S.D. Warren Company **Somerset County** **Skowhegan, Maine** **A-19-77-2-A**	**Departmental** **Findings of Fact and Order** **New Source Review** **Amendment #1**

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	S.D. Warren Company (SDW)
CURRENT PART 70 LICENSE NUMBER	A-19-70-A-I
LICENSE TYPE	06-096 CMR 115, Major Modification
NAICS CODES	322121
NATURE OF BUSINESS	Pulp & Paper Mill
FACILITY LOCATION	Skowhegan, Maine
NSR AMENDMENT ISSUANCE DATE	

B. Amendment Description

SDW proposes to amend their New Source Review (NSR) license in order to upgrade the Recovery Boiler and supporting equipment. This upgrade will increase the maximum firing rate of the Recovery Boiler from 5.1 to 5.5 million pounds per day of black liquor solids.

The Conditions in the Order section of this License will become effective upon startup of the Recovery Boiler and Evaporators after the upgrade project. If the project is not undertaken, the Conditions in the Order section of this License will not take effect.

C. Application Classification

The application for SDW does not violate any applicable federal or state requirements and does not reduce monitoring, reporting, testing or record keeping requirements. 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 Department determined that the units modified or affected by SDW's project have begun normal operations. For baseline actual emissions, SDW used emissions from calendar years 2005 and 2006, the last full years for which data was available when the application was submitted. The projected actual emissions increases for the modified sources (i.e., the evaporators and recovery boiler) are as follows:

Pollutant	Average Past Actuals 2005 - 2006 (ton/year)	Future Actual (ton/year)	Net Change (ton/year)	Significance Level (ton/year)
PM	32.9	37.1	+4.2	25
PM_{10}	32.9	37.1	+4.2	15
SO_2	81.6	97.1	+15.5	40
NO_x	679.0	764.9	+85.9	40
CO	505.4	569.3	+63.9	100
VOC	39.4	44.4	+5.0	40
TRS	4.9	5.5	+0.6	10

The projected actual emissions increase from sources affected by the project but not modified are as follows:

Area	**PM**	**SO_2**	**NO_x**	**CO**	**VOC**	**TRS**
Digester & Brown Stock Washer	---	4.73	---	---	Negligible	Negligible
Smelt Dissolving Tanks	3.87	---	---	---	---	1.04
Bleach Plant	---	---	---	---	0.66	---
Lime Kiln	1.41	10.08	4.71	1.02	0.68	0.02
Lime Slakers	0.20	---	---	---	---	---
Total (Tons/Yr)	5.48	14.81	4.71	1.02	1.34	1.06

Emissions from the Digester and Brown Stock Washers are captured and controlled by SDW's LVHC/HVLC control system. Emissions from the Bleach Plant are controlled by a scrubbing system. The emissions increases listed for this equipment is actually seen at the associated control equipment.

The total projected actual emissions increases as a result of this project are as follows:

Pollutant	Net Change in Modified Sources (Tons/yr)	Net Change in Sources Not Modified (Tons/yr)	Total Net Change (Tons/yr)	Significance Levels (Tons/yr)
PM	+4.2	+5.5	+9.7	25
PM_{10}	+4.2	+5.5	+9.7	15
SO_2	+15.5	+14.8	+30.3	40
NO_x	+85.9	+4.7	+90.6	40
CO	+63.9	+1.0	+64.9	100
VOC	+5.0	+1.3	+6.3	40
TRS	+0.6	+1.1	+1.7	10

The difference between baseline emissions and potential emissions are as follows:

Pollutant	Average Past Actuals 2005 - 2006 (Ton/year)	Future Potential* (Ton/year)	Difference (Future License – Past Actuals) (Ton/year)
PM	32.9	430.1	397.2
PM_{10}	32.9	430.1	397.2
SO_2	81.6	1,974.1	1,892.5
NO_x	679.0	1,135.1	456.1
CO	505.4	2,878.9	2,373.5
VOC	39.4	70.9	31.5

*Licensed emissions are based on firing black liquor at maximum capacity for 8,760 hours.

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.

SDW 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 Recovery Boiler and evaporators pursuant to 06-096 CMR 115. In addition, as described in Section III of this License, SDW has demonstrated that potential emissions of all such pollutants from the Mill (including the units modified or affected by this project) 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 units 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

Currently, SDW produces more black liquor than can be burned in the mill's Recovery Boiler. SDW has been sending black liquor to other mills in the region to be burned and, in return, has been getting green liquor for use in the pulp production process. The Recovery Boiler upgrade project is intended to increase the capacity and efficiency of the Recovery Boiler to enable the mill to burn all of the black liquor it produces and to increase the energy efficiency of the mill. It is expected to reduce the mill's dependency on fossil fuel by approximately 100,000 barrels of oil per year and increase pulp production capacity by approximately 3% to 4%. This project will not change the design or nature of the Recovery Boiler or evaporators.

