , or (2) a distance of 50 km, whichever is less. All sources of the affected pollutant(s) within 50 km of that SIA were assumed to potentially contribute to ground-level concentrations within the SIA and were evaluated for possible inclusion in the NAAQS and PSD Increment analyses.

The NAAQS regional source inventory was comprised of all sources (major and minor) within the SIA along with those sources outside of the SIA that are not excluded based on the "20D" procedure.[40] Using this procedure, sources outside the area of significant impact are excluded from the inventory if the entire facility's emissions (tpy) are less than 20 times the distance (km) from the facility to the nearest edge of the SIA (long-term averaging period), and are excluded if the entire facility's emissions (tpy) are less than 20 times the distance (km) from the facility to the Sampson site (short term averaging period).

Sources in the inventories provided by NCDAQ[41] (included on the CD-ROM in Appendix H) were evaluated for inclusion in the NAAQS and PSD Increment analyses. The complete list of modeled inventory sources and the associated model input parameters are provided in Appendix G.

5.9. NAAQS ANALYSIS

The primary NAAQS are the maximum concentration ceilings, measured in terms of total concentration of a pollutant in the atmosphere, which define the "levels of air quality that the EPA judges are necessary, with an adequate margin of safety, to protect the public health."[42] Secondary NAAQS define

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[40] *Federal Register* 8079, March 6, 1992.
[41] Email from Connie Horne (NCDAQ) to Joe Sullivan (Trinity) on August 12, 2013.
[42] 40 CFR §50.2(b).

the levels that "protect the public welfare from any known or anticipated adverse effects of a pollutant." The primary and secondary NAAQS are shown in Table 5-1 for NO_X, PM_{10}, and $PM_{2.5}$. In the NAAQS analysis, the potential emissions from all emission units at the facility as well as sources included in the regional NAAQS inventory were modeled together to compute the cumulative impact.

The objective of the NAAQS Analysis is to demonstrate through air quality modeling that emissions from the facility do not cause or contribute to an exceedance of the NAAQS at any ambient location at which the impact from the proposed project is greater than the SIL. The modeled cumulative impacts were added to appropriate background concentrations and assessed against the applicable NAAQS as listed in Table 5-1 to demonstrate compliance.

The following modeling results for each PSD triggering pollutant and averaging period were used to determine the design concentration in the NAAQS Analysis:

- The maximum-modeled annual arithmetic mean impact from the full five years of meteorological data to demonstrate compliance with the annual NO_2 standard.
- The modeled annual arithmetic mean impact averaged over the full five years to demonstrate compliance with the annual $PM_{2.5}$ standard.
- The 24-hr PM_{10} standard is not to be exceeded more than 3 times in any consecutive 3 year period, meaning that generally the highest sixth-high (H6H) modeled concentration over the full five years of meteorological data is compared against the NAAQS. However, the highest second-high concentrations was used as a more conservative approach to avoid the long model run times associated with running all five meteorological years within one model run.
- The 24-hr $PM_{2.5}$ standard is the 98th percentile (approximated by the high-eighth-high, H8H modeled concentration) of 24-hr concentrations in a given year averaged over the full five years.
- Maximum five-year average of the 98th percentile (H8H) modeled daily maximum 1-hr concentration, on a receptor-by-receptor basis, to demonstrate compliance with the 1-hr NO_2 standard.

5.10. PSD INCREMENT ANALYSIS

The PSD regulations were enacted to "prevent significant deterioration" of air quality in areas of the country where the air quality was better than the NAAQS. To achieve this goal, the EPA established PSD Increments for NO_2, SO_2, PM_{10}, and $PM_{2.5}$.[43] The PSD Increments are divided into Class I, II, and III Increments. No Class III air quality areas have been established. The Class I modeling portion of this report is limited only to the increment screening procedure described later in the document. The Class II PSD Increments for NO_2, PM_{10} and $PM_{2.5}$ are listed in Table 5-1. The Sampson facility is the first $PM_{2.5}$ increment consuming source in the area and as such there were no additional offsite sources to include in a regional inventory.

Since all short-term PSD Increments are not to be exceeded more than once per year, the highest-second-high modeled impacts for PM_{10} and $PM_{2.5}$ from among the five meteorological years modeled were compared against the short-term increment. The highest annual average PM_{10}, $PM_{2.5}$ and NO_2 impacts were compared against the annual increments.

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[43] The $PM_{2.5}$ PSD Increments became effective on October 20, 2011 (i.e., one year after the date of promulgation).

The sum of the PSD Increment concentration and a baseline concentration defines a "reduced" ambient standard, either lower than or equal to the NAAQS that must be met in a designated attainment area. Significant deterioration is said to have occurred if the *change* in emissions occurring since a baseline date results in an off-property impact greater than the PSD Increment (i.e., the increased emissions "consume" more than the available PSD Increment).

The determination of whether an emissions change at a given source consumes or expands increment is based on the source definition (major or minor for PSD) and the time the change occurs in relation to baseline dates. The major source baseline date for SO_2, PM_{10} and $PM_{2.5}$ was established as January 6, 1975 and for NO_X as February 8, 1988. Increases or decreases in actual emissions at major sources after the major source baseline date as a result of construction of a new source, a physical or operational change (i.e., modification) to an existing source, or shutdown of an existing source affect the available increment, and therefore, must be included in an increment analysis. Actual emission changes at minor sources only affect increment after the minor source baseline date (MSBD), which is set at the date the first complete PSD permit application is submitted in a county. The MSBDs for PM_{10}, $PM_{2.5}$ and NO_x have not yet been established in Sampson County, and as such, no minor sources need to be included in the increment inventory.[44] In order to maintain conservatism, the increment modeling was performed by using the previously described NAAQS inventory.

5.11. OZONE AMBIENT IMPACT ANALYSIS

Elevated ground-level ozone concentrations are the result of photochemical reactions among various chemical species. These reactions are more likely to occur under certain ambient conditions (e.g., high ground-level temperatures, light winds, and sunny conditions). The chemical species that contribute to ozone formation, referred to as ozone precursors, include NO_X and VOC emissions from both anthropogenic (e.g., mobile and stationary sources) and natural sources (e.g., vegetation). While the facility will not directly emit ozone, the facility will emit both NO_X and VOC at levels that are greater than the PSD SER for ozone precursors, and thus, ambient ozone impacts must be addressed. Enviva proposes that no modeling be required for ozone since the use of reactive plume models is rarely conducted on an individual source basis. In addition, NCDAQ and other Region 4 states have only very rarely assessed single source impacts on ozone in PSD air quality analyses and as such a qualitative rather than quantitative analysis was performed.

The two closest ambient ozone monitors to the project site, located in Lenoir County and Cumberland County, NC, are in attainment with the current ozone standard. The Lenoir County monitored design value is 0.069 ppm and the Cumberland County monitored design value is 0.072 ppm, both in relation to the NAAQS of 0.075 ppm. The monitors are located in suburban to rural locations, with more vehicle traffic than the very rural project site would experience. Therefore, given the attainment status of the area, the low vehicle traffic counts and the very small individual source contributions associated with projects of this nature, Enviva believes that no further ozone ambient impact analysis is warranted.

5.12. CLASS I AREA ANALYSIS

Class I areas are federally protected areas for which more stringent air quality standards apply to protect unique natural, cultural, recreational, and/or historic values. There are three (3) Class I areas within 300 km of the Sampson facility as follow:

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[44] http://daq.state.nc.us/permits/psd/docs/mbd1.pdf

- Swanquarter National Wildlife Refuge located 158 km to the east;
- Cape Romain National Wildlife Refuge located 252 km to the south-southwest; and
- James River Face Wilderness area located 294 km to the northwest.

The Federal Land Managers (FLM) have the authority to protect air quality related values (AQRVs), and to consider in consultation with the permitting authority whether a proposed major emitting facility will have an adverse impact on such values. Upon receiving the modeling protocol for this project, NCDAQ contacted the FLM and determined that no AQRV analysis would be required.[45]

In addition to the AQRV analysis, Class I PSD Increment consumption at the affected Class I areas was required to be assessed. The assessment was performed in AERMOD by placing a ring of receptors at 50 km distance (along 1 degree radials), in the direction of the closest Class I area (Swanquarter). Figure E-3 illustrates the receptors included in the analysis. This Class I increment "screening" procedure was originally proposed by EPA Region 4 and has been used in several recent PSD applications to fulfill the Class I increment modeling requirement. Table 5-3 below illustrates that the proposed project impacts will not exceed any Class I SIL.

Table 5-3. Class I SIL Modeling Results

Pollutant	Averaging Period	UTM-E (m)	UTM-N (m)	Date/Time	Modeled Concentration ($\mu g/m^3$)	SIL ($\mu g/m^3$)	Exceeds SIL? (Yes/No)
$PM_{2.5}$	24-Hour	804,996.3	3,903,241.0	2008-2012	0.042	0.07	No
	Annual	805,214.8	3,902,396.1	2008-2012	0.003	0.06	No
PM_{10}	24-Hour	806,084.4	3,898,121.7	10120224	0.166	0.32	No
	Annual	806,084.4	3,898,121.7	2010	0.007	0.20	No
NO_2	Annual	806,084.4	3,898,121.7	2010	0.008	0.1	No

5.13. MODEL SELECTION

The latest version (14134) of the AERMOD modeling system was used to estimate maximum ground-level concentrations in all Class II Area analyses conducted for this application. AERMOD is a refined, steady-state, multiple source, Gaussian dispersion model and was promulgated in December 2005 as the preferred model for use by industrial sources in this type of air quality analysis.[46] The AERMOD model has the Plume Rise Modeling Enhancements (PRIME) incorporated in the regulatory version, so the direction-specific building downwash dimensions used as inputs are determined by the Building Profile Input Program, PRIME version (BPIP PRIME), version 04274.[47] BPIP PRIME is designed to incorporate

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[45] Protocol Approval Letter from Tom Anderson (NCDAQ) to Jonathan Hill (Trinity) on August 13, 2013.
[46] 40 CFR Part 51, Appendix W–*Guideline on Air Quality Models*, Appendix A.1– AMS/EPA Regulatory Model (AERMOD).
[47] Earth Tech, Inc., *Addendum to the ISC3 User's Guide, The PRIME Plume Rise and Building Downwash Model*, Concord, MA.

the concepts and procedures expressed in the GEP Technical Support document, the Building Downwash Guidance document, and other related documents, while incorporating the PRIME enhancements to improve prediction of ambient impacts in building cavities and wake regions.[48]

The AERMOD modeling system is composed of three modular components: AERMAP, the terrain preprocessor; AERMET, the meteorological preprocessor; and AERMOD, the control module and modeling processor. AERMAP is the terrain pre-processor that is used to import terrain elevations for selected model objects and to generate the receptor hill height scale data that are used by AERMOD to drive advanced terrain processing algorithms. National Elevation Dataset (NED) data available from the United States Geological Survey (USGS) were utilized to interpolate surveyed elevations onto user specified receptor grids and buildings and sources in the absence of more accurate site-specific (i.e., site surveys, GPS analyses, etc.) elevation data.

AERMET generates a separate surface file and vertical profile file to pass meteorological observations and turbulence parameters to AERMOD. AERMET meteorological data are refined for a particular analysis based on the choice of micrometeorological parameters that are linked to the land use and land cover (LULC) around the meteorological site shown to be representative of the application site.

Enviva used the most recent versions of AERMOD and AERMAP (version 11103) to estimate ambient impacts from the modeled sources in the Class II area. Per NCDAQ guidelines, AERMOD was run using all regulatory default options.

5.14. RECEPTOR GRID AND COORDINATE SYSTEM

Modeled concentrations were calculated at receptors beginning at the ambient air boundary, which consists of those areas on facility property with clear deterrents to public access (e.g. fencing, regular security patrols). Receptors were placed along that "fenceline" and also on a Cartesian receptor grid. Fenceline receptors were spaced 25 meters apart as specified in NCDAQ's modeling guidance for facilities with sources within 100 meters of the fenceline.[49] Beyond the fenceline, receptors were spaced 500 meters apart in a Cartesian grid extending out 10 km for the significance analyses. Those results were reviewed to ensure that the grid captured all potential areas of significant impacts. Figure E-4 presents a plot of the receptor grid utilized in the significance analysis.

The NAAQS and Increment analyses included a 100 meter-spaced grid extending out 3 km from the facility (i.e. encompassing all areas with impacts above the SIL). Figure E-5 presents the NAAQS/Increment modeling receptor grid.

Receptor elevations required by AERMOD were determined using the AERMAP terrain preprocessor. AERMAP also calculates hill height parameters required by AERMOD. Terrain elevations from the USGS 1 arc second NED were used for the AERMAP processing. AERMAP was also used to determine elevations for the modeled sources and buildings.

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[48] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, *Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) (Revised)*, Research Triangle Park, North Carolina, EPA 450/4-80-023R, June 1985.
[49] http://www.ncair.org/permits/mets/psd_guidance.pdf

In all modeling analysis data files, the location of emission sources, structure, and receptors were represented in the UTM coordinate system. The Sampson plant will be located at approximately 756.7 kilometers (km) east and 3,890.2 km north in Zone 17 (NAD 83).

5.15. METEOROLOGICAL DATA

The AERMOD modeling results were based on sequential hourly surface observations from Fayetteville, NC and upper air data from Greensboro, NC. These stations are recommended by NCDAQ for modeling facilities located in Sampson County and the 2008-2012 files are downloaded from the NCDAQ website.[50] Per NCDAQ guidance, the base elevation (PROFBASE) for the Fayetteville surface station was set to 58 m.[51]

5.16. BUILDING DOWNWASH ANALYSIS

AERMOD incorporates the Plume Rise Model Enhancements (PRIME) downwash algorithms. Direction-specific building parameters required by AERMOD are calculated using the BPIP-PRIME preprocessor (version 04274).

5.17. REPRESENTATION OF EMISSION SOURCES

5.17.1. Source Types and Parameters

The AERMOD dispersion model allows for emission units to be represented as point, area, or volume sources. The majority of the point sources planned for the facility have clearly discernable emission points with vertical orientations and no rain caps. As such those sources were modeled with actual stack parameters (i.e., height, diameter, exhaust gas temperature, and gas exit velocity). There are a few horizontal releases planned for the site and, per NCDAQ guidance, those sources were assigned an exit velocity of 0.01 m/s. A list of modeled point sources and locations is presented in Table 5-4 and the modeled stack parameters are shown in Table 5-5 (have these been updated and made currrent?). In addition to the modeled point sources, an area source (PAVEDRDS) was included in the model to represent ground-level emissions from the roadway traffic at the site. That source was polygon-shaped with a total surface area of 70,491 m^2.

[50] http://www.ncair.org/permits/mets/metdata.shtml
[51] http://www.ncair.org/permits/mets/ProfileBaseElevations.pdf

Table 5-4. Modeled Source Locations

Model ID	Description	UTM-E (m)	UTM-N (m)	Elevation (m)
EP1	Dryer WESP Stack	756,748.6	3,890,256.1	51.91
EP2	Hammermill Filter #1 and #2	756,691.4	3,890,157.1	52.07
EP3	Hammermill Filter #3 and #4	756,686.4	3,890,152.5	52.03
EP4	Hammermill Filter #5 and #6	756,680.0	3,890,147.1	52.02
EP5	Hammermill Filter #7 and #8	756,674.5	3,890,142.6	52.01
EP6	Pellet Silo Bin Vent	756,625.2	3,890,120.9	51.98
EP7	Pellet Cooler #1 Cyclone	756,618.9	3,890,100.4	51.96
EP8	Pellet Cooler #2 Cyclone	756,615.9	3,890,097.4	51.97
EP9	Pellet Cooler #3 Cyclone	756,612.2	3,890,093.8	51.98
EP10	Pellet Cooler #4 Cyclone	756,608.0	3,890,089.4	51.99
EP11	Pellet Cooler #5 Cyclone	756,604.3	3,890,086.0	51.99
EP12	Pellet Cooler #6 Cyclone	756,601.0	3,890,083.3	51.98
EP13	Emergency Generator	756,657.0	3,890,225.0	52.52
EP14	Firewater Pump	756,535.9	3,889,980.6	51.93
EP15	Fines Dust Bin Vent	756,700.3	3,890,164.4	52.13
EP16	Finished Goods Dust Collection Stack	756,537.0	3,890,036.0	51.94
EP17	Greenwood Hammermill #1 Bin Vent	756,728.3	3,890,272.4	51.93
EP18	Greenwood Hammermill #2 Bin Vent	756,729.6	3,890,266.6	51.94
EP19	Dryer Out Conv. Tail Bin Vent	756,720.0	3,890,215.0	52.13
EP20	Dryer Out Conv. Head Bin Vent	756,692.0	3,890,181.2	52.25
PAVEDRDS	Paved Roadway	756,731.0	3,889,783.5	51.97

Table 5-5. Modeled Stack parameters

Model ID	Stack Height (m)	Stack Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
EP1	28.65	350.93	10.59	3.05
EP2	16.46	310.93	13.80	1.14
EP3	16.46	310.93	13.80	1.14
EP4	16.46	310.93	13.80	1.14
EP5	16.46	310.93	13.80	1.14
EP6	23.77	305.37	0.01	0.40
EP7	22.86	316.48	16.48	0.66
EP8	22.86	316.48	16.48	0.66
EP9	22.86	316.48	16.48	0.66
EP10	22.86	316.48	16.48	0.66
EP11	22.86	316.48	16.48	0.66
EP12	22.86	316.48	16.48	0.66
EP13	4.57	919.82	78.30	0.09
EP14	4.57	954.00	109.18	0.06
EP15	20.42	293.00	0.01	0.93
EP16	7.62	310.93	14.35	1.22
EP17	12.19	293.00	16.17	0.61
EP18	12.19	293.00	16.17	0.61
EP19	4.57	293.00	0.01	0.40
EP20	15.85	293.00	0.01	0.40

The emission rates for modeled criteria pollutants are shown in Table 5-7.

Table 5-7. Modeled Emission Rates

Model ID	Modeled Emission Rates (g/s)				
	TSP	PM_{10}	$PM_{2.5}$	CO	NO_x
EP1	1.48E+00	1.48E+00	1.48E+00	6.63E+00	6.31E+00
EP2	1.30E-01	1.30E-01	4.54E-04	-	-
EP3	1.30E-01	1.30E-01	4.54E-04	-	-
EP4	1.30E-01	1.30E-01	4.54E-04	-	-
EP5	1.30E-01	1.30E-01	4.54E-04	-	-
EP6	1.06E-02	1.06E-02	1.06E-02	-	-
EP7	2.85E-01	7.43E-02	9.11E-03	-	-
EP8	2.85E-01	7.43E-02	9.11E-03	-	-
EP9	2.85E-01	7.43E-02	9.11E-03	-	-
EP10	2.85E-01	7.43E-02	9.11E-03	-	-
EP11	2.85E-01	7.43E-02	9.11E-03	-	-
EP12	2.85E-01	7.43E-02	9.11E-03	9.05E-02	1.04E-01
EP13	1.04E-02	1.04E-02	1.04E-02	9.05E-02	1.04E-01
EP14	1.04E-02	1.04E-02	1.04E-02	-	-
EP15	4.23E-02	4.23E-02	4.23E-02	-	-
EP16	1.53E-01	1.40E-01	5.37E-04	-	-
EP17	4.32E-02	4.32E-02	4.32E-02	-	-
EP18	4.32E-02	4.32E-02	4.32E-02	-	-
EP19	4.32E-03	4.32E-03	4.32E-03	-	-
EP20	4.32E-03	4.32E-03	4.32E-03	-	-
PAVEDRDS*	9.87E-07	1.97E-07	4.85E-08	-	-

* Area source emission rates expressed per unit area ($g/s/m^2$)

5.17.2. GEP Stack Height Analysis

EPA has promulgated stack height regulations that restrict the use of stack heights in excess of "Good Engineering Practice" (GEP) in air dispersion modeling analyses. Under these regulations, that portion of a stack in excess of the GEP height is generally not creditable when modeling to determine source impacts. This essentially prevents the use of excessively tall stacks to reduce ground-level pollutant concentrations. The minimum stack height not subject to the effects of downwash, called the GEP stack height, is defined by the following formula:

$H_{GEP} = H + 1.5L$, where:

H_{GEP} = minimum GEP stack height,
H = structure height, and
L = lesser dimension of the structure (height or projected width).

This equation is limited to stacks located within 5L of a structure. Stacks located at a distance greater than 5L are not subject to the wake effects of the structure. The wind direction-specific downwash dimensions and the dominant downwash structures used in this analysis are determined using BPIP. In general, the lowest GEP stack height for any source is 65 meters by default.[52] None of the proposed emission units at the Sampson plant will exceed GEP height.

Figure E-2 presents a site layout for the proposed facility that shows the source and building arrangement as modeled.

5.18. NO_2 MODELING APPROACH

EPA's *Guideline on Air Quality Models (Guideline)*, in 40 CFR Part 51, Appendix W, recommends a tiered approach for modeling annual average NO_2 from point sources. The tiers are described in Section 6.2.3 of the *Guideline*:

a) A tiered screening approach is recommended to obtain annual average estimates of NO_2 from point sources for New Source Review analysis, including PSD... For Tier 1 ... use an appropriate Gaussian model to estimate the maximum annual average concentration and assume a total conversion of NO to NO_2. If the concentration exceeds the NAAQS and/or PSD Increments for NO_2, proceed to the 2nd level screen.

b) For Tier 2 (2nd level) screening analysis, multiply the Tier 1 estimate(s) by an empirically derived NO_2/NO_X value of 0.75 (annual national default).

c) For Tier 3 (3rd level) analyses, a detailed screening method may be selected on a case-by-case basis. For point source modeling, detailed screening techniques such as the Ozone Limiting Method may also be considered.

Enviva utilized the Ambient Ratio Method (ARM), or Tier 2 approach, which has evolved from previous representations of the oxidation of nitric oxide (NO) by ambient ozone and other photochemical oxidants to form nitrogen dioxide (NO_2 – the regulated ambient pollutant). EPA issued a memo on March 1, 2011 providing additional clarifications regarding application of Appendix W modeling guidance for the 1-hr NO_2 NAAQS.[53] Per the memo, EPA recommends the use of 0.80 as a default ambient ratio for the 1-hour NO_2 standard under the Tier 2 approach. Based on this updated EPA guidance, Enviva utilized 0.80 as the ambient NO_2 to NO_X ratio in the significance, NAAQS and PSD Increment modeling analyses, even conservatively for the annual analyses.

5.19. STATE-ONLY MODELING

In addition to the federal NAAQS and PSD increment standards that are required to be analyzed under PSD review, Enviva has performed TSP modeling and modeling under North Carolina's air toxics program.

