



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE  
GOVERNOR

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ACTING COMMISSIONER

**Madison Paper Industries  
Somerset County  
Madison, Maine  
A-427-77-2-A**

**Departmental  
Findings of Fact and Order  
New Source Review  
Amendment #2**

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	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	September 1, 2011

B. Amendment Description

Madison Paper Industries has submitted an amendment application to allow natural gas to be fired in Boilers 4 and 7, in addition to the current oil firing capacity.

C. Emission Equipment

The following equipment is addressed in this air emission license:

AUGUSTA  
17 STATE HOUSE STATION  
AUGUSTA, MAINE 04333-0017  
(207) 287-7688 FAX: (207) 287-7826  
RAY BLDG., HOSPITAL ST.

BANGOR  
106 HOGAN ROAD, SUITE 6  
BANGOR, MAINE 04401  
(207) 941-4570 FAX: (207) 941-4584

PORTLAND  
312 CANCO ROAD  
PORTLAND, MAINE 04103  
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE  
1235 CENTRAL DRIVE, SKYWAY PARK  
PRESQUE ISLE, MAINE 04679-2094  
(207) 764-0477 FAX: (207) 760-3143

**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:

Pollutant	Average Past Actual Emissions 2009 and 2010 (ton/year)	Projected Future Actual Emissions (ton/year)	Net Change (ton/year)	Significance Level (ton/year)
PM	78.4	5.1	-73.3	25
PM <sub>10</sub>	78.4	5.1	-73.3	15
SO <sub>2</sub>	726.85	0.4	-726.5	40
NO <sub>x</sub>	196.7	81.6	-115.1	40
CO	20.3	56.0	+35.7	100
VOC	1.2	3.7	+2.5	40

Notes: 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. AP-42 factors were used for the past actual and future actual calculations.

The above numbers are for Boilers 4 and 7 only. No other equipment at the facility is affected by 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 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.

#### *Project Description*

Madison Paper Industries recently entered into an agreement with an energy company, Seaside Energy, to provide natural gas to the facility. The natural gas will be delivered in liquid form (LNG), stored, and gasified for use in Boilers 4 and 7. Seaside Energy will own and operate the five storage vessels and vaporization equipment up to the natural gas flow meter.

Madison Paper Industries proposes to modify Boilers 4 and 7 to allow the boilers to fire re-gasified LNG and also future pipeline delivered natural gas, in addition to the continued use of fuel oil. A natural gas fuel header will be installed downstream of the flow meter, after the LNG re-gasifying equipment, and piped into the Madison Paper Industries boiler house. From the natural gas fuel header, natural gas fuel trains for the two boilers will be installed. It is expected that each boiler will be capable of firing either oil or natural gas, but not both fuels simultaneously.

B. Federal Regulations

1. New Source Performance Standards (NSPS) - Project Applicability

Madison Paper Industries proposes that the addition of natural gas in the boilers does not constitute a modification of the boilers, as defined by the NSPS regulations.

New units or modifications to existing units are subject to the requirements of 40 CFR Part 60, Subpart Db, *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units* greater than 100 MMBtu/hr and 40 CFR Part 60, Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* 10 MMBtu/hr - 100 MMBtu/hr. The NSPS definition of 'modification' is, in part, any physical or operation change that results in an increase in the emissions rate to the atmosphere of any pollutant to which a standard applies (§60.14(a)). In addition, §60.14(b) states that the emission rate shall be expressed as kg/hr of any pollutant discharged into the atmosphere for which a standard is applicable and EPA's AP-42 Compilation of Air Pollutant Emission Factors may be used to demonstrate that the emission level resulting from the physical or operational change will either clearly increase or clearly not increase.

The standards addressed in 40 CFR Part 60, Subpart Db are for PM and SO<sub>2</sub>, and the standards in 40 CFR Part 60, Subpart Dc are for PM, SO<sub>2</sub> and NO<sub>x</sub>. As seen in the tables below, all three pollutants, both on an AP-42 factor lb/MMBtu basis and a calculated mass emission (lb/hr), are lower for natural gas than for oil.

