

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

TECHNICAL SUPPORT DOCUMENT
FOR
Title V
PERMIT TO CONSTRUCT AND OPERATE
#AOP-14-032

December 23, 2014

FiberMark North America, Inc. – Brattleboro, 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 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:

FiberMark North America, Inc.
Paperboard Manufacturing
161 Wellington Road
Brattleboro, Vermont 05302

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1.0 INTRODUCTION

FiberMark, Inc. (hereinafter "Permittee" and also referred to herein as "Owner/Operator") owns and operates a paperboard manufacturing facility at 161 Wellington Road in Brattleboro, Vermont (also referred to herein as "Facility").

The Facility currently operates under a combined construction and operating permit issued May 31, 2013 (AOP-13-002). The Permittee submitted an application to modify their operating permit on August 25, 2014. The Permittee has proposed to install and operate a natural gas fired drying oven for their roll-to-roll laminating machine (also referred to as laminating line).

This Technical Support Document details the Agency of Natural Resources, Department of Environmental Conservation, Air Quality & Climate Division (hereinafter "Agency") review for renewal of the Facility's combined Air Pollution Control Permit to Construct and Operate and Title V permit and the modification resulting from the installation of a natural gas fired drying oven on the laminating line.

Table 1-1: Administrative Summary	
Administrative Item	Result or Date
Date Application Received:	8/25/2014
Date Administratively Complete:	8/25/2014
Date Draft Decision:	10/3/2014
Date & Location Draft Decision/Comment Period Noticed:	10/3/2014 Environmental Notice Bulletin & Brattleboro Reformer
Date & Location Public Meeting Noticed:	None requested
Date & Location of Public Meeting:	None requested
Deadline for Public Comments:	11/3/2014
Proposed Permit Submitted to EPA for Review	11/5/2014
Date Final Decision:	12/23/2014
Classification of Source Under §5-401:	§5-401(6): Fuel burning installation
Classification of Application:	Title V Subject Source
New Source Review Designation of Source:	Major Stationary Source
Facility SIC Code & Description:	2631 / Paperboard Mills
NAICS Code & Description:	322130 / Paperboard Mills

The allowable emissions, as approved in permit AOP-14-032, for the Facility are summarized below:

Table 1-2: Previous Allowable Air Contaminant Emissions (tons/year)¹						
<i>PM/PM₁₀</i>	<i>SO₂</i>	<i>NO_x</i>	<i>CO</i>	<i>VOC</i>	<i>Total HAPs²</i>	<i>CO_{2e}³</i>
31.8	431.6	<100	17.1	<50	<10/25	34,249

¹ PM/PM10 - particulate matter, SO₂ - sulfur dioxide, NO_x - 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. Actual total combined HAPs estimated at <1 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 Permittee owns and operates the paperboard manufacturing facility located at 161 Wellington Road in Brattleboro, Vermont. The area surrounding the Facility is primarily industrial and commercial with neighbors such as The Brattleboro Development Credit Corporation Business Park, Fulflex, and C&S Wholesale Warehouse. The Facility is located greater than 100 kilometers from the Great Gulf and Dry River Wilderness areas in New Hampshire and within 100 kilometer of the Lye Brook Wilderness Area in Manchester, Vermont.

2.2 Facility Description

The regulated sources of air contaminant emissions at the Facility are the paper making processes, two (2) No. 6 fuel oil-fired Bigelow boilers rated at 38 million British Thermal Units per hour ("MMBTU/hr") each of heat input, and a temporary No. 2 fuel oil-fired seasonal boiler (hereinafter "seasonal boiler") rated at less than 15 MMBTU/hr of heat input. Specifications for emission sources are presented in Table 2-1

Table 2-1: Equipment Specifications			
Equipment/Make/Model	capacity/size	fuel type	date of installation
Two (2) Bigelow boilers	38.2 (each) MMBTU/hr ¹	No. 6 fuel oil SVO ² Natural gas	1960
Cummins Model DSFAE-826111 Tier 3 diesel generator Serial number: H90027596	80 kW ³	ULSD ⁴	Manufacture Date September 2009
Three (3) Safety-Kleen Model 16 parts cleaner	na	na	unknown

Table 2-1: Equipment Specifications			
Equipment/Make/Model	capacity/size	fuel type	date of installation
One (1) Safety-Kleen Model 81 parts cleaner	na	na	unknown
Paper Coating Line #1	na	na	1988
Paper Coating Line #2	na	na	1985
Lamination Line – Drying Oven	3 MMBtu/hr	Natural Gas	Proposed 2014

¹ MMBtu/hr - Million British Thermal Units per hour maximum rated heat input.

² SVO – straight vegetable oil, also referred to as waste vegetable oil (WVO).

³ kW – kilowatts of electrical output.

⁴ ULSD – ultra low sulfur diesel fuel oil, maximum sulfur content of 0.0015% by weight.

na – not applicable

Boilers - The Boiler Room at the Facility contains two boilers. The two boilers located in the boiler room are identical water tube boilers installed in 1960 and fire No. 6 fuel oil. The two boilers, manufactured by The Bigelow Company, are each equipped with one Model HT66 oil burner manufactured by Coen Company. Each Bigelow boiler has a heat input rating of 38.2 MMBTU/hr.

No. 6 fuel oil and Straight Vegetable Oil (SVO) for the Bigelow boilers are delivered and stored each in one of two underground storage tanks located outside the southeastern end of the facility building. Each underground storage tank has a capacity of 25,000 gallons. A fuel additive, Chemtreat BL-1544, is added to the No. 6 fuel oil in the underground storage tanks at time of fuel delivery. The fuel oil is piped to the boiler room and preheated to a temperature of 210° F.

