Rumford Paper Company **Oxford County** **Rumford, Maine** **A-214-77-7-A**	**Departmental** **Findings of Fact and Order** **New Source Review** **Amendment #6**

After review of the air emissions license amendment application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., § 344 and § 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

FACILITY	Rumford Paper Company (The Mill)
LICENSE TYPE	06-096 CMR 115, Major Modification
NAICS CODES	322121
NATURE OF BUSINESS	Pulp & Paper Manufacturer
FACILITY LOCATION	Rumford, Maine
NSR AMENDMENT ISSUANCE DATE	September 2, 2008

B. Amendment Description

Rumford Paper Company (The Mill) is proposing to modify their lime kiln located at their integrated pulp and paper mill located in Rumford, Maine. They have proposed modifying the existing lime kiln to allow the firing of natural gas as an alternative to, or in conjunction with, the fuel oil presently fired .

These changes will not alter the fundamental design or operational characteristics of the lime kiln. The project will not increase the throughput production capacity of the lime kiln. Although actual emissions of NO_x are expected to be higher from firing natural gas than oil, the Mill is not proposing to increase any licensed emission limits.

The Conditions in the Order section of this license will become effective upon startup of the lime kiln after the project.

C. Emission Equipment

The following equipment is addressed in this air emission license:

Fuel Burning Equipment

Equipment	Maximum Capacity (MMBtu/hr)	Fuel Type, % sulfur
Lime Kiln	100 110	#6 fuel oil, 2.0% natural gas, negligible

D. Application Classification

The application for the Mill does not violate any applicable federal or state requirements and does not reduce monitoring, reporting, testing or record keeping. This application does seek to modify a Best Available Control Technology (BACT) analysis performed per New Source Review.

Additionally, the modification of a major source is considered a major modification based on whether or not expected emissions increases exceed the "Significant Emission Increase Levels" as given in *Definitions Regulation*, 06-096 CMR 100 (last amended December 1, 2005).

The emission increases from an existing unit that has already begun normal operation are determined by subtracting the average actual emissions of the 24 months preceding the modification (or representative 24 months) from the projected future actual emissions. The results of this test are as follows:

Pollutant	Average Past Actuals 2006 - 2007 (ton/year)	Future Actuals (ton/year)	Net Change (ton/year)	Significance Level (ton/year)
PM	28.6	28.6	0.0	25
PM_{10}	28.6	28.6	0.0	15
SO_2	2.2	2.2	0.0	40
NO_x	40.1	100.4	60.3	40
CO	2.3	2.3	0.0	100
VOC	2.1	2.1	0.0	40

Note: The above numbers are for the lime kiln only. None of the other equipment at the facility is affected by this amendment.

Therefore, this amendment is determined to be a major modification under *Major and Minor Source Air Emission License Regulations*, 06-096 CMR 115 (last amended December 1, 2005) and has been processed as such.

The Mill is located in an area covered by a NO_x Waiver. Therefore, offsets and Lowest Achievable Emission Rate (LAER) are not required for NOx. Emissions of VOC will not increase above significance levels. Therefore, this amendment is subject to Best Available Control Technology (BACT) and not LAER for VOC .

This license has been processed as a major modification. As such, BACT applies to all criteria pollutants and TRS emissions from the lime kiln pursuant to 06-096 CMR 115. In addition, as described in Section III of this License, the Mill has demonstrated that potential emissions of all such pollutants from the Mill (including the lime kiln) will not cause or contribute to a violation of ambient air quality standards or increments. Because BACT has been applied to all emissions from the modified unit regardless of the size of the emissions increase, and potential emissions from the Mill have been modeled in compliance with ambient air quality standards and increments, future actual emissions greater than the future actual emissions identified above (but within the emission limits set forth in the Conditions) will not constitute a violation of applicable new source review requirements.

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 06-096 CMR 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 CMR 100. BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. Project Description

The project includes the equipment changes that are needed to support firing fuel oil or natural gas alone or together in the lime kiln in a manner that supports the existing kiln throughput capacity. The Mill proposes to replace the current oil-only burner with a burner system designed for a heat release of 100 MMBtu/hr for oil and 110 MMBtu/hr for natural gas. Since natural gas generates a greater flue gas volume than oil, the firing rate for natural gas must be greater to support the

same process heating and process throughput capacity. The proposed change may also include a separate dedicated burner for LVHC combustion.

