

**State of Vermont  
Agency of Natural Resources  
Department of Environmental Conservation**



**Air Pollution Control Division  
Waterbury, Vermont**

**Technical Support Document  
For:**

**Title V  
Air Pollution Control Permit to Construct and Operate  
#AOP-04-005**

**Ethan Allen, Inc.  
Beecher Falls Division  
Main Street  
Beecher Falls, Vermont 05902-0217**

*This document is intended to provide additional technical information 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 AND PERMIT SUMMARY:**

Ethan Allen, Inc. - Beecher Falls Division ("Ethan Allen") owns and operates a wood furniture manufacturing facility at 1280 VT Route 253 (Main Street) in the town of Beecher Falls, Vermont ("Facility"). Operations at the Facility include a rough mill, drying kilns, woodworking processes, wood gluing, traditional spray wood finishing, ultra-violet (UV) roll coat wood finishing, and boilers for process and space heat. This Permit is the initial Title V Permit to Operate for the Facility and incorporates an emission limitation on federally regulated hazardous air pollutants (HAPs) to a level below the federal major HAP source threshold as requested by Ethan Allen, Inc. The Permit also incorporates minor modifications recently completed to the "System A" and "System B" dust collection systems.

▫ **PROCESS DESCRIPTION:**

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 bldg. Here the boards may be further processed into furniture parts with saws, shavers, shapers, molders, lathes, tenors, drills, and sanders. Some furniture pieces are then partially assembled and sent on to finish coating operations. 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.

▫ **EQUIPMENT SPECIFICATIONS:** see Permit

▫ **EMISSION CALCULATIONS:**

▫ Emissions from the facility are from three main sources: boilers, wood waste handling (cyclones and fabric filters), and finishing operations.

▫ **Boilers:**

| Boiler                                      | Capacity on wood (MMBTU)           | Capacity on Oil (MMBTU)                                    |
|---------------------------------------------|------------------------------------|------------------------------------------------------------|
| Bigelow #240                                | 59.5                               | Na                                                         |
| Wickes #239                                 | 31.8                               | 24.9                                                       |
| Bigelow #232                                | Na                                 | 19.5                                                       |
| CB #238                                     | Na                                 | 21.0                                                       |
| Dravo                                       | Na                                 | 2.5                                                        |
| Rettew                                      | 3.6                                | na                                                         |
| Total Wood/Oil Capacity (MMBTU/hr)          | 94.9                               | 67.9                                                       |
| Total MMBTU/yr (x8760)                      | 831,324                            | 594,804                                                    |
| Max possible fuel usage (tons/yr or gal/yr) | 94,468 wet/54,692 dry <sup>1</sup> | 4,248,600 No.2 <sup>2</sup><br>3,965,360 No.4 <sup>2</sup> |

<sup>1</sup> 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. These values represent the same heat content for wood and are simply adjusted for the weight percent of moisture in the fuel.

<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.

Thus if the Permittee were to run at full capacity for 8760 hours per year it could burn 94,468 tons of wet wood or 54,692 tons of dry wood. However, as a result of the fuel usage restrictions to keep NOx below 100 tpy, the Permittee is more restrictively limited for dry wood usage to 26,845 tons per year. Below are the maximum amounts of each fuel that can be burned and the facility still remain below 100 tpy NOx. In the case of No.2 and No.4 oil and wet wood, the facility does not have the capacity in its existing boilers to consume this much fuel.

