STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION AUGUSTA, MAINE 04333-0017

DEPARTMENT ORDER

Woodland Pulp LLC **Washington County** **Baileyville, Maine** **A-215-77-20-A**	**Departmental** **Findings of Fact and Order** **New Source Review** **NSR #20**

FINDINGS OF FACT

After review of the air emission license amendment 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	Woodland Pulp LLC
LICENSE TYPE	06-096 C.M.R. ch. 115, Major Modification
NAICS CODES	322121
NATURE OF BUSINESS	Pulp and Paper Mill
FACILITY LOCATION	144 Main Street, Baileyville, Maine 04694

B. NSR License Description

Woodland Pulp LLC (Woodland Pulp or Woodland) has requested a New Source Review (NSR) license to construct and operate a new tissue machine (TM3), and to re-license two previously licensed tissue machines (TM1 and TM2) to uncouple the units from PM and VOC emission caps with the #9 Power Boiler established in NSR A-215-77-6-A (3/8/13).

C. Emission Equipment

The following equipment is addressed in this NSR license:

Fuel Burning Equipment

Equipment	Maximum Capacity (MMBtu/hr)	Maximum Firing Rate (scf/hr)	Fuel Type, % sulfur	Stack #
TM1 Dryer Burners	50 (total)	49,019	Natural gas, negligible	TM1_YH
TM2 Dryer Burners	50 (total)	49,019	Natural gas, negligible	TM2_YH

Equipment	Maximum Capacity (MMBtu/hr)	Maximum Firing Rate (scf/hr)	Fuel Type, % sulfur	Stack #
TM3 TAD1 Dryer	100	98,039	Natural gas, negligible	TM3_TAD1
TM3 TAD2 Dryer	41	40,196	Natural gas, negligible	TM3_TAD2

Process Equipment

Equipment	Production Rate	Pollution Control Equipment	Stack #
TM1	187.4 air-dried tons* (ADT)/day	Wet dust collection system and venturi scrubber	TM1_YH TM1_DUST
TM2	187.4 ADT/day	Wet dust collection system and venturi scrubber	TM2_YH TM2_DUST
TM3	250-366 ADT/day	Droplet separators, wet dust collection system, venturi scrubber	TM3_TAD1 TM3_TAD2 TM3_WET TM3_MIST TM3_GLUE TM3_DUST

* "Tons" are defined as U.S. tons or "short tons" equivalent to 2,000 pounds.

D. Project Description

Woodland Pulp was issued NSR license A-215-77-15-A on July 27, 2018, approving a Major Modification to construct and operate two new tissue machines which included a through-air-dried (TAD) tissue machine (TM3) and a light dry crepe (LDC) tissue machine (TM4). The NSR also relicensed existing LDC tissue machines TM1 and TM2 as new units to uncouple these units from a PM and VOC emissions cap with the #9 Power Boiler. TM1 and TM2, initially licensed in NSR license A-215-77-6-A (3/8/2013), have been in operation since 2016. TM3 and TM4 have not yet been constructed.

In 2021, Woodland Pulp decided to pursue permitting of a TAD tissue machine for use at the facility with design parameters that differed significantly from the design of the TAD tissue machine (TM3) approved for construction by NSR A-215-77-15-A (7/27/2018). At that time, Woodland Pulp also determined that it would no longer pursue construction of TM4.

Woodland Pulp has requested that NSR A-215-77-15-A (7/27/2018) be replaced by this NSR license containing a revised project description which accurately describes the design capacity, emission rates, and exhaust flow characteristics of the TAD tissue machine selected for TM3 and the removal of TM4. The proposed project will also consist of the re-licensing of the existing LDC TM1 and TM2 tissue machines as new units to uncouple them from the PM and VOC emissions cap with the #9 Power Boiler established in NSR A-215-77-6-A (3/11/2013). The facility has also proposed the construction of a new tissue converting facility and storage warehouse.

E. 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 Woodland Pulp 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. However, there are no existing emission units which are considered "modified" or "affected" by this project.

Tissue Machines TM1 and TM2 were initially licensed in 2013 on the basis that neither steam production nor pulp production capacity would be increased as a result of the addition of the two tissue machines. Steam was to be diverted from other sources within the mill to supply steam demand to support TM1 and TM2, and a portion of the then-current pulp production would be diverted from the existing pulp dryer to the new tissue machines. With the current NSR application, Woodland has provided the Department with historical data demonstrating that operation of TM1 and TM2 since 2016 did not result in any upstream emission increases. There will be no increase in steam demand from the boilers as a result of this project, as steam will be diverted from other sources, such as the pulp dryer, to supply the tissue machines. Woodland will not increase pulp production to accommodate these new units but will instead divert a portion of current market pulp production from the existing pulp dryer to the tissue machines as well as potentially source pulp externally for use on the tissue machines. The reduced use of the pulp dryer will offset steam demand from TM1, TM2, and TM3. Because there will be no increase in steam or pulp production as a result of this project, there are no existing affected units at Woodland.

Tissue machines TM1, TM2, and TM3 are all being treated as new units for the purposes of this license. 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.

Potential to Emit

Equipment	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_x (tpy)	CO (tpy)	VOC (tpy)	GHG (tpy)
TM1	9.42	8.15	6.13	0.13	19.71	18.04	35.38	25,818.00
TM2	9.42	8.15	6.13	0.13	19.71	18.04	35.38	25,818.00
TM3	35.70	31.80	22.47	0.36	22.4	22.8	59.0	72,806.76
Converting Operations	--	--	--	--	--	--	10.0	--
Total	**54.54**	**48.10**	**34.76**	**0.62**	**61.82**	**58.88**	**139.76**	**124,442.76**

3. Emissions Increases

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

Pollutant	Baseline Actual Emissions (ton/year)	Potential to Emit (ton/year)	Emissions Increase (ton/year)	Significant Emissions Increase Levels (ton/year)
PM	0	54.54	54.54	25
PM_{10}	0	48.10	48.10	15
$PM_{2.5}$	0	34.76	34.76	10
SO_2	0	0.62	0.62	40
NO_x	0	61.82	61.82	40
CO	0	58.88	58.88	100
VOC	0	139.76	139.76	40
GHG	0	124,442.76	124,442.76	75,000

4. Classification

Emissions increases exceed the significant emissions increase level for PM, PM_{10}, $PM_{2.5}$, NO_x, VOC, and GHG. Because at least one regulated pollutant has exceeded significant emissions increase levels, this license is determined to be a major modification as defined in *Definitions Regulation*, 06-096 C.M.R. ch. 100, and has been processed according to Major Modification procedures of *Minor and Major Source Air Emission License Regulations,* 06-096 C.M.R. ch. 115. Woodland Pulp 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.

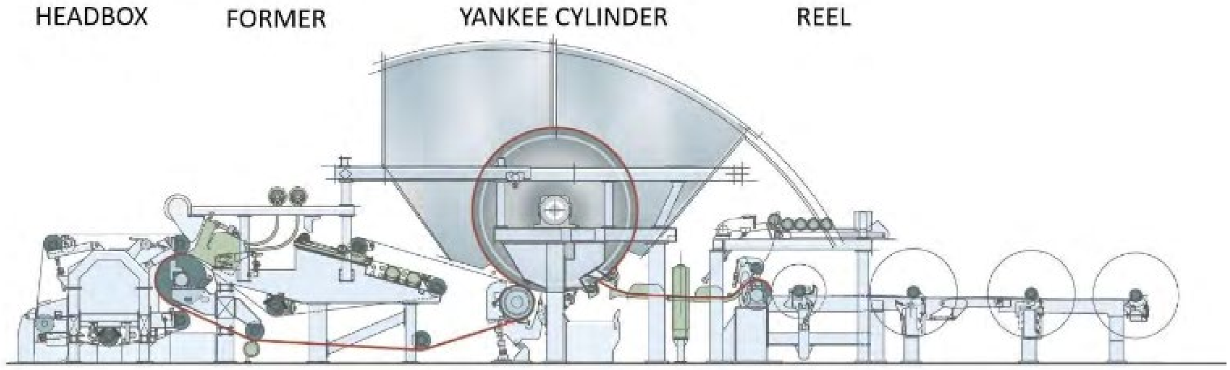
BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in 06-096 C.M.R. ch. 100. BACT is a top-down approach to selecting air emission controls considering economic, environmental, and energy impacts.

B. Tissue Machines

1. Equipment Description

TM1 and TM2 are identical LDC tissue machines, each with a nominal production capacity of 187 air-dried tons per day (ADTPD). Each machine utilizes a yankee dryer, which includes a large steam-heated drum and a hood in which hot air, produced by two 25 MMBtu/hr (each) natural gas-fired burners, impinges on the paper sheet. The dried tissue web is removed from the yankee cylinder by a doctor blade which forms the creped structure of the tissue paper. The finished tissue paper is then wound onto a spool to form parent rolls of tissue. The parent rolls are wrapped and stored prior to converting into the final product.

LDC Tissue Machine

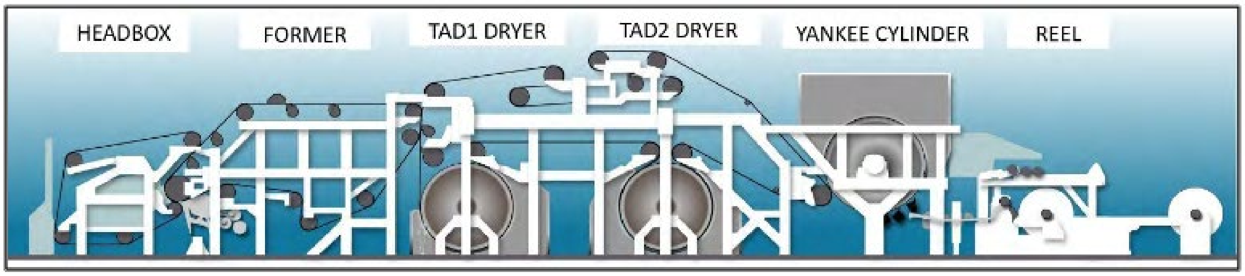


Both TM1 and TM2 have multiple exhaust points to the atmosphere as well as fugitive emissions. Exhaust points include vacuum pump stacks and mist stacks on the wet end, dust stacks, and yankee hood stacks.

- Wet end exhaust points: Although VOC emissions may occur at vacuum pump stacks and mist stacks, neither the applicant not the Department is aware of data that indicates the potential for other pollutants to be emitted in a fugitive manner from wet-end exhaust points of tissue machines of this type.
- Dust stacks: The dust stacks collect exhaust emissions from the doctor blade at the yankee drum and the reel. The TM1 dust stack is equipped with a venturi scrubber. The TM2 dust stack is currently equipped with a cyclone separator, but that will be replaced by a venturi scrubber as part of this project. The dust stacks from TM1 and TM2 currently exhaust at 97.3 feet above ground level (AGL) but will be raised to approximately 126 feet AGL and 148 feet AGL, respectively, as part of this project.
- Yankee hood stacks: The yankee hood stacks exhaust the products of combustion from the natural gas-fired burners in the yankee dryer. The yankee hood stacks from TM1 and TM2 currently exhaust at 97.3 feet AGL but will be raised to approximately 126 feet AGL and 148 feet AGL, respectively.

