S.D. Warren Co.
Somerset County
Skowhegan, Maine
A-19-77-7-A

Departmental
Findings of Fact and Order
New Source Review
NSR # 7

FINDINGS OF FACT

After review of the air emissions license minor modification 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., Section 344 and Section 590, the Maine Department of Environmental Protection (the Department) finds the following facts:

I. REGISTRATION

A. Introduction

FACILITY	S.D. Warren Company (SDW)
LICENSE TYPE	06-096 CMR 115, Minor Modification
NAICS CODES	322121
NATURE OF BUSINESS	Pulp and Paper Mill
FACILITY LOCATION	1329 Waterville Road, U.S. Route 201 Skowhegan, ME

B. Amendment Description

S.D. Warren Company (SDW) has submitted an amendment application to allow natural gas to be fired in their lime kiln. SDW will retain the ability to burn oil for operational flexibility but intends to burn natural gas as the primary fuel.

C. Emission Equipment

The following equipment is addressed in this air emission license:

Fuel Burning Equipment

Equipment	Maximum Capacity	Maximum Firing Rate	Fuel Type	Stack #
Lime Kiln	125 MMBtu/hr	6.719 kpph No. 6 oil or 0.125 MM scf/hr of natural gas (based on 1,000 Btu/scf)	Natural Gas, No. 6 oil, or combination of both, No. 2 oil, used oil, propane, kraft condensates, LVHC gases	1

Process Equipment

Equipment	Production Rate	Pollution Control Equipment	Stack #
New Purchased Lime Silo (to be installed in 2014)	N/A	Baghouse Filter	N/A

An indirect natural gas fired water bath heater may be required at the natural gas pressure reduction station. This unit is used to heat natural gas prior to the pressure reduction station to eliminate frost formation downstream of the expansion valving for natural gas supplied to both SDW and possibly other parties, including the Town of Skowhegan. Although, this unit will be located on the mill property, it will be owned, maintained, operated and otherwise controlled by the natural gas supplier. The heater is listed here for description purposes only and is not required to be included on SDW's Air Emission license.

D. 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. This application does seek to establish Best Available Control Technology (BACT) limits per New Source Review for burning natural gas in the Lime Kiln.

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 (as amended).

The emission increases are determined by subtracting the baseline actual emissions of any consecutive 24 month period in the ten years preceding the modification from the projected actual emissions. The results of this test are as follows:

Pollutant	Baseline Actual Emissions 2010 & 2011 (ton/year)	Projected Actual Emissions (ton/year)	Net Change (ton/year)	Significance Level (ton/year)
PM	55.7	58.4	2.7	25
PM_{10}	66.8	70.1	3.3	15
$PM_{2.5}$	66.8	70.1	3.3	10
SO_2	31.1	35.7	4.6	40
NO_x	116.8	137.4	20.6	40
CO	8.0	8.5	0.5	100
VOC	5.2	5.7	0.5	40
TRS	2.5	3.0	0.5	10
CO_2e	55,470	58,334	2864	75,000

Note: None of the other equipment at the facility is affected by this amendment.

The following assumptions were made in calculating these numbers:

1) The above numbers are based on No. 6 fuel oil for the projected actual calculations. Natural gas is expected to replace a majority of the No. 6 oil used and therefore future emissions should be lower.
2) The projected actual values for PM, NO_x, CO, VOC, and TRS emissions from the lime kiln are based on current performance for PM, VOC, and TRS and vendor performance guarantees for NO_x and CO.
3) PM_{10} and $PM_{2.5}$ emissions were estimated using the 11/27/12 lime kiln stack tests which demonstrated that total PM (filterable + condensable) was 20% higher than the filterable PM. Since the method normally required to be used to determine only the filterable PM_{10} and $PM_{2.5}$ (Method 201A), cannot be run on a saturated stack, for the purpose of this application, SDW assumed that filterable PM_{10} and filterable $PM_{2.5}$ were each equal to filterable PM. Therefore total PM_{10} = total $PM_{2.5}$=1.2 x filterable PM.
4) SDW has estimated projected actual emissions based on an increase in the firing rate of 2.0% sulfur oil from a past actual annual average production of 299 ton/day to a future 328 ton/day annual average with an improved efficiency of 6.1 MMBtu/ton CaO product (86% availability) and an estimated average 90% SO2 removal efficiency by the kiln and scrubber.