No.2 oil: 0.02 lbs NOx/gal x "X" gal/yr = 100 tpy NOx "X" = 10 million gal/yr  
 No.4 oil: 0.02 lbs NOx/gal x "X" gal/yr = 100 tpy NOx "X" = 10 million gal/yr  
 Wet wood: 1.94 lbs NOx/ton x "X" tons/yr = 100 tpy NOx "X" = 103,093 tons/yr  
 Dry wood: 7.45 lbs NOx/ton x "X" tons/yr = 100 tpy NOx "X" = 26,845 tons/yr

Worst case emission scenarios for each fuel case:

1. Maximized wet fuel usage scenarios:

- 94,468 tons wet wood (=91.6 tpy NOx) + 2,255 tons dry wood (=8.4 tpy NOx) #1
- 94,468 tons wet wood (=91.6 tpy NOx) + 840,000 gal No.2 oil (=8.4 tpy NOx) #2
- 94,468 tons wet wood (=91.6 tpy NOx) + 840,000 gal No.4 oil (=8.4 tpy NOx) #3

| <b>“Boiler” Allowable Air Contaminant Emissions (tons/year)<sup>1</sup></b> |                       |            |           |             |             |
|-----------------------------------------------------------------------------|-----------------------|------------|-----------|-------------|-------------|
| <b>PM/PM<sub>10</sub></b>                                                   | <b>SO<sub>2</sub></b> | <b>NOx</b> | <b>CO</b> | <b>VOCs</b> | <b>HAPs</b> |
| 248                                                                         | 11                    | <100       | 260       | 7           | 17          |
| 242                                                                         | 40                    | <100       | 251       | 7           | 16          |
| 245                                                                         | 73                    | <100       | 252       | 7           | 16          |

<sup>1</sup> PM/PM<sub>10</sub> - particulate matter and particulate matter of 10 micrometers in size or smaller; SO<sub>2</sub> - sulfur dioxide; NO<sub>x</sub> - oxides of nitrogen measured as NO<sub>2</sub> equivalent; CO - carbon monoxide; VOCs - volatile organic compounds; HAPs - hazardous air pollutants as defined in §112 of the federal Clean Air Act. HCl is the largest single HAP with a potential of 8.2 tpy.

2. Maximized dry fuel usage scenario:

- 26,845 tons dry wood (=100 tpy NOx) #4

| <b>“Boiler” Allowable Air Contaminant Emissions (tons/year)<sup>1</sup></b> |                       |            |           |             |             |
|-----------------------------------------------------------------------------|-----------------------|------------|-----------|-------------|-------------|
| <b>PM/PM<sub>10</sub></b>                                                   | <b>SO<sub>2</sub></b> | <b>NOx</b> | <b>CO</b> | <b>VOCs</b> | <b>HAPs</b> |
| 86                                                                          | 5                     | <100       | 122       | 3           | 8           |

3. Maximized No.2 oil scenarios:

- 4,248,600 gal No.2 oil (=42.5 tpy NOx) + 59,278 tons wet wood (=57.5 tpy NOx) #5
- 4,248,600 gal No.2 oil (=42.5 tpy NOx) + 15,436 tons dry wood (=57.5 tpy NOx) #6

| <b>“Boiler” Allowable Air Contaminant Emissions (tons/year)<sup>1</sup></b> |                       |            |           |             |             |
|-----------------------------------------------------------------------------|-----------------------|------------|-----------|-------------|-------------|
| <b>PM/PM<sub>10</sub></b>                                                   | <b>SO<sub>2</sub></b> | <b>NOx</b> | <b>CO</b> | <b>VOCs</b> | <b>HAPs</b> |
| 158                                                                         | 157                   | <100       | 167       | 5           | 10          |
| 56                                                                          | 154                   | <100       | 81        | 3           | 5           |

4. Maximized No.4 oil scenarios:

3,965,360 gal No.4 oil (=39.7 tpy NOx) + 62,165 tons wet wood (=60.3 tpy NOx) #7

3,965,360 gal No.4 oil (=39.7 tpy NOx) + 16,188 tons dry wood (=60.3 tpy NOx) #8

| <b>“Boiler” Allowable Air Contaminant Emissions (tons/year)<sup>1</sup></b> |                       |            |           |             |             |
|-----------------------------------------------------------------------------|-----------------------|------------|-----------|-------------|-------------|
| <b>PM/PM<sub>10</sub></b>                                                   | <b>SO<sub>2</sub></b> | <b>NOx</b> | <b>CO</b> | <b>VOCs</b> | <b>HAPs</b> |
| 175                                                                         | 304                   | <100       | 174       | 5           | 11          |
| 68                                                                          | 300                   | <100       | 84        | 3           | 5           |