TM3 will be a through-air-dried (TAD) tissue machine with a nominal production capacity between 250 and 366 ADTPD of tissue depending on the product grade being manufactured. Woodland expects TM3 will produce an average of 305.2 ADTPD of tissue on an annual basis. TM3 will utilize two TAD cylinders to remove moisture from the product by blowing hot air through the tissue web. TAD Cylinder 1 will be heated by a 100 MMBtu/hr natural gas-fired burner, and TAD Cylinder 2 will be heated by a 41 MMBtu/hr natural gas-fired burner. From the TAD cylinders, the tissue web will then be adhered to a steam-heated yankee cylinder using an adhesive (glue). Like the LDC process of TM1 and TM2, the dried paper web will be removed from the yankee cylinder by a doctor blade, wound onto spools to form parent rolls, and wrapped and stored for converting.

TAD Tissue Machine



TM3 will have multiple exhaust points, including a Wet End Exhaust Stack, TAD Mist Exhaust Stack, TAD1 and TAD2 Stacks, Wet Dust Collection System Stack, and Glue Shield Exhaust.

- The Wet End Exhaust Stack and TAD Mist Exhaust Stack will both collect warm and humid air generated at the wet end of TM3 which will pass through a droplet separator before being discharged to atmosphere.
- The TAD1 and TAD2 Stacks will exhaust the products of combustion from the natural gas-fired burners heating the TAD cylinders.
- The Wet Dust Collection System Stack will serve numerous dust collectors located around the dry end of TM3.
- The Glue Shield Exhaust Stack will capture glue overspray at the yankee cylinder and will be equipped with a droplet separator.

2. Best Available Control Technology (BACT)

The following is a summary of the BACT determination for the Tissue Machines, by pollutant.

a. Particulate Matter (PM/PM_{10}/$PM_{2.5}$)

PM emissions from tissue machines are generated by combustion and process sources. Emissions of PM from natural gas combustion are generally minimal and are comprised of fine filterable and condensable PM. PM emissions can result from carryover of noncombustible trace constituents in the fuel and from products of incomplete combustion. PM emissions are also generated by the tissue making process itself in which dust particles are freed from the paper web during drying and while the dried sheet is removed from the yankee cylinder by the doctor blade. Potential control technologies for PM emissions include add-on pollution control equipment such as fabric filters (baghouses), electrostatic precipitators (ESP) and wet ESP, wet scrubbers, and cyclones/multiclones.

Fabric filters, commonly referred to as baghouses, remove particulates from exhaust streams by drawing exhaust air through a series of filter bags suspended in a housing structure, collecting filterable particulates on the upstream side. The dust collected is periodically removed and disposed of. Dust removal typically involves mechanical shaking, pulsing with jets of high-pressure air, or reversing the exhaust air flow. The primary advantages of baghouses include high removal efficiencies for filterable particulates, operational simplicity, and ease of maintenance. Disadvantages include high pressure drops across the systems and bag replacement costs. Baghouses are not highly effective in controlling condensable particulate matter emissions. Baghouses can achieve filterable PM removal efficiencies of greater than 99.9%. Due to the high moisture loading of the tissue machine's exhaust streams, baghouses would be blinded and not effective in this application; therefore, baghouses are considered technologically infeasible for the application.

An ESP removes filterable PM from a gas stream through the use of electric fields. The incoming exhaust gas is ionized, which negatively charges the filterable PM and causes it to be attracted to and collected on positively charged plates. At preset intervals, the plates are rapped to mechanically dislodge the PM for collection and disposal. Collection efficiency is affected by several factors including dust resistivity, gas temperature, chemical composition of the dust and gas, and particle size distribution. Filterable PM removal efficiencies of greater than 99% of total filterable PM are achievable. Wet ESPs are specifically designed to collect particulate matter from wet air streams and are therefore considered technically feasible. Woodland estimates a cost effectiveness of approximately $72,994 per ton of PM controlled for TM1 and TM2, and $85,292 per ton of PM controlled for TM3. The high capital and operating costs associated with wet ESPs make this option economically unjustifiable. A review of recently permitted and installed tissue machines in the U.S. did not indicate that any tissue machines employed the use of a wet ESP.

Wet scrubbers remove PM from exhaust streams by spraying a scrubbing liquid (typically water) countercurrent to the exhaust gas stream. Contact between the larger scrubbing liquid droplets and the suspended particulate removes the PM from the gas stream. Entrained liquid droplets are removed by a mist eliminator. Wet scrubbers have typical removal efficiencies of 90 to 99% for emissions of PM_{10} and significantly lower removal efficiencies for $PM_{2.5}$. High-efficiency scrubbers such as venturi scrubbers can be used to achieve removal efficiencies for $PM_{2.5}$ of greater than 99% due to the high velocities and pressure drops at which they operate. Wet scrubbers are considered technically feasible for controlling emissions of PM, PM_{10}, and $PM_{2.5}$ from the tissue machines.

Cyclones consist of one or more conically shaped vessels in which the gas stream follows a circular motion prior to outlet. The gas stream carrying suspended particles enters the cyclone and is forced into a vortex by the shape of the cyclone. The particles resist the change in direction as they move outward under the influence of centrifugal force until they strike the wall of the cyclone. Here, they become caught in a thin laminar layer of air next to the cyclone wall and are carried downward by gravity and collected. A variation of this technology is the multicyclone which arranges a bank of small cyclone tubes in a configuration that is similar to bags in a baghouse. Multicyclones can maintain high collection efficacies with variations in mass flow and can be used individually or in series with another particulate control device. Cyclones provide a low cost, low maintenance method of removing larger diameter filterable particulates (greater than 30 microns in diameter). Cyclones are considered technically feasible for controlling emissions of PM, PM_{10}, and $PM_{2.5}$ from the tissue machines.

Woodland has proposed the use of a venturi-style wet scrubber to control PM, PM_{10}, and $PM_{2.5}$ emissions from the dust collection stacks on TM1, TM2, and TM3 as well as cyclone droplet separators to control PM, PM_{10}, and $PM_{2.5}$ emissions from the non-combustion associated stacks on TM3.

The Department finds BACT for PM, PM_{10}, and $PM_{2.5}$ emissions from TM1, TM2, and TM3 to be the control strategy outlined above, and the emission limits in the table below.

b. Sulfur Dioxide (SO_2)

Emissions of SO_2 from the tissue machines are attributable to the oxidation of sulfur compounds contained in the natural gas used to generate hot air in the yankee hood and TADs. Pollution control options to reduce emissions of SO_2 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 by means of wet scrubbing works by injecting a caustic solution, such as limestone or lime, into a 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 percent. For tissue machine dryers using a low-sulfur fuel such as natural gas, the installation costs, annual operating and maintenance costs, costs for the caustic solution used in the scrubber, and the increased use of energy make this option economically infeasible.

The Department finds BACT for SO_2 emissions from TM1, TM2, and TM3 to be the use of natural gas in the burners associated with the tissue machines, which has an inherently low sulfur content, and the emission limits listed in the table below.

c. Nitrogen Oxides (NO_x)

Emissions of NO_x from the tissue machines are attributable to the combustion of natural gas in the yankee hood burners of TM1 and TM2 and the TAD burners in TM3. NO_x from the combustion process 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 distillate fuel and 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 and ultra-low NO_x burners, and flue gas recirculation (FGR); and the combustion of clean fuel such as distillate fuel or natural gas.

SCR systems inject an ammonia-based reagent into the exhaust stream just prior to passing over a catalyst bed. The reagent and the catalyst work together to convert NO_x to elemental nitrogen, carbon dioxide, and water vapor. The optimum temperature range for the highest reduction efficiencies (up to 90%) is between 700 and 750 °F. The exhaust temperatures for the TM1 and TM2 yankee burners and the TM3 TAD burners are below the optimal temperature range for an SCR system. In addition, particulate matter emissions from the tissue machine process would coat the SCR catalyst. For these reasons, SCR is not considered technically feasible for this application.

Like SCR, SNCR systems also inject ammonia-based reagent into the exhaust stream to convert NO_x into elemental nitrogen, carbon dioxide, and water vapor but do so without the aid of a catalyst. Because SNCR systems do not require a catalyst bed, this technology can be better suited for applications with higher levels of particulate and catalyst poisoning agents in the exhaust stream. The optimal temperature range for SNCR is approximately 1,800 to 2,100 °F when using urea as a reagent, and slightly lower for ammonia. The exhaust stream temperature from the tissue machine burners is well below this temperature range. Therefore, SNCR is not considered technically feasible.

Combustion controls for control of NO_x emissions include low excess air firing, FGR, low NO_x burners (LNB), and ultra-low NO_x burners (ULNB). Low excess air firing involves limiting the net excess air flow to the combustion chamber to less than 2%. FGR is a system where a portion of the flue gas is recirculated back into the main combustion chamber, reducing the formation of thermal NO_x by lowering the peak flame temperature and reducing the oxygen concentration surrounding the flame zone. FGR systems require moderately high capital costs due to the ductwork needed to span from the burner outlet to the combustion air duct and the operating costs associated with the energy requirements of recirculation fans. Additionally, FGR systems can affect heat transfer and system pressures. Exhaust gases from the tissue machine burners do not contain enough oxygen for them to be usable as combustion air. The exhaust gases also contain PM emissions that could foul the burner air passages, which would create a fuel rich condition that could present a safety hazard. For these reasons, FGR is not considered technically feasible.

LNBs reduce NO_x by causing combustion to occur in stages, delaying the combustion process and resulting in a cooler flame that suppresses thermal NO_x formation. Similar to FGR systems, LNBs also require moderately high capital costs for the combustion technology. LNBs have been observed to have NO_x emission reductions of 40 to 85 percent relative to uncontrolled emission levels. LNBs are considered technically and economically feasible for control of NO_x emissions from the dryer burners. TM1 and TM2 are already equipped with LNBs.

ULNBs employ staged combustion similar to LNBs while also allowing for the injection of flue gas at the burner. This allows the flue gas and fuel gas to mix prior to combustion which serves to reduce flame temperature substantially and further suppress the formation of thermal NO_x. ULNBs are capable of reducing NO_x emissions by 60 to 90 percent relative to uncontrolled emission levels. ULNBs are considered technically feasible for control of NO_x emissions from the dryer burners.

