



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PATRICIA W. AHO
COMMISSIONER

**Madison Paper Industries
Somerset County
Madison, Maine
A-427-77-4-A**

**Departmental
Findings of Fact and Order
New Source Review
Amendment #4**

After review of the air emissions license minor revision request, 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	Madison Paper Industries
LICENSE TYPE	06-096 CMR 115, Minor Modification
NAICS CODES	322121 Paper Mills
NATURE OF BUSINESS	Mechanical Pulp and Supercalendered Paper Production
FACILITY LOCATION	Madison, Maine
NSR AMENDMENT ISSUANCE DATE	January 24, 2012

B. Amendment Description

Madison Paper Industries has submitted a minor modification amendment for an increase in the licensed natural gas NO_x emission limits for Boilers 4 and 7. Amendment A-427-77-2-A (issued September 1, 2011) allowed for the firing of natural gas in the boilers, but the NO_x emissions were underestimated as shown by the operational data during the switchover from oil to natural gas which took place in December 2011. Madison Paper Industries was issued a minor revision (A-427-77-3-M on December 27, 2011) to allow for a temporary NO_x limit for Boiler 7 when firing natural gas until a full amendment could be submitted and processed.

This amendment will permanently change the licensed NO_x emission limits for both Boilers 4 and 7 when firing natural gas. The NO_x emissions will be based on 0.2 lb/MMBtu rather than AP-42 factors.

C. Emission Equipment

The following existing equipment is addressed in this air emission license:

Fuel Burning Equipment

<u>Equipment</u>	<u>Maximum Capacity (MMBtu/hr)</u>	<u>Maximum Firing Rate</u>	<u>Fuel Type</u>
Boiler 4	119	793.3 gal/hr	#6 fuel oil, 2% sulfur
	124.8	122,353 scf/hr	natural gas
Boiler 7	117	780.0 gal/hr	#6 fuel oil, 0.5% sulfur
	122.7	120,294 scf/hr	natural gas

D. Application Classification

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 (as amended).

The emission increases are determined by subtracting the average actual emissions of the 24 months preceding the modification (or representative 24 months) from the future actual emissions. The results are as follows:

<u>Pollutant</u>	<u>Average Past Actual Emissions 2009 and 2010 (ton/year)</u>	<u>Projected Future Actual Emissions (ton/year)</u>	<u>Net Change (ton/year)</u>	<u>Significance Level (ton/year)</u>
NO _x	196.7	135.6	-61.1	40

- Notes:
- Average past actual emissions were based on Boilers 4, 6, and 7 firing #6 fuel oil and the use of AP-42 factors.
 - Projected future actual emissions were based on Boiler 4 firing 689,300 MMBtu/yr of natural gas and Boiler 7 firing 666,500 MMBtu/hr of natural gas.
 - As a comparison, the projected future actual emissions in A-427-77-2-A were 81.6 tons/year versus the 135.6 tons/year proposed in this amendment.

The expected emissions are below the significant emission increase levels, therefore, this amendment is determined to be a minor modification under *Minor*

and Major Source Air Emission License Regulations 06-096 CMR 115 (as amended) since the changes being made are not addressed or prohibited in the Part 70 air emission license. An application to incorporate the requirements of this amendment into the Part 70 air emission license shall be submitted no later than 12 months from commencement of the requested operation.

The annual licensed allowed emission limits are not changing with this amendment.

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 (as amended). 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 (as amended). BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. Natural Gas NO_x Emission Limits - Boilers 4 and 7

Boiler 4 is a 1967 Combustion Engineering boiler, rated at 119 MMBtu/hr firing #6 fuel oil and 124.8 MMBtu/hr firing natural gas. Boiler 7 is a 1991 Nebraska Boiler Co., Inc. unit rated at 117 MMBtu/hr firing #6 fuel oil and 122.7 MMBtu/hr firing natural gas. When firing natural gas the boilers have the same steam output as when firing fuel oil, but the combustion of natural gas results in a 4% reduction in boiler efficiency; therefore the heat input must be slightly higher to achieve the same output.

The proposed modification is to increase the licensed natural gas NO_x emission limits for Boilers 4 and 7 found in new source review license A-427-77-2-A. The proposed NO_x emission rates submitted in that application were based on EPA's AP-42 factors of 140 lb/MMscf and 100 lb/MMscf, respectively, from Table 1.4-1 dated 7/98. These factors calculate out to 17.13 lb/hr and 12.03 lb/hr, for Boilers 4 and 7 respectively, using a natural gas heat content of 1020 Btu/scf.

When the fuel switchover occurred during the second week of December 2011, Madison Paper Industries became aware that the numbers submitted in the

application were lower than the burner vendor guarantee of 0.2 lb/MMBtu for NO_x. The higher predicted values were due to the unique characteristics of the boilers including their age, that the original boilers' designs did not include firing natural gas, and that the boilers are high heat release units.

From the time Madison Paper Industries realized the NO_x emission rates were higher than licensed, the facility scaled down natural gas operations. To offset this, Boiler 6 continued to operate firing #6 fuel oil. Madison Paper Industries then received a minor revision (A-427-77-3-M) for a temporary increase in the natural gas NO_x emission rate for Boiler 7 to allow for full natural gas firing, but only until operations reach an increase of 4 tons per year.

Madison Paper Industries has requested a permanent NO_x emission limit of 0.2 lb/MMBtu for Boilers 4 and 7 when each unit is firing natural gas. The 0.2 lb/MMBtu emission limit is representative for these types of boilers, is still lower than the emission limits when firing oil, and is consistent with EPA's New Source Performance Standard found in 40 CFR Part 60, Subpart Db, §60.44b (although the boilers aren't subject to that federal regulation).