This project consists of three primary changes:

1. The evaporator train will be upgraded by replacing the two existing concentrators with either two or three new concentrators. The vapor flow and

liquor flows will be redirected through the existing evaporator bodies. In addition, new preheater(s) will be added to increase the total heat transfer surface area. These changes will increase the efficiency of the evaporator train by reducing the boiler steam usage per pound of water evaporated. The changes will also increase the capacity of the evaporator train to process enough liquor to support the recovery boiler upgrade.

2. The economizer on the Recovery Boiler will be replaced. This change will allow the mill to recover more heat from the Recovery Boiler flue gases reducing the heat lost through the stack, thereby improving the thermal efficiency of the Recovery Boiler and reducing fuel consumption in the mill's power boilers.

3. The existing Recovery Boiler combustion air system will be upgraded to meet BACT. The existing tertiary air system will be upgraded to a quaternary or five level air feed system. The upgraded/new air system will reduce the temperature of the flue gas entering the steam generating bank and therefore the likelihood of producing a sticky salt cake that could plug the generating bank. The new air system, through improved combustion control, will also reduce solids carryover and the concentration of carbon monoxide in the flue gas.

Other upgrades supporting the three primary changes noted above may include:

1. Replacing the steam drum internals of the Recovery Boiler to reduce the potential for water droplet carryover due to inadequate steam separation which could result in superheater deposits, corrosion and turbine generator blade deposits.
2. Upgrading the Recovery Boiler feed water control valve to accommodate the new feed water flow conditions.
3. The addition of two new smelt spouts to the four spouts currently in service on the Recovery Boiler to handle the increase in smelt flow.
4. Modification of the corner floor tubes on each side of the Recovery Boiler to increase the water velocity and reduce the risk of overheating the tubes.
5. Upgrade the green liquor transfer system with new valves and larger pumps to accommodate the increase in green liquor flow.
6. Potentially provide steam coil heaters in the combustion air system to improve the efficiency of the Recovery Boiler.
7. Install a vapor line from the evaporator system's fifth effect to the surface condenser. This will reduce the pressure drop and improve evaporator steam economy.
8. Install a black liquor bypass line which will allow the mill to run on one of the two second effect bodies. This will stabilize the evaporator operation during startups and while running under reduced loads.

9. Relocate the opacity monitor to optimize its location on the Recovery Boiler stack gas ductwork.

During this extended outage, maintenance that would otherwise be required will be performed. The steam tubes in the generating section of the Recovery Boiler may be replaced during this outage.

This project will not involve any physical changes to the Recovery Boiler oil firing system or the Smelt Dissolving Tanks. Because this project will not affect the oil firing system of the Recovery Boiler, this project does not trigger applicability of 40 CFR Part 60, Subpart D or Db for the Recovery Boiler.

C. Recovery Boiler BACT

SDW performed a BACT analysis on the Recovery Boiler for all criteria pollutants and TRS.

1. PM

For control of particulate matter, SDW evaluated the following control technologies: fabric filters, electrostatic precipitators (ESPs), and Venturi scrubbers. Theoretically, all of these technologies could be used for recovery boilers at kraft pulp mills. However, as can be seen from reviewing the RACT/BACT/LAER Clearinghouse (RBLC) listings, only ESP technology is actually utilized. ESPs have a higher control efficiency (99+% reduction) compared to the efficiencies of venturi scrubbers and operate at lower pressure drops (lower operating energies) compared to fabric filters. Therefore, ESPs are considered the top control technology for control of PM from recovery boilers.

Previous BACT determinations for pulp mills in Maine set PM limits from 0.044 gr/dscf to 0.021 gr/dscf. The mills with emission limits lower than 0.03 gr/dscf were for recovery boilers constructed more recently than the SDW's Recovery Boiler, for completely rebuilt precipitators, or in some cases where a more stringent analysis was required, i.e. LAER. The mills with emission limits higher than 0.03 gr/dscf were for existing modified recovery boilers. The incremental cost to achieve the lower emission limits by a new source is low when compared to the incremental cost to achieve the lower emission limits by modifying SDW's existing ESP.

SDW has proposed BACT for PM while firing only black liquor to be the operation of the current ESP and an emission limit of 0.030 gr/dscf when all three ESP chambers are online and 0.038 gr/dscf when only one or two ESP chambers are online. This is consistent with recent BACT determinations for other existing modified recovery boilers. SDW shall operate three chambers at all operating times with the exception of periods of startup, shutdown,

malfunction, maintenance, and repair. With only one or two chambers online, SDW is not able to operate their pulp mill at full capacity. Therefore, there is an incentive for them to operate three chambers whenever possible. BACT also includes a PM emission limit of 207 lb/hr while firing black liquor and 283 lb/hr while firing oil alone or in combination with black liquor.

