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-10-004

Permit Date: May 2, 2014

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

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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

Table 1-1: Administrative Summary

Administrative Item	Result or Date
Date Application Received:	1/12/2011
Date Administratively Complete:	1/12/2011
Date Technically Complete:	01/12/2011
Date Draft Decision:	02/06/2014
Date & Location Draft Decision/Comment Period Noticed:	02/06/2014 *The Caledonian Record*
Date & Location Public Meeting Noticed:	Not applicable
Date & Location of Public Meeting:	Not applicable
Deadline for Public Comments:	03/10/2014
Date Proposed Decision:	3/13/2014
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:

Table 1-2: Estimated Air Contaminant Emissions (tons/year)[1]						
PM/PM10	***SO2***	***NOx***	***CO***	***VOC***	***Total HAPs*** [2]	***CO_2e*** [3]
577	**304**	**<100**	**242**	**>50**	**<10/25**	96,633

[1] PM/PM10 - particulate matter, SO2 - sulfur dioxide, NOx - oxides of nitrogen, CO - carbon monoxide, HAPs - hazardous air pollutants.
[2] Emissions of individual HAPs each < 10 tpy and emissions of total HAPs combined <25 tpy.
[3] CO_2e '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 and finishing 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.

TABLE 2-1: Equipment Specifications - Energy Plant [1]			
Boiler unit	Unit Rating(s): MMBtu/hr [2] max heat input;	Fuel Type(s)	Year of Installation
Bigelow Boiler #240 Type F54/46 (6479 ft^2 boiler heating surface)	54 MMBtu /hr	Wood (fly ash reinjection)	1950
Wickes Boiler #239 Type A (3565 ft^2 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
Rettew Furnace Model 60 (saw mill)	3.6 MMBtu /hr (<90 hp [3])	Wood / Bark	Removed 2011
Steam Turbine	700 kW [4]	Steam	2005

[1] 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.

[2] MMBTU/hr - Million British Thermal Units per hour maximum rated heat input.

[3] hp: boiler horse power rating.

[4] kW – kilowatts of electrical output.

Table 2-2 Equipment Specifications – Wood Waste Handling Operations		
Wood Waste Handling Operation (if known: installation date)	Air Flow (acfm)	Unit Description/Specifications (4-diget 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".
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).

Table 2-2 Equipment Specifications – Wood Waste Handling Operations		
Wood Waste Handling Operation (if known: installation date)	Air Flow (acfm)	Unit Description/Specifications (4-diget number = blower ID #)
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 [1]	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 – sander BH (8,000 cfm); 5011 – sander TH (8,000 cfm); 7001 – rip saw relay (15,300 cfm); 5018 – double trim & bust-up saw (8,000 cfm). [1]
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 Twin 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).
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).

Table 2-2 Equipment Specifications – Wood Waste Handling Operations		
Wood Waste Handling Operation (if known: installation date)	Air Flow (acfm)	Unit Description/Specifications (4-diget number = blower ID #)
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).

[1] June 2008 blower 5018 installed to send material from the double trim saw and the bust-up saw to the MAC #1 dust collector. This increased the flow to the MAC #1 by 8000 cfm.

Table 2-3 Equipment Specifications – Miscellaneous Equipment and Operations
Previous permits included a Spray Finishing Operation with (±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 (±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 (±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, but permit AOP-10-004 will reflect the fact that some equipment and operations have been removed from the facility and there were some changes to the wood waste handling system(s).

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.

Table 2-4: Negligible Sources of Contaminant Emissions	
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 Bldg. 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 not proposed any limits as part of this permit review.

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_X could exceed 100 tons/year and the Facility would then be subject to the NOx 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_X by limiting the total fuel usage. So the fuel usage will be limited such that the maximum NO_X 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_X emissions, or the physical limit of the boilers. If the maximum amount of a given fuel is used, and 100 tons of NO_X has not been reached, then other fuels will assume to be used until there is a total of 100 tons of NO_X 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_X limited to < 100 ton/yr) will be identified, and this will represent the allowable emission of these pollutants from the boilers.

