DEPARTMENT ORDER

Sappi North America, Inc. **Cumberland County** **Westbrook, Maine** **A-29-77-5-A**	**Departmental** **Findings of Fact and Order** **New Source Review** **NSR #5**

FINDINGS OF FACT

After review of the air emission license application, staff investigation reports, and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 Maine Revised Statutes (M.R.S.) § 344 and § 590, the Maine Department of Environmental Protection (the Department) finds the following facts:

I. REGISTRATION

A. Introduction

FACILITY	Sappi North America, Inc.
LICENSE TYPE	06-096 C.M.R. ch. 115, Minor Modification
NAICS CODES	322121
NATURE OF BUSINESS	Paper Mill
FACILITY LOCATION	89 Cumberland Street, Westbrook, Maine

B. NSR License Description

Sappi North America, Inc. (Sappi) has requested a New Source Review (NSR) license for their 2020 Restructuring Project. The project includes the following changes:

1. Addition of two new natural gas-fired boilers (Boilers #22 and #23);
2. Permanent shutdown of #9 Paper Machine; and
3. Reduction in operation of Boilers #17, #18, and #21.

C. Emission Equipment

The following new equipment is addressed in this NSR license:

Fuel Burning Equipment

Equipment	Maximum Capacity (MMBtu/hr)	Maximum Firing Rate (scf/hr)	Fuel Type, % sulfur	Stack #
Boiler #22	99.9[a]	96,400[b]	Natural Gas, negligible	22
Boiler #23	42.0[a]	40,500[b]	Natural Gas, negligible	23

[a] The maximum capacities listed are estimates. Each boiler shall not exceed 99.9 MMBtu/hr, and both boilers combined shall not exceed 150.0 MMBtu/hr.

[b] Based on a heating value of 1,037 Btu/scf (representative of the natural gas supplied).

The following emission units are discussed in this license. However, they are not considered modified or affected units, since the 2020 Restructuring Project will not result in any increase in emissions from this equipment.

Boilers

Equipment	Maximum Heat Input Capacity (MMBtu/hr)	Fuel	Manufacture Date
Boiler #21	1,074	biomass, CDD, sludge, coal, distillate fuel, #6 fuel oil	1981
Boiler #17	232.7 (199.0 limit)	distillate fuel, #6 fuel oil	1948
Boiler #18	232.7 (199.0 limit)	distillate fuel, #6 fuel oil	1948
Technology Center Boiler	8.4	natural gas	1969

The following equipment will be permanently shutdown as part of the 2020 Restructuring Project:

Process Equipment

Equipment	Process Rate	Pollution Control Equipment	Installation Date
#9 Paper Machine	185 ton/day	N/A	1963

D. Definitions

East-Side Boilers means Boilers #22 and #23 collectively.

Transitional Period means the time when Sappi is transitioning from one boiler group to the other, e.g., changing steam load from being supplied by West-Side Boilers to being supplied by East-Side Boilers. The transitional period begins when useful thermal energy is being supplied for any purpose from one of the boilers in the group the steam demand is being transitioned to. The transitional period ends when fuel is no longer being introduced into any of the boilers in the group the steam demand is being transitioned away from. Transitional periods shall not exceed 2 hours in length.

West-Side Boilers means Boilers #17, #18, and #21 collectively.

Useful Thermal Energy means energy (i.e., steam, hot water, or process heat) that meets the minimum operating temperature, flow, and/or pressure required by any energy use system that uses energy provided by the affected boiler or process heater.

E. Project Description

Sappi operates a specialty paper coating facility with a power boiler complex for the production of steam and power. In addition to the boiler complex, the facility consists of one paper machine (#9 Paper Machine), four offline coaters, paper winding and shipping operations, a Technology Center, and a wastewater treatment plant.

Sappi currently operates Boiler #21 to supply building heat, process steam, facility power, and power for sale to the grid. Boilers #17 and #18 are limited-use boilers used as back-up for Boiler #21. These boilers are oversized for current operations. In addition, Sappi plans to shut down #9 Paper Machine by October 2020. Therefore, Sappi has proposed the installation of two new, smaller boilers (Boilers #22 and #23) to supply process steam and building heat.

Sappi intends to maintain Boilers #17, #18, and #21 (referred to as West-Side Boilers) for potential future use and backup of Boilers #22 and #23 (East-Side Boilers). However, the West-Side Boilers will not be operated at the same time as East-Side Boilers with the exception of transitional periods (as defined above).

The Technology Center will be heated by steam provided by whichever group of boilers is providing heat to the mill. The Technology Center Boiler will continue to be a limited-use boiler used only for back-up heat for the Technology Center.

Boilers #22 and #23 will be package boilers which are expected to have maximum heat inputs of approximately 99.9 MMBtu/hr and 42.0 MMBtu/hr, respectively, firing natural gas. However, the exact size of each boiler will depend upon vendor availability at the time the purchase order is placed. Therefore, this licensing action is based on each boiler having a maximum heat input of less than 100 MMBtu/hr and the two boilers having a maximum combined heat input of less than 150 MMBtu/hr.

F. Application Classification

All rules, regulations, or statutes referenced in this air emission license refer to the amended version in effect as of the issued date of this license.

The application for Sappi does not violate any applicable federal or state requirements and does not reduce monitoring, reporting, testing, or recordkeeping requirements.

The modification of a major source is considered a major or minor modification based on whether or not expected emissions increases exceed the "Significant Emission Increase" levels as given in *Definitions Regulation*, 06-096 Code of Maine Rules (C.M.R.) ch. 100. For a major stationary source, the expected emissions increase from each new, modified, or affected unit may be calculated as equal to the difference between the post-modification projected actual emissions and the baseline actual emissions for each NSR regulated pollutant.