This permit also allows for natural gas to be used as an alternate fuel for No.6 fuel oil in the boilers.

CNG System - The decompression system for the compressed natural gas (CNG) at the Facility is owned and operated by NG Advantage. The anticipated emissions from the unloading system is small, and the heater is below the Agency's regulatory thresholds, so NG Advantage is not required to apply for an Air Pollution Control Permit to Construct for the CNG unloading system. The Permittee's equipment 'starts' at the gas meter, so the emissions from the operation of the unloading system are not included in this permitting review. The following is a description of the unloading system.

The CNG offloading station will have three off-loading bays to allow a second or third full trailer to be dropped off before the first is empty. The Unloading System ("System") is an integrated packaged process system designed to depressurize and transport CNG from a highly compressed state as delivered in tube trailers to a low-pressure gas at the Facility's main building regulator. During the depressurization process in the System, the gas cools precipitously and heat must be continuously added to stop the freezing of process equipment.

The System is comprised of two principal modules: the Unloading Skid Module ("USM") and Gas Heating Module ("GHM"). The CNG in the trailers flows through reinforced hoses to the USM. The USM consists of process equipment, instruments, piping, valves and controls that regulate the pressure and temperature of the gas as it depressurizes. The process equipment and controls regulate the gas to process values and tolerances specified to meet the Permittee's requirements.

The GHM adds heat to the compressed natural gas prior to depressurization. A high-efficiency condensing boiler will use natural gas from the low pressure side of the System (but prior to the Facility's meter) to heat a 50/50 mix of ethylene glycol and water in a closed loop, consisting of pumps, pipes, and a heat exchanger. Once heated, the water/glycol mix will transfer heat to the cold CNG. One side of the heat exchanger will be high pressure CNG, and the other low-pressure water/glycol mix. The GHM will be fitted with a water and glycol make up system, based on delivering the mixture from a premixed storage tank.

At the maximum demand rate for natural gas by the Facility, the System must deliver 73,000 SCF/H of natural gas, at standard conditions. The greatest heat demand for the CNG will occur when there is maximum demand, a full trailer of CNG, and the CNG in the trailer is coldest. To handle this peak energy demand, the GHM must provide 539,600 BTU/H of thermal energy directly to the CNG; therefore, the boiler must have a capacity greater than CNG demand to overcome losses in the whole system, including the boiler combustion efficiency, heat lost to the environment, heat exchanger efficiency, lower specific heat for glycol/water vs. water only, and other minor losses. The boiler will be a 94% efficient condensing boiler (while condensing only), with a gross input rating of 750,000 Btu/hr. The CNG supplier estimated that at the forecasted demand of 237 MMCF per year for the Permittee, the gas burned for heating of CNG would be about 0.2% of delivered gas or about 0.5 MMCF per year.

Paper Production and Coating - Raw materials, including recyclable paper and treatment chemicals, are conveyed to the Facility and stored in the Materials Storage Area. Paper is transferred to a pulper and then pumped as a slurry through piping (located under the floor) to the Stock Prep area. The paper is mixed and cleaned in the Stock Prep area. Cleaning involves the physical separation of impurities (e.g., envelope windows, rubber bands, paper clips, etc.). Dyes for the paper, if necessary, are added at this point. Boil-out and neutralization chemicals may also be added here for cleaning purposes.

The cleaned paper slurry exits the Stock Prep area and is pumped to the “wet end” of the paper machine (identified as Paper Machine No. 1 by the Permittee). The paper is formed and pressed into a thin, continuous, and cohesive sheet of paper. Boil-out and neutralization chemicals may be added here as well as felt washes. The sheet of paper is conveyed through steam heated dryers to remove moisture. The dried paper is passed through calendars which impart physical properties to the paper. The continuous sheet of paper is then wound into a roll at the “Winder.”

The roll of paper is either transported to the “Converting” area, the “Shipping” area, or to one of two coating lines.

Converting Area - The Converting Area includes cutting, slitting, embossing, glazing, winding, and packaging of the paper. The paper is packaged in stretch wrap and is loaded onto trucks for subsequent distribution.

Coating Lines – The Facility has two coating lines. Coating Line No. 1 (installed in 1988) consists of a roll coater that applies acrylic-based coatings. The applied coating is then dried using a steam heat dryer. Coating Line No. 2 (installed in 1985) utilizes a roll coater or rod coater to apply the acrylic-based coatings. Applied coatings on Coating Line No. 2 are also dried using a steam heated dryer.

Each coating line uses similar steps to process paper. The roll of paper exiting the paper machine is unwound and passes through the coater which then applies an acrylic-based film to the surfaces of the paper sheeting. The paper then passes through an air flotation dryer and to an “embosser” which imprints and forms the paper sheeting into the desired format. The paper sheeting is finally rewound at the end of the coating line.

The acrylic-based film is mixed in batches of 60 gallons and consists of equal parts of Rhoplex HA-12 Dispersant and Tamol 165A Dispersant and transferred to the coating line. Dyes may also be mixed in with the coating film.

Parts Cleaning - FiberMark utilizes four (4) Safety-Kleen Parts Cleaning Systems (Three - Model #16 cleaners and one Model #81 cleaner) for cleaning various machine parts [referred to as cold cleaning in the *Regulations* - see §5-253.14(b)]. The units are serviced by Safety Kleen every twelve (12) weeks

2.3 Description of Existing Air Pollution Control Equipment

This Facility is not equipped with air pollution control equipment.