Table 3-1: Boilers - Rated Heat Input

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)	90,586 wet [1] 52,445 dry	4,248,600 No.2 [2] 3,965,360 No.4

[1] Based on a higher heating value of 4400 BTUs/lb at 50% moisture for wet wood and 7600 BTUs/lb at 12% moisture for dry wood.

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

Table 3-2: Emission Factors for Boilers							
Emission Factors & Fuel Type	**PM/PM_{10}**	**SO_2**	**NOx**	**CO**	**VOC**	**HAP**	Source
	lb/MMBtu (wood) or lb/1000 gal (oil)						
Wet wood	0.58	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)
Dry wood	0.42	0.025	0.49	0.6	0.017	0.0389	
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 Wet Wood Fuel Usage:

Scenario A: Maximum wood usage without oil

(91,000,000 Btu/hr)*(8760 hr/yr)/(4,400 Btu/lb)/(2000 lb/ton) = 90,586 tpy wet wood.

As shown in Table 3-3, this amount of wet wood usage does not reach 100 tons/yr of NO_X emissions, but there is no operating time available on the wood boilers to burn dry wood (to bring the NO_X emissions up to 100 tons/yr), so no dry wood usage in included in Scenario A. This is different than the review for permit AOP-04-005, which estimated emissions from dry wood fuel until 100 tons/yr of NO_X emission was reached. With the extra wood fuel, the review for permit AOP-04-005 incorrectly resulted in a maximum potential CO emission rate of 260 ton/yr.

Table 3-3 Scenario A							
Fuel Type	Fuel Amount	PM/ PM_{10}	SO_2	NO_X	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
wet wood	90,586	231.2	10.0	87.7	239.1	6.8	15.5
dry wood	0	0.0	0.0	0.0	0.0	0.0	0.0
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		231.2	10.0	87.7	239.1	6.8	15.5

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

Table 3-4 Scenario B							
Fuel Type	Fuel Amount	PM/ PM_{10}	SO_2	NO_X	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
wet wood	90,586	231.2	10.0	87.7	239.1	6.8	15.5
dry wood	0	0.0	0.0	0.0	0.0	0.0	0.0
No.2 oil	1,231,240	2.0	43.7	12.3	3.1	0.2	0.04
No.4 oil	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	-	233.2	53.7	100.0	***242.2***	***7.0***	***15.5***

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

Table 3-5 Scenario C							
Fuel Type	Fuel Amount	PM/ PM_{10}	SO_2	NO_X	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
wet wood	90,586	231.2	10.0	87.7	239.1	6.8	15.5
dry wood	0	0.0	0.0	0.0	0.0	0.0	0.0
No.2 oil	0	0.0	0.0	0.0	0.0	0.0	0.0
No.4 oil	1,231,240	2.0	92.3	12.3	3.1	0.2	0.04
Total	-	***236.3***	102.3	100.0	***242.2***	***7.0***	***15.6***

Scenario D: Maximized Dry Wood Fuel Usage:

(91,000,000 Btu/hr)*(8760 hr/yr)/(7,600 Btu/lb)/(2000 lb/ton) = 52,445 tpy dry wood.

This amount of dry wood fuel will greatly exceed 100 ton/year NOx, so Scenario D will be based on 26,853 tons of dry wood and this will result in 100 ton/yr of NOx. Since this amount of dry wood will 'consume' the available NOx, no other fuels can be used.

Table 3-6 Scenario D							
Fuel Type	Fuel Amount	PM/ PM_{10}	SO_2	NO_X	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
wet wood	0	0.0	0.0	0.0	0.0	0.0	0.0
dry wood	26,853	85.7	5.1	100.0	122.4	3.5	7.9
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	-	85.7	5.1	100.0	122.4	3.5	7.9

Scenario E & F: Maximized No.2 Fuel Oil Usage:

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

Scenario E: Maximum No.2 fuel oil with additional wet wood usage.