1. Baseline Actual Emissions

Baseline actual emissions (BAE) for existing affected emission units are equal to the average annual emissions from any consecutive 24-month period within the ten years prior to submittal of a complete license application. The selected 24-month baseline period can differ on a pollutant-by-pollutant basis.

The West-Side Boilers and #9 Paper Machine are not required to be considered "affected" units since there will be no emissions increases from these units associated with the 2020 Restructuring Project. Therefore, there are no existing emission units which are considered "affected" by this project.

The only equipment addressed by this license are new emission units. Baseline actual emissions for new equipment are considered to be zero for all pollutants; therefore, the selection of a baseline year is unnecessary.

2. Projected Actual Emissions

New emission units must use potential to emit (PTE) emissions for projected actual emissions (PAE). Those emissions are presented in the following table.

Projected Actual Emissions

Equipment	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_x (tpy)	CO (tpy)	VOC (tpy)
Boilers #22 & #23	3.3	3.3	3.3	0.7	23.7	25.0	2.6

The PAE above assume Boilers #22 and #23 have a combined maximum heat input capacity of 150 MMBtu/hr. This is a conservative estimate as the two boilers are expected to have a combined heat input of less than 150 MMBtu/hr.

3. Emissions Increases

Emissions increases are calculated by subtracting BAE from the PAE. The emission increase is then compared to the significant emissions increase levels.

Pollutant	Baseline Actual Emissions (ton/year)	Projected Actual Emissions (ton/year)	Emissions Increase (ton/year)	Significant Emissions Increase Levels (ton/year)
PM	0	3.3	3.3	25
PM_{10}	0	3.3	3.3	15
$PM_{2.5}$	0	3.3	3.3	10
SO_2	0	0.7	0.7	40
NO_x	0	23.7	23.7	40
CO	0	25.0	25.0	100
VOC	0	2.6	2.6	40

4. Classification

Since emissions increases do not exceed significant emissions increase levels, this NSR license is determined to be a minor modification under *Minor and Major Source Air Emission License Regulations*, 06-096 C.M.R. ch. 115. Sappi has submitted an application to incorporate the requirements of this NSR license into the facility's Part 70 air emission license.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license, the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 C.M.R. ch. 100. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in 06-096 C.M.R. ch. 100. BACT is a top-down approach to selecting air emission controls considering economic, environmental, and energy impacts.

B. Boilers #22 and #23

Sappi proposes to install two new, natural gas-fired, package boilers (Boilers #22 and #23). Boilers #22 and #23 will be package boilers which are expected to have maximum heat inputs of approximately 99.9 MMBtu/hr and 42.0 MMBtu/hr, respectively, firing natural gas. However, the exact size of each boiler will depend upon vendor availability at the time the purchase order is placed. Therefore, this licensing action is based on each boiler having a maximum heat input of less than 100 MMBtu/hr and the two boilers having a maximum combined heat input of less than 150 MMBtu/hr.

Boilers #22 and #23 will be leased units which may be temporary. In the next two to three years, Sappi will determine whether to purchase Boilers #22 and #23 or to replace them with other similar units. However, these boilers do not meet the definition of “temporary” units in either State or Federal regulations and are therefore treated as permanent installations for applicability purposes.

Boilers #22 and #23 shall each exhaust through their own stack. Each stack shall be at least 70-feet above ground level.

1. Transitional Periods

The East-Side Boilers shall not operate concurrently with the West-Side Boilers with the exception of Transitional Periods (as that term is defined in this license). Sappi shall keep records of the date and time each West-Side and East-Side boiler begins producing useful thermal energy and the date and time they end fuel firing in order to demonstrate compliance with this requirement.

2. Best Available Control Technology (BACT) Analysis

Since the exact sizes of Boilers #22 and #23 is not currently known, BACT emission limits have been established on a lb/MMBtu basis. Emission limits on a lb/hr basis will be established through BPT when these units are incorporated into the facility's Part 70 license. The following is a summary of the BACT determination for Boilers #22 and #23 by pollutant.

a. Alternative Technologies

Sappi considered several alternative technologies to provide facility heat and process steam as part of their BACT analysis, including the use of hydrogen fuel boilers, solar technologies, and industrial heat pumps.

Hydrogen Fuel
Alternative fuels, such as hydrogen, could be used to produce heat and steam at a significant reduction in pollutants which are products of combustion. However, there is no local infrastructure available to supply hydrogen fuel in the quantities needed. Therefore, the use of hydrogen fuel is not considered technologically feasible.

Concentrating Solar / Solar Photovoltaics
Concentrating solar technologies use mirrors to reflect and concentrate sunlight onto receivers that collect solar energy and convert it to heat. This technology is currently neither commercially proven nor suitable for continuous 24/7 manufacturing. Similarly, photovoltaics cannot provide 24/7 industrial steam for manufacturing. Neither of these technologies is determined to be technologically feasible.

Industrial Heat Pumps
Heat pumps are proven technology for heating and cooling of commercial facilities. However, heat pumps cannot provide the high-heat needs of the coaters and retrofitting the coaters to accommodate a heating system other than process steam is outside the scope of this project. Therefore, the use of industrial heat pumps for this project is determined to not be technically feasible.

The Department finds that the use of alternative technologies, instead of installation of Boilers #22 and #23, does not represent BACT for this project.

b. Particulate Matter: $PM/PM_{10}/PM_{2.5}$

The principle components of the particulate matter emissions from Boilers #22 and #23 include filterable and condensable particulate matter from incomplete combustion. Natural gas combustion typically has low emissions of filterable PM. Potential control technologies include baghouses, electrostatic precipitators (ESP), wet scrubbers, and multicyclones.