5. Worst Case Boiler Emissions of All Fuels

| <b>Max Worst Case “Boiler” Allowable Air Contaminant Emissions (tons/year)<sup>1</sup></b> |                       |            |           |             |             |
|--------------------------------------------------------------------------------------------|-----------------------|------------|-----------|-------------|-------------|
| <b>PM/PM<sub>10</sub></b>                                                                  | <b>SO<sub>2</sub></b> | <b>NOx</b> | <b>CO</b> | <b>VOCs</b> | <b>HAPs</b> |
| 248                                                                                        | 304                   | <100       | 260       | 7           | 17          |

▫ **Wood Waste Handling Systems:**

| <b>Wood Waste Handling System<br/>Particulate Matter Emission (tons/year)</b> |                                            |                      |                       |                        |
|-------------------------------------------------------------------------------|--------------------------------------------|----------------------|-----------------------|------------------------|
| Unit                                                                          | Emission Limitations                       |                      |                       |                        |
|                                                                               | AirFlow<br>(acfm)                          | gr/dscf <sup>1</sup> | lbs/hour <sup>2</sup> | Tons/year <sup>3</sup> |
| Fuel Metering bin Cyclone #6                                                  | Na - Closed loop blower                    |                      |                       |                        |
| Sawmill Cyclone #7 and #8                                                     | Na - green material only <sup>4</sup>      |                      |                       |                        |
| Sawmill/Grinding Room Fabric Filter #9                                        | 2,700                                      | 0.06                 | 1.4                   | 6.1                    |
| System B – Pneumafil #4                                                       | 48,800                                     | 0.02                 | 8.4                   | 36.8                   |
| System B – MAC #1                                                             | 31,300                                     | 0.02                 | 5.4                   | 23.7                   |
| System A – MAC #2                                                             | 50,400                                     | 0.02                 | 8.7                   | 38.1                   |
| System A – Cyclone #5                                                         | 58,200                                     | 0.06                 | 29.9                  | 131.0                  |
| System A – Pneumafil #1                                                       | 35,200                                     | 0.06                 | 18.1                  | 79.3                   |
| Silo #1 with cyclone #30                                                      | Na – air returned to System B Pneumafil #4 |                      |                       |                        |
| Silo #4 with cyclone #2                                                       | Na – green material only                   |                      |                       |                        |
| UV Flat Line Sander Pneumafil #3                                              | 30,450                                     | 0.02                 | 5.3                   | 13.3@5000hrs           |
| Main Plant Grinding Room Cyclone #1                                           | 3,000                                      | 0.06                 | 1.5                   | 6.6                    |
| <b>Total</b>                                                                  |                                            |                      |                       | <b>334.9</b>           |

<sup>1</sup> gr/dscf equals grains of pollutant emitted per dry standard cubic foot of undiluted exhaust gas. See discussion of condition (30) of permit for basis for emission limitations.

<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 8760 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.

▫ **Finishing Operations:**

Since the Facility finishing operations were installed prior to the inception of the new source review permitting requirements there is no tons per year emission cap on the VOC emissions from these operations. The potential emissions are thus 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 146.6 tons in 2003 as they have implemented lower VOC coatings and improved coating transfer efficiency. A historical summary of actual VOC emissions is provided below.