2.4 Description of Compliance Monitoring Devices

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

2.5 Proposed Modifications to Facility

As noted above, the Permittee is proposing to install a natural gas drying oven to control the moisture content of the finished product from the lamination line.

2.6 Proposed Limitations

The Permittee has proposed to not change the overall fuel limits at the Facility. Any natural gas used in the lamination line's drying oven will reduce the amount of fuel available for use in the Bigelow boilers.

2.7 Identification of Insignificant and Exempt Activities

Activities which qualify as an "insignificant activity" pursuant to §5-1002(h) of the *Regulations* need not be considered when determining the applicability of Subchapter X of the *Regulations* and must only be listed as such within the operating permit application. 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.

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.

As noted in previous permits, the Agency is aware of the following activities or equipment at the Facility:

1. Forklifts;
2. Repair and maintenance shop activities;
3. Soldering and welding equipment;
4. Ventilating units used for human comfort;
5. Fuel oil and propane storage tanks [No. 6 oil - (2) 25,000 gallon storage capacity (installed post 1984)]
6. Chemical storage tanks (<10,000 gallon storage capacity each);
7. Paper testing laboratory; and
8. Intermittent construction activities.

Emissions were not quantified from the above insignificant activities because they are considered negligible or not quantifiable. The exclusion of emissions produced by the insignificant and trivial activities does not alter the applicability status of the Facility under Subchapter X of the *Regulations*.

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 boilers are the only sources of NO_x at this Facility and are therefore the only emission units affected by the 100 tpy emission cap. As stated previously, the Agency has limited NO_x emissions from the Facility to less than 100 tpy. The Agency has included monitoring, record keeping, and reporting requirements in the Permit to assure compliance with this emission cap.

Although a fuel cap has not been imposed on the fuel burned in the Bigelow boilers, 2,749,000 gallons of No. 6 fuel oil was used to estimate annual emissions from the boilers. This is the estimated quantity of No. 6 fuel that could be burned in the Bigelow boilers without exceeding the NO_x emissions cap. For quantifying potential emissions from the boilers when firing SVO, or an SVO/No.6 fuel oil blend, it is assumed that the emission rate will be the same as No. 6 fuel oil.

Table 3-1: Bigelow Boilers - Estimated Emissions from No.6 Fuel Oil				
Total Fuel input both Bigelow boilers: 2,749,000 gal/yr No.6 Fuel Oil, or SVO, or SVO/No.6 blend.				
	Emission Factor			Allowable Emissions tons per year
	Factor	Units ¹	Source	
SO ₂	314 ²	lb/1000 gal	AP-42, Fuel Oil Combustion, Table 1.3-1 (9/98)	431.6
NO _x	72.74			100.0
PM	23.1		AP-42, Fuel Oil Combustion, Tables 1.3-1 and 1.3-2 (9/98)	31.8
CO	5		AP-42, Fuel Oil Combustion, Table 1.3-1 (9/98)	6.9
VOC	0.76		AP-42, Fuel Oil Combustion, Table 1.3-3 (9/98)	1.0
HAPs	0.15		AP-42, Fuel Oil Combustion, Tables 1.3-8 to 1.3-10 (9/98)	0.2

¹ lb/1000 gal: pounds of pollutant emitted per 1000 gallons of fuel input to the boiler.

² Factor based on 157S, where S represents the weight % of sulfur in the oil. For example if the fuel is 1.5% sulfur, then S=1.5

Table 3-2: 80 kW Diesel Generator – Estimated Emissions				
Emission estimate based on 200 hours/yr of operation	Emission Factor			Allowable Emissions, tons/yr
	Factor	Units	Source	
SO ₂	0.0015	lb/MMBtu	0.0015% sulfur content in fuel	0.0001
PM	0.15	g/bhp-hr	40 CFR Part 89 Tier 3 Emission Standards	0.004
NO _x	3.0			0.07
CO	2.6			0.06
VOC ¹	-			-

VOC/HC included in the NO_x emission factor for Tier 3 engines.

Emissions from Paper Making and Paper Coating -- The Permittee submits annual VOC emission inventories in accordance with Subchapter VIII of the *Regulations*. The inventories detail the emissions produced by the paper coating operations, the board machine, and the cold cleaners. For paper coatings, the Permittee calculates the VOC emission rates assuming that 100% of each volatile constituent is emitted to the atmosphere. For board machine emissions, the Permittee relies on guidance published in the *Federal Register* (Vol. 63, No. 72, p. 18526) to assume that only 20% of each VOC constituent is emitted to the atmosphere. For cold cleaning units, the Permittee uses a mass balance (based on manifest data) to assume that 25% of the solvent is emitted to the atmosphere. The Permittee uses Material Safety Data Sheets to determine the composition of each chemical product and usage records to determine the amount of each product used at the Facility. The Agency also assumes that 100% of the fuel treatment is emitted as VOC.

For Permit AOP-04-027 the Agency estimated the Facility's allowable VOCs. This estimate was based in the emission inventories from 2002 and 2003: 11.5 tons and 11.3 tons of VOCs respectively. The Agency assumed that the 2-year average of the VOC emission rate (11.4 tons) would be representative of expected actual emissions. Using a multiplying factor, the Agency scaled actual emissions to represent the allowable emissions. The Agency examined operating schedule and production capacity to develop the scaling factor. First, based on the information listed in the application, the Agency assumed that the Permittee operates 8,760 hours per year. Second, the Agency assumed that the Facility operated at 50% production capacity during those two reporting years. Based on these assumptions, the Agency concluded that a multiplying factor of 2 was appropriate to calculate allowable emissions. The Agency estimated the allowable VOC emissions from the paper making and coating operations to be 22.8 tons per year.