As part of the application for the 2018 re-licensing of TM1 and TM2 (addressed in A-215-77-15-A), Woodland performed an analysis of the incremental control cost effectiveness of ULNBs relative to LNBs for TM1 and TM2. The analysis demonstrated that the cost per additional ton of NO_x removed for ULNBs was $16,125/ton. Costs are expected to have increased since 2018 while the level of emission control offered has remained the same. Therefore, ULNBs are not considered economically justified for TM1 and TM2.

The Department finds BACT for NO_x emissions to be the use of LNBs on TM1 and TM2, the use of ULNBs on TM3, firing natural gas, and the emission limits listed in the table below.

d. Carbon Monoxide (CO)

Emissions of CO from the Tissue Machines are attributable to the incomplete combustion of organic compounds contained in the natural gas fired in the yankee hood burners and TAD burners. CO is also generated in the papermaking process itself when paper dust and VOC-containing additives are subjected to high temperatures in the burners. The amount of CO generated in this manner is highly variable and dependent on the additive chemistry as well as the amount of paper dust generated by the paper making process. Potential technologies for the control of CO emissions from the Tissue Machines include add-on controls, such as oxidation catalysts, and combustion control techniques, such as good combustion practices.

Oxidation catalysts oxidize CO with the aid of a catalyst into carbon dioxide. The "light-off" temperatures of an oxidation catalyst system is considered one of the important catalyst performance parameters and can range from 600 to 1,200 °F. Oxidation catalyst systems are typically installed directly into the exhaust streams where the optimal temperature zone exists. Typical CO reduction efficiencies range from 60 to 90 percent. The exhaust gas temperatures from the yankee dryer or TAD burners are well below the range in which a CO catalyst would be effective. Duct burners would be required to raise the exhaust gas temperature prior to the oxidation catalyst system. The duct burner would require more natural gas to be combusted and would result in additional emissions. Additionally, a separate control device would be needed to remove the paper dust from the exhaust streams so that it does not clog or coat the catalyst bed. For these reasons, oxidation catalysts are not considered technically feasible.

The Department finds BACT for CO emissions from TM1, TM2, and TM3 to be good combustion practices and the CO emission limits listed in the table below.

e. Volatile Organic Compounds (VOC)

Emissions of VOC from the tissue machines can be attributed to many different sources. Small amounts of VOC are present in the water carrying the pulp to the tissue machines and dryers and can be released as the water is removed from the sheet. The most often detected compound is methanol, a byproduct of chemical and mechanical pulping and bleaching processes. VOC are most often present in papermaking additives (defoamers, slimicides, retention aids, wet strength agents, wire and felt cleaners, etc.) and can be released during the papermaking process. On tissue machines with direct-fired dryers, VOC are also emitted from fuel combustion. Potential strategies for the control of VOC emissions from the tissue machines include thermal oxidation, catalytic oxidizers, carbon adsorption, and use of low-VOC containing materials.

Thermal oxidizers work on the principle of reacting VOC in exhaust gas with oxygen in air to form carbon dioxide and water vapor. This occurs when the exhaust gases are heated to a sufficiently high temperature, typically 1,400 to 1,600 °F. Thermal oxidation performance is affected by the quality of filterable PM and condensable PM contained in the exhaust gas stream. Paper machine exhaust contains “sticky” particulate matter due to the paper dust and chemical additives. Therefore, to avoid interference from PM contained in the exhaust gases, as much PM as possible should be removed prior to the exhaust gas entering the thermal oxidizer. According to a cost analysis performed by Woodland Pulp, operation of a thermal oxidizer on either TM1 or TM2 would cost approximately $17,996/ton of VOC controlled. Operation of a thermal oxidizer on TM3 would cost approximately $59,711/ton of VOC controlled. Therefore, the use of thermal oxidizers for the control of VOC from the tissue machines is not considered economically feasible.

Catalytic oxidizer systems use a catalyst to facilitate the oxidation reaction at a lower temperature. Reactions in a catalytic oxidizer usually take place between 600 and 900 °F. The lower combustion temperature creates the opportunity to reduce fuel expenses and materials costs. The addition of a preheater can further reduce fuel costs. These types of oxidizers are capable of removing VOC from a gas stream with a destruction efficiency of about 95%. To avoid contamination of the catalyst by PM contained in the exhaust gases, and PM control device would be required upstream of any catalytic oxidizer system. According to a cost analysis performed by Woodland Pulp, operation of a catalytic oxidizer on either TM1 or TM2 would cost approximately $26,119/ton of VOC controlled. Operation of a catalytic oxidizer on TM3 would cost approximately $86,664/ton of VOC controlled. Therefore, the use of catalytic oxidizers for the control of VOC from the tissue machines is not considered economically feasible.

Carbon adsorption recovers VOC from a gas stream by passing it through a static bed of activated carbon. The VOC are retained in the pores of the carbon molecules while air is discharged to the atmosphere. The bed of carbon must be regenerated after it becomes saturated with VOC. Regeneration may involve the use of heat to release the adsorbed VOC. There is typically a series of beds in the unit so that one or more beds are in use while others are being regenerated. VOC removal efficiency is dependent upon the adsorption capacity for each of the specific organic compounds that make up the exhaust gas stream. A maximum VOC removal efficiency of 90% is assumed for the tissue machine exhaust streams. Adsorption of VOC on the activated carbon bed could be impeded by PM contained in the exhaust stream clogging the pores of the bed. Upstream PM removal is required for carbon adsorption to be technically feasible for this application. Unlike other technologies that physically destroy VOC, carbon adsorption units act as collection and concentrating units that leave a concentrated liquid VOC waste stream that must further be treated through incineration, biological treatment at the mill wastewater plant, or managed as a hazardous waste. Due to the potential environmental effects of these additional treatment steps, carbon adsorption is not considered justified for use on the tissue machines.

The use of low-VOC containing materials where appropriate can help minimize VOC emissions from the papermaking process. Chemical recordkeeping and the use of lower VOC additives, when possible, are technically feasible options for controlling emissions of VOC from the tissue machines.

The Department finds BACT for VOC emissions from TM1, TM2, and TM3 to be good combustion practices, chemical recordkeeping, and the use of low VOC additives when possible, and the VOC emission limits listed in the table below.

f. Greenhouse Gases (GHG)

The natural gas-fired burners associated with TM1, TM2, and TM3 will emit GHG, most notably carbon dioxide (CO_2), but also methane (CH_4), and nitrous oxide (N_2O) as byproducts of combustion.

The primary strategies available to minimize the generation of GHG are burning clean fuel, such as natural gas or propane, and following good operating practices. Good operating practices include maintaining burners according to manufacturer recommendations, including conducting routine tune-ups, maintaining proper use of the burner management system, and conducting routine inspection and repair/replacement of key components. These practices will facilitate optimal performance of the burners and thereby minimize GHG emissions.

There are no add-on GHG emissions control technologies that may be considered technically feasible for application to these units. Carbon capture and sequestration would not be a viable technology to control GHG emissions from tissue machine burners due to the very low emission levels generated from the combustion of natural gas.

The Department finds that BACT for GHG emissions from TM1, TM2, and TM3 to be the use of natural gas and employing good operating and maintenance practices as discussed in the paragraph above.

3. Emission Limits

The BACT emission limits for the Tissue Machines and associated dryers firing natural gas are the following:

Unit	**PM (lb/hr)**	**PM_{10} (lb/hr)**	**$PM_{2.5}$ (lb/hr)**	**SO_2 (lb/hr)**	**NO_x (lb/hr)**	**CO (lb/hr)**
TM1	2.15	1.86	1.39	0.03	4.50	4.12
TM2	2.15	1.86	1.39	0.03	4.50	4.12
TM3	8.15	7.26	5.13	0.09	5.10	5.20

Process related VOC emissions from each of the Tissue Machines shall not exceed 1.0 lb/ADT of finished product. Combined VOC emissions from all three Tissue Machines, from both process and combustion related emissions, shall not exceed 130 TPY on a 12-month rolling total basis.

4. Visible Emissions

Visible emissions from each exhaust point associated with TM1, TM2, and TM3 shall not exceed 20% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 101, § 3(B)(4)]

5. Emission Limit Compliance Methods

Compliance with the emission limits associated with TM1, TM2, and TM3 shall be demonstrated in accordance with the methods and frequencies indicated in the table below or other methods or frequencies as approved by the Department. Unless otherwise stated in the table below, for TM1, TM2, and TM3, source testing shall be conducted simultaneously on each of the stacks identified below. The sum of the source test results from each stack shall be used to demonstrate compliance.

TM1: Dust Stack, Yankee Hood Stack
TM2: Dust Stack, Yankee Hood Stack
TM3: Wet End Exhaust Stack, TAD Mist Exhaust Stack, TAD1 Stack, TAD2 Stack, Wet Dust Collection System Stack, and Glue Shield Exhaust Stack

Pollutant	**Applicable Emission Limit**	**Compliance Method**	**Frequency**
PM	lb/hr	Source testing conducted in accordance with 40 C.F.R. Part 60, App. A, Method 5	As requested
$PM_{10}/PM_{2.5}$	lb/hr	Source testing conducted in accordance with 40 C.F.R. Part 60, App. A, Method 5 and Method 202 assuming 40% of filterable PM is PM_{10} and 20% is $PM_{2.5}$	As requested

Pollutant	Applicable Emission Limit	Compliance Method	Frequency
NO_X	lb/hr	Source testing conducted in accordance with 40 C.F.R. Part 60, App. A, Method 7 Source testing for NOx is only required on the TM1 Yankee Hood Stack, TM2 Yankee Hood Stack and TM3 TAD1 and TAD2 Stacks.	As requested
CO	lb/hr	Source testing conducted in accordance with 40 C.F.R. Part 60, App. A, Method 10 Source testing for CO is only required on the TM1 Yankee Hood Stack, TM2 Yankee Hood Stack and TM3 TAD1 and TAD2 Stacks.	As requested
VOC	ton/yr	Process VOC: Recordkeeping of chemicals/additives including the % VOC content, and records of paper production Combustion VOC: Recordkeeping of natural gas used by dryer burners on TM1, TM2 and TM3 and applying an emission factor of 5.5 lb VOC/MMScf sourced from U.S. EPA AP-42 Table 1.4-2.	Monthly

6. Parameter Monitoring

During all operating times, Woodland shall monitor the flow rate through, and pressure drop across each venturi scrubber.

7. Periodic Monitoring

   a. Periodic monitoring for the control equipment associated with the Tissue Machines shall include the following, as applicable:

      (1) Monthly inspections of the wet dust collection systems, venturi scrubbers, and cyclone droplet separators on each tissue machine;
      (2) Recordkeeping to document all maintenance, malfunctions, inspections, and downtime of the wet dust collection systems, venturi scrubbers, and cyclone droplet separators on each tissue machine; and
      (3) Recordkeeping of the flow rate through and pressure drop across each venturi scrubber at least once per shift.

   b. Periodic monitoring for all three Tissue Machines shall include the following:

      (1) Monthly records of the amount of each VOC-containing chemical/additive used on each machine;
      (2) Records of the amount of VOC in each chemical additive used;
      (3) Monthly records of the amount (ADT) of finished tissue product produced on each machine;
      (4) Monthly and 12-month rolling total calculations used to demonstrate compliance with the process related ton per year VOC emission limit; and
      (5) Monthly records of fuel use for each tissue machine.