Baghouses

Baghouses consist of a number of fabric bags placed in parallel that collect particulate matter on the surface of the filter bags as the exhaust stream passes through the fabric membrane. The collected particulate is periodically dislodged from the bags' surface to collection hoppers via short blasts of high-pressure air, physical agitation of the bags, or by reversing the gas flow. Baghouse systems are capable of PM filterable collection efficiencies greater than 98%. A baghouse is a technically feasible option for control of PM from Boilers #22 and #23.

ESPs/WESPs

ESPs work by charging particles in the exhaust stream with a high voltage, oppositely charging a collection surface where the particles accumulate, removing the collected dust by a rapping process, and collecting the dust in hoppers. In wet ESPs (WESPs), the collectors are either intermittently or continuously washed by a spray of liquid, usually water. Instead of collection hoppers, a drainage system is used. ESP/WESP systems are capable of PM filterable collection efficiencies up to 98%. An ESP/WESP is a technically feasible option for control of PM from Boilers #22 and #23.

Multicyclones

Mechanical separators include cyclonic and inertial separators. In a multicyclone, centrifugal force separates larger PM from the gas stream. The exhaust gas enters a cylindrical chamber on a tangential path and is forced along the outside wall of the chamber at a high velocity, causing the PM to impact collectors on the outer wall of the unit and fall into a hopper for collection. Multicyclones have typical removal efficiencies of 40 – 90% for PM_{10} and zero to 40% for $PM_{2.5}$. The use of multicyclones is considered a technically feasible option for the control of PM emissions from Boilers #22 and #23.

Wet Scrubbers

Wet scrubbers remove PM from gas streams primarily through impaction and, to a lesser extent, other mechanisms such as interception and diffusion. A scrubbing liquid (typically water) is sprayed countercurrent to the exhaust gas stream. Contact between the larger scrubbing liquid droplets and the suspended particulates removes the PM from the gas stream. Entrained liquid droplets then pass through a mist eliminator (coalescing filter) which causes the droplets to become heavier and fall out of the exhaust stream. Wet scrubbers typically have removal efficiencies of 90 – 99% for emissions of PM_{10} and significantly lower efficiencies for $PM_{2.5}$ (as low as 50% for spray tower scrubbers). High-efficiency scrubbers such as venturi scrubbers can be used to achieve greater removal efficiencies for $PM_{2.5}$ of greater than 99% due to the high velocities and pressure drops at which they operate. A wet scrubber is a technically feasible option for control of PM Boilers #22 and #23.

BACT Determination for Particulate Matter

A search of the RBLC did not identify any particulate matter control technologies in use on natural gas-fired boilers similar to Boilers #22 and #23. Although each of the control options listed above is technically feasible, uncontrolled emissions of particulate matter from Boilers #22 and #23 combined are estimated to be no more than 3.3 tpy. Even assuming 100% control from the most cost-effective option (multicyclones), the cost of control would still exceed $100,000/ton. Therefore, additional controls for particulate matter from Boilers #22 and #23 are determined not to be economically feasible.

The Department finds the firing of natural gas and the following emission limits to represent BACT for particulate matter emissions from Boilers #22 and #23 (each):

Units	PM	PM_{10}	$PM_{2.5}$
lb/MMBtu	0.005	0.005	0.005

These standards apply at all times. Upon request by the Department, compliance with the particulate matter limits shall be demonstrated through performance testing in accordance with 40 C.F.R. Part 60, Appendix A, Methods 5, 201, 201A, and 202, as applicable, or other method as approved by the Department.

Visible emissions from Boilers #22 and #23 shall each not exceed 10% opacity on a six-minute block average basis. Compliance shall be demonstrated through performance testing in accordance with 40 C.F.R. Part 60, Appendix A, Method 9 upon request by the Department.

c. Sulfur Dioxide: SO_2

Emissions of SO_2 from Boilers #22 and #23 are attributable to the oxidation of sulfur compounds contained in the fuel. Pollution control options to reduce SO_2 emissions include flue gas desulfurization by means of wet scrubbing and firing fuels with an inherently low sulfur content, such as natural gas.

Flue Gas Desulfurization

Flue gas desulfurization by means of wet scrubbing works by injecting a caustic solution into the scrubber unit to react with the SO_2 in the flue gas to form a precipitate and either carbon dioxide or water. Flue gas desulfurization by means of wet scrubbing can have control efficiencies upwards of 90%. However, operation of a scrubber is very energy intensive due to the pressure differential created. Although technically feasible, uncontrolled emissions of SO_2 from Boilers #22 and #23 are estimated to be less than 1.0 tpy. Therefore, operation of flue gas desulfurization for control of SO_2 from Boilers #22 and #23 is determined to not be economically feasible.

BACT Determination for SO_2

The Department finds the use of natural gas, which inherently has a low sulfur content, and an emission limit of 0.001 lb/MMBtu represent BACT for SO_2 emissions from Boilers #22 and #23. This standard applies at all times.