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[52] 40 CFR §51.100(ii)

[53] U.S. EPA, Region 4, Memorandum from Mr. Tyler Fox to Regional Air Division Directors. Research Triangle Park, North Carolina. March 1, 2011.

5.19.1. Toxic Air Pollutant Modeling

As shown in Table B-3 of this application, several toxic air pollutants (TAP) will exceed their facility-wide toxics permitting emission rates (TPER) under the NC Air Toxics Rules. However, those emissions emanate from sources covered by a NESHAP/MACT regulation and as such, are exempt from modeling requirements. However, since this project is for a new, greenfield facility, as an informative conservative exercise, Enviva elected to perform a NC TAP modeling analysis. In that analysis, the TAP with the highest impact relative to the AAL, hexachlorodibenzo-p-dioxin, showed impacts of only 13.2% of the standard. Given that, along with the minor nature of the changes to TAP sources in this version of the application, Enviva asserts and DAQ has verbally concurred that no additional TAP modeling should be required as part of this revised application.[54]

The TAP modeling analyses were performed in accordance with North Carolina's *Guidelines for Evaluating the Air Quality Impacts of Toxic Air Pollutants in North Carolina* (February 2014). The modeling was generally conducted using the same methodology and data resources in AERMOD as described in the previous sections of this report.

5.19.2. Total Suspended Particulate Modeling

15A NCAC 2D .0403 establishes the ambient air quality standards for total suspended particulate matter (TSP). The standards are the following:

(1) 75 micrograms per cubic meter annual geometric mean,
(2) 150 micrograms per cubic meter maximum 24-hour concentration not to be exceeded more than once per year.

Enviva performed an analysis to demonstrate compliance with this applicable state standard. The results are presented in Table 5-13.

5.20. PSD MODELING RESULTS

The following sections summarize the results of the PSD Class II dispersion modeling analyses which demonstrate that Enviva's proposed Sampson facility will neither cause nor contribute to an exceedance of the NAAQS or PSD Increment. Electronic copies of all modeling input and output files are included on the CD-ROM in Appendix H.

5.21. SIGNIFICANCE ANALYSIS

5.21.1. Class II Significance Analysis

As discussed in Section 5.5, a Significance Analysis was conducted to determine the need for further pollutant modeling. The results of the Significance Analysis for each pollutant are provided in Table 5-9. Figures E-6 through E-11 present plots of the significance results which were used to determine the SIA.

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[54] Phone call between William Willets and Mark Cuilla of NCDAQ and Dale Overcash and Jon Hill of Trinity Consultants on August 18, 2014.

Table 5-9. Significance Model Results

Pollutant	Averaging Period	Concentration Basis	UTM-E (m)	UTM-N (m)	Date/Time	Modeled Concentration ($\mu g/m^3$)	SIL ($\mu g/m^3$)	SIA (km)
CO	1-Hour	H1H in any year	757,035.7	3,890,062.2	12021117	49.65	2,000	N/A
	8-Hour	H1H in any year	757,035.7	3,890,062.2	09040716	38.35	500	
NO_2	1-Hour	5-Year Avg. H1H	756,879.8	3,890,807.8	2008-2012	39.71	10	2.5
	Annual	H1H in any year	756,452.5	3,889,774.7	2009	2.29	1	
PM_{10}	24-Hour	H1H in any year	756,549.9	3,889,681.0	11122424	34.84	5	2.5
	Annual	H1H in any year	756,452.5	3,889,774.7	2009	4.62	1	
$PM_{2.5}$	24-Hour	5-Year Avg. H1H	756,442.7	3,889,780.8	2008-2012	7.45	1.2	3.0
	Annual	5-Year Avg. H1H	756,462.2	3,889,765.4	2008-2012	1.19	0.3	

As shown in the results table, NO_2, PM_{10}, and $PM_{2.5}$ exceed the Class II SILs, requiring further analysis to demonstrate compliance with NAAQS and Class II Increment (where established).

5.22. NAAQS ANALYSIS

The NAAQS Analysis for NO_2, PM_{10}, and $PM_{2.5}$ was conducted using the approach described in Section 5-9 with the emissions and stack parameter data shown in Tables 5-4 through and 5-6 for the proposed emissions sources and Appendix G for regional sources.

Table 5-10 presents the results for the NAAQS modeling analyses. The concentrations shown represent the maximum modeled concentrations required by each standard at which the proposed Sampson facility is also significant. The results demonstrate that the proposed facility will neither cause nor contribute to a violation of the NAAQS.

Table 5-10. NAAQS Modeling Results

Pollutant	Averaging Period	UTM-E (m)	UTM-N (m)	Date/Time	Modeled Concentration ($\mu g/m^3$)	Background Concentration[1] ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Exceeds NAAQS? (Yes/No)
NO_2	1-Hour	756,359.1	3,889,835.6	2008-2012	46.27	32.10	78.37	188	No
	Annual	756,379.4	3,889,821.1	2008	3.14	5.30	8.44	100	No
PM_{10}	24-Hour	756,514.9	3,889,712.1	11122424	29.62	25.00	54.62	150	No
$PM_{2.5}$	24-Hour	756,462.2	3,889,765.4	2008-2012	5.32	19.00	24.32	35	No
	Annual	756,462.2	3,889,765.4	2008-2012	1.19	7.76	8.95	12	No

[1] Background Concentrations provided in letter from Tom Anderson (NCDAQ) to Jon Hill (Trinity) on August 13, 2013.

5.23. PSD INCREMENT ANALYSIS

The PSD Increment Analysis for NO_X, PM_{10} and $PM_{2.5}$ was conducted using the approach described in Section 5.10. Emissions and stack parameter data are shown in Tables 5-4 through and 5-6 for the facility proposed emissions sources and Appendix G for regional sources. The modeling results presented in Table 5-11 demonstrate that the proposed facility will neither cause nor contribute to an exceedance of the PSD Increment for NO_2, PM_{10}, or $PM_{2.5}$.

Table 5-11. Class II PSD Increment Results

Pollutant	Averaging Period	UTM-E (m)	UTM-N (m)	Date/Time	Modeled Concentration ($\mu g/m^3$)	Increment ($\mu g/m^3$)	Exceeds Increment? (Yes/No)
NO_2	Annual	756,379.4	3,889,821.1	2008	3.14	25	No
PM_{10}	24-Hour	756,514.9	3,889,712.1	11122424	29.62	30	No
	Annual	756,452.5	3,889,774.7	2009	4.62	17	No
$PM_{2.5}$	24-Hour	756,572.6	3,889,691.3	11110724	7.60	9	No
	Annual	756,462.2	3,889,765.4	2009	1.31	4	No

5.24. STATE-ONLY MODELING RESULTS

5.24.1. Toxic Air Pollutant Modeling

In the original application, TAP modeling analyses were conducted using the approach in described in Section 5.19. Table 5-12 presents the results for the state toxics modeling that was previously performed for the proposed Enviva Sampson facility. As shown, the project will not cause an exceedance of any pollutant AAL. All modeled TAP had impacts less than 50% of the AAL, and as such, only the most recent meteorological year (2012) was modeled to determine the maximum result. Given the small magnitude of these results, no further TAP modeling was conducted for this application.

Table 5-12. TAP Modeling Results

Pollutant	Averaging Period	UTM-E (m)	UTM-N (m)	Date/Time (YYMMDDHH)	Maximum Concentration ($\mu g/m^3$)	AAL ($\mu g/m^3$)	% of AAL (%)
Arsenic	Annual	757,048.70	3,890,762.10	2012	1.00E-05	2.30E-04	4.35%
Benzo(a)pyrene	Annual	757,048.70	3,890,762.10	2012	2.00E-05	3.30E-02	0.06%
Cadmium*	Annual	757,048.70	3,890,762.10	2012	1.91E-06	5.50E-03	0.03%
Chlorine	1-Hour 24-Hour	757,035.70 756,640.70	3,890,062.20 3,889,722.60	12021117 12102724	0.13 5.50E-02	900 37.5	0.01% 0.15%
Formaldehyde	1-hour	756,595.40	3,889,701.60	12012519	6.32	150	4.21%
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8	Annual	757,048.70	3,890,762.10	2012	1.00E-05	7.60E-05	13.16%
Hydrogen chloride (hydrochloric acid)	1-Hour	757,035.70	3,890,062.20	12021117	0.31	700	0.04%
Vinyl chloride	Annual	757,048.70	3,890,762.10	2012	1.20E-04	0.38	0.03%

*Cadmium impacts are presented in nanograms per cubic meter in the electronic output files in order to maintain enough significant figures in the results.

5.24.2. Total Suspended Particulate Modeling

Table 5-13 presents the results for the TSP modeling analysis that was performed for the proposed Sampson facility. As shown, the project will not cause any violation of the TSP SAAQS.

Table 5-13. TSP Modeling Results

Pollutant	Averaging Period	UTM-E (m)	UTM-N (m)	Date/Time	Modeled Concentration ($\mu g/m^3$)	SAAQS ($\mu g/m^3$)	Exceeds SAAQS? (Yes/No)
TSP	24-Hour Annual	756,514.9 756,452.5	3,889,712.1 3,889,774.7	11110724 2009	74.1 10.5	150 75	No No

SECTION 6
ADDITIONAL IMPACTS

6. ADDITIONAL IMPACTS

In addition to the NAAQS and PSD Increment modeling analyses described previously in this report, applicants are required to perform additional impacts evaluations including: a growth analysis, a soil and vegetation analysis, and a plume visibility analysis.

6.1. PLUME VISIBILITY ANALYSIS

There are no airports or state parks located within the maximum SIA (3.0 km) and as such, no plume visibility analysis was required.

6.2. GROWTH ANALYSIS

The project will consist of the construction and operation of a new wood pellet facility. There will be temporary jobs associated with facility construction as well as the creation of approximately 80 permanent jobs to staff the site. It is anticipated that the large majority of the permanent jobs will be filled with residents that are already located in the area, and thus, no significant growth (in population or infrastructure) is expected in association with the new facility.

6.3. SOIL AND VEGETATION ANALYSIS

To assess soil and vegetation impacts, two comparisons were used. First, the NAAQS results (or significance results if SILs were not reached) were assessed against the secondary NAAQS standards, which provide protection for public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Second, the NAAQS results (or significance results if SILs were not reached) were compared to values from the EPA document, *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals* (EPA 450/2-81-078), 1981.[55]

The results for both comparisons are presented in Table 6-1 and show that no impacts exceed the secondary NAAQS or the EPA screening levels. Thus, there are no adverse impacts expected on soils or vegetation.

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[55] EPA, *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals* (EPA 450/2-81-078), 1981.

Table 6-1. Soil and Vegetation Impacts

Pollutant	Averaging Period	Total Concentration ($\mu g/m^3$)	Vegetation Sensitivity[1] Sensitive ($\mu g/m^3$)	Intermediate ($\mu g/m^3$)	Resistant ($\mu g/m^3$)	Secondary NAAQS ($\mu g/m^3$)	Minimum Threshold ($\mu g/m^3$)	Exceeds Threshold? (Yes/No)
NO_2[2]	4-Hour	78.37	3,760	6,400	16,920	-	3,760	No
	8-Hour	78.37	3,760	7,520	15,040	-	3,760	No
	1-Month	78.37	-	564	-	-	564	No
	Annual	8.44	-	94	-	100	94	No
PM_{10}[3]	24-Hour	54.62	-	-	-	150	150	No
	Annual	12.70	-	-	-	50	50	No
$PM_{2.5}$	24-Hour	19.00	-	-	-	35	35	No
	Annual	7.76	-	-	-	12	12	No
CO	1-Week[4]	1,529.23	1,800,000	-	18,000,000	-	1,800,000	No

[1] Screening Concentrations based on Table 3.1 *A Screening Procedure for Impact of Air Pollution Sources on Plants, Soil and Animals, USEPA, Dec. 12, 1980.*

[2] 4-Hour, 8-Hour and Monthly Averages are conservatively estimated by the 1-hour NAAQS modeling results.

[3] Annual results are based on the increment analysis (with background added), since no annual NAAQS exists.

[4] 1-Week Results are approximated by the 8-hour average SIL results and include 2013 background concentrations from Raleigh, NC.

APPENDIX A
NCFAQ APPLICATION FORMS

APPENDIX A - NCDAQ APPLICATION FORMS

Facility Forms

FORM A1

FACILITY (General Information)

REVISED 11/01/02 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — A1

NOTE- APPLICATION WILL NOT BE PROCESSED WITHOUT THE FOLLOWING:

☑ Local Zoning Consistency Determination (if required) ☑ Facility Reduction & Recycling Survey Form (Form A4) ☑ Application Fee
☑ Responsible Official/Authorized Contact Signature ☑ Appropriate Number of Copies of Application ☑ P.E. Seal (if required)

GENERAL INFORMATION

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

CONTACT INFORMATION

Permit/Technical Contact:	*Facility/Inspection Contact:*
Name/Title: Joe Harrell	Name/Title: Joe Harrell
Mailing Address Line 1: 142 N.C. Route 561 East	Mailing Address Line 1: 142 N.C. Route 561 East
Mailing Address Line 2:	Mailing Address Line 2:
City: Ahoskie State: NC Zip Code: 27910	City: Ahoskie State: NC Zip Code: 27910
Phone No. (area code) (252) 209-6032 Fax No. (area code)	Phone No. (area code) (252) 209-6032 Fax No. (area code)
Email Addres: Joe.Harrell@envivabiomass.com	Email Addres: Joe.Harrell@envivabiomass.com
Responsible Official/Authorized Contact:	*Invoice Contact:*
Name/Title: Norb Hintz	Name/Title: Same as permit/technical contact
Mailing Address Line 1: 7200 Wisconsin Avenue	Mailing Address Line 1:
Mailing Address Line 2: Suite 1000	Mailing Address Line 2:
City: Bethesda State: MD Zip Code: 20814	City: State: Zip Code:
Phone No. (area code) (240) 482-3770 Fax No. (area code)	Phone No. (area code) Fax No. (area code)
Email Addres: [redacted]	Email Address:

APPLICATION IS BEING MADE FOR

☑ New Non-permitted Facility/Greenfield ☐ Modification of Facility (permitted) ☐ Renewal with Modification
☐ Renewal (TV Only)

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): Facility ID No. : (to be assigned)
Wood pellet manufacturing facility

Primary SIC/NAICS Code: 2499 (Wood Products, Not Elsewhere Classified)	Current/Previous Air Permit No. Expiration Date:
Facility Coordinates: Latitude: 35 degrees, 7 minutes, 19.8 seconds	Longitude: 78 degrees, 10 minutes, 59.7 seconds
Does this application contain confidential data? ☐ YES ☑ NO	

PERSON OR FIRM THAT PREPARED APPLICATION

Person Name: Dale Overcash	Firm Name: Trinity Consultants, Inc.
Mailing Address Line 1: One Copley Parkway	Mailing Address Line 2: Suite 310
City: Morrisville State: North Carolina	Zip Code: 27560 County: Wake
Phone No. (919) 462-9693 Fax No. (919) 462-9694	Email Address: [redacted]

SIGNATURE OF RESPONSIBLE OFFICIAL/AUTHORIZED CONTACT

Name (typed): Norb Hintz	Title: Senior Vice President and Chief Engineer
X Signature(Blue Ink): [signature]	Date: 8-22-14

Attach Additional Sheets As Necessary

FORMs A2, A3

EMISSION SOURCE LISTING FOR THIS APPLICATION - A2

112r APPLICABILITY INFORMATION - A3

REVISED 04/10/07

NCDENR/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-CHIP-1	Log Chipping	N/A	N/A
ES-GHM-1, 2	Green Wood Hammermills	CD-RCHP-BV	Bin Vent Baghouse
ES-CHIP-2	Portable Chipper	N/A	N/A
ES-BARKHOG	Bark Hog	N/A	N/A
ES-DRYER	Green Wood Direct-Fired Dryer System	CD-DC	Three (3) Simple Cyclones
		CD-WESP	Wet Electrostatic Precipitator
ES-HM-1, through 8	Eight (8) Hammermills	CD-HM-CYC-1 CD-HM-BF1	Simple Cyclone, Bagfilter
		CD-HM-CYC-2 CD-HM-BF2	Simple Cyclone, Bagfilter
		CD-HM-CYC-3 CD-HM-BF3	Simple Cyclone, Bagfilter
		CD-HM-CYC-4 CD-HM-BF4	Simple Cyclone, Bagfilter
		CD-HM-CYC-5 CD-HM-BF5	Simple Cyclone, Bagfilter
		CD-HM-CYC-6 CD-HM-BF6	Simple Cyclone, Bagfilter
		CD-HM-CYC-7 CD-HM-BF7	Simple Cyclone, Bagfilter
		CD-HM-CYC-8 CD-HM-BF8	Simple Cyclone, Bagfilter
ES-HMA	Hammermill Area Filter	CD-PFB-BF	Bin Vent Baghouse
ES-PMFS	Pellet Mill Feed Silo	CD-PMFS-BV	Bin Vent Baghouse
ES-CLR-1 through 6	Six (6) Pellet Coolers	CD-CLR-1 through 6	Six (6) Pellet Cooler Cyclones
ES-PFB	Pellet Fines Bin	CD-PFB-BF	Bin Vent Baghouse
ES-FPH	Finished Product Handling	CD-FPH-BF	Finished Product Handling Bagfilter
ES-PB-1 through 4	Four (4) Pellet Loadout Bins		
ES-PL-1, -2	Pellet Mill Loadout 1 and 2		
ES-GN	Emergency Generator (250 bhp)	N/A	N/A
ES-FWP	Fire Water Pump (250 bhp)	N/A	N/A
Existing Permitted Equipment To Be MODIFIED By This Application			
Equipment To Be DELETED By This Application			

112(r) APPLICABILITY INFORMATION

A3

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

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

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: _____

Attach Additional Sheets As Necessary

FORM A4

SURVEY OF AIR EMISSIONS AND FACILITY - WIDE REDUCTION & RECYCLING ACTIVITIES

DATE:	**Does facility have an environmental mangement system in place? ( ) YES (X) NO If so, is facility ISO 14000 Certified? ( ) YES (X) NO**

Facility Name:	**Enviva Pellets Sampson, LLC**			**Permit Number:**	**N/A**		
Facility ID:	**to be assigned**	**County:**	**Sampson**	**Environmental Contact:**	**Joe Harrell**		
Mailing Address Line 1:		**US Highway 117**		**Phone No. ( )**	**(252) 209-6032**	**Fax No. ( )**	
Mailing Address Line 2:				**Zip Code:**	**28341**	**County:**	**Sampson**
City:	**Faison**	**State:**	**North Carolina**	**Email Address:**	**Joe.Harrell@envivabiomass.com**		

AIR EMISSIONS SOURCE REDUCTIONS Any Air Emissions Source Reductions in the past year? ( ) YES (X) NO

Source Description and ID	Air Pollutant	Enter Code for Emission Reduction Option (See Codes)	Date Reduction Option Implemented (mo/yr)	Quantity Emitted from prior annual report to DAQ (lb/yr)	Quantity Emitted from current annual report to DAQ (lb/yr)	Has reduction activity been discontinued? If so, when was it discontinued? (mo/yr)	Addition detail about source
N/A							

Comments:

FACILITY - WIDE REDUCTIONS & RECYCLING ACTIVITIES Any Reductions or Recycling Activities in the past year? ( ) YES (X) NO

Source Description or Activity	Pollutant or Recycled or Reduced Materials	Enter Code for Emission Reduction Option (See Codes)	Date Reduction Option Implemented (mo/yr)	Quantity Emitted from prior annual report	Quantity Emitted from current annual report	Has reduction activity been discontinued? If so, when was it discontinued? (mo/yr)	Addition detail about source
N/A							

Comments:

The requested information above shall be used for fulfilling the requirements of North Carolina General Statute 143-215.108(g). The permit holder shall submit to the Department a written description of current and projected plans to reduce the emissions of air pollutants by source reduction or recycling. The written description shall accompany any application for a new permit, modification of an existing permit and for each annual air quality permit fee payment. Source reduction is defined as reducing the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal. If no activity has taken place since the previous report, simply indicate so by checking the no box in that section. Once completed, this form should be submitted along with your fee payment. Examples are listed on the first line of each section of the form for your benefit.

N.C. Division of Pollution Prevention and Environmental Assistance

POLLUTION PREVENTION PAYS

REVISED 1/07

Attach Additional Sheets As Necessary

FORM D1
FACILITY-WIDE EMISSIONS SUMMARY

REVISED 12/01/01

NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate

D1

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

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

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

INDICATE REQUESTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS. EMISSIONS ABOVE THE TOXIC PERMIT EMISSION RATE (TPER) IN 15A NCAC 2Q .0711 MAY REQUIRE AIR DISPERSION MODELING. USE NETTING FORM D2 IF NECESSARY.

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM D4
EXEMPT AND INSIGNIFICANT ACTIVITIES SUMMARY

REVISED: 12/01/01

NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate

D4

ACTIVITIES EXEMPTED PER 2Q .0102 OR INSIGNIFICANT ACTIVITIES PER 2Q .0503 FOR TITLE V SOURCES

DESCRIPTION OF EMISSION SOURCE	SIZE OR PRODUCTION RATE	BASIS FOR EXEMPTION OR INSIGNIFICANT ACTIVITY
1. Green Wood Handling and Sizing Operations IES-GWHS	N/A	15A NCAC 2Q .0503(8)-low emissions, see Appendix B
2. Dried Wood Handling and Sizing Operations IES-DWHS	N/A	15A NCAC 2Q .0503(8) -negligible emissions, enclosed
3. Emergency Generator Diesel Fuel Storage Tank TK-1	Up to 2,500 gallons	15A NCAC 2Q .0503(8)
4. Firewater Pump Diesel Fuel Storage Tank TK-2	Up to 1,000 gallons	15A NCAC 2Q .0503(8)
5. Green Wood Storage Piles IES-GWSP1 and IES-GWSP2	N/A	15A NCAC 2Q .0503(8) -low emissions, see Appendix B
6. Debarker IES-DEBARK-1	N/A	15A NCAC 2Q .0503(8) -negligible emissions
7. Green Wood Fuel Bin IES-GWFB	13.93 ODT/hr	15A NCAC 2Q .0503(8) -no quantifiable emissions
8. Mobile Fuel Diesel Tank TK-3	Up to 2,500 gallons	15A NCAC 2Q .0503(8)
9.		
10.		

Attach Additional Sheets As Necessary

FORM D
TECHNICAL ANALYSIS TO SUPPORT PERMIT APPLICATION

REVISED: 12/01/01 — NCDENR/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)** - 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 TO DOCUMENT COMPLIANCE WITH ANY REGULATIONS. INCLUDE EMISSION RATES CALCULATED IN ITEM "A" ABOVE.

C **CONTROL DEVICE ANALYSIS (FORM C)** - 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).

