



ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Air Protection Branch

4244 International Parkway
Suite 120
Atlanta, Georgia 30354
404-363-7000

NARRATIVE

TO: Jeng-Hon Su
FROM: Nada Osman
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Facility Name: **Profile Products LLC**
AIRS No.: 159-00017
Location: Monticello, GA (Jasper County)
Application #: 28288
Date of Application: February 2nd, 2022

Background Information

Profile Products LLC (hereinafter, “facility”) is a proposed manufacturer of erosion and sediment control products, to be located at 791 Georgia-Pacific Road in Monticello, Georgia. The facility will be located in Jasper County, which is an attainment area for all criteria air pollutants. Equipment at the facility will include a wood fiber refining and drying process (ID No. ES-01) and its associated dual cyclone system (ID No. CD-01), a natural gas-fired boiler (ID No. ES-02), and a fiber bagging process (ID No. ES-03) and its associated quad-cyclone system (ID No. CD-03).

The manufacturing process begins with wood chips being shipped to the facility, where they will undergo an initial size screening. Any oversized chips will be ground and screened again before being stockpiled onto a concrete pad. The chips will then be conveyed to the refiner/dryer (ID No. ES-01); the refiner will refine the chips down to the appropriate size before they are blown into the dryer and exit into the dual cyclone system (ID No. CD-01) before being bagged for shipping. Emissions from the bagging process (ID No. ES-03) will be controlled by a quad-cyclone system (ID No. CD-03).

Facility-wide potential uncontrolled emissions of volatile organic compounds (VOC), particulate matter (PM), and single hazardous air pollutants (HAP) each exceed their respective Title V major source thresholds. To keep facility-wide VOC and PM emissions below 100 tons per year (tpy), each, the facility will operate with an emission limit of 98 tpy for VOC and will use cyclone systems to control PM emissions. Additionally, the facility will also be subject to a HAP synthetic minor limit. Therefore, the facility is considered a synthetic minor source.

Purpose of Application

On January 2nd, 2022, the facility submitted Application No. 28288 for the construction and operation of the new facility. A Public Advisory was issued for this application on February 16th, 2022.

Updated Equipment List**Table 1: Emission Units**

Emission Units			Associated Control Devices	
Source Code	Description	Installation Date	Source Code	Description
ES-01	Wood Fiber Drying/Refining (with a 35 MMBtu/hr burner)	2022	CD-01	Dual-Cyclone System
ES-03	Bagging Operation	2022	CD-03	Quad-Cyclone System

Table 2: Fuel Burning Equipment

Source Code	Input Heat Capacity (MMBtu/hr)	Description	Installation Date	Construction Date	Control Device	Description
ES-02	16.74	Boiler	03/22	01/22	--	--

Emissions Summary**Wood Drying Process (ID Nos. ES-01 and CD-01)**

The facility is expected to process a combination of hardwood and softwood at a proportion of approximately 2/3 hardwood and 1/3 softwood, with a combined design capacity of 40 tons per hour (tph). However, for the most conservative results, potential emissions were calculated assuming that the facility processes only softwood, which produces more VOC and HAP emissions than hardwood (note that the potential emissions calculations for the drying process in the application have been revised accordingly). The resulting facility-wide potential-to-emit (PTE) for VOC is well over 100 tpy; therefore, the facility will operate with a VOC limit of 98 tpy for Title V avoidance and will be required to track monthly emissions in order to demonstrate compliance. This limit accounts for less than 2 tpy of VOC emissions from combustion, which the facility will not be required to track.

Additionally, assuming the facility only processes softwood, potential methanol emissions from drying exceed 10 tpy, thereby exceeding the Title V major source threshold for single HAP emissions. Potential combined HAP emissions may also exceed the 25-tpy major source threshold if the facility were to process more than 40 tph of softwood. As a result, the facility will be subject to synthetic minor limits for single and combined HAP and will be required to track monthly HAP emissions in order to demonstrate compliance. It is assumed that hardwood drying produces no HAP emissions, so the facility will only be required to track HAP emissions from softwood drying.

PM emissions from wood product exiting the drying/refining process (ID No. ES-01) will be controlled by the dual cyclone system (ID No. CD-01). Manufacturer specifications indicate that the cyclones operate with a PM₁₀ collection efficiency rate of 95%; although most of the material processed by the cyclones will be larger than PM₁₀, calculations were done assuming all material will be PM₁₀, for conservative results.