| <b>Historical Actual VOC and Acetone Emissions (tons per year)</b> |                                  |                         |
|--------------------------------------------------------------------|----------------------------------|-------------------------|
| Year                                                               | VOC <sup>1</sup> (tons per year) | Acetone (tons per year) |
| 1987                                                               | 253 <sup>2</sup>                 | --                      |
| 1988                                                               | 268 <sup>2</sup>                 | --                      |
| 1989                                                               | 292 <sup>2</sup>                 | --                      |
| 1990                                                               | 284 <sup>2</sup>                 | --                      |
| 1991                                                               | 266 <sup>2</sup>                 | --                      |
| 1992                                                               | 300 <sup>2</sup>                 | --                      |
| 1993                                                               | 255.6                            | 4.4                     |
| 1994                                                               | 251.6                            | 4.4                     |
| 1995                                                               | 264.2                            | 11.8                    |
| 1996                                                               | 224.7                            | 40.3                    |
| 1997                                                               | 239.1                            | 54.9                    |
| 1998                                                               | 222.8                            | 48.2                    |
| 1999 <sup>3</sup>                                                  | 219.4                            | 51.6                    |
| 2000 <sup>4</sup>                                                  | 219.0                            | 47.0                    |
| 2001                                                               | 184.1                            | 45.9                    |
| 2002                                                               | 177.0                            | 44.0                    |
| 2003                                                               | 146.6                            | 29.4                    |

<sup>1</sup> The registration database includes all hydrocarbons in its VOC total, including acetone. Where acetone data is available, the VOC total above DOES NOT include acetone.

<sup>2</sup> Acetone data is not available for these years but is assumed to be negligible since its usage did not become widespread in the industry until it was delisted by EPA as a VOC on June 16, 1995.

<sup>3</sup> Installation of flatline UV rollcoat unit.

<sup>4</sup> Installation of high solids hot spray for sealer and topcoat application.

▫ **Total Facility Emissions:**

| Facility Allowable Air Contaminant Emissions (tons/year) <sup>1</sup> |                 |                 |     |      |        |
|-----------------------------------------------------------------------|-----------------|-----------------|-----|------|--------|
| PM/PM <sub>10</sub>                                                   | SO <sub>2</sub> | NO <sub>x</sub> | CO  | VOCs | HAPs   |
| 582.9                                                                 | 304             | <100            | 260 | >50  | <10/25 |

▫ **APPLICABLE REQUIREMENTS DISCUSSION:**

Section 5-211(1) - Prohibition of Visible Air Contaminants, Installations Constructed Prior to April 30, 1970 - Bigelow Boiler #240 and Wickes Boiler #239. While the Facility was constructed prior to 1970, only the above two boilers are considered subject to the above VE limits since all other boilers at the Facility were installed or modified after this date. Records indicate that the Bigelow Boiler #232 was installed in 1970 but absent any additional records it is reasonable to assume that it did not commence operations until after April 30<sup>th</sup>. All dust collection equipment is assumed to have undergone either modifications, reconfigurations, or replacements including the tools ducted to them since 1970 and therefore are subject to the more stringent VE limitations of 5-211(2).

Section 5-253.16 – Wood Furniture Manufacturing. This state regulation incorporates the requirements of both the Control Techniques Guideline for VOC emissions and the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Wood Furniture Manufacturing Operations (40 CFR Part 63 Subpart JJ), commonly referred to as the MACT (maximum achievable control technology) standard for wood furniture manufacturing operations. As of the issuance of this Permit, Vermont has not accepted delegation of this NESHAP and instead intends to submit our rule to EPA for approval in lieu of the MACT. In the interim, the Facility is subject to both the state and federal regulations which are functionally equivalent. The Facility will remain subject to both regulations despite the imposition in this Permit of a cap on HAP emissions that will no longer classify the Facility as a major HAP source since EPA's "once-in, always-in" policy on applicability to their NESHAP regulations applies and the authority under HMSEER enables continued applicability to the state rule.

Section 5-261 – Control of Hazardous Air Contaminants. See below.

40 CFR Part 63, Subpart JJ - National Emission Standards for Wood Furniture Manufacturing Operations. See above Section 5-253.16.