Table 3-7 Scenario E

Fuel Type	Fuel Amount	PM/ PM_{10}	SO_2	NO_X	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
wet wood	59,415	151.6	6.5	57.5	156.9	4.4	10.2
dry wood	0	0.0	0.0	0.0	0.0	0.0	0.0
No.2 oil	4,248,600	7.0	150.8	42.5	10.6	0.7	0.1
No.4 oil	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	-	158.6	157.4	100.0	167.5	5.2	10.3

Scenario F: Maximum No.2 fuel oil with additional dry wood usage.

Table 3-8 Scenario F

Fuel Type	Fuel Amount	PM/ PM_{10}	SO_2	NO_X	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
wet wood	0	0.0	0.0	0.0	0.0	0.0	0.0
dry wood	15,444	49.3	2.9	57.5	70.4	2.0	4.6
No.2 oil	4,248,600	7.0	150.8	42.5	10.6	0.7	0.1
No.4 oil	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	-	56.3	153.8	100.0	81.0	2.7	4.7

Scenario G & H: Maximized No.4 Fuel Oil Usage:

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

Scenario G: Maximum No.4 fuel oil with additional wet wood usage.

Table 3-9 Scenario G

Fuel Type	Fuel Amount	PM/ PM_{10}	SO_2	NO_X	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
wet wood	62,341	159.1	6.9	60.3	164.6	4.7	10.7
dry wood	0	0.0	0.0	0.0	0.0	0.0	0.0
No.2 oil	-	0.0	0.0	0.0	0.0	0.0	0.0
No.4 oil	3,965,360	16.5	297.4	39.7	9.9	0.7	0.3
Total	-	175.6	***304.3***	100.0	174.5	5.3	11.0

Scenario H: Maximum No.4 fuel oil with additional dry wood usage.

Table 3-10 Scenario H							
Fuel Type	Fuel Amount	PM/ PM_{10}	SO_2	NO_X	CO	VOCs	HAPs
	Tons/yr or gallons/yr	Tons/year					
wet wood	0	0.0	0.0	0.0	0.0	0.0	0.0
dry wood	16,205	51.7	3.1	60.3	73.9	2.1	4.8
No.2 oil	-	0.0	0.0	0.0	0.0	0.0	0.0
No.4 oil	3,965,360	16.5	297.4	39.7	9.9	0.7	0.3
Total	-	68.2	300.5	100.0	83.8	2.8	5.1

Worst Case Boiler Emissions from Scenarios A through H:

Table 3-11: Maximum Boiler Emissions					
PM/PM_{10}	***SO_2***	***NO_X***	***CO***	***VOC***	***Total HAPs***
236.3	304.3	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
Distillate Fuel Oil #2	0	gallons
Distillate Fuel Oil #4	1,231,240	gallons
Wood and Wood Waste	50,326	tons

For wood - the calculations are based on tons of wood at 10% MC

Table 3. Total Company-wide CO_2, CH_4 and N_2O Emissions from Stationary Source Fuel Combustion

Fuel Type	CO_2 (kg)	CO_2 (lb)	CH_4 (kg)	CH_4 (lb)	N_2O (kg)	N_2O (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_2	CH_4	N_2O	CO_2e	
	1.0	21.0	310.0	metric ton	short ton
Total CO_2 Emissions - Equivalent (Fossil CO2e + Biogenic CH4 & N2O)				**15,061.9**	**16,602.9**
All CO2e emissions at stack (Fossil CO2e + Biogenic CO2e) - for APCD Permit info				**87,664.1**	**96,633.0**

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 3-12: Wood Waste Handling Systems Particulate Matter Emissions (tons/year)