2. SO_2

Recovery boiler operation involves maintaining a balance among a complex series of chemical reactions. The boiler itself consists of three overlapping operating zones to achieve the three concurrent objectives of its operation (i.e. recovery of spent cooking chemicals, drying of liquor to induce combustion, and production of steam from combustion heat). The factors that influence the rate and extent of the chemical reactions that take place within each zone, including those which govern the formation and/or capture of SO_2, consist of both physical parameters (i.e. boiler volume and geometry, number and design of burners, etc.) and operational characteristics (boiler combustion temperature, air and liquor temperatures, solids content, wood species, etc.). The design and operation of a recovery boiler combustion air system involves the balancing of all of these factors.

In order to maximize the recovery of sulfur and sodium compounds contained in the black liquor, reducing conditions must be maintained in the smelt bed to promote the retention of sulfur in the smelt as sodium sulfide. Additionally, a large fraction of the sodium input to the boiler vaporizes into submicron particles, also known as sodium fume, above the smelt bed. These sodium particles react with sulfur present in the combustion zone to form sodium sulfate, the vast majority of which is then captured in the particulate matter control device, returned to the process and used to make digester cooking liquor. Thus the recovery boiler process itself effectively captures and controls most of the SO_2 before it escapes into the upper zone of the boiler. Therefore, good combustion control in a recovery boiler results in inherent minimization of SO_2 emissions.

For control of SO_2, SDW evaluated the following control technologies: wet scrubbers, dry scrubbers, and good combustion controls.

A dry scrubber was eliminated as not technically feasible. The calcium compounds that are used to absorb SO_2 and collected in the ESP would contaminate the salt cake. This technology was not used on any recovery boilers in the RACT/BACT/LAER Clearinghouse (RBLC) review.

Under good combustion conditions, the recovery boiler process will inherently reduce SO_2 emissions making the analysis of the energy, environmental, and

economic impact of a wet scrubber infeasible and eliminating it from consideration as BACT.

The competing Maine mills that have gone through a BACT analysis have licensed limits of 100, 141, and 150 ppm. These emission rates are attained by proper operation of the combustion air system.

SDW currently has a tertiary combustion air system. SDW has proposed BACT for SO_2 while firing only black liquor to be operation of the Recovery Boiler utilizing a new four or five level staged combustion air control system. Therefore BACT for SO_2 is the new combustion air control system with emission limits of 150 ppmdv at 8% O_2 and 1975 lb/hr.

3. NO_x

For control of NO_x, SDW evaluated the following control technologies: good combustion controls and Selective Non-Catalytic Reduction (SNCR).

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. While this technique has been applied to coal and residual oil fired units, it has never been applied to recovery boilers. An experimental development program would need to be undertaken to determine if this technology is even capable of reducing NO_x formation beyond what can be achieved with good combustion practices. Therefore, this option was removed from consideration.

As can be seen from the RBLC listings, good combustion control is BACT for NO_x. SDW will install a four or five level combustion control air system for NO_x control.

NOx emissions for competing Maine mills range from 80 to 233 ppm. The 80 ppm standard was for a newly constructed Recovery Boiler. The two mills that have undergone a BACT analysis have emission standards of 110 and 233 ppm. The remaining BPT mills have standards from 129 to 206 ppm. The Department concurs with SDW that a 120 ppm emissions requirement is BACT. Therefore, the new combustion air control system and emission limits of 120 ppmdv at 8% O_2 and 750 lb/hr is BACT for NO_x.

4. CO

For control of CO, SDW evaluated the following control technologies: good combustion controls and oxidation catalysts.

Oxidation catalysts were eliminated as not technically feasible. It would be necessary to place the catalyst within the highest temperature region of the

furnace to function properly. This would be in a high dust environment and catalyst poisoning would rapidly foul the precious metal oxidation catalyst. No successful application of this technology to a recovery boiler has been identified.

A review of the RBLC listings shows that good combustion control is BACT for CO from recovery boilers. SDW will install a four or five level combustion control air system for CO control. The CO level proposed for SDW's recovery boiler is consistent with BACT determinations for other modified recovery boilers in Maine. Therefore, this new combustion air control system and emission limits of 500 ppmdv at 8% O_2 and 3113 lb/hr is BACT for CO.

5. VOC
For control of VOC, SDW evaluated the following control technologies: good combustion controls and oxidation catalysts.

As mentioned in Section 4 above, Oxidation catalysts were eliminated as not technically feasible.