The BACT NO_x emission limits for Boilers 4 and 7 when firing natural gas shall be revised to the following:

Unit	lb/MMBtu	lb/hr
Boiler 4	0.2	24.96 lb/hr
Boiler 7	0.2	24.54 lb/hr

C. Minor Modification Compliance

This project was classified as a minor modification based on the comparison of past actual oil emissions to future actual natural gas emissions. The future actual natural gas emissions were calculated using Boiler 4 at 689,300 MMBtu/yr and Boiler 7 at 666,500 MMBtu/yr.

In order to determine if Madison Paper Industries is required to have an annual natural gas limit to remain a minor modification, calculations were performed with Boilers 4 and 7 firing only natural gas and operating at a worst case scenario (8760 hours/year, or 1,093,248 MMBtu/yr and 1,074,851 MMBtu/yr for each boiler, respectively). The calculation results showed that even worst case future emissions on natural gas are below the minor modification thresholds (past actuals plus significant levels). The natural gas is not in addition to the currently licensed oil amounts, but replaces any oil that would have been fired.

Therefore, Madison Paper Industries does not need to have a natural gas annual limit to ensure compliance with the minor modification status, although the facility will need to keep natural gas monthly and 12 month rolling total combustion records.

D. Annual Emissions

This amendment does not change the current licensed allowed emission limits. The facility licensed emissions were calculated based on the worst-case scenario of an annual #6 fuel oil limit of 11,000,000 gallons per year (12 month rolling total), an annual sulfur dioxide limit of 1276 tons/year for the boilers, use of the groundwood mill, and 1008 hours of operation of a temporary package boiler.

Total Allowable Annual Emissions for the Facility

(used to calculate the license fee)

Tons/year

EMISSION UNIT	PM	PM ₁₀	SO ₂	NO _x	CO	VOC
Boilers 4, 6, and 7	135	135	1276	371	100	8
Groundwood Process	-	-	-	-	-	39
Temporary Package Boiler	2	2	23	5	4	0.2
TOTALS	137	137	1299	376	104	47

Notes: The addition of the temporary boiler emissions is worst-case scenario since the emissions will actually be offset by one or more of the three main boilers being off-line.

The worst-case scenario for each pollutant was calculated as follows, based on the 11,000,000 gal/yr oil restriction and the largest emission limit: PM - Boiler 4 at its max. oil usage, with remainder fired in Boiler 6; SO₂ - licensed ton/yr limit; NO_x - Boilers 4 and 6 using the full fuel limit; CO - Boiler 7 at its max. oil usage, remainder fired in Boiler 4 or 6; VOC - any combination of Boilers 4, 6, 7 using the full fuel limit. Natural gas total emissions were all lower than licensed allowed oil.

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-427-77-4-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 shall replace Condition 1 in air emission license amendment A-427-77-2-A:

(1) Boiler 4

- A. Natural gas may be fired in Boiler 4. [06-096 CMR 115, BACT]
- B. Emissions from Boiler 4 (124.8 MMBtu/hr on natural gas) shall not exceed the following limits while firing natural gas [06-096 CMR 115, BACT]:

Pollutant	lb/MMBtu	Limit
PM	-	0.93 lb/hr
PM ₁₀	-	0.93 lb/hr
SO ₂	-	0.07 lb/hr
NO _x	0.2 (determined by stack testing)	24.96 lb/hr
CO	-	10.28 lb/hr
VOC	-	0.67 lb/hr

- C. Madison Paper Industries shall operate Boiler 4 such that visible emissions from Boiler 4 when firing natural gas shall not exceed 10% opacity on a six (6) minute block average basis, for more than one (1) six (6) minute block average in a 3-hour period. [06-096 CMR 101]
- D. Madison Paper Industries shall maintain records of natural gas fired in Boiler 4, based on a monthly and 12 month rolling total basis for inventory purposes. [06-069 CMR 137]

The following shall replace Condition 2 in air emission license amendment A-427-77-2-A, as amended in A-427-77-3-M:

(2) Boiler 7

- A. Natural gas may be fired in Boiler 7. [06-096 CMR 115, BACT]
- B. Emissions from Boiler 7 (122.7 MMBtu/hr on natural gas) shall not exceed the following limits while firing natural gas [06-096 CMR 115, BACT]:

Pollutant	lb/MMBtu	lb/hr
PM	-	0.91 lb/hr
PM ₁₀	-	0.91 lb/hr
SO ₂	-	0.07 lb/hr
NO _x	0.2 (determined by CEM data, 30 day rolling total)	24.54 lb/hr
CO	-	10.10 lb/hr
VOC	-	0.66 lb/hr

- C. Madison Paper Industries shall operate Boiler 7 such that visible emissions from Boiler 7 when firing natural gas shall not exceed 10% opacity on a six (6) minute block average basis, for more than one (1) six (6) minute block average in a 3-hour period. [06-096 CMR 101]
- D. Madison Paper Industries shall maintain records of natural gas fired in Boiler 7, based on a monthly and 12 month rolling total basis for inventory purposes. [06-069 CMR 137]

DONE AND DATED IN AUGUSTA, MAINE THIS 24th DAY OF January, 2012.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Melanie Aho
PATRICIA AHO, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: December 27, 2011

Date of application acceptance: December 28, 2011

Date filed with the Board of Environmental Protection:

This Order prepared by Kathleen E. Tarbuck, Bureau of Air Quality.

