



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
DATE: August 4, 2022

Facility Name: **Steves & Sons, Inc.**
AIRS No.: 04-13-287-00035
Location: Sycamore, GA (Turner County)
Application #: 28223
Date of Application: December 10th, 2021

Background Information

Steves & Sons (hereinafter, “facility”) is a greenfield facility that will manufacture wooden doors in Sycamore, Georgia. The facility will be located in Turner County, which is an attainment county for all criteria air pollutants. Process equipment at the facility include a woodworking line, an adhesive application line (or “glue line”), a painting process consisting of two paint booths and two respective paint booth heaters, and a wood waste storage and loadout operation. The facility’s particulate matter (PM) control systems consist of two baghouse filters, each placed above a cyclone, and a series of air filters within the paint booths.

The facility manufactures solid core and hollow core wooden doors. Raw materials used in the manufacturing process include core (particle board or fiber board), stiles and rails (solid wood or fiberwood that make up the sides and top/bottom of the door, respectively), skins (compressed fiber mat), cardboard, expanded polystyrene (EPS) foam, and glue.

Materials are processed in the wood working line (ID No. WW) before assembly; the core is routed, and stiles, rails, foam sheets, and skins are cut down to size. The doors are then assembled on the glue line (ID No. GL), where the components are glued together, pressed, and left to dry before being sized and sanded to trim any excess material. The doors are then sent to one of two paint booths (ID Nos. PB1 and PB2) to be painted with primer before performing any final machining (i.e., adding hinges or knob holes). Two paint booth heaters (ID Nos. PBH1 and PBH2) aid in the drying process.

PM emissions from Woodworking Line WW are controlled by two baghouses (ID Nos. BH1 and BH2, respectively). The exhaust from the Woodworking Line WW is controlled by the baghouse, where larger particles are transferred to the cyclones for collection. Wood waste from the cyclones is collected in a wood waste bin (ID No. WW1) and loaded out of the facility. The fine dust collected in the baghouse is returned to the closed loop system and recycled continuously.

Purpose of Application

On December 10th, 2021, Steves & Sons submitted Application No. 28223 for the construction and operation of the wood door manufacturing facility. A Public Advisory was issued for this application on December 22, 2021.

Updated Equipment List

Table 1: Emissions Units

Emission Units			Associated Control Devices	
Source Code	Description	Construction Date	Source Code	Description
WW	Wood Working	2022	BH1, BH2	Baghouses
GL	Glue-up Line	2022	--	--
PB1	Paint Booth 1	2022	--	--
PB2	Paint Booth 2	2022	--	--
WW1	Wood Waste Loadout	2022	--	--

Table 2: Fuel-Burning Sources

Source Code	Input Heat Capacity (MMBtu/hr)	Description	Installation Date	Construction Date
PBH1	1.5e-04	Natural Gas-fired	2024	2023
PBH2	1.5e-04	Natural Gas-fired	2024	2023

Emissions Summary

The glue line (GL) and paint booths (PB1 and PB2) have the potential to emit a combined total of 26.95 tpy of VOC at their maximum expected operating hours (2,500 and 2,080 hrs/yr, respectively). The operating hours of the glue line (GL) and the paint booths (PB1 and PB2) are currently restricted by the operating hours of the wood working line (WW), but there is no guarantee that they will not increase their operating hours in the future. If the glue line (GL) and the paint booths (PB1 and PB2) were to both operate at 8,760 hrs/yr, the facility-wide VOC potential-to-emit (PTE) would exceed 100 tpy, as follows.

Table 3: Uncontrolled VOC Emissions from Glue Line and Paint Booths

Source Code	Uncontrolled VOC Emissions (lb/hr)
Glue Line (GL)	19.86
Paint Booths (PB1 and PB2)	2.04

VOC PTE for Glue Line (GL) at 8,760 hrs/yr (tpy):

$$= \frac{19.86 \frac{\text{lb}}{\text{hr}} * 8,760 \frac{\text{hrs}}{\text{yr}}}{2000 \text{ lbs/ton}} = 86.99 \text{ tpy}$$

VOC PTE for Paint Booths (PB1, PB2) at 8,760 hrs/yr (tpy):

$$= \frac{2.04 \frac{\text{lb}}{\text{hr}} * 8,760 \frac{\text{hrs}}{\text{yr}}}{2000 \text{ lbs/ton}} = 8.94 \text{ tpy} * 2 \text{ paint booths} = 17.88 \text{ tpy}$$

$$86.99 \text{ tpy} + 17.88 \text{ tpy} = 104.87 \text{ tpy VOC total}$$

To ensure that the facility-wide VOC PTE remains below 100 tpy, the facility will be subject a facility-wide VOC emission limit of 99 tpy. Note that the fuel burning sources onsite will emit lower than 1 tpy VOC.