A review of the RBLC listings shows that good combustion control is BACT for VOC. SDW will install a four or five level combustion control air system for VOC control. The VOC level mass emission rate limit proposed (15 lb/hr) is roughly equal to a concentration of 10 ppm which is as low as any recovery boiler in the RBLC listings. Therefore the new combustion air control system and an emission limit of 15 lb/hr is BACT for VOC.

6. TRS
No add on control technology for control of TRS was found in the RBLC nor has it been required on any similar equipment within Maine.

A review of the RBLC listings shows that good combustion control is BACT for TRS from recovery boilers. SDW will install a four or five level combustion control air system for TRS control. The TRS level proposed is consistent with other recovery boilers in the Maine and is consistent with levels contained in the RBLC listing. Therefore, the new combustion air control system and an emission limit of 5 ppmdv at 8% O_2 is BACT for TRS.

D. Recovery Boiler Streamlining

1. Opacity
   a. 06-096 CMR 101, Section (2)(B)(5) and Section (3) contain an applicable opacity standard for the combined emissions from the Main Stack. **No streamlining is requested.**

b. MACT, 40 CFR Part 63, Subpart MM contains an applicable opacity standard for emissions from the Recovery boiler in the duct to the Main Stack.
c. NSPS, 40 CFR Subpart BB contains an applicable opacity standard.

SDW accepts streamlining for the opacity standards listed in 1(b) and 1(c) above. The MACT opacity standard is considered to be more stringent and is therefore the only standard included in this license.

2. 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. SDW established a PM limit pursuant to 63.862(a)(1)(ii). The emission limit was submitted as part of the notification of compliance status required under Subpart A of Part 63, pursuant to Section 63.867(b)(1). SDW may reestablish a different alternative PM limit by following the procedures required in 63.862(a)(1)(ii) and this will not be considered a modification.
   c. BACT establishes applicable PM gr/dscf emission limits based on the number of chambers on-line in the ESP.

   SDW accepts streamlining for the PM standards in 2(a), 2(b), and 2(c) above. The BACT limits are determined to be most stringent and is therefore the only PM concentration standard included in this license.

   d. BACT establishes an applicable PM lb/hr emission limit for firing black liquor and a PM lb/hr limit for firing oil.
      No streamlining is requested.

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

4. SO_2
   a. 06-096 CMR 106, Section (2)(A) contains the only applicable fossil fuel sulfur content standard (this applies only when there is no smelt in the boiler). **No streamlining is requested.**
   b. 06-096 CMR 106, Section (4) contains the only applicable SO_2 lb/MMBtu emission standard (this applies when there is smelt in the boiler). **No streamlining is requested.**
   c. BACT establishes the only applicable SO_2 lb/hr emission limit. **No streamlining is requested.**

5. NO_x
   a. 06-096 CMR 138, Section (3)(C) contains an applicable NO_x ppm emission standard. (120 ppmv on a wet basis and 24-hr average)
   b. BACT establishes an applicable NO_x ppm emission limit. (120 ppmv on a dry basis and a 30-day rolling average)

   SDW accepts streamlining for the NO_x ppm emission limit. The BACT limit is more stringent and is therefore the only NO_x ppm emission limit included in this license.

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

6. CO
   a. BACT establishes the only applicable CO ppm emission limit. **No streamlining is requested.**
   b. BACT establishes the only applicable CO lb/hr emission limit. **No streamlining is requested.**

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

8. 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.

   SDW 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. Multiple Effect Evaporators BACT

SDW performed a BACT analysis on the Multiple Effect Evaporators for VOC and TRS. Gases produced by the multiple effect evaporators are controlled by the mill's High Volume Low Concentration (HVLC) and Low Volume High Concentration (LVHC) collection systems. HVLC and LVHC gases are combusted in Power Boiler #1, Power Boiler #2, the Lime Kiln, and the Recovery Boiler. The existing redundant combustion control technologies are consistent with BACT for this equipment.

F. Multiple Effect Evaporators Streamlining

1. TRS
   a. 06-096 CMR 124 contains 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.

   SDW accepts streamlining for the TRS ppm emission standard. All three ppm standards listed above are identical. Therefore, only the BACT limit is cited in this license.