Emission factors for wood drying were taken from values developed for other Profile Products facilities, based on the North Carolina Environmental Quality Emission Estimation Spreadsheet for Lumber Kilns (2007). Emission calculations for wood drying were based on a maximum throughput rate of 40 tons per hour (tph) of softwood and 8,760 hours per year of operation.

Table 3: Emission Factors for Wood Drying

Emission Factor	VOC (softwood)	VOC (hardwood)	PM	Acetaldehyde	Formaldehyde	Methanol
Lb/1000 BF	4.34	0.434	0.4	0.052	0.103	0.161
Lb/ton wood*	1.55	0.155	0.143	0.019	0.0368	0.0575

*Derived assuming 5.6 lbs wood/BF

Table 4: Key Potential Emissions from Wood Drying

Emissions	VOC (softwood)	VOC (hardwood)	PM		Acetaldehyde	Formaldehyde	Methanol
			Uncontrolled	Controlled			
Lb/hr	62.00	--	5.72	0.29	0.76	1.47	2.30
Lb/yr	543,120	--	50,107	2,505	6,657	12,895	20,148
Ton/yr	271.56	--	25.05	1.25	3.33	6.45	10.07

Fiber Bagging Process (ID No. ES-03)

The fiber bagging process (ID No. ES-03) only produces particulate matter emissions and will be controlled by the quad cyclone system (ID No. CD-03). The cyclone system is assumed to have a PM₁₀ control efficiency of 85%. Potential PM emissions were calculated based on a maximum throughput rate of 16 tph and 8,760 hours per year of operation. All material processed by the cyclones was assumed to be PM₁₀.

Uncontrolled PM emissions from the drying process (ID No. ES-01) and the fiber bagging process (ID No. ES-03), combined, exceed 100 tpy. The facility will be required to operate the cyclone systems at all times while their associated emissions units are in operation, in order to keep PM emissions under the Title V limit. An uncontrolled PM emission factor of 1.71 lb/ton of material bagged was used for uncontrolled emissions calculations, developed based on a stack test performed at a separate Profile Products facility with an identical bagging process.

Table 5: Potential PM Emissions from Fiber Bagging Process

Uncontrolled Emissions		Controlled Emissions	
Lb/hr	27.36	Lb/hr	4.10
Lb/yr	239,674	Lb/yr	35,951
Tons/yr	119.8	Tons/yr	17.97

Combustion (ID Nos. ES-01 and ES-02)

The wood dryer (ID No. ES-01) and the boiler (ID No. ES-02) fire only natural gas. Combined VOC emissions from combustion from both units is less than 2 tpy; in order to avoid requiring the facility to track emissions from combustion to demonstrate compliance with the facility-wide VOC limit, the limit was set at 98 tpy.

Table 6: Facility-wide Potential Emissions (tpy)

Pollutant	Pre-Control Emissions	After-Control Emissions
PM/PM ₁₀ /PM _{2.5}	146.6	20.9
NO _x	22.2	22.2
SO ₂	0.1	0.1
CO	18.7	18.7
VOC	272.8	< 98
Max. Individual HAP	10.1	< 10
Total HAP	21.4	< 25
Total GHG (if applicable)	26,500	26,500

Regulatory Applicability

40 CFR 60, Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

Because it produces steam and has a heat input capacity between 10 MMBtu/hr and 100 MMBtu/hr, Boiler ES-02 is subject to 40 CFR 60 Subpart Dc. Because it combusts natural gas only, the boiler is not subject to any testing requirements or any emissions standards, but the facility must keep records of the amount of natural gas combusted by the boiler each month and must submit notification of startup of the boiler to the Division.

The wood dryer (ID No. ES-01) does not produce steam, and therefore does not meet the definition of a “steam-generating unit” as defined by 40 CFR 60.41c. Therefore, the wood dryer is not subject to Subpart Dc.

40 CFR 63, Subpart JJJJJ – NESHAP for Industrial, Commercial, and Institutional Boilers for Area Sources

Because the facility is an area source of HAP emissions, Boiler ES-02 is potentially subject to 40 CFR 63 Subpart 6J. However, because it will combust only natural gas, Boiler ES-02 meets the definition of a “gas-fired boiler” as defined by 40 CFR 63.11237, which are not subject to Subpart 6J.

The wood dryer (ID No. ES-01) does not meet the definition of a “boiler” as defined by 40 CFR 63.11237 and is therefore not subject to Subpart 6J.

Georgia Rule 391-3-1-.02(2)(b), Visible Emissions

Georgia Rule (b) limits the visible emissions from all manufacturing processes not to exceed 40% opacity. PM emissions from the refining and drying process (ID No. ES-01) and the fiber bagging process (ID No. ES-03) are controlled by a dual cyclone system (ID No. CD-01) and a quad-cyclone system (ID No. CD-03), respectively. Therefore, visible emissions are expected to comply with Georgia Rule (b).