Device No.	Source Description	Air Flow (acfm)	PM Limit (gr/dscf) [1]	lbs/hr [2]	tpy [3]
Cyclone #7	sawmill	green wood [4]			
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	8.4	36.6
MAC #1		39,300 [5]	0.02	5.4	29.5
MAC #2	System A (finish mill)	50,400	0.02	8.6	37.8
Cyclone #5		58,200	0.06	29.9	131.1
Pneumafil #1		35,200	0.06	18.1	79.3
Pneumafil #3	UV Flat Line Sander (5000 hours/yr)	30,450	0.02	5.2	13.1
				Total	327.4

[1] gr/dscf equals grains of pollutant emitted per dry standard cubic foot of undiluted exhaust gas.
[2] lbs/hour equals pounds of pollutant emitted per hour based on the air flow rates as given in Findings of Fact A.
[3] tpy based on 8760 hours of operation unless noted otherwise.
[4] 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.
[5] 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.

Table 3-13: Miscellaneous Particulate Matter Emissions (tons/year)					
Device No.	**Source Description**	**Air Flow (acfm)**	**PM Limit (gr/dscf)**	**lbs/hr**	**tpy**
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 kilns) * (70,000 BF/cycle) + (5 kilns) * (40,000 BF/cycle) = 900,000 BF/cycle

(1 cycle/14 days) * (365 days/year) * (900,000 BF/cycle) = 23,464,286 BF/year

(23,464,286 BF/yr) * (2.21 lb VOC / 1000 BF) * (1 ton/2000 lbs) = 25.9 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 to as low as 0.1 tons in 2010 and 2011.

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 is provided below.

Table 3-14: Historical Actual VOC and Acetone Emissions (tons per year) from Wood Finishing Operations

Year	VOC[1] (tons per year)	Acetone (tons per year)
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 [2]	202.8	51.6
2000 [3]	201.1	47.0
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 [4]	28.2	3.8
2010	0.1	0.0
2011	0.1	0.0

[1] The VOC emission data is from the registration database.
[2] Installation of flatline UV rollcoat unit.
[3] Installation of high solids hot spray for sealer and topcoat application.
[4] Shutdown main spray finishing operation on 8/29/2009.

3.1.7 Total Facility Emissions:

Table 3-15: Summary of Allowable Air Contaminant Emissions by Source (tons/year)							
Source	***PM/PM$_{10}$***	***SO$_2$***	***NO$_X$***	***CO***	***VOC***	***Total HAPs***	***CO$_2$e***
Boilers	236	304	<100	242	7	16	96,633
Lumber Kilns	-	-	-	-	25.9	-	
Wood Waste Baghouses & Cyclones	327.4	-	-	-	-	-	
Miscellaneous PM Sources	12.8	-	-	-	-	-	
Wood Furniture Finishing Operations	-	-	-	-	>50	varies	
Facility Totals	**577**	**304**	**<100**	**242**	**>50**	**<10/25**	96,633

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_2, NO_X, CO and VOCs greater than 50 tons/yr which would 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, SO_2, 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 2010 and 2011, 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 these two years, no Action Levels were exceeded.

Table 3-16 Quantification of HAC Emissions 2010/2011					
Hazardous Air Contaminant	**CAS#**	**Toxic Category**	**Emission Rate (lb/8-hrs)[1]**	**Averaging Time (hrs)**	**Action Level (lb/8-hrs)**
ethyl alcohol	64-17-5	2	0.0532	8760	37.2
isopropyl alcohol	67-63-0	2	0.0033	8760	184
acetone	67-64-1	2	0.0110	8760	26.1
isobutyl alcohol	78-83-1	2	0.0086	8760	8.7
isobutyl ester isobutyric acid (isobutyl isobutyrate)	97-85-8	3	0.0104	2000	1.9
ethyl benzene	100-41-4	1	0.0015	8760	8.3
2,6-dimethyl-4-heptanone (diisobutyl ketone)	108-83-8	3	0.0020	2000	1.8
n-propyl acetate	109-60-4	2	0.0033	8760	9.5
n-butyl acetate	123-8-4	2	0.0591	8760	35.2
xylene	1330-20-7	2	0.0068	8760	8.3
propoxypropanol (1-propoxy-2-propanol)	1569-01-3	3	0.0688	2000	1.9
butyl propasol (2-propanol, 1-butoxy)	5131-66-8	3	0.0665	2000	1.9
crystalline silica	14808-60-7	2	0.0085	8760	0.01
trimethyl benzene (including mixed isomers such as 1,2,4-trimethyl benzene)	25551-13-7	2	0.0030	8760	243
dipropylene glycol methyl ether	34590-94-8	2	0.0139	8760	120

