

VERMONT AGENCY OF NATURAL RESOURCES  
Department of Environmental Conservation  
Air Quality & Climate Division

**TECHNICAL SUPPORT DOCUMENT**  
**FOR**  
**TITLE V**  
**AIR POLLUTION CONTROL**  
**PERMIT TO CONSTRUCT AND OPERATE**  
**#AOP-18-029**

Permit Date: September 5, 2019

**Ethan Allen Operations, Inc. – Beecher Falls Division**  
**Beecher Falls, VT**

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Air Quality & Climate Division

*This Technical Support Document details the Agency of Natural Resources, Department of Environmental Conservation, Air Quality & Climate Division (Agency) review for the Air Pollution Control Permit to Construct and is intended to provide additional technical information, discussion and clarification in support of the Permit. It is not intended to provide a comprehensive review of the Facility or permit process or duplicate the information contained in the Permit.*

**Facility:**  
 Ethan Allen, Inc.  
 Beecher Falls Division  
 Wood Furniture Manufacturing  
 and Finishing  
 1280 VT Route 253 (Main Street)  
 Beecher Falls, Vermont 05902-0217

**Facility / Applicant Contact Person:**  
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**1.0 INTRODUCTION**

Ethan Allen, Inc. Beecher Falls Division (hereinafter “Permittee”) owns and operates the wood furniture manufacturing and finishing operation (also referred to herein as “Facility”) at Beecher Falls, Vermont. The operations at the Facility include a rough mill, drying kilns, woodworking processes, wood gluing, a spray booth, ultra-violet (UV) roll coat wood finishing, and boilers for process and space heat. This Permit is the renewal of the Title V Permit to Operate for the Facility.

Administrative Milestones

<b>Table 1-1: Administrative Summary</b>	
<b>Administrative Item</b>	<b>Result or Date</b>
Date Application Received:	11/2/2018
Date Administratively Complete:	11/2/2018
Date Technically Complete:	1/24/2019
Date Draft Decision:	6/3/2019
Date & Location Draft Decision/Comment Period Noticed:	Environmental Notice Bulletin
Date & Location Public Meeting Noticed:	Not applicable
Date & Location of Public Meeting:	Not applicable
Deadline for Public Comments:	07/1/2019
Date Proposed Decision:	7/11/2019
Date Final Permit	9/5/3019
Classification of Source Under §5-401:	§5-401(4): Wood products industries; §5-401(6)(b) Wood fuel burning equipment of greater than 90 H.P. rated output
Classification of Application:	Title V Subject Source
New Source Review Designation of Source:	Major Stationary Source
Facility SIC Code(s):	2511
Facility SIC Code Description(s):	Wood household furniture, except upholstered

The allowable emissions for the Facility are summarized below:

<b>Table 1-2: Allowable Air Contaminant Emissions (tons/year)<sup>1</sup></b>						
<b>PM/PM<sub>10</sub>/PM<sub>2.5</sub></b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>VOC</b>	<b>Total HAPs<sup>2</sup></b>	<b>CO<sub>2e</sub><sup>3</sup></b>
<b>459</b>	<b>242</b>	<b>&lt;100</b>	<b>81</b>	<b>58</b>	<b>&lt;10/25</b>	<b>100,881</b>

<sup>1</sup> PM/PM<sub>10</sub> - particulate matter, SO<sub>2</sub> - sulfur dioxide, NO<sub>x</sub> - oxides of nitrogen, CO - carbon monoxide, HAPs - hazardous air pollutants.

<sup>2</sup> Emissions of individual HAPs each < 10 tpy and emissions of total HAPs combined <25 tpy.

<sup>3</sup> CO<sub>2e</sub> 'at the stack' – includes emissions from biogenic sources. See section 3.3 for details. This is not a facility limit.

## **2.0 FACILITY DESCRIPTION AND LOCATION**

### **2.1 Facility Locations and Surrounding Area**

The area surrounding the Facility is primarily undeveloped land along with limited residential development. The Canaan schools (K-12) are approximately 3.1 km to the southwest and the Stewartstown Community School (K-8) is approximately 2 km to the southwest.

### **2.2 Facility Description**

The Facility operations are listed under the Standard Industrial Classification (“SIC”) Code 2511, Wood household furniture, except upholstered. The regulated sources of air contaminant emissions and other notable equipment at the Facility are listed in Table 2-1.

The Facility is a typical wood furniture manufacturing plant that receives raw logs that are debarked and sawed into boards in the saw mill and sent to the onsite kilns for drying. The boards are then planed in the rough mill and ready for further processing in the finishing mill building. Here the boards may be further processed into furniture parts with saws, shavers, shapers, molders, lathes, tenoners, drills, and sanders. Some pieces are sent directly to finishing before assembly, such as flatwood pieces including drawer bottoms and back panels that go to the UV flatline finishing system. The pieces then undergo final assembly including the addition of hardware.

<b>Table 2-1: Equipment Specifications - Energy Plant <sup>1</sup></b>			
Boiler unit	Unit Rating(s): MMBtu/hr <sup>2</sup> max heat input;	Fuel Type(s)	Year of Installation
Bigelow Boiler #240 Type F54/46 (6479 ft <sup>2</sup> boiler heating surface)	54 MMBtu /hr	Wood (fly ash reinjection)	1950
Wickes Boiler #239 Type A (3565 ft <sup>2</sup> boiler heating surface)	37 MMBtu /hr (wood) 24.9 MMBTU/hr (oil)	Wood / No.4 oil (fly ash reinjection)	1950
Bigelow Boiler #232 Model ST-304-PF	19.5 MMBtu /hr	No.4 oil	1970
Cleaver-Brooks Boiler #238, Model CB600-500 (finishing bldg)	21.0 MMBtu /hr	No.4 oil	1972
Dravo Furnace Model 200 (sawmill)	2.5 MMBtu /hr	No.2 oil	1972
Steam Turbine	700 kW <sup>4</sup>	Steam	2005
Fire Pump Detroit Diesel Model 4061AZ S/N 4A0175625	115 HP <sup>5</sup>	Ultra-low sulfur diesel	Unknown, estimated 1960

<sup>1</sup> Equipment specifications are based on the best available information at the time of permit issuance and may be subject to some uncertainty due to use of certain assumptions and calculations for older and site engineered/fabricated equipment.

<sup>2</sup> MMBTU/hr - Million British Thermal Units per hour maximum rated heat input.

<sup>3</sup> hp: boiler horse power rating.

<sup>4</sup> kW – kilowatts of electrical output.

<sup>5</sup> HP – engine rated output - horsepower.

<b>Table 2-2: Equipment Specifications – Wood Waste Handling Operations</b>		
Wood Waste Handling Operation (if known installation date)	Air Flow (acfm)	Unit Description/Specifications (4-digit number = blower ID #)
Fuel Metering Bin Cyclone #6	Closed loop	Emergency conveying of wood fuel from silos to metering bin in the event the flight conveyors are inoperable. Conveying air is returned from cyclone outlet back to blower 5022 with no ambient discharge. Cyclone diameter 3' 10".