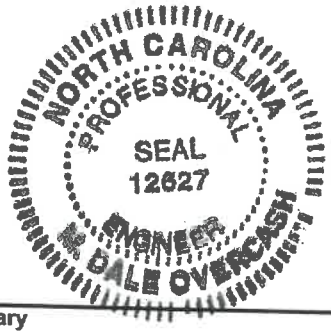
I, M. Dale Overcash, attest that this application for Enviva Pellets Sampson, LLC has been reviewed by me and is accurate, complete and consistent with the information supplied in the engineering plans, calculations, and all other supporting documentation to the best of my knowledge. I further attest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

(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)

NAME: M. Dale Overcash
DATE: 8/25/16
COMPANY: Trinity Consultants of North Carolina P.C.
ADDRESS: One Copley Parkway, Suite 310, Morrisville, NC 27560
TELEPHONE: (919) 462-9693
SIGNATURE:
PAGES CERTIFIED: Entire Application

(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: 12/01/01 — 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: X Emissions ☐ Other

If subject to Title V by other, check or specify: ☐ NSPS ☐ NESHAPS (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
ES-EG, ES-FWP	Emergency Generator and Firepump	Subpart ZZZZ
ES-DRYER	Green Wood Direct-Fired Dryer System	40 CFR 63 Subpart B, [112(g)]

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
15A NCAC 2D .1111 (Subpart DDDD)	All sources at site	A pellet manufacturing facility has operations similar to a PCWP facility as defined by the rule, but a pellet manufacturing facility and it's operation are not included in this subpart.

Comments:

Attach Additional Sheets As Necessary

FORM E2

EMISSION SOURCE APPLICABLE REGULATION LISTING

REVISED 12/01/01 **Division of Air Quality - Application for Air Permit to Construct/Operate** **E2**

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

Attach Additional Sheets As Necessary

FORM E3
EMISSION SOURCE COMPLIANCE METHOD

REVISED 12/01/01 — NCDENR/Division Of Air Quality - Application for Air Permit to Construct/Operate — E3

Emission Source ID NO. **See attached table following Form E3 for a summary of regulatory requirements and associated compliance requirements**

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):

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 ☐ QUARTERL ☐ 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 Title V Applicable Regulations and Compliance Demonstration Procedures
Enviva Pellets Sampson, LLC

Emission Source Description and ID No.	Pollutant	Regulation	Final Control Device	Monitoring Method/Frequency/Duration	Recordkeeping	Reporting
Wood-fired Dryer System (ES-DRYER)	PM/ PM10/PM2.5	15A NCAC 2D .0515	Cyclones + WESP	PM emissions shall be controlled by a an ESP. To assure compliance, daily verification of power and rapper operations are functioning. Monthly visual inspection of the ductwork and material collection units. Every 24 months internal inspection of the structural integrity	Written or electronic log of date and time of each inspection, results of inspection and maintenance, and variance from manufacturer's recommendation	Any maintenance performed on the scrubber within 30 days of a written request by DAQ. Semi-annual progress report and annual compliance certification
Hammermill Area (ES-HMA)						
Coarse Hammermills (ES-HM-1 through 8)						
Pellet Mill Feed Silo (ID No. ES-PMFS)			Fabric Filter	Inspections and maintenance, including monthly inspection of ductwork and annual internal inspection of bagfilter integrity	Written or electronic log of date and time of each inspection, results of inspection and maintenance, and variance from manufacturer's recommendation	Semi-annual progress report and annual compliance certification
Pellet Fines Bin (ES-PFB)						
Finished Product Handling (ES-FPH)						
Pellet Presses & Coolers (ES-CLR-1 through 6)			Cyclones	Inspections and maintenance, including monthly inspection of ductwork and annual internal inspection of cyclone	Written or electronic log of date and time of each inspection, results of inspection and maintenance, and variance from manufacturer's recommendation	Semi-annual progress report and annual compliance certification
Green Wood Hammermills (ES-GHM-1 & 2)						
Wood-fired Dryer System (ES-DRYER)	SO2	15A NCAC 2D .0516	WESP	None required because inherently low sulfur content of wood fuel achieves compliance		
Emergency Generator (ID No. ES-EG) and Fire Water Pump (ID No. ES-FWP)	SO2	15A NCAC 2D .0516	N/A	None required because inherently low sulfur content of fuel achieves compliance		
Wood-fired Dryer System (ES-DRYER)	Opacity	15A NCAC 2D. 0521	Cyclones + WESP	Monthly visible observation for "normal." If above normal, correct action or Method 9 observation required	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of the corrective action	Semi-annual progress report and annual compliance certification
Hammermill Area (ES-HMA)						
Coarse Hammermills (ES-HM-1 through 7)			Fabric Filter			
Pellet Mill Feed Silo (ID No. ES-PMFS)						
Pellet Fines Bin (ES-PFB)						
Finished Product Handling (ES-FPH)						
Pellet Presses & Coolers (ES-CLR-1 through 6)			Cyclones			
Green Wood Hammermills (ES-GHM-1 & 2)						
Emergency Generator (ID No. ES-EG) Fire Water Pump (ID No. ES-FWP)	Opacity	15A NCAC 2D. 0521	N/A	Monthly visible observation for "normal." If above normal, correct action or Method 9 observation required	Written or electronic log of date/time/result of each observation, results of each non-compliant observation and actions taken to correct, and results of the corrective action	Semi-annual progress report and annual compliance certification
Emergency Generator (ID No. ES-EG) Fire Water Pump (ID No. ES-FWP)	PM, CO, NOx, NMHC, SO2	40 CFR Part 60 Subpart IIII	N/A	All requirements as 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 hours meter	Maintain records of engine certification, fuel certifications and hours/year of operation of each engine	N/A
Emergency Generator (ID No. ES-EG) Fire Water Pump (ID No. ES-FWP)	HAPs	40 CFR Part 63 Subpart ZZZZ	N/A	Comply with the NSPS requirements above and no other requirements apply	Comply with the NSPS requirements above and no other requirements apply	N/A
Wood-fired Dryer System (ES-DRYER)	PM/ PM10/PM2.5 NOx VOC CO GHGs	PSD	Cyclones + WESP	See Proposed BACT Limit Table 4-2 of Application		
Hammermill Area (ES-HMA)	PM/ PM10/PM2.5					
Coarse Hammermills (ES-HM-1 through 7)	PM/ PM10/PM2.5 VOC		Fabric Filter			
Pellet Mill Feed Silo (ID No. ES-PMFS)	PM/ PM10/PM2.5					
Pellet Fines Bin (ES-PFB)	PM/ PM10/PM2.5					
Finished Product Handling (ES-FPH)	PM/ PM10/PM2.5					
Pellet Presses & Coolers (ES-CLR-1 through 6)	PM/ PM10/PM2.5 VOC		Cyclones			
Green Wood Hammermills (ES-GHM-1 & 2)	PM/ PM10/PM2.5 VOC					

FORM E4
EMISSION SOURCE COMPLIANCE SCHEDULE

Revised 12/01/01

NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate

E4

COMPLIANCE STATUS WITH RESPECT TO ALL APPLICABLE REQUIREMENTS

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

X 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?

X 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?

X 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)

Revised 01/01/07 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | E5

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

SITE NAME: Enviva Pellets Sampson, LLC

SITE ADDRESS: 5 Connector Road

CITY, NC : Faison, NC

COUNTY: Sampson

PERMIT NUMBER : N/A

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 certifiies 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:** 8-22-14

Norb Hintz, Senior Vice President and Chief Engineer
Name, Title of responsible company official (Type or print)

Attach Additional Sheets As Necessary

Source Specific Forms - Chipper

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

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: **Chipper**	EMISSION SOURCE ID NO: **ES-CHP**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **N/A**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are screened and oversized chips will undergo additional chipping as required.

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)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ■ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	OPERATION 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 (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):			
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%**	SEP-NOV **25%**		
EXPECTED ANNUAL HOURS OF OPERATION **8,760**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY				

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix B**						
PARTICULATE MATTER<10 MICRONS (PM_{10})							
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)							
SULFUR DIOXIDE (SO_2)							
NITROGEN OXIDES (NOx)							
CARBON MONOXIDE (CO)							
VOLATILE ORGANIC COMPOUNDS (VOC)							
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

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

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED: 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B9**

EMISSION SOURCE DESCRIPTION: Rechipper	EMISSION SOURCE ID NO: ES-CHP
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): N/A

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are screened and oversized chips will undergo additional chipping as required.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
Green Wood	ODT	71.71	

MATERIALS ENTERING PROCESS - BATCH OPERATION

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/BATCH)	REQUESTED CAPACITY 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

Source Specific Forms - Green Wood Hammermills

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

REVISED 12/01/01 — NCDENR/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
	CONTROL DEVICE ID NO(S): CD-GHM-BV1, 2
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-17 & EP-18

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are screened and oversized chips will undergo additional chipping as required.

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)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ■ Other (Form B9)

START CONSTRUCTION DATE:	TBD	OPERATION 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 (SUBPART?):		NESHAP (SUBPART?):		MACT (SUBPART?):	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB	25%	MAR-MAY	25%	JUN-AUG	25%
SEP-NOV	25%				
EXPECTED ANNUAL HOURS OF OPERATION	8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	<20	% OPACITY	

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	See Emission Calculations in Appendix B						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED: 12/01/01 | NCDENR/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
	CONTROL DEVICE ID NO(S): CD-GHM-BV1, 2
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-17 & EP-18

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood chips are screened and oversized chips will undergo additional chipping as required.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	CAPACITY (UNIT/HR)	LIMITATION(UNIT/HR)
Green Wood	ODT	71.71	

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 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C1

CONTROL DEVICE ID NO: CD-GHM-BV1, 2	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-GHM-1, 2
EMISSION POINT (STACK) ID NO(S): EP-17 & EP-18	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: TBD[1]	MODEL NO: TBD
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO: 1 OF 1	PROPOSED START CONSTRUCTION DATE: TBD
	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 each green hammermill. The bin vent collects dust from the air volume present in the hammermill. The bin vent is sized to offset the air displacement created by the material feed to the hammermill.

POLLUTANT(S) COLLECTED:	PM	PM-10	PM-2.5	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	~99.9 %	~99.9 %	~99.9 %	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PRESSURE DROP (IN. H_2O): MIN: MAX: 4" GAUGE? ◉ YES ○ NO	WARNING ALARM? ◉ YES ○ NO
BULK PARTICLE DENSITY (LB/FT^3): 1.43E-06	INLET TEMPERATURE (°F): Ambient
POLLUTANT LOADING RATE: 0.1 ○ LB/HR ◉ GR/FT^3	OUTLET TEMPERATURE (°F): Ambient
INLET AIR FLOW RATE (ACFM):	FILTER MAX OPERATING TEMP. (°F): N/A
NO. OF COMPARTMENTS: 1	NO. OF BAGS PER COMPARTMENT: 1
DIAMETER OF BAG (IN.): 5.875	DRAFT: ◉ INDUCED/NEG. ○ FORCED/POS.
AIR TO CLOTH RATIO: 6	FILTER MATERIAL: ○ WOVEN ◉ FELTED
LENGTH OF BAG (IN.): 120	FILTER SURFACE AREA (FT^2): 377

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

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE INCOMING AIR STREAM:
The air stream will contain wood dust particulate emissions

METHOD FOR DETERMINING WHEN TO CLEAN:
○ AUTOMATIC ◉ TIMED ○ MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:
○ ALARM ◉ INTERNAL INSPECTION ○ VISIBLE EMISSION ○ OTHER

SPECIAL CONDITIONS: None
○ MOISTURE BLINDING ○ CHEMICAL RESISTIVITY ○ OTHER
EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES: Per manufacturer recommendations

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

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

Source Specific Forms - Bark Hog

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

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

EMISSION SOURCE DESCRIPTION: Barkhog	EMISSION SOURCE ID NO: ES-BARKHOG
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): N/A

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood bark fuel is sent to the bark hog to break up bark into smaller pieces prior to the dryer.

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) ☐ Manufact. 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	OPERATION 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 (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25%	SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY		

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	See Emission Calculations in Appendix B						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED: 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B9**

EMISSION SOURCE DESCRIPTION: Barkhog	EMISSION SOURCE ID NO: ES-BARKHOG
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): N/A

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Green wood bark fuel is sent to the bark hog to break up bark into smaller pieces prior to the dryer.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
Green Wood	ODT	8.02	

MATERIALS ENTERING PROCESS - BATCH OPERATION

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/BATCH)	REQUESTED CAPACITY 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

Source Specific Forms - Dryer Source

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

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

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

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Green wood is conveyed to either a rotary dryer system. Direct contact heat is provided to the system via a 205 mmBtu/hr burner system. Air emissions are controlled by cyclones for bulk particulate removal and additional particulate is removed utilitizing a wet electrostatic precipitator (WESP) operating after the cyclones.

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)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: TBD	OPERATION 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 (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25% SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	See Emission Calculations in Appendix B						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
	See Emission Calculations in Appendix B						

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr	lb/day	lb/yr
	See Emission Calculations in Appendix B			

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B1
EMISSION SOURCE (WOOD, COAL, OIL, GAS, OTHER FUEL-FIRED BURNER)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B1

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

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

HEATING MECHANISM: ○ INDIRECT ◉ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): 250.4

WOOD-FIRED BURNER

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

PERCENT MOISTURE OF FUEL: 20 to 50%

○ UNCONTROLLED ○ CONTROLLED WITH FLYASH REINJECTION ◉ CONTROLLED W/O REINJECTION

FUEL FEED METHOD:

HEAT TRANSFER MEDIA: ○ STEAM ◉ AIR ○ OTHER

METHOD OF TUBE CLEANING: N/A

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	

METHOD OF LOADING: ○ CYCLONE ○ HANDFIRED ○ TRAVELING GRATE ○ OTHER (DESCRIBE): _____

METHOD OF TUBE CLEANING: CLEANING SCHEDULE:

OIL/GAS-FIRED BURNER

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

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

METHOD OF TUBE CLEANING: CLEANING SCHEDULE:

OTHER FUEL-FIRED BURNER

TYPE OF FUEL: _____ PERCENT MOISTURE: _____

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

TYPE OF FIRING: _____ TYPE OF CONTROL (IF ANY): _____ FUEL FEED METHOD: _____

METHOD OF TUBE CLEANING: CLEANING SCHEDULE:

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Bark/Wet Wood	tons	29.8	

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

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

SAMPLING PORTS, COMPLIANT WITH EPA METHOD 1 WILL BE INSTALLED ON THE STACKS: ◉ YES ○ NO

COMMENTS:

Attach Additional Sheets As Necessary

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

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C4

CONTROL DEVICE ID NO: CD-DC	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-DRYER
EMISSION POINT (STACK) ID NO(S): EP-1	POSITION IN SERIES OF CONTROLS NO. 1 OF 2 UNITS
MANUFACTURER: TBD[1]	MODEL NO:
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? ○ YES ○ NO

DESCRIBE CONTROL SYSTEM :
Four identical simple cyclones are equipped to the discharge of the rotary dryer system to capture bulk PM emissions. Emissions from each the cyclones are combined into a common duct and are routed to the WESP. The parameters presented here 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 EMISSION RATE (LB/HR):				

PRESSURE DROP (IN. H_2O): MIN MAX 6.0" WARNING ALARM? ○ YES ○ NO

INLET TEMPERATURE (°F): MIN MAX Nominal 400	OUTLET TEMPERATURE (°F): MIN MAX Nominal 400
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: 132" S:		○ YES ○ NO
	TYPE OF CYCLONE: ○ CONVENTIONAL ○ HIGH EFFICIENCY ○ OTHER		

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

DESCRIBE INCOMING AIR STREAM:
The flue gas from the dryer will be split and distributed through a set of three cyclones before entering the WESP. 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:
None

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

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

FORM C2
CONTROL DEVICE (Electrostatic Precipitator)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **C2**

CONTROL DEVICE ID NO: CD-WESP	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO: ES-DRYER
EMISSION POINT (STACK) ID NO(S): EP-1	POSITION IN SERIES OF CONTROLS: NO. 2 OF 2 UNITS
MANUFACTURER: SonicKleen	MODEL NO. SonicKleen WESP-304L-567-12H19
MANUFACTURE DATE: TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO: ____ OF ____	PROPOSED START CONSTRUCTION DATE: TBD
EQUIPMENT SPECIFICATIONS	P.E. SEAL REQUIRED (PER 2Q .0112)? ◉ YES ○ NO
TYPE: ◉ WET ○ DRY	GAS DISTRIBUTION GRIDS: ◉ YES ○ NO
TOTAL COLLECTION PLATE AREA (FT^2): 29,904	◉ SINGLE-STAGE ○ TWO-STAGE
COLLECTOR PLATES SIZE (FT): LENGTH: WIDTH:	NO. FIELDS 2 NO. COLLECTOR PLATE PER FIELD: 567 tubes
TOTAL DISCHARGE ELECTRODE LENGTH(FT): 19'-0"	SPACING BETWEEN COLLECTOR PLATES (INCHES): 12" hextube
NUMBER OF DISCHARGE ELECTRODES: 567	GAS VISCOSITY (POISE): 2.054E-04 Poise
MAXIMUM INLET AIR FLOW RATE (ACFM): 117,000	NUMBER OF COLLECTING ELECTRODE RAPPERS: none
MINIMUM GAS TREATMENT TIME (SEC): 2.3	PARTICLE MIGRATION VELOCITY (FT/SEC): 0.234
FIELD STRENGTH (VOLTS) CHARGING: 83 kVA COLLECTING: N/A	BULK PARTICLE DENSITY (LB/FT^3): 45 lb/cu. ft.
ELECTRICAL USAGE (kw/HOUR): 141.5	CORONA POWER (WATTS/1000 CFM): 4000
CLEANING PROCEDURES: ○ RAPPING ○ PLATE VIBRATING ◉ WASHING ○ OTHER	
OPERATING PARAMETERS PRESSURE DROP (IN. H20): MIN 2" MAX 2"	WARNING ALARM? ○ YES ○ NO
RESISTIVITY OF POLLUTANT (OHM-CM): N/A	GAS CONDITIONING: ○ YES ◉ NO TYPE OF AGENT (IF YES):
INLET GAS TEMPERATURE (°F): 240 °F nominal	OUTLET GAS TEMPERATURE (°F): 180 °F nominal
VOLUME OF GAS HANDLED (ACFM): 117,000	INLET MOISTURE PERCENT: MIN 40% MAX 50%
POWER REQUIREMENTS	IS AN ENERGY MANAGEMENT SYSTEM USED? ○ YES ○ NO

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

POLLUTANT(S) COLLECTED:	$PM / PM_{10} / PM_{2.5}$			
BEFORE CONTROL EMISSION RATE (LB/HR):	150.00			
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE STARTUP PROCEDURES:
See attached

DESCRIBE MAINTENANCE PROCEDURES:
See attached

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM:
NOAH

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

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

Source Specific Forms - Hammermills & Hammermill Area

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

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

EMISSION SOURCE DESCRIPTION: **Eight (8) Hammermills**	EMISSION SOURCE ID NO: **ES-HM-1 thru 8**
	CONTROL DEVICE ID NO(S): **CD-HM-CYC-1 through 8**, **CD-HM-BF1 through 8**
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): **EP-2 through 5**

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

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

☐ Coal,wood,oil, gas, other burner (Form B1) ☐ Woodworking (Form B4) ☐ Manufact. 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	OPERATION 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 (SUBPART?):		NESHAP (SUBPART?):		MACT (SUBPART?):	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB	25%	MAR-MAY	25%	JUN-AUG	25% SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION	8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	<20	% OPACITY	

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	See Emission Calculations in Appendix B						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED: 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | B9

EMISSION SOURCE DESCRIPTION: Eight (8) Hammermills	EMISSION SOURCE ID NO: ES-HM-1 thru 8
	CONTROL DEVICE ID NO(S): CD-HM-CYC-1 through 8 CD-HM-BF1 through 8
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-2 through 5

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

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
Dried Wood	ODT	71.71	

MATERIALS ENTERING PROCESS - BATCH OPERATION TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/BATCH)	REQUESTED CAPACITY 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 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C4

CONTROL DEVICE ID NO: CD-HM-CYC-1 thru -8	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-HM-1 through-8
EMISSION POINT (STACK) ID NO(S): EP-2 through 5	POSITION IN SERIES OF CONTROLS NO. 1 OF 2 UNITS
MANUFACTURER: Aircon	MODEL NO: AC-96
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: 1Q2014
OPERATING SCENARIO: 1 OF 1	PROPOSED START CONSTRUCTION [TBD
	P.E. SEAL REQUIRED (PER 2Q .0112)? (YES) ○ NO

DESCRIBE CONTROL SYSTEM :
One cyclone is equipped for each hammermill to capture bulk PM emissions. The emissions from the cyclone are then routed to a dedicated bagfilter per cyclone and hammermill.

POLLUTANT(S) COLLECTED:	PM	PM_{10}	$PM_{2.5}$	
BEFORE CONTROL EMISSION RATE (LB/HR):	See calculations in Appendix B			
CAPTURE EFFICIENCY:	98.0%	98.0%	98.0%	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PRESSURE DROP (IN. H_2O):	MIN	MAX 6.0"	WARNING ALARM?	○ YES ○ NO	
INLET TEMPERATURE (°F):	MIN	MAX Ambient	OUTLET TEMPERATURE (°F):	MIN	MAX Ambient
INLET AIR FLOW RATE (ACFM):	15,000 each cyclone		BULK PARTICLE DENSITY (LB/FT³):	1.43E-03	
POLLUTANT LOADING RATE (GR/FT³):	10 gr/cf 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 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 discharge to atmosphere via a discharge stack common to all fitlers 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:
None

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

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

FORM C1
CONTROL DEVICE (FABRIC FILTER)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C1

CONTROL DEVICE ID NO: CD-HM-BF-1 through 8	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-HM-1 through 8
EMISSION POINT (STACK) ID NO(S): EP-2 through 5	POSITION IN SERIES OF CONTROLS NO. 2 OF 2 UNITS
MANUFACTURER: Aircon	MODEL NO: 10 RA 144-10
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE:
OPERATING SCENARIO: 1 OF 1	PROPOSED START CONSTRUCTION DATE: TBD
	P.E. SEAL REQUIRED (PER 2Q .0112)? (YES) NO

DESCRIBE CONTROL SYSTEM:
Eight (8) bagfilters will be utilized for emission control on the eight hammermill cyclones.
Two bagfilters will share a common stack, so there will be 4 hammermill bagfilter stacks.
All 4 stacks will be identical unless the height needs to be adjusted for the model.