Compliance with the SO_2 limit is based on monthly recordkeeping of the amount of natural gas fired in Boilers #22 and #23 and the most recent tariff sheet showing the sulfur content of the natural gas fired.

d. Nitrogen Oxides: NO_x

NO_x from combustion is generated through one of three mechanisms: fuel NO_x, thermal NO_x, and prompt NO_x. Fuel NO_x is produced by the oxidation of nitrogen in the fuel source, with low nitrogen content fuels such as natural gas producing less NO_x than fuels with higher levels of fuel-bound nitrogen. Thermal NO_x forms in the high temperature area of the combustor and increases exponentially with increases in flame temperature and linearly with increases in residence time. Flame temperature is dependent upon the ratio of fuel burned in a flame to the amount of fuel needed to consume all the available oxygen, also known as the equivalence ratio. The lower this ratio is, the lower the flame temperature; thus, by maintaining a low fuel ratio (lean combustion), the potential for NO_x formation can be reduced. In most modern burner designs, the high temperature combustion gases are cooled with dilution air. The sooner this cooling occurs, the lower the formation of thermal NO_x. Prompt NO_x forms from the oxidation of hydrocarbon radicals near the combustion flame; this produces an insignificant amount of NO_x.

Control of NO_x emissions can be accomplished through one of three methods: the use of add-on controls, such as selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR), the use of combustion control techniques, such as low excess air firing, low NO_x burners (LNBs), ultra-low NO_x burners (ULNBs), water/steam injection, and flue gas recirculation (FGR), and the combustion of clean fuel, such as natural gas.

SCR

SCR employs the reaction of NO_x with ammonia in the presence of a catalyst to produce nitrogen and water. The reduction is considered "selective" because the catalyst selectively targets NO_x reduction in the presence of ammonia within a temperature range of approximately 480 ºF to 800 ºF, according to the following reactions:

$$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$$
$$2NO_2 + 4NH_3 + O_2 \rightarrow 3N_2 + 6H_2O$$

SCR systems have typical control efficiencies between 70 – 90%. SCR is considered technically feasible for control of NO_x emissions from Boilers #22 and #23.

Capital costs for SCR systems are significantly higher than other types of NO_x control due to the large volume of catalyst that is required. Operation and maintenance costs are driven by reagent usage, catalyst replacement, and increased electrical power usage. Sappi estimated the cost of installing an SCR system at approximately $1.1 million with an additional $700,000 for additional infrastructure needed to accommodate the SCR system. When amortized over seven years, the cost of SCR for these units exceeds $10,000 per ton of NO_x removed. Therefore, operation of an SCR system for control of NO_x from Boilers #22 and #23 is determined to not be economically feasible.

<u>SNCR</u>

SNCR is a method of post combustion control that selectively reduces NO_x into nitrogen and water vapor by reacting the exhaust gas with a reagent such as ammonia or urea, similar to SCR. However, in SNCR, a catalyst is not used to lower the activation temperature of the NO_x reduction reaction. Therefore, SNCR is used when flue gas temperatures are between 1600 ºF and 2100 ºF. The NO_x reduction efficiency decreases rapidly at temperatures outside this optimum temperature window which results in excessive unreacted ammonia slip and increased NO_x emissions.

The reagent solution (either ammonia or urea) is typically injected along the post-combustion section of the boiler. Injection sites must be optimized for reagent effectiveness and must balance residence time with flue gas stream temperature. The potential for unreacted ammonia slip emissions is greater with SNCR than with SCR and the overall NO_x reduction is less. SNCR systems have typical control efficiencies between 30 – 75%.

For boilers with a large turndown ratio, such as package boilers, it is nearly impossible to inject the reagent at a location where the temperature remains in the reaction window for all modes of operation. Additionally, to ensure proper mixing of the reagent with flue gas, a large amount of wall space is needed for installation of the injectors and a large furnace volume is needed to ensure adequate residence time for the reaction to occur. This is not possible for package boilers, such as Boilers #22 and #23, as they have a very small equipment footprint and lack the size/volume necessary to ensure an efficient reduction reaction. Therefore, operation of an SNCR system for control of NO_x from Boilers #22 and #23 is determined to not be technically feasible.

LNBs/ULNBs

LNBs reduce NO_x by accomplishing combustion in stages which delays the combustion process resulting in a cooler flame that suppresses thermal NO_x formation. While the technology varies between manufacturers, LNBs typically target emission levels around 30 ppmdv at 3% O_2. LNBs are a technically feasible option for control of NO_x from Boilers #22 and #23.

ULNBs typically employ rapid mixing of gaseous fuel with air near the burner exit. ULNBs typically target emission levels around 9 ppmdv at 3% O_2. Rapid mixing virtually eliminates prompt NO_x formation and promotes complete fuel combustion. However, the high amounts of excess air used in rapid mix burners reduces boiler efficiency. In addition, this type of burner configuration does not allow for high turndown ratios. Boilers #22 and #23 will need to modulate frequently in response to changes in the mill steam demand. A high turndown ratio is required to operate this equipment as intended. Therefore, ULNBs are not a technically feasible option for control of NO_x from Boilers #22 and #23 as the project is currently defined.

FGR

FGR is a system where a portion of the flue gas is recirculated back into the main combustion chamber; this helps to decrease the formation of thermal NO_x by lowering the peak flame temperature and reducing the oxygen concentration surrounding the flame zone. The recycled flue gas consists of combustion products which act as inert heat sinks during combustion of the fuel/air mixture. This reduces NO_x emissions by two mechanisms. Primarily, the recirculated gas acts as a diluent to reduce combustion temperatures, lowering peak flame temperatures, thus suppressing thermal NO_x formation. In addition, the recirculated flue gas lowers the average oxygen concentration in the combustion zone, which lowers the amount of oxygen available to react with nitrogen to form NO_x. FGR systems are capable of control efficiencies up to 75%. FGR is considered technically feasible for control of NO_x emissions from Boilers #22 and #23.