5) Projected actual CO_2e emissions were based on EPA factors at 40 CFR Part 98 Table C-1, C-2 for No. 6 firing only.

The expected emissions changes 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.

II. BEST PRACTICAL TREATMENT (BPT) & EMISSION STANDARDS

A. Introduction

In order to receive a license the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 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 new and increased 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.

Process Description

SDW is an integrated bleach Kraft pulp and paper mill producing market bleached Kraft pulp and coated fine paper. In the Kraft pulping process, black liquor produced in the pulp digester is converted back into white cooking liquor through a multi-step liquor recovery process. The lime kiln is an integral piece of equipment in this liquor recovery process. Its function is to convert lime mud (CaCO3), which is generated from the recausticizing step of the process, into lime (CaO). The lime is conveyed to the slakers and reacted with green liquor to provide the white liquor used to cook wood chips in the pulp digester.

The Lime Kiln Natural Gas Conversion Project ("the Project") replaces oil with natural gas as the primary fuel in the lime kiln. The Project is dependent on the construction of a natural gas pipeline by a third party which will bring natural gas service to the facility.

It is anticipated that a natural gas pipeline will be at the mill by the fall of 2014. The objective of the lime kiln conversion is to convert the kiln from oil to natural gas for both economic and environmental reasons. The lime kiln uses more No. 6 oil than any other fuel burning source in the mill and approximately 50% of all fuel oil consumed at the mill. For operation flexibility the company will retain the ability to use oil should the availability of natural gas be interrupted or because of economic reasons. The conversion to natural gas is expected to reduce emissions of most if not all the criteria pollutants as well as greenhouse gas emissions. This project currently includes additional lime storage capacity and an improved lime mud reclaim system that will reduce the quantity of make-up lime transported to the mill and the need to landfill excess lime mud. An upgrade to the existing satellite coolers will also improve the energy efficiency of the kiln, reducing the quantity of fuel fired as well as reducing greenhouse gas emissions per ton of product. A 10% reduction in capacity is typically expected when converting from oil to gas in a lime kiln. However, this reduction is expected to be offset with more efficient product coolers, increased insulated brick, a kiln product dam and improved flame shaping. The upgraded lime mud reclaim system will also allow the kiln to sustain more normal production rates during pulp mill startups when the kiln rate is usually slowed back waiting for the recausticizing process to catch up. The addition of a new lime silo will provide additional inventory capacity for the mill's reburned lime reducing the need to purchase lime. The lime kiln project will not affect the production rates or emissions of any other emissions units at the mill.

The following equipment changes are currently anticipated to be made as part of the Project:

1) The existing No. 6 oil burner in the kiln will be replaced with a dual fuel low NOx burner. The burner will be capable of burning oil, natural gas and combinations of both fuels. A natural gas train with its associated equipment will be part of the conversion. There will continue to be a separate Low Volume High Concentration Non-Condensable Gas burner.
2) The existing satellite lime product coolers will be replaced with a more energy efficient product cooling system with a new firing hood.
3) A new lime crusher with a new conveyor and bucket elevator are part of this conversion project. A new baghouse filter will be added to the existing north silo (the No.2 Reburnt Lime Silo) to collect dust from the new lime bucket elevator and pan conveyor as well as this existing silo.
4) The existing induced draft fan on the lime kiln will be replaced with a larger induced draft fan and motor to accommodate the increase in flue gas flow from natural gas, an upgrade to the kiln's oil heater set, a new lime silo will be added that will be equipped with a new bag house filter to collect fugitive emissions and an upgrade to the lime mud reclaim system are currently

planned. The upgraded lime mud reclaim system will allow the mill to reduce the quantity of lime mud sent to the landfill.