Table 3-3 shows the reported VOC emissions from the facility since the issuance of Permit AOP-04-027. This shows that the Facility's VOC emissions continue to stay well below the previously estimated allowable VOC emissions.

Table 3-3: Summary of VOC Emissions – Annual Registration	
Reporting Year	Tons VOCs
2013	8.94
2012	8.4
2011	9.13
2010	8.04
2009	7.29
2008	9.95
2007	11.06
2006	13.36
2005	12.01
2004	12.94

Table 3-4 summarizes the existing allowable air contaminant emissions by source at the Facility

Table 3-4: Summary of Existing Allowable Air Contaminant Emissions by Source (tons/year)						
Source	PM/PM₁₀	SO₂	NO_x	CO	VOC	Total HAPs
Bigelow Boilers	31.8	431.6	<100	6.9	1.0	0.2
Paper Making and Coating	-	-	-	-	22.8	<0.01
Diesel generator	0.004	0.0001	0.07	0.06	-	-
Facility Totals	31.8	431.6	<100	7.0	23.8	0.2

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

The potential source of regulated emissions of Hazardous Air Contaminants (HACs) includes the paper machines, off machine coaters and the solvent based parts cleaners.

As established in the technical support document for AOP-04-027, the following two equations were developed for estimating the emission of formaldehyde from the Permittee's standard and pigment coatings. The Permittee has been using these equations for determining their annual emissions of formaldehyde.

Standard Coating:

$$Fa_{sc} = \frac{5 \times C_s}{1 \times 10^6} \quad \text{Where:}$$

Fa_{sc}= Annual Formaldehyde Emissions, in lbs/year, from the standard clear coating.

C_s = Annual Standard Coating Usage, in lbs/year

Pigment Coating:

$$Fa_{pc} = \frac{43 \times C_p}{1 \times 10^6} \quad \text{Where:}$$

Fa_{pc}= Annual Formaldehyde Emissions, in lbs/year, from the standard pigment coating.

C_p = Annual Pigment Coating Usage, in lbs/year

Based on the facility's annual registration information for the reporting years 2011 through 2013, the following table summarizes the estimated actual emission rate of HACs from the facility. To be conservative, for each HAC emitted, the year with the highest emission rate was used in this evaluation.

Formaldehyde continues to be the only HAC emitted at a rate that exceeds its Action Level.

Table 3-5 Quantification of HAC Emissions				
Hazardous Air Contaminant	CAS#	Toxic Category	Emission Rate (lb/8-hrs)¹	Action Level (lb/8-hrs)
formaldehyde	50000	1	0.046	0.0065
diethylaminoethanol	100378	2	0.51	0.71
triethanolamine	102716	2	1.29	1.4
1,2-propanediol	57556	2	2.65	5.8
acetic acid	64197	3	1.92	3

3.3 – Estimating Potential Green House Gas Emissions

Using fuel oil will result in a higher GHG emission rate compared to natural gas, so this estimate is just for the use of fuel oil.

Facility: FiberMark	Permit #: AOP-14-032
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GHG estimate when burning No.6 fuel oil in Bigelow boilers.

Table 1. Stationary Source Fuel Combustion

Source ID	Source Description	Fuel Combusted	Quantity Combusted	Units
	Bigelow Boilers	Residual Fuel Oil #6	2,749,000	gallons
			0	

Table 2. Total Company-Wide Stationary Source Fuel Combustion

Fuel Type	Quantity Combusted	Units
Residual Fuel Oil #6	2,749,000	gallons

Table 3. Total Company-wide CO₂, CH₄ and N₂O Emissions from Stationary Source Fuel Combustion

Fuel Type	CO ₂ (kg)	CO ₂ (lb)	CH ₄ (kg)	CH ₄ (lb)	N ₂ O (kg)	N ₂ O (lb)
Residual Fuel Oil #6	30,967,485	68,271,537	1,237.1	2,727.2	247.4	545.4
Total Fossil Fuel Emissions	30,967,485	68,271,537	1,237.1	2,727.2	247.4	545.4
Total Non-Fossil Fuel Emissions	0	0	0.0	0.0	0.0	0.0
Total Emissions for all Fuels	30,967,485	68,271,537	1,237.1	2,727.2	247.4	545.4
Global Warming Potential	CO ₂	CH ₄	N ₂ O	CO ₂ e		
	1.0	21.0	310.0	metric ton	short ton	
Total CO₂ Emissions - Equivalent (Fossil CO₂e + Biogenic CH₄ & N₂O)				31,070.2	34,248.9	
All CO₂e emissions at stack (Fossil CO₂e + Biogenic CO₂e) - for APCD Permit info				31,070.2	34,248.9	

3.4 Designation of Proposed Modification for the Permit to Construct

The designation of the proposed modification is determined by the designation of the existing Facility and the allowable emissions associated with the proposed modification. The existing Facility, before construction or installation of the proposed modification, is designated as a major stationary source of air contaminants, as defined in §5-101 of the Regulations. The modification’s allowable emissions are calculated according to the following procedure.

