MSAD #54
Penobscot County
Skowhegan, Maine
A-1080-71-A-N

Departmental
Findings of Fact and Order
Air Emission License
After-the-Fact

FINDINGS OF FACT

After review of the air emissions license 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 Maine Department of Environmental Protection (Department) finds the following facts:

I. REGISTRATION

A. Introduction

MSAD #54 has applied for an air emission license, permitting the operation of emission sources associated with their education facilities.

The equipment addressed in this license is part of the Skowhegan School District and is located in the High School at 61 Academy Circle, the Middle School at 155 Academy Circle, and Bloomfield Elementary School at 140 Academy Circle, in Skowhegan, Maine.

B. Emission Equipment

The following equipment is addressed in this air emission license:

Boilers

Equipment	Maximum Capacity (MMBtu/hr) *	Maximum Firing Rate (gal/hr) *	Fuel Type, % sulfur	Install. Date	Stack #
Boiler #1	12.55	83.5	No. 2 Fuel Oil, 0.5%	1968	1
Boiler #2	12.55	83.5	No. 2 Fuel Oil, 0.5%	1968	1
Boiler #3	6.25	750 lb/hr	Wood Pellets	2012	2
Boiler #4	1.5	17.4	No. 2 Fuel Oil, 0.5%	2001	3
Boiler #5	1.5	17.4	No. 2 Fuel Oil, 0.5%	2001	4
Boiler #6	1.5	10.95	No. 2 Fuel Oil, 0.5%	Unknown	5
Boiler #7	1.5	10.95	No. 2 Fuel Oil, 0.5%	Unknown	5

* The maximum capacities and firing rates are taken from the boiler plates on the individual units at the facility. In some cases for the No. 2 fuel oil fired boilers, the capacity does not equal the firing rate when using the heating value for No. 2 fuel oil. Therefore, the emissions in this license are based on either the maximum capacity or the firing rate, whichever yields the higher potential to emit emission limits.

C. Application Classification

MSAD #54 is classified as an existing source that is applying for its first air emission license, after the fact.

The new source is considered a major source based on whether or not expected emissions exceed the "Significant Emission Levels" as defined in the Department's regulations. The emissions for the new source are determined by the maximum future license allowed emissions, as follows:

Pollutant	Max. Future License (TPY)	Sig. Level (TPY)
PM	12.4	100
PM_{10}	12.4	100
SO_2	18.3	100
NO_x	11.0	100
CO	5.6	100
VOC	0.3	50

The Department has determined the facility is a minor source and the application has been processed through *Major and Minor Source Air Emission License Regulations*, 06-096 CMR 115 (as amended).

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 *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 emissions are receiving Best Available Control Technology (BACT), as defined in

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

B. Boilers #1, #2, #4, #5, #6 and #7 (No. 2 fuel oil units)

MSAD #54 operates a total of seven (7) boilers to heat various facility buildings in the Skowhegan School District. Boilers #1, #2 and #3 are located in the High School, Boilers #4 and #5 are located in the Middle School, and Boilers #6 and #7 are located in the Elementary School.

Boilers #1, #2, #4, #5, #6 and #7 are all units that use No. 2 fuel oil as a fuel source. The maximum heat input capacities of the units are 12.55 MMBtu/hr for Boilers #1 and #2 and 1.5 MMBtu/hr for Boilers #4 - #7. Boilers #1 and #2 were both installed in 1968 and exhaust to common Stack #1 and Boilers #4 and #5 were both installed in 2001 and exhaust to Stack #3 and #4, respectively. Boilers #6 and #7 are older units and it is not known when they were installed but they exhaust to common Stack #5.

Due to the installation dates of Boilers #1 and #2, and the sizes of Boilers #4 - #7, the units are not subject to the New Source Performance Standards (NSPS) 40 CFR Part 60, Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*, for units greater than 10 MMBtu/hr manufactured after June 9, 1989.

MSAD #54 submitted a BACT analysis for PM, SO_2, NO_X, CO and VOC for Boilers #1, #2, #4, #5, #6 and #7 firing No.2 fuel oil.