5) Supplemental equipment including pumps, motors, valves, piping ductwork and instrumentation will be included.
6) An indirect fired water bath heater may also be required at the natural gas pressure reduction station. The heater would be fired with natural gas. It is used to heat natural gas prior to pressure reduction to eliminate frost formation downstream of the expansion valving for natural gas supplied to both SDW and possibly other parties, including the Town of Skowhegan. Heat input of the indirect fired heater was expected to be 2.77 MMBtu/hr before considering potential third party needs. This unit will be owned, maintained, operated, and controlled by the natural gas supplier and at this time is expected to also supply gas to the Town of Skowhegan. Therefore, this unit is not considered an SDW emission unit and is referenced in this license modification for description purposes only.

The project is currently scheduled to be completed during the October 2014 maintenance outage, contingent on the status of the anticipated natural gas pipeline to the mill. During this outage, routine maintenance, replacement and repair projects on the lime kiln are also scheduled to occur. Cracks in the lime kiln shell have occurred over the last few years at the piers where the shell is supported. Therefore sections of the kiln shell will be replaced. Other kiln components such as sections of the bull gear drive mechanism are also scheduled to be replaced and/or repaired during this outage. These are routine maintenance activities that will not have an impact on the kiln's emissions or production capacity.

B. New Source Performance Standards (NSPS)

The U.S. EPA promulgated standards of performance for specific sources of air pollution at 40 CFR Part 60, Subparts A through MMMM. The proposed natural gas conversion project involves physical changes to SDW's lime kiln. As a result the following NSPS potentially apply to the proposed project:

- Subpart A- General Provisions
- Subpart BB – Standards of Performance for Kraft Pulp Mills

NSPS apply to new sources that are constructed after the effective date as specified in each standard or to units that are modified or reconstructed after the effective date. The concept of a modification under NSPS is detailed in Subpart A, §60.14. The provisions of 40 CFR Part 60, Subpart A apply to the owner or operator of a stationary source that is subject to any of the NSPS. In order for the project to qualify as the reconstruction of an affected source, the fixed capital cost of the new components necessary for the natural gas conversion would need to

exceed 50% of the fixed capital cost required to replace the existing affect source. Since the costs for the conversion are well below 50% of the cost of replacing the entire affected source, the project does not constitute reconstruction under NSPS.

Under §60.14, a physical change or change in the method of operation of an existing source, such as a lime kiln, qualifies as a modification only if it results in an increase in the emission rate of a pollutant regulated by the standard. Furthermore, §60.14 specifies that the increase is determined on a short-term basis (e.g., lb/hr) based on emissions factors, mass balance, test data, or other representative information. The proposed natural gas conversion project does not include an increase in the short term maximum production capacity of the kiln nor any changes to the wet scrubbing system that controls particulate matter (PM) emissions from the lime kiln. The existing wet scrubber will maintain the PM emissions to a level previously emitted by the lime kiln and, therefore, short term PM emissions from the kiln will not increase as a result of the proposed project. TRS emissions from the kiln are the result of the combustion of Pulp Mill non-condensable gases (NCGs) as well as the conversion of residual sulfide contained in the lime mud to hydrogen sulfide. TRS emissions are not the result of the fuels combusted in the kiln. The installation of natural gas burners in the lime kiln will have no effect on the facility's pulp production operations and, consequently, will not cause TRS emissions from the lime kiln to increase above the levels previously emitted. Since the proposed natural gas conversion project will not result in a short-term emissions increase of either PM or TRS, the project does not qualify as a modification under NSPS, thus Subpart BB does not apply to SDW's Lime Kiln as a result of this project.

C. National Emission Standards for Hazardous Air Pollutants (NESHAP)

Pursuant to the Clean Air Act Amendments of 1990, process-specific NESHAP are included in 40 CFR Part 63. NESHAP promulgated under 40 CFR Part 63, also referred to as Maximum Achievable Control Technology (MACT) standards, apply to certain identified source categories that are considered area sources or major sources of hazardous air pollutants (HAP). A major source of HAP is defined as a source with a facility-wide potential-to-emit (PTE) of 10 tons per year or more of any single HAP, or a facility-wide PTE of 25 tons per year or more of total HAP. SDW is a major source of HAP. The following 40 CFR Part 63 Subparts are potentially applicable to the proposed natural gas conversion project:

- Subpart A – General Provisions
- Subpart S – National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry

- Subpart MM – National Emission Standards for Hazardous Air Pollutants for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills

The provisions of 40 CFR Part 63, Subpart S apply to all major HAP sources that produce pulp, paper, or paperboard and use the Kraft, soda, sulfite, or semi-chemical pulping processes. Subpart S already applies to SDW and SDW is currently in compliance with all of the applicable provisions. The individual facility sources subject to Subpart S standards are classified as being part of one of three possible control systems:

- The LVHC system;
- The HVLC system; or
- The condensate collection/treatment system.