8. Regulatory Applicability

   a. Federal Regulations

      (1) New Source Performance Standards

      New Source Performance Standards (NSPS) require new, modified, or reconstructed individual industrial or source categories to control emissions to the level achievable by the best-demonstrated technology. Sources subject to an NSPS are also subject to the general provisions established in *General Provisions*, 40 C.F.R. Part 60, Subpart A.

      There are no NSPS applicable to the Tissue Machines or their natural gas-fired dryers.

      (2) National Emission Standards for Hazardous Air Pollutants

      National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations establish emission standards for air pollutants not covered by the National Ambient Air Quality Standards (NAAQS), primarily hazardous air pollutants (HAP). The standards for source categories establish requirements for the installation of the maximum achievable control technology (MACT), as determined by the United States Environmental Protection Agency (EPA).

There are no NESHAP applicable to the Tissue Machines or their natural gas-fired dryers.

b. State Regulations

(1) *Visible Emissions Regulation*, 06-096 C.M.R. ch. 101

The Tissue Machines are subject to *Visible Emissions Regulation,* 06-096 C.M.R. ch. 101. This chapter establishes opacity limitations for emissions from several categories of air contaminant sources. The applicable requirements are included in the BACT determination.

(2) *Fuel Burning Equipment Particulate Emission Standard*, 06-096 C.M.R. ch. 103

The Tissue Machines are not subject to *Fuel Burning Equipment Particulate Emission Standard*, 06-096 C.M.R. ch. 103, which applies to all fuel burning equipment that has a rated heat input capacity of 3 MMBtu/hr or greater. The natural gas-fired yankee hood and through-air dryers on TM1, TM2, and TM3 have rated heat input capacities greater than 3 MMBtu/hr but do not meet the definition of “fuel burning equipment” as defined in 06-096 C.M.R. ch. 100; therefore, the dryers are not subject to 06-096 C.M.R. ch. 103.

(3) *General Process Source Particulate Emission Standard*, 06-096 C.M.R. ch. 105

The Tissue Machines are subject to *General Process Source Particulate Emission Standard*, 06-096 C.M.R. ch. 105, which applies to any source except fuel-burning equipment, incinerators, mobile sources, open burning sources, and sources of fugitive dust, and establishes a limitation on the amount of particulate emissions allowed from the source determined on the basis of the size and rate at which the process operates. The Tissue Machines have the potential to generate PM emissions and are therefore subject to the applicable limitations in Table 105A of 06-096 C.M.R. ch. 105; however, the emission limits proposed as BACT are more stringent. The limits provided by 06-096 C.M.R. ch. 105 shall be streamlined to the units’ BACT determined PM emission limits.

(4) *Control of Volatile Organic Compounds from Adhesives and Sealants*, 06-096 C.M.R. ch. 159

The adhesive used to adhere tissue web to the yankee cylinder is subject to *Control of Volatile Organic Compounds from Adhesives and Sealants*, 06-096 C.M.R. ch. 159, which applies to the use or application for compensation any adhesive, sealant, adhesive primer, or sealant primer within Maine. The applicable requirements are included below in section II.D.

C. Converting Facility

Woodland has proposed to add converting operations that will include five new converting lines. The converting lines will process tissue "parent" rolls from TM1, TM2 and TM3 using a series of rewinder/slitting machines which cut/slice the parent rolls into narrower widths and then package the product with wrapping and containerboard for shipment to customers.

The converting department will consist of paper core manufacturing activities and laminating/ply-bonding of embossed, multi-layered tissue products. Paper core manufacturing activities take place within a web coating line where paper core stock is drawn from one or more rolls and glue is continuously applied along its length and overlapped to form the round paper cores. The embossing operation imposes a raised or depressed impression on a paper web by passing the web between two steel rolls or plates, one of which is engraved. Laminating/ply-bonding of embossed, multi-layered paper follows the embossing for the creation of multi-ply products. During this process, adhesive is applied by a roller to bind multiple layers of substrate together.

Each of the converting lines will use either a pulse-jet baghouse or a drum filtering system to collect dust generated from the unwind reels, the embosser/laminator, and the rewinder. The exhaust air from each filtering system will be recycled back into the converting building as clean supply air, and as a result, there will be no PM, PM_{10}, or $PM_{2.5}$ emissions directly discharged to the atmosphere from this process.

VOC are emitted from converting operations when VOC-containing adhesives are used. While the specific converting chemicals and annual quantities used have not yet been specified, Woodland has obtained information from prospective suppliers stating that the chemicals will not contain HAP. Woodland utilized emission estimates from similar sources and based on these estimates, has proposed to limit VOC emissions from the converting operations to no more than 10 tons per year on a 12-month rolling total basis.

Woodland shall demonstrate compliance with the Converting Facility annual VOC emission limit by maintaining records of the types and amounts of each VOC-containing adhesive used, the VOC contents of those adhesives, and calculations of VOC emissions from the converting operations on a monthly and 12-month rolling total basis.

National Emission Standards for Hazardous Air Pollutants: Paper and Other Web Coating, 40 C.F.R. Part 63, Subpart JJJJ regulates HAP emissions from paper and other web coating lines at facilities that are major sources of HAP. Because adhesives will be applied to the tissue web on each of the converting lines, the proposed converting operations at Woodland will be subject to this regulation. However, if all the web coating lines at Woodland utilize non-HAP coatings, Woodland can become exempt from the reporting requirements of Subpart JJJJ after submitting a one-time report documenting the use of only non-HAP coatings. Woodland intends to use non-HAP containing adhesives on its converting lines. Woodland will submit the one-time notification exempting converting operations from Subpart JJJJ requirements.

Control of Volatile Organic Compounds from Adhesives and Sealants, 06-096 C.M.R. ch. 159 regulates the emissions of VOC from adhesives, sealants, and primers. Because adhesives will be used in the proposed converting operations, Woodland is subject to this regulation. The applicable requirements are included below in section II.D.

D. <u>Control of Volatile Organic Compounds from Adhesives and Sealants, 06-096 C.M.R. ch. 159</u>

Control of Volatile Organic Compounds from Adhesives and Sealants, 06-096 C.M.R. ch. 159 is applicable to facilities that use or apply for compensation any adhesive, sealant, adhesive primer, or sealant primer within Maine. Woodland has proposed the use of adhesives as part of the operation of the TM3 yankee cylinder and as part of the converting operations. Woodland shall comply with the requirements of 06-096 C.M.R. ch. 159 including, but not limited to, the following:

1. Woodland shall not use or apply for compensation any adhesive, sealant, adhesive primer, or sealant primer manufactured on or after January 1, 2011, in excess of the applicable VOC content limits specified in Table 1 of 06-096 C.M.R. ch. 159.
[06-096 C.M.R. ch. 159, § 2(B)]

2. Woodland shall maintain records demonstrating compliance with applicable limits. Records shall include the following information:
   a. A list of each adhesive, sealant, adhesive primer, sealant primer cleanup solvent, and surface preparation solvent in use and in storage;
   b. A data sheet or material list which provides the material name, manufacturer identification and material application;
   c. Catalysts, reducers, or other components used and the mix ratio;
   d. The VOC content of each product as supplied;
   e. The final VOC content or vapor pressure, as applied; and
   f. The annual volume of each adhesive, sealant, adhesive primer, sealant primer, cleanup or surface preparation solvent used or purchased.

   [06-096 C.M.R. ch. 159, § 4(A)]

3. All records made to determine compliance with ch. 159 requirements shall be maintained for five years from the date such record is created and shall be made available to the Department within 90 days of a request. [06-096 C.M.R. ch. 159, § 4(C)]

4. These requirements do not apply to any adhesives and sealants that contain less than 20 grams of VOC per liter of adhesive or sealant, less water and less exempt compounds, as applied. [06-096 C.M.R. ch. 159, § 3(A)(3)]

E. Additional Requirements

As part of their application, Woodland Pulp performed a refined modeling analysis to determine the facility's impact on ambient air quality. Emission limits for $PM_{2.5}$ were proposed for the #9 Power Boiler and Lime Kiln as emission limits for $PM_{2.5}$ have not previously been established. The table below summarizes Woodland Pulp's proposed $PM_{2.5}$ emission limits. These emission limits were used in the refined modeling analysis in support of this project.

Pollutant	**Unit**	**Emission Limit**
$PM_{2.5}$	#9 Power Boiler	76.0 lb/hr
	Lime Kiln	15.0 lb/hr

The Department has determined that inclusion of the additional requirements listed above for $PM_{2.5}$ emissions from #9 Power Boiler and the Lime Kiln are appropriate for demonstrating compliance with NAAQS and Class I and II Increment Standards.

F. Incorporation Into the Part 70 Air Emission License

Pursuant to *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.

G. 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 and establishing the facility's potential to emit (PTE). Only licensed equipment is included, i.e., emissions from insignificant activities are excluded. Similarly, unquantifiable fugitive particulate matter emissions are not included except when required by state or federal regulations. Maximum potential emissions were calculated based on the following assumptions:

- Operating the Tissue Machines, #9PB, #3RB, SDT, Lime Kiln, and Natural Gas Heater for 8,760 hours/year (each);
- Operating the Lime Kiln Auxiliary Drive Engine, Backup Lime Kiln Auxiliary Drive Engine, and #1 and #2 Fire Pumps for 100 hour/year, each; and
- Operating the Portable Package Boiler for six weeks (42 days) per year.

This information does not 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	TRS
Tissue Machines	54.5	48.1	0.7	61.8	58.9	129.8	--
Converting Operations	--	--	--	--	--	10.0	--
#9 Power Boiler	355.0	355.0	676.0	780.0	5,008.8	130.0	--
#3 Recovery Boiler	214.6	214.6	1,117.0	727.1	1,879.0	176.1	28.6
Smelt Dissolving Tank	62.2	62.2	30.7	--	--	--	16.2
Lime Kiln	87.0	87.0	35.0	175.0	1,750.0	--	--
Package Boiler	56.0	56.0	9.9	5.6	1.4	0.1	--
NCG Incinerator	8.4	8.4	12.7	39.6	2.8	0.2	--
Emergency Engines	0.1	0.1	--	1.3	0.2	0.1	--
Natural Gas Heater	0.7	0.7	--	1.3	1.1	0.1	--
Total TPY	**838.5**	**832.1**	**1,882.0**	**1,791.7**	**8,702.2**	**446.4**	**44.8**

III. AMBIENT AIR QUALITY ANALYSIS

A. Overview

A refined modeling analysis was performed to show that emissions from Woodland Pulp, in conjunction with other sources, will not cause or contribute to violations of National Ambient Air Quality Standards (NAAQS) for SO_2, PM_{10}, $PM_{2.5}$, NO_2, or CO or to Class I or Class II increments for $PM_{2.5}$ or NO_2.