	PM	PM-10	PM-2.5	
POLLUTANT(S) COLLECTED:				
BEFORE CONTROL EMISSION RATE (LB/HR):	See calculations in Appendix B			
CAPTURE EFFICIENCY:	~99.9 %	~99.9 %	~99.9 %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PRESSURE DROP (IN. H_2O): MIN: MAX: 6"	GAUGE? (YES) NO	WARNING ALARM? (YES) NO	
BULK PARTICLE DENSITY (LB/FT³): 1.43E-05	INLET TEMPERATURE (°F): 120		
POLLUTANT LOADING RATE: 0.1 gr/cf inlet LB/HR (GR/FT³)	OUTLET TEMPERATURE (°F): 100		
INLET AIR FLOW RATE (ACFM): 15,000	FILTER MAX OPERATING TEMP. (°F): N/A		
NO. OF COMPARTMENTS: 1	NO. OF BAGS PER COMPARTMENT: 144	LENGTH OF BAG (IN.): 120	
DIAMETER OF BAG (IN.): 5.75	DRAFT: (INDUCED/NEG.) FORCED/POS.	FILTER SURFACE AREA (FT²): 2,168	
AIR TO CLOTH RATIO: 6.90	FILTER MATERIAL: Polyester or equivalent	WOVEN (FELTED)	

DESCRIBE CLEANING PROCEDURES:
AIR PULSE
(REVERSE FLOW)
MECHANICAL/SHAKER
OTHER
SONIC
SIMPLE BAG COLLAPSE
RING BAG COLLAPSE

PARTICLE SIZE DISTRIBUTION:

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

DESCRIBE INCOMING AIR STREAM:
The air stream will contain wood dust particles. Larger particles will have been removed by the upstream cyclone.

METHOD FOR DETERMINING WHEN TO CLEAN:
(AUTOMATIC) TIMED MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:
ALARM (INTERNAL INSPECTION) VISIBLE EMISSION OTHER

SPECIAL CONDITIONS: None
MOISTURE BLINDING CHEMICAL RESISTIVITY OTHER
EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES: Per manufacturer recommendations

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

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

Source Specific Forms - Pellet Presses & Coolers

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

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: **Pellet Coolers**	EMISSION SOURCE ID NO: **ES-CLR1 through 6**
OPERATING SCENARIO 1 OF 1	CONTROL DEVICE ID NO(S): **CD-CLR-1 through 6**
	EMISSION POINT (STACK) ID NO(S): **EP-7 through 12**

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) ☐ Manufact. 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	OPERATION DATE:	2Q2014	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 (SUBPART?):		NESHAP (SUBPART?):		MACT (SUBPART?):	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB	25%	MAR-MAY	25%	JUN-AUG	25% SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION	8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	<20	% OPACITY	

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	See Emission Calculations in Appendix B						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED: 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B9**

EMISSION SOURCE DESCRIPTION: **Pellet Coolers**	EMISSION SOURCE ID NO: **ES-CLR1 through 6**
OPERATING SCENARIO: 1 OF 1	CONTROL DEVICE ID NO(S): **CD-CLR-1 through 6**
	EMISSION POINT (STACK) ID NO(S): **EP-7 through 12**

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

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
Dried Wood	**ODT**	**76.07**	

MATERIALS ENTERING PROCESS - BATCH OPERATION

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/BATCH)	REQUESTED CAPACITY 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 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C4

CONTROL DEVICE ID NO: CD-CLR-1 through 6	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-CLR1 through 6
EMISSION POINT (STACK) ID NO(S): EP-7 through 12	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: TBD[1]	MODEL NO:
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: 2Q2014
OPERATING SCENARIO: 1 OF 1	PROPOSED START CONSTRUCTION DATE: TBD
	P.E. SEAL REQUIRED (PER 2Q .0112)? ◉ YES ○ NO

DESCRIBE CONTROL SYSTEM :
Six (6) identical high efficiency cyclones are to be used to 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):	See Emissions Calculations in Appendix B			
CAPTURE EFFICIENCY:	90+ %	90+ %	90+ %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See Emissions Calculations in Appendix B			

PRESSURE DROP (IN. H_2O): MIN MAX 6.0" WARNING ALARM? ○ YES ○ NO

INLET TEMPERATURE (°F): MIN	MAX Ambient	OUTLET TEMPERATURE (°F): MIN	MAX Ambient
INLET AIR FLOW RATE (ACFM):	21,000 each	BULK PARTICLE DENSITY (LB/FT³):	2.86E-05
POLLUTANT LOADING RATE (GR/FT³):	0.2		

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

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

DESCRIBE INCOMING AIR STREAM:
The cyclones used for particulate capture the pellet coolers will be ducted to a discharge stack. The stack will be common to all cooler aspiration systems.

PARTICLE SIZE DISTRIBUTION

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

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

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

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

Source Specific Forms - Pellet Mill Feed Silo

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

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

EMISSION SOURCE DESCRIPTION: **Pellet Mill Feed Silo**	EMISSION SOURCE ID NO: **ES-PMFS**
OPERATING SCENARIO 1 OF 1	CONTROL DEVICE ID NO(S): **CD-PMFS-BV**
	EMISSION POINT (STACK) ID NO(S): **EP-6**

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)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	OPERATION 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 (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%**	SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **8,760**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY		

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	See Emission Calculations in Appendix B						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B6
EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 12/01/01 — NCDENR/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**
OPERATING SCENARIO: ____ OF ____	CONTROL DEVICE ID NO(S): **CD-PMFS-BV**
	EMISSION POINT(STACK) ID NO(S): **EP-6**

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:				DENSITY OF MATERIAL (LB/FT3): **40**		
CAPACITY	CUBIC FEET: **TBD**			TONS: **TBD**		
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	MOTOR HP:	☐ TRUCK
☐ OTHER:	☐ BUCKET ELEVATOR		☐ STORAGE PILE
	☐ OTHER:		☑ OTHER: **Conveyor**

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS FILLED 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 12/01/01

NCDENR/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-6	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: TBD[1]	MODEL NO: TBD
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: TBD
OPERATING SCENARIO: 1 OF 1	PROPOSED START CONSTRUCTION DATE: TBD
	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 the material feed to the silo.

POLLUTANT(S) COLLECTED:	PM	PM-10	PM-2.5	
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	~99.9 %	~99.9 %	~99.9 %	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PRESSURE DROP (IN. H_2O): MIN:	MAX: 4"	GAUGE? (YES) NO	WARNING ALARM? (YES) NO
BULK PARTICLE DENSITY (LB/FT^3):	1.43E-06	INLET TEMPERATURE (°F):	Ambient
POLLUTANT LOADING RATE: 0.1	LB/HR (GR/FT^3)	OUTLET TEMPERATURE (°F):	Ambient
INLET AIR FLOW RATE (ACFM):		FILTER MAX OPERATING TEMP. (°F):	N/A
NO. OF COMPARTMENTS: 1	NO. OF BAGS PER COMPARTMENT: 1	LENGTH OF BAG (IN.):	120
DIAMETER OF BAG (IN.): 5.875	DRAFT: (INDUCED/NEG.) FORCED/POS	FILTER SURFACE AREA (FT^2):	377
AIR TO CLOTH RATIO: 6	FILTER MATERIAL:	WOVEN (FELTED)	

DESCRIBE CLEANING PROCEDURES:
(AIR PULSE)
REVERSE FLOW
MECHANICAL/SHAKER
OTHER
SONIC
SIMPLE BAG COLLAPSE
RING BAG COLLAPSE

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE INCOMING AIR STREAM:
The air stream will contain wood dust particulate emissions

METHOD FOR DETERMINING WHEN TO CLEAN:
AUTOMATIC (TIMED) MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:
ALARM (INTERNAL INSPECTION) VISIBLE EMISSION OTHER

SPECIAL CONDITIONS: None
MOISTURE BLINDING CHEMICAL RESISTIVITY OTHER
EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES: Per manufacturer recommendations

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

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

Source Specific Forms - Pellet Fines Bin

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

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

EMISSION SOURCE DESCRIPTION: **Pellet Fines Bin**	EMISSION SOURCE ID NO: **ES-PFB**
OPERATING SCENARIO 1 OF 1	CONTROL DEVICE ID NO(S): **CD-PFB-BV**
	EMISSION POINT (STACK) ID NO(S): **EP-15**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Fine pellet material from hammermill pollution control system and screening operation is collected in the pellet fines bin which is controlled by a bin vent filter.

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)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: **TBD**	OPERATION DATE: **2Q2014**	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 (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%**	SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **8,760**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY		

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix B**						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B6
EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B6**

EMISSION SOURCE DESCRIPTION: Pellet Fines Bin	EMISSION SOURCE ID NO: ES-PFB
OPERATING SCENARIO: 1 OF 1	CONTROL DEVICE ID NO(S): CD-PFB-BV
	EMISSION POINT(STACK) ID NO(S): EP-15

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Fine pellet material from hammermill pollution control system and screening operation is collected in the pellet fines bin which is controlled by a bin vent filter.

MATERIAL STORED: Fine pellet material				DENSITY OF MATERIAL (LB/FT3): 40		
CAPACITY	CUBIC FEET: 2200			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	MOTOR HP:	☐ RAILCAR
☐ COMPRESSOR	☑ BELT CONVEYOR		☐ TRUCK
☐ OTHER:	☐ BUCKET ELEVATOR		☐ STORAGE PILE
	☐ OTHER:		☑ OTHER: Conveyor

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS FILLED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM C1
CONTROL DEVICE (FABRIC FILTER)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C1

CONTROL DEVICE ID NO: CD-PFB-BV	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-HMA, ES-PFB
EMISSION POINT (STACK) ID NO(S):	POSITION IN SERIES OF CONTROLS NO. 2 OF 2 UNITS
MANUFACTURER: Aircon	MODEL NO: CAR 101-10
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE:
OPERATING SCENARIO:	PROPOSED START CONSTRUCTION DATE: TBD
1 OF 1	P.E. SEAL REQUIRED (PER 2Q .0112)? ◉ YES ○ NO

DESCRIBE CONTROL SYSTEM:
The bin vent baghouse collects dust from when wood enters or exits the fines bin and displaces air and also provides control from hammermill area clean up air and transpc

POLLUTANT(S) COLLECTED:	PM	PM-10	PM-2.5	
BEFORE CONTROL EMISSION RATE (LB/HR):	See calculations in Appendix B			
CAPTURE EFFICIENCY:	~99.9 %	~99.9 %	~99.9 %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PRESSURE DROP (IN. H_2O): MIN: MAX: 6"	GAUGE? ◉ YES ○ NO	WARNING ALARM? ◉ YES ○ NO	
BULK PARTICLE DENSITY (LB/FT^3): 1.43E-05	INLET TEMPERATURE (°F): 120		
POLLUTANT LOADING RATE: 0.1 gr/cf inlet ○ LB/HR ◉ GR/FT^3	OUTLET TEMPERATURE (°F): 100		
INLET AIR FLOW RATE (ACFM): 9,800	FILTER MAX OPERATING TEMP. (°F): N/A		
NO. OF COMPARTMENTS: 1	NO. OF BAGS PER COMPARTME 100	LENGTH OF BAG (IN.): 120	
DIAMETER OF BAG (IN.): 5.75	DRAFT: ○ INDUCED/NEG. ◉ FORCED/POS	FILTER SURFACE AREA (FT^2): 1,520	
AIR TO CLOTH RATIO: 6.45	FILTER MATERIAL: Polyester or equivalent	○ WOVEN ◉ FELTED	

DESCRIBE CLEANING PROCEDURES:
◉ AIR PULSE ○ REVERSE FLOW ○ MECHANICAL/SHAKER ○ OTHER ○ SONIC ○ SIMPLE BAG COLLAPSE ○ RING BAG COLLAPSE

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE INCOMING AIR STREAM:
The air stream will contain wood dust particles. Larger particles will have been removed by the upstream cyclone. The filters will discharge to a common stack. This stack will also accept the discharge air flow from a third bag filter (CD-HMA-BF) (located in this area.)

METHOD FOR DETERMINING WHEN TO CLEAN:
◉ AUTOMATIC ○ TIMED ○ MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:
○ ALARM ◉ INTERNAL INSPECTION ○ VISIBLE EMISSION ○ OTHER

SPECIAL CONDITIONS: None
○ MOISTURE BLINDING ○ CHEMICAL RESISTIVITY ○ OTHER
EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES: Per manufacturer recommendations

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

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

EMISSION SOURCE DESCRIPTION: Hammermill Area	EMISSION SOURCE ID NO: ES-HMA
OPERATING SCENARIO 1 OF 1	CONTROL DEVICE ID NO(S): CD-PFB-BV
	EMISSION POINT (STACK) ID NO(S): EP-15

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Hammermill area dust from the hammermill and screening operations will be vented to the pellet fines bin bin vent filter (CD-PFB-BV) to control particulate matter emissions.

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)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ■ Other (Form B9)

START CONSTRUCTION DATE: TBD	OPERATION DATE: 1Q2014	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 (SUBPART?):	NESHAP (SUBPART?):	MACT (SUBPART?):	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25%	SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY		

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	See Emission Calculations in Appendix B						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED: 12/01/01 NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate **B9**

EMISSION SOURCE DESCRIPTION:	EMISSION SOURCE ID NO:	ES-HMA
Hammermill Area	CONTROL DEVICE ID NO(S):	CD-PFB-BV
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S):	EP-15

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Hammermill area dust from the hammermill and screening operations will be vented to the pellet fines bin bin vent filter (CD-PFB-BV) to control particulate matter emissions.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS

TYPE	UNITS	MAX. DESIGN CAPACITY	REQUESTED CAPACITY LIMITATION(UNIT/HR)
Dried Wood	ODT	71.71	

MATERIALS ENTERING PROCESS - BATCH OPERATION

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/BATCH)	REQUESTED CAPACITY 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

Specific Forms - Final Product Handling

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

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

EMISSION SOURCE DESCRIPTION: Finished Product Handling/ Pellet Loadout Bins / Pellet Loadout	EMISSION SOURCE ID NO: ES-FPH, ES-PB1 thru 4, ES-PL1 and 2
OPERATING SCENARIO 1 OF 1	CONTROL DEVICE ID NO(S): CD-FPH-BF
	EMISSION POINT (STACK) ID NO(S): EP-16

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Pelletized product is conveyed to 4 pellet loadout bins (PB-1, 2, 3, 4) that feed two pellet loadout operations (ES-PL-1, -2). Emissions from the Pellet Loadout Bins are controlled by a bagfilter. 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 product as it is loaded to prevent emissions. Although emissions to the atmosphere from conveyance from the storage bins are minimal because of dried wood fines have been removed in the pellet coolers, a slight negative pressure is maintained in the loadout building a fire prevention measure to prevent any buildup of dust on surfaces within the building. The slight negative pressure is produced via an induced draft fan that exhausts to the same bagfilter that controls minor dust emissions from loading of the pellet press silo. Trucks are 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) ☐ Manufact. 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	OPERATION DATE:	1Q2014	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 (SUBPART?):		NESHAP (SUBPART?):		MACT (SUBPART?):	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB	25%	MAR-MAY	25%	JUN-AUG	25%
EXPECTED ANNUAL HOURS OF OPERATION	8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	<20 % OPACITY	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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	See Emission Calculations in Appendix B						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
N/A							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
N/A				

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED: 12/01/01 — NCDENR/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-16

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Collection of transfer points, pellet screening operations, and pellet conveying.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
Dried Wood	ODT	74.94	

MATERIALS ENTERING PROCESS - BATCH OPERATION

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/BATCH)	REQUESTED CAPACITY 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 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B6**

EMISSION SOURCE DESCRIPTION: Four (4) Pellet Loadout Bins	EMISSION SOURCE ID NO: ES-PB1 through 4
OPERATING SCENARIO: 1 OF 1	CONTROL DEVICE ID NO(S): CD-FPH-BF
	EMISSION POINT(STACK) ID NO(S): EP-16

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):

Pellet loadout bins are used to store pellets for shipping. Pellets are then loaded from the bins into trucks/train in either of the two pellet loadout areas.

MATERIAL STORED: Pellet Product				DENSITY OF MATERIAL (LB/FT3): 40		
CAPACITY	CUBIC FEET:			TONS:		
DIMENSIONS (FEET)	HEIGHT:	DIAMETER: 12	*(OR)*	LENGTH:	WIDTH:	HEIGHT:
ANNUAL PRODUCT THROUGHPUT (TONS)	ACTUAL:			MAXIMUM DESIGN CAPACITY: 71.19 ODT/hr		

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

NO. FILL TUBES:

MAXIMUM ACFM: 750 each

MATERIAL IS FILLED TO:

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?

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

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

COMMENTS:

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED: 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B9**

EMISSION SOURCE DESCRIPTION: Pellet Loadout 1 and 2	EMISSION SOURCE ID NO: ES-PL-1 and PL-2
OPERATING SCENARIO: 1 OF 1	CONTROL DEVICE ID NO(S): CD-FPH-BF
	EMISSION POINT (STACK) ID NO(S): EP-16

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Final product is loaded into trucks in either of the two (2) pellet loadout areas.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS

TYPE	UNITS	MAX. DESIGN CAPACITY (ODT)	REQUESTED CAPACITY LIMITATION(UNIT/HR)
Dried Wood	ODT	70.83	

MATERIALS ENTERING PROCESS - BATCH OPERATION

TYPE	UNITS	MAX. DESIGN CAPACITY (UNIT/BATCH)	REQUESTED CAPACITY 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 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — C1

CONTROL DEVICE ID NO: CD-FBH-BF	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES-FPH, ES-PB-1 through 12, ES-PL1 and 2
EMISSION POINT (STACK) ID NO(S): EP-16	POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS
MANUFACTURER: Aircon	MODEL NO: TBD
DATE MANUFACTURED: TBD	PROPOSED OPERATION DATE: 2Q2014
OPERATING SCENARIO: 1 OF 1	PROPOSED START CONSTRUCTION DATE: TBD
	P.E. SEAL REQUIRED (PER 2Q .0112)? ◉ YES ○ NO

DESCRIBE CONTROL SYSTEM:

This bagfilter will be utilized to control particulate form the finished product handling pellet conveyers and screens, as well as the pellet load out operation consisting of loading finished product from the bins into the trucks.

POLLUTANT(S) COLLECTED:	PM	PM-10	PM-2.5	
BEFORE CONTROL EMISSION RATE (LB/HR):	See calculations in Appendix B			
CAPTURE EFFICIENCY:	~99.9 %	~99.9 %	~99.9 %	%
CONTROL DEVICE EFFICIENCY:	%	%	%	%
CORRESPONDING OVERALL EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR):	See calculations in Appendix B			

PRESSURE DROP (IN. H_2O): MIN:	MAX: 6"	GAUGE? ◉ YES ○ NO	WARNING ALARM? ◉ YES ○ NO
BULK PARTICLE DENSITY (LB/FT^3):	1.43E-05	INLET TEMPERATURE (°F):	120
POLLUTANT LOADING RATE:	0.10 ○ LB/HR ◉ GR/FT^3	OUTLET TEMPERATURE (°F):	100
INLET AIR FLOW RATE (ACFM):	35,500	FILTER MAX OPERATING TEMP. (°F):	N/A
NO. OF COMPARTMENTS:	1	NO. OF BAGS PER COMPARTMENT:	LENGTH OF BAG (IN.): 144
DIAMETER OF BAG (IN.):	5.75	DRAFT: ○ INDUCED/NEG. ◉ FORCED/POS	FILTER SURFACE AREA (FT^2): 4,842
AIR TO CLOTH RATIO:	7.30	FILTER MATERIAL: Polyester or equivalent	○ WOVEN ◉ FELTED

DESCRIBE CLEANING PROCEDURES:

○ AIR PULSE
◉ REVERSE FLOW
○ MECHANICAL/SHAKER
○ OTHER
○ SONIC
○ SIMPLE BAG COLLAPSE
○ RING BAG COLLAPSE

PARTICLE SIZE DISTRIBUTION

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

DESCRIBE INCOMING AIR STREAM:

The air stream will contain wood dust particles.

METHOD FOR DETERMINING WHEN TO CLEAN:

◉ AUTOMATIC ○ TIMED ○ MANUAL

METHOD FOR DETERMINING WHEN TO REPLACE THE BAGS:

○ ALARM ◉ INTERNAL INSPECTION ○ VISIBLE EMISSION ○ OTHER

SPECIAL CONDITIONS: None

○ MOISTURE BLINDING ○ CHEMICAL RESISTIVITY ○ OTHER

EXPLAIN:

DESCRIBE MAINTENANCE PROCEDURES: Per manufacturer recommendations

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

Attach Additional Sheets As Necessary

[1]Final equipment selection has not yet occurred but will be similar in design to specifications shown.

Source Specific Forms - Emergency Generator & Fire pump

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

REVISED 12/01/01 **NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION: **Emergency Generator (250 bhp)**	EMISSION SOURCE ID NO: **ES-EG**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-13**

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Diesel-fired internal combustion generator 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) ☐ Manufact. 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**	OPERATION 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 (SUBPART?): **IIII**	NESHAP (SUBPART?):	MACT (SUBPART?): **ZZZZ**
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB **25%**	MAR-MAY **25%**	JUN-AUG **25%** SEP-NOV **25%**
EXPECTED ANNUAL HOURS OF OPERATION **500**	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: **<20** % OPACITY	

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	**See Emission Calculations in Appendix B**						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
	See Emission Calculations in Appendix B						

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
	See Emission Calculations in Appendix B			

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B2
EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/GENERATORS)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B2

EMISSION SOURCE DESCRIPTION: Emergency Generator (250 bhp)	EMISSION SOURCE ID NO: ES-GN
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-13

CHECK ALL THAT APPLY: ☐ EMERGENCY ☐ SPACE HEAT ☐ ELECTRICAL GENERATION ☐ PEAK SHAVER ☐ OTHER (DESCRIBE): _____

GENERATOR OUTPUT (KW): ANTICIPATED ACTUAL HOURS OF OPERATION AS PEAK SHAVER (HRS/YR):

ENGINE OUTPUT (HP):

TYPE ICE: ☐ GASOLINE ENGINE ☐ DIESEL ENGINE UP TO 600 HP ☐ DIESEL ENGINE GREATER THAN 600 HP (complete below) ☐ DUAL FUEL ENGINE ☐ OTHER (DESCRIBE):

ENGINE TYPE ☐ RICH BURN ☐ LEAN BURN N/A

EMISSION REDUCTION MODIFICATIONS ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☐ OTHER _____

OR ☐ STATIONARY GAS TURBINE (complete below)

FUEL: ☐ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE):_____

CYCLE: ☐ COGENERATION ☐ SIMPLE ☐ REGENERATIVE ☐ COMBINED

CONTROLS: ☐ WATER-STEAM INJECTION ☐ UNCONTROLLED ☐ LEAN-PREMIX

☐ NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

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 CHAMBER ☐ 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 manufacturers specification or common industry practices.