The Lime Kiln serves as a control device for ensuring compliance for the LVHC system with the Subpart S standards. Adding natural gas as an alternative fuel to the lime kiln will not change the applicability of any of the current Subpart S requirements, nor will it impact SDW's ability to comply with the standards.

Subpart MM sets forth various PM emission limits, testing requirements, monitoring requirements, and recordkeeping/reporting requirements for chemical recovery combustion sources. Subpart MM codifies the NESHAPs for both new and existing Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semi-chemical Pulp Mills. Under the provisions of Subpart MM, SDW's Lime Kiln is subject to a PM emission limit of 0.10 grains per dry standard cubic foot (gr/dscf) at 10% oxygen (O_2). (This standard was set as part of a bubbling calculation with the Recovery Boiler as permitted in Subpart MM.)

Under the Part 63 MACT standards, the affected sources are either existing units or new units. There are no provisions for modifications under these regulations. However, if a unit is reconstructed as defined in the standards it becomes subject to the requirements for new units. Reconstruction under the NESHAP general provisions is defined similarly to the NSPS in that the fixed capital costs of the new components would need to exceed 50% of the fixed capital cost for constructing a comparable new source. Since the cost of modifying the Lime Kiln to fire natural gas is well less than 50% of the costs for replacing the kiln, the proposed project will not qualify as reconstruction under the Part 63 standards. As a result, the current Subpart MM standards for PM for existing lime kilns will continue to apply to the Lime Kiln.

D. Best Available Control Technology (BACT)

Lime Kiln

1. Particulate Matter

As part of SDW's BACT analysis, the following were evaluated for controlling Particulate Matter (PM) emissions: fabric filters, electrostatic precipitators (ESP), and wet scrubbers. SDW already has a wet scrubber in place for control of $PM/PM_{10}/PM_{2.5}$ and SO_2 emissions. In addition, control options such as fabric filters, dry and wet ESP's, and upgrading the existing scrubber were evaluated as part of this BACT determination.

Fabric filters, more commonly referred to as baghouses, consist of a structure containing tubular bags made of woven or felted fabric in which particulate matter is removed by drawing the particulate laden gas through the bags with the bags capturing the particulate matter. The collected particulate is periodically removed by shaking the bag. When using fabric filters for control, exhaust gas temperatures must be less than 500°F to avoid damaging the bag material. Additionally moisture must be minimized to avoid condensation and possible blinding of the bags. Since wet particles in the exhaust stream can clog the bag pores and block gas movement, the high level of moisture in the exhaust stream of the SWD lime kiln makes this alternative unsuitable.

Electrostatic precipitators remove particulate matter from the exhaust streams by charging suspended particles through a direct current corona, collecting the charged particles on a grounded plate, and removing the particles from the plates by mechanical means or water flushing. ESP's can be classified as dry or wet ESPs. Dry ESPs are typically used for applications where the exhaust stream contains very little moisture. Wet ESPs are typically used to collect PM from streams that have relatively high moisture contents. Dry ESP are primarily effective at collecting filterable PM, while wet ESPs have shown limited effectiveness at collecting condensable PM via the mechanism of condensation onto liquid covered plates. Removing the existing wet scrubber and replacing it with either a wet or dry ESP for particulate matter control would result in higher SO_2 emissions and possibly an increase in TRS. Consequently the use of either a wet ESP or Dry ESP without a wet scrubber would, in this case, not be representative of BACT.

Cost effectiveness of the control options were evaluated to be approximately $13,729/ton for the Dry ESP, $19,503/ton for the wet ESP, and $38,760/ton for an upgraded scrubber. None of the alternatives are representative of BACT on the basis of economic infeasibility.