As required by 06-096 C.M.R. ch. 115, the Department notified Federal Land Managers (FLMs) representing the US Fish & Wildlife Service (USFWS), the National Park Service (NPS), and the National Forest Service (NFS) of the proposed Woodland Pulp major modification. The notification contained a detailed description of the proposed project, the proposed project-only TPY emissions increases of SO_2, PM_{10}, $PM_{2.5}$, and NO_x, the distances to each of the nearby Class I areas and the proposed methodology for addressing

NAAQS, increment, and Air Quality Related Values (AQRV) for the closest Class I area, Moosehorn National Wildlife Refuge (MNWR), which is comprised of two separate units: Baring and Edmunds.

Based upon the information provided in the notification, FLMs representing USFWS requested that a visibility assessment for plume blight be conducted for MNWR-Baring using Woodland Pulp's project-only emissions.

B. Model Inputs

The AERMOD refined dispersion model was used to address NAAQS and increment impacts in all areas. The modeling analysis accounted for the potential of building wake and cavity effects on emissions from all modeled stacks that are below their calculated formula GEP stack heights.

All modeling was performed in accordance with all applicable requirements of the Department and the USEPA. The most-recent regulatory version of the AERMOD model and its associated processors were used to conduct the analyses.

A valid five-year, hourly, on-site meteorological database was used in the AERMOD modeling analysis. The following parameters and their associated heights were collected at Woodland Pulp's meteorological monitoring site during the period July 1, 1991 to June 30, 1996:

TABLE III-1 : Meteorological Parameters and Collection Heights

Parameter	**Sensor Heights**
Wind Speed	10 & 76 meters
Wind Direction	10 & 76 meters
Standard Deviation of Wind Direction (Sigma Θ)	10 & 76 meters
Temperature	10 & 76 meters

When possible, hourly ISHD TD-3505 surface data collected at the Bangor International Airport NWS site were substituted for missing on-site surface data. All other missing data were interpolated or coded as missing, per USEPA guidance. In addition, hourly Bangor International Airport NWS data from the same time period were used to supplement the primary surface dataset for any required variables that were not explicitly collected on-site.

The surface meteorological data was combined with concurrent hourly cloud cover and upper-air data obtained from the Caribou National Weather Service (NWS). Missing cloud cover and/or upper-air data values were interpolated or coded as missing, per USEPA guidance.

All necessary representative micrometeorological surface variables for inclusion into AERMET (surface roughness, Bowen ratio, and albedo) were calculated using the AERSURFACE utility program and from procedures recommended by USEPA.

Point-source parameters used in the NAAQS and increment modeling for Woodland Pulp are listed in Table III-2.

TABLE III-2 : Woodland Pulp Point Source Stack Parameters

Woodland Pulp Stacks	Stack Base Elevation (m)	Stack Height (m)	GEP Stack Height (m)	Stack Diameter (m)	UTM Easting NAD83 (m)	UTM Northing NAD83 (m)
PROPOSED/CURRENT						
#9 Power Boiler	37.06	68.58	128.45	3.66	625,698	5,001,618
#3 Recovery Boiler	35.88	83.82	130.05	2.90	625,747	5,001,644
#3 Smelt Tank	35.72	70.71	130.21	1.78	625,745	5,001,652
Lime Kiln	38.51	79.55	127.00	1.27	625,649	5,001,526
TM #1 – Yankee Hood	40.75	38.39	88.49	1.31	625,481	5,001,613
TM #1 – Dust Vent	40.75	38.39	88.49	1.60	625,480	5,001,640
TM #2 – Yankee Hood	40.75	45.10	67.41	1.31	625,432	5,001,594
TM #2 – Dust Vent	40.75	45.10	67.41	1.60	625,420	5,001,618
TM #3 – TAD1	44.91	50.29	63.25	1.52	625,331	5,001,581
TM #3 – TAD2	44.91	50.29	63.25	1.07	625,355	5,001,548
TM #3 – Wet End	44.91	50.29	63.25	1.37	625,328	5,001,586
TM #3 – Mist Exhaust	44.91	50.29	63.25	0.81	625,337	5,001,574
TM #3 – Glue Shield	44.91	50.29	63.25	0.46	625,351	5,001,554
TM #3 – Dust Collection	44.91	50.29	63.25	1.37	625,359	5,001,542
2010 BASELINE (PM$_{2.5}$ INCREMENT)						
#9 Power Boiler	37.06	68.58	128.45	3.66	625,698	5,001,618
#3 Recovery Boiler	35.88	83.82	130.05	2.90	625,747	5,001,644
#3 Smelt Tank	35.72	70.71	130.21	1.78	625,745	5,001,652
Lime Kiln	38.51	79.55	127.00	1.27	625,649	5,001,526
1987 BASELINE (NO$_2$ INCREMENT)						
#9 Power Boiler	37.06	46.33	92.26	3.66	625,698	5,001,618
Lime Kiln	38.51	49.07	127.00	1.49	625,649	5,001,526

Emission parameters used in the NAAQS and increment modeling for Woodland Pulp are listed in Table III-3.

TABLE III-3 : Stack Emission Parameters

Stacks	**Averaging Periods**	**SO_2 (g/s)**	**PM_{10} (g/s)**	**PM2.5 (g/s)**	**NO_x (g/s)**	**CO (g/s)**	**Stack Temp (K)**	**Stack Velocity (m/s)**
MAXIMUM LICENSE ALLOWED								
#9 Power Boiler	All	23.44	10.63	9.58	23.44	150.24	328.7	10.67
#3 Recovery Boiler	All	49.39	6.18	6.18	25.20	277.20	484.8	33.08
#3 Smelt Tank	All	0.88	1.79	1.70	-	-	338.7	9.58
Lime Kiln	All	1.05	2.62	1.89	5.25	52.54	332.6	7.07
TM #1 – Yankee Hood	All	0.004	0.134	0.100	0.57	0.52	654.3	17.79
TM #1 – Dust Vent	All	-	0.100	0.080	-	-	303.2	13.12
TM #2 – Yankee Hood	All	0.004	0.134	0.100	0.57	0.52	654.3	17.79
TM #2 – Dust Vent	All	-	0.100	0.080	-	-	303.2	13.12
TM #3 – TAD1	All	0.008	0.160	0.110	0.460	0.470	397.6	30.65
TM #3 – TAD2	All	0.004	0.130	0.100	0.190	0.190	398.2	30.15
TM #3 – Wet End	All	-	0.240	0.151	-	-	313.7	29.32
TM #3 – Mist Exhaust	All	-	0.150	0.110	-	-	316.5	30.26
TM #3 – Glue Shield	All	-	0.100	0.083	-	-	324.8	27.42
TM #3 – Dust Collection	All	-	0.140	0.100	-	-	310.9	28.90
2020/2021 CURRENT ACTUALS								
#9 Power Boiler	24-Hour	-	-	9.92	-	-	328.7	10.67
	Annual	-	-	6.17	11.06	-	328.7	7.47
Lime Kiln	24-Hour	-	-	0.92	-	-	332.6	6.93
	Annual	-	-	0.68	0.78	-	332.6	6.10
2010 BASELINE ($PM_{2.5}$ INCREMENT)								
#9 Power Boiler	Short Term	-	-	10.63	-	-	341.5	9.57
	Annual	-	-	8.02	-	-	341.5	6.89
#3 Recovery Boiler	Short Term	-	-	3.02	-	-	466.5	21.22
	Annual	-	-	1.60	-	-	466.5	20.08
#3 Smelt Tank	Short Term	-	-	1.03	-	-	341.5	4.40
	Annual	-	-	0.72	-	-	341.5	4.50
Lime Kiln	Short Term	-	-	2.37	-	-	344.3	7.92
	Annual	-	-	1.62	-	-	344.3	6.26
1987 BASELINE (NO_2 INCREMENT)								
#9 Power Boiler	Annual	-	-	-	21.54	-	341.5	8.23
Lime Kiln	Annual	-	-	-	4.68	-	344.3	5.38

C. Single Source Modeling Impacts – Significant Impact Analysis

AERMOD modeling was performed for a range of operating scenarios that represented a range of maximum, typical, and minimum boiler/equipment operations.

The AERMOD significant impact results for Woodland Pulp alone are shown in Table III-4. Maximum predicted impacts that exceed their respective significance level are indicated in boldface type. For comparison to the Class II significance levels, the impacts for 1-hour SO_2, 1-hour NO_2, 24-hour $PM_{2.5}$, and annual $PM_{2.5}$ were conservatively based on the maximum High-1st-High predicted values, averaged over all five years of meteorological data. All other pollutants/averaging periods were conservatively based on their maximum High-1st-High predicted values. For the purpose of determining maximum predicted impacts, all NO_x emissions were conservatively assumed to convert to NO_2.

TABLE III-4 : Maximum AERMOD Significant Impact Analysis Results from Woodland Pulp

Pollutant	**Averaging Period**	**Max Impact ($\mu g/m^3$)**	**Receptor UTM E (m)**	**Receptor UTM N (m)**	**Receptor Elevation (m)**	**Class II Significance Level ($\mu g/m^3$)**
SO_2	1-hour	**192.37**	624,600	4,999,800	137.16	**7.9**
	3-hour	**157.02**	625,383	5,001,783	45.57	**25**
PM_{10}	24-hour	**36.96**	626,130	5,001,397	29.43	**5**
$PM_{2.5}$	24-hour	**28.25**	626,135	5,001,431	28.17	**1.2**
	Annual	**3.71**	626,102	5,001,410	29.41	**0.2**
NO_2	1-hour	**274.49**	623,300	4,999,550	137.72	**7.5**
	Annual	**7.26**	626,130	5,001,422	28.55	**1**
CO	1-hour	**3,456.05**	623,200	4,999,650	136.48	**2,000**
	8-hour	**822.61**	626,800	4,999,600	126.07	**500**

D. Secondary Formation of $PM_{2.5}$

New major sources or existing sources undergoing a major modification must assess their potential impacts on the secondary formation of $PM_{2.5}$ in accordance with federal regulations. Emissions of NO_x and SO_2 can react to form fine particulate matter ($PM_{2.5}$). The formation of secondary $PM_{2.5}$ is dependent on the concentrations of precursor and relative species, atmospheric conditions, and the interactions of those precursors with other entities such as particles, rain, fog, or cloud droplets.