2. VOC
   This source is subject to and has been evaluated for VOC RACT per 06-096 CMR 134. **No streamlining is requested.**

3. HAPs
   40 CFR Part 63, Subpart S contains applicable HAP standards.
   No streamlining is requested.

G. Annual Emissions
SDW shall be restricted to the following annual emissions, based on a 12 month rolling total:

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

	PM	**PM_{10}**	**SO_2**	**NO_x**	**CO**	**VOC**
Package Boiler	4.5	4.5	224.3	44.7	11.4	0.4
Power Boiler #1	963.6	963.6	3,258.7	1,309.6	9,942.6	60.0
Power Boiler #2	170.8	170.8	1,537.4	1,138.8	2,277.6	39.9
Recovery Boiler	906.7	906.7	8650.5	3,285.0	13,634.9	65.7
Smelt Tanks #1 &2	113.9	--	113.9	--	--	--
Lime Kiln	254.0	254.0	328.5	254.0	254.0	43.8
Total TPY	**2,413.5**	**2,413.5**	**14,113.2**	**6,032.1**	**26,120.6**	**209.8**

III. AMBIENT AIR QUALITY ANALYSIS

A. Overview

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

Based upon the distance from SDW to the nearest Class I area (104 kilometers) and the magnitude of emissions increase, the affected Federal Land Managers (FLMs) and MEDEP-BAQ have determined that an assessment of Class I increment standards and Air Quality Related Values (AQRVs) is not required.

B. Model Inputs

The AERMOD-PRIME refined model was used to address standards and increments 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 Maine Department of Environmental Protection, Bureau of Air Quality (MEDEP-BAQ) and the United States Environmental Protection Agency (USEPA).

A valid 5-year hourly on-site meteorological database was used in the AERMOD-PRIME refined modeling analysis. Five years of wind data was collected at heights of 10 and 100 meters at the SDW meteorological monitoring site during the following periods: 1991, 1993-1996. All missing data were interpolated or coded as missing, per USEPA guidance.

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 by MEDEP from procedures recommended by USEPA.

Point-source parameters, used in the modeling for SDW are listed in Table III-1.

TABLE III-1 : Point Source Stack Parameters

Facility/Stack	Stack Base Elevation (m)	Stack Height (m)	GEP Stack Height (m)	Stack Diameter (m)	UTM Easting NAD83 (km)	UTM Northing NAD83 (km)
CURRENT/PROPOSED						
IV. SDW						
• #1 Stack	59.13	83.78	127.10	4.34	448.679	4950.250
• #2 Stack	59.13	88.08	127.10	3.35	448.767	4950.235
V. Madison Paper Industries						
Main Stack – Flue A	79.25	76.20	76.20	1.45	429.962	4960.863
Main Stack – Flue B	79.25	76.20	76.20	1.45	429.962	4960.863
1987 BASELINE						
SDW						
• #1 Stack	59.13	83.78	127.10	4.34	448.679	4950.250
VI. Madison Paper Industries						
• Main Stack – Flue A	79.25	76.20	76.20	1.45	429.962	4960.863
• Main Stack – Flue B	79.25	76.20	76.20	1.45	429.962	4960.863
1977 BASELINE						
SDW						
• #1 Stack	59.13	83.78	127.10	4.34	448.679	4950.250
VII. Madison Paper Industries						
Main Stack	79.25	76.20	76.20	1.61	429.962	4960.863

Emission parameters for SDW for MAAQS and increment modeling are listed in Table III-2. The emission parameters for SDW are based on the maximum license allowed (worst-case) operating configuration. For the purposes of determining PM_{10} and NO_2 impacts, all PM and NO_x emissions were conservatively assumed to convert to PM_{10} and NO_2, respectively.

TABLE III-2 : Stack Emission Parameters

Facility/Stack	Averaging Periods	SO_2 (g/s)	PM_{10} (g/s)	NO_2 (g/s)	CO (g/s)	Stack Temp (K)	Stack Velocity (m/s)
MAXIMUM LICENSE ALLOWED							
SDW							
• #1 Stack	All	495.10	74.35	140.80	685.90	452.00	27.80
• #2 Stack	All	122.80	4.91	32.76	65.52	326.00	19.11
Madison Paper Industries							
• Main Stack – Flue A	All	39.29	3.26	10.97		450.00	17.40
• Main Stack – Flue B	All	26.20	2.18	7.32		450.00	11.62
CURRENT ACTUALS							
SDW							
• #1 Stack	3-Hour	298.10				454.00	30.36
• #2 Stack	3-Hour	40.08				343.00	13.58
• #1 Stack	24-Hour	260.20				455.00	31.39
• #2 Stack	24-Hour	10.71				343.00	15.41
• #1 Stack	24-Hour		29.82			455.00	32.31
• #2 Stack	24-Hour		1.76			343.00	16.33
• #1 Stack	Annual	99.93	19.08	63.61		454.00	30.06
• #2 Stack	Annual	2.08	1.73	21.20		343.00	17.59
BASELINE – 1987							
SDW							
• #1 Stack	Annual			44.65		444.00	19.99
Madison Paper Industries							
• Main Stack – Flue A	Annual			3.73		450.00	9.27
• Main Stack – Flue B	Annual			3.36		450.00	8.29
BASELINE – 1977							
SDW							
• #1 Stack	3-Hour	291.50				433.00	15.73
• #1 Stack	24-Hour	266.40	24.20			432.00	13.44
• #1 Stack	Annual	72.11	15.57			451.00	14.26
Madison Paper Industries							
• Main Stack	Short-Term	63.55	4.86			450.00	8.37
	Annual	34.85	2.66			450.00	7.48

C. Single Source Modeling Impacts

AERMOD-PRIME refined modeling, using five years of sequential meteorological data, was performed for multiple operating scenarios that represented maximum, typical and minimum operations. In addition, the modeling also accounted for two different economizer designs.