Georgia Rule 391-3-1-.02(2)(d), Fuel-Burning Equipment

Georgia Rule (d) limits the emission of fly ash and other particulate matter from fuel burning equipment. The definition of “fuel-burning equipment” as defined in 391-3-1-.01(cc) includes equipment that “furnishes process heat indirectly, through transfer by fluids or transmissions through process vessel walls.” Boilers meet this definition by default by transferring heat through the vessel walls. Since Boiler ES-02 will only burn natural gas, it is always expected to comply with the rate and opacity limits of Georgia Rule (d).

Dryer ES-01 provides heat to the drying process directly from combustion, and therefore does not meet the definition above. Therefore, the dryer is not subject to Georgia Rule (d).

Georgia Rule 391-3-1-.02(2)(e), Particulate Matter Emissions from Manufacturing Processes

Georgia Rule (e) limits particulate matter emissions based on process input weight rate. Because PM emissions from the manufacturing process are controlled by the dual cyclone (ID No. CD-01) and the quad-cyclone (ID No. CD-03), PM emissions are expected to comply with Georgia Rule (e) limits.

Georgia Rule 391-3-1-.02(2)(lll), NOx Emissions from Fuel Burning Equipment

Because it has a heat input capacity between 10 and 250 MMBtu/hr, will be installed after May 1st, 1999, and is located in one of the counties listed in GA Rule (lll), Boiler ES-02 is subject to the NOx limit of Georgia Rule (lll). The boiler is equipped with a low NOx burner that produces less than 30 ppm of NOx; additionally, the facility must perform an annual tune-up of the boiler in order to monitor NOx emissions and demonstrate compliance with the 30 ppm NOx limit.

Permit Conditions

Condition 2.1 limits VOC emissions from the facility to 98 tpy for Title V avoidance. VOC emissions from fuel combustion in the dryer (ID No. ES-01) and boiler (ID No. ES-02) are less than 2 tpy; to avoid requiring the facility to track combustion emissions, the facility-wide limit was set at 98 tpy.

Condition 2.2 limits single and combined HAP emissions from the facility to 10 and 25 tpy, respectively. This is a Title V avoidance limit for HAP emissions.

Condition 2.3 requires the facility to always operate the two cyclone systems (ID Nos. CD-01 and CD-03) while their associated emission units/processes are in operation, to keep facility-wide PM emissions below 100 tpy.

Condition 2.4 subjects Boiler ES-02 to 40 CFR 60 Subpart A and Subpart Dc.

Condition 2.5a. limits Boiler ES-02 to firing only natural gas, for avoidance of 40 CFR 63 Subpart 6J. This also subsumes the fuel sulfur requirement of Georgia Rule (g).

Condition 2.5b. limits the dryer burner to firing only natural gas. This subsumes the GA Rule (g) fuel sulfur content requirement.

Condition 2.6 limits the opacity of emissions from all manufacturing processes, per Georgia Rule (b).

Condition 2.7 limits the amount and opacity of particulate matter emissions from all fuel burning equipment, per Georgia Rule (d).

Condition 2.8 limits the amount of PM emissions from all manufacturing processes by process input weight rate, per Georgia Rule (e).

Condition 2.9 limits NO_x emissions from Boiler ES-02 to 30 ppm corrected to 3% oxygen (dry basis), per GA Rule (III).

Condition 4.1 requires the facility to perform and maintain records of routine maintenance on all air pollution control equipment.

Condition 5.2 requires the facility to perform an annual tune-up of Boiler ES-02 in order to demonstrate compliance with the NO_x limitation of Georgia Rule (III). The condition also lists requirements and procedures for performing the tune-ups.

Condition 5.3 requires the facility to install and maintain a differential pressure indicator on the dual cyclone (ID No. CD-01) and quad-cyclone (ID No. CD-03), and to record the data daily.

Condition 7.1 requires the facility to submit written notification of startup to the Division within 15 days after such date.

Condition 7.2 requires the facility to record and maintain monthly records of the amount of natural gas combusted in Boiler ES-02. As an alternative, the facility may elect to record and maintain records of the total amount of natural gas being delivered to the facility during each calendar month.

Condition 7.3 requires that the facility keep monthly records of the amount of softwood and hardwood processed in Dryer ES-01.