<b>Table 2-2: Equipment Specifications – Wood Waste Handling Operations</b>		
Wood Waste Handling Operation (if known installation date)	Air Flow (acfm)	Unit Description/Specifications (4-digit number = blower ID #)
Sawmill Cyclone #7	20,410	Conveying of green material only (sawdust) to relay silo. Unit: 10'0" diameter. Emission sources: 5023 – sawdust (6,280 cfm); 5025 – sawdust (7,065 cfm); 5026 – sawdust (7,065 cfm).
System B - Rough Mill Pneumafil #4 fabric filter (12/22/2003)	48,800	Conveying of rough mill dry wood wastes. Pneumafil Model 13.5-460-10 Unit: 5,922 sq.ft. cloth filter area: 8:1 air to cloth. Emission sources: 5003 – planer mill relay (5,500 cfm); 5004 – rough mill relay (10,000 cfm); 5005 – rough mill relay (6,200 cfm); 5009 – UV Pneumafil #3 relay (5,500 cfm); Relays through Cyclone #3/Silo#1: 6006 – System A relay (10,800 cfm) 6005 – System B relay (10,800 cfm).
System B – Rough Mill MAC #1 fabric filter (12/15/2003)	39,300	Conveying of rough mill dry wood wastes. MAC Model 144MCF416 Unit: 6,032 sq.ft. cloth filter area: 5.2:1 air to cloth. Emission sources: 5010 – abrasive planer (8,000 cfm); 5018 – abrasive planer (8,000 cfm). 5011 – saw (8,000 cfm); 7001 – rip saw relay (15,300 cfm);
System A – Finish Mill/ Sanding MAC #2 fabric filter (2004)	50,400	Conveying of finish mill dry wood wastes. MAC Model 144MCF361 Unit: 5,202 sq.ft. cloth area: 9.7:1 air to cloth. Emission sources: 4002 – wide belt sander (5,500 cfm), 4003 – orbital sander (4,800 cfm), 5012T – molders (19,200 cfm), 5017– CNC routers (8,900cfm), 5502 – DMC sander (12,000 cfm).
System A – Finish Mill/ Sanding Cyclone #5	58,200	Conveying of finish mill dry wood wastes. Unit: 13'8" diameter Emission sources: 5013 – tenoners (7,100 cfm); 5014T – tenoners (19,200 cfm); 5015 – lathe (9,800 cfm); 5016 – sander (8,000 cfm); 6001 – shaper etc. (14,100 cfm).

<b>Table 2-2: Equipment Specifications – Wood Waste Handling Operations</b>		
Wood Waste Handling Operation (if known installation date)	Air Flow (acfm)	Unit Description/Specifications (4-digit number = blower ID #)
System A – Finish Mill/ Sanding  Pneumafil #1 fabric filter (1981)	35,200	Conveying of finish mill dry wood wastes. Pneumafil model 11.5-316-8 Unit: 3,255 sq.ft. cloth area: 10.8:1 air to cloth Emission sources: 5019 – sanding (9,800 cfm), 5020 – sanding (7,100cfm), 5501 – sanding (12,000cfm), 5021 – routers (6,300cfm).
Silo #1 with  Cyclone #30	21,600	Receives material relayed from 6006 – System A (10,800 cfm) and relayed from 6005 – System B (10,800 cfm) which utilizes wood hog line conveying air (5006). Cyclone exit ducted back to System B Pneumafil #4 with emergency bypass to System B MAC #1.
Silo #4 with  Cyclone #2	38,300	Receives green material only including sawdust, chips and bark relayed from sawmill and hammermill or chip delivery vehicles. Cyclone diameter: 12 feet. Emission sources: 4004 – 2 – debarking (8,200 cfm); 6003 – relay of sawmill sawdust from cyclone #7 (8,000 cfm); 8001 – hammer mill (22,100 cfm).
UV Flat Line Sanding  Pneumafil #3 (2000)	30,450	Conveying of sander dust from UV flat line sanding which consists of a two head and a three head wide belt sander. Pneumafil Model 11.5-320-8 Unit: 3,200 sq.ft. cloth area: 9.5:1 air to cloth Emission sources: 5007 – UV flatline wide belt sander (9,800 cfm) 5008 – UV flatline wide belt sander (9,800 cfm); 5024 – dove tailors (8,850 cfm); 3501 – carpenter shop (2,000 cfm)
Sawmill/Grinding Room (metal; not wood waste)  Cyclone w/ fabric filter #9	2,700	Grinding operations for sharpening of cutting tools, namely bandsaw cutting blades. Lavcor model 30-11 Unit: cyclone diameter 2' 2", followed by fabric filter with 160 sq.ft. cloth area: 17:1 air to cloth. Emission sources: 3001 – grindings (2,700 cfm)
Main Plant Grinding Room (metal; not wood waste)  Cyclone #1	3,000	Grinding operations for sharpening of cutting tools, namely shaping and molder knives. Unit: 5'6" diameter Emission sources: 4001 – grinder (3,000 cfm).

**Table 2-3 Equipment Specifications – Miscellaneous Equipment and Operations**

Previous permits included a Spray Finishing Operation with ( $\pm$ 31) spray booths. This operation ceased on 8/25/2009, and the spray booths were removed in 2011.

UV Flatline Roll Coat Finishing Operations: consists of (3) roll coaters utilizing 100% solid UV finishes, (3) UV curing ovens, (2) sanders (noted above) and (1) offline conventional spray booth for ends and edges.

Glue Line Operations nine ( $\pm$ 9) total glue operations: six (6) in Glue Panel Dept., three (3) in Pre-assembly. All use Poly Vinyl Acetate (PVA) glue.

Dry Kilns fifteen ( $\pm$ 15) total kilns: ten (10) drying kilns each with 70,000 board foot capacity and five (5) drying kilns each with 40,000 board foot capacity with heat provided by boilers (noted above).

### 2.3 Description of Compliance Monitoring Devices

This Facility is not equipped with devices to continuously monitor the emission of air contaminants to the ambient air.

### 2.4 Proposed Modifications to Facility

The Permittee has not proposed to modify the Facility.

### 2.5 Identification of Sources with Insignificant or Negligible Emissions

Although not required for determining applicability with Subchapter X, quantifiable emissions from “insignificant activities” must be included for the purposes of establishing whether or not a source is subject to other air pollution control requirements, including, but not limited to reasonably available control technology, major source status, and Title V operating permit applicability.

Additionally, guidance provided by the U.S. EPA (entitled “White Paper for Streamlined Development of Part 70 Permit Applications”) lists activities which are considered as “trivial” sources of air contaminants and may be presumptively omitted from operating permit applications.

Table 2-4 lists activities at the Facility which were considered negligible or exempt sources of air contaminant emissions, and therefore were not considered as emission sources as part of the Operating/Construction Permit review.

<b>Table 2-4: Negligible Sources of Contaminant Emissions</b>	
Above-ground Storage Tanks:	13,500 gallon No. 4 fuel oil above ground storage tank. Main boiler room. Installed 1995
	12,000 gallon No. 4 fuel oil above ground storage tank. Finishing building. Installed 1996.
	10,000 gallon No. 2 fuel oil/diesel above ground storage tank. Yard. Installed 1998.
	Two (2) 500 gallon LPG storage tanks. Installed 2001 near dry kilns for fueling forklifts and 1970 in Finishing Building. Also various other smaller propane tanks throughout the Facility.
	550 gallon gasoline tank. Installed 1994.
	275 gallon waste oil storage tank. Installed 1990s.

It should be noted that a process or piece of equipment which is considered a “negligible activity” does not relieve the owner or operator from the responsibility of complying with any applicable requirements associated with said process or equipment.

**2.6 Proposed Limitations**

The Permittee has proposed to limit the hours of operation of the MAC #2 dust collector to reduce its pre-control potential emissions of PM10 to less than 100 ton/yr which is below the threshold for requiring a Compliance Assurance Monitoring (CAM) plan. The hours of operation will be restricted to 3,175 hours/year; previous permits allowed this dust collector to operate 8,760 hours/year.