The modeling results for SDW alone, which were conservatively based upon high-first-high values, are shown in Tables III-3. The maximum predicted impacts that

exceed their respective significance level are indicated in boldface type. Given that two different economizer designs were modeled, the higher of the predicted impacts, on a pollutant/averaging period basis, are shown No further modeling was required for pollutants that did not exceed their respective significance levels.

TABLE III-3 : Maximum AERMOD-PRIME Impacts from SDW Alone

Pollutant	Averaging Period	Max Impact ($\mu g/m^3$)	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Class II Significance Level ($\mu g/m^3$)
SO_2	3-hour	**418.43**	448.120	4950.850	61.30	**25**
	24-hour	**149.22**	449.320	4949.550	48.70	**5**
	Annual	**3.11**	450.720	4959.250	204.50	**1**
PM_{10}	24-hour	**22.02**	449.320	4949.550	48.70	**5**
	Annual	0.43	449.420	4949.450	42.90	**1**
NO_2	Annual	**1.30**	450.720	4959.250	204.50	**1**
CO	1-hour	827.55	448.320	4950.750	56.70	**2000**
	8-hour	364.76	448.120	4948.650	49.40	**500**

D. Combined Source Modeling Impacts

For predicted modeled impacts from SDW alone that exceeded significance levels, as indicated in boldface type in Table III-3, other sources not explicitly included in the modeling analysis must be accounted for by using representative background concentrations for the area.

Background concentrations for use in the Central Maine region, listed in Table III-4, were derived from representative 2004-2006 rural background data, per USEPA guidance.

TABLE III-4 : Background Concentrations

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)	Data Source
SO_2	3-hour	31.2	McFarland Hill, Bar Harbor
	24-hour	15.6	
	Annual	2.6	
PM_{10}	24-hour	38.0	Lincoln School, Augusta
NO_2	Annual	1.9	Cadillac Mountain, Bar Harbor

MEDEP examined other area sources whose impacts would be significant in or near SDW's significant impact area. Due to SDW's location, extent of the significant impact area and nearby source's emissions, MEDEP has determined that one other

source would be considered for combined source modeling: Madison Paper Industries.

Table III-5 summarizes maximum combined source impacts. The maximum modeled combined source impacts, based upon high-second-high values, were added with the background concentrations to demonstrate compliance with MAAQS, as shown in Table III-5. Because all pollutant/averaging period impacts using this method meet MAAQS, no further MAAQS modeling analyses need to be performed.

TABLE III-5 : Maximum AERMOD-PRIME Combined Sources Impacts

Pollutant	Averaging Period	Max Impact ($\mu g/m^3$)	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Back-Ground ($\mu g/m^3$)	Max Total Impact ($\mu g/m^3$)	MAAQS ($\mu g/m^3$)
SO_2	3-hour	**310.26**	449.160	4949.021	49.17	**31.20**	**341.46**	**1150**
	24-hour	**120.80**	449.218	4949.266	48.89	**15.60**	**136.40**	**230**
	Annual	**4.25**	435.720	4959.250	197.00	**2.60**	**6.85**	**57**
PM_{10}	24-hour	**17.61**	449.218	4949.266	48.89	**38.0**	**55.61**	**150**
NO_2	Annual	**1.49**	450.720	4959.250	204.50	**1.90**	**3.39**	**100**

E. Increment

The AERMOD-PRIME refined model was used to predict maximum Class II increment impacts in all areas.

Results of the combined-source Class II increment analysis are shown in Tables III-6. All modeled maximum increment impacts were below all increment standards. Because all predicted increment impacts meet increment standards, no further Class II SO_2, PM_{10} and NO_2 increment modeling needed to be performed.

TABLE III-6 : Combined Source Class II Increment Consumption

Pollutant	Averaging Period	Max Impact ($\mu g/m^3$)	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Class II Increment ($\mu g/m^3$)
SO_2	3-hour	**84.50**	435.720	4959.250	197.00	**512**
	24-hour	**10.55**	435.720	4959.250	197.00	**91**
	Annual	**1.42**	435.720	4959.250	197.00	**20**
PM_{10}	24-hour	**0.92**	435.720	4959.250	197.00	**30**
	Annual	**0.13**	435.720	4959.250	197.00	**17**
NO_2	Annual	**0.63**	435.720	4959.250	197.00	**25**

Federal guidance and 06-096 CMR 115 require that any source undergoing a major modification provide additional analyses of impacts that would 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: Very minimal increases in local emissions due to construction related activities are expected to occur, as the proposed modification will involve relatively minor and short-lived general construction. Increases in potential emissions of NO_x due to increased traffic to the mill will be minimal, as there will be an insignificant increase in truck traffic in and out of SDW. Fugitive PM emissions (if any) will be minimized by the use of "Best Management Practices".