As such, $PM_{2.5}$ NAAQS, Class I, and Class II increment compliance demonstrations must account for contributions due to primary $PM_{2.5}$ (from a source's direct $PM_{2.5}$ emissions) as well as secondarily formed $PM_{2.5}$ resulting from the source's precursor emissions.

Since Woodland Pulp's proposed NO_x emissions increases for this modification are greater than 40 TPY and therefore is a major modification for NO_x, a review of secondary impacts due to $PM_{2.5}$ precursor emissions (secondary $PM_{2.5}$) is required. Since the contribution from secondary formation of $PM_{2.5}$ cannot be explicitly accounted for in AERMOD, the impact~~s~~ of secondarily formed $PM_{2.5}$ from Woodland Pulp was determined using a Tier I analysis following methodologies prescribed in USEPA's *Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and* $PM_{2.5}$ *under the PSD Permitting Program (April 2019).*

For a Tier I secondary formation assessment, a source uses technically credible empirical relationships between precursor emissions and secondary impacts based upon USEPA modeling. Specifically, USEPA has performed single-source photochemical modeling to examine the range of modeled estimated impacts of secondary $PM_{2.5}$ formation for different theoretical source types (based on pollutant, stack height, and location) for facilities in different geographical locations in the United States.

Woodland Pulp estimated the potential impact of its precursor emissions using Equation 2 from USEPA's MERPs guidance, in which a source's impacts are estimated as the product of the relevant hypothetical source air quality impacts relative to emissions, scaled either upwards or downwards to the emission rate of the project itself. Equation 2 is presented below:

$$\textit{Project Impact} = \begin{matrix}\textit{Project}\\ \textit{Emission Rate}\end{matrix} \; X \; \frac{\textit{Modeled impact from hypothetical modeling}}{\textit{Modeled emission rate from hypothetical modeling}}$$

This procedure was followed for both NO_x and SO_2 precursors and the individual contributions summed to achieve a final estimated potential secondary $PM_{2.5}$ concentration, as shown in Table III-5.

TABLE III-5 : Secondary $PM_{2.5}$ from NOx & SO2 Precursors

Pollutant	**Potential Increase of Precursors (TPY)**	**Impact/Emissions Ratio ($\mu g/m^3$ / TPY)**	**Estimated Secondary $PM_{2.5}$ Impacts ($\mu g/m^3$)**
NOx	61.77	0.130208314	0.0161
SO_2	0.62	0.963075936	0.0012
Total Estimated Secondary $PM_{2.5}$ from NO_x and SO_2 precursors			**0.0173**

Using this methodology, the total estimated secondary $PM_{2.5}$ impact due to Woodland Pulp's NO_x and SO_2 precursor emissions were predicted to be extremely low (~0.02 $\mu g/m^3$) and are not expected to contribute significantly to the $PM_{2.5}$ NAAQS and Class I or Class II increment impacts.

E. Combined Source Modeling Impacts

As indicated in boldface type in Table III-4, pollutants/averaging periods with predicted impacts greater than their respective significant impact levels must consider other local sources for inclusion in a combined-source analysis.

The Department examined other nearby sources to determine if any impacts would be significant in or near the Woodland Pulp significant impact area. Due to the location of Woodland Pulp, extent of the predicted significant impact area on a pollutant-by-pollutant basis, and other nearby sources' emissions, the Department has determined that no other sources need to be included into a combined-source AERMOD modeling analysis.

In addition to the consideration of other sources, the modeling analysis must also account for the existing air quality background concentrations by using monitored data representative of the area.

Background concentrations, listed in Table III-6, are derived from representative rural background data for use in the Eastern Maine region.

TABLE III-6 : Background Concentrations

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)	Site Name, Location, Data Years
SO_2	1-hour	5	Mic Mac Site, Presque Isle, 2016/2017/2019
	3-hour	4	
PM_{10}	24-hour	58	Kenduskeag Pump Station, Bangor, 2019 - 2021
$PM_{2.5}$	24-hour	12	Presque Isle DEP Site, 2019 - 2021
	Annual	4	
NO_2	1-hour	40	Mic Mac Site, Presque Isle, 2019 - 2021
	Annual	4	
CO	1-hour	1,102	Mic Mac Site, Presque Isle, 2021
	8-hour	789	

For the purpose of determining maximum predicted impacts for comparison against NAAQS, the following assumptions were used:

- The predicted impacts were explicitly normalized to the form of their respective NAAQS;
- NO_x emissions were assumed to convert to NO_2 using USEPA's Tier II Ambient Ratio Method (ARM2) which uses an upper default ambient ratio limit of 0.9 and a lower default ambient ratio limit of 0.5;
- all direct particulate emissions were conservatively assumed to convert to PM_{10}.

As shown in Table III-7, the maximum modeled impacts were added with conservative background concentrations to demonstrate compliance with NAAQS. Because all pollutant/averaging period impacts using this method meet their respective standards, no further NAAQS modeling analyses are required to be performed.

TABLE III-7 : Maximum Combined Source Impacts (µg/m³)

Pollutant	**Averaging Period**	**Max Impact (µg/m³)**	**Receptor UTM E (m)**	**Receptor UTM N (m)**	**Receptor Elevation (m)**	**Back-Ground (µg/m³)**	**Total Impact (µg/m³)**	**NAAQS (µg/m³)**
SO_2	1-hour	133.21	626,180	5,001,347	30.16	5	138.21	196
	3-hour	135.98	626,384	5,001,793	45.49	4	139.98	1,300
PM_{10}	24-hour	32.00	626,180	5,001,422	27.78	58	90.02*	150
$PM_{2.5}$	24-hour	18.74	626,052	5,001,484	30.28	12	30.76*	35
	Annual	3.71	626,102	5,001,410	29.41	4	7.73*	12
NO_2	1-hour	104.14	626,003	5,001,496	33.17	40	144.14	188
	Annual	6.53	626,130	5,001,422	28.55	4	10.53	100
CO	1-hour	1,899.20	623,300	4,999,550	137.72	1,102	3,001.20	40,000
	8-hour	636.72	625,059	5,001,882	45.40	789	1,425.72	10,000

* Final predicted impacts for PM_{10} and $PM_{2.5}$ were adjusted by 0.02 µg/m³ to account for secondary formation of particulates, as calculated in Section D.

F. Secondary Formation of Ozone

The *New Source Review Workshop Manual (Draft, 1990)* requires that any major new source or source undergoing a major modification evaluate for the potential formation of ozone, which is a secondary pollutant formed through non-linear photochemical reactions primarily driven by precursor emissions of NO_x and VOC in the presence of sunlight.

NO_x and VOC precursor contributions to the 8-hour daily maximum ozone are considered together to determine if a source's air-quality impact would exceed a prescribed critical threshold value. Since the chemical formation of ozone associated with precursor emissions cannot be explicitly accounted for in AERMOD, USEPA has developed a two-tiered approach for addressing single-source impacts of ozone formation.

Modeled Emission Rates for Precursors (MERPs) are expressed as an annual emissions rate (in TPY) of precursor emissions and relate maximum downwind impacts to a critical threshold value. A value less than 100% indicates that the USEPA's critical air quality threshold ozone value of 1 part per billion (ppb) will not be exceeded.

Using methodologies from USEPA's *Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program (April 2019)* and data from the lowest (most conservative) MERP values representative of the Northeast climate zone from Table 4-1, the proposed emissions increase can be conservatively expressed as a percent of the lowest MERP for each precursor. Those individual contributions are then summed to achieve a final estimated potential secondary ozone concentration, as shown in the calculation below:

(61.8 TPY NO_x increase / 209 TPY NO_x 8-hour daily maximum O_3 MERP) +

(139.8 TPY VOC increase / 2068 TPY default VOC 8-hour daily maximum O_3 MERP) =

0.30 + 0.07 = 0.37 (or 37%)

Since the final calculated value of 37% is less than 100%, USEPA's critical air-quality threshold value of 1 ppb will not be exceeded. Therefore, the proposed NO_x and VOC emissions are not expected to contribute to any new significant formation of ozone.

G. Class II Increment

Since Woodland Pulp's current actual SO_2 and PM_{10} TPY values (for non-modified equipment) and future actual TPY values (for new or modified equipment) combined are much less than they were during the 1977 baseline year, these pollutants are not considered to be increment consuming. Therefore, only $PM_{2.5}$ and NO_2 increment were explicitly modeled.

Results of the Class II increment analysis are shown in Table III-8. Because all predicted increment impacts meet their respective Class II increment standards, no additional Class II $PM_{2.5}$ and NO_2 increment modeling is required to be performed.

For the purpose of determining maximum predicted increment impacts, all NO_x was conservatively assumed to convert to NO_2.

TABLE III-8 : Class II Increment Consumption

Pollutant	**Averaging Period**	**Max Impact (µg/m³)**	**Receptor UTM E (km)**	**Receptor UTM N (km)**	**Receptor Elevation (m)**	**Class II Increment (µg/m³)**
$PM_{2.5}$	24-hour	8.68*	625,323	5,001,491	44.03	9
	Annual	1.22*	625,418	5,001,485	43.52	4
NO_2	Annual	0.03	598,489	5,011,033	233.27	25

* Final predicted Class II increment impacts for $PM_{2.5}$ were adjusted by 0.02 µg/m³ to account for secondary formation of particulates, as calculated in Section D.

The *New Source Review Workshop Manual (Draft, 1990)* requires that any major new source or major source undergoing a major modification provide analyses of additional impacts that may occur as a direct result of the general, commercial, residential, industrial, and mobile-source growth associated with the construction and operation of that source.

GENERAL GROWTH: The proposed modification at Woodland Pulp is not expected to induce any secondary growth at the site. Other than temporary construction-related activities, no commercial, residential, industrial, or other growth impacts are expected.

Some very minor increases in localized emissions due to modification-related activities may occur, with these possible emissions likely stemming from additional truck and contractor vehicle traffic. Any increase in potential emissions of NO_x and $PM_{2.5}$ due to this vehicle traffic will be temporary and short-lived.

AREA SOURCE GROWTH: Population growth in the general area of Woodland Pulp can be used as a surrogate factor for the growth in emissions from residential combustion sources. Since the 1977 (PM_{10}), 1988 (NO_x), and 2010 ($PM_{2.5}$) baseline years, there has been a decrease in population in Washington County as shown in Table III-9.

TABLE III-9 : Washington County Population Growth

Pollutant	Baseline Year	Baseline Year Population	2021 Population	Percent Change from Baseline Year
NO_2	1988	35,308 (1990)	31,121	-11.9%
PM_{10}	1977	34,963 (1980)		-11.0%
$PM_{2.5}$	2010	32,856 (2010)		-5.3%

In addition, the manpower required for the construction and operation of the proposed project will be primarily available from the existing in-house workforce. Therefore, no new residential, commercial, and/or industrial growth will follow from the modification associated with Woodland Pulp.