For this permit renewal, there was a review of the woodworking processes (sawing, planing, shaping, sanding, etc.), the wood waste/dust collection blowers and the dust collectors. This review was to help estimate the potential to emit (PTE) PM<sub>10</sub> and PM<sub>2.5</sub> from the wood waste dust collectors. If the pre-control PTE from a given dust collector exceeds 100 tons/year, then CAM requirements kick in. This review resulted in reductions in the permitted hourly operation of the MAC#1, and PN#4 fabric filters from 8,760 hours/year to 5,000 hours/year.

**3.0 QUANTIFICATION OF POLLUTANTS**

The quantification of emissions from a stationary source is necessary in order to establish the regulatory review process necessary for the operating permit application and to determine applicability with various air pollution control requirements. These determinations are normally based upon allowable emissions. Allowable emission is defined as the emission rate calculated using the maximum rated capacity of the source and, if applicable, either: (a) the applicable emission standard contained in the *Regulations*, if any, or (b) the emission rate or design, operational or equipment standard specified in any order or agreement issued under the *Regulations* that is state and federally enforceable. An applicant may impose in its application an emission rate or design, or an operational or equipment limitation which may be incorporated in the Permit to restrict operation to a lower level. Such limitations may include fuel restrictions or production limits.



### 3.1 Estimating Potential Emission of Criteria Pollutants from the Existing Stationary Source

The emissions from the Facility are from four main sources: boilers (combustion), wood waste handling equipment (dust), lumber kilns, and finishing operations (VOCs and organic toxics). The estimated/allowable emissions from each of these four groups will be reviewed.

#### 3.1.1 Boilers

Since the Facility does not have limits on fuel usage, the boilers could theoretically operate for 8760 hours/yr at full load. However, if this was done, then the emissions for NO<sub>x</sub> could exceed 100 tons/year and the Facility would then be subject to the NO<sub>x</sub> RACT requirements of § 5-251(2) in the *Regulations*.

The Permittee does not want to be subject to this RACT requirement and can avoid exceeding 100 tons/yr of NO<sub>x</sub> by limiting the total fuel usage. So, the fuel usage will be limited such that the maximum NO<sub>x</sub> emissions will not exceed 100 tons/year. Several operating scenarios will be reviewed for the boilers:

The usage of each fuel type (wet wood, dry wood, No.4 fuel oil and No.2 fuel oil) will be maximized up to 100 tons of potential NO<sub>x</sub> emissions, or the physical limit of the boilers. If the maximum amount of a given fuel is used, and 100 tons of NO<sub>x</sub> has not been reached, then other fuels will assume to be used until there is a total of 100 tons of NO<sub>x</sub> emissions. For each of these scenarios, the emission of the other criteria pollutants will also be calculated. Reviewing all the operating scenarios, the maximum potential emission of each pollutant (with NO<sub>x</sub> limited to < 100 ton/yr) will be identified, and this will represent the allowable emission of these pollutants from the boilers.

The Facility produces both 'wet' wood residue (green wood, typical average moisture content is 48%, and higher heat value, HHV, is 4,400 Btu/lb) and dry wood residue (kiln dried wood, typical average moisture content is 6% and HHV is 7,600 Btu/lb). The typical operation of the wood fuel handling system is to blend the wet and dry wood fuel in the fuel silo. There may be times where 100% dry wood or 100% wet wood is being fed to the wood boilers, but most of the time the boilers are firing a blend of wet and dry. In a typical year 84% of the wood fuel is wet wood and 16% is dry wood. Averaged over the year, the wood fuel has a moisture content of 41% and an HHV of 4912 Btu/lb. The calculations shown below are based on this blend of wet and dry wood and will be referred to as 'wood blend.'

With regards to emission factors for wood fuel, the EPA has established different EFs for NO<sub>x</sub> for wet wood (0.22 lb/MMBtu) and dry wood (0.49 lb/MMBtu). The EPA considers wood with less than 20% moisture content to be 'dry wood' and wood with greater than 20% moisture content to be 'wet wood.' For calculating NO<sub>x</sub> emissions from firing wood at this Facility, the 'wet wood' NO<sub>x</sub> emission factor (0.22 lb/MMBtu) shall be used. Note that stack testing on the wood fired boilers in 2012 and 2016 confirmed that the measured NO<sub>x</sub> emissions were below 0.22 lb/MMBtu (overall average of the testing was 0.17 lb/MMBtu).

For previous permits, PM emission factors established by the EPA were used for reviewing potential emissions: wet wood @ 0.58 lb/MMBtu and dry wood @ 0.42 lb/MMBtu. Going forward, for calculating PM emissions from wood combustion, the results of stack testing of the Wickes #239 and Bigelow #240 boilers conducted in 2012 and again in 2016 will be used as the basis for the EFs. The Wickes #239 boiler had an average filterable PM emission rate of 0.39 lb/MMBtu. The Bigelow #240 boiler had an average filterable PM emission rate of 0.38 lb/MMBtu. For this permit review the total PM emissions from wood combustion will be based on a filterable PM emission rate of 0.4 and the EPA’s EF for condensable PM (0.017 lb/MMBtu) added to bring the total PM EF to 0.42 lb/MMBtu.

<b>Table 3-1: Boilers - Rated Heat Input</b>		
Boiler	Capacity on wood (MMBtu)	Capacity on Oil (MMBtu)
Bigelow #240	54.0	-
Wickes #239	37.0	24.9
Bigelow #232	-	19.5
CB #238	-	21.0
Dravo	-	2.5
Total Wood/Oil Capacity (MMBtu/hr)	91	67.9
Total MMBtu/yr (8760 hours/yr)	797,160	594,804
Max possible fuel usage (tons/yr or gal/yr)	81,144 wet <sup>1</sup>	4,248,600 No.2 <sup>2</sup> 3,965,360 No.4

<sup>1</sup> Based on a higher heating value of 4912 BTUs/lb at 41.3% moisture for wet wood (a blend of 16% dry wood @6% MC and 7,600 Btu/lb and 84% wet wood @48% MC and 4,400 Btu/lb).

<sup>2</sup> Based on a higher heating value of 140,000 BTU/gal for No.2 oil and 150,000 BTU/gal for No.4 oil.

<b>Table 3-2 Emission Factors for Boilers</b>							
Emission Factors & Fuel Type	PM/PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	HAP	Source
	lb/MMBtu (wood) or lb/1000 gal (oil)						
Wood blend	0.42	0.025	0.22	0.6	0.017	0.0389	AP-42 Tables 1.6-1 1.6-2, 1.6-3. 1.6-4 (9/03). Filterable PM from stack tests
No.4 fuel oil	8.30	150	20	5	0.340	0.155	AP-42 Tables 1.3-1, 1.3-2, 1.3-3, 1.3-9, and 1.3-10 (5/2010)
No.2 fuel oil	3.30	71	20	5	0.340	0.0622	

Scenario A, B & C: Maximized Wood Fuel Usage:

Scenario A: Maximum wood blend usage without oil

$$(91,000,000 \text{ Btu/hr}) * (8760 \text{ hr/yr}) / (4,912 \text{ Btu/lb}) / (2000 \text{ lb/ton}) = 81,144 \text{ tpy wood blend.}$$

As shown in Table 3-3, this amount of wood blend usage does not reach 100 tons/yr of NO<sub>x</sub> emissions.