1. BACT Findings

Information on the economic impact, technical feasibility, and environmental impact of various control options was used to determine the available control technologies and corresponding levels of control for Boilers #1, #2, #4, #5, #6 and #7. The following summarizes the BACT findings for these No. 2 fired boiler units.

PM/PM_{10} – Particulate matter (PM) from fuel combustion is formed from non-combustible material (ash) in the fuel and from incomplete combustion of the fuel. Potential particulate matter controls for oil boilers consists of add-on controls, combustion of clean fuels, good combustion and operating practices, or a combination of options. Potential add-on controls for oil-fired boilers (Boilers #1, #2, #4, #5, #6 and #7) include electrostatic precipitators (ESPs), absorption systems (wet scrubbers) and fabric filters (baghouses).

Due to the relatively small amount of PM emissions from each boiler unit, the installation of add-on pollution control equipment is not cost effective.

The combustion of clean fuels to minimize PM emissions is accomplished by burning fuels with minimal amounts of impurities in conjunction with good combustion practices. The use of good combustion practices and the combustion of clean fuels are technically feasible to minimize PM emissions and have been selected as part of the BACT strategy for the oil-fired boilers.

BACT for PM/PM_{10} emissions from Boilers #1, #2, #4, #5, #6 and #7 is the combustion of cleaner fuels and the use of good combustion and operating practices. In addition, the boilers shall comply with a PM emission limit of 0.12 lb/MMBtu based on 06-096 CMR 103, *Fuel Burning Equipment Particulate Emission Standard.*

SO_2 – Sulfur dioxide (SO_2) is formed from the combustion of sulfur present in the fuel. Control options for SO_2 include flue gas desulfurization by means of a wet scrubbing system whereby a caustic solution is used to remove sulfur from the flue gas, or restricting the sulfur content of the fuel oil. The No. 2 fuel oil fired in Boilers #1, #2, #4, #5, #6 and #7 is restricted to a sulfur content of 0.5%, with more stringent restrictions required in future years. Additional sulfur controls including a wet scrubber system are not economically feasible for the relatively small boilers due to the associated annual operating cost for caustic, energy, operation and maintenance.

BACT for SO_2 emissions from the oil fired boilers is the firing of No. 2 fuel with a maximum sulfur content of 0.5% through the calendar year 2016 and then applying the required percent sulfur restrictions thereafter.

NO_X – Nitrogen oxide (NO_X) is generated from fuel NO_X, thermal NO_X, and prompt NO_X. Oxidation of hydrocarbon radicals near the combustion flame forms prompt NO_X in insignificant amounts. Reducing NO_X formation from the two other NO_X generating mechanisms includes firing a low nitrogen content fuel to minimize fuel NO_X and maintaining combustion temperatures below 3600°F to minimize thermal NO_X. Potential control technologies for NO_X emissions include add-on controls, such as selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR), combustion of clean fuels, and combustion control techniques.

Add-on SCR and SNCR are primarily used on large industrial and utility boilers. The installation of these pollution control technologies on these low heat input capacity units is not economically feasible due to control

installation costs, annual operating costs, added energy consumption, and operation and maintenance costs.

The combustion of clean fuels to minimize NO_X emissions is accomplished by burning fuels with less bound nitrogen. The boilers use distillate fuel oil which has a low nitrogen content.

Good combustion practices can limit the formation of thermal NO_X. The use of good combustion practices are feasible to minimize NO_X emissions and have been selected as part of the BACT strategy for the oil fired boiler units.

BACT for NO_X emissions from the oil fired boilers (Boilers #1, #2, #4, #5, #6 and #7) is following good combustion practices, combusting a clean burning fuel (No. 2/distillate fuel oil), and meeting an emission limit of 20 lbs/1000 gallons (equivalent to 1.79 lb/hr for Boilers #1 and #2, 0.35 lb/hr for Boilers #4 and #5, and 0.22 lb/hr for Boilers #6 and #7).