Other changes anticipated as part of the project to support the existing throughput capacity while firing natural gas alone or in combination with fuel oil may include:

1. The addition of natural gas piping, a kiln burner, burner management controls, and other changes to add natural gas firing capability to the lime kiln.
2. Changes to supply cooling air to a dedicated LVHC burner. These changes could include a minor upgrade to the primary air fan so that the cooling air may be supplied from this fan or the addition of a small blower designed to supply this cooling air.
3. An increase in the capacity of the I.D. fan. The I.D. fan is adequate to support oil firing but marginal for supporting the increased flue gas volume from natural gas firing.
4. An increase in the amount of chain hanging in the chain section of the kiln by replacing the existing worn chain and by adding additional chain.
5. Improvements to better handle mud from the scrubber underflow. These changes may include simplifying piping runs, adding a y-strainer, and increasing pumping capacity.

C. Lime Kiln BACT

The Mill performed a BACT analysis on the lime kiln for all criteria pollutants and TRS.

1. PM

For control of particulate matter, the Mill evaluated the following control technologies: fabric filters, electrostatic precipitators (ESPs), and wet scrubbers.

Fabric filters (baghouses) are technically infeasible for this application due to the high level of moisture which would cause caking problems in the filter. This technology has not been utilized for a kraft mill lime kiln.

The lime kiln has an existing wet scrubber. The incremental cost to control PM with an ESP above what can be controlled with a well performing wet scrubber was determined to be approximately $19,000/ton of emissions reduction. The high incremental cost of the ESP as well as consideration of the increased electrical energy impact eliminated ESPs from consideration.

The RACT/BACT/LAER Clearinghouse (RBLC) BACT limits for existing kilns with wet scrubbers range between 0.064 and 0.130 gr/dscf. The

standards in 40 CFR Part 63, Subpart MM establishes a limit of 0.064 gr/dscf for lime kilns with ESPs.

The Mill has proposed BACT for PM for the lime kiln to be the operation of the current wet scrubber and an emission limit of 0.064 gr/dscf. This is consistent with recent BACT determinations for other existing modified lime kilns. BACT also includes PM and PM_{10} emission limits of 24.0 lb/hr each.

2. SO_2

For control of SO_2, the Mill evaluated the following control technologies: wet scrubbers and "in-process" capture.

The lime kiln process is recognized as having a large "in-process" SO_2 capture efficiency. Industry data is unclear as to whether lime kilns equipped with wet scrubbers have any lower SO_2 emissions than lime kilns with ESPs (without wet scrubbers). The "in-process" capture of SO_2 has positive cost, energy, and environmental impacts by not requiring additional resources. A wet scrubber is not identified as BACT since the control impact is not certain. However, the wet scrubber is in place as BACT for PM and will provide some marginal benefit for SO_2 control in addition to the "in-process" capture.

Competing Maine mills, with lime kilns of similar or smaller sizes, have licensed limits ranging between 6.7 to 75 lb/hr. BACT limits nation-wide from the RBLC also have a wide range from 1.2 to 57.95 lb/hr.

The Mill has proposed BACT for SO_2 to be "in-process" capture and an emission limit of 23.0 lb/hr.

3. NO_x

For control of NO_x, the Mill evaluated the following control technologies: Selective Non-Catalytic Reduction (SNCR), Selective Catalytic Reduction (SCR), Non-Selective Catalytic Reduction (NSCR), Flue Gas Recirculation (FGR) Low NO_x Burners, (LNB), and Good Combustion Practices.

SNCR was eliminated as not technically feasible. This control requires the introduction of a chemical reducing agent, which is typically ammonia or urea, into a specific temperature zone. The correct temperature window for SNCR occurs mid-length inside the rotating body of the lime kiln. Locating injection nozzles in such an area is not technically feasible at the present time and is not in operation in any lime kiln Therefore, this option was removed from consideration.

SCR was eliminated as not technically feasible. The catalyst bed of an SCR unit has the potential to plug and can suffer from deactivation of the catalyst.

Given the moist dust loading and the known presence of catalyst deactivators including sodium, phosphorus, and potassium, SCR technology has not been applied to, and is not suitable for, a kraft mill lime kiln. Therefore, this option was removed from consideration.

NSCR was eliminated as not technically feasible. This process is only effective in a fuel-rich environment of less than 1% oxygen. This technology may also be prone to plugging and catalyst deactivation. For this lime kiln application, the flue gas oxygen operates in the range of 3-5% oxygen which is above the range for this technology. Decreasing air to reduce the flue gas oxygen may raise emissions of CO and would raise emissions of TRS to above permit limits. This technology has not been used for kraft lime kiln and this option was removed from consideration.