Table 3-3 Scenario A							
Fuel Type	Fuel Amount	PM/ PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
Wood blend	81,144	166.2	10.0	87.7	239.1	6.8	15.5
No.2 oil	0	0.0	0.0	0.0	0.0	0.0	0.0
No.4 oil	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	-	166.2	10.0	87.7	239.1	6.8	15.5

Scenario B: Maximum wood blend usage with additional No. 2 fuel oil

Table 3-4 Scenario B							
Fuel Type	Fuel Amount	PM/ PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
Wood blend	81,144	166.2	10.0	87.7	239.1	6.8	15.5
No.2 oil	1,231,240	2.0	0.1	12.3	3.1	0.2	0.04
Total	-	168.2	10.1	100.0	<b>242.2</b>	<b>7.0</b>	<b>15.5</b>

Scenario C: Maximum wood blend usage with additional No. 4 fuel oil

Table 3-5 Scenario C							
Fuel Type	Fuel Amount	PM/ PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
Wood blend	81,144	166.2	10.0	87.7	239.1	6.8	15.5
No.4 oil	1,231,240	5.1	23.1	12.3	3.1	0.2	0.1
Total	-	<b>171.3</b>	33.1	100.0	<b>242.2</b>	<b>7.0</b>	<b>15.6</b>

Scenario D: Maximized No.2 Fuel Oil Usage:

$$(67,900,000 \text{ Btu/hr}) * (8760 \text{ hr/yr}) / (140,000 \text{ Btu/gallon}) = 4,248,600 \text{ gal/yr No.2 oil.}$$

Scenario D: Maximum No.2 fuel oil with additional wood blend usage.

Table 3-6 Scenario D							
Fuel Type	Fuel Amount	PM/ PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
Wood blend	53,222	109	6.5	57.5	156.9	4.4	10.2
No.2 oil	4,248,600	7.0	0.5	42.5	10.6	0.7	0.1
Total	-	116	7	100.0	167.5	5.2	10.3

Scenario F: Maximized No.4 Fuel Oil Usage:

$$(67,900,000 \text{ Btu/hr}) * (8760 \text{ hr/yr}) / (150,000 \text{ Btu/gallon}) = 3,965,360 \text{ gal/yr No.4 oil.}$$

Scenario F: Maximum No.4 fuel oil with additional wood blend usage.

Table 3-7 Scenario F							
Fuel Type	Fuel Amount	PM/ PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
Wood blend	55,843	114.4	6.9	60.3	164.6	4.7	10.7
No.4 oil	3,965,360	16.5	74.4	39.7	9.9	0.7	0.3
Total	-	130.8	<b>81.2</b>	100.0	174.5	5.3	11.0

Worst Case Boiler Emissions from Scenarios A through F:

Table 3-8: Maximum Boiler Emissions					
<i>PM/PM<sub>10</sub></i>	<i>SO<sub>2</sub></i>	<i>NO<sub>x</sub></i>	<i>CO</i>	<i>VOC</i>	<i>Total HAPs</i>
171.3	81.2	100.0	242.2	7.0	15.6

### 3.1.2 – Estimating Potential Green House Gas Emissions

Facility: Ethan Allen - Beecher Falls	Permit #: AOP-10-004		
The highest potential GHG emission scenario is for maximizing the use of green wood: Scenario B, for 100 tpy NOx limit, has been used for GHG.			

**Table 1. Stationary Source Fuel Combustion**

Source ID	Source Description	Fuel Combusted	Quantity Combusted	Units	Reported wood usage (raw tons)	%MC for raw wood fuel
	Total for wood boiler	Wood and Wood Waste	50,326	tons	90586	50.0%
	Total for oil boilers	Distillate Fuel Oil #4	1,231,240	gallons	0	0.0%

**Table 2. Total Company-Wide Stationary Source Fuel Combustion**

Fuel Type	Quantity Combusted	Units	For wood - the calculations are based on tons of wood at 10% MC
Distillate Fuel Oil #2	0	gallons	
Distillate Fuel Oil #4	1,231,240	gallons	
Wood and Wood Waste	50,326	tons	

**Table 3. Total Company-wide CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O Emissions from Stationary Source Fuel Combustion**

Fuel Type	CO <sub>2</sub> (kg)	CO <sub>2</sub> (lb)	CH <sub>4</sub> (kg)	CH <sub>4</sub> (lb)	N <sub>2</sub> O (kg)	N <sub>2</sub> O (lb)
Distillate Fuel Oil #2	0	0	0.0	0.0	0.0	0.0
Distillate Fuel Oil #4	13,489,268	29,738,711	539.3	1,188.9	107.9	237.8
Total Fossil Fuel Emissions	13,489,268	29,738,711	539.3	1,188.9	107.9	237.8
Wood and Wood Waste	72,602,152	160,060,157	24,768.3	54,604.7	3,250.8	7,166.9
Total Non-Fossil Fuel Emissions	72,602,152	160,060,157	24,768.3	54,604.7	3,250.8	7,166.9
Total Emissions for all Fuels	86,091,421	189,798,868	25,307.6	55,793.7	3,358.7	7,404.7
Global Warming Potential	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e		
	1.0	21.0	310.0	metric ton	short ton	
<b>Total CO<sub>2</sub> Emissions - Equivalent (Fossil CO<sub>2</sub>e + Biogenic CH<sub>4</sub> &amp; N<sub>2</sub>O)</b>				<b>15,061.9</b>	<b>16,602.9</b>	
<b>All CO<sub>2</sub>e emissions at stack (Fossil CO<sub>2</sub>e + Biogenic CO<sub>2</sub>e) - for APCD Permit info</b>				<b>87,664.1</b>	<b>96,633.0</b>	

### 3.1.3 Wood Waste Handling Systems

Those dust collection systems that have historically never been modified are subject only to the 0.06 gr/dscf emission limitation of 5-231(1)(b). For those dust collection systems which have been modified, a lower allowed emission rate has been imposed to maintain any associated emission increase below the “significant” emission increase thresholds of 5-502. The new System B units, which qualify as modifications under the Regulations, are limited to 0.02 gr/dscf which is readily achievable by a well-maintained unit with air to cloth ratios below 10:1, thus no stack emission compliance tests have been required for these units.

Table 3-9: Wood Waste Handling Systems Particulate Matter Emissions (tons/year)						
Device No.	Source Description	Air Flow (acfm)	PM Limit (gr/dscf) <sup>1</sup>	Hours/year	lbs/hr <sup>2</sup>	tpy <sup>3</sup>
Cyclone #7	sawmill	green wood <sup>4</sup>				
Cyclone #8	sawmill	green wood				
Cyclone #6	Fuel metering bin	closed loop blower				
Cyclone #30	Silo #1	air returned to System B Pneumafil #4				
Cyclone #2	Silo #4	green wood				
Pneumafil #4	System B (rough mill)	48,800	0.02	5,000	8.4	20.9
MAC #1		39,300 <sup>5</sup>	0.02	5,000	5.4	16.8
MAC #2	System A (finish mill)	50,400	0.02	3,175	8.6	13.7
Cyclone #5		58,200	0.06	8,760	29.9	131.1
Pneumafil #1		35,200	0.06	8,760	18.1	79.3
Pneumafil #3	UV Flat Line Sander (5000 hours/yr)	30,450	0.02	5,000	5.2	13.1
Total						274.9

<sup>1</sup> gr/dscf equals grains of pollutant emitted per dry standard cubic foot of undiluted exhaust gas.

<sup>2</sup> lbs/hour equals pounds of pollutant emitted per hour based on the air flow rates as given in Findings of Fact A.