CO & VOC – Carbon monoxide (CO) and volatile organic compounds (VOCs) can result from incomplete combustion caused by conditions such as insufficient resident time or limited oxygen availability during combustion. Due to all of the oil fired boilers being relatively small, it is not economically feasible to install any add-on or auxiliary pollution control equipment for CO and VOC emission control. In addition, auxiliary equipment is not needed to control VOC emissions from commercial and industrial boilers because properly maintaining the burning/boiler package will reduce VOC emissions to a minimum.

Good combustion efficiency and properly maintaining the units will keep CO and VOC emission at a minimum. Proper maintenance includes keeping the air/fuel ratio at the manufacturer's specified setting and having the proper air and fuel pressures at the burners.

BACT for CO and VOC emissions from the oil fired boilers is the use of good combustion techniques, proper equipment maintenance, and complying with the emission limits of 5 lbs/1000 gallons for CO and 0.34 lbs/1000 gallons for VOC.

Therefore, based on BACT, the emission limits for Boilers #1, #2, #4, #5, #6 and #7 were based on the following:

No. 2 Fuel Oil

PM/PM_{10} – 0.12 lb/MMBtu based on 06-096 CMR 103

SO_2 – 0.5 lb/MMBtu based on firing ASTM D396 compliant No. 2 fuel oil (0.5% sulfur)

NO_X – 20 lb/1000 gal, AP-42, Table 1.3-1, dated 5/10
CO – 5 lb/1000 gal, AP-42, Table 1.3-1, dated 5/10
VOC – 0.34 lb/1000 gal, AP-42, Table 1.3-3, dated 5/10
Opacity – 06-096 CMR 101

The BACT emission limits for the boilers are the following:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Boiler #1	1.51	1.51	6.32	1.79	0.45	0.03
Boiler #2	1.51	1.51	6.32	1.79	0.45	0.03
Boiler #4	0.29	0.29	1.23	0.35	0.09	0.01
Boiler #5	0.29	0.29	1.23	0.35	0.09	0.01
Boiler #6	0.18	0.18	0.77	0.22	0.05	0.01
Boiler #7	0.18	0.18	0.77	0.22	0.05	0.01

Visible emissions from the each of the stacks serving the boilers firing No. 2 fuel oil (Stacks #1, #3, #4 and #5) shall not exceed 20% opacity on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period.

MSAD #54 shall be limited to a combined total of 500,000 gallons/yr of No. 2 fuel oil in Boilers #1, #2, #4, #5, #6 and #7 based on a calendar year.

Prior to January 1, 2016 or by the date otherwise stated in 38 MRSA §603-A(2)(A)(3), the No. 2 fuel oil fired in Boilers #1, #2, #4, #5, #6 and #7 shall be ASTM D396 compliant No. 2 fuel oil (maximum sulfur content of 0.5% by weight). Per 38 MRSA §603-A(2)(A)(3), beginning January 1, 2016 or on the date specified in the statute, the facility shall fire No. 2 fuel oil with a maximum sulfur content limit of 0.005% by weight (50 ppm), and beginning January 1, 2018 or on the date specified in the statute, the facility shall fire No. 2 fuel oil with a maximum sulfur content limit of 0.0015% by weight (15 ppm). The specific dates contained in this paragraph reflect the current dates in the statute as of the effective date of this license; however, if the statute is revised, the facility shall comply with the revised dates upon promulgation of the statute revision.

2. Periodic Monitoring

Periodic monitoring for the No. 2 fuel oil fired boilers shall include recordkeeping to document fuel use both on a monthly and calendar year basis. Documentation shall include the quantity and type of fuel used and sulfur content of the fuel.

C. Boiler #3

MSAD #54 operates one wood pellet fired boiler (Boiler #3) with a maximum design heat input capacity of 6.25 MMBtu/hr. Boiler #3 is located in the High School, however, it provides heat to the High School, Middle School and Elementary School. The boiler uses pellets which have a moisture content of 8% or less. The boiler was manufactured in 2012 and exhausts through Stack #2.

Due to the size of Boiler #3, the unit is not subject to the New Source Performance Standards (NSPS) 40 CFR Part 60, Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*, for units greater than 10 MMBtu/hr manufactured after June 9, 1989.