As the next most stringent alternative, the use of the existing wet scrubber is concluded to represent BACT. SDW proposes a PM limit of 0.10 gr/dscf @10% O_2.

The Department finds that utilizing the existing wet scrubber system to meet a PM emission limit of 0.10 gr/dscf@10% O_2 and 58 lb/hr, represents BACT. For PM_{10} and $PM_{2.5}$, the BACT limit shall be 70 lb/hr which includes PM condensables.

2. Nitrogen Oxides
Nitrogen oxide (NO_x) emissions from combustion units originate from two chemical pathways, thermal NO_x and fuel NO_x.

Thermal NO_x – results from the chemical reaction between the nitrogen and oxygen present in combustion air. The amount of thermal NO_x formed is highly dependent on the combustion temperature, the quantity of oxygen available to react with the atmospheric nitrogen, and the residence time of the combustion air in the high temperature region of the combustion chamber.

Fuel NO_x - results from the chemical reaction between the fuel bound nitrogen and the oxygen present in the combustion air. Fuel NO_x is relatively insensitive to temperature but very sensitive to the nitrogen content of the fuel. Natural gas has negligible nitrogen content.

SDW evaluated Selective Catalytic Reduction (SCR), Selective Non-Catalytic reduction (SNCR), low NO_x burner technology, flue gas recirculation and good design and combustion practices for control of NO_x from the lime kiln. Review of these methods yielded SCR and SNCR as being infeasible in being used in this application.

SCR is a process which involves post combustion removal of NO_x from the flue gas with a catalytic reactor. In the SCR process, ammonia injected into the exhaust gas reacts with nitrogen oxides and oxygen to form nitrogen and water with the chemical reactions taking place on the surface of a catalyst. Parameters to optimal functioning of SCR include appropriate exhaust gas temperatures, suitable catalyst composition and configuration, the sulfur and metals content of the exhaust and the design of the ammonia injection system. In retrofit situations, extensive physical modifications may be required to allow the use of SCR.

This alternative has not been utilized on lime kilns, and is not technically feasible in this case. The principal limitation is that temperature of the exhaust from the lime kiln is well below the minimum required catalyst operating

temperature. Therefore, SCR is not representative of BACT for control of NOx emissions from the kiln.

Selective Non-Catalytic Reduction (SNCR) is another post combustion NO_x control alternative that has been used to control emissions from certain other combustion process applications. Though SNCR does not utilize a catalyst, this alternative is similar to SCR in that a reducing agent, usually urea or ammonia, is used to chemically convert NO_x to nitrogen and water. These reactions occur in a narrow temperature window (1600°F-2100°F), thus having a location to inject the reducing agent upstream of where this temperature window exists is a critical factor in the use of SNCR. In this application the reducing agent would need to be injected at either the hot end of the kiln or at the downstream (i.e. mid-kiln) location. Because the reducing agent is oxidized at temperatures exceeding the optimum range for NO_x reduction and thereby creates additional NO_x, reagent injected at the hot end of the kiln would create NO_x. Mid-kiln reagent injection has not been utilized to control NOx emissions in Kraft pulp mill lime kilns. Since SNCR has not been utilized in Kraft mill lime kilns and because these units are fundamentally different than the preheater/precalciner type of cement kilns to which this technology has been applied, this alternative is technically infeasible and does not represent BACT for control of NO_X emissions from this source type.

Low NO_x burner designs usually incorporate a staged combustion process using primary air to maintain low oxygen gas and low temperature conditions near the fuel injection points and secondary air to complete the combustion process at lower temperatures.

The formation of NO_x is also minimized by proper kiln design and operation. Generally emissions are minimized when the lime kiln temperature is kept at the lower end of the desired range and when the distribution of air at the air and fuel injection zones is controlled. Lime kilns are designed such that they have a long flame length which helps reduce thermal NOx emissions. The use of good kiln design and combustion practices is therefore a technically feasible NO_x control measure for lime kilns.

Base on this review, good kiln design and combustion practices and the use of a low NO_x burner design are the only technically feasible control alternatives to control NO_x emissions from lime kilns designed for Kraft pulp mill lime recovery processes. SDW proposes a NO_x emission limit of 120 ppmvw @10% O_2 (180 ppmvd @10% O_2) as BACT.