Due to changes in the wood furniture markets, the Facility's need for applying finishes to their products has been significantly reduced in the last few years. In the past, the emissions of Hazardous Air Contaminants were much greater than during this permit review. Since the wood furniture market could change in the future and could return to previous levels experienced at this Facility, the Hazardous Most Stringent Emission Rate for HACs discussed in Section 7.0 of this document will be based on the permit review that was conducted in 2006, when the level of operation was more typical for this Facility

3.3 Review of Past Modifications

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 cfm) * (0.02 grain/cf) * (1 lb/7000 grains) * (1 ton/2000 lb) * (60 min/hr) * (8760 hr/yr) = 6.0 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 cfm) * (0.02 grain/cf) * (1 lb/7000 grains) * (1 ton/2000 lb) * (60 min/hr) * (3,000 hr/yr) = 5.9 ton/yr of PM

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

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

12/15/2003 – A 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 – A 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:

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

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

Net effect of this change: 8.0 ton/yr – 23.9 ton/year = - 15.9 ton/yr

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

(+ 4,000 cfm) * (0.02 grain/cf) * (1 lb/7000 grains) * (1 ton/2000 lb) * (60 min/hr) * (8,760 hr/yr) = 3.0 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 cfm) * (0.02 grain/cf) * (1 lb/7000 grains) * (1 ton/2000 lb) * (60 min/hr) * (3,000 hr/yr) = 0.1 ton/yr of PM

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

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 ton/yr PM

The aggregated emissions from the modifications are estimated to result in an emissions 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_{10}, the aggregated emissions are also below the significance level of 15 tpy for PM_{10}. 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:

$$E_{PM} = 10^{[-0.47039(\log_{10} 24.9)+0.16936}$$
$$E_{PM} = 0.326 \text{ lb/MMBtu}$$

Table 4-1: Equipment Subject to §5-231(3)			
Equipment ID	***Size/Capacity***	***Emission Standard, lbs/MMBtu***	***Allowable Emissions, lbs/hr***
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.

§5-253.14 – 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.

§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.
Upon renewal of a Title V Permit to Operate, a 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 precontrol potential to emit (PTE) emissions that exceed 100 tons/yr, then they are subject to the CAM requirements of Part 64.

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 precontrol 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 precontrol 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 $PM_{2.5}$, PM_{10}, and PM_{100} (very coarse PM) from the several different wood working tools. Note that the coarser fractions also include all of the smaller fractions; so for an operation like sanding, the total of the percentages for $PM_{2.5}$, PM_{10} and PM_{100} are not expected to be less than or equal to 100%. Table 4-2 summarizes this data.

Table 4-2: Percentage of PM fractions in Wood Waste

Equipment	***$PM_{2.5}$***	***PM_{10}***	***PM_{100} (<100 µm)***
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	8.81%	23.8%	76%

Based on the annual registration data supplied by the Permittee for reporting years 2010, 2011, and 2012, estimates have been made for the precontrol PTE, for each of the dust collectors listed above, for total PM and PM_{10}. This data is summarized in Table 4-3:

Table 4-3: Estimated Actual Precontrol PM_{10} & Total PM Emissions						
Equipment ID	**Wood Waste 3-yr avg. (ton/yr)**	**Wood working description**	**% PM10**	**Precontrol emissions of PM10 (ton/yr)**	**% Total PM**	**Precontrol emissions of Total PM (ton/yr)**
MAC # 1	894	Planing (60%)	0%	0	0%	0
	596	Fine sawing (40%)	0.37%	2	31%	185
			TOTAL	2	TOTAL	185
MAC # 2	291	sanding	23.8%	69	76%	221
			TOTAL	69	TOTAL	221
PN # 1	292	milling	0%	0	0%	0
			TOTAL	0	TOTAL	0
PN # 3	149	sanding	23.8%	35	76%	113
			TOTAL	35	TOTAL	113
PN # 4	298	planing (20%)	0%	0	0%	0
	1192	rough sawing (80%)	1.89%	23	18%	215
			TOTAL	23	TOTAL	215
Cyc # 5	257	molding	0%	0	5.2%	13
			TOTAL	0	TOTAL	13

The operational data in 2010 – 2012 represents does not represent the 'potential to emit,' since the operation did not run 8760 hours/year. The estimates in Table 4-3 were scaled up to 8760 hours to establish the precontrol PTE. The precontrol PTE data is summarized in Table 4-4. This data shows that the MAC#2 baghouse has a precontrol PTE that exceeds 100 tons/year of PM_{10} therefore the MAC#2 baghouse is subject to the CAM requirements of Part 64.

Table 4-4: Precontrol Potential to Emit PM_{10} & Total PM						
Equipment ID	**Wood Waste 3-yr avg. (ton/yr)**	**Wood working description**	**% PM10**	**Precontrol potential to emit of PM10 (ton/yr)**	**% Total PM**	**Precontrol potential to emit of Total PM (ton/yr)**
MAC # 1	3232	Planing (60%)	0%	0	0%	0
	2154	Fine sawing (40%)	0.37%	8	31%	668
			TOTAL	8	TOTAL	668
MAC # 2	1158	sanding	23.8%	**276**	76%	880
			TOTAL	276	TOTAL	880
PN # 1	1160	milling	0%	0	0%	0
			TOTAL	0	TOTAL	0

PN # 3	297 [1]	sanding	23.8%	35	76%	113
			TOTAL	35	TOTAL	113
PN # 4	1036	planing (20%)	0%	0	0%	0
	4145	rough sawing (80%)	1.89%	78	18%	746
			TOTAL	78	TOTAL	746
Cyc # 5	1161	molding	0%	0	5.2%	60
			TOTAL	0	TOTAL	60

[1] The Pneumafil #3 dust collector is limited in the permit to 5000 hours/year.

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. The Facility will remain subject to the above regulation regardless of future actual or allowable emissions based on the U.S. EPA's "Once-in, Always-in" policy, articulated in a memorandum, dated May 16, 1995 from John S. Seitz Director of Air Quality Planning and Standards. However, to the extent that EPA's policy on this issue changes, the Permittee may in the future be able to avoid applicability of 40 CFR Part 63, Subpart JJ based on its future actual or allowable HAP emissions.

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 the boiler(s). 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.

Since the date of the last permit review, the Agency updated the HAC regulation and this included updating the hazard category and Action Level for many HACs. From this point going forward, the Facility will be reviewed for compliance with §5-261 of the Regulations using the list of HACs and their respective action levels that were adopted effective March 28, 2007.

As noted in Section 3, the facility has had the potential to exceed the action level of several HACs and is therefore subject to §5-261.

7.1 HMSER Selection

If the emission of any HAC from all regulated sources at the Facility is estimated to exceed its AL, then the Facility is subject to the rule and the emissions must be reduced to achieve HMSER for that HAC.

In the review for permit AOP-04-005, the Agency determined that the Facility had regulated emissions, namely from the finishing operations, of the following HAC compounds that were in excess of their respective Action Levels and those emissions were reviewed under §5-261:

Crystalline silica (14808-60-7)
isobutyl acetate (110-19-0)
isobutyl alcohol (78-83-1)
1,2,4-trimethyl benzene (95-63-6)
methyl amyl ketone (110-43-0)
1-butoxy-2-propanol (synonym butyl propasol) (5131-66-8)

With the updated Action Levels effective March 28, 2007, the Facility is no longer expected to exceed the Action Level for 1,2,4-trimethyl benzene. The following HMSER is no longer needed for 1,2,4-trimethyl benzene.