40 CFR Part 63, Subpart DDDDD - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, Institutional Boilers and Process Heaters. Ethan Allen has requested a cap on the HAP emissions that will no longer classify the Facility as a major HAP source. While the MACT standard was finalized on February 26, 2004 before issuance of this Permit restricting HAP emissions, the Permit is being issued prior to the compliance date contained in the regulation for existing boilers which is three years after promulgation. Therefore the facility is not subject to this regulation provided the permit is issued and the cap remains in place thereafter.

▫ **HAZARDOUS MOST STRINGENT EMISSION RATE DISCUSSION (HMSER):**

As discussed further in the Finding of Fact of the Permit, the Agency has determined that the Facility has regulated emissions, namely from the finishing operations, of the following HAC compounds in excess of their respective Action Levels and those emissions are now being 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 (syn. butyl propasol) (5131-66-8)

The Agency has determined that the Permittee has achieved HMSER for the respective HACs through implementation of several emission reduction measures over the past several years. These measures are discussed more fully in the Findings of Fact but 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 precatalyzed 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 requires the Permittee to continue to comply with the state wood furniture regulation, regardless of that regulation’s applicability section.

Emissions of silica are 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 is being established. These emission caps are based on the highest level of respective HAC emission since year 2000 (first full year after implementation of HMSER measures) 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 following table provides a summary of actual HAC emissions over the past several years. 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 Emissions |                    |            |                           |       |       |       |
|-------------------------------------|--------------------|------------|---------------------------|-------|-------|-------|
|                                     |                    |            | Annual Emission in lbs/yr |       |       |       |
| Contaminant                         | ActionLevel        | Avg.period | 2000                      | 2001  | 2002  | 2003  |
| Crystalline silica                  | 0.01 <sup>1</sup>  | Annual     | 34.0                      | 24.0  | 42    | 41    |
| 1,2,4-Trimethyl benzene             | 0.013 <sup>2</sup> | Annual     | 280                       | 170   | 36    | 1     |
| Isobutyl acetate                    | 294                | 8 hr       | 76000                     | 64000 | 61200 | 43565 |
| Methyl amyl ketone                  | 98                 | 8 hr       | 77800                     | 64200 | 55000 | 41832 |
| Butyl propasol                      | 7.4                | 24 hr      | 4380                      | 3440  | 3220  | 2658  |
| Isobutanol                          | 63                 | 8 hr       | 16720                     | 16580 | 16160 | 12688 |

<sup>1</sup> Action Level is slated to be revised to 0.02 and moved from Category II to Category I (known or suspected carcinogens) based on review of latest toxicological data.

<sup>2</sup> Action Level is slated to be revised to 24.7 based on review of latest toxicological data and Facility will no longer exceed AL at that time.

Since the year 2000, the above hazardous air contaminants are the only ones that have approached or exceeded their respective Action Levels at the Facility, even if emissions of all other contaminants were to increase by 17.8% which is representative of the 39 ton VOC increase being approved over the existing baseline of 219 tons VOC per year. On an annual average basis, only silica and TMB exceed their Action Levels. However, since the remaining HAC Action Levels are based on 8 hr or 24 hr exposures, it is not appropriate to annualize the emissions but rather base the comparison on the operating hours during which the emission actually occur. Thus for those HACs one must compare the respective Action Level to the annual emissions divided by the operating hours (not 8760 which is used to annualize the emissions) and then multiplied by 8. These HACs all exceed their respective Action Level when 2000 hours of operation is assumed. No ambient air quality impact evaluation was required given the respective emissions are not significantly exceeding their respective Action Levels.

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.

- **MOST STRINGENT EMISSION RATE DISCUSSION (MSER):** Not applicable
- **AMBIENT AIR QUALITY IMPACT EVALUATION DISCUSSION (AQIE):** Not applicable
- **PERMIT CONDITIONS DISCUSSION:**

## (2) Boilers:

▫ Flyash reinjection is allowed on those boilers that have historically used it but since it increases PM emissions it would not be allowed on other boilers. The only other solid fuel boiler here is the sawmill's Rettew furnace at 3.6 MMBTU so this is not a significant issue.