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

The new equipment is the laminating line drying oven. The Permittee has proposed unlimited operation of the drying oven, so the potential natural gas usage (1020 Btu/CF) is based on the oven’s maximum heat input of 3.0 MMBtu/hr and 8760 hours/year: 25.8 MMCF/yr.

The emissions from the combustion of natural gas in the drying oven are calculated using the same emission factors that are used for natural gas combusted in the Bigelow boilers.

Table 3-6: Lamination Line Drying Oven - Estimated Emissions from Natural Gas				
Total Fuel input both Bigelow boilers: 25.8 MMCF natural gas.				
	Emission Factor			Allowable Emissions
	Factor	Units ¹	Source	Tons/year
SO ₂	15.1 ²	lb/MMCF	AP-42, Natural Gas Combustion, Table 1.4-2, 7/98	0.2
NO _x	100		AP-42, Natural Gas Combustion, Table 1.4-1, 7/98	1.3
PM	7.6		AP-42, Natural Gas Combustion, Table 1.4-2, 7/98	0.1
CO	84		AP-42, Natural Gas Combustion, Table 1.4-1, 7/98	1.1
VOC	5.5		AP-42, Natural Gas Combustion, Table 1.4-2, 7/98	0.07
HAPs	1.89		AP 42, Natural Gas Combustion, Tables 1.4-3 & 1.4-4 (7/98)	0.02

¹ lb/MMCF: pounds of pollutant per million cubic feet of natural gas combusted.

² The SO₂ emission factor in AP-42 is based on a sulfur content of 2000 grains/MMSCF. The permit application for AOP-13-002 indicated the maximum sulphur content specification for their natural gas is 115 mg/m³ (55,216 grain/MMSCF), so the AP-42 factor of 0.6 has been multiplied by (55,216 / 2000).

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

The existing processes are not expected to be affected by the installation and operation of the lamination line’s drying oven. Therefore there are no allowable emissions to be calculated.

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.

The existing processes are not expected to be affected by the installation and operation of the lamination line's drying oven. Therefore there are no actual emissions to be calculated.

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. 'Negative' allowable emissions are treated as zero.

Past modifications at the Facility involved the previous supplemental boiler which was subsequently removed from the facility; so there are no allowable emissions associated with that piece of equipment. The modification to allow the use of SVO did not result in any additional allowable emissions since any use of SVO replaced the use of No.6 fuel oil.

From the Technical Support Document for AOP-13-002, the modification to allow the use of natural gas as an alternate fuel in the Bigelow boilers was assessed as follows (this was Table 3-10 in TSD AOP-13-002):

Table 3-7: Step d: Summary of Allowable Air Contaminant Emissions (tons/year)						
Source	PM/PM₁₀	SO₂	NO_x	CO	VOC	Total HAPs
Step a	-	-	-	-	-	-
Step b (natural gas)	1.5	3.1	20.2	17.0	1.1	0.38
Step c (fuel oil)	22.6	287.6	88.7	6.1	0.3	0.18
Step d	-	-	-	-	-	-
Size of Modification for adding Natural Gas as an alternate fuel in the boilers	-21.1	-284.6	-68.5	10.9	0.8	0.20

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

Table 3-8: Step e: Summary of Allowable Air Contaminant Emissions by Source (tons/year)						
Source	PM/PM₁₀	SO₂	NO_x	CO	VOC	Total HAPs
Step a	0.1	0.2	1.3	1.1	0.07	0.02
Step b	-	-	-	-	-	-
Step c	-	-	-	-	-	-
Step d	0	0	0	10.9	0.8	0.2
Size of Modification	0.1	0.2	1.3	12.0	0.87	0.22
Major Modification Threshold	25/15	40	40	50	40	-

The proposed modification's allowable emissions are summarized in Table 3-8. The proposed modification's allowable emissions are estimated to result in an emissions increase less than significant levels for each air contaminant. Therefore, the proposed modification is designated as a non-major modification and is not subject to review under §5-502 of the Regulations.

3.5 Designation of the Facility for the Permit to Operate

The designation of the Facility for the Permit to Operate is determined by its allowable emissions following issuance of the permit, taking into account any limitations contained in the permit that restrict the Facility's allowable emissions.

Table 3-9: Summary of Future Allowable Air Contaminant Emissions by Source (tons/year)						
Source	PM/PM₁₀	SO₂	NO_x	CO	VOC	Total HAPs
Bigelow Boilers (fuel oil)	31.8	431.6	<100	6.9	1.0	0.2
Bigelow Boilers (natural gas) – this includes natural gas used in the laminating line's drying oven.	1.5	3.1	20.2	17.0	1.1	0.38
Bigelow Boilers (higher of oil or natural gas)	31.8	431.6	<100	17.0	1.1	0.38
Paper Making and Coating	-	-	-	-	22.8	<0.01
Diesel generator	0.004	0.0001	0.07	0.06	-	-
Facility Totals	31.8	431.6	<100	17.1	<50	0.4

As summarized in Table 3-9 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 SO₂ and NO_x great than 50 ton/yr which classifies the source as a "Major Source" and therefore is subject to the new source review requirements of §5-502 of the *Regulations*.
- The Facility has allowable emissions of SO₂ greater than 100 tons/year 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.

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 and §5-202 - Open Burning Prohibited and Permissible Opening Burning

Open burning of materials is prohibited except in conformance with the requirements of this section. Based on the application submittal and information available to the Agency, the Facility is in compliance with this requirement.

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

This standard applies to the two Bigelow boilers. The Permittee has stated that it complies with the standard based on their equipment maintenance.