Water/Steam Injections

Water/steam injection is the process of injecting water or steam into the combustion chamber to act as a thermal ballast in the combustion process. The ballast lowers the combustion temperature, minimizing thermal formation of NO_x. Water/steam injection can reduce NO_x emissions at a rate equivalent to flue gas recirculation and is technically feasible for the control of NO_x emissions from Boilers #22 and #23.

BACT Determination for NO_x

Sappi has proposed the installation and operation of LNBs and FGR to control NO_x from Boilers #22 and #23. The Department finds the use of LNBs and FGR for control of NO_x emissions and an emission limit of 0.036 lb/MMBtu represent BACT for NO_x emissions from Boilers #22 and #23. This standard applies at all times.

Upon request by the Department, compliance shall be demonstrated through performance testing in accordance with 40 C.F.R. Part 60, Appendix A, Method 7 or other method as approved by the Department.

e. Carbon Monoxide and Volatile Organic Compounds: CO & VOC

CO and VOC emissions are attributable to the incomplete combustion of organic compounds in the fuel. Emissions result when there is insufficient residence time or when there is insufficient oxygen available near the hydrocarbon molecule during combustion to complete the final step in oxidation. Combustion modifications taken to reduce NO_x emissions may result in increased emissions of CO. Pollution control options to reduce CO and VOC emissions include add-on technologies such as catalytic oxidation and thermal oxidizers as well as combustion controls.

Catalytic Oxidation

Catalytic oxidation is a post combustion control technology that has been used extensively with gas turbines and internal combustion engines. Catalysts are typically based on a noble metal and operate by decreasing the temperature at which oxidation of CO and VOC will occur. The catalyst lowers the activation energy necessary for CO to react with available oxygen in the exhaust to produce CO_2. Despite the decreased oxidation temperature, process exhaust gas must typically be preheated prior to contact with the catalyst bed. An oxidation catalyst is located within the heat recovery section of the system, or in a downstream location where the exhaust gases are reheated to meet the proper temperature environment. The operating temperature window of an oxidation catalyst is between approximately 600 °F and 800 °F. Catalytic oxidation is considered technically feasible for control of CO and VOC emissions from Boilers #22 and #23.

A review of the RBLC did not find any boilers in similar configurations currently utilizing catalytic oxidation. Sappi estimated the cost of a catalytic oxidation system would be at least $450,000 with the cost of removal exceeding $10,000 per ton. Therefore, based on the combination of the cost per ton of pollutant controlled and the need to fire additional fuel to reheat the flue gas, the installation and operation of an oxidation catalyst for control of CO and VOC on Boilers #22 and #23 is determined to be economically infeasible and environmentally unjustified.

Oxygen Trim

Oxygen trim systems monitor the amount of oxygen in the exhaust gas and adjust the inlet flow of combustion air in order to achieve an optimum air-to-fuel ratio. By monitoring the oxygen level in the exhaust gas, fine adjustments can be applied to the combustion air ratio to compensate for combustion variables such as barometric pressure change, air humidity, and variances in fuel quality. If insufficient combustion air is available in the combustion chamber, incomplete combustion occurs, resulting in increased CO and VOC emissions. An oxygen trim system ensures adequate combustion air is present for complete combustion. Use of an oxygen trim system is considered technically feasible for control of CO and VOC emissions from Boilers #22 and #23.

BACT Determination for CO and VOC

The Department finds the use of an oxygen trim system and emission limits of 0.038 lb/MMBtu for CO and 0.004 lb/MMBtu for VOC represent BACT for CO and VOC emissions from Boilers #22 and #23.

These standards apply at all times. Upon request by the Department, compliance shall be demonstrated through performance testing in accordance with 40 C.F.R. Part 60, Appendix A, Method 10 or 19 (CO) and Method 25A (VOC) or other method as approved by the Department.

3. New Source Performance Standards (NSPS): 40 C.F.R. Part 60, Subpart Dc

Boilers #22 and #23 are subject to *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* 40 C.F.R. Part 60, Subpart Dc for units greater than 10 MMBtu/hr and less than 100 MMBtu/hr manufactured after June 9, 1989. [40 C.F.R. § 60.40c]

A summary of the currently applicable 40 C.F.R. Part 60, Subpart Dc requirements for Boilers #22 and #23 is listed below.

a. Notification

Sappi shall submit notification to EPA and the Department of the date of construction and actual start-up. This notification shall include the design heat input capacity of each boiler and the type of fuel to be combusted. [40 C.F.R. § 60.48c(a)]

b. Standards

(1) Boilers #22 and #23 will fire only natural gas. As such, there are no applicable SO_2 emission limits in Subpart Dc.

(2) Boilers #22 and #23 will fire only natural gas. As such, there are no applicable particulate matter emission limits in Subpart Dc.

c. Reporting and Recordkeeping

Sappi shall maintain records of the amounts of natural gas fired in Boilers #22 and #23 (each) during each calendar month. [40 C.F.R. § 60.48c(g)(2)]

4. National Emission Standards for Hazardous Air Pollutants (NESHAP): 40 C.F.R. Part 63, Subpart DDDDD

Boilers #22 and #23 are subject to the *National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters*, 40 C.F.R. Part 63, Subpart DDDDD. Boilers #22 and #23 will fire natural gas and will be considered new boilers in the "units designed to burn gas 1 fuels" subcategory.