MSAD #54 submitted a BACT analysis for PM, SO_2, NO_X, CO and VOC from Boiler #3 firing biomass. EPA's RACT/BACT/LAER Clearinghouse (RBLC) and licensed Maine DEP biomass-fired boilers were reviewed for requirements on similar units.

The following table contains the results of the RBLC and Maine DEP licensed sources:

Summary of Licensed Biomass Boilers < 100 MMBtu/hr

Facility	Description (MMBtu/hr)	State	Control Methods	Emissions Limits (lb/MMBtu)				
				PM	SO_2	NO_X	CO	VOC
NMCC	3.62	ME	Cyclone	0.3	-	-	-	-
Togus VA Medical Center	38	ME	ESP	0.03	-	0.25	0.25	-
Jackson Laboratory	49.9	ME	Baghouse	0.04	-	0.3	0.3	-
ACEC	22.5	ME	Baghouse	0.07	-	0.25	0.3	-
MSAD #29	2.7	ME	Cyclone &Baghouse	0.03[1]	-	-	-	-
West Fraser Timber Company, LTD	58.3	LA	None	-	-	-	1.81	-
Hunt Forest Products, Inc	99.4	LA	ESP	-	-	-	1.568	-
Flakeboard America Limited	99.00	SC	Dry ESP, Mutlicyclone, Low NO_X Burner	0.025	-	1.23	0.30	0.1
ERA Comilog, Inc	69.3	TN	Good Combustion Practices	-	-	0.25	-	-
Middlebury College	29.5	VT	Mutlicyclone & Baghouse	0.091	-	-	-	-
Louisiana Pacific - WI	19.4	WI	Lox NO_X Burner, Flue Gas Recirculation, Staged Combustion Air	0.5	-	0.23	1.35	-

Facility	Description (MMBtu/hr)	State	Control Methods	Emissions Limits (lb/MMBtu)				
				PM	SO_2	NO_X	CO	VOC
Louisiana Pacific - WI	23.8	WI	Electrified Filter Bed, Good Combustion Practices	0.5	-	0.34	1.1	-
Deltic Timber Corp.	64.32	AR	Dry Low NO_X Burner & Good Combustion Practices	0.08	-	0.3	0.47	0.07
Wellborn Cabinets	29.50	AL	Boiler Design & Combustion Control	-	-	0.5	-	-
West Frazier (South) Inc	29.63	LA	Good Combustion Practices	0.24	-	0.3	0.3	0.1
T.R. Miller Mill	36.0	AL	Good Combustion Practices	-	-	-	-	0.017
West Frazier (South) Inc. – Joyce	58.30	LA	None	-	-	-	1.81	-
Diboll Particleboard	40.0	TX	ESP	0.29	-	1.43	4.67	-

1. BACT Findings

The data obtained from the RBLC and similar sources license review, along with information on the economic impact, technical feasibility, and environmental impact of various control options, was used to determine the available control technologies and corresponding levels of control for Boiler #3. The following summarizes the BACT findings for Boiler #3.

PM/PM_{10} – Particulate matter from fuel combustion is formed from non-combustible material (ash) in the fuel and from incomplete combustion of the fuel. Potential particulate matter controls for biomass boilers consists of add-on controls, combustion of clean fuels, good combustion and operating practices, or a combination of options. The evaluation of add-on controls for Boiler #3 included electrostatic precipitators (ESPs), absorption systems (wet scrubbers), fabric filters (baghouses), and multicyclones.

ESPs consist of charging particles in the exhaust stream with a high voltage, oppositely charging a collection surface where the particles accumulate, removing the collected dust by a rapping process, and collecting the dust in hoppers. The dust is then removed for disposal or recycling. When applied to wood-fired boilers, ESPs are often used downstream of mechanical collectors which remove larger-sized particles. According to the US-EPA Air Pollution Control Technology Fact Sheet (EPA-452/F-03-030) for wet ESPs, posted 2003, ESPs have high capital costs. Although the operating costs are relatively low, MSAD #54 does not find the high capital costs for an ESP to be economically feasible.