To assure compliance with the particulate standard the Agency has included periodic monitoring and reporting requirements for the Bigelow boilers in the Permit. The Permittee must perform monthly testing to determine the CO and either CO₂ or O₂ concentrations in the exhaust gas streams of the Bigelow boilers. With these measurements, The Permittee must then compute boiler efficiency and make any operational or maintenance-related changes to assure that the boilers are running at peak efficiency. The Permittee is also required to file semi-annual reports to the Agency detailing the results of the boiler efficiency testing and any corrective measures taken.

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

This standard applies to the diesel generator and the coating lines.

The Agency will verify compliance with this requirement in the future during any inspections of the Facility.

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

This subsection prohibits the use of any fuel, in stationary fuel burning equipment, with a sulfur content more than 2.0% by weight. This prohibition applies to all stationary fuel burning equipment used on-site. Compliance with this standard is based on fuel analyses following the procedures prescribed by the American Society for Testing and Materials.

The Permittee has stated that it complies with this standard based on their contract with fuel suppliers.

To provide a reasonable assurance of compliance with this standard, the Agency has included periodic monitoring and reporting requirements in the Permit. The Permittee is required to obtain fuel supplier certifications detailing the sulfur content of fuel oil delivered to the Facility, and submit semi-annual reports containing the fuel supplier certifications.

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

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

Table 4-1: Equipment Subject to §5-231(3)(a)			
Equipment ID	Size/Capacity	Emission Standard	Allowable Emissions
Bigelow – Boiler #1	38.2 MMBTU/hr	0.27 lb/MMBTU	10.3 lb/hr
Bigelow – Boiler #2	38.2 MMBTU/hr	0.27 lb/MMBTU	10.3 lb/hr
Laminating Line Drying Oven	3.0 MMBtu/hr	0.5 lb/MMBtu	1.5 lb/hr

Compliance with the standard in §5-231(3)(a)(ii) of the *Regulations* is generally based on the use of Reference Method 5 (40 *CFR* Part 60, Appendix A).

The Permittee has stated that it complies with the standard based on their emission estimates, and the scheduled maintenance of the boilers.

The Agency has included periodic monitoring and reporting requirements for the Bigelow boilers in the Permit to assure compliance with the particulate standard. The Permittee must perform monthly testing to determine the CO and either CO₂ or O₂ concentrations in the exhaust gas streams of the Bigelow boilers. With these measurements, the Permittee must then compute boiler efficiency and make any operational or maintenance-related changes to assure that the boilers are running at peak efficiency. These requirements are premised on a correlation between boiler efficiency and particulate/visible emission rates. The Permittee is also required to file semi-annual reports to the Agency detailing the results of the boiler efficiency testing and any corrective measures taken.

The Agency will also assess visible emissions from the fuel burning equipment during site inspections. If visible emissions are observed to be in excess of the respective standard, the Agency may require performance of stack testing.

§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.

Based on the application submittal and information available to the Agency, the Facility currently is not considered a source of fugitive particulate matter subject to this regulation. The Facility is required to take reasonable precautions at all times to control and minimize emissions of fugitive particulate matter from the operations at the Facility.

The Agency will verify compliance with this standard in the future during any inspections of the Facility. The inspections will include confirmation of the proper operation of any fugitive particulate matter control measures and visual observations of any emission points.

§5-241(1) & (2) - 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.

Based on the application submittal and information available to the Agency, the Facility currently is in compliance with this regulation. The Agency will verify compliance with this requirement in the future during any inspections of the Facility. Additionally, the Agency investigates all complaints that it receives in order to determine whether or not there is a violation of this requirement.

Section 5-251.3 – Control of Nitrogen Oxide Emissions

This regulation applies to stationary sources with NO_x emissions greater than 100 tons per year. NO_x emissions have been capped at 100 tons per year and the Facility is not required to comply with this regulation.

§5-253.10 - Control of Volatile Organic Compounds - Paper Coating.

This section regulates the release of VOCs from all paper coating units, except units within a paper coating source that have actual emissions without control devices from all paper coating units within the source of less than fifteen (15) pounds of VOCs per day ("lbs/day"). Once a source becomes subject to this subsection, it shall remain so even if emission levels subsequently fall below the applicable threshold.

Based on the registration data the Permittee submitted for the year 2001, the Agency estimated that VOC emissions resulting from the application of coatings and dyes totaled 8,745 pounds. Assuming that the Facility operates 365 days per year, the Agency estimated that the daily VOC emissions from the coating operations approach 24 pounds per day which is greater than the 15 lb/day threshold noted in §5-253.10(a) of the *Regulations*. Using this estimate, the Agency has determined that the Permittee is subject to §5-253.10 of the *Regulations*.

As a subject source, the Permittee shall not cause, allow or permit the daily-weighted average VOC content of paper coatings applied to exceed 2.9 pounds of VOCs per gallon (excluding water and exempt compounds).

To assure compliance with this standard, the Agency has included monitoring and record keeping requirements in the Permit. The Permittee is required to record the amount of each paper coating used monthly, as well as the density, the volatile organic compound content (expressed as a weight percentage and volume percentage), and the solids content (expressed as a weight percentage) of each paper coating.

§5-253.14 - Control of Volatile Organic Compounds - Solvent Metal Cleaning.