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — B

EMISSION SOURCE DESCRIPTION: Fire Water Pump (250 bhp)	EMISSION SOURCE ID NO: ES-FWP
	CONTROL DEVICE ID NO(S): N/A
OPERATING SCENARIO 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-14

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Diesel-fired internal combustion pump 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)
- ■ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: TBD	OPERATION 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 (SUBPART?): IIII	NESHAP (SUBPART?):	MACT (SUBPART?): ZZZZ	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25%	MAR-MAY 25%	JUN-AUG 25%	SEP-NOV 25%
EXPECTED ANNUAL HOURS OF OPERATION 100	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY		

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 EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	See Emission Calculations in Appendix B						
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 AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
	See Emission Calculations in Appendix B						

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
	See Emission Calculations in Appendix B			

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

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B2
EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/GENERATORS)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B2**

EMISSION SOURCE DESCRIPTION: **Fire Water Pump (250 bhp)**	EMISSION SOURCE ID NO: **ES-FWP**
	CONTROL DEVICE ID NO(S): **N/A**
OPERATING SCENARIO: **1** OF **1**	EMISSION POINT (STACK) ID NO(S): **EP-14**

CHECK ALL THAT APPLY: ☐ EMERGENCY (●) ☐ SPACE HEAT ☐ ELECTRICAL GENERATION ☐ PEAK SHAVER ☐ OTHER (DESCRIBE): _____

GENERATOR OUTPUT (KW): _____ ANTICIPATED ACTUAL HOURS OF OPERATION AS PEAK SHAVER (HRS/YR): _____

ENGINE OUTPUT (HP): _____

TYPE ICE: ☐ GASOLINE ENGINE (●) DIESEL ENGINE UP TO 600 HP ☐ DIESEL ENGINE GREATER THAN 600 HP (complete below) ☐ DUAL FUEL ENGINE ☐ OTHER (DESCRIBE): _____

ENGINE TYPE ☐ RICH BURN ☐ LEAN BURN (N/A)

EMISSION REDUCTION MODIFICATIONS ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☐ OTHER _____

OR ☐ STATIONARY GAS TURBINE (complete below)

FUEL: ☐ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE): _____

CYCLE: ☐ COGENERATION ☐ SIMPLE ☐ REGENERATIVE ☐ COMBINED

CONTROLS: ☐ WATER-STEAM INJECTION ☐ UNCONTROLLED ☐ LEAN-PREMIX

☐ NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

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 CHAMBER ☐ 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 manufacturers specification or common industry practices.

COMMENTS:

Attach Additional Sheets As Necessary

APPENDIX B
EMISSIONS CALCULATIONS

APPENDIX B - EMISSIONS CALCULATIONS

TABLE B-1
PSD APPLICABILITY SUMMARY
ENVIVA PELLET SAMPSON, LLC

Source Description	Unit ID	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)	VOC (tpy)	Pb (tpy)	CO_{2e} (tpy)	$CO_{2e\ biomass\ deferral}$ [1] (tpy)
Dryer System	ES-DRYER	230.45	219.35	51.55	51.55	51.55	27.42	288.25	0.00E+00	229,828	3,064
Emergency Generator	ES-EG	0.36	0.41	0.02	0.02	0.02	0.0002	0.41	-	67	67
Fire Water Pump	ES-FWP	0.36	0.41	0.02	0.02	0.02	0.0002	0.41	-	67	67
Hammermills	ES-HM-1 thru 8	-	-	18.02	18.02	0.06	-	34.37	-	-	-
Pellet Mill Feed Silo	ES-PMFS	-	-	0.37	0.37	0.37	-	-	-	-	-
Pellet Mill Fines Bin/ Hammermill Area	ES-PFB, ES-HMA	-	-	1.47	1.47	1.47	-	-	-	-	-
Pellet Presses and Coolers	ES-CLR1 thru -6	-	-	59.47	15.49	1.90	-	227.64	-	-	-
Log Bark Hog	ES-BARKHOG							0.37			
Log Chipping	ES-CHIP-1	-	-	-	-	-	-	1.25	-	-	-
Green Wood Hammermills	ES-GHM-1, ES-GHM-2	-	-	3.00	3.00	3.00	-	50.53	-	-	-
Finished Product Handling/ Pellet Loadout Bins/ Pellet Loadout Area	ES-FPH/ ES-PL/ ES-PB-1 & 2	-	-	5.33	4.85	0.02	-	-	-	-	-
Paved Roads		-	-	2.42	0.48	0.12	-	-	-	-	-
Dried Wood Handling	IES-DWH			0.30	0.30	0.30					
Green Wood Sizing & Handling	IES-GWH	-	-	0.016	0.008	0.001	-	-	-	-	-
Green Wood Storage Piles	IES-GWSP1 & 2	-	-	4.01	2.00	0.30	-	2.93	-	-	-
Diesel Storage Tanks	TK1, TK2, & TK3	-	-	-	-	-	-	4.00E-03	-	-	-
Project Emissions		**231.17**	**220.17**	**145.99**	**97.59**	**59.13**	**27.42**	**606**	**0.00E+00**	**229,961**	**3,197**
PSD Significant Emission Rate		**100**	**40**	**25**	**15**	**10**	**40**	**40**	**0.60**	**75,000**	**75,000**
PSD Review Required		**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**

1. CO_{2e} does not include CO_2 from biomass combustion.

TABLE B-2
FACILITYWIDE HAP EMISSIONS SUMMARY
ENVIVA PELLET SAMPSON, LLC

Description	ES-DRYER (tpy)	ES-EG (tpy)	ES-FWP (tpy)	ES-HM-1 through 7 (tpy)	ES-CLR-1 through 6 (tpy)	ES-BARKHOG (tpy)	ES-CHIP-1 (tpy)	ES-GHM-1 & 2 (tpy)	Total (tpy)
1,3-Butadiene	-	1.71E-05	1.71E-05	-	-	-	-	-	0.00
Acetaldehyde	6.520	3.36E-04	3.36E-04	0.645	2.075	-	-	1.297	10.54
Acetophenone	0.000	-	-	-	-	-	-	-	0.00
Acrolein	0.000	4.05E-05	4.05E-05	0.000	0.000	-	-	0.000	0.00
Antimony & Compounds	0.001	-	-	-	-	-	-	-	0.00
Arsenic & Compounds	0.002	-	-	-	-	-	-	-	0.00
Benzene		4.08E-04	4.08E-04			-	-	-	0.00
Beryllium metal (un-reacted) (Also include in BEC)	0.000	-	-	-	-	-	-	-	0.00
Cadmium Metal (elemental un-reacted) –(Add w/CDC)	0.000	-	-	-	-	-	-	-	0.00
Carbon tetrachloride	0.049	-	-	-	-	-	-	-	0.05
Chlorine	0.866	-	-	-	-	-	-	-	0.87
Chlorobenzene	0.036	-	-	-	-	-	-	-	0.04
Chromium–Other compds (add w/chrom acid to get CRC)	0.001	-	-	-	-	-	-	-	0.00
Cobalt compounds	0.001	-	-	-	-	-	-	-	0.00
Chloroform		-	-			-	-	-	0.00
Cumene		-	-			-	-	-	0.00
Dinitrophenol, 2,4-	0.000	-	-	-	-	-	-	-	0.00
Di(2-ethylhexyl)phthalate (DEHP)	0.000	-	-	-	-	-	-	-	0.00
Ethyl benzene	0.034	-	-	-	-	-	-	-	0.03
Ethylene dichloride (1,2-dichloroethane)	0.032	-	-	-	-	-	-	-	0.03
Formaldehyde	16.597	5.16E-04	5.16E-04	1.017	1.355	-	-	0.772	19.74
Hydrogen chloride (hydrochloric acid)	2.084	-	-	-	-	-	-	-	2.08
Lead and Lead compounds	0.004	-	-	-	-	-	-	-	0.00
m-,p-Xylene		1.25E-04	1.25E-04			-	-	-	0.00
Manganese & compounds	0.127	-	-	-	-	-	-	-	0.13
Mercury, vapor (Include in Mercury&Compds)	0.000	-	-	-	-	-	-	-	0.00
Methanol	35.643	-	-	0.484	2.098	0.079	0.269	0.574	39.15
Methyl bromide (bromomethane)	0.016	-	-	-	-	-	-	-	0.02
Methyl chloride (chloromethane)	0.025	-	-	-	-	-	-	-	0.03
Methyl chloroform (1,1,1 trichloroethane)	0.034	-	-	-	-	-	-	-	0.03
Methyl ethyl ketone	0.006	-	-	-	-	-	-	-	0.01
Methyl isobutyl ketone		-	-			-	-	-	0.00
Methylene chloride		-	-			-	-	-	0.00
Nickel metal (Component of Nickel & Compounds)	0.003	-	-	-	-	-	-	-	0.00
Nitrophenol, 4-	0.000	-	-	-	-	-	-	-	0.00
o-Xylene		-	-			-	-	-	0.00
Pentachlorophenol	0.000	-	-	-	-	-	-	-	0.00
Perchloroethylene (tetrachloroethylene)	0.042	-	-	-	-	-	-	-	0.04
Phenol	0.000	-	-	0.000	0.000	-	-	0.000	0.00
Phosphorus Metal, Yellow or White	0.002	-	-	-	-	-	-	-	0.00
Polychlorinated biphenyls	0.000	-	-	-	-	-	-	-	0.00
Propionaldehyde	8.840	-	-	0.430	0.406	-	-	0.188	9.86
Propylene dichloride (1,2 dichloropropane)	0.036	-	-	-	-	-	-	-	0.04
Selenium compounds	0.000	-	-	-	-	-	-	-	0.00
Styrene		-	-			-	-	-	0.00
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	0.000	-	-	-	-	-	-	-	0.00
Toluene		1.79E-04	1.79E-04			-	-	-	0.00
Total PAH (POM)	0.137	7.35E-05	7.35E-05	-	-	-	-	-	0.14
Trichloroethylene	0.033	-	-	-	-	-	-	-	0.03
Trichlorophenol, 2,4,6-	0.000	-	-	-	-	-	-	-	0.00
Vinyl chloride	0.020	-	-	-	-	-	-	-	0.02
TOTAL HAPs	**71.19**	**1.69E-03**	**1.69E-03**	**2.58**	**5.93**	**0.08**	**0.27**	**2.83**	**82.89**
MAX INDIVIDUAL HAP	**Formaldehyde**	**Formaldehyde**	**Formaldehyde**	**Methanol**	**Methanol**	**Methanol**	**Methanol**	**Methanol**	**Methanol**
MAX INDIVIDUAL HAP VALUE	**35.64**	**5.16E-04**	**5.16E-04**	**1.02**	**2.10**	**0.08**	**0.27**	**1.30**	**39.15**

TABLE B-3
DETERMINATION OF POLLUTANTS SUBJECT TO AIR TOXICS PERMITTING
ENVIVA PELLET SAMPSON, LLC

TAP Emissions

Description		Dryer			Hammermills			Pellet Coolers			Emergency Generator			Fire Water Pump			Total		
Pollutant	CAS Number	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)
1,3-Butadiene	106-99-0	-	-	-							0.001	0.002	0.054	0.000	0.002	0.054	0.000	0.003	0.108
Acetaldehyde	75-07-0	1.739	41.746	15,040.643	0.172	4.128	1,289.494	0.554	13.286	4,150.324	0.001	0.032	0.671	0.001	0.032	0.671	2.468	59.224	18,481.803
Acrolein	107-02-8	-	-	-	-	-	-	-	-	-	0.000	0.000	0.081	0.000	0.000	0.081	0.000	0.000	0.162
Arsenic		0.000	0.010	3.499	-	-	-	-	-	-							0.000	0.010	3.499
Benzene	71-43-2	-	-	-	-	-	-	-	-	-	0.002	0.039	0.816	0.002	0.039	0.816	0.003	0.078	1.633
Benzo(a)pyrene	50-32-8	0.001	0.016	5.703	-	-	-	-	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.016	5.703
Beryllium		0.000	0.000	0.175	-	-	-	-	-	-							0.000	0.000	0.175
Cadmium		0.000	0.002	0.652	-	-	-	-	-	-							0.000	0.002	0.652
Carbon Tetrachloride		0.011	0.270	98.708	-	-	-	-	-	-							0.011	0.270	98.708
Chlorine		0.198	4.748	1,732.868	-	-	-	-	-	-							0.198	4.748	1,732.868
Chlorobenzene		0.008	0.198	72.386	-	-	-	-	-	-							0.008	0.198	72.386
Chloroform	67-66-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromic acid (Chromium VI)	7738-94-5	0.000	0.002	0.557	-	-	-	-	-	-							0.000	0.002	0.557
Di(2-ethylhexyl)phthalate (DEHP)		0.000	0.000	0.163	-	-	-	-	-	-							0.000	0.000	0.163
Ethylene dichloride (1,2-dichloroethane)		0.007	0.174	63.612	-	-	-	-	-	-							0.007	0.174	63.612
Formaldehyde	50-00-0	4.428	106.261	33,194.365	0.271	6.513	2,034.534	0.361	8.673	2,709.146	0.002	0.050	1.033	0.002	0.050	1.033	5.064	121.546	37,940.110
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8		0.000	0.010	3.510	-	-	-	-	-	-							0.000	0.010	3.510
Hydrogen chloride (hydrochloric acid)		0.476	11.418	4,167.658	-	-	-	-	-	-							0.476	11.418	4,167.658
Manganese & compounds		0.029	0.697	254.446	-	-	-	-	-	-							0.029	0.697	254.446
Mercury, vapor (Include in Mercury&Compds)		0.000	0.002	0.557	-	-	-	-	-	-							0.000	0.002	0.557
Methyl chloroform (1,1,1 trichloroethane)		0.008	0.186	67.999	-	-	-	-	-	-							0.008	0.186	67.999
Methyl ethyl ketone		0.001	0.032	11.845	-	-	-	-	-	-							0.001	0.032	11.845
Xylene	1330-20-7	-	-	-	-	-	-	-	-	-	0.000	0.012	0.249	0.000	0.012	0.249	0.001	0.024	0.499
Methyl isobutyl ketone	108-10-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	75-09-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel metal (Component of Nickel & Compounds)		0.001	0.014	5.248	-	-	-	-	-	-							0.001	0.014	5.248
Pentachlorophenol		0.000	0.000	0.113	-	-	-	-	-	-							0.000	0.000	0.113
Perchloroethylene (tetrachloroethylene)		0.010	0.228	83.353	-	-	-	-	-	-							0.010	0.228	83.353
Phenol	108-95-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated biphenyls		0.000	0.000	0.018	-	-	-	-	-	-	-	-	-	-	-	-	0.000	0.000	0.018
Styrene	100-42-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachlorodibenzo-p-dioxin 2,3,7,8-		0.000	0.000	0.000	-	-	-	-	-	-							0.000	0.000	0.000
Toluene	108-88-3	-	-	-	-	-	-	-	-	-	0.001	0.017	0.358	0.001	0.017	0.358	0.001	0.034	0.716
Trichloroethylene		0.008	0.180	65.805	-	-	-	-	-	-							0.008	0.180	65.805
Trichlorofluoromethane (CFC 11)		0.010	0.246	89.934	-	-	-	-	-	-							0.010	0.246	89.934
Vinyl chloride		0.005	0.108	39.483	-	-	-	-	-	-							0.005	0.108	39.483

TPER Comparison Table

Pollutant	CAS Number	Total			TPER (TQ .0711)			Modeling Required?
		(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	
1,3-Butadiene	106-99-0			6.84E-02			1.10E+01	No
Acetaldehyde	75-07-0	2.47E+00			6.30E+00			No
Acrolein	107-02-8	3.24E-04			2.60E-02			No
Arsenic				3.50E+00			1.60E-02	Yes
Benzene	71-43-2			1.63E+00			8.10E+00	No
Benzo(a)pyrene	50-32-8			5.70E+00			2.20E+00	Yes
Beryllium				1.75E-01			2.80E-01	No
Cadmium				6.52E-01			3.70E-01	Yes
Carbon Tetrachloride				9.87E+01			4.60E+02	No
Chlorine		1.98E-01	4.75E+00		2.30E-01	7.90E-01		Yes
Chlorobenzene			1.98E-01			4.40E+01		No
Chloroform	67-66-3			0.00E+00			2.90E+02	No
Chromic acid (Chromium VI)	7738-94-5		1.52E-03			1.30E-02		No
Di(2-ethylhexyl)phthalate (DEHP)			2.87E-04			6.30E-01		No
Ethylene dichloride (1,2-dichloroethane)				6.36E+01			2.60E+02	No
Formaldehyde	50-00-0	5.06E+00			4.00E-02			Yes
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8				3.51E+00			5.10E-03	Yes
Hydrogen chloride (hydrochloric acid)		4.76E-01			1.80E-01			Yes
Manganese & compounds			6.97E-01			5.30E-01		Yes
Mercury, vapor (Include in Mercury&Compds)			1.52E-03			1.30E-02		No
Methyl chloroform (1,1,1 trichloroethane)		2.76E-03	1.80E-01		6.40E+01	2.50E+02		No
Methyl ethyl ketone		1.35E-03	3.25E-02		2.24E+01	7.80E+01		No
Xylene	1330-20-7	9.98E-04	2.39E-02		1.64E+01	5.70E+01		No
Methyl isobutyl ketone	108-10-1	0.00E+00	0.00E+00		7.60E-00	5.20E+01		No
Methylene chloride	75-09-2	0.00E+00		0.00E+00	3.90E-01		1.60E+03	No
Nickel metal (Component of Nickel & Compounds)			1.44E-02			1.30E-01		No
Pentachlorophenol		1.28E-05	3.06E-04		6.40E-03	6.30E-02		No
Perchloroethylene (tetrachloroethylene)				8.34E+01			1.30E+04	No
Phenol	108-95-2	0.00E+00			2.40E-01			No
Polychlorinated biphenyls				1.79E-02			5.60E+00	No
Styrene	100-42-5	0.00E+00			2.70E+00			No
Tetrachlorodibenzo-p-dioxin 2,3,7,8-				1.89E-05			2.00E-04	No
Toluene	108-88-3		3.44E-02		1.44E+01	9.80E+01		No
Trichloroethylene				6.58E+01			4.00E+03	No
Trichlorofluoromethane (CFC 11)		1.03E-02			1.40E+03			No
Vinyl chloride				3.95E+01			2.60E+01	Yes

TABLE B-4
ROTARY DRYER -CRITERIA POLLUTANT EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Dryer Inputs

Dryer Throughput (@ Dryer Exit)	575,000	tons/year @ 6.5% moisture
Annual Dried Wood Throughput of Dryer	537,625	ODT/year
Hourly Dried Wood Throughput of Dryer	71.71	ODT/hr
Flow rate =	180,000	ACFM
Exit Temperature =	355.40	deg K
Standard flow rate =	148,472	SCFM
Annual Utilization Factor	100%	
Burner Heat Input	250.4	MMBtu/hr
Annual Burner Heat Input at Annual Utilization	2,193,504.0	MMBtu/yr
Percent Hardwood	25%	
Percent Softwood	75%	

Criteria Pollutant Calculations:

Pollutant	Baseline Emission Factors			Proposed BACT Emission Factor			Baseline Emissions		Total Controlled Potential Emissions	
	Uncontrolled Biomass Emission Factor	Units	Emission Factor Source	Controlled Biomass Emission Factor	Units	Emission Factor Source	(lb/hr)	(tpy)	(lb/hr)	(tpy)
CO	0.210	lb/MMBtu	Note 1	0.210	lb/MMBtu	Baseline	52.61	230.5	52.61	230.5
NO_X	0.200	lb/MMBtu	Note 6	0.200	lb/MMBtu	Note 6	50.08	219.4	50.08	219.4
$PM/PM_{10}/PM_{2.5}$ Condensible Fraction	0.017	lb/MMBtu	AP-42 Section 1.6	0.017	lb/MMBtu	AP-42 Section 1.6	4.26	18.6	4.26	18.6
TSP (Filterable)	2.092	lb/ODT	Note 6	0.030	lb/MMBtu	NSPS emission limit	150.00	562.3	7.51	32.9
Total TSP (Filterable + Condensible)							154.26	580.9	11.77	51.5
PM_{10} (Filterable)	2.092	lb/ODT	Note 6	0.030	lb/MMBtu	NSPS emission limit	150.00	562.3	7.51	32.9
Total PM_{10} (Filterable + Condensible)							154.26	580.9	11.77	51.5
$PM_{2.5}$ (Filterable)	2.092	lb/ODT	Note 6	0.030	lb/MMBtu	NSPS emission limit	150.00	562.3	7.51	32.9
Total $PM_{2.5}$ (Filterable + Condensible)							154.26	580.9	11.77	51.5
SO_2	0.025	lb/MMBtu	AP-42, Section 1.6 [3]	0.025	lb/MMBtu	AP-42, Section 1.6 [3]	6.26	27.4	6.26	27.4
VOC	1.07	lb/ODT	Note 2	1.07	lb/ODT	Baseline	76.90	288.3	76.90	288
Lead	0.00	N/A	N/A	0.00	N/A	N/A	0.00	0.0	0.00	0.0

Note:

[1] CO emissions are based on stack testing conducted at Ahsokie, NC facility on June 7, 2012 with a conservative safety margin on CO due to the significant variability that is possible with this pollutant.

[2] VOC emissions emission factor based on Vendor guarantee of 0.95 lb/ODT as propane converted to alpha -pinene and Enviva Wiggins October 2013 Stack Test Data as Total VOC as alpha-pinene using OTM 26.

[3] Although the vendor estimated emissions to include condensibles, additional condensibles from wood combustion AP-42, Section 1.6 were included. The vendor only provided the filterable fraction of particulate matter in the emission factors. Enviva has conservatively calculated the condensible fraction based upon the heat input of the dryer burners using an emission factor for wood combustion from AP-42, Section 1.6.

[4] No emission factor is provided in AP-42, Section 10.6.2 for SO_2 for rotary dryers. Enviva has conservatively calculated SO2 emissions based upon the heat input of the dryer burners using an emission factor for wood combustion from AP-42, Section 1.6.

[5] Controlled filterable particulate matter emissions based on NSPS Subpart Db limit of 0.03 lb/MMBtu.

[6] NO_x and filterable PM/PM10 emissions based on TSI guanrantee on 7/15/14. The $PM_{2.5}$ filterable emission factor is assumed to be the same as PM and PM10.