Wet scrubbers consist of using particle inertia and pressure to transfer particles from the gas stream to a liquid stream using water, purging the liquid, and removing the particles in sludge form. Thereby, wet scrubbers generate a waste stream that must be treated and disposed of properly. The most widely used wet scrubbers for wood-fired boilers are venturi scrubbers. The shape of the venturi scrubber increases the velocity of the particulate matter as it approaches the throat where the particles are then driven into large water droplets. According to the US-EPA Air Pollution Control Technology Fact Sheet (EPA-452/F-03-015) for wet scrubbers, posted on 7/15/03, the average cost for a scrubber to control PM will be approximately $206,000. Due to the capital cost of the wet scrubber system, the ongoing operating costs, make-up water requirements, and waste sludge disposal, the economic and environmental cost associated with wet scrubber systems are not justifiable.

Fabric filters (i.e., baghouses) collect particulate matter on the surfaces of filter bags. Most of the particles are captured by inertial impaction, interception, Brownian diffusion, and sieving on already collected particles that have formed a dust layer on the bags. The control efficiencies of fabric filters usually range from 99% to greater than 99.5% depending on the characteristics of the particulate matter and the fabric filter design. While the initial capital cost of a fabric filter installation is low relative to other PM control technologies, operating costs for these units are higher due to the energy required to power an induced draft fan to pull the gas stream through the filter. Considering the high operating costs of a fabric filter unit and the area needed to construct these units, the economic costs associated with using a fabric filter to control a relatively small amount of PM are not justifiable.

Multicyclones use inertia to separate PM from the gas stream. The gas stream enters the cyclone and spirals around the inside of the cyclone forcing particles with greater inertia to the outside wall where they encounter a boundary layer of gas and fall down the cone to a collection hopper below. The use of cyclones provides particulate control for many wood-fired boilers. The efficiency of this arrangement varies from 25 to 65 percent. The use of a multicyclone has been determined to be feasible and has been selected as part of the BACT strategy for Boiler #3.

The combustion of clean fuels to minimize PM emissions is accomplished by burning fuels with minimal amounts of impurities in conjunction with good combustion practices. The use of a wood pellet burner that provides a cleaner combustion generation of particulate then other forms of biomass combustion has been selected as part of the BACT strategy for Boiler #3.

Good combustion practices can reduce products of incomplete combustion, including particulate matter. The use of good combustion practices are feasible to minimize PM emissions and have been selected as part of the BACT strategy for Boiler #3.

The following summarizes the PM control technology rankings:

Boiler #3 PM Control Technology Rankings

Control Technology	% PM/PM_{10} Control	Technical Feasibility	Economic Feasibility
ESP/Wet ESP	80+	Feasible	Cost prohibitive
Wet Scrubber	85+	Feasible	Cost prohibitive
Baghouse (fabric filter)	99+	Feasible	Cost prohibitive
Multicyclone ***SELECTED***	25-60	Feasible	Feasible
Combustion of Clean Fuels ***SELECTED***	General Minimization of Emissions	Feasible	Feasible
Good Combustion Practices ***SELECTED***	General Minimization of Emissions	Feasible	Feasible

BACT for PM/PM_{10} emissions from Boiler #3 is the use of a multicyclone, combustion of cleaner fuels, and good combustion and operating practices. In addition, MSAD #54 shall comply with a PM emission limit of 0.25 lb/MMBtu based on 06-096 CMR 103, *Fuel Burning Equipment Particulate Emission Standard*, for Boiler #3 as representing BACT.

SO_2 – Sulfur dioxide is formed from the combustion of sulfur present in the fuel. Control options for SO_2 include flue gas desulfurization by means of a wet scrubbing system whereby a caustic solution is used to remove sulfur from the flue gas, or restricting the sulfur content of the fuel oil. The wood pellets fired in Boiler #3 is inherently a low sulfur fuel, with only trace amounts of sulfur available to combine with oxygen in the combustion process. Additional sulfur controls including a wet scrubber system are not justified because it is not economically feasible for a relatively small boiler due to the associated annual operating cost for caustic, energy, operation and maintenance.