This subsection applies to all cold cleaning operations, open-top vapor degreasing operations with an open area of 10.8 square feet or greater, and degreasing operations with conveyors and an air/solvent interface 21.5 square feet or greater. The cold cleaning standards require the units to be designed and equipped with a cover easily operated with one hand if the vapor pressure of the solvent exceeds 0.3 psi and an internal drainage area and additional control measures if the vapor pressure of the solvent exceeds 0.6 psi. All cold cleaning operations regardless of solvent vapor pressure must:

- (i) Provide a permanent, legible, conspicuous label, summarizing the operating requirements;
- (ii) Store waste solvent in covered containers;
- (iii) Close the cover whenever parts are not being handled in the cleaner;
- (iv) Drain the cleaned parts until dripping ceases;
- (v) Supply a solvent spray, if used, that ensures a solid fluid stream at a pressure that does not exceed 10 pounds per square inch gauge;
- (vi) Degrease only materials that are neither porous nor absorbent; and
- (vii) Cease operation of the unit upon the detection of any visible solvent leak until such solvent leak is repaired."

That applicant has stated that the Safety-Kleen cold cleaning unit and solvent used at the Facility has a vapor pressure (0.008 psi) less than the applicable levels requiring controls other than the requirements of parts (iv) through (x) above and that the unit is designed and operated in accordance with those provisions.

The Agency will assess compliance with this regulation in the future during any inspections of the Facility. The inspections will include confirmation of the solvent used and the proper design and operation of

§5-261 - Control of Hazardous Air Contaminants

See Section 7.0 below.

4.2 Federal Air Pollution Control Regulations and the Clean Air Act**40 C.F.R. Part 60 Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units**

“The affected facility to which this Subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million BTU per hour) or less, but greater than or equal to 2.9 MW (10 million BTU/hr).” The regulation limits fuel oil sulfur content to a maximum of 0.5 weight percent.

The Bigelow boilers were installed prior to 6/9/1989 and are not subject to this regulation.

40 C.F.R. Part 60 Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984

On 10/15/2003 the EPA changed Subpart Kb; it no longer applies to the fuel oil storage tanks at the Facility.

40 C.F.R. Part 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI-RICE)

Applies to CI RICE model year 2007 and newer. This regulation establishes emission rates for affected engines, requires routine engine maintenance and sets maximum sulfur content for the diesel fuel.

This regulation applies to the 80 kW Cummins diesel emergency generator.

Please consult the most current version of the actual regulation for the specific requirements. For further information please review the EPA’s website: <http://www.epa.gov/region1/rice/#NewSourcePerformanceStandards>. This webpage also has additional EPA contact information.

1. This regulation requires the use ULSD fuel in the affected diesel engine.
2. The engine must be equipped with a non-resettable hour meter.
3. The Facility must maintain and operate the engine according to the manufacturer’s written recommendations for the life of the engine.

40 CFR Part 63 Subpart S – National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry

The Pulp and Paper Production MACT in 40 *CFR* Part 63 Subpart S applies to pulp and paper facilities that are major HAP sources. Based upon its estimated emissions of HAPs regulated by the U.S. EPA, the Facility does not generate HAP emissions in excess of the federal thresholds for a major source. Consequently, the pulp and paperboard industry NESHAP does not apply to the Facility.

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 boilers. Since the Bigelow boilers 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 periodic tune-ups and a one-time energy assessment.

40 C.F.R. Part 64 – Compliance Assurance Monitoring

Pursuant to requirements concerning enhanced monitoring and compliance certification under the *Clean Air Act* (“CAA”), EPA promulgated new regulation on October 22, 1997 and revised regulation on January 12, 2001. These new requirements implemented compliance assurance monitoring (“CAM”) for major stationary sources of air pollution that are required to obtain operating permits under Title V of the CAA. Subject to certain exemptions, the new regulations require owners or operators of such sources to conduct monitoring that satisfies particular criteria established in the rule to provide a reasonable assurance of compliance with applicable requirements under the CAA. Monitoring is proposed to focus on emissions units that rely on pollution control device equipment to achieve compliance with the applicable standards. The regulations also provide procedures for coordinating these requirements with the operating permits program regulations.

Section 64.2 of 40 C.F.R. specifies that each pollutant specific emission unit at a facility that meets a three-part test is subject to the requirements for CAM. An emission unit must:

- (1) be subject to an emission limit or standard;
- (2) use a control device to achieve compliance;
- (3) have **pre-control** emissions that exceed or are equivalent to the major source threshold in 40 *CFR* Part 70 (i.e., 10 tpy individual HAP, 25 tpy total HAP, 50 tpy VOCs, or 100 tpy for any other air contaminant).

Equipment at the Facility that meets the first criteria are the boilers. The Facility does have emissions of SO₂ in excess of major source thresholds. However, none of the equipment in use at the Facility, including the boilers, utilizes a control device, and therefore are not subject to CAM. As none of the equipment at the Facility meets the three criteria listed above the Facility is currently not subject to CAM.

40 CFR Part 98 – Mandatory Greenhouse Gas Reporting Pursuant to requirements concerning reporting of greenhouse gas (GHG) emissions under section 307(d)(1) of the CAA, EPA promulgated new regulations on October 30, 2009 and revised these regulations on March 18, 2011.

The requirement for reporting is described in 40 CFR, §98.2(a)(1), which states reporting requirements are applicable to “A facility that contains any source category that is listed in Table A–4 of this subpart and that emits 25,000 metric tons CO₂e or more per year in combined emissions from stationary fuel combustion units, miscellaneous uses of carbonate, and all applicable source categories that are listed in Table A–3 and Table A–4 of this subpart”. Table A-4 identifies pulp and paper manufacturing as a source category

The Facility’s actual emissions have exceeded the 25,000 metric ton threshold for CO₂e.