MOBILE SOURCE GROWTH: Since mobile sources are considered to be minor sources of SO_2, PM_{10}, $PM_{2.5}$ and NOx, their contribution to increment consumption needs to be evaluated. The *New Source Review Workshop Manual (Draft, 1990)* points out that screening procedures can be used to determine whether additional detailed analyses of minor source emissions are required. Compiling a source inventory may not be required if it can be shown that little or no growth has taken place in the impact area of the proposed source since the pollutant baseline dates were initially established.

The Maine Department of Transportation has compiled Vehicle Miles Traveled (VMT) data for all counties in Maine from 1985 through 2021. As shown in Table III-10, the calculated growth in VMTs over the time period, combined with increasingly more stringent federal emissions standards for mobile sources and the overall concurrent decrease in background concentrations, indicate that mobile sources are not expected to impact the available increment in or near Woodland Pulp.

TABLE III-10 : Washington County Growth in Vehicle Miles Travelled

Pollutant	Baseline Year	Baseline Year VMTs	2019 VMTs	Percent Change from Baseline Year
SO_2/PM_{10}	1977	292,192,533 (1985)	354,288,020	+21.3%
NO_2	1988	352,664,880		+0.5%
$PM_{2.5}$	2010	392,864,783		-9.8%

Therefore, no additional analyses of SO_2, PM_{10}, $PM_{2.5}$ and NO_x from mobile source emissions are required to be performed.

H. Impacts on Plants, Soils, & Animals

In accordance with the *New Source Review Workshop Manual (Draft, 1990)*, Woodland Pulp evaluated the impacts of its emissions using procedures described in *A Screening Procedure for the Impacts of Air Pollution on Plants, Soils, and Animals (USEPA, 1981).*

AERMOD was used to predict maximum impacts in both Class II and Class I areas. The overall maximum impacts were then compared to USEPA's screening concentrations values, which represent the minimum concentration at which adverse growth effects or tissue injury in sensitive vegetation can likely be anticipated.

As shown in Tables III-11 and III-12, the maximum Class II and Class I modeled impacts were added with conservative background concentrations to demonstrate compliance with NAAQS, respectively. Background concentrations for non-standard averaging times were scaled using default AERSCREEN scaling factors, except for 1-week CO which used the 8-hour CO background concentration. In addition, the scaled 24-hour NO_2 background concentration was conservatively used to represent the 1-month average background.

TABLE III-11 : Class II Maximum Impacts on Plants, Soils, & Animals (μg/m³)

Pollutant	Averaging Period	Max Impact (μg/m³)	Receptor UTM E (m)	Receptor UTM N (m)	Receptor Elevation (m)	Back-Ground (μg/m³)	Total Impact (μg/m³)	Screening Concentration (μg/m³)
SO_2	1-hour	371.11	624,600	4,999,800	137.16	5	376.12	917
	3-hour	157.02	625,383	5,001,783	45.57	4	161.02	786
	Annual	6.91	626,180	5,001,397	28.65	0.5	7.41	18
NO_2	4-hour	153.93	626,800	4,999,600	126.07	40	193.93	3,760
	8-hour	107.62	626,180	5,001,347	30.16	36	143.62	3,760
	Month	13.62	626,155	5,001,397	29.15	24	37.62	564
	Annual	7.26	626,130	5,001,422	28.55	4	11.26	94
CO	Week	822.61	626,800	4,999,600	126.07	789	1,611.61	1,800,000

TABLE III-12 : Class I Maximum Impacts on Plants, Soils, & Animals ($\mu g/m^3$)

Pollutant	Averaging Period	Max Impact ($\mu g/m^3$)	Receptor UTM E (m)	Receptor UTM N (m)	Receptor Elevation (m)	Back-Ground ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Screening Concentration ($\mu g/m^3$)
SO_2	1-hour	46.99	631,487	4,994,029	66.99	5	51.99	917
	3-hour	21.10	631,506	4,993,103	65.78	4	25.10	786
	Annual	0.46	632,085	4,996,819	55.40	0.5	0.96	18
NO_2	4-hour	14.86	631,506	4,993,103	65.78	40	54.86	3,760
	8-hour	8.51	631,506	4,993,103	65.78	36	44.52	3,760
	Month	1.09	632,123	4,994,968	68.76	24	25.09	564
	Annual	0.43	632,085	4,996,819	55.40	4	4.43	94
CO	Week	68.79	631,506	4,993,103	65.78	789	857.79	1,800,000

Because all predicted Class II and Class I impacts for all pollutants/averaging periods were below their respective screening concentrations, no further assessment of the impacts to plants, soils, and animals is required to be performed.

I. Class I Increment

AERMOD was used to predict maximum increment impacts in the closest Class I area, MNWR – Baring.

Since Woodland Pulp's current actual SO_2 and PM_{10} TPY values (for non-modified equipment) and future actual TPY values (for new or modified equipment) combined are much less than they were during the 1977 baseline year, these pollutants are not considered to be increment consuming. Therefore, only $PM_{2.5}$ and NO_2 increment were explicitly modeled.

Results of the Class I increment analysis are shown in Table III-13. Because all predicted increment impacts meet Class I $PM_{2.5}$ and NO_2 increment standards, no additional Class I increment modeling is required to be performed.

For the purpose of determining maximum predicted impacts, all NO_x was conservatively assumed to convert to NO_2.

TABLE III-13 : Class I Increment Consumption

Pollutant	Averaging Period	Max Impact ($\mu g/m^3$)	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Class I Increment ($\mu g/m^3$)
$PM_{2.5}$	24-hour	0.18*	634,766	4,994,097	109.68	2
	Annual	0.03*	632,104	4,995,894	74.12	1
NO_2	Annual	0.00	-	-	-	2.5

* Final predicted Class I increment impacts for $PM_{2.5}$ were adjusted by 0.02 $\mu g/m^3$ to account for secondary formation of particulates, as calculated in Section D.

J. Class I AQRVs

Based upon the magnitude of SO_2, PM_{10}, and NO_2 proposed emissions increases and the distance from Woodland Pulp to the nearest Class I area, FLMs representing USFWS requested that a VISCREEN visibility assessment for plume blight be conducted for MNWR-Baring using Woodland Pulp's project-only emissions.

The VISCREEN model calculates the change in color difference index (Delta E) and contrast between a coherent plume and the viewing (sky & terrain) background. If the visual plume screening analysis can demonstrate that the increase in project emissions will not cause a plume with any hourly estimates greater than or equal to 2.0, or the absolute value of plume contrast greater than or equal to 0.05, then no further review of visibility impacts due to plume blight will be required.

Using methodologies and procedures prescribed in USEPA's *Workbook for Plume Visual Impact Screening and Analysis (Revised)*, *Federal Land Managers Air Quality Related Values Work Group: Phase I Report Revised 2010* (FLAG 2010) and guidance obtained directly from USFWS staff, a VISCREEN Level-2 modeling analysis was performed for MNWR - Baring.

Inputs for the VISCREEN Level-2 modeling can be found in Table III – 14.

Table III – 14 : VISCREEN Level-2 Inputs for MNWR - Baring

Pollutant	Maximum Hourly Emissions (g/s)	
Particulates (PM_{10})	1.38	
NO_x (as NO_2)	1.78	
Primary NO_2	0.00	
Soot	0.00	
Primary SO_4	0.00	
Background Characteristics		
Background Ozone	46 ppb	
Background Visual Range	166.0 km	
Plume-Source-Observer Angle	11.25˚	
Level-2 Worst Case Meteorological Conditions		
Stability Class	F	
Wind Speed	3.0 m/s	
Level-2 Particle Characteristics		
Constituent	**Density (g/cm^3)**	**Mass Median Diameter (μg)**
Background Fine	1.5	0.3
Background Coarse	2.5	6.0
Plume Particulate	2.5	2.0
Plume Soot	2.0	0.1
Plume Sulfate	1.5	0.5

Distance Input Data			
Class I Area	**Source-Observer Distance**	**Minimum Source to Class I Distance**	**Maximum Source to Class I Distance**
MNWR - Baring	9.5 km	7.8 km	13.2 km

The results of the VISCREEN Level-2 visibility assessment modeling are listed in Table III-15.

Based upon a review of the topography within and outside of MNWR-Baring and in accordance with a specific example presented in *Workbook for Plume Visual Impact Screening and Analysis (Revised),* no observer orientation exists that would allow an elevated plume originating at Woodland Pulp to be viewed against an elevated terrain background within MNWR-Baring. Therefore, only visual impacts based on "against the sky" were utilized for comparison to the prescribed visual screening criteria.

Because all predicted 'against the sky' visibility (Delta E and Contrast) impacts are below the defined critical values, no additional VISCREEN modeling is required to be performed.

Table III – 15 : VISCREEN Level-2 Results for MNWR - Baring

Background	**Scatter Angle (degrees)**	**Azimuthal Angle (degrees)**	**Distance (km)**	**Alpha (degrees)**	**Inside MNWR - Baring**	
					Delta E	**Contrast (+/-)**
Sky	10	143	13.2	26	0.726	0.014
Sky	140	143	13.2	26	0.306	-0.007
Critical Values (Sky & Terrain)					**2.000**	**0.050**

K. Summary

In summary, it has been demonstrated that Woodland Pulp in its proposed configuration will not cause or contribute to a violation of any SO_2, PM_{10}, $PM_{2.5}$, NO_2, or CO NAAQS or to Class I or II increments for $PM_{2.5}$ or NO_2.

In addition, it has also been determined that Woodland Pulp will not cause an impairment to visibility AQRVs in MNWR – Baring Class I area.

This determination is based on information provided by the applicant regarding the expected construction and operation of the proposed emission units. If the Department determines that any parameter (e.g., stack size, configuration, flow rate, emission rates, nearby structures, etc.) deviates from what was included in the application, the Department may require Woodland Pulp to submit additional information and may require an ambient air quality impact analysis at that time.