Condition 7.4 contains the equation that the facility will use to calculate monthly VOC emissions from the drying process and demonstrate compliance with the emission limit in Condition 2.1. The facility must notify the Division if VOC emissions exceed 8.2 tons during any calendar month.

Condition 7.5 requires the facility to use the monthly calculations from Condition 7.4 to determine the 12-month rolling total of VOC emissions, and to notify the Division if the total exceeds 98 tons during any 12-consecutive month period.

Condition 7.6 contains the equation that the facility will use to calculate monthly HAP emissions from the drying process and demonstrate compliance with the emission limit in Condition 2.2. The facility must notify the Division if any single HAP emissions exceed 0.83 tons or any combined HAP emissions exceed 2.08 tons during any calendar month.

Condition 7.7 requires the facility to use the monthly calculations from Condition 7.6 determine the 12-month rolling total of single/combined HAP emissions, and to notify the division if the total exceeds 10/25 tons during any 12-consecutive month period.

Condition 8.2 requires the facility to pay an annual permit fee to the Division.

Toxic Impact Assessment

The facility performed a toxic impact assessment (TIA) in order to demonstrate compliance with Georgia Air Toxic Guidelines. Potential HAP emissions were compared with their respective minimum emission rates (MER). Potential emissions of acetaldehyde, acrolein, arsenic, chromium VI, and formaldehyde each exceeded their associated MER, as shown in Table 7.

Table 7: PTE of Key HAP and Corresponding MER

Pollutant	Emission Rate (lb/hr)	Emission Rate (lb/yr)	MER (lb/yr)	Modeling Required?
Acetaldehyde	0.76	6,660	1,110	YES
Acrolein	0.11	1,000	4.87	YES
Arsenic	1.01E-05	0.0889	0.0567	YES
Chromium VI	2.84E-06	0.0249	0.0195	YES
Formaldehyde	1.47	12,900	267	YES
Methanol	2.30	20,140	30,100	NO

A toxic impact analysis of the five HAP was performed by calculating the maximum ground level concentration (MGLC) of each pollutant using SCREEN3 modeling. Emissions from all pollutants were assumed to emit mainly from the refiner/dryer (ID No. ES-01) and were therefore assumed to exhaust from the dryer's two identical stacks (EP01 and EP02), which were modeled as one stack. The stack height was assumed to be 125.5 feet, with a diameter of 5.33 feet. Exhaust velocity was assumed to be 28.01 feet/second, discharged vertically. A summary of the modeling results is shown in Table 8.

Note that the modeling was performed by conservatively assuming that the dryer (ID No. ES-01) only processes softwood, and the modeling results have therefore been revised from the results included in the application.

Table 8: Summary of Toxic Impact Analysis

Pollutant	AAC, $\mu\text{g}/\text{m}^3$		SCREEN3 Modeling Results/MGCL, $\mu\text{g}/\text{m}^3$			Acceptability of the Predicted MGCL/Ambient Impact	
	15-Minute	Annual	1-Hour	15-Minute	Annual	15-Minute	Annual Impact
Acetaldehyde	4,500	4.55	0.96	1.27	0.08	Acceptable	Acceptable
Acrolein	23	0.02	0.14	0.18	0.01	Acceptable	Acceptable
Arsenic	2.00E-01	2.33E-04	1.28E-05	1.69E-05	1.02E-06	Acceptable	Acceptable
Chromium VI	N/A	8.30E-05	3.6E-06	N/A	2.9E-07	N/A	Acceptable
Formaldehyde	245	1.10	1.86	2.46	0.15	Acceptable	Acceptable

Based on a unit emission rate of 1 lb/hr, the unit MGLC was found to be 1.27 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), located 442 feet from the stack. The short-term (15-minute) and long-term (annual) MGLC for acetaldehyde and formaldehyde are each below their respective acceptable ambient concentrations (AAC), and therefore both pollutants comply with the Georgia Air Toxics Guidelines. No further modeling is needed.

MER and AAC values for each HAP were referenced from Appendix A of the Summary of Ambient Impact Assessment of Toxic Air Pollutant Emissions (2018).

Summary & Recommendations

Profile Products, LLC is a manufacturer of sediment control products, to be located in Monticello, GA. The facility will operate with controls and limitations for VOC, PM, and single/combined HAP emissions and will therefore be considered a synthetic minor source. The Stationary Source Compliance Program (SSCP) will be responsible for compliance and inspection of this facility.

I recommend the issuance of Permit No. 2679-159-0017-S-01-0 to Profile Products, LLC. The Public Advisory for this application expired on March 18th, 2022. No comments were received.