The Department agrees that good kiln design, combustion practices and low burner technology is BACT for NO_x control. BACT for NO_x from the lime kiln is a NOx emission limit of 120 ppmvw @10% O2 (180 ppmvd @10% O_2) and 58 lb/hr.

3. Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

Both CO and VOC emissions from lime kilns are caused by incomplete combustion of carbonaceous fuels. The methods of controlling these two pollutants are therefore similar.

SDW investigated the following methods of control for CO and VOC: catalytic oxidation, thermal oxidation and good design and combustion practices. Catalytic oxidation and thermal oxidation were eliminated as being infeasible. Catalytic oxidation operates in a narrow operating range (770°F – 1100°F). Lime kiln exhaust temperature is significantly lower than the minimum optimal temperature of 700°F. Although the exhaust gas could be reheated, this would result in an unacceptable energy and environmental impact. If the oxidation catalyst is placed upstream of the particulate control device, the particles present in the exhaust may cause fouling, blinding and subsequent deactivation of the catalyst.

Thermal oxidation is the oxidation of the CO and VOC in the exhaust stream by supplying additional thermal energy from an external source such as a natural gas fired re-heater. Reheating of the exhaust gas would result in unacceptable energy and environmental impacts due to the collateral increase in fuel usage and criteria pollutant emissions from the heater. Good design and combustion practices ensure minimization of products of incomplete combustion such as CO and VOC while minimizing the generation of NO_x. SDW proposes good lime kiln design and combustion practices as BACT.

The Department finds that lime kiln design and combustion practices are BACT for control of CO and VOC. BACT for CO and VOC emissions are 58 lb/hr and 10 lb/hr respectively.

4. Sulfur Dioxide

Emissions of SO_2 from lime kilns are a result of oxidation of fuel sulfur as well as oxidation of residual sulfide in the lime mud and the reduced sulfur compounds in the non-condensable gases that are treated in the lime kiln. Emissions of SO_2 from lime kilns are very low (on the order of 10-50 ppm). The alkaline nature of the particulate catch in the wet scrubber immediately following the lime kiln promotes SO_2 capture and low emissions.

The control technologies SDW reviewed as part of this process includes in-situ SO_2 removal, dry scrubbing, semi-dry scrubbing, and wet scrubbing. In-situ removal is already in place and is inherent to the lime kiln at SDW. Since the in-situ removal mechanism inherent in the design is already in place, no economic, energy and environmental impacts associated with the use of this technology have been evaluated. Review of dry scrubbing and semi-dry scrubbing did not reveal instances where these technologies were used to control SO_2 in lime kilns. These technologies were considered to be technically infeasible.

Wet scrubbing and in-situ SO_2 removal are the only two SO_2 control technologies that are technically feasible and both of them are already employed on the lime kiln at this facility.

SDW proposed to maintain the current SO_2 emissions limit of 75 lb/hr as BACT using the existing wet scrubber system and in-situ SO_2 removal.

The Department accepts SDW's proposed BACT limit of 75 lb/hr for SO_2 emissions using existing controls.

5. Total Reduced Sulfur
Total Reduced Sulfur (TRS) compounds consist primarily of hydrogen sulfide, methyl mercaptan, dimethyl sulfide and dimethyl disulfide with the principal constituent being hydrogen sulfide.

The only TRS technologies identified for lime kilns are wet scrubbing and good kiln design and combustion practices. SDW employs both these technologies already to control TRS. SDW concludes that the existing wet scrubber and the current TRS limit of 20 ppmvd@10% O_2 via the use of the wet scrubber and good combustion represents BACT for TRS emissions from the lime kiln.

The Department accepts the proposed TRS limit of 20 ppmvd@10% O_2 as BACT for TRS.

This Table summarizes SDW's current license limits, the proposed BACT limits along with the proposed compliance demonstration methodology.