The Agency determined that the Permittee achieved HMSER for the respective HACs through implementation of several emission reduction measures. These measures are comprised of the following five measures:

1. coating reformulations to reduce VOCs and TRI reportable toxics and thus replace more toxic HACs and HAPs with less toxic compounds;

2. continued reformulation measures specifically focused on increased use of acetone in place of more toxic components;
3. more extensive use of high volume low pressure (HVLP) spray guns to improve coating transfer efficiency and reduce coating usage;
4. use of high solids “hot spray” coatings (sealer 3.8 lbs VOC/gal; topcoat 4.8 lbs VOC/gal) in place of the previous conventional and pre-catalyzed coatings (sealer 4.0 - 4.3 lbs VOC/gal; topcoat 3.6 - 6.0 lbs VOC/gal). The high solid hot spray coatings use heat to increase viscosity of higher solids coatings with less solvent. Due to the increased solids content, these coatings also attain the necessary film build thickness with two coats instead of the previous standard of three coats; and
5. the installation of the UV flatline rollcoat finishing system that uses 100% solids (solvent free) coatings where high quality finishes are not necessary such as drawer bottoms and backs.

In addition, the HMSER determination required the Permittee to continue to comply with the state wood furniture regulation, regardless of that regulation’s applicability section.

Emissions of silica were also reduced by measures that decrease coating usage such as HVLP spray guns, high solids coatings and UV coating applications. In addition, overspray filters are used to capture a minimum of 95% of the overspray in the exhaust air. It should also be noted that while the silica in the coatings is in the crystalline silica form it is not emitted with the hazardous properties of free crystalline silica since it is encapsulated in the overspray coatings.

As part of the HMSER determination, an emission cap on each of the respective HACs was established. These emission caps are based on the highest level of respective HAC emission for years 2000 through 2004 plus a factor of growth of 33% which is equivalent to the addition of an additional production shift which could reasonably be accomplished without triggering a permit modification. The year 2000 was selected as the oldest year representing actual emissions under normal operations since it reflects the first year after full implementation of all the emission reduction measures. The year 2000 also represents the highest production year since 1991 at the facility in terms of sq.ft. of product finished (8,362,097 sq.ft.). Subsequent years show a decline in production due to the national economic decline and are not considered fully representative of normal operations.

Hazardous Air Contaminant Emission Limitations			
Hazardous Air Contaminant	CAS #	Maximum Actual Emissions from 2000 - 2003	Emission Limitation lbs/year [1]
Crystalline silica	14808-60-7	42	56 [2]
Isobutyl acetate	110-19-0	76000	101,080 [3]
Methyl amyl ketone	110-43-0	77800	103,474 [4]
Butyl propasol	5131-66-8	4380	5,825 [5]
Isobutanol	78-83-1	16720	22,238 [6]

[1] lbs/year equals pounds of pollutant emitted per rolling twelve (12) consecutive calendar month period. Emission limit is based on 133% of the maximum actual emissions during the time period from 2000 through 2003.
[2] Max actuals were 42 lbs in 2002, plus 33%. This assumes an average transfer efficiency of 60% (HVLP) and an overspray filter efficiency of 95%.
[3] Max actuals were 76,000 lbs in 2000, plus 33%.
[4] Max actuals were 77,800 lbs in 2000, plus 33%.
[5] Max actuals were 4,380 lbs in 2000, plus 33%.
[6] Max actuals were 16,720 lbs in 2000, plus 33%.