FGR was eliminated as not technically feasible. FGR recycles flue gas back to the flame zone and may be recycled back into the primary air feeding the burner. This recycling of the flue gas lowers the oxygen and temperature in the flame zone. However, reducing the flame temperature decreases the radiant heat transfer to the calcium carbonate/lime in the kiln and reduces the conversion efficiency of calcium carbonate to lime. More fuel would need to be added to raise the flame temperature which would eliminate the opportunity to reduce NO_x. FGR has not been applied to, and is not suitable for, a kraft mill lime kiln. Therefore, this option was removed from consideration.

A LNB was eliminated as not technically feasible. LNBs add significantly less than a stoichiometric quantity of air with the fuel. In cement kiln burners recognized as LNBs, only 5-7% of stoichiometric air is added as primary air with the fuel. This creates a first stage of combustion that is fuel rich and oxygen starved where oxygen is unavailable for NO_x formation. Subsequently, a second stage of combustion occurs with the addition of secondary air for complete combustion but at a cooler temperature after the flame mixes with the "cooler" secondary air.

This technology has widespread usage in boilers and in multiple applications in certain cement kiln configurations. However, the transfer of this technique to kraft mill lime kilns has not been successful. The flame shape and peak temperatures are significant for the radiative heat transfer that heats the calcium carbonate/lime to a temperature high enough to meet the chemical thermodynamic requirements for lime to be produced. The change in flame shape and reduction in flame temperature associated with reduction of primary air to the extent needed to be considered a LNB would be problematic for meeting the chemical conditions necessary for lime production. LNBs have

not been applied to kraft mill lime kilns and are not available from equipment vendors. Therefore, this option was removed from consideration.

Good combustion practices ensure the proper excess air range in the lime kiln for controlling emissions including NO_x and for minimizing fuel usage. Good combustion practices also include properly monitoring the process and adjusting fuel usage so as to conserve energy and minimize emissions. A proper burner design may not meet the LNB definition used above (5-7% or less of stoichiometric air to burner) but utilizes the similar principles of substoichiometric addition of primary air for a partial staging of combustion and minimization of NO_x.

Review of the RBLC shows BACT emission limits for lime kilns firing natural gas to be in the range of 175-235 ppmvd @ 10% O_2. The only kiln in the RBLC which fires oil has an emission limit of 152 ppmvd @ 10% O_2.

The lime kiln is subject to 06-096 CMR 138, *Reasonably Available Control technology for Facilities that Emit Nitrogen Oxides (NOx-RACT)* which limits NO_x emissions to 120 ppmvw @ 10% O_2 on a one hour average.

The Mill has proposed BACT for NO_x to be good combustion practices and emission limits of 120 ppmvw @ 10% O_2 and 52.0 lb/hr.

4. CO/VOC/TRS

CO, VOC, and TRS all result from incomplete combustion and are usually controlled using similar control strategies. As such, these pollutants were evaluated jointly.

For control of CO, VOC, and TRS the Mill evaluated the following control technologies: Catalytic Oxidation, Thermal Oxidation, Good Combustion and Operating Practices.

Catalytic Oxidation was eliminated as not technically feasible. A catalytic oxidation system includes a platinum catalyst matrix where CO and other pollutants are oxidized. The process requires temperatures in the 600 to 1000 °F range. This system would need to be placed after the particulate control equipment to minimize fouling and catalyst deactivation. Even after control equipment, catalyst fouling and deactivation is likely given the flue gas volume, nature, and moisture. Additional fuel would be required to raise the process temperature. No successful application of this technology to a lime kiln has been identified. Therefore, this option was removed from consideration.

Thermal oxidation reduces emissions by supplying sufficient oxygen at temperatures of at least 1250 to 1450 °F for complete combustion. Good combustion and operating practices reduces emissions by supplying sufficient oxygen at temperatures exceeding 2000 °F. Therefore, good combustion and operating practices is in effect a thermal oxidation process that has a greater control effectiveness than a traditional thermal oxidation process.

Good combustion and operating practices include monitoring and controlling the excess air so that sufficient air is present for complete combustion and also so that more air than appropriate is not present which would increase energy consumption and the generation of NO_x. Good operating practices include proper operation of the lime mud washer to wash away sulfides in the lime mud and not introducing foul condensates into the process so that reduced sulfur is not introduced into the "cold" feed side of the lime kiln. Good combustion and operating practices may also produce favorable cost, energy, and environmental impacts.