BACT for SO_2 emissions from Boiler #3 is the firing of wood pellets and an emission limit of 0.16 lb/hr (equivalent to 0.025 lb/MMBtu) based on the manufacturer's guarantee.

NO_X – Nitrogen oxide is generated from fuel NO_X, thermal NO_X, and prompt NO_X. Oxidation of hydrocarbon radicals near the combustion flame forms prompt NO_X in insignificant amounts. Reducing NO_X formation from the two other NO_X generating mechanisms includes firing a low nitrogen content fuel to minimize fuel NO_X and maintaining combustion temperatures below 3600°F to minimize thermal NO_X. Potential control technologies for NO_X emissions include add-on controls, such as selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR), combustion control techniques, such as staged combustion, low excess air firing, flue gas recirculation, and combustion of clean fuels.

Add-on SCR and SNCR are primarily used on large industrial and utility boilers. There were no SCR or SNCR installations on biomass boilers with maximum heat inputs less than 69.3 MMBtu/hr listed in the RBLC database. Control installation costs, annual operating costs, added energy consumption, and operation and maintenance costs are not economically feasible for this size project.

Flue gas recirculation and low NO_X burners are utilized on larger boilers. Flue gas recirculation requires ductwork from the burner outlet duct to the combustion air duct, reducing peak flame temperatures. Flue gas recirculation and low NO_X burners are not typically economically feasible on smaller wood fired units.

The combustion of clean fuels to minimize NO_X emissions is accomplished by burning fuels with less bound nitrogen. The wood pellets being fired in Boiler #3 typically have a low nitrogen content.

BACT for NO_X emissions from Boiler #3 is the firing of clean wood pellets (having inherently low nitrogen content), good combustion practices, and an emission limit of 1.38 lb/hr (equivalent to 0.22 lb/MMBtu) based on the manufacturer's guarantee.

CO & VOC – Carbon monoxide and volatile organic compounds can result from incomplete combustion caused by conditions such as insufficient resident time or limited oxygen availability during combustion. CO and VOC emissions from units with burners are typically minimized by good combustion, although oxidation catalyst systems have been used on larger units. Due to Boiler #3 being a relatively small, it is not economically feasible to install add-on pollution control equipment for CO and VOC emission control. In addition, auxiliary equipment is not needed to control VOC emissions from commercial and industrial boilers because properly maintaining the burning/boiler package will reduce VOC emissions to a minimum.

Good combustion efficiency and proper equipment operation and maintenance incorporate various techniques to minimize CO and VOC emissions. Proper combustion techniques include maintaining optimum combustion conditions within the system via optimization of residence time, temperature, and mixing. Proper maintenance includes keeping the air to fuel ratio at the manufacturer's specified settings and having proper air and fuel pressures at the burner.

BACT for CO and VOC emissions from Boiler #3 is the use of good combustion techniques, proper equipment maintenance, and emission limits of 1.00 lb/hr (equivalent to 0.16 lb/MMBtu) for CO and 0.11 lb/hr (equivalent to 0.017 lb/MMBtu) for VOC, based on the manufacturer's guarantee.

Therefore, based on BACT, the emission limits for Boiler #3 were based on the following:

Wood Pellets

PM/PM_{10} – 0.25 lb/MMBtu based on units of similar size and age
SO_2 – 0.025 lb/MMBtu based on manufacturer's guarantee and AP-42, Table 1.6-2, dated 9/03
NO_X – 0.22 lb/MMBtu based on manufacturer's guarantee and AP-42, Table 1.6-2, dated 9/03
CO – 0.16 lb/MMBtu based on manufacturer's guarantee
VOC – 0.017 lb/MMBtu based on manufacturer's guarantee and AP-42, Table 1.6-2, dated 9/03
Opacity – 06-096 CMR 115, BACT

The BACT emission limits for Boiler #3 are the following:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Boiler #3	1.56	1.56	0.16	1.38	1.00	0.11

Visible emissions for Boiler #3 firing biomass wood pellets shall not exceed 20% opacity on a six (6) minute block average basis, except for no more than two (2) six (6) minute block averages in a 3-hour period.