Note regarding federal enforceability and equivalency: On February 10, 1982 the Federal EPA approved, as part of Vermont's State Implementation Plan, §5-261 of the Vermont Air Pollution Control Regulations. As approved, §5-261 required a "most stringent emission rate" (MSER), as defined for major stationary sources for the control of hazardous air contaminants. The current State of Vermont hazardous air contaminants regulation, as amended on January 20, 1993, employs both an action level and a "hazardous most stringent emission rate" (HMSER) for the control of hazardous air contaminants. Both MSER and HMSER are established on a case-by-case basis and are based on the lowest emission rate achieved in practice by such category of source. The Agency has determined that the use of an action level in conjunction with a HMSER is at least as stringent as the MSER as adopted by the EPA.

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 (7):

In order to maintain emissions of nitrogen oxides (NO_X) below the one hundred (100) tons per year threshold of §5-251(3), the Permittee shall not burn fuel in all boilers combined located at its Facility in quantities greater than the following limit during any rolling twelve (12) consecutive calendar month period:

$$0.020 * X + 1.94 * Y + 7.45 * Z < 200{,}000$$

where:

X = quantity of No.2 and No.4 fuel oil burned in units of gallons;
Y = quantity of wet wood fuel burned in units of tons (as fired, including moisture); Wet wood fuel shall be defined as wood fuel with a moisture content of 20% by weight or greater on a green basis.
Z = quantity of dry wood fuel burned in units of tons (as fired, including moisture). Dry wood fuel shall be defined as wood fuel with a moisture content of less than 20% by weight on a green basis.

The NOx emission rates of 1.94 lbs per ton of wet wood and 7.45 lbs per ton of dry wood in the above formula may be revised by the Agency based on the results of any stack emission testing on the Facility boilers or other credible emission data as approved by the Agency.

Formula is based on AP42 factors.

Oil: 0.020 lbs NOx/gal from §1.3 table 1.3-1 (boilers <100MM) ver. 5/2010.

Wet wood: 0.22 lbs NOx/MMBTU from §1.6 table 1.6-2 ver. 9/03 and an assumed heat value of 4,400 btu/lb for 50% moisture "wet" wood.

(0.22 lb/MMBtu) * (4400 Btu/lb wood) * (2000 lb wood/ton) * (1 MMBtu/10^6 Btu)

= 1.94 lb NOx/ton wood

Dry wood: 0.49 lbs NOx/MMBTU from §1.6 table 1.6-2 ver. 9/03 and an assumed heat value of 7,600 btu/lb for 12% moisture "dry" wood.

(0.49 lb/MMBtu) * (7600 Btu/lb wood) * (2000 lb wood/ton) * (1 MMBtu/10^6 Btu)

= 7.45 lb NOx/ton wood

The Permittee uses following procedure to determine the quantity of wet/green and dry wood burned:

The quantity of wet/green wood burned (Y) is calculated from the recorded sawmill production in thousands of board feet of lumber (Kbf). This calculation assumes a chip weight of 1.25 ton/Kbf, a saw dust weight of 0.625 ton/Kbf and a bark weight of 0.75Kbf. Any chips, sawdust or material sold are reduced from the total of the recorded amounts, and spillage is estimated as a reduction of 5 percent. Additional assumptions are all wood is burned (i.e., no storage) and high heat value of Btu/lb is applied at 4400 Btu/lb.

The quantity of dry wood burned (Z) is calculated from plant production in thousands of board feet of lumber (Kbf) and depending upon the lines of furniture produced, an average waste factor for the relevant time period determined will be calculated as a percent. Therefore, the dry wood burned is based upon a waste factor times the

production amount in Kbf. The calculation for weight of waste is 3,400 lbs/Kbf divided by 2000 (tons). Shavings that are sold are subtracted from the total accumulated number and the balance is assumed to be burned as fuel (i.e., no storage). A high heat value is estimated at 8,000 Btu/lb as 100% dry or other wise 7600 Btu/lb.

* Ref: Forest Products Measurements and Conversion Factors: With Special Emphasis on the U.S. Pacific Northwest, Chapter 7. Chips, Sawdust, Planer Shavings, Bark, and Hog.