RESIDENTIAL, COMMERCIAL AND INDUSTRIAL GROWTH: Population growth in the impact area of a proposed source can be used as a surrogate factor for the growth in emissions from combustion sources. Since the population in Somerset County has increased approximately 5% since the minor source baseline date was established and the modification is not expected to create any new jobs, no new significant residential, commercial and industrial growth will likely follow from the modification associated with this source.

MOBILE SOURCE AND AREA SOURCE GROWTH: Since area and mobile sources are considered minor sources of NO_2, their contribution to increment has to be evaluated. Technical guidance from the Environmental Protection Agency points out that screening procedures can be used to determine whether additional detailed analyses of minor source emissions are required. Compiling a minor 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 baseline date (February 8, 1988) was established. Emissions during the calendar year 1987 are used to determine baseline emissions. As stated previously, the population in Somerset County has increase approximately 5% since the minor source baseline date was established; therefore, no further assessment of additional area source growth of NO_2 increment is needed.

Any emissions associated with the minimal increases in vehicle miles traveled have been more than offset by decreases in NO_x emissions in terms of reduced average grams-per-vehicle-mile emission rates since the minor source baseline date was established. Therefore, no increase in actual NO_x emissions from mobile sources is expected. No further detailed analyses of mobile NO_2 emissions are needed.

F. Class I Impacts

Based upon the distance from SDW to the nearest Class I area (104 kilometers) and the magnitude of emissions increase, the affected Federal Land Managers (FLMs) and MEDEP-BAQ have determined that an assessment of Class I increment standards and Air Quality Related Values (AQRVs) is not required.

G. Summary

In summary, it has been demonstrated that SDW in its proposed configuration will not cause or contribute to a violation of any SO_2, PM_{10}, NO_2 or CO averaging period MAAQS or any SO_2, PM_{10} or NO_2 averaging period Class II increment standards.

ORDER

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

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

The Department hereby grants Air Emission License A-19-77-2-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.

The following NSR conditions supersede all previous NSR conditions for the Recovery Boiler. These conditions will replace Condition (18) of Part 70 Air Emission License A-19-70-A-I. Conditions with authority other than NSR are cited with the appropriate authority and included for completeness. The following conditions will become effective upon startup of the Recovery Boiler and Evaporator after the project. If the project is not undertaken, the following conditions will not take effect.

(3) **Recovery Boiler**

A. The Recovery Boiler is licensed to fire #6 fuel oil, #2 fuel oil, used oil, black liquor, LVHC gases, and HVLC gases. [06-096 CMR 115, BACT]

B. The sulfur content of the fuel oil fired including used oil shall not exceed 2.0% by weight when there is no smelt in the boiler and 2.5% by weight when there is smelt in the boiler. [06-096 CMR 106]

C. Emissions from the Recovery Boiler shall not exceed the following when firing only black liquor:

Pollutant	ppmdv @ 8% O_2	Origin	Enforceability
SO_2	150	06-096 CMR 115, BACT	Federally Enforceable
NO_x	120	06-096 CMR 115, BACT	Federally Enforceable
CO	500	06-096 CMR 115, BACT	Federally Enforceable
TRS	5	06-096 CMR 124	Federally Enforceable

Pollutant	gr/dscf @ 8% O_2	Origin	Enforceability
PM	0.030 (with 3 ESP chambers)	06-096 CMR 115, BACT	Federally Enforceable
PM	0.038 (with 1 or 2 ESP chambers)	06-096 CMR 115, BACT	Federally Enforceable

Pollutant	lb/MMBtu	Origin	Enforceability
SO_2	1.92	06-096 CMR 106	Federally Enforceable

D. Emissions from the Recovery Boiler shall not exceed the following:

Pollutant	lb/hr	Origin	Enforceability
PM	207 [a]	06-096 CMR 115, BACT	Federally Enforceable
PM_{10}	207 [a]	06-096 CMR 115, BACT	Federally Enforceable
SO_2	1975	06-096 CMR 115, BACT	Federally Enforceable
NO_x	750	06-096 CMR 115, BACT	Federally Enforceable
CO	3113	06-096 CMR 115, BACT	Federally Enforceable
VOC	15	06-096 CMR 115, BACT	Federally Enforceable

[a] Except when firing fuel oil as stated below.