<sup>3</sup> tpy based on 8,760 hours of operation unless noted otherwise.

<sup>4</sup> Conveying of green wood wastes are not considered to be a particulate matter emission due to its weight and rapid settling out of the air per APCD policy.

<sup>5</sup> Includes an additional 8000 cfm of air flow from blower 5018, which was added in June 2008.

**3.1.4 Miscellaneous PM Sources**

The facility has two metal grinding operations for re-sharpening wood cutting tools. Both of the 'grinding rooms' have a dust collector.

<b>Table 3-10: Miscellaneous Particulate Matter Emissions (tons/year)</b>					
<b>Device No.</b>	<b>Source Description</b>	<b>Air Flow (acfm)</b>	<b>PM Limit (gr/dscf)</b>	<b>lbs/hr</b>	<b>tpy</b>
Fabric Filter #9	Sawmill/ Grinding room	2,700	0.06	1.4	6.1
Cyclone #1	Main Plant Grinding Room	3,000	0.06	1.5	6.7
Total					12.8

**3.1.5 Lumber Kilns**

While the previous permits for this Facility have not included emission estimates for the release of VOCs during the kiln drying of lumber, the Agency is now including an estimate for VOC emissions at permitted kiln drying facilities in the state. The basis for this estimate is from the Permittee’s original Title V permit application submitted in 1996. The application included an emission factor for hardwood kiln drying that was developed by the American Furniture Manufacturer’s Association (AFMA). The factor is 2.21 lb VOC/1000 board feet (BF). The facility has 10 kilns each with a capacity of 70,000 BF per cycle, and 5 kilns each with a capacity of 40,000 BF.

$$(10 \text{ kilns}) * (70,000 \text{ BF/cycle}) + (5 \text{ kilns}) * (40,000 \text{ BF/cycle}) = 900,000 \text{ BF/cycle}$$

$$(1 \text{ cycle/14 days}) * (365 \text{ days/year}) * (900,000 \text{ BF/cycle}) = 23,464,286 \text{ BF/year}$$

$$(23,464,286 \text{ BF/yr}) * (2.21 \text{ lb VOC} / 1000 \text{ BF}) * (1 \text{ ton}/2000 \text{ lbs}) = 25.9 \text{ ton/yr VOC}$$

25.9 tons/yr of VOC will be included in the Facilities allowable emissions.

If additional kiln capacity is added to the Facility, then the potential emissions from the new source(s) will be reviewed as a modification to the Facility.

**3.1.6 Finishing Operations**

Because the Facility wood finishing operations were installed prior to the inception of the new source review permitting requirements there were no tons per year emission cap on the VOC emissions from these operations. In prior permits the potential emissions were stated simply as greater than 50 tons per year which is the threshold for determining major source status under both the Permit to Construct and the Title V Permit to Operate regulations. Any modifications to the finishing operations in the future could subject those modifications to the new source review permitting requirements of section 5-501 of the Regulations. Actual VOC emissions from the Facility have ranged as high as 300 tons per year in 1992 and since 2010 has not exceeded 1 ton/year.

As noted earlier, the Permittee ceased operating their spray booth-based spray finishing

operation on 8/25/2009 and removed the equipment in 2011. The remaining wood finishing equipment consists of the UV flat line operation, which uses a 100% solids content coating, and a spray booth for treating the edges of the boards in the flat line process. A historical summary of actual VOC emissions, based on annual registration, is provided below.

<b>Table 3-11: Historical Actual VOC and Acetone Emissions (tons per year) from Wood Finishing Operations</b>			
Year	VOC (tons per year)	Acetone (tons per year)	Comments
1993	237.8	4.4	
1994	233.1	4.4	
1995	245.9	11.8	
1996	205.7	40.3	
1997	219.3	54.9	
1998	250.8	48.2	
1999	202.8	51.6	Installation of flatline UV rollcoat unit.
2000	201.1	47.0	Installation of high solids hot spray for sealer and topcoat application.
2001	182.0	45.9	
2002	171.5	44.0	
2003	142.6	29.4	
2004	129.1	33.9	
2005	143.8	41.2	
2006	115.4	30.6	
2007	122.6	29.4	
2008	199.5	32.5	
2009	28.2	3.8	Shutdown main spray finishing
2010	0.1	0.006	
2011	0.1	0.003	
2012	0.12	0.008	
2013	0.13	0.01	
2014	0.02	0	
2015	0.03	0	
2016	0.03	0	
2017	0.04	0	



**3.1.7 Total Facility Emissions:**

<b>Table 3-12: Summary of Allowable Air Contaminant Emissions by Source (tons/year)</b>						
<b>Source</b>	<b>PM/PM<sub>10</sub></b>	<b>SO<sub>2</sub></b>	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>VOC</b>	<b>Total HAPs</b>
Boilers	171.3	81.2	<100	242.2	7	15.6
Lumber Kilns	-	-	-	-	25.9	-
Wood Waste Baghouses & Cyclones	274.9	-	-	-	-	-
Miscellaneous PM Sources	12.8	-	-	-	-	-
Wood Furniture Finishing Operations	-	-	-	-	24.9	<1
<b>Facility Totals</b>	<b>459</b>	<b>81</b>	<b>&lt;100</b>	<b>242</b>	<b>58</b>	<b>&lt;10/25</b>

As summarized in Table 3-15 above:

- The Facility has allowable emissions of all air contaminants in the aggregate of ten (10) or more tons per year: the Facility is therefore subject to Subchapter X of the Regulations and is designated as a Subchapter X Major Source.
- The Facility has allowable emissions of PM, SO<sub>2</sub>, NO<sub>x</sub>, CO and VOCs greater than 50 tons/yr which classifies the source as a “Major Source.” The Permittee has not proposed any changes that would increase the allowable emissions above the significance levels and therefore is not subject to the new source review requirements of §5-502 of the *Regulations*.
- The Facility has allowable emissions of PM and CO greater than 100 tons/yr which classifies the source as a "Title V Subject Source" and therefore is subject to the federal operating permit requirements of 40 *C.F.R.* Part 70 or 71.

**3.2 Estimating Actual Emissions of Hazardous Air Contaminants from the Existing Stationary Source.**

Based on the facility’s annual registration information for the reporting years 2015 through 2017, the following table summarizes the estimated actual emission rate of HACs from the facility. The year with the highest emission rate was used in this evaluation. During this three-year time frame no Action Levels were exceeded.

Table 3-13 Quantification of HAC Emissions 2015 – 2017				
Hazardous Air Contaminant	CAS#	Toxic Category	Emission Rate (lb/8-hrs)	Action Level (lb/8-hrs)
ethyl benzene	100-41-4	1	0.0024	8.3
1,2,4-trimethyl benzene	95-63-6	2	0.0026	35.2
dipropylene glycol methyl ether	34590-94-8	2	0.012	8.3
n-butyl acetate	123-86-4	2	0.0047	0.01
crystalline silica	14808-60-7	2	0.0089	120
xylene	1330-20-7	2	0.0089	0.8
butyl propasol	5131-66-8	3	0.059	1.9

### 3.3 Review of Past Modifications

This section is being brought forward from the Technical Support Document for permit AOP-10-004. If/when future modifications are made to the facility, this information should help with the review of aggregating the emissions.

As noted in Section 2.4 above, the renewal of the operating permit will include some small changes to the Facilities wood dust handling system(s). During June 2008 the Agency approved the addition of blower 5018 which sends wood waste from the double trim saw and bust-up saw to the MAC #1 dust collector. Blower 5018 is rated at 8000 cfm and will increase the potential emissions from the MAC #1 dust collector.