TABLE B-5
ROTARY DRYER - HAP AND TAP EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	537,625
Hardwood Composition	25%
Softwood Composition	75%

Short Term Composition and Throughput

ODT/hr	71.71
Hardwood Composition	25%
Softwood Composition	75%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor Comparison: Stack Tests		Weighted Emission Factor			Potential Emissions	
					Emission Factor (lb/ODT)	Reference	Short-term EF (lb/ODT)	Annual EF (lb/ODT)	EF Source	(lb/hr)	(tpy)
Acetaldehyde	75-07-0	Yes	Yes	Yes	0.024	1	0.024	0.024	stack test	1.74	6.52
Acrolein	107-02-8	Yes	Yes	Yes	0.000	1	0.000	0.000	stack test	0.00	0.00
Formaldehyde	50-00-0	Yes	Yes	Yes	0.062	1	0.062	0.062	stack test	4.43	16.60
Methanol	67-56-1	Yes	No	Yes	0.133	1	0.133	0.133	stack test	9.51	35.64
Phenol	108-95-2	Yes	Yes	Yes	0.000	1	0.000	0.000	stack test	0.00	0.00
Propionaldehyde	123-38-6	Yes	No	Yes	0.033	1	0.033	0.033	stack test	2.36	8.84
									Total HAPs	**18.03**	**67.60**

Notes:
[1] HAP emissions from Enviva Wiggins October 2013 Stack Testing on Dryer No. 2.

TABLE B-6
ROTARY DRYER -HAP AND TAP WOOD COMBUSTION EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Calculation Inputs:

Heat Input (MMBtu/hr)	250.40
Operating Schedule (hrs/yr)	8,760
Heat Input (MMBtu/yr)	2,193,504
WESP Metal HAP Control Efficiency[2]	92.75%
HCl Control Efficiency[3]	90.00%

HAP & TAP Emission Calculations:

Pollutant	HAP/TAP?	VOC?	Emission Factors - Biomass				Emissions - Biomass		Emissions - Maximum Uncontrolled Total			Emissions - Maximum Controlled Total		
			lb/mmBtu Uncontrolled	Control Efficiency	lb/mmBtu Controlled	Ref.	lb/hr Uncontrolled	lb/hr Controlled	lb/hr	lb/yr	tpy	lb/hr	lb/yr	tpy
Acetophenone	HAP	VOC	3.20E-09	0%	3.20E-09	1	8.01E-07	3.20E-09	8.01E-07	7.02E-03	3.51E-06	3.20E-09	2.80E-05	1.40E-08
Antimony & Compounds	HAP		7.90E-06	92.75%	5.73E-07	1, 2	1.98E-03	1.43E-04	1.98E-03	1.73E+01	8.66E-03	1.43E-04	1.26E+00	6.28E-04
Arsenic	TAP/HAP		2.20E-05	92.75%	1.60E-06	1, 2	5.51E-03	3.99E-04	5.51E-03	4.83E+01	2.41E-02	3.99E-04	3.50E+00	1.75E-03
Benzo(a)pyrene	TAP/HAP	VOC	2.60E-06	0%	2.60E-06	1	6.51E-04	6.51E-04	6.51E-04	5.70E+00	2.85E-03	6.51E-04	5.70E+00	2.85E-03
Beryllium	TAP/HAP		1.10E-06	92.75%	7.98E-08	1, 2	2.75E-04	2.00E-05	2.75E-04	2.41E+00	1.21E-03	2.00E-05	1.75E-01	8.75E-05
Cadmium	TAP/HAP		4.10E-06	92.75%	2.97E-07	1, 2	1.03E-03	7.44E-05	1.03E-03	8.99E+00	4.50E-03	7.44E-05	6.52E-01	3.26E-04
Carbon tetrachloride	TAP/HAP	VOC	4.50E-05	0%	4.50E-05	1	1.13E-02	1.13E-02	1.13E-02	9.87E+01	4.94E-02	1.13E-02	9.87E+01	4.94E-02
Chlorine	TAP/HAP		7.90E-04		7.90E-04	1	1.98E-01	1.98E-01	1.98E-01	1.73E+03	8.66E-01	1.98E-01	1.73E+03	8.66E-01
Chlorobenzene	TAP/HAP	VOC	3.30E-05	0%	3.30E-05	1	8.26E-03	8.26E-03	8.26E-03	7.24E+01	3.62E-02	8.26E-03	7.24E+01	3.62E-02
Chromic acid (Chromium VI)	TAP[4]		3.50E-06	92.75%	2.54E-07	1, 2	8.76E-04	6.35E-05	8.76E-04	7.68E+00	3.84E-03	6.35E-05	5.57E-01	2.78E-04
Chromium--Other compds (add w/chrom acid to get CRC)	HAP		1.75E-05	92.75%	1.27E-06	1, 2	4.38E-03	3.18E-04	4.38E-03	3.84E+01	1.92E-02	3.18E-04	2.78E+00	1.39E-03
Cobalt compounds	HAP		6.50E-06	92.75%	4.71E-07	1, 2	1.63E-03	1.18E-04	1.63E-03	1.43E+01	7.13E-03	1.18E-04	1.03E+00	5.17E-04
Dinitrophenol, 2,4-	HAP	VOC	1.80E-07	0%	1.80E-07	1	4.51E-05	4.51E-05	4.51E-05	3.95E-01	1.97E-04	4.51E-05	3.95E-01	1.97E-04
Di(2-ethylhexyl)phthalate (DEHP)	TAP/HAP	VOC	4.70E-08	0%	4.70E-08	1	1.18E-05	1.18E-05	1.18E-05	1.03E-01	5.15E-05	1.18E-05	1.03E-01	5.15E-05
Ethyl benzene	HAP	VOC	3.10E-05	0%	3.10E-05	1	7.76E-03	7.76E-03	7.76E-03	6.80E+01	3.40E-02	7.76E-03	6.80E+01	3.40E-02
Ethylene dichloride (1,2-dichloroethane)	TAP/HAP	VOC	2.90E-05	0%	2.90E-05	1	7.26E-03	7.26E-03	7.26E-03	6.36E+01	3.18E-02	7.26E-03	6.36E+01	3.18E-02
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8	TAP	VOC	1.60E-06	0%	1.60E-06	1	4.01E-04	4.01E-04	4.01E-04	3.51E+00	1.75E-03	4.01E-04	3.51E+00	1.75E-03
Hydrogen chloride (hydrochloric acid)	TAP/HAP		1.90E-02	90.00%	1.90E-03	1, 3	4.76E+00	4.76E-01	4.76E+00	4.17E+04	2.08E+01	4.76E-01	4.17E+03	2.08E+00
Lead and Lead compounds	HAP		4.80E-05	92.75%	3.48E-06	1, 2	1.20E-02	8.71E-04	1.20E-02	1.05E+02	5.26E-02	8.71E-04	7.63E+00	3.82E-03
Manganese & compounds	TAP/HAP		1.60E-03	92.75%	1.16E-04	1, 2	4.01E-01	2.90E-02	4.01E-01	3.51E+03	1.75E+00	2.90E-02	2.54E+02	1.27E-01
Mercury, vapor (Include in Mercury&Compds)	TAP/HAP		3.50E-06	92.75%	2.54E-07	1, 2	8.76E-04	6.35E-05	8.76E-04	7.68E+00	3.84E-03	6.35E-05	5.57E-01	2.78E-04
Methyl bromide (bromomethane)	HAP	VOC	1.50E-05	0%	1.50E-05	1	3.76E-03	3.76E-03	3.76E-03	3.29E+01	1.65E-02	3.76E-03	3.29E+01	1.65E-02
Methyl chloride (chloromethane)	HAP	VOC	2.30E-05	0%	2.30E-05	1	5.76E-03	5.76E-03	5.76E-03	5.05E+01	2.52E-02	5.76E-03	5.05E+01	2.52E-02
Methyl chloroform (1.1,1 trichloroethane)	TAP/HAP		3.10E-05		3.10E-05	1	7.76E-03	7.76E-03	7.76E-03	6.80E+01	3.40E-02	7.76E-03	6.80E+01	3.40E-02
Methyl ethyl ketone	TAP/HAP	VOC	5.40E-06	0%	5.40E-06	1	1.35E-03	1.35E-03	1.35E-03	1.18E+01	5.92E-03	1.35E-03	1.18E+01	5.92E-03
Naphthalene	HAP	VOC	9.70E-05	0%	9.70E-05	1	2.43E-02	2.43E-02	2.43E-02	2.13E+02	1.06E-01	2.43E-02	2.13E+02	1.06E-01
Nickel metal (Component of Nickel & Compounds)	TAP/HAP		3.30E-05	92.75%	2.39E-06	1, 2	8.26E-03	5.99E-04	8.26E-03	7.24E+01	3.62E-02	5.99E-04	5.25E+00	2.62E-03
Nitrophenol, 4-	HAP	VOC	1.10E-07	0%	1.10E-07	1	2.75E-05	2.75E-05	2.75E-05	2.41E-01	1.21E-04	2.75E-05	2.41E-01	1.21E-04
Pentachlorophenol	TAP/HAP		5.10E-08		5.10E-08	1	1.28E-05	1.28E-05	1.28E-05	1.12E-01	5.59E-05	1.28E-05	1.12E-01	5.59E-05
Perchloroethylene (tetrachloroethylene)	TAP/HAP		3.80E-05		3.80E-05	1	9.52E-03	9.52E-03	9.52E-03	8.34E+01	4.17E-02	9.52E-03	8.34E+01	4.17E-02
Phosphorus Metal, Yellow or White	HAP		2.70E-05	92.75%	1.96E-06	1, 2	6.76E-03	4.90E-04	6.76E-03	5.92E+01	2.96E-02	4.90E-04	4.29E+00	2.15E-03
Polychlorinated biphenyls	TAP/HAP	VOC	8.15E-09	0%	8.15E-09	1	2.04E-06	2.04E-06	2.04E-06	1.79E-02	8.94E-06	2.04E-06	1.79E-02	8.94E-06
Polycyclic Organic Matter	HAP		1.25E-04		1.25E-04	1	3.13E-02	3.13E-02	3.13E-02	2.74E+02	1.37E-01	3.13E-02	2.74E+02	1.37E-01
Propylene dichloride (1,2 dichloropropane)	HAP	VOC	3.30E-05	0%	3.30E-05	1	8.26E-03	8.26E-03	8.26E-03	7.24E+01	3.62E-02	8.26E-03	7.24E+01	3.62E-02
Selenium compounds	HAP		2.80E-06	92.75%	2.03E-07	1, 2	7.01E-04	5.08E-05	7.01E-04	6.14E+00	3.07E-03	5.08E-05	4.45E-01	2.23E-04
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	TAP/HAP	VOC	8.60E-12	0%	8.60E-12	1	2.15E-09	2.15E-09	2.15E-09	1.89E-05	9.43E-09	2.15E-09	1.89E-05	9.43E-09
Trichloroethylene	TAP/HAP	VOC	3.00E-05	0%	3.00E-05	1	7.51E-03	7.51E-03	7.51E-03	6.58E+01	3.29E-02	7.51E-03	6.58E+01	3.29E-02
Trichlorofluoromethane (CFC 111)	TAP	VOC	4.10E-05	0%	4.10E-05	1	1.03E-02	1.03E-02	1.03E-02	8.99E+01	4.50E-02	1.03E-02	8.99E+01	4.50E-02
Trichlorophenol, 2,4,6-	HAP	VOC	2.20E-08	0%	2.20E-08	1	5.51E-06	5.51E-06	5.51E-06	4.83E-02	2.41E-05	5.51E-06	4.83E-02	2.41E-05
Vinyl chloride	TAP/HAP	VOC	1.80E-05	0%	1.80E-05	1	4.51E-03	4.51E-03	4.51E-03	3.95E+01	1.97E-02	4.51E-03	3.95E+01	1.97E-02
Total							**5.55E+00**	**8.56E-01**	**5.55E+00**	**4.86E+04**	**24.31**	**8.56E-01**	**7.50E+03**	**3.75**

[1] Uncontrolled and controlled emission factors (criteria and HAP/TAP) for wood combustion in a stoker boiler from NCDAQ Wood waste Combustion Spreadsheet/AP-42: Compilation of Air Pollutant Emission Factors Vol. I - Stationary Sources USEPA, 5th ed. Section 1.6, 9/03

[2] The control efficiency of the wet electrostatic precipitator (WESP) for filterable particulate matter is applied to all metal hazardous and toxic pollutants. Actual design filterable efficiency is estimated to 96.4%, but 92.75% is assumed for toxics permitting.

[3] 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 10/18/2011 with Steven A. Jaasund, P.E. of Lundberg Associates, a manufacturer of WESPs.

[4] Chromic acid is a subset of chrome compounds, which is accounted for seperately as a HAP. As such, chromic acid is only calculated as a TAP.

TABLE B-7
HAMMERMILLS - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Calculation Inputs:

Total Plant Throughput ODT/yr	537,625
% of Total Throughput to the Hammermills	53.3%

Based on 53.3% sent through Enviva Northampton site

Annual Composition and Throughput

Hammermills Throughput ODT/yr	286,554
Hardwood Composition	25%
Softwood Composition	75%

Short Term Composition and Throughput

ODT/hr	38.22
Hardwood Composition	25%
Softwood Composition	75%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor Comparison – Stack Tests		Weighted Emission Factor			Potential Emissions	
					Emission Factor (lb/ODT)	Reference	Short-term EF (lb/ODT)	Annual EF (lb/ODT)	EF Source	(lb/hr)	(tpy)
Total VOC	**N/A**	**N/A**	**N/A**	**N/A**	**0.240**	[1]	**0.24**	**0.24**	**stack test**	**9.17**	**34.37**
Acetaldehyde	75-07-0	Yes	Yes	Yes	0.005	[1]	4.50E-03	4.50E-03	stack test	1.72E-01	6.45E-01
Acrolein	107-02-8	Yes	Yes	Yes	0.000	[1]	0.00E+00	0.00E+00	stack test	0.00E+00	0.00E+00
Formaldehyde	50-00-0	Yes	Yes	Yes	0.007	[1]	7.10E-03	7.10E-03	stack test	2.71E-01	1.02E+00
Methanol	67-56-1	Yes	No	Yes	0.0034	[2]	3.38E-03	3.38E-03	stack test	1.29E-01	4.84E-01
Phenol	108-95-2	Yes	Yes	Yes	0.000	[1]	0.00E+00	0.00E+00	stack test	0.00E+00	0.00E+00
Propionaldehyde	123-38-6	Yes	No	Yes	0.003	[1]	3.00E-03	3.00E-03	stack test	1.15E-01	4.30E-01
									Total VOC	**9.17**	**34.37**
									Total HAPs	**0.69**	**2.58**

Notes:

[1] HAP emissions from Enviva Wiggins October 2013 Stack Testing with a throughput of 62.5% softwood.

[2] Total VOC emissions from Enviva Amory October 2013 Stack Testing with a throughput of 60% softwood.

TABLE B-8
PELLET PRESSES AND COOLERS - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Calculation Inputs:

Annual Composition and Throughput

Throughput ODT/yr	537,625
Hardwood Composition	25%
Softwood Composition	75%

Short Term Composition and Throughput

ODT/hr	71.71
Hardwood Composition	25%
Softwood Composition	75%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor Comparison - Stack Tests		Selected Emission Factor			Potential Emissions	
					Emission Factor (lb/ODT)	Reference	Short-term EF (lb/ODT)	Annual EF (lb/ODT)	EF Source	(lb/hr)	(tpy)
Total VOC	N/A	N/A	N/A	N/A	0.85	[1]	0.85	0.85	stack test	60.73	227.64
Acetaldehyde	75-07-0	Yes	Yes	Yes	7.72E-03	[1]	7.72E-03	7.72E-03	stack test	5.54E-01	2.08E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.00E+00	[1]	0.00E+00	0.00E+00	stack test	0.00E+00	0.00E+00
Formaldehyde	50-00-0	Yes	Yes	Yes	5.04E-03	[1]	5.04E-03	5.04E-03	stack test	3.61E-01	1.35E+00
Methanol	67-56-1	Yes	No	Yes	7.80E-03	[1]	7.80E-03	7.80E-03	stack test	5.60E-01	2.10E+00
Phenol	108-95-2	Yes	Yes	Yes	0.00E+00	[1]	0.00E+00	0.00E+00	stack test	0.00E+00	0.00E+00
Propionaldehyde	123-38-6	Yes	No	Yes	1.51E-03	[1]	1.51E-03	1.51E-03	stack test	1.08E-01	4.06E-01
									Total VOC	**60.73**	**227.64**
									Total HAPs	**1.58**	**5.93**

Notes:

[1] HAP emissions from Enviva Wiggins October 2013 Stack Testing with a throughput of 62.5% softwood.

TABLE B-9
BAGFILTER AND CYCLONE EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Emission Unit	Emission Source ID	Filter, Vent -or- Cyclone ID	Flowrate[1] (cfm)	Pollutant Loading[2] (gr/cf)	Annual Operation (hours)	% PM that is PM_{10}	% PM that is $PM_{2.5}$	Reference	Potential Emissions: PM (lb/hr)	PM (tpy)	PM_{10}[3] (lb/hr)	PM_{10}[3] (tpy)	$PM_{2.5}$[3] (lb/hr)	$PM_{2.5}$[3] (tpy)
Green Wood Hammermills	ES-GHM-1	CD-GHM-BV1	10,000	0.004	8,760	100.0%	100.0%	4	0.34	1.50	0.34	1.50	0.343	1.50
Green Wood Hammermills	ES-GHM-2	CD-GHM-BV2	10,000	0.004	8,760	100.0%	100.0%	4	0.34	1.50	0.34	1.50	0.343	1.50
Hammermills Bagfilter 1	ES-HM-1	CD-HM-BF1	15,000	0.004	8,760	100.0%	0.35%	4, 6	0.51	2.25	0.51	2.25	0.002	0.01
Hammermills Bagfilter 2	ES-HM-2	CD-HM-BF2	15,000	0.004	8,760	100.0%	0.35%	4, 6	0.51	2.25	0.51	2.25	0.002	0.01
Hammermills Bagfilter 3	ES-HM-3	CD-HM-BF3	15,000	0.004	8,760	100.0%	0.35%	4, 6	0.51	2.25	0.51	2.25	0.002	0.01
Hammermills Bagfilter 4	ES-HM-4	CD-HM-BF4	15,000	0.004	8,760	100.0%	0.35%	4, 6	0.51	2.25	0.51	2.25	0.002	0.01
Hammermills Bagfilter 5	ES-HM-5	CD-HM-BF5	15,000	0.004	8,760	100.0%	0.35%	4, 6	0.51	2.25	0.51	2.25	0.002	0.01
Hammermills Bagfilter 6	ES-HM-6	CD-HM-BF6	15,000	0.004	8,760	100.0%	0.35%	4, 6	0.51	2.25	0.51	2.25	0.002	0.01
Hammermills Bagfilter 7	ES-HM-7	CD-HM-BF7	15,000	0.004	8,760	100.0%	0.35%	4, 6	0.51	2.25	0.51	2.25	0.002	0.01
Hammermills Bagfilter 8	ES-HM-8	CD-HM-BF8	15,000	0.004	8,760	100.0%	0.35%	4, 6	0.51	2.25	0.51	2.25	0.002	0.01
Dry Wood Handling	Dryer Out Conv. Tail Bin Vent	CD-DC-BV1	1,000	0.004	8,760	100%	100%	4	0.03	0.15	0.03	0.15	0.034	0.15
Dry Wood Handling	Dryer Out Conv. Head Bin Vent	CD-DC-BV2	1,000	0.004	8,760	100%	100%	4	0.03	0.15	0.03	0.15	0.034	0.15
Pellet Mill Feed Silo Bin Vent Baghouse	ES-PMFS	CD-PMFS-BV	2,444	0.004	8,760	100%	100%	4	0.08	0.37	0.08	0.37	0.084	0.37
Pellet Mill Fines Bin & Hammermill Filter	ES-PFB, ES-HMA	CD-PFB-BV	9,800	0.004	8,760	100%	100%	4	0.34	1.47	0.34	1.47	0.336	1.47
Pellet Coolers Cyclone 1	ES-CLR-1	CD-CLR-1	12,000	0.022	8,760	26.1%	3.2%	3	2.26	9.91	0.59	2.58	0.072	0.32
Pellet Coolers Cyclone 2	ES-CLR-2	CD-CLR-2	12,000	0.022	8,760	26.1%	3.2%	3	2.26	9.91	0.59	2.58	0.072	0.32
Pellet Coolers Cyclone 3	ES-CLR-3	CD-CLR-3	12,000	0.022	8,760	26.1%	3.2%	3	2.26	9.91	0.59	2.58	0.072	0.32
Pellet Coolers Cyclone 4	ES-CLR-4	CD-CLR-4	12,000	0.022	8,760	26.1%	3.2%	3	2.26	9.91	0.59	2.58	0.072	0.32
Pellet Coolers Cyclone 5	ES-CLR-5	CD-CLR-5	12,000	0.022	8,760	26.1%	3.2%	3	2.26	9.91	0.59	2.58	0.072	0.32
Pellet Coolers Cyclone 6	ES-CLR-6	CD-CLR-6	12,000	0.022	8,760	26.1%	3.2%	3	2.26	9.91	0.59	2.58	0.072	0.32
Finished Product Handling Bagfilter	ES-FPH, ES-PL, ES-PB-1 & 2	CD-FPH-BF	35,500	0.004	8,760	91%	0.35%	5, 6	1.22	5.33	1.11	4.85	0.004	0.02
								TOTAL	20.08	87.96	9.93	43.51	1.63	7.12

Note:

[1] Filter, Vent, and Cyclone inlet flow rate (cfm) provided by design engineering firm (Mid-South Engineering Co.).

[2] Pollutant Loading (gr/cf) provided by Aircon, a control device vendor.

[3] Based on September 2013 Enviva Northampton Engineering Tests

[4] No speciation data is available for PM 10. Therefore, it is assumed PM=PM10.

[5] Finished product handling PM10 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 finished product handling is anticipated to be larger than flyash, this factor is believed to be a conservative indicator of speciation.

[6] Dry Hammermills and Finished product handling PM2.5 speciation based on April 2014 Enviva Southampton PM2.5 speciation tests.

TABLE B-10
ELECTRIC POWERED CHIPPER EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Chipper Throughput 537,625 tons dry wood

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[3] (lb/yr)	Emissions[3] (tpy)
PM[3]	N/A	0.00E+00	0.00
THC as Carbon[1]	0.0041	2.20E+03	1.10
THC as alpha-pinene [2]	0.0047	2.50E+03	1.25
Methanol[1]	0.0010	5.38E+02	0.27

[1] Emission factor obtained from available emissions factors for chippers in AP-42 Section 10.6.3, Table 7 and Section 10.6.4, Tables 7 and 9. Emission factors for THC and Methanol are the same across all three tables.

[2] Emission factor converted from as carbon to as alpha-pinene by multiplying by 1.14.