However, under 40 CFR, Part 70.2 and 71.2, emissions of GHGs are not included in the definition of “applicable requirements” unless as of July 1, 2011, the GHG emissions are at a stationary source emitting or having the potential to emit 100,000 tpy CO₂ equivalent emissions.

Since the Facility was not estimated to emit or have the potential to emit 100,000 tpy CO₂ equivalent emissions, as of July 1, 2011, so the requirements for Part 98 are not incorporated into this permit, however the Permittee is still subject to the requirements for mandatory GHG reporting if the Facilities actual CO₂e emissions exceed 25,000 metric tons/year.

4.3 Non-Applicable Requirements for Which a Permit Shield Provision Has Been Requested

Pursuant to §5-1015(a)(14) of the Regulations, an owner/operator may request to be shielded from potentially applicable state or federal requirements. The Facility has not requested a permit shield from any specific, potentially applicable requirement. Accordingly, the Agency has not granted any permit shields for the Facility.

5.0 CONTROL TECHNOLOGY REVIEW FOR MAJOR SOURCES AND MAJOR MODIFICATIONS

The proposed project is designated as a non-major modification of a stationary source and therefore is not subject to MSER review under §5-502 of the Regulations.

6.0 AMBIENT AIR QUALITY IMPACT EVALUATION

The proposed modification is not estimated to produce greater than 10 tpy of any single pollutant. The Agency has previously established that increases in emissions of less than 10 tpy do not pose a threat to the ambient air quality standards, nor are they expected to significantly deteriorate existing air quality. Therefore an impact evaluation was not necessary to assess compliance with the ambient air quality standards.

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.

The production of paper products does result in the discharge of HACs at the Facility. In Section 3.2 above, the Agency has quantified and compared the HAC emissions to the respective Action Levels (found in Appendix C of the *Regulations*) in order to determine if §5-261 of the *Regulations* is applicable to the Facility. The emission of formaldehyde continues to exceed its Action Level. As a result, the Permittee is subject to §5-261 of the *Regulations*.

7.1 HMSER Selection

Pursuant to §5-261 of the *Vermont Air Pollution Control Regulations (Regulations)* any stationary source whose current or proposed actual emission rate of a hazardous air contaminant (“HAC”) is equal to or greater than the respective Action Level shall achieve the HMSER for the respective HAC.

The Permittee submitted an HMSER report to the Agency in March 2003, pursuant to a requirement of the Initial Operating Permit (#AOP-95-174) issued October 4, 2002. The permit required that Permittee develop HMSER for two compounds, formaldehyde and benzyl alcohol, that were being emitted from the Facility at levels exceeding their respective Action Levels. Since that time the Permittee has discontinued the use of products that contain benzyl alcohol.

Various control strategies for controlling formaldehyde were explored in the Permittee's HMSEER report. Two compounds containing formaldehyde (Rhoplex HA-12 and Michem) are used in the Permittee's standard clear coating and standard pigment coating. As part of their research the Permittee reviewed the chemistry associated with these products, and tested the hypothesis that formaldehyde scavenging occurs during the paper-coating process.

Scavenging reactions are based on the assumption that certain materials may react with (or scavenge) free formaldehyde to reduce formaldehyde emissions. Common formaldehyde scavengers include ammonia and urea. Approximately 95% of the Permittee's coating process utilizes the two formaldehyde-containing products (Rhoplex HA-12 and Michem) in combination with Tamol, a product containing ammonia. The Permittee's vendor RhomNova tested and confirmed this hypothesis.

In permit AOP-04-027, the Agency determined HMSEER for formaldehyde to be 65 pounds per year, which correlates to an emission rate of 0.059 pounds per 8 hour period

If any of the formaldehyde-containing products utilized in these coatings are changed (unless that change involves only the reduction of formaldehyde) the Permittee is required to notify the Agency in writing of the change. Use of any new products shall not begin until the Permittee receives written approval from the Agency. Additional analysis of any new products may be required prior to use of any new product. Additional analysis of any new products may be required before an adjusted emission factor (such as those presented above) may be used for any new product.

According to 2011 – 2013 annual registration information, formaldehyde emissions averaged 40.3 pounds, or 0.046 pounds per 8 hour period. This confirms that the Facility has emissions of formaldehyde that are below the established HMSEER levels.

With the issuance of this permit AOP-13-002 on 5/31/2013, the Agency re-established the HMSEER for formaldehyde to be 65 pounds per year. This HMSEER evaluation shall be subject to re-evaluation five (5) years from the date of its determination and shall remain in effect until revised by the Agency.

Permit AOP-14-032 is not modifying or re-establishing the existing HMSEER.

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 (5)(a): 5-year tune-ups of the Bigelow boiler(s) as required by 40 *CFR* §63.11223(c). For boilers installed prior to June 4, 2010 the first tune-up is required by March 21, 2014. Subsequent tune-ups must be completed no later than 61 months after the prior tune-up. Each tune-up must be conducted while burning the type of fuel that provided the majority of the heat input to the boiler over the 12 months prior to the tune-up.

The 5-year tune-up interval applies to boilers with an oxygen trim system that maintains an optimum air-to-fuel ratio that would otherwise be subject to a biennial tune-up. The Bigelow boilers currently use an oxygen trim system. Should the Permittee stop using the oxygen trim system, the boilers would be required to conduct biennial tune-ups.