Pollutant	Previous License Limit	Proposed BACT Limit	Proposed BACT Technology	Compliance Demonstration Method
PM	0.10 gr/dscf 58 lb/hr	0.10 gr/dscf 58 lb/hr	Existing venturi scrubber	Stack testing, EPA method 5 once every 5 years
PM_{10}	58 lb/hr(1)	70 lb/hr(2)	Existing venturi scrubber	Stack testing, EPA Method 5 and 202, at department's request(3)
$PM_{2.5}$	N/A	70 lb/hr(2)	Existing venturi scrubber	Stack testing, EPA Method 5 and 202, at department's request(3)
NO_x	120 ppmvw 58 lb/hr	120 ppmvw(4) 58 lb/hr	Good design and combustion practices Low NOx burner	Stack testing, EPA Method 7E, once every 5 years
CO	58 lb/hr	58 lb/hr	Good design and combustion practices Low NOx burner	Stack testing, EPA method 10, at Department's request
VOC	10 lb/hr	10 lb/hr	Good kiln design and combustion practices	Stack testing, EPA Method 25A, at Department's request
SO_2	75 lb/hr 1.92 lb/MMBtu	75 lb/hr 1.92 lb/MMBtu	Wet Scrubbing and good combustion practices	Stack Testing, EPA Method 6, at Department's request
TRS	20 ppmvd(4)	20 ppmvd(4)	Wet scrubbing and good combustion practices	CEM, 12 hr block average basis, measured as H_2S

Note (1): The previous license limit for PM_{10} is based on the pre-2012 definition in 06-096 CMR 100. The original definition of PM_{10} did not include condensable PM emissions.

(2): includes condensable PM

(3): cannot run method 201A on a saturated stack gas so filterable

PM = filterable PM_{10} = filterable $PM_{2.5}$

(4): All concentration-based limits are based on a reference oxygen concentration of 10%

New Purchased Lime Silo and a New #2 Reburnt Lime Silo Baghouse

SDW is installing a New Purchased Lime Silo as part of this project. SDW has determined that a new baghouse is BACT for controlling dust from the New Purchase Lime Silo. The proposed baghouse will be a high efficiency unit, approximately 99.0% efficiency by weight based on 1 micron sized particles.

In addition, SDW will be installing a new baghouse on the existing No. 2 Reburnt Lime silo. The new baghouse will capture particulate from the new lime crusher bucket elevator and pan conveyor as well as particulate emissions from the No. 2 Reburnt Lime Silo. Presently, both the No. 1 and No. 2 Reburnt Lime Silos share a baghouse.

The Department approves baghouses as BACT for control of dust and visible emissions from the New Purchased Lime Silo and the No. 2 Reburnt Lime Silo. Compliance of proper, efficient operation of the baghouses shall be based on visible emissions from the unit. Per Visible Emissions Regulation, 06-096 CMR 101 (as amended), opacity from each baghouse shall not exceed 10% on a six (6) minute block average basis, for more than on (1) six minute block average in a 1 hour period. SDW shall take corrective action if visible emissions from the baghouse exceed 5% opacity, on a six (6) minute block average basis.

E. Incorporation into the Part 70 Air Emission License

The requirements in this 06-096 CMR 115 New Source Review amendment shall apply to the facility upon amendment issuance. Per *Part 70 Air Emission License Regulations*, 06-096 CMR 140 (as amended), Section 1(C)(8), for a modification that has undergone NSR requirements or been processed through 06-096 CMR 115, the source must then apply for an amendment to the Part 70 license within one year of commencing the proposed operations as provided in 40 CFR Part 70.5.

F. Total Facility Licensed Annual Emissions (used to calculate the annual license fee)

	PM	PM_{10}	$PM_{2.5}$	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	--	113.9	--	--	--
Lime Kiln	254.0	306.6	306.6	328.5	311.0	254.0	43.8
Total TPY	**2,413.5**	**2,466.1**	**306.6**	**14,113.2**	**6,032.1**	**26,120.6**	**209.8**

* PM_{10}, $PM_{2.5}$, and CO are not used in calculating the annual fee but are included for completeness.
* PM and VOC emissions do not include process emission units (e.g., woodyard, paper machines) which have no license emissions limits.
* VOC lb/hr limits, lb/MMBtu limits, and VOC TPY emissions listed in this license are based on VOC emissions reported as carbon by EPA Method 25A.
* The PM_{10} total for the lime kiln has increased due to a change in definition for PM_{10}. The current definition now includes PM condensables. PM_{10} totals for all other emission units above have not been adjusted at this time to include PM condensables.
* $PM_{2.5}$ totals for emission units other than the Lime Kiln above have not been included in the license at this time.