Step a: Calculate the allowable emissions for each new piece of equipment or process being added.

The new piece of equipment being reviewed is the re-installation of blower 5018 which sends wood dust from equipment in System B to the MAC#1 dust collector. The blower was installed in June 2008. Since it goes to the dust collector, there are no direct emissions from the blower. The emissions from MAC#1 will be estimated in Step b.

Step b: Calculate the allowable emissions for all existing processes that are affected by the modification.

The exhaust volume from MAC#1 is expected to increase by the rated capacity of the blower: 8,000 cfm.

$$(+ 8,000 \text{ cfm}) * (0.02 \text{ grain/cf}) * (1 \text{ lb}/7000 \text{ grains}) * (1 \text{ ton}/2000 \text{ lb}) * (60 \text{ min/hr}) * (8760 \text{ hr/yr}) = \underline{6.0 \text{ ton/yr of PM}}$$

Step c: Calculate the actual emissions from all existing processes that are affected by the modification (i.e., that were included in Step b) that were installed prior to 1979 or have already been reviewed as being major under §5-502 of the Regulations.

There is no affected equipment that was installed prior to 1979 or was previously

reviewed as being major.

0 tons/yr of PM

Step d: Calculate the allowable emissions from all other equipment or processes at the facility modified since 1979 that have not been reviewed as being major in the past.

10/19/1999 - The addition of the UV line flat line sander controlled by PN#3:

$$(23,000 \text{ cfm}) * (0.02 \text{ grain/cf}) * (1 \text{ lb}/7000 \text{ grains}) * (1 \text{ ton}/2000 \text{ lb}) * (60 \text{ min/hr}) * (3,000 \text{ hr/yr}) = \underline{5.9 \text{ ton/yr of PM}}$$

11/26/2001 – Increase load on PN#3 by 7,000 cfm.

$$(+ 7,000 \text{ cfm}) * (0.02 \text{ grain/cf}) * (1 \text{ lb}/7000 \text{ grains}) * (1 \text{ ton}/2000 \text{ lb}) * (60 \text{ min/hr}) * (3,000 \text{ hr/yr}) = \underline{1.8 \text{ ton/yr of PM}}$$

12/15/2003 – #2 Carter Day fabric filter was replaced by the larger MAC#1 fabric filter. Because the emissions from the newer fabric filter will be based on a lower grain loading (0.2 gr/dscf instead of 0.6 gr/dscf) this would reduce allowable PM emissions but should not significantly change actual emissions.

12/22/2003 – #1 Carter Day fabric filter was replaced by a larger Pneumafil (PN#4) fabric filter. Again, because of the lower grain loading used for newer fabric filters, this would reduce allowable PM emissions but should not significantly change actual emissions.

9/24/2004 – Cyclone #4 was replaced with the MAC#2 fabric filter dust collector. This should reduce PM emissions. The creditable emission reduction needs to be based on actual emissions. To estimate this, we are assuming 2000 hours/year of operation:

$$\text{Cyclone \#4: } (46,400 \text{ cfm}) * (0.06 \text{ grain/cf}) * (1 \text{ lb}/7000 \text{ grains}) * (1 \text{ ton}/2000 \text{ lb}) * (60 \text{ min/hr}) * (2,000 \text{ hr/yr}) = 23.9 \text{ ton/yr of PM}_{(\text{reduction})}$$

$$\text{MAC\#2: } (46,400 \text{ cfm}) * (0.02 \text{ grain/cf}) * (1 \text{ lb}/7000 \text{ grains}) * (1 \text{ ton}/2000 \text{ lb}) * (60 \text{ min/hr}) * (2,000 \text{ hr/yr}) = 8.0 \text{ ton/yr of PM}$$

$$\text{Net effect of this change: } 8.0 \text{ ton/yr} - 23.9 \text{ ton/year} = \underline{- 15.9 \text{ ton/yr}}$$

7/20/2005 – Replace blower 5018 in System A with blower 5502; this is an increase of 4,000 cfm.

$$(+ 4,000 \text{ cfm}) * (0.02 \text{ grain/cf}) * (1 \text{ lb}/7000 \text{ grains}) * (1 \text{ ton}/2000 \text{ lb}) * (60 \text{ min/hr}) * (8,760 \text{ hr/yr}) = \underline{3.0 \text{ ton/yr of PM}}$$

5/31/2006 – Permit AOP-04-005 increased the flow through PN#3 by 450 cfm and increased the operating hours from 3,000 to 5,000 hours.

$$(+ 450 \text{ cfm}) * (0.02 \text{ grain/cf}) * (1 \text{ lb/7000 grains}) * (1 \text{ ton/2000 lb}) * (60 \text{ min/hr}) * (3,000 \text{ hr/yr}) = \underline{0.1 \text{ ton/yr of PM}}$$

$$(30,450 \text{ cfm}) * (0.02 \text{ grain/cf}) * (1 \text{ lb/7000 grains}) * (1 \text{ ton/2000 lb}) * (60 \text{ min/hr}) * (+ 2,000 \text{ hr/yr}) = \underline{5.2 \text{ ton/yr of PM}}$$

6/1/2019 – Permit AOP-18-029 reduced the annual allowable hours of operation for several dust collectors:

MAC#1 from 8,760 to 5,000

MAC#2 from 8,760 to 3,175

PN#4 from 8,760 to 5,000

Since these dust collectors have been operating for less than the new allowable limit for several years, this change will not affect the actual PM emissions from these dust collectors.

*Step e:* Calculate the size of the modification on a pollutant-by-pollutant basis using the following formula:

Results of [step a + step b – step c + step d] = size of modification

$$[ 6.0 ] + [ 0 ] - [ 0 ] + [ 5.9 + 1.8 - 15.9 + 3.0 + 0.1 + 5.2 ] = 6.1 \text{ ton/yr PM}$$

The aggregated emissions from the modifications are estimated to result in an emission increase less than the significance level of 25 tpy for PM. In addition, if we assume all the emissions from these PM control devices is in the form of PM<sub>10</sub>, the aggregated emissions are also below the significance level of 15 tpy for PM<sub>10</sub>. Therefore, the modification(s) are designated as a non-major modification.

#### **4.0 DISCUSSION OF SELECT APPLICABLE AND NON-APPLICABLE REQUIREMENTS**

The Agency will assess compliance with these regulations during any inspections of the Facility. The inspections will include confirmation of the proper operation and maintenance of equipment and air pollution control devices, visual observations of emission points, and review of any records required by the Permit.

##### **4.1 Vermont Air Pollution Control Regulations and Statutes**

###### ***§5-201 - Open Burning Prohibited and Permissible Opening Burning***

Open burning of materials is prohibited except in conformance with the requirements of this section.

###### ***§5-211(1) - Prohibition of Visible Air Contaminants - Installations constructed prior to April 30, 1970***

These emission standards apply to Bigelow Boiler #240 and Wickes Boiler #239.

**§5-211(2) - Prohibition of Visible Air Contaminants - Installations constructed subsequent to April 30, 1970**

This emission standard applies Facility wide except for the two boilers subject to §5-211(1). All dust collectors themselves or one or more tools ducted to the dust collector are assumed to have been modified since 1970.

**§5-211(3) – Exceptions for Wood Fuel Burning Equipment** – The EPA never accepted this state regulation in the approved Vermont SIP. For Federal Title V Operating permits, the exceptions for Wood Fuel Burning Equipment do not apply.