PM emissions are expected from the wood working line (WW), the wood waste storage bin (WW1), and the paint booths (PB1 and PB2). Both the facility and the Division agree that, without any control devices, the uncontrolled PM potential-to-emit (PTE) will be greater than 100 tpy. However, the Division disagrees with the facility that the after-control PM PTE will absolutely be lower than 100 tpy. Below is a breakdown of PM emission calculations:

- PM emissions from the paint booths are calculated using a mass balance approach and considering paint application efficiency, solid transfer efficiency, and filter control efficiency; the Division agrees with the facility on the approach, and the result is less than 2 tpy. Considering that this calculation is based on 2,080 hrs/yr of paint booth operation, the after-control PM PTE would be lower than 10 tpy if 8,760 hrs/yr of operation is assumed.
- The facility calculated PM PTE for the wood working process (WW) and wood waste loadout (WW1) by assuming maximum annual wood waste generated by the facility, and applied 85-99% control efficiencies for the cyclone followed by a 99-percent baghouse control efficiency. The Division could not verify the annual maximum wood waste generation rate, and was not confident to apply two (very high) control efficiencies in series. The facility's result was 7.90 tpy. Any difference in wood waste generation rate or the control efficiencies would greatly impact on the PM PTE for WW and WW1. The Division also questions whether the facility should apply both control efficiencies of the cyclone (85%-99%) and baghouse (99%) in series when the exhaust from the wood working process would pass through only the baghouse.

In order to issue the facility a SIP permit, the Division has to ensure that the facility-wide after-control PM PTE below 100 tpy. To be conservative, WW and WW1 cannot emit more than 80 tpy PM. In order to validate this assumption, the Division would require a one-time PM performance test. The facility must simultaneously test the two baghouse emissions while WW is operated at its maximum design throughput rates, and the combined test results must be below 80 tpy (18.26 pounds per hour). If the test is conducted at anywhere below 85% of the WW maximum design throughput rate, the test results must be scaled back proportionally to 100% of the WW maximum design throughput rate.

Based on the above assumptions, the facility's synthetic minor limits for PM will be to operate their control devices at all times while the associated emission units are operating.

Table 4: Facility-Wide Potential Emissions (tpy)

Pollutant	Potential Emissions
PM/PM ₁₀ /PM _{2.5}	< 100
NO _x	6.44E-05
SO ₂	1.84E-07
CO	5.41E-05
VOC	26.95
Max. Individual HAP	4.04
Total HAP	5.52
Total GHG (if applicable)	7.60E-03

Regulatory Applicability

40 CFR 60 Subpart Dc, NSPS for Small Industrial-Commercial-Institutional Steam-Generating Units

40 CFR 60 Subpart Dc applies to steam-generating units with a heat input capacity between 10 MMBtu/hr and 100 MMBtu/hr. The paint booth heaters (PBH1 and PBH2) do not produce steam or heat a transfer medium, and therefore, they do not meet the definition of steam-generating units as defined in 40 CFR 60.41c and are not subject to the standards of Subpart Dc.

40 CFR 63 Subpart JJ, NESHAP for Wood Furniture Manufacturing Operations

40 CFR 60 Subpart JJ applies to facilities that manufacture wood furniture or wood furniture components and are major sources of HAP. The facility is not a major source of HAP emissions, and therefore, Subpart JJ does not apply.

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

40 CFR 63 Subpart 6J applies to boilers located at facilities that are area sources of HAP emissions. Paint Booth Heaters PBH1 and PBH2 meet the definition of "Process Heater" in 40 CFR 63.11237 and are therefore not boilers. Therefore, Subpart 6J does not apply to the heaters.

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. Airborne PM emissions from Wood Working Line WW are controlled by a Baghouses BH1 and BH2, and PM emissions from Paint Booths PB1 and PB2 are controlled by air filters. Therefore, the facility's visible emissions are expected to be compliant with Georgia Rule (b).

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

Georgia Rule (d) limits the amount and opacity of PM emissions from fuel-burning equipment. According to 391-3-1-.01(cc), “fuel-burning equipment” is equipment that “furnishes process heat indirectly, through transfer by fluids or transmissions through process vessel walls.” Because the heat from combustion in Paint Booth Heaters PBH1 and PBH2 is transferred directly to the surrounding air in the heating process, they do not meet the definition of fuel-burning equipment and are not subject to Georgia Rule (d) PM limits.

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. PM emissions from Woodworking Line WW are controlled by Baghouses BH1 and BH2, and PM emissions from Paint Booths PB1 and PB2 are controlled by air filters; therefore, the facility is expected to comply with Georgia Rule (e) PM limits.

Georgia Rule 391-3-1-.02(2)(g), Sulfur Dioxide

Georgia Rule (g) limits the fuel sulfur content of fuel-burning equipment less than 100 MMBtu/hr to 2.5%, by weight. Because Paint Booth Heaters PBH1 and PBH2 only burn natural gas, they are expected to comply with the sulfur limit of Georgia Rule (g).

Georgia Rule 391-3-1-.02(2)(tt), VOC Emissions from Major Sources

Turner County is not one of the named counties subject to the 25 tpy VOC limit of Georgia Rule (tt), and therefore, the rule does not apply.

Georgia Rule 391-3-1-.02(2)(hhh), Wood Furniture Finishing and Cleaning Operations

Georgia Rule (hhh) limits VOC emissions from wood furniture finishing operations. Turner County is not one of the named counties subject to Georgia Rule (hhh) requirements, and therefore, the rule does not apply.

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

Georgia Rule (lll) limits NO_x emissions from fuel burning equipment to less than 30 ppm at 3% oxygen on a dry basis. Because Paint Booth Heaters PBH1 and PBH2 are not considered fuel-burning equipment according to 391-3-1-.01(cc), the rule does not apply.

Permit Conditions

Condition 2.1 limits the the facility-wide VOC emissions to 99 tpy.

Condition 2.2 requires the facility to operate control devices at all times while their associated emission units are in operation. This is a Title V avoidance condition for PM.

Condition 2.3 limits the opacity of emissions from all manufacturing processes to less than 40%, per GA Rule (b).

Condition 2.4 limits facility-wide particulate matter emissions based on process input weight rate, per GA Rule (e).

Condition 2.5 requires the facility to burn only natural gas in Paint Booth Heaters PBH1 and PBH2, subsuming the GA Rule (g) fuel sulfur limitation.

Condition 4.2 requires the facility to maintain an inventory of replacement baghouse filters.

Condition 4.3 requires paint booth filter replacements whenever the static pressure drop across the filter systems falls outside the manufacturers recommended value.

Condition 5.1 requires the facility to install and maintain devices to monitor the pressure drop across Baghouses BH1 and BH2 and the paint booth filters, and to record the data for each week of operation.

Condition 5.2 requires the facility to perform daily visible emissions checks on Baghouses BH1 and BH2.

Condition 5.3 requires the facility to develop and implement a Preventative Maintenance Program for Baghouses BH1 and BH2.

To confirm that facility-wide after-control PM emissions are below 100 tpy, Condition 6.2 requires the facility to perform a one-time test at both baghouses simultaneously to confirm that the combined PM emission rate is less than 18.26 lbs/hr. If the test cannot be performed at maximum capacity (85% or higher), then the facility will be required to scale up the tested results proportionally to 100% of the WW maximum design throughput rate.

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

Condition 7.2 requires the facility to maintain a log of the pressure drop monitoring required by Condition 5.1.

Condition 7.3 requires the facility to maintain monthly usage records of all VOC-containing materials used at the facility.

Condition 7.4 requires the facility to use the records from Condition 7.3 to calculate total monthly VOC emissions from the entire facility. The facility must notify the Division if total VOC emissions equal or exceed 8.25 tons during any calendar month.

Condition 7.5 requires the facility to use the calculations from Condition 7.4 to determine the total VOC emissions from the facility during any consecutive 12-month period. The facility must notify the Division if total VOC emissions equal or exceed 99 tpy during any consecutive 12-month period.

Toxic Impact Assessment

A toxic impact assessment (TIA) of potential HAP was required to be performed by the facility as part of this application. Emissions from four key HAP – methanol, formaldehyde, vinyl acetate, and glycol ethers – were compared with the respective minimum emission rate (MER) for each pollutant. Diethylene Glycol Monobutyl Ether Acetate is the only glycol ether emitted by the facility, and its emissions were compared with the MER from ethylene glycol for the most conservative result.

Each pollutant's emission rate was below its respective MER, and therefore, no additional modeling was required.

Table 6: PTE of Key HAP and Corresponding MER¹

Pollutant	CAS Number	Potential Emissions (ton/yr)	Potential Emissions (lb/hr)	Potential emissions (lb/yr)	Minimum Emission Rate (MER) (lb/yr)	Greater than MER?
Formaldehyde	50-00-0	0.09	0.07	175.0	267.0	NO
Methanol	67-56-1	1.19	0.95	2,375	30,126.7	NO
Vinyl Acetate	108-05-4	0.21	0.17	425	48,666.0	NO
Glycol Ether ²	10-72-11 ³	4.03	3.23	8,075	20,149.4	NO

¹ Based on 2,500 hours per year of glue application

² Diethylene Glycol Monobutyl Ether Acetate

³ Compared to MER for ethylene glycol, for conservative results

Summary & Recommendations

Steves & Sons is a greenfield wooden door manufacturer located in Sycamore, GA. The facility will be required to operate control devices at all times while the associated emission units are in operation and will be subject to a 99-tpy VOC cap for Title V avoidance, making them a synthetic minor source. The Stationary Source Compliance Program will be responsible for compliance and inspection of this facility.

I recommend the issuance of Permit No. 2431-287-0035-S-01-0 to Steves & Sons. The Public Advisory for this facility expired on January 21st, 2022. No comments were received.