III. AMBIENT AIR QUALITY ANALYSIS

SDW submitted an ambient air quality analysis based on the original project scope which included a production increase because of the potential inclusion of a lime mud dryer. The project scope has changed resulting in pollutant increases which no longer require modeling. However, since the modeling was conducted at these higher emission rates, the modeling was submitted as part of the application and can be found within the SDW's application for this project. The modeling demonstrates that even at the higher emission rates from the facility, in conjunction with all other sources, SDW does not violate ambient air quality standards. An additional ambient air quality analysis is not required for this amendment.

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-19-77-7-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.

SPECIFIC CONDITIONS

(1) Lime Kiln

A. Natural gas may be fired in the Lime Kiln [06-096 CMR 115, BACT]

B. SDW shall maintain records of the amount of natural gas fired in the lime kiln [06-096 CMR 115, BACT]

C. With the addition of natural gas in the Lime Kiln, SDW shall utilize low NO_x technology consisting of good equipment design, good combustion practices and the installation of a low NO_x burner to minimize NO_x emissions. [06-096 CMR 115, BACT]

D. SDW shall conduct tuning operations during the shakedown of the new burner and as necessary thereafter, in an effort in minimize emissions and optimize energy efficiency. [06-096 CMR 115, BACT]

E. SDW shall utilize good combustion practices to minimize CO and VOC [06-096 CMR 115, BACT]

F. SDW shall utilize good combustion and operating practices to minimize SO_2 and TRS emissions. [06-096 CMR 115, BACT]

G. Beginning 180 days after startup following completion of the lime kiln natural gas conversion project, emissions from the lime kiln shall not exceed the following when firing natural gas:

Pollutant	BACT limit*	Compliance Demonstration method
PM_{10}	70 lb/hr	Stack testing, EPA Method 5 and 202, at the Department's request
$PM_{2.5}$	70 lb/hr	Stack testing, EPA Method 5 and 202, at the Department's request

*lb/hr limits shall apply at all times [06-096 CMR 115, BACT]

H. Emission limits established in Air Emission License A-19-70-A-I for the lime kiln for PM, SO_2, NO_x, CO, VOC, and TRS shall remain in effect when natural gas is being fired in the unit. [06-096 CMR 115, BACT]

(2) New Purchased Lime Silo

A. SWD shall install, operate, and maintain a baghouse on the New Purchased Lime Silo in accordance with the Best Management Practice (BMP) Plan established in Air Emission License A-19-70-A-I Condition (33).

B. Visible emissions from the baghouse shall not exceed 10% on a six (6) minute block average basis, for more than (1) six minute block average in a 1 hour period. SDW shall take corrective action if visible emissions from the baghouse exceed 5% opacity on a six minute block average basis. [06-096 CMR 101]

(3) New No. 2 Reburnt Lime Silo Baghouse

A. SWD shall install, operate, and maintain a baghouse on the No. 2 Reburnt Lime Silo in accordance with the Best Management Practice (BMP) Plan established in Air Emission License A-19-70-A-I Condition (33).

B. Visible emissions from the baghouse shall not exceed 10% on a six (6) minute block average basis, for more than (1) six minute block average in a 1 hour period. SDW shall take corrective action if visible emissions from the baghouse exceed 5% opacity on a six minute block average basis. [06-096 CMR 101]

(4) SWD shall submit an application to incorporate this amendment into the Part 70 air emission license no later than 12 months from commencement of the requested operation. [06-096 CMR 140, Section 1(C)(8)]

DONE AND DATED IN AUGUSTA, MAINE THIS 8 **DAY OF** July **, 2013.**

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Marc Allen Robert Cone for
PATRICIA W. AHO, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: April 23, 2013
Date of application acceptance: April 23, 2013
Date filed with the Board of Environmental Protection:

This Order prepared by Lisa P. Higgins, Bureau of Air Quality.

Filed
JUL - 8 2013
State of Maine
Board of Environmental Protection