Boiler #3 shall be limited to 3,285 tons/year of wood pellets at 8% moisture content with a heat content of 8,335 Btu/lb (or equivalent), on a calendar year basis.

2. Periodic Monitoring

Periodic monitoring for Boiler #3 shall include recordkeeping to document fuel use both on a monthly and calendar year basis. Compliance may be based on either delivery records, including receipts of wood pellet deliveries and a record of deliveries each month to represent the fuel consumed for the month, or actual fuel metering data.

D. 40 CFR Part 63 Subpart JJJJJJ

All of the boiler units at MSAD #54 are subject to the *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources* (40 CFR Part 63 Subpart JJJJJJ). Boilers #1, #2, #4, #5, #6 and #7 are classified as existing sources in the oil-fired and oil-fired less than 5 MMBtu/hr subcategories. Boiler #3 is classified as a new source in the biomass subcategory.

For informational purposes, a summary of the currently applicable federal 40 CFR Part 63 Subpart JJJJJJ requirements is listed below. At this time, the Department has not taken delegation of this area source MACT (Maximum Achievable Control Technology) rule promulgated by EPA, however MSAD #54 is still subject to the requirements. Notification forms and additional rule information can be found on the following website:
http://www.epa.gov/ttn/atw/boiler/boilerpg.html.

a. Compliance Dates, Notifications, and Work Practice Requirements

i. Initial Notification of Compliance

An Initial Notification submittal to EPA is due no later than January 20, 2014 for existing sources (Boilers #1, #2, #4, #5, #6 and #7) or within 120 days after the source becomes subject to the standard for new source Boiler #3. [40 CFR Part 63.11225(a)(2)]

ii. Boiler Tune-Up Program

(a) MSAD #54 shall implement a boiler tune-up program which includes the initial tune-up of Boilers #1, #2, #4, #5, #6 and #7 no later than March 21, 2014. [40 CFR Part 63.11196(a)(1)]

(b) The facility shall implement a boiler tune-up program for Boiler #3 upon startup of the unit. MSAD #54 is not required to complete an initial performance tune-up on Boiler #3 due to the unit being classified as new. [40 CFR Part 63.11210(f))]

(c) The boiler tune-up program, conducted to demonstrate continuous compliance, shall be performed as specified below:

1. As applicable, inspect the burner, and clean or replace any component of the burner as necessary. Delay of the burner inspection until the next scheduled shutdown is permitted; not to exceed 36 months from the previous inspection for boilers greater than 5 MMBtu/hr (Boilers #1 - #3) or 72 months from the previous inspection for oil fired boilers less than 5 MMBtu/hr (Boilers #4 - #7). [40 CFR Part 63.11223(b)(1)]

2. Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern, consistent with the manufacturer's specifications. [40 CFR Part 63.11223(b)(2)]

3. Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure it is correctly calibrated and functioning properly. Delay of the inspection until the next scheduled shutdown is permitted; not to exceed 36 months from the previous inspection for boilers greater than 5 MMBtu/hr (Boilers #1 - #3) or 72 months from the previous inspection for oil fired boilers less than 5 MMBtu/hr (Boilers #4 - #7). [40 CFR Part 63.11223(b)(3)]

4. Optimize total emissions of CO, consistent with manufacturer's specifications. [40 CFR Part 63.11223(b)(4)]

5. Measure the concentration in the effluent stream of CO in parts per million by volume (ppmv), and oxygen in volume percent, before and after adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable CO analyzer. [40 CFR Part 63.11223(b)(5)]

6. If a unit is not operating on the required date for a tune-up, the tune-up must be conducted within 30 days of start-up. [40 CFR Part 63.11223(b)(7)]

(d) After conducting the initial boiler tune-up, a Notification of Compliance Status shall be submitted to EPA no later than July 19, 2014. [40 CFR Part 63.11225(a)(4) and 40 CFR Part 63.11214(b)]

(e) The facility shall implement a boiler tune-up program after the initial tune-up, if applicable, and initial compliance report (called a Notification of