E. Emissions from the Recovery Boiler shall not exceed the following whenever fuel oil is being fired:

Pollutant	lb/hr	Origin	Enforceability
PM	283	06-096 CMR 115, BACT	Federally Enforceable
PM_{10}	283	06-096 CMR 115, BACT	Federally Enforceable

F. SDW is subject to and shall comply with the applicable requirements of 40 CFR Part 60, Subpart A and Subpart BB for the Recovery Boiler. [40 CFR Part 60, Subpart BB]

G. SDW is subject to and shall comply with the applicable requirements of 40 CFR Part 63, Subpart A and Subpart MM for the Recovery Boiler. [40 CFR Part 63, Subpart MM]

H. Compliance with the NO_x, SO_2 and CO ppm emission limits shall each be on a 30-day rolling average basis and demonstrated by means of CEMS. [06-096 CMR 115, BACT]

I. Compliance with the TRS ppm emission limit shall be determined on a 12-hr block average basis demonstrated by means of a CEMS, measured as H_2S. Pursuant to 06-096 CMR 124, Section 5(C)(1) and 40 CFR Part 60, Subpart BB, the first two 12-hour block averages in a quarter which exceed either license limits or emission standards in 06-096 CMR 124 are exempt and are not considered a violation. [06-096 CMR 124 and 117, BACT, and 40 CFR Part 60, Subpart BB]

J. Compliance with the SO_2 lb/hr emission limit shall be on a 24-hr block demonstrated by means of a CEMS. [06-096 CMR 115 (BACT) and 117]

K. Compliance with the PM emission limits shall be demonstrated by stack testing in accordance with 40 CFR Part 60, Appendix A, Method 5. [06-096 CMR 115, BACT]

L. Compliance stack testing for PM while firing black liquor shall be performed by December 31, 2008, 2010, and 2011. Stack testing for PM while operating less than 3 chambers of the ESP shall be performed in 2010 and 2011 and upon request by the Department thereafter. [06-096 CMR 115, BACT]

M. While firing fuel oil, compliance with the PM limit and with the CO lb/hr and VOC lb/hr limits shall be demonstrated by stack testing upon request by the Department. [06-096 CMR 115, BACT]

N. While operating the Recovery Boiler, SDW shall operate the ESP for particulate emissions. SDW shall operate three ESP chambers at all operating times except for periods of startup, shutdown, malfunction, maintenance, and repair. During these periods a minimum of one chamber shall be operated in the ESP. [06-096 CMR 115, BACT]

O. The MACT CMS for the Recovery Boiler shall consist of a COMS to monitor opacity from the Recovery Boiler in the duct to the Main Stack in accordance with 40 CFR Part 63, Subpart MM and 40 CFR Part 60, Subpart BB. [40 CFR Part 63, Subpart MM §63.864(d) & 40 CFR Part 60, Subpart BB §60.284(a)]]

P. Pursuant to 40 CFR Part 63.864(k)(1)(i), SDW shall implement corrective action, as specified in the SSM plan, prepared under 40 CFR Part 63.866(a), when the average of ten consecutive 6-minute averages result in a measurement by the MACT CMS greater than 20% opacity. [40 CFR Part 63, Subpart MM §63.864(k)(1)(i)]

Q. Pursuant to 40 CFR Part 63.864(k)(2)(i), SDW shall not exceed a measurement by the MACT CMS greater than 35 percent opacity for 6 percent or more of the operating time within a quarterly period. [40 CFR Part 63, Subpart MM §63.864(k)(2)(i)]

The following NSR conditions supersede all previous NSR conditions for the Evaporator System. These conditions will replace Condition (26) of Part 70 Air Emission License A-19-70-A-I. Conditions with authority other than NSR are cited with the appropriate authority and included for completeness. The following conditions will become effective upon startup of the Recovery Boiler and Evaporator after the project. If the project is not undertaken, the following conditions will not take effect.

(4) **Evaporator System**

A. Emissions of TRS from the "Evaporator System" as defined by 06-096 CMR 124 are to be collected by the LVHC or HVLC system and controlled in accordance with 06-096 CMR 124. The venting allowances in 06-096 CMR 124 shall apply to the Evaporator System. [06-096 CMR 115 (BACT) and 124 and 40 CFR Part 60, Subpart BB]

B. The "Evaporator System" as defined by 40 CFR 63.441 is subject to and shall comply with 40 CFR Part 63 Subpart S. [40 CFR Part 63, Subpart S]

C. The "Evaporator System" as defined by 40 CFR 60.280 is subject to and shall comply with 40 CFR Part 60 Subpart BB. [40 CFR Part 60, Subpart BB]

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: 1/25/08
Date of application acceptance: 1/25/08

Date filed with the Board of Environmental Protection: _____

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