**AP-42 Factors in lb/MMBtu**

	PM		SO <sub>2</sub>		NO <sub>x</sub>	
	Oil	Nat'l Gas	Oil	Nat'l Gas	Oil	Nat'l Gas
Boiler 4	0.144	0.0075	2.09	0.0006	0.267	0.137
Boiler 7	0.052	0.0075	0.523	0.0006	0.267	0.098

Note: The oil sulfur contents of 2% for Boiler 4 and 0.5% for Boiler 7 were used in the PM and SO<sub>2</sub> oil calculations.

Calculation of lb/hr from AP-42 Factors and Boiler Capacities

	PM		SO <sub>2</sub>		NO <sub>x</sub>	
	Oil	Nat'l Gas	Oil	Nat'l Gas	Oil	Nat'l Gas
Boiler 4	17.14	0.93	249.1	0.073	31.73	17.13
Boiler 7	6.10	0.92	61.23	0.072	31.20	12.03

Note: The current oil license limits are slightly different from the AP-42 values.

When firing natural gas, the input capacities of the boilers are increased by 4% due to boiler efficiencies, however there will be no change in the current steam output.

The Department has determined that adding natural gas firing capability to Boilers 4 and 7 is not considered a modification for NSPS purposes based on the following: the addition of natural gas as an alternative fuel will not cause emissions increases of any pollutants regulated by 40 CFR Subparts Db or Dc; the project does not result in an increase in the facility's steam demand; and the gas (when fired) will replace oil, decreasing actual PM, SO<sub>2</sub>, and NO<sub>x</sub> emissions.

2. National Emission Standards for Hazardous Air Pollutants (NESHAPS)

The allowance to fire natural gas in Boilers 4 and 7 does not change the status of the boilers as existing sources for the purposes of the current applicable regulations under 40 CFR Part 63. The additional fuel is not considered a change which would make the units either new or reconstructed sources.

3. Compliance Assurance Monitoring (CAM)

When firing natural gas, Boilers 4 and 7 do not meet the applicability criteria in the CAM rule under 40 CFR Part 64.

C. Boiler 4

Boiler 4 is a Combustion Engineering boiler manufactured in 1967 and rated at 119 MMBtu/hr firing #6 fuel oil with a sulfur content of 2.0%. The unit has a Coen low NO<sub>x</sub> oil burner, a continuous opacity monitor, and exhausts through the common boiler stack.

Madison Paper Industries has requested to be licensed to fire natural gas in Boiler 4 in addition to firing fuel oil. Firing natural gas will increase the heat input to 124.8 MMBtu/hr when on the gaseous fuel, but the steam output will remain the

same. 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 changes needed to the boiler to fire natural gas will not alter the boiler design or overall steam producing capacity; and the expected burner configuration will be such that the boiler will fire either fuel oil or natural gas.

The proposed changes to Boiler 4 include installing a separate natural gas fuel train, burner modifications and controls (gas injectors, a manifold, and additional burner parts), the ability to manually close the NO<sub>x</sub> ports, minor changes to the existing PLC-based electronic burner management system, and the replacement of the existing flame scanner. The gas burner tips will be located around the periphery of the burner to uniformly distribute the gas to the entire burner cross section. A breach damper will also be added to provide constant furnace pressure to the boiler.

The modification of Boiler 4 is the addition of natural gas, which is an inherently low emissions fuel. The use of combustion controls represents BACT for this type and size of boiler when firing natural gas.

The BACT emission limits for Boiler 4 when firing natural gas were based on the following:

- PM/PM<sub>10</sub> – 7.6 lb/MMscf, AP-42, Table 1.4-2, dated 7/98; 0.93 lb/hr
- SO<sub>2</sub> – 0.6 lb/MMscf, AP-42, Table 1.4-2, dated 7/98; 0.07 lb/hr
- NO<sub>x</sub> – 140 lb/MMscf, AP-42, Table 1.4-1, dated 7/98; 17.13 lb/hr
- CO – 84 lb/MMscf, AP-42, Table 1.4-1, dated 7/98; 10.28 lb/hr
- VOC – 5.5 lb/MMscf, AP-42, Table 1.4-2, dated 7/98; 0.67 lb/hr
- Opacity – Visible emissions from Boiler 4 shall not exceed 10% opacity on a 6 minute block average, except for no more than one (1) six (6) minute block average in a 3 hour period.

Madison Paper Industries shall keep records of the natural gas in Boiler 4 fired on a monthly and 12 month rolling total basis.