[3] PM emission factor is not applicable as emissions are routed downward to the ground.

TABLE B-11
ELECTRIC POWERED BARKHOG EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Hog Throughput 157,680 tons dry wood
Based on max hourly design throughput of 30 tph

Pollutant	Emission Factors (lb/dry wood tons)	Emissions[3] (lb/yr)	Emissions[3] (tpy)
PM[3]	N/A	0.00E+00	0.00
THC as Carbon[1]	0.0041	6.46E+02	0.32
THC as alpha-pinene [2]	0.0047	7.34E+02	0.37
Methanol[1]	0.0010	1.58E+02	0.08

[1] Emission factor obtained from available emissions factors for chippers in AP-42 Section 10.6.3, Table 7 and Section 10.6.4, Tables 7 and 9. Emission factors for THC and Methanol are the same across all three tables.

[2] Emission factor converted from as carbon to as alpha-pinene by multiplying by 1.14.

[3] PM emission factor is not applicable as emissions are routed downward to the ground.

TABLE B-12
GREEN HAMMERMILLS - VOC, HAP, AND TAP EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Calculation Inputs:

Total Plant Throughput ODT/yr	537,625
% of Total Throughput to the Green Hammermills	70.0%

30% will bypass the green hammermills due to pre-screener

Annual Composition and Throughput

Green Hammermills Throughput ODT/yr	376,338
Hardwood Composition	25%
Softwood Composition	75%

Short Term Composition and Throughput

ODT/hr	50.20
Hardwood Composition	25%
Softwood Composition	75%

Emission Calculations:

Pollutant	CAS Number	HAP (Yes/No)	NC TAP (Yes/No)	VOC (Yes/No)	Emission Factor Comparison: Stack Tests Emission Factor (lb/ODT)	Stack Tests Reference	AP-42 Calculated Direct wood-fired, hardwood factors Emission Factor (lb/ODT)	AP-42 Calculated Direct wood-fired, hardwood factors Reference	AP-42 Green, Direct wood-fired softwood factors Emission Factor (lb/ODT)	AP-42 Green, Direct wood-fired softwood factors Reference	Weighted Emission Factor: Short-term EF (lb/ODT)	Weighted Emission Factor: Annual EF (lb/ODT)	EF Source	Potential Emissions[4] (lb/hr)	Potential Emissions[4] (tpy)
Total VOC	N/A	N/A	N/A	N/A	**0.27**	[5]	**4.75E-02**	[2,3]	1.25E+00	[1,3]	**0.27**	**0.27**	**stack test**	**13.48**	**50.53**
Acetaldehyde	75-07-0	Yes	Yes	Yes	0.007	[5]	8.46E-04	[2,3]	1.66E-02	[1,3]	6.89E-03	6.89E-03	stack test	3.46E-01	1.30E+00
Acrolein	107-02-8	Yes	Yes	Yes	0.000	[5]	2.59E-04	[2,3]	5.08E-03	[1,3]	0.00E+00	0.00E+00	stack test	0.00E+00	0.00E+00
Formaldehyde	50-00-0	Yes	Yes	Yes	0.004	[5]	1.58E-03	[2,3]	3.09E-02	[1,3]	4.11E-03	4.11E-03	stack test	2.06E-01	7.72E-01
Methanol	67-56-1	Yes	No	Yes	0.003	[5]	1.24E-03	[2,3]	2.43E-02	[1,3]	3.05E-03	3.05E-03	stack test	1.53E-01	5.74E-01
Phenol	108-95-2	Yes	Yes	Yes	0.000	[5]	3.16E-04	[2,3]	6.18E-03	[1,3]	0.00E+00	0.00E+00	stack test	0.00E+00	0.00E+00
Propionaldehyde	123-38-6	Yes	No	Yes	0.001	[5]	1.47E-04	[2,3]	2.87E-03	[1,3]	1.00E-03	1.00E-03	stack test	5.02E-02	1.88E-01
													Total VOC	**13.48**	**50.53**
													Total HAPs	**0.76**	**2.83**

Notes:

[1] HAP & TAP emission factors for "Rotary Dryer, green, direct wood-fired, (inlet moisture content >50%, dry basis) softwood were obtained from AP-42, Section 10.6.2, Table 10.6.2-3.

[2] To account for hardwood emissions since no HAP/TAP emission factors are given for direct hardwood-fired, factors were conservatively calculated by multiplying AP-42 Section 10.6.2-3 HAP factors for green, direct softwood fired by the ratio of the VOC emission factors for hardwood to softwood drying (0.24/4.7).

[3] Both AP-42 hardwood and softwood factor emissions from dryers were adjusted to represent the hammermills by multiplying the emission facotr time the ratio of the VOC from hammermills to dryers based on engineering testing conducted at the Enviva Wiggins facility (19.8%).

[4] Short-term emissions were calculated based upon a worst-case scenario of 25% softwood firing on an hourly basis.
Annual emissions were calculated based on the Annual average % Hardwood and Softwood Composition.

[5] HAP emissions from Enviva Wigginis October 2013 Stack Testing with a throughput of 62.5% softwood.

TABLE B-13
EMERGENCY GENERATOR AND FIRE PUMP EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Emergency Generator Emissions (ES-EG)

Equipment and Fuel Characteristics

Engine Output	0.19	MW
Engine Power	250	hp (brake)
Hours of Operation	500	hr/yr[1]
Heating Value of Diesel	19,300	Btu/lb
Power Conversion	2,545	Btu/hr/hp

Criteria Pollutant Emissions

Pollutant	Category	Emission Factor	Units	Potential Emissions	
				lb/hr	tpy
TSP	PSD	0.20	g/KW-hr	0.08	0.02
PM_{10}	PSD	0.20	g/KW-hr	0.08	0.02
$PM_{2.5}$	PSD	0.20	g/KW-hr	0.08	0.02
NO_x	PSD	4.00	g/KW-hr	1.64	0.41
SO_2	PSD	15.00	ppmw (3)	9.89E-04	2.47E-04
CO	PSD	3.50	g/KW-hr	1.44E+00	3.59E-01
VOC (NMHC)	PSD	4.00	g/KW-hr	1.64E+00	4.11E-01
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.34E-03	3.36E-04
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	1.62E-04	4.05E-05
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	1.63E-03	4.08E-04
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	3.29E-07	8.23E-08
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	6.84E-05	1.71E-05
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.07E-03	5.16E-04
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	2.94E-04	7.35E-05
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	7.16E-04	1.79E-04
Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	4.99E-04	1.25E-04
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.07E-03	5.16E-04
Total HAPs				6.78E-03	1.69E-03

Note:

[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-2010 construction.

[3] Sulfur content in accordance with Year 2013 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 and VOC.

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

TABLE B-13
EMERGENCY GENERATOR AND FIRE PUMP EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Firewater Pump Emissions (ES-FWP)

Equipment and Fuel Characteristics

Engine Output	0.19	MW
Engine Power	250	hp
Hours of Operation	500	hr/yr[1]
Heating Value of Diesel	19,300	Btu/lb
Power Conversion	2,545	Btu/hr/hp

Criteria Pollutant Emissions

Pollutant	Category	Emission Factor	Units	Potential Emissions	
				lb/hr	tpy
TSP	PSD	0.20	g/KW-hr	0.08	0.02
PM_{10}	PSD	0.20	g/KW-hr	0.08	0.02
$PM_{2.5}$	PSD	0.20	g/KW-hr	0.08	0.02
NO_x	PSD	4.00	g/KW-hr	1.64	0.41
SO_2	PSD	15.00	ppmw (3)	9.89E-04	2.47E-04
CO	PSD	3.50	g/KW-hr	1.44E+00	3.59E-01
VOC (NMHC)	PSD	4.00	g/KW-hr	1.64E+00	4.11E-01
Toxic/Hazardous Air Pollutant Emissions					
Acetaldehyde	HAP/TAP	5.37E-06	lb/hp-hr (4)	1.34E-03	3.36E-04
Acrolein	HAP/TAP	6.48E-07	lb/hp-hr (4)	1.62E-04	4.05E-05
Benzene	HAP/TAP	6.53E-06	lb/hp-hr (4)	1.63E-03	4.08E-04
Benzo(a)pyrene[6]	HAP/TAP	1.32E-09	lb/hp-hr (4)	3.29E-07	8.23E-08
1,3-Butadiene	HAP/TAP	2.74E-07	lb/hp-hr (4)	6.84E-05	1.71E-05
Formaldehyde	HAP/TAP	8.26E-06	lb/hp-hr (4)	2.07E-03	5.16E-04
Total PAH (POM)	HAP	1.18E-06	lb/hp-hr (4)	2.94E-04	7.35E-05
Toluene	HAP/TAP	2.86E-06	lb/hp-hr (4)	7.16E-04	1.79E-04
Xylene	HAP/TAP	2.00E-06	lb/hp-hr (4)	4.99E-04	1.25E-04
Highest HAP (Formaldehyde)		8.26E-06	lb/hp-hr (4)	2.07E-03	5.16E-04
Total HAPs				6.78E-03	1.69E-03

Note:

[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 and VOC.

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

TABLE B-14
GREEN WOOD HANDLING DROP POINT EXAMPLE EMISSIONS
ENVIVA PELLET SAMPSON, LLC

ID	Emission Source Group	Transfer Activity	Type of Operation	Number of Drop Points	PM Particle Size Multiplier (dimensionless)	PM_{10} Particle Size Multiplier (dimensionless)	$PM_{2.5}$ Particle Size Multiplier (dimensionless)	Mean Wind Speed (U) (mph)	Material Moisture Content (M)[1] (%)	PM Emission Factor[2] (lb/ton)	PM_{10} Emission Factor[2] (lb/ton)	$PM_{2.5}$ Emission Factor[3] (lb/ton)	Potential Throughput (tpy)	Potential PM Emissions (tpy)	Potential PM_{10} Emissions (tpy)	Potential $PM_{2.5}$ Emissions (tpy)
GDP1	ES-GWH	Purchased Bark Transfer to Outdoor Storage Area	Batch Drop	1	0.74	0.35	0.053	7.9	48%	4.97E-05	2.35E-05	3.56E-06	13,733	8.63E-05	4.08E-05	6.18E-06
GDP1	ES-GWH	Drop Points via Conveying from Bark Pile to Dryer	Batch Drop	4	0.74	0.35	0.053	7.9	42%	5.92E-05	2.80E-05	4.24E-06	13,733	4.11E-04	1.95E-04	2.95E-05
GDP2	ES-GWH	Transfer Purchased Wood Chips (Wet) to Outdoor Storage	Batch Drop	1	0.74	0.35	0.053	7.9	49%	4.78E-05	2.26E-05	3.42E-06	140,600	8.50E-04	4.02E-04	6.08E-05
GDP2	ES-GWH	Drop Points via Conveying from Chip Pile to Dryer	Batch Drop	5	0.74	0.35	0.053	6.0	41%	4.36E-05	2.06E-05	3.12E-06	530,451	1.46E-02	6.91E-03	1.05E-03
		Total Emissions												**1.60E-02**	**7.55E-03**	**1.14E-03**

1. Average moisture content for logs, bark, and wood chips (wet) based on material balance provided by design engineering firm (Mid-South Engineering).

2. Emission factor calculation based on formula from AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, Equation 13.2.1, (11/06)

where: E = emission factor (lb/ton)
k = particle size multiplier (dimensionless) for PM 0.74
k = particle size multiplier (dimensionless) for PM_{10} 0.35
k = particle size multiplier (dimensionless) for $PM_{2.5}$ 0.053
U = mean wind speed (mph) 7.9
M = material moisture content (%)

3. PM_{10} control efficiency of 74.7% applied for three-sided enclosed structure with 50% porosity per Sierra Research *"Final BACM Technological and Economic Feasibility Analysis"*, report prepared for the San Joaquin Valley Unified Air Pollution Control District (3/03). The control efficiency is assumed equivalent for PM_{10} and $PM_{2.5}$ emissions

4. These green wood handling emissions are representative of the fugitive emissions at the site. Note there may be multiple drop points for each type but as shown these emissions will be negligible

TABLE B-15
GREEN WOOD STORAGE PILES FUGITIVE EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Emission Unit ID	Description	TSP Emission Factor [1] (lb/day/acre)	TSP Emission Factor [1] (lb/hr/ft²)	VOC Emission Factor [3] (lb/day/acre)	VOC Emission Factor [3] (lb/hr/ft²)	Width (ft)	Length (ft)	Height (ft)	Outer Surface Area of Storage Pile (ft²)	PM Emissions (lb/hr)	PM Emissions (tpy)	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (lb/hr)	$PM_{2.5}$ Emissions (tpy)	VOC as Carbon Emissions (lb/hr)	VOC as Carbon Emissions (tpy)	VOC as alpha-Pinene Emissions [4] (lb/hr)	VOC as alpha-Pinene Emissions [4] (tpy)
GWSP1	Green Wood Pile No. 1	5.61	5.37E-06	3.60	3.44E-06	100	400	10	60,000	0.322	1.410	0.161	0.705	0.0242	0.106	0.21	0.90	0.24	1.03
GWSP2	Green Wood Pile No. 2	5.61	5.37E-06	3.60	3.44E-06	200	400	10	110,400	0.593	2.595	0.296	1.298	0.0444	0.195	0.38	1.67	0.43	1.90
Total										**0.915**	**4.006**	**0.457**	**2.003**	**0.0686**	**0.300**	**0.59**	**2.57**	**0.67**	**2.93**

1. TSP $E = 1.7\left(\frac{s}{1.5}\right)\left(\frac{(365-p)}{235}\right)\left(\frac{f}{15}\right)$ (lb / day /acre) *Fugitive Dust Sources*. Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988, Page 4-17.

where:

s, silt content of wood chips (%):	4.8	s - silt content(%) for lumber sawmills (minimum), from AP-42 Table 13.2.2-1
p, number of days with rainfall greater than 0.01 inch:	120	Based on AP-42, Section 13.2.2, Figure 13.2.1-2.
f (time that wind exceeds 5.36 m/s - 12 mph) (%):	14.8	Based on meteorological data averaged for 2007-2011 for Sampson, NC.
PM_{10}/TSP ratio:	50%	PM_{10} is assumed to equal 50% of TSP based on U.S. EPA *Control of Open Fugitive Dust Sources*, Research Triangle Park, North Carolina, EPA-450/3-88-008. September 1988.
$PM_{2.5}$/TSP ratio:	7.5%	$PM_{2.5}$ is assumed to equal 7.5 % of TSP U.S. EPA Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors. November 2006.

2. The surface area is calculated as [2*H*L+2*W*H+L*W] + 20% to consider the sloping pile edges. Length and width based on proposed site design with a conservative height.

3. Emission factors obtained from NCASI document provided by SC 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.

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 alpha-pinene by multiplying by 1.14.

TABLE B-16
TANKS EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Tank ID	Tank Description	Volume[1] (gal)	Tank Dimensions		Orientation	Throughput (gal/yr)	Turnovers	TANKS 4.0 VOC Emissions	
			Diameter (ft)	Height/Length (ft)				(lb/yr)	(tpy)
TK01	Emergency Generator Fuel Oil Tank[2]	2,500	6	12	Vertical	12,000	4.80	0.37	3.57E-03
TK02	Fire Water Pump Fuel Oil Tank[2]	1,000	5	9	Horizontal	10,300	10.30	0.86	4.30E-04
							TOTAL	**1.23**	**4.00E-03**

Note:

[1] Conservative design specifications.

[2] Throughput based on fuel consumption and 500 hours of operation per year.

TABLE B-17
PAVED ROAD POTENTIAL FUGITIVE PM EMISSIONS
ENVIVA PELLET SAMPSON, LLC

Transfer Activity	Distance Traveled per Round Trip[1] (ft)	Trips Per Day	Miles Traveled per Day)	Events Per Year (Days)	Truck Weight (Empty) lbs	Truck Weight (Loaded) lbs	Average Weight (W) (tons)	Vehicle Miles Traveled (VMT/yr)	Emission Factor[2] (lb/VMT) PM	PM_{10}	$PM_{2.5}$	Potential Emissions[3] PM (lb/hr)	(tpy)	Potential Emissions[3] PM_{10} (lb/hr)	(tpy)	Potential Emissions[3] $PM_{2.5}$ (lb/hr)	(tpy)
Logs Delivery to Crane	12,800	47	113.94	365	40480	102540	35.8	41,588	0.25	0.05	0.012	0.12	0.51	0.02	0.10	5.7E-03	2.5E-02
Logs Delivery to Log Storage Area	11,200	47	99.70	365	40480	102540	35.8	36,389	0.25	0.05	0.012	0.10	0.45	0.02	0.09	5.0E-03	2.2E-02
Chips Delivery	16,000	66	199.39	365	40960	101440	35.6	72,779	0.24	0.05	0.012	0.20	0.89	4.1E-02	1.8E-01	1.0E-02	4.4E-02
Hog Fuel Delivery	16,000	28	85.45	365	40960	101440	35.6	31,191	0.24	0.05	0.012	0.09	0.38	0.02	0.08	4.3E-03	1.9E-02
Pellet Delivery	3,200	66	39.92	365	40960	101440	35.6	14,570	0.24	0.05	0.012	0.04	0.18	0.01	0.04	2.0E-03	8.7E-03
Employee Car Parking	4,000	75	56.8	365	4000	4000	2.0	20,739	0.01	0.00	0.001	0.00	0.01	0.00	0.00	1.5E-04	6.6E-04
Total Paved Road Emissions												**0.55**	**2.42**	**0.11**	**0.48**	**0.03**	**0.12**

1. Distance traveled per round trip was estimated based on truck route and site layout.

2. Paved road emission factors based on emission estimation Equation 2 from AP-42, Section 13.2.1 (1/11) for paved roads.

Where:

$$E = \left[k(sL)^{0.91}(W)^{1.02}\right]\left[1-\frac{P}{4*365}\right] \quad \text{(lb/VMT)}$$

	TSP	PM_{10}	$PM_{2.5}$
E = particulate emission factor (lb/VMT)			
k - particle size multiplier from AP-42 Table 13.2.1-1	0.011	0.0022	0.00054
sL - road surface silt loading from AP-42 Table 13.2.1-2 for ADT <500	0.6		
W = mean vehicle weight (ton)			
P - No. days with rainfall greater than 0.01 inch, Per AP-42, Section 13.2.1, Figure 13.2.1-2 (Sampson County, NC).			110

	9.869E-07	1.974E-07	4.845E-08

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.

TABLE B-18
POTENTIAL GHG EMISSIONS FROM COMBUSTION SOURCES
ENVIVA PELLET SAMPSON, LLC

Potential GHG Emissions

Operating Data:

Dryer Heat Input	250.40 MMBtu/hr
Operating Schedule	8,760 hrs/yr
Emergency Generator Output	250 bhp
Operating Schedule	500 hrs/yr
No. 2 Fuel Input	11.9 gal/hr[1]
Energy Input	1.630 MMBtu/hr[2]
Fire Water Pump Output	250 bhp
Operating Schedule	500 hrs/yr
No. 2 Fuel Input	11.9 gal/hr[1]
Energy Input	1.630 MMBtu/hr[2]

Emission Unit ID	Fuel Type	Emission Factors from Table C-1 (kg/MMBtu)[3]			Emissions (tons)				
		CO2	CH4	N2O	CO2	CH4	N2O	Total CO2e	Total CO2e[5]
ES-DRYER	Wood and Wood Residuals	9.38E+01	7.20E-03	3.60E-03	226,798.97	17	9	229,828	3,064
ES-EG	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	66	2.70E-03	5.39E-04	67	67
ES-FWP	No. 2 Fuel Oil (Distillate)	7.40E+01	3.00E-03	6.00E-04	66	2.70E-03	5.39E-04	67	67

[1] Fuel consumption calculated using a factor of 0.0476 gal/hr-hp. Advanced Environmental Interface, Inc. (1998). General Permits for Emergency Engines. INSIGHTS, 98-2, 3.

[2] Energy calculated on a fuel consumption basis, using an energy factor of 0.137 MMBtu/gal.

[3] Emission factors from Table C-1 and C-2 of GHG Reporting Rule. Emission factors for methane and N2O already multiplied by their respective GWPs of 25 and 298.

[4] As per NC DAQ Biomass Deferral Rule 15A NCAC 02D .0544, CO2 emissions from bioenergy and other biogeneic sources are not applicable towards PSD and Title V permitting.

[5] CO_{2e} reflects the biomass defferral which does not add in CO_2 from biomass combustion.

APPENDIX C
ZONING CONSISTENCY

APPENDIX C - LOCAL ZONING CONSISTENCY DETERMINATION

Zoning Consistency Determination

Facility Name	Enviva Pellets Sampson, LLC
Facility Street Address	US Highway 117 (Street Number TBD)
Facility City	Faison
Description of Process	Wood pellet manufacturing facility
SIC Code/NAICS	SIC – 2499 ; NAICS - 321999
Facility Contact	Joe Harrell
Phone Number	(252) 209-6032
Mailing Address	142 NC Route 561 East
Mailing City, State Zip	Ahoskie, NC 27910

Based on the information given above:

☑ I have received a copy of the air permit application (draft or final) AND...

☐ There are no applicable zoning and subdivision ordinances for this facility at this time

☐ The proposed operation IS consistent with applicable zoning and subdivision ordinances

☐ The proposed operation IS NOT consistent with applicable zoning and subdivision ordinances (please include a copy of the rules in the package sent to the air quality office)

☐ The determination is pending further information and can not be made at this time

☐ Other: _____

Agency	Clinton-Sampson Planning Dept.
Name of Designated Official	Mary M. Rose
Title of Designated Official	Planning Director
Signature	Mary M. Rose
Date	9-9-13

Please forward to the mailing address listed above and the air quality office at the appropriate address as checked on the back of this form.