A summary of the currently applicable 40 C.F.R. Part 63, Subpart DDDDD requirements for Boilers #22 and #23 is listed below.

a. Compliance Date

Boilers #22 and #23 must comply with the requirements of 40 C.F.R. Part 63, Subpart DDDDD upon startup. [40 C.F.R. § 63.7495(a)]

b. Initial Compliance Requirements

(1) Boilers in the "units designed to burn gas 1 fuels" subcategory are not subject to the emission limits in Tables 1 and 2, or Tables 11 through 13, or the operating limits in Table 4. [40 C.F.R. § 63.7500(e)]

(2) Fuel analyses are not required for boilers that fire a single type of fuel. [40 C.F.R. § 63.7510(a)(2)(i)]

(3) Initial compliance shall be demonstrated by completing the required initial tune-up within 61 months of the initial startup of each boiler. [40 C.F.R. §§ 63.7510(g) and 63.7515(d)]

c. Continuous Compliance Requirements

(1) At all times, Sappi must operate and maintain Boilers #22 and #23, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source. [40 C.F.R. § 63.7500(a)(3)]

(2) Sappi has proposed operation of an oxygen trim system as part of the BACT analysis for Boilers #22 and #23. Therefore, Sappi shall demonstrate continuous compliance by performing tune-ups on Boilers #22 and #23 every 5 years as specified in §§ 63.7540(a)(10)(i) through (vi). Each tune-up must be conducted no more than 61 months after the previous tune-up. Sappi may delay the burner inspection specified in § 63.7540(a)(10)(i) until the next scheduled or unscheduled unit shutdown, but the burner shall be inspected at least once every 72 months. [40 C.F.R. §§ 63.7515(d) and 63.7540(a)(12)]

(3) If either Boiler #22 or #23 is not operating on the required date for a tune-up, the tune-up for that boiler must be conducted within 30 calendar days of its startup. [40 C.F.R. § 63.7540(a)(13)]

(4) The oxygen level shall be set no lower than the oxygen concentration measured during the most recent tune-up. [40 C.F.R. § 63.7540(a)(12)]

d. Recordkeeping

(1) Records shall be kept for a period of 5 years. [40 C.F.R. § 63.7560(b)]

(2) Records shall be kept on-site, or be accessible from on site, for at least 2 years. Records may be kept off-site for the remaining 3 years. [40 C.F.R. § 63.7560(c)]

(3) Sappi shall maintain records in accordance with 40 C.F.R. Part 63, Subpart DDDDD including, but not limited to, copies of notifications and reports submitted to comply with the subpart and any supporting documentation. [40 C.F.R. § 63.7555(a)(1)]

e. Notifications and Reports

Sappi shall submit to the Department and EPA all notifications and reports required by 40 C.F.R. Part 63, Subpart DDDDD including, but not limited to, the following:

(1) An Initial Notification shall be submitted no later than 15 days after the date of startup of Boilers #22 and #23. [40 C.F.R. § 63.7545(c)]

(2) Sappi shall prepare and submit a compliance report every 5 years which contains the following information:

(i) Company and Facility name and address;
(ii) Process unit information, emissions limitations, and operating parameter limitations;
(iii) Date of report and the beginning and ending dates of the reporting period;
(iv) Date of the most recent tune-up and date of the most recent burner inspection if not conducted with the tune-up;
(v) Statement by a responsible official with that official's name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report.

[40 C.F.R. § 63.7550(c)(1)]

(3) The first compliance report covers the period beginning on the date of startup of each boiler (Boiler #22 or #23) and ending on December 31 within 5 years after the startup. Subsequent compliance reports shall cover the 5-year period from January 1 through December 31 as applicable. Each compliance report shall be submitted or postmarked no later than January 31.
[40 C.F.R. § 63.7550(b)]

(4) All reports required by 40 C.F.R. Part 63, Subpart DDDDD shall be submitted electronically to EPA via the Compliance and Emissions Data Reporting Interface (CEDRI). [40 C.F.R. § 7550(h)(3)]

C. <u>Shutdown of #9 Paper Machine</u>
The 2020 Restructuring Project includes the permanent shutdown of #9 Paper Machine. Sappi may continue to operate #9 Paper Machine under its existing licensed conditions until March 30, 2021.

D. Incorporation Into the Part 70 Air Emission License

Per *Part 70 Air Emission License Regulations*, 06-096 C.M.R. ch. 140 § 1(C)(8), for a modification at the facility that has undergone NSR requirements or been processed through 06-096 C.M.R. ch. 115, the source must apply for an amendment to their Part 70 license within one year of commencing the proposed operations, as provided in 40 C.F.R. Part 70.5. An application to incorporate the requirements of this NSR license into the Part 70 air emission license has been submitted to the Department.

E. Annual Emissions

The table below provides an estimate of facility-wide annual emissions for the purposes of calculating the facility's annual air license fee. Only licensed equipment is included, i.e., emissions from insignificant activities are excluded. Similarly, unquantified fugitive emissions are not included. Quantified emissions calculations are based on the following:

- Operation of Boiler #21 at 100% for 8,760 hrs/yr plus operation of Boilers #17 and #18 for 876 hrs/yr (10% capacity) for PM/PM_{10}, CO, and VOC;
- The combined permitted "not to exceed" numbers for SO_2 and NO_x for Boilers #21, #17, and #18, as these are lower than the calculation method stated above;
- Boilers #22 and #23 not operating simultaneously with Boilers #17, #18, or #21 except for transitional periods;
- A 10% capacity factor for the Technology Center Boiler;
- Operating each generator for 100 hrs/yr;
- Maximum operation (100% load for 8,760 hrs/yr) of the fuel burning equipment associated with the coaters; and
- Maximum licensed VOC emissions for the coaters and Ultracast Roll Cleaning process.

Please note, this information provides the basis for fee calculation only and should not be construed to represent a comprehensive list of license restrictions or permissions. That information is provided in the Order section of this license.