Good combustion and operating practices were the only control strategies found for lime kilns for these pollutants within Maine and in the RBLC.

Competing Maine mills, with lime kilns of similar or smaller sizes, have licensed CO limits ranging between 27.1 to 417 lb/hr. BACT limits nation-wide from the RBLC also have a wide range from 2 to 337 lb/hr.

Competing Maine mills, with lime kilns of similar or smaller sizes, have licensed VOC limits ranging between 1.5 to 10 lb/hr. BACT limits nation-wide from the RBLC range from 4 to 8.3 lb/hr.

Competing Maine mills, with lime kilns of similar or smaller sizes, have licensed TRS limits of 20 ppm. BACT limits nation-wide from the RBLC range from 6.5 to 20 ppm with a limit of 8 ppm as the most frequent limit.

The Mill has proposed BACT for CO, VOC, and TRS to be Good combustion and operating practices and emission limits of 39.0 lb/hr for CO, 2.0 lb/hr for VOC, and 8.0 ppmvd @ 10% O_2 for TRS.

D. Lime Kiln Streamlining

1. PM
   a. 06-096 CMR 105, Section (2) contains an applicable PM emission standard on a lb/air dried ton of pulp basis.
   b. MACT, 40 CFR Part 63, Subpart MM contains an applicable PM g/dscm (gr/dscf) emission standard.
   c. BACT establishes applicable PM gr/dscf emission limits.

The Mill accepts streamlining for the PM standards in 1(a), 1(b), and 1(c) above. The MACT and BACT limits are equivalent. These limits are determined to be the most stringent and are therefore the only PM concentration standard included in this license.

d. BACT establishes an applicable PM lb/hr emission limit.
No streamlining is requested.

2. PM_{10}
BACT establishes the only applicable PM_{10} lb/hr emission limit.
No streamlining is requested.

3. SO_2
   a. 06-096 CMR 106, Section (2)(A) contains the only applicable fossil fuel sulfur content standard. **No streamlining is requested.**
   b. BACT establishes the only applicable SO_2 lb/hr emission limit. **No streamlining is requested.**

4. NO_x
   a. 06-096 CMR 138, Section (3)(E) contains an applicable NO_x ppm emission standard.
   b. BACT establishes an applicable NO_x ppm emission limit.

   The Mill accepts streamlining for the NO_x ppm emission limit. The limits in 4(a) and 4(b) above are equivalent. These limits are determined to be most stringent and are therefore the only NO_x ppm concentration standard included in this license.

   c. BACT establishes the only applicable NO_x lb/hr emission limit.
   No streamlining is requested.

5. CO
BACT establishes the only applicable CO lb/hr emission limit.
No streamlining is requested.

6. VOC
BACT establishes the only applicable VOC lb/hr emission limit.
No streamlining is requested.

7. Total Reduced Sulfur (TRS)
   a. 06-096 CMR 124, Section (3)(H) contains an applicable TRS ppm emission standard.

b. NSPS, 40 CFR Subpart BB contains an applicable TRS ppm emission standard.
c. BACT establishes an applicable TRS ppm emission standard.

The Mill accepts streamlining for the TRS ppm emission standard. The BACT limit is most stringent and is therefore the only ppm emission standard included in this license.

E. Annual Emissions

Total Allowable Annual Emission for the Facility
(used to calculate the annual license fee)

	PM	**PM_{10}**	**SO_2**	**NO_x**	**CO**	**VOC**	**Cl_2**	**ClO_2**
Power Boiler #3	65.7	65.7	341.6	525.6	262.8	19.7	-	-
Power Boiler #5	65.7	65.7	341.6	525.6	262.8	19.7	-	-
Power Boiler #6	82.8	82.8	772.6	1,655.6	1,090.0	22.1	-	-
Power Boiler #7	82.8	82.8	772.6	1,655.6	1,090.0	22.1	-	-
Lime Kiln	105.1	105.1	100.7	227.8	170.8	8.8	-	-
Recovery Boiler	379.7	284.7	903.6	941.7	972.4	16.2	-	-
Smelt Tank C	70.1	69.2	24.1	-	-	-	-	-
Dryers	15.2	15.2	0.1	19.6	2.7	0.7	-	-
Air Heaters	2.0	2.0	0.1	40.6	40.6	2.2	-	-
Cogen Emerg Gen	0.1	0.1	0.1	1.6	0.4	0.1	-	-
R15 Emerg Gen	0.1	0.1	0.1	1.4	0.3	0.1	-	-
Mill Emerg Gen	0.2	0.2	0.1	4.4	1.2	0.1	-	-
Fire Pump	0.1	0.1	0.1	2.5	0.5	0.2	-	-
Lift Pump Engine	0.1	0.1	0.1	2.1	1.1	2.1	-	-
Bleach Plant	-	-	-	-	-	-	13.1	13.1
Total TPY	**869.7**	**773.8**	**3,257.5**	**5,577.1**	**3895.6**	**114.1**	**13.1**	**13.1**