#### D. Boiler 7

Boiler 7 is a Nebraska Boiler Co., Inc. unit manufactured in 1991 and rated at 117 MMBtu/hr firing #6 fuel oil with a sulfur content of 0.5%. The unit has a Todd Combustion low NO<sub>x</sub> oil burner, flue gas recirculation, a continuous opacity monitor, a continuous emissions monitor for NO<sub>x</sub> and O<sub>2</sub> (or CO<sub>2</sub>), and exhausts through the common boiler stack. Boiler 7 is subject to 40 CFR Part 60, Subpart Db, *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units* greater than 100 MMBtu/hr.

As with Boiler 4, Madison Paper Industries has requested to be licensed to fire natural gas in Boiler 7 in addition to firing fuel oil. Firing natural gas will increase the heat input to 122.7 MMBtu/hr when on the gaseous fuel. The changes to the boiler will not alter the boiler design or overall steam producing capacity.

The changes to Boiler 7 include installing a separate natural gas fuel train, burner modifications and controls (Coen providing a new Variflame gas carriage to the burner front plate), the ability to shut off the flue gas recirculation fan when firing natural gas, replacing the burner management system with a COEN Fyr-Logix™, and the replacement of the existing flame scanner. A breach damper will also be added to provide constant boiler furnace pressure.

The modification of Boiler 7 is the addition of natural gas, which is an inherently low emissions fuel. The use of combustion controls represents BACT for this type and size of boiler when firing natural gas.

The BACT emission limits for Boiler 7 when firing natural gas were based on the following:

- PM/PM<sub>10</sub> – 7.6 lb/MMscf, AP-42, Table 1.4-2, dated 7/98; 0.91 lb/hr
- SO<sub>2</sub> – 0.6 lb/MMscf, AP-42, Table 1.4-2, dated 7/98; 0.07 lb/hr
- NO<sub>x</sub> – 100 lb/MMscf, AP-42, Table 1.4-1, dated 7/98; 12.03 lb/hr
- CO – 84 lb/MMscf, AP-42, Table 1.4-1, dated 7/98; 10.10 lb/hr
- VOC – 5.5 lb/MMscf, AP-42, Table 1.4-2, dated 7/98; 0.66 lb/hr
- Opacity – Visible emissions from Boiler 7 shall not exceed 10% opacity on a 6 minute block average, except for no more than one (1) six (6) minute block average in a 3 hour period.

Madison Paper Industries shall keep records of the natural gas in Boiler 7 fired on a monthly and 12 month rolling total basis.

#### E. 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 worst case (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 added to past actuals are below the minor modification thresholds (past actuals plus significant levels).

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.

F. Annual Emissions

This amendment does not change the current licensed allowed emission limits. The facility licensed emissions were calculated based on an annual fuel limit of 11,000,000 gallons per year (12 month rolling total) of #6 fuel oil, 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**

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

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; SO<sub>2</sub> - licensed ton/yr limit; NO<sub>x</sub> - 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.

### III. AMBIENT AIR QUALITY ANALYSIS

According to 06-096 CMR 115, the level of air quality analyses required for a minor modification shall be determined on a case-by case basis. Maine Ambient Air Quality Standards (MAAQS) will not be violated by this source based on the information available in the file, the firing of natural gas which will offset fuel oil, the

tons/year emissions which are not changing, and the reduced short term emission limits of PM, SO<sub>2</sub>, and NO<sub>x</sub>.

### 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-427-77-2-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.

#### (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) shall not exceed the following limits while firing natural gas [06-096 CMR 115, BACT]:

Pollutant	Limit
PM	0.93 lb/hr
PM <sub>10</sub>	0.93 lb/hr
SO <sub>2</sub>	0.07 lb/hr
NO <sub>x</sub>	17.13 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]

(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) shall not exceed the following limits while firing natural gas [06-096 CMR 115, BACT]:

Pollutant	Limit
PM	0.91 lb/hr
PM <sub>10</sub>	0.91 lb/hr
SO <sub>2</sub>	0.07 lb/hr
NO <sub>x</sub>	12.03 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 1<sup>st</sup> DAY OF September, 2011.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: *Patricia W. OHO*  
PATRICIA W. OHO, ACTING COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: July 25, 2011

Date of application acceptance: July 27, 2011

Date filed with the Board of Environmental Protection:

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