Total Licensed Annual Emissions for the Facility
Tons/year
(used to calculate the annual license fee)

	PM	**PM_{10}**	**SO_2**	**NO_x**	**CO**	**VOC**
Boilers #17, #18, #21, #22, & #23 (combined)	208.9	208.9	3,763.5	1,787.6	2,169.7	180.2
Technology Center Boiler	0.1	0.1	–	0.4	0.3	–
Engine #1	–	–	–	0.4	–	0.1
Engine #2	–	–	–	0.4	0.1	–
Engine #3	–	–	–	0.2	–	–
Engine #4	–	–	–	0.1	–	–
Engine #5	–	–	–	0.2	0.4	–
#35 Coater Dryer	1.7	1.7	–	3.3	2.8	0.2
#2 Coater 4th Zone Dryer	0.9	0.9	–	2.6	2.1	0.2
#20 Coater 7th Zone Dryer	0.9	0.9	–	1.7	1.4	0.1
#20 Coater Floatation Dryers	1.8	1.8	–	3.4	2.9	0.2
Catalytic Incinerator	4.0	4.0	–	4.4	7.8	–
#2 & #20 Coaters (combined)	–	–	–	–	–	139.7
Ultracast Roll Cleaning	–	–	–	–	–	2.0
Total TPY	**218.3**	**218.3**	**3,763.5**	**1,804.7**	**2,187.5**	**322.7**

III. AMBIENT AIR QUALITY ANALYSIS

Sappi previously submitted an ambient air quality analysis demonstrating that emissions from the facility, in conjunction with all other sources, do not violate National Ambient Air Quality Standards (NAAQS) or increment standards (see license A-29-71-AB-M, issued 7/17/1997).

The West-Side Boilers have significantly higher licensed emissions than the East-Side Boilers, and these two boiler groups cannot operate simultaneously except for transitional periods. Therefore, it is expected that the 2020 Restructuring Project will have a net positive effect on ambient air quality.

Since Boilers #22 and #23 may be replaced by different permanent units within the next three years, the Department has agreed to postpone requiring a new ambient air quality dispersion modeling analysis until these boilers are made permanent or are replaced. Therefore, by May 1, 2023, Sappi shall either submit an ambient air quality impact analysis for the facility as licensed or submit an application (including an ambient air quality impact analysis) to replace Boilers #22 and/or #23 or other license changes necessary to demonstrate compliance with all NAAQS and increment standards.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants New Source Review License A-29-77-5-A pursuant to the preconstruction licensing requirements of 06-096 C.M.R. ch. 115 and subject to the specific conditions below.

Severability. The invalidity or unenforceability of any provision of this License or part thereof shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

SPECIFIC CONDITIONS

(1) **Boilers #22 and #23**

A. Boilers #22 and #23 shall fire only natural gas. [06-096 C.M.R. ch. 115, BACT]

B. Boiler Size

1. The maximum heat input for Boilers #22 and #23 shall each not exceed 99.9 MMBtu/hr. [06-096 C.M.R. ch. 115, BACT]

2. The maximum heat input for Boilers #22 and #23 combined shall not exceed 150 MMBtu/hr. [06-096 C.M.R. ch. 115, BACT]

C. The East-Side Boilers shall not operate concurrently with the West-Side Boilers with the exception of Transitional Periods (as that term is defined in this license). Compliance shall be demonstrated through the Periodic Monitoring requirements of this license. [06-096 C.M.R. ch. 115, BACT]

D. Boilers #22 and #23 shall each exhaust through a stack that is at least 70-feet above ground level. [06-096 C.M.R. ch. 115, BACT]

E. Control Equipment

1. Sappi shall operate and maintain LNBs on Boilers #22 and #23 for control of NO_x during all times the boiler is operating. [06-096 C.M.R. ch. 115, BACT]

2. Sappi shall operate and maintain FGR on Boilers #22 and #23 for control of NO_x during all times the boiler is operating except during periods of startup and shutdown. [06-096 C.M.R. ch. 115, BACT]

3. Sappi shall operate and maintain an oxygen trim system on Boilers #22 and #23 for control of CO and VOC during all times the boiler is operating. [06-096 C.M.R. ch. 115, BACT]

F. Emission Limits and Standards

1. Emissions from Boilers #22 and #23 shall each not exceed the following limits. These limits apply at all times (including periods of startup, shutdown, and malfunction). Unless otherwise stated, limits are on a 1-hour block average basis demonstrated in accordance with the methods described herein or as required by the relevant standard. [06-096 C.M.R. ch. 115, BACT]

Emission Unit	PM (lb/MMBtu)	$PM_{10}/PM_{2.5}$ (lb/MMBtu)	SO_2 (lb/MMBtu)	NO_x (lb/MMBtu)	CO (lb/MMBtu)	VOC (lb/MMBtu)
Boiler #22	0.005	0.005	0.001	0.036	0.038	0.004
Boiler #23	0.005	0.005	0.001	0.036	0.038	0.004

2. Visible emissions from Boilers #22 and #23 shall each not exceed 10% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 101, § 3(A)(3)]

G. Compliance Demonstration

1. Upon request by the Department, compliance with the particulate matter, NO_x, CO, and VOC emission limits shall be demonstrated through performance testing in accordance with the appropriate test method as approved by the Department. [06-096 C.M.R. ch. 115, BACT]

2. Compliance with the SO_2 limits is based on monthly recordkeeping of the amount of natural gas fired in Boilers #22 and #23 and the most recent tariff sheet showing the sulfur content of the natural gas fired. [06-096 C.M.R. ch. 115, BACT]