III. AMBIENT AIR QUALITY ANALYSIS

This license projects an increase in actual NO_x emissions with no increases in other pollutants and with no increases in license limits. The proposed licensed NO_x emissions limits were included in a comprehensive modeling study for NO_x which was summarized in air emission license A-214-71-AN-A dated April 9, 2002. This modeling was performed using AERMOD and modeling protocols similar to what would be performed for the project.

Since the Mill previously submitted an ambient air quality analysis demonstrating that emissions from the facility, in conjunction with all other sources, do not violate ambient air quality standards, an additional ambient air quality analysis is not required at this 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 Air Emission License A-214-77-7-A pursuant to the preconstruction licensing requirements of 06-096 CMR 115 and subject to the standard and special conditions below.

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

The following NSR conditions supersede all previous NSR conditions for the Lime Kiln:

(9) Lime Kiln

A. The lime kiln shall be limited to a maximum fuel oil sulfur content not to exceed 2.0% by weight when there is no lime within the kiln and 2.5% by weight when there is lime within the kiln. The lime kiln is licensed to fire natural gas, fuel oil, and Non-Condensable Gases (NCGs). [06-096 CMR 115, BACT]

B. The lime kiln shall not exceed the following emission limits:

Pollutant	ppmv	Ave Time	lb/hour
PM	--		24.0
PM_{10}	--		24.0
SO_2	--		23.0
NO_x	120	1-hr block	--
NO_x	--		52.0
CO	--		39.0

VOC	--		2.0
TRS	8.0	12-hr block	--

[06-096 CMR 115, BACT]

C. The lime kiln shall not exceed a limit of 0.064 grains/dscf corrected to 10% O_2 for PM. Compliance with the particulate matter limits shall be demonstrated by stack testing performed once within a year of startup after installation of the project and upon request of the Department thereafter.. [06-096 CMR 115, BACT and 40 CFR Part 63, Subpart MM]

D. The lime kiln shall not exceed a NO_x limit of 120 ppmv corrected to 10% O_2 on a wet basis. Compliance with the NO_x limits shall be demonstrated by stack testing performed once e within a year of startup after installation of the project and upon request of the Department thereafter in accordance with 40 CFR Part 60, Appendix A. [06-096 CMR 115, BACT and 06-096 CMR 138, NO_x RACT]

E. The lime kiln shall not exceed a TRS limit of 8.0 ppmv corrected to 10% O_2 on a dry basis, measured as H_2S. Compliance with the TRS ppmv emission limit shall be determined on a 12-hr block average basis, as described in 40 CFR Part 60, Subpart BB and demonstrated by means of a CEMS on the lime kiln. The first four twelve (12)-hour block averages in a quarter which exceed either license limits or the emission standards of 06-096 CMR 124, Section 3(K) are not in violation of Chapter 124. [06-096 CMR 115, BACT]

F. The Mill shall continuously operate the Scrubber System on the emissions from the lime kiln. [06-096 CMR 115, BACT]

G. The Mill shall monitor and record the following for the lime kiln:

Parameter	**Monitor**	**Record**
scrubber media flowrate	continuously	once every 8 hours
scrubber media solids	once every 24 hours	once every 24 hours
NCGs combustion duration	continuously	continuously

[06-096 CMR 115, BACT]

H. The Mill is subject to and shall comply with the requirements of 40 CFR Part 60, Subpart A and Subpart BB for the lime kiln.[40 CFR Part 60, Subpart BB]

I. The Mill is subject to and shall comply with the requirements of 40 CFR Part 63, Subpart A and Subpart MM for the lime kiln by the dates required by that Subpart. [40 CFR Part 63, Subpart MM]

DONE AND DATED IN AUGUSTA, MAINE THIS DAY OF 2008.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:_____
DAVID P. LITTELL, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 6/9/08
Date of application acceptance: 6/9/08

Date filed with the Board of Environmental Protection: _____

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