## (3) Wood Waste Dust Collection Systems:

▫ The main concern here is that the total air flow not increase above the values provided to us since PM emissions are directly calculated from those air flow rates. In addition, as the air to cloth ratios start to increase above 10:1 it is more likely that they will not achieve the 0.02 gr limit if so limited.

(6) Stack Heights: The exhaust gases from the Bigelow Boiler #240 and the Wickes Boiler #239 shall be vented vertically through a stack or stacks which extends a minimum of seventy-nine (79) feet above the stack base grade elevation. The stack shall not be equipped with any device that may obstruct the upward discharge of the exhaust gases such as a fixed raincap. [10 V.S.A. §§556(c) and 556a(d)] [§5-406 of the *Regulations*]

▫ These stack heights are taken from the OP application and are not based on a Permit to Construct or a modeling analysis requirement. This condition is intended to establish the base conditions at the facility. Under the authority of 5-406, the Agency may require modeling if these stack heights were ever to be decreased in the future.

(7) In order to maintain emissions of nitrogen oxides (NO<sub>x</sub>) 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:

$$0.02*X + 1.94*Y + 7.45*Z < 200,000$$

where:

X = quantity of No. 4 and No. 2 fuel oil burned in units of gallons;

Y = quantity of wet wood fuel burned in units of tons (as fired including moisture);

Z = quantity of dry wood fuel burned in units of tons (as fired including moisture).

The NO<sub>x</sub> 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.

[10 V.S.A. §§556(c) and 556a(d)] [§5-251(3) of the *Regulations*]

▫ The Permittee burns a combination of bark, wet wood chips, wet and dry sawdust, and

dry wood wastes. The fuel oil emission factor in the equation above is from AP42 Section 1.3 Fuel Oil Combustion (9/98) Table 1.3-1 which provides a value of 20 lbs/1000 gallons for both No.2 and No.4 fuel oil. The formula to account for nitrogen content of residual oil was not used. The wood fuel emission factors are from AP42 Section 1.6 - Wood Residue Combustion in Boilers (9/03) which provides a value of 0.22 lbs/MMBTU for wet wood and 0.49 lbs/MMBTU for dry wood. A heat value of 4400 BTU/lb is assumed for wet wood at 50% moisture. A heat value of 7600 BTU/lb is assumed for dry wood at 12% moisture. The values both assume the same heat value of the wood and are simply adjusted by the weight of the moisture (4400 is to 50% solids as 7600 is to 88% solids). Thus  $0.22 \text{ lbs NO}_x/\text{MMBTU} \times 0.0044 \text{ MMBTU/lb wood} \times 2000 = 1.94 \text{ lbs NO}_x/\text{ton of wet wood burned}$ . The NO<sub>x</sub> emission factors for wet wood and dry wood may be revised upward or downward, decreasing or increasing allowed annual fuel usage respectively, based on actual stack emission testing of these boilers.

(14) Solvent Metal Cleaning:

▫Most large facilities have a maintenance shop that contains a small Safety-Kleen type degreaser so this condition is added for completeness.

(15) Stage I Vapor Recovery Controls:

▫The Facility has a small gasoline tank for refueling some on-site equipment. While it is unlikely that they would receive deliveries from tank trucks instead of account trucks, this condition is added for completeness since any non account truck delivery must be done with Stage I vapor recovery.

(28) ▫Incorporates several of the HMSER measures the Permittee has taken to achieve HMSER. Other measures are contained in the requirements to require overspray filters, specifically to address silica emissions (condition [5]) and require use of HVLP (condition [24]).

(29) PM [Boilers]

▫The wood boiler emission limits are both based on 5-231(3)(b)(i) since they were both installed prior to 1977. The oil boiler limits are based on 5-231(3)(a). With respect to the Wickes boiler #239 which may burn both wood and No.4 oil, the wood emission limit shall apply when wood fuel comprises 50% or more of the heat input to the boiler.

(30) PM [Wood Waste Dust Collection 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 test is being required at this time for these units.