3. Upon request by the Department, Compliance with the visible emission limits shall be demonstrated through performance testing in accordance with 40 C.F.R. Part 60, Appendix A, Method 9. [06-096 C.M.R. ch. 115, BACT]

H. Periodic Monitoring

Sappi shall operate, record data, and maintain records from the following periodic monitors for Boilers #22 and #23:

1. Amount of natural gas fired in Boilers #22 and #23 (each) on a calendar month basis; [40 C.F.R. § 60.48c(g)(2)]
2. The current tariff sheet showing the maximum total sulfur content of the natural gas fired; and [06-096 C.M.R. ch. 115, BACT]
3. Date and time each West-Side Boiler and East-Side boiler begins producing useful thermal energy (used to document transitional periods); and [06-096 C.M.R. ch. 115, BACT]
4. Date and time each West-Side Boiler and East-Side boiler stops introducing fuel into the boiler (used to document transitional periods). [06-096 C.M.R. ch. 115, BACT]

I. 40 C.F.R. Part 60, Subpart Dc

Following are applicable requirements of 40 C.F.R. Part 60, Subpart Dc for Boilers #22 and #23 not addressed elsewhere in this Order:

Sappi shall submit notification to EPA and the Department of the date of construction and actual start-up. This notification shall include the design heat input capacity of each boiler and the type of fuel to be combusted. [40 C.F.R. § 60.48c(a)]

J. 40 C.F.R. Part 63, Subpart DDDDD

Following are applicable requirements of 40 C.F.R. Part 63, Subpart DDDDD for Boilers #22 and #23 not addressed elsewhere in this Order:

1. Initial compliance with 40 C.F.R. Part 63, Subpart DDDDD shall be demonstrated by completing the required initial tune-up within 61 months of the initial startup of each boiler. [40 C.F.R. §§ 63.7510(g) and 63.7515(d)]

2. At all times, Sappi must operate and maintain Boilers #22 and #23, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source. [40 C.F.R. § 63.7500(a)(3)]

3. Sappi shall demonstrate continuous compliance by performing tune-ups on Boilers #22 and #23 every 5 years as specified in §§ 63.7540(a)(10)(i) through (vi). Each tune-up must be conducted no more than 61 months after the previous tune-up. Sappi may delay the burner inspection specified in § 63.7540(a)(10)(i) until the next scheduled or unscheduled unit shutdown, but the burner shall be inspected at least once every 72 months. [40 C.F.R. §§ 63.7515(d) and 63.7540(a)(12)]

4. If either Boiler #22 or #23 is not operating on the required date for a tune-up, the tune-up for that boiler must be conducted within 30 calendar days of its startup. [40 C.F.R. § 63.7540(a)(13)]

5. The oxygen level shall be set no lower than the oxygen concentration measured during the most recent tune-up. [40 C.F.R. § 63.7540(a)(12)]

6. Recordkeeping

   a. Records shall be kept on site, or be accessible from on site, for at least 2 years. Records may be kept off site for the remaining 3 years. [40 C.F.R. § 63.7560(c)]
   b. Sappi shall maintain records in accordance with 40 C.F.R. Part 63, Subpart DDDDD including, but not limited to, copies of notifications and reports submitted to comply with the subpart and any supporting documentation; [40 C.F.R. § 63.7555(a)(1)]

7. Notifications and Reports

   Sappi shall submit to the Department and EPA all notifications and reports required by 40 C.F.R. Part 63, Subpart DDDDD including, but not limited to, the following:

   a. An Initial Notification (for each boiler) shall be submitted no later than 15 days after the date of startup of Boilers #22 and/or #23. [40 C.F.R. § 63.7545(c)]
   b. Sappi shall prepare and submit a compliance report every 5 years which contains the following information:

      (1) Company and Facility name and address;
      (2) Process unit information, emissions limitations, and operating parameter limitations;
      (3) Date of report and the beginning and ending dates of the reporting period;
      (4) Date of the most recent tune-up and date of the most recent burner inspection if not conducted with the tune-up;
      (5) Statement by a responsible official with that official's name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report.

      [40 C.F.R. § 63.7550(c)(1)]

c. The first compliance report covers the period beginning on the date of startup of each boiler (Boiler #22 or #23) and ending on December 31 within 5 years after the startup. Subsequent compliance reports shall cover the 5-year period from January 1 through December 31 as applicable. Each compliance report shall be submitted or postmarked no later than January 31.
[40 C.F.R. § 63.7550(b)]

d. All reports required by 40 C.F.R. Part 63, Subpart DDDDD shall be submitted electronically to EPA via the Compliance and Emissions Data Reporting Interface (CEDRI). [40 C.F.R. § 7550(h)(3)]

(2) **#9 Paper Machine**

Sappi shall permanently shut down #9 Paper Machine by March 30, 2021.
[06-096 C.M.R. ch. 115, BPT]

(3) **Ambient Air Quality Dispersion Modeling**

No later than May 1, 2023, Sappi shall either submit an ambient air quality impact analysis for the facility as licensed or submit an application (including an ambient air quality analysis) to replace Boilers #22 and/or #23 or other necessary license changes necessary to demonstrate compliance with all NAAQS and increment standards.
[06-096 C.M.R. ch. 115, BPT]

DONE AND DATED IN AUGUSTA, MAINE THIS 21st DAY OF AUGUST, 2020.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: ______________________ for ______________
GERALD D. REID, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 7/30/2020
Date of application acceptance: 7/31/2020

Date filed with the Board of Environmental Protection:

FILED
AUG 21, 2020
State of Maine
Board of Environmental Protection

This Order prepared by Lynn Muzzey, Bureau of Air Quality.