Courtesy of the Small Business Assistance Program
toll free at 1-877-623-6748 or on the web at www.envhelp.org/sb

All PSD and Title V Applications

X Attn: Dr. Donald van der Vaart, PE
DAQ – Permitting Section
1641 Mail Service Center
Raleigh, NC 27699-1641

Local Programs

☐ Attn: David Brigman
Western NC Regional Air Quality Agency
49 Mount Carmel Road
Asheville, NC 28806
(828) 250-6777

☐ Attn: Donald R. Willard
Mecklenburg County Air Quality
700 N. Tryon Street, Suite 205
Charlotte, NC 28202-2236
(704) 336-5500

☐ Attn: Robert R. Fulp
Forsyth County
Environmental Affairs Department
537 N. Spruce Street
Winston-Salem, NC 27101-1362
(336) 703-2440

Division of Air Quality Regional Offices

☐ Attn: Paul Muller
Asheville Regional Office
2090 U.S. Highway 70
Swannanoa, NC 28778
(828) 296-4500

☐ Attn: Steven Vozzo
Fayetteville Regional Office
225 Green Street Suite 714
Fayetteville, NC 28301
(910) 433-3300

☐ Attn: Ron Slack
Mooresville Regional Office
610 East Center Avenue, Suite 301
Mooresville, NC 28115
(704) 663-1699

☐ Attn: Patrick Butler, PE
Raleigh Regional Office
1628 Mail Service Center
Raleigh, NC 27699-1628
(919) 791-4200

☐ Attn: Robert Fisher
Washington Regional Office
943 Washington Square Mall
Washington, NC 27889
(252) 946-6481

☐ Attn: Wayne Cook
Wilmington Regional Office
127 Cardinal Drive Extension
Wilmington, NC 28405
(910) 796-7215

☐ Attn: Margaret Love, PE
Winston-Salem Regional Office
585 Waughtown Street
Winston-Salem, NC 27107
(336) 771-5000

APPENDIX D
BACT TABLES

APPENDIX D - BACT TABLES

TABLE D-1
REGENERATIVE SELECTIVE CATALYTIC REDUCTION COST ANALYSIS
ENVIVA PELLET SAMPSON, LLC

Capital Cost		Notes	References
Direct Capital Costs			
Total Equipment Cost + Freight	$4,312,654		2(a), 8
Sales Taxes	$129,380	0.03 EC	3(a)
Total Direct Capital Costs	$4,442,033	A	
Indirect Installation Costs			
General Facilities	$222,102	0.05A	1(a)
Engineering and Home Office Fees	$444,203	0.10A	1(a)
Process Contingencies	$222,102	0.05A	1(a)
Start-Up	$88,841	0.02A	6
Performance Testing	$44,420	0.01A	6
Total Indirect Installation Costs	$1,021,668	B	1(a)
Project Contingency	$819,555	C = 0.15 × (A + B)	1(a)
Total Plant Cost	$6,283,256	D = A + B + C	1(a)
Other Costs			
Preproduction Costs	$125,665	E = 0.02 × (D)	1(a)
Inventory Capital*	$5,368	$F=Vol_{reag}(gal)*Cost_{reag}(\$/gal)$	1(a), 2 (d)
Initial Catalyst and Chemicals	0	G	1(a)
Total Capital Investment	**$6,414,289**	**TCI = D + E + F + G**	1(a)
Operating Cost			
Operation and Maintenance Costs			
Operating and Maintenance Cost	$96,214	0.015TCI	1(b)
Total	$96,214		
Reagent Costs (19% Aqueous Ammonia)			
Reagent Consumption	15.54	gal/hr	2(c), 2(d), 10
Unit cost	1.50	$/gal	2(d)
Total	$204,169		
Electricity			
Combustion Air Fan	21.15	HP	2(a), 9
Hydraulic Power unit	3.44	HP	2(a), 10
Ammonia Pumps	0.26	HP	2(a), 10
Misc./Instruments, Hydraulic Heaters	5.29	KW	2(a), 10
Fan Power to Overcome Catalyst Pressure	610	HP (14 iwc), Assumed 65% Efficiency	2(c), 5(a)
Total Power Requirement	479	KW	7
Unit cost	$0.070	$/kW-hr	4(b)
Total	$293,522		
Fuel			
Natural Gas or fuel	0.68	MMBTU/hr	2(a), 9
Cost	$6.88	$/1000 ft^3	7
Conversion	1020	Btu/ft^3	
Total	$40,368		

Compressed Air			
Requirement	20.90	SCFM	2(a), 10
Cost	$0.31	$/1000 ft^3 air	4(a)
Total	$3,406		
Catalyst Costs			
Catalyst Cost (Present Value)	$502,595		2(b), 9
Catalyst Life	2.00		2(b)
Catalyst Cost (Future Value)	$538,280	F/P, 3.5%, 2 years	
Catalyst Cost (Annualized) Total	$256,329	A/F, 10%, 2 years	
Total Direct Annual Costs	*$894,008*	*DAC*	
Indirect Annual Costs			
Administrative Charges	$128,286	2% of TCI	1(c)
Property tax	$64,143	1% of TCI	!(c)
Insurance	$64,143	1% of TCI	1(c)
Annual Interest Rate	10%		
Economic life of RSCR	20		
Capital Recovery Factor	0.117		
Total Capital Recovery Cost	$753,420		
Total Indirect Annual Costs	$1,009,992		
Total Annual Cost	**$1,904,000**	*TAC = DAC + IDAC*	

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)* , October 2000, Section 4.2, Chapter 2.
   [a] Table 2.5: Capital Cost Factors for an SCR Application (OAQPS 2-44)
   [b] Equation 2.46 for maintenance (OAQPS 2-45)
   [c] Taxes, Insurance, Admin applies (OAQPS 2-48)
2. Hertford Renewable Energy PSD Application (Hertford, North Carolina). Submitted 2008, Approved 2009.
   a RSCR Price/Quote of $6,226,436 scaled from Hertford August 2008 Permit Application
   b Hertford Application detailing catalyst costs and life
   c Ammonia consumption of 58.72 gal/hr and 14 iwc for pressure drop across catalyst
   d Volume of initial ammonia fill, price per gallon, and density of ammonia (7.83 lb/gal) $1.50/gallon for ammonia provided from vendor.
3. U.S. EPA and Office of Air Quality Planning and Standards (OAQPS), EPA Air Pollution Control Cost Manual, 6th Ed. (EPA 452/B-02-001), Research Triangle Park, NC, Jan 2002. *Section 1, Chapter 2, Cost Estimation: Concepts and Methodology*
   a Table 2.4: Cost Ranges for Freight, Sales Tax, and Instrumentation; no sales tax and low end of range for freight (OAQPS 2-27)
4. Taken from *Methodology for Estimating Control Costs for Industrial, Commercial, Institutional Boilers and Process Heaters Nation Emissions Standards for Hazardous Air Pollutants* – Major Source ERG Memo April 2010.
   a Electricity and Compressed Air Cost from Memo
5. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)* , July 2002, Section 6, Chapter 2.
   a Equation 2.40 for fan HP (OAQPS 2-42)
6. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)* , September 2000, Section 3, Chapter 2. Table 2.8: Capital Cost Factors for Thermal and Catalytic Incinerators (OAQPS 2-42) were used because factors were not in SCR section
7. Energy Information Administration highest price for industrial natural gas between November 09 through April 10. http://www.eia.gov/dnav/ng/ng_pri_sun
8. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 ($C1*(S2/S1)^{0.6}$) where S1 is Hertford Biomass Boiler (Wood Chips) flow rate of 331,969 acfm from Hertford August 2008 Application and S2 is Enviva dryer flow rate of 180,000 ACFM.
9. Scaled Direct Annual Costs linearly based on Hertford flow rate of 331,969 ACFM and Enviva flow rate of
   The resulting Qnew/Qinitial = 0.542
10. Scaled Hertford August 2008 reagent consumption, electricity, and compressed air based on NOx emissions reduction at 715.2 MMBTU/hr versus the Enviva basis of 220 MMBtu/hr. Hertford Application specified NOx reduction from 0.25 lb/MMBTU to 0.075 lb/MMBTU with heat input of 715.2 MMBTU/hr or 125.1 lb/hr reduction. Enviva is assuming reduction from 0.228 lb/MMBtu to 0.077 lb/MMBtu or lb/hr reduction of = 33.1
    Thus, multiply Hertford cost by 23.1/125.1 = 0.265

TABLE D-2
CONVENTIONAL SELECTIVE CATALYTIC REDUCTION COST ANALYSIS
ENVIVA PELLET SAMPSON, LLC

Capital Cost	Boiler	OAQPS Notation[1]
Purchased Equipment Costs		
Total Equipment Cost[2,3]	3,843,236	A
Instrumentation[4]	384,324	0.10 × A
Sales Tax[4]	115,297	0.03 × A
Freight[4]	192,162	0.05 × A
Total Purchased Equipment Costs	*4,535,018*	*B = 1.18 × A*
Direct Installation Costs[6]		
Foundations and Supports	453,502	0.10 × B
Handling and Erection	1,814,007	0.40 × B
Electrical	181,401	0.04 × B
Piping	90,700	0.02 × B
Insulation	45,350	0.01 × B
Painting	45,350	0.01 × B
Site Preparation (Site Specific)	272,101	0.06 × B
Total Direct Installation Costs	*2,902,412*	*C = 0.64 × B*
Indirect Installation Costs		
General Facilities[6]	1,487,486	0.20 × (B + C)
Engineering and Home Office Fees	743,743	0.10 × (B + C)
Process Contingencies	371,872	0.05 × (B + C)
Construction Management[6]	1,115,615	0.15 × (B + C)
Owner's Cost[6]	371,872	0.05 × (B + C)
Total Indirect Installation Costs	*4,090,587*	*D = 0.55 × (B + C)*
Project Contingency[6]	2,305,603	E = 0.20 × (B + C + D)
Total Plant Cost	13,833,620	F = B + C + D + E
Allowance for Funds During Construction[5]	968,353	G = 0.07 × F
Royalty Allowance	0	H
Preproduction Costs	296,039	I = 0.02 × (F + G)
Inventory Capital[7,3]	4,753	J
Initial Catalyst and Chemicals	0	K
Total Capital Investment	**15,102,766**	**TCI = F + G + H + I + J + K**

Operating Cost	Boiler	OAQPS Notation
Direct Annual Costs		
Operating and Supervisory Labor	64,549	L
Maintenance Cost	226,541	M = 0.015 × TCI
Reagent Consumption[10]	70,334	N
Electricity[10]	143,627	O
Catalyst Replacement[8, 10]	222,703	P
Catalyst Regeneration[6, 10]	107,719	Q
Total Direct Annual Costs	*835,474*	*DAC = L + M + N + O + P + Q*

Indirect Annual Costs		
Overhead, Taxes, Insurance, Administration	604,111	R
Annual Interest Rate	10%	
Economic life of "Hot" SCR	20	
Capital Recovery[9]	1,773,965	S
Total Indirect Annual Costs	*2,378,096*	*IDAC = R + S*
Total Annual Cost	**3,213,570**	*TAC = DAC + IDAC*

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, January 2002, Section 4.2, Chapter 2. Adjustments to lettering made as PEC and direct installation costs were broken out for this analysis.

2. Direct Capital Costs are based on an Oglethorpe Power Corporation (Baxley, Georgia) PSD Application Submitted 2009, which includes High Dust SCR, Ammonia Unloading and Storage, ID Fans, Flue Gas Handling System, Ash Handling System, and Extra Charge of Catalyst.

3. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 (C1*(S2/S1) 0.6) where S1 is Olgethorpe Biomass Boiler (Wood Chips) Capacity of 1,282 MMBtu/hr, S2 is Enviva dryer heat input of 220 MMBtu/hr, and C1 is $10,238,805.

4. Based on general OAQPS costs as presented on page 2-27 of Section 1, Chapter 2 of OAQPS Manual.

5. Estimates based on engineering knowledge and evaluation of costs for other equipment as specified in OAQPS Manual.

6. Costs were not included in OAQPS calculation or underestimated by OAQPS based on vendor data and experience. Costs have been included or adjusted.

7. Inventory capital is the cost to fill the reagent tank(s) for the first time, OAQPS Manual, Section 4.2, Chapter 2, page 2-44.

8. Catalyst replacement is calculated based on Future Worth Factor in Equations 2.51 and 2.52 of OAQPS Manual, Section 4.2, Chapter 2, page 2-47.

9. Capital Recovery calculated based on Equations 2.54 and 2.55 of OAQPS Manual, Section 4.2, Chapter 2, pages 2-48 and 2-49.

10. Scaled Olgethorpe reagent consumption, electricity, and catalyst based on NOx emissions reduction at 1282 MMBTU/hr versus the Enviva basis of 220 MMBtu/hr. Oglethorpe Application specified NOx reduction from 0.18 lb/MMBTU to 0.07 lb/MMBTU with heat input of 1,282 MMBTU/hr or 140.9 lb/hr reduction. Enviva is assuming reduction from 0.228 lb/MMBtu to 0.077 lb/MMBtu or lb/hr reduction =

33.10 lbs/hr Thus, multiply Olgethorpe cost by the ratio of NOx reduction = 0.235

TABLE D-3
SELECTIVE NON-CATALYTIC REACTOR COST ANALYSIS
ENVIVA PELLET SAMPSON, LLC

Cost Item		Notes	Reference
Direct Capital Costs			
Installed Capital Cost	$207,791		2(a), 4
Total Capital Investment	**$207,791**		
Operating Cost			
Direct Annual Costs			
Capacity Factor For Direct Annual Costs	100.0%		3(a)
Operation and Maintenance Costs	$25,000		2(c)
Reagent Costs (50% Urea Solution)			
Reagent Consumption	6.16	gph	2(d), 5
Reagent Cost	$2.00	($/gal)	2(d)
Total	$107,950		
Compressed Air			
Compressed Air	31	scfm	2(e), 5
Air Price	$0.15	$/1000 ft^3 air	
Total	$2,459		
Water Consumption			
Water	122	gph	2(f), 5
Water Price	$1.65	$/1000 gallons	3(b)
Total	$1,765		
Electricity			
Power	2.19	kW	3(c), 5
Unit Cost	$0.070	$/kWh	
Total	$1,342		
Total Direct Annual Costs	*$138,516*		
Indirect Annual Costs			
Administrative Charges	$4,156	2% of TCI	
Property tax	$2,078	1% of TCI	
Insurance	$2,078	1% of TCI	
Annual Interest Rate	10%		
Economic life of SNCR	15		
Capital Recovery Factor	0.131		1(b)
Total Capital Recovery Cost	$27,319		
Total Indirect Annual Costs	$35,631		
Total Annual Cost	**$174,147**		

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, March 2003, Section 4.2, Chapter 2.

[a] No taxes, Insurance, Admin applies (OAQPS 1-37)

[b] Equation 1.34 for CFI (OAQPS 1-38)

2. Verbal quote provided by Chris Culpepper for Factory sales on 3-27-2012 for Capital cost. Other costs provided from Hertford Renewable Energy PSD Application (Hertford, North Carolina). Submitted 2008, Approved 2009.

a Cost of SNCR System $300,000

b BOP Interface Design Engineering and Erection - Assumes Install = 1.25 x Mat'l & Engineering

c Estimated Value, Parts and Labor

d Reagent Consumption (gph) and Cost ($/gal) from vendor-90% Capacity

e Plant air + instrument air, based on $0.15 per 1000 cubic feet of air

f Assumes 1 gpm per injector total flow and $2.50 per 1000 gallons filtered water

3 Sources as follows:

a Capacity factor calculated as 8760 times the average hourly annual throughput divided by maximum hourly throughput (71.71 ODT/hr / 71.71 ODT/hr)

b Base water price from Hertford Renewable Energy PSD Application (Hertford, North Carolina). Submitted 2008, Approved 2009.

c Base electricity price from Hertford Renewable Energy PSD Application (Hertford, North Carolina). Submitted 2008, Approved 2009.

4. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 $(C1*(S2/S1)^{0.6})$ where S1 is
Hertford Biomass Boiler (Wood Chips) flow rate of 331,969 ACFM and S2 is the flow rate of 180000 ACFM 0.542

5. Scaled original quoted reagent consumption based on the Herford NOx emissions reduction at 762.5 MMBTU/hr versus the Enviva dryer heat input rating of
175 MMBtu/hr. Herford had a reduction from a NOx reduction from 0.30 lb/MMBTU to 0.15 lb/MMBTU at 762.5 MMBTU/hr or
114.4 lb/hr reduction. The dryer will have a NOx reduction of 0.22 lb/mmBtu to 0.114 lb/mmBtu or 12.52 lbs/hr reduction.
Thus, multiply the Hertford quote by 12.52/114.4, which is equal to 0.109
Electricity, Water, and Compressed air were also scaled accordingly

TABLE D-4
NOx BACT IMPACTS SUMMARY
ENVIVA PELLET SAMPSON, LLC

Control Options (lb/MMBTU)	Baseline Emissions (tons/yr)	Control Efficiency	Emissions Reduction (tons/year)	Economic Impacts			Energy Impacts	Environmental Impacts
				Total Capital Cost ($)	Annual Cost ($/year)	Cost Effectiveness ($/ton)	Increase Over Baseline (kW*hr/yr)	Adverse Environmental Impacts? (Yes/No)
0.068 (RSCR)	219.35	66.1%	145.0	$6,414,289	$1,904,000	$13,132	4.19E+06	No
0.068 (HD SCR)	219.35	66.1%	145.0	$15,102,766	$3,213,570	$22,164	2.51E+07	No
0.150 (SNCR)	219.35	25.0%	54.8	$207,791	$174,147	$3,176	1.92E+04	No
0.200 (Baseline)	219.35	N/A	N/A	N/A	N/A	N/A	N/A	No

TABLE D-5
WET ESP ECONOMICS IMPACTS EVALUATION
ENVIVA PELLET SAMPSON, LLC

Capital Cost		Notes	Ref.
Total Capital Investment			
Direct Costs			
Purchased Equipment Costs			
WESP	$3,126,634	A	1, 11
Freight Estimate	$113,696		1(a), 11
Instrumentation	$312,663	0.10A	2
Sales Tax	$93,799	0.03A	2
Purchased Equipment Cost, PEC	**$3,646,793**	B	
Direct Installation Costs			
Foundations and Support	$145,872	0.04B	2
Handling & Erection	$1,823,396	0.50B	2
Electrical	$291,743	0.08B	2
Piping	$36,468	0.01B	2
Insulation for ductwork	$72,936	0.02B	2
Painting	$72,936	0.02B	2
Total	**$2,443,351**		
Total Direct Costs, DC	**$6,090,143**	*DC = B + 0.67 * B*	
Indirect Costs (Installation)			
Engineering	$729,359	0.20B	2
Construction and field expenses	$729,359	0.20B	2
Contractor Fees	$364,679	0.10B	2
Start-up	$36,468	0.01B	2
Performance test	$36,468	0.01B	2
Model study	$72,936	0.02B	2
Contingencies	$109,404	0.03B	2
Total Indirect Costs, IC	**$2,078,672**	*IC = 0.57 * B*	
Total Capital Investment	**$8,168,815**	**TCI = DC + IC**	
Operating Cost			
Direct Annual Costs			
Operating Labor			
Operator	$56,130	3 hr/d * d/y * $51.26/hr	3(a), 5
Supervisor	$8,419	15% of operator	3(b)
Coordinator	$18,710	1/3 of operator	3(c)
Total	**$83,259**		
Maintenance			
Labor	$2,512	0.825*ESP Plate Area (ft^2)	4, 11
Material	$36,468		3(d)
Total	**$38,980**		
Electricity Costs			
Requirement	228	kw/HR	6(a), 9, 11
Unit cost	$0.070	$/kW-hr	9
Total	**$140,114**		
Water Costs			
Wastewater Disposal	$1,703		6(b), 7
Municipal Water Usage	$284		6(b), 8
	$1,987		
Total Direct Annual Costs	***$264,340***		

Indirect Annual Costs			
Overhead	$73,344	60% * (operating labor + maintenance)	3(e)
Administrative Charges	$163,376	2% of TCI	3(e)
Property tax	$81,688	1% of TCI	3(e)
Insurance	$81,688	1% of TCI	3(e)
Annual Interest Rate	10.0%		10
Economic life of ESP	15		10
Capital Recovery Factor	0.131		10
Total Capital Recovery Cost	$1,073,985		10
Total Indirect Annual Costs	***$1,474,081***		
Total Annual Cost	**$1,738,421**	*TAC = DAC + IDAC*	

1. Quote of $3,300,000 provided by TurboSonic (6/22/2010) for a 130 MMBtu/hr Wood-fired Boiler achieving similar performance levels.
   a Email from Rod Pennington (TurboSonic) to Joe Sullivan (Trinity) June 26, 2010 that stated additional freight costs no included. Freight cost $215,000.
2. Direct and Indirect capital costs associated with the purchase of the ESP determined in accordance with EPA OAQPS APCCM Sec.6, Ch.3, Table 3.16
3. EPA OAQPS APCCM Sec.6, Ch.3, Table 3.21
   (a) Operator costs calculated @ 3 hr per day and 2200 days of operation
   (b) Supervisor labor costs calculated @ 15% of operator cost as per APCCM guidance
   (c) Coordinator costs calculated @ 1/3 of operator costs as per APCCM guidance
   (d) Maintenance material(s) calculated @ 1% of purchased equipment cost as per APCCM guidance
   (e) Indirect annual costs calculated in accordance with APCCM guidance
4. EPA OAQPS APCCM Sec.6, Ch.3, Equation 3.45 for Maintenance Materials
5. US Dept. of Labor - Bureau of Labor Statistics - $51.26/hr (Stationary Engineers and Boiler Operators, 2008 dollars)
6. Provided by TurboSonic, ESP supplier/vendor
   (a) Electrical power requirements
   (b) Wastewater blowdown rate (0.6 gallons / minute); assumes water usage (blowdown rate + 50% sump vol)
7. Waste water disposal cost - $0.0054/gal - provided by Air Compliance Advisor User Guide - Version 7.5
8. Municipal water usage cost - $0.0006 /gal - provided by Electric Power Research Institute
9. Electricity unit cost provided by the Energy Information Administration
10. Capital recovery calculated assuming 15 years of equipment life @ a recovery rate of 10%
    Capital Recovery Factor (CRF)
    = (IR*(1+IR)^n)/((1+IR)^n - 1)
11. Scale-up capital cost factor from Ulrich, Gael D. Chemical Engineering Process Design and Economics, 2004 $(C1*(S2/S1)^{0.6})$ where S1 is basis flow rate of 196,940 ACFM from a NC wood products facility and S2 is Enviva dryer flow rate of 215,000 ACFM.
    0.91

TABLE D-6
PM BACT IMPACTS SUMMARY FOR ROTARY DRYER
ENVIVA PELLET SAMPSON, LLC

Control Options (lb/ODT)	Baseline Emissions (tons/yr)	Control Efficiency	Emissions Reduction (tons/year)	Economic Impacts			Energy Impacts	Environmental Impacts
				Total Capital Cost ($)	Annual Cost ($/year)	Cost Effectiveness ($/ton)	Increase Over Baseline (kW*hr/yr)	Adverse Environmental Impacts? (Yes/No)
0.105 (WESP)	562.29	95%	534.2	$8,168,815	$1,738,421	$3,254	2.00E+06	No
2.092 (Baseline, Cyclone)	562.29	N/A	N/A	N/A	N/A	N/A	N/A	No

[1] Filterable reduction of PM to 0.105 lb/ODT equates to a limit of 0.03 lb/MMBtu filterable PM. Condensible portion is 0.017 lb/MMBtu as shown in the emission calculations.