**§5-221(1) - Prohibition of Potentially Polluting Materials in Fuel; Sulfur Limitation in Fuel**

This prohibition applies to the Wickes Boiler #239 when burning fuel oil, Bigelow Boiler #232, Cleaver Brooks Boiler #238, and the Dravo Furnace.

**§5-231(1)(b) - Prohibition of Particulate Matter; Industrial Process Emissions**

This emission standard applies to cyclone #1, cyclone #5, Pneumafil #1 and fabric filter #9.

**§5-231(3) - Prohibition of Particulate Matter; Combustion Contaminants**

Based on the application submitted and information available to the Agency, this Facility currently has applicable fuel burning equipment subject to this regulation. The allowable particulate emissions from the subject equipment is shown in Table 4-1.

- (i) 0.5 pounds per hour per million BTU's of *heat input* in combustion installations where the *heat input* is 10 million BTU's or less per hour.
- (ii) For combustion installations where the *heat input* is greater than 10 million BTU's per hour, but where the *heat input* is equal to or less than 250 million BTU's per hour, the applicable limit is determined by using the following formula:

$$E_{PM} = 10^{[-0.47039(\log_{10} HI) + 0.16936]}$$

where:

- $E_{PM}$  - is the *particulate matter emission* limit, expressed to the nearest hundredth pound per hour per million BTU's; and
- HI - is the *heat input* in millions of BTU's per hour.

For the Wickes Boiler #239 when firing oil:

$$E_{PM} = 10^{[-0.47039(\log_{10} 24.9) + 0.16936]}$$

$$E_{PM} = 0.326 \text{ lb/MMBtu}$$

<b>Table 4-1: Equipment Subject to §5-231(3)</b>			
<b>Equipment ID</b>	<b>Size/Capacity</b>	<b>Emission Standard, lbs/MMBtu</b>	<b>Allowable Emissions, lbs/hr</b>
Wickes #239	24.9	0.33	8.2
Bigelow #232	19.5	0.37	7.2
Cleaver Brooks #238	21.0	0.35	7.4
Dravo Furnace	2.5	0.5	1.3

**§5-231(4) - Prohibition of Particulate Matter; Fugitive Particulate Matter**

This section requires the use of fugitive PM control equipment on all process operations and the application of reasonable precautions to prevent PM from becoming airborne during the handling, transportation, and storage of materials, or use of roads. This requirement applies to the entire Facility, and the Facility is therefore expected to comply with the fugitive emission limitations of this section.

**§5-241 - Prohibition of Nuisance and Odor**

This requirement applies to the entire Facility and prohibits the discharge of air contaminants that would be a nuisance to the public or the discharge of objectionable odors beyond the property-line of the Facility.

**§5-253.14 - Solvent Metal Cleaning**

Based on the application submittal and information available to the Agency, this Facility currently has operations subject to this regulation.

**§5-253.16 – Wood Furniture Manufacturing**

This regulation combines the federal MACT requirements of 40 CFR Part JJ and the Control Techniques Guideline for Wood Furniture Manufacturing. The rule was adopted on August 14, 2003 and became effective on March 1, 2004. By accepting a 25 ton/year VOC limit for their wood manufacturing processes, this Facility will not be subject to 5-253.16.

**§5-261 - Control of Hazardous Air Contaminants**

See Section 7.0 below.

**4.2 Federal Air Pollution Control Regulations and the Clean Air Act**

**Clean Air Act §§114(a)(3), 502(b), and 504(a)-(c); 40 CFR Part 70 §§70.6(a)(3)(i)(B) and 70.6(c)(1); and 40 CFR Part 64 - Compliance Assurance Monitoring.**

A Title V facility must comply with enhanced monitoring and compliance assurance monitoring requirements for any emission unit with uncontrolled emissions in excess of the Title V major source threshold and which is subject to an emission standard and which is equipped with an emission control device.

The woodworking operations used in the processing of kiln-dried wood at the Facility are considered to be pollutant specific emission units (PSEU). These

operations have their PM emissions controlled by either fabric filters and/or cyclones, and are subject to PM emission limits.

If it is determined that any of these PSEUs also have pre-control potential to emit (PTE) emissions that exceed 100 tons/yr, then they are subject to the CAM requirements of Part 64. This review evaluates the potential pre-control emission of PM<sub>10</sub> and PM<sub>2.5</sub> to see if they are greater than 100 tons/year.

The Facility has several potentially affected operational areas; the Agency considers each of the main dust collectors servicing these operational areas as a separate PSEU: MAC#1, MAC#2, Pneumafil #1, Pneumafil #3, Pneumafil #4 and Cyclone #5.

There are several methods that could be used to estimate the pre-control PTE. If the actual outlet emissions are known, then the control device’s efficiency could be used to calculate the inlet loading (potential emissions). The outlet emissions are divided by (1 – control efficiency/100). However, for high efficiency control devices, such as a fabric filter, this method can result in huge errors in calculating the pre-control PTE (Barrett Parker, EPA, OAQPS).

Because the wood waste being generated by the various wood working machines at the Facility result in mainly coarse wood waste material, of which most is large enough to not represent airborne PM, it is difficult to estimate the PM emission rate. AP-42 does not have established emission factors for these types of emission sources. The North Carolina Department of Air Quality has established data that provides estimates of the % of PM<sub>2.5</sub>, PM<sub>10</sub>, and PM<sub>100</sub> (very coarse PM) from the several different wood working tools. Table 4-2 summarizes this data.

<b>Table 4-2: Percentage of PM fractions in Wood Waste</b>			
<b>Equipment</b>	<b>PM<sub>2.5</sub></b>	<b>PM<sub>10</sub></b>	<b>PM<sub>100</sub> (&lt;100 μm)</b>
Planing	0	0	0
Shaving/chipping	0	0	0.56%
Rough sawing	0.7%	1.89%	18%
Fine sawing	0.14%	0.37%	31%
Milling	0	0	10%
Molding	0	0	5.2%
Sanding (coarse and fine)	8.81%	23.8%	76%

The VT AQ&CD also used a Journal of Occupational Health paper (Ojima J, “Generation rate and particle size distribution of wood dust by handheld sanding operation”, J Occup Health 2016; 58: 640-643.) to estimate the percentage of PM<sub>10</sub> from coarse sanding. For the 80-grit belt sander used in the Facilities Abrasive Planer unit, it is estimated that 14% of the wood dust formed is PM<sub>10</sub>.