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 Amendment A-215-77-20-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 Amendment or part thereof shall not affect the remainder of the provision or any other provisions. This License Amendment shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

SPECIFIC CONDITIONS

All Specific Conditions found in NSR Licenses A-215-77-6-A (issued 3/8/2013) and A-215-77-15-A (issued 7/27/2018) are deleted and replaced with the following conditions:

(1) Tissue Machines (TM1, TM2, and TM3)

A. Woodland Pulp is licensed to install and operate TM1, TM2, and TM3. TM1 and TM2 were installed in 2015 and 2016, respectively. [06-096 C.M.R. ch. 115]

B. Control Equipment

1. TM1, TM2, and TM3 shall be equipped with venturi-style wet scrubbers on the exhaust streams leading to the TM1 and TM2 Dust Stacks and the TM3 Wet Dust Collection System Stack. Additionally, TM3 shall be equipped with cyclone droplet separators on the Wet End Exhaust, TAD Mist Exhaust and Glue Shield Exhaust stacks. These controls shall be operated whenever the associated tissue machine is in operation. [06-096 C.M.R. ch. 115, BACT]

2. The venturi-style wet scrubber shall be installed on TM2 as soon as is practicable but in no case later than twenty-four (24) months after the date of issuance of this license. [06-096 C.M.R. ch. 115]

3. The TM1 and TM2 Dryer Burners shall utilize low NO_x burners for control of NO_x. The TM3 TAD1 and TAD2 Dryers shall utilize ultra-low NO_x burners for control of NO_x. Woodland shall maintain the burners according to manufacturer

recommendations, including conducting routine tune-ups, maintaining proper use of the burner management system, and conducting routine inspections and repair/replacement of key components. [06-096 C.M.R. ch. 115, BACT]

C. Stack Height

1. Woodland shall increase the height of the Dust Stack and Yankee Hood Stack of TM1 to at least 126 feet AGL. Woodland shall increase the height of the Dust Stack and Yankee Hood stack of TM2 to at least 148 feet AGL. These stacks currently have a height of 97.3 feet AGL, therefore an additional 28.7 feet of stack length must be added to these TM1 stacks and an additional 50.7 feet must be added to these TM2 stacks. The stack modifications shall be completed within 24 months after the date that Woodland commences construction on TM3.
[06-096 C.M.R. ch. 115]

2. The TM3 TAD1 Stack, TAD2 Stack, Wet End Exhaust Stack, TAD Mist Exhaust Stack, Wet Dust Collection System Stack, and Glue Shield Exhaust Stack shall each be a minimum of 165 feet AGL. [06-096 C.M.R. ch. 115]

D. Emission Limits

1. Emissions from the Tissue Machines and associated dryers shall not exceed the following [06-096 C.M.R. ch. 115, BACT]:

Unit	**PM (lb/hr)**	**PM_{10} (lb/hr)**	**$PM_{2.5}$ (lb/hr)**	**SO_2 (lb/hr)**	**NO_x (lb/hr)**	**CO (lb/hr)**
TM1	2.15	1.86	1.39	0.03	4.50	4.12
TM2	2.15	1.86	1.39	0.03	4.50	4.12
TM3	8.15	7.26	5.13	0.09	5.10	5.20

2. Process VOC emissions from each of the Tissue Machines shall not exceed 1.0 lb/ADT of finished product. Combined VOC emissions from the Tissue Machines, from both process and combustion emissions, shall not exceed 130 TPY on a 12-month rolling total basis. [06-096 C.M.R. ch. 115, BACT]

3. Visible emissions from each exhaust point associated with TM1, TM2, and TM3 shall not exceed 20% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 101, § 3(B)(4)]

E. Emission Limit Compliance Methods

Compliance with the emission limits associated with TM1, TM2, and TM3 shall be demonstrated in accordance with the methods and frequencies indicated in the table below or other methods or frequencies as approved by the Department. Unless otherwise stated in the table below, for TM1, TM2, and TM3, source testing shall be conducted simultaneously on each of the stacks identified below. The sum of the source test results from each stack shall be used to demonstrate compliance.

TM1: Dust Stack, Yankee Hood Stack
TM2: Dust Stack, Yankee Hood Stack
TM3: Wet End Exhaust Stack, TAD Mist Exhaust Stack, TAD1 Stack, TAD2 Stack, Wet Dust Collection System Stack, and Glue Shield Exhaust Stack

Pollutant	Applicable Emission Limit	Compliance Method	Frequency
PM	lb/hr	Source testing conducted in accordance with 40 C.F.R. Part 60, App. A, Method 5	As requested
PM_{10}/$PM_{2.5}$	lb/hr	Source testing conducted in accordance with 40 C.F.R. Part 60, App. A, Method 5 and Method 202 assuming 40% of filterable PM is PM_{10} and 20% is $PM_{2.5}$	As requested
NO_X	lb/hr	Source testing conducted in accordance with 40 C.F.R. Part 60, App. A, Method 7 Source testing for NOx is only required on the TM1 Yankee Hood Stack, TM2 Yankee Hood Stack and TM3 TAD1 and TAD2 Stacks.	As requested
CO	lb/hr	Source testing conducted in accordance with 40 C.F.R. Part 60, App. A, Method 10 Source testing for CO is only required on the TM1 Yankee Hood Stack, TM2 Yankee Hood Stack and TM3 TAD1 and TAD2 Stacks.	As requested

Pollutant	Applicable Emission Limit	Compliance Method	Frequency
VOC	ton/yr	Process VOC: Recordkeeping of chemicals/additives including the % VOC content, and records of paper production Combustion VOC: Recordkeeping of natural gas used by dryer burners on TM1, TM2 and TM3 and applying an emission factor of 5.5 lb VOC/MMScf sourced from U.S. EPA AP-42 Table 1.4-2.	Monthly

[06-096 C.M.R. ch. 115]

F. Parameter Monitoring

During all operating times, Woodland shall monitor the flow rate through, and pressure drop across each venturi scrubber. [06-096 C.M.R. ch. 115]

G. Periodic Monitoring

1. Periodic monitoring for the control equipment associated with the Tissue Machines shall include the following [06-096 C.M.R. ch. 115]:

   a. Monthly inspections of the wet dust collection systems, venturi scrubbers, and cyclone droplet separators on each tissue machine;
   b. Recordkeeping to document all maintenance, malfunctions, inspections, and downtime of the wet dust collection systems, venturi scrubbers, and cyclone droplet separators on each tissue machine; and
   c. Recordkeeping of the flow rate through and pressure drop across each venturi scrubber at least once per shift.

2. Periodic monitoring for all three Tissue Machines shall include the following [06-096 C.M.R. ch. 115]:

   a. Monthly records of the amount of each VOC-containing chemical/additive used on each machine;
   b. Records of the amount of VOC in each chemical additive used;

c. Monthly records of the amount (ADT) of finished tissue product produced on each machine;
d. Monthly and 12-month rolling total calculations used to demonstrate compliance with the process related ton per year VOC emission limit; and
e. Monthly records of fuel use for each tissue machine.

(2) **Converting Facility**

A. VOC emissions from the converting operations shall not exceed 10 tons/year on a 12-month rolling total basis. Woodland Pulp shall demonstrate compliance with this emission limit by maintaining records of the types and amounts of each VOC containing adhesive used, the VOC contents of those adhesives, and calculations of VOC emissions from the converting operations on a monthly and 12-month rolling total basis. [06-096 C.M.R. ch. 115, BACT]

B. Woodland Pulp shall submit a one-time report upon startup of the converting facility documenting the use of only non-HAP coatings in the web coating lines as described in 40 C.F.R. Part 63, Subpart JJJJ. The report shall demonstrate that all of the coatings applied at all of the web coating lines have organic HAP contents below 0.1% by mass for OSHA-defined carcinogens as specified in section A.6.4 of appendix A to 29 C.F.R. § 1910.1200, and below 1.0% by mass for other organic HAP compounds using the following procedures:

1. Determine the organic HAP mass fraction of each coating material "as purchased" by following one of the procedures in 40 C.F.R. § 63.3360(c)(1) through (3) and determine the organic HAP mass fraction of each coating material "as applied" by following the procedures in 40 C.F.R. § 63.3360(c)(4).

2. Submit a report certifying that all coatings applied at all of the web coating lines are non-HAP coatings.

3. Maintain records of coating formulations used as required in 40 C.F.R. § 63.3410(a)(1)(iii).

If any of the coating formulations are modified to exceed the above HAP thresholds, or new coatings which exceed the above HAP thresholds are used, Woodland shall comply with all applicable reporting requirements of 40 C.F.R. Part 63, Subpart JJJJ.

[40 C.F.R. §§ 63.3300(j) and 63.3370(s)]

(3) Control of Volatile Organic Compounds from Adhesives and Sealants, 06-096 C.M.R. ch. 159

A. Woodland shall not use or apply for compensation any adhesive, sealant, adhesive primer, or sealant primer manufactured on or after January 1, 2011, in excess of the applicable VOC content limits specified in Table 1 of 06-096 C.M.R. ch. 159.
[06-096 C.M.R. ch. 159, § 2(B)]

B. Woodland shall maintain records demonstrating compliance with applicable limits. Records shall include the following information:

1. A list of each adhesive, sealant, adhesive primer, sealant primer cleanup solvent, and surface preparation solvent in use and in storage;
2. A data sheet or material list which provides the material name, manufacturer identification and material application;
3. Catalysts, reducers, or other components used and the mix ratio;
4. The VOC content of each product as supplied;
5. The final VOC content or vapor pressure, as applied; and
6. The annual volume of each adhesive, sealant, adhesive primer, sealant primer, cleanup or surface preparation solvent used or purchased.

[06-096 C.M.R. ch. 159, § 4(A)]

C. All records made to determine compliance with ch. 159 requirements shall be maintained for five years from the date such record is created and shall be made available to the Department within 90 days of a request.
[06-096 C.M.R. ch. 159, § 4(C)]

D. These requirements do not apply to any adhesives and sealants that contain less than 20 grams of VOC per liter of adhesive or sealant, less water and less exempt compounds, as applied. [06-096 C.M.R. ch. 159, § 3(A)(3)]

(4) NAAQS and Class I and II Increment Standards Compliance

Emissions from the Lime Kiln shall not exceed the following when firing natural gas or propane:

Pollutant	lb/hr	Origin and Authority
$PM_{2.5}$	15.0	06-096 C.M.R ch. 115, § 7

Emissions from the #9 Power Boiler shall not exceed the following when firing natural gas or propane in combination with other fuels:

Pollutant	lb/hr	Origin and Authority
$PM_{2.5}$	76.0	06-096 C.M.R ch. 115, § 7

(5) If the Department determines that any parameter value pertaining to construction and operation of the proposed emissions units, including but not limited to stack size, configuration, flow rate, emission rates, nearby structures, etc., deviates from what was submitted in the application or ambient air quality impact analysis for this air emission license, Woodland may be required to submit additional information. Upon written request from the Department, Woodland shall provide information necessary to demonstrate AAQS will not be exceeded, potentially including submission of an ambient air quality impact analysis or an application to amend this air emission license to resolve any deficiencies and ensure compliance with AAQS. Submission of this information is due within 60 days of the Department's written request unless otherwise stated in the Department's letter. [06-096 C.M.R. ch. 115, § 2(O)]

DONE AND DATED IN AUGUSTA, MAINE THIS 25th DAY OF MAY, 2023.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:____________________________________for_____
MELANIE LOYZIM, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: July 22, 2022
Date of application acceptance: August 4, 2022

Date filed with the Board of Environmental Protection:

This Order prepared by Benjamin Goundie, Bureau of Air Quality.

FILED

MAY 25, 2023

State of Maine
Board of Environmental Protection