Based on the annual registration data supplied by the Permittee for reporting years 2015, 2016, and 2017, estimates have been made for the pre-control PTE, for each of the dust collectors listed above, for PM<sub>10</sub> and PM<sub>2.5</sub>. This data is summarized in Table 4-3:

<b>Table 4-3: Estimated <u>Actual</u> Pre-control PM<sub>10</sub> &amp; PM<sub>2.5</sub> Emissions</b>						
<b>Equipment ID</b>	<b>Wood Waste 3-yr avg. (ton/yr)</b>	<b>Wood working description</b>	<b>% PM<sub>10</sub></b>	<b>Pre-control emissions of PM<sub>10</sub> (ton/yr)</b>	<b>% PM<sub>2.5</sub></b>	<b>Pre-control emissions of PM<sub>2.5</sub> (ton/yr)</b>
MAC # 1	263	Planing (20.4%)	0%	0	0%	0
	765	Fine sawing (50.3%)	0.37%	2.8	0.14%	1.1
	263	Coarse sanding (20.4%)	13.9%	36.6	8.81%	23.1
			TOTAL	39.5	TOTAL	24.2
MAC # 2	244	sanding	23.8%	58.2	8.81%	21.5
PN # 1	240	milling	0%	0	0%	0
PN # 3	129	sanding	23.8%	30.8	8.81%	11.4
PN # 4	298	planing (19%)	0%	0	0%	0
		Sanding (6%)	23.8%	19.8	8.81%	7.3
	1192	rough sawing (75%)	1.89%	18.2	0.7%	6.8
			TOTAL	38.1	TOTAL	14.1
Cyc # 5	210	Molding (86%)	0%	0	0%	0
	33	Sanding (14%)	23.8%	8.0	8.81%	3.0
			TOTAL	8.0	TOTAL	3.0

The operational data in 2015 – 2017 does not represent the ‘potential to emit,’ since the operation did not run 8,760 hours/year. The estimates in Table 4-3 were scaled up to 8,760 hours to establish the pre-control PTE. When this is done, several of the dust collectors have pre-control PTM of PM<sub>10</sub> that are estimated to exceed 100 ton/year. To reduce the pre-control PTE, the Permittee has proposed to reduce the permitted operating time for the affected dust collectors to less than 8,760 hours/year. The pre-control PTE data is summarized in Table 4-4 along with the annual hour limit for each unit.



<b>Table 4-4: Estimated <u>Potential</u> Pre-control PM<sub>10</sub> &amp; PM<sub>2.5</sub> Emissions</b>						
<b>Equipment ID &amp; (Hour/year limit)</b>	<b>Wood Waste 3-yr avg. (ton/yr)</b>	<b>Wood working description</b>	<b>% PM10</b>	<b>Pre-control emissions of PM<sub>10</sub> (ton/yr)</b>	<b>% PM<sub>2.5</sub></b>	<b>Pre-control emissions of PM<sub>2.5</sub> (ton/yr)</b>
MAC # 1 (5,000)	602	Planing (20.4%)	0%	0	0%	0
	1,755	Fine sawing (50.3%)	0.37%	6.5	0.14%	2.5
	602	Coarse sanding (20.4%)	13.9%	84.0	8.81%	53.1
			<b>TOTAL</b>	<b>90.5</b>	<b>TOTAL</b>	<b>55.5</b>
MAC # 2 (3,175)	390	sanding	23.8%	<b>92.9</b>	8.81%	34.4
PN # 1 (8,760)	1,079	milling	0%	<b>0</b>	0%	0
PN # 3 (5,000)	295	sanding	23.8%	<b>70.1</b>	8.81%	26.0
PN # 4 (5,000)	551	planing (19%)	0%	0	0%	0
	190	Sanding (6%)	23.8%	45.2	8.81%	16.7
	2,394	rough sawing (75%)	1.89%	45.2	0.7%	16.8
			<b>TOTAL</b>	<b>90.5</b>	<b>TOTAL</b>	<b>33.5</b>
Cyc # 5 (8,760)	928	Molding (86%)	0%	0	0%	0
	148	Sanding (14%)	23.8%	35.2	8.81%	13.0
			<b>TOTAL</b>	<b>35.2</b>	<b>TOTAL</b>	<b>13.0</b>

#### **40 CFR Part 63, Subpart JJ - National Emission Standards for Wood Furniture Manufacturing Operations**

§63.802 Emission limits; §63.803 Work practice Standards; §63.806 Recordkeeping requirements; §63.807 Reporting requirements. Applicable to all facilities engaged in the manufacture of wood furniture and that are major HAP sources.

In the past, the Facility has been a major source of HAPs and was subject to the requirements of 40 *CFR* Part 63, Subpart JJ. The processes that were the main contributors to HAP emissions at the Facility were the wood furniture spray finishing operations. The spray finishing operation included (±31) spray booths. This operation ceased on 8/25/2009, and the spray booths were removed in 2011. The Facility has not emitted HAPs at a rate greater than 10 tons/year for any individual HAP or 25 ton/year for total HAPs since before 5/31/2006 when permit AOP-04-005 was issued with an enforceable HAP limit of 10/25 tons/year.

On January 25, 2018, the U.S. EPA's Assistant Administrator, William Wehrum, issued a memorandum that supersedes the previous "once in, always in" policy (original policy, articulated in a memorandum, dated May 16, 1995 from John S. Seitz Director of Air Quality Planning and Standards). With this policy change the Permittee is changing its status, with regards to 40 *CFR* Part 63 Subpart JJ, from major HAP source to area source. As an area source, the Facility is no longer subject to 40 *CFR* Part 63, Subpart JJ.

**40 C.F.R. Part 63 Subpart JJJJJJ – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial and Institutional Boilers – area sources.**

This regulation applies to all the boiler(s) at the Facility. Since the boiler(s) are considered existing boilers under this regulation, they are subject to the work practice standards as well as notification, reporting and recordkeeping requirements established in this rule. The work practice standards include biennial tune-ups and a one-time energy assessment.

## **5.0 CONTROL TECHNOLOGY REVIEW FOR MAJOR SOURCES AND MAJOR MODIFICATIONS**

The Facility is not undergoing changes subject to new source review; therefore, this section is not applicable.

## **6.0 AMBIENT AIR QUALITY IMPACT EVALUATION**

The Facility is not undergoing changes subject to new source review; therefore, this section is not applicable.

## **7.0 HAZARDOUS AIR CONTAMINANTS**

The emissions of hazardous air contaminants ("HACs") are regulated under to §5-261 of the Regulations. The Owner/Operator of a source must quantify its emissions of HACs regulated by this rule. Any Facility whose emission rate of a HAC exceeds its respective Action Level ("AL") is subject to the rule for the HAC, and the Owner/Operator must then demonstrate that the emissions of the HAC are minimized to the greatest extent practicable by achieving the Hazardous Most Stringent Emission Rate ("HMSER") for that HAC.

The emission of hazardous air pollutants ("HAPs") may also be regulated separately under to §112 of the Federal Clean Air Act. Any applicable HAP regulations are discussed under Section 4 above.

As noted in Section 3, for the facility currently does not have estimated emissions of HACs that exceed their respective action levels and is therefore not subject to §5-261 at this time.

## **8.0 Discussion of Permit Conditions**

*For purposes of clarity, discuss any unique permit conditions and explain what was considered in the development of the condition.*

Condition (36):

Records of Adhesive Use: In accordance with 5-253.8 [Industrial Adhesives] of the Regulations, the Permittee shall maintain sufficient monthly records demonstrating compliance with the exemption provided by §5-253.8(A)(2)(iii). [10 V.S.A. §§556(c) and 556a(d)] [§5-253.8 and 5-405(1) of the Regulations]

*§5-253.8(A)(2)(iii) of the regulations requires recordkeeping to document that the Facility does not emit more than 200 pounds/year of VOCs from adhesives.*

*The records must be updated monthly and include the total VOC emissions from adhesives based on a 12- month rolling average.*

*Recommended records:*

- (a) A list of each adhesive, sealant, adhesive primer, sealant primer cleanup solvent and surface preparation solvent in use and in storage;*
- (b) A data sheet or material list which provides the material name, manufacturer identification, and material application;*
- (c) Catalysts, reducers or other components used and the mix ratio;*
- (d) The VOC content of each product as supplied;*
- (e) The final VOC content or vapor pressure, as applied; and*
- (f) The monthly volume of each adhesive, sealant, adhesive primer, sealant primer, cleanup or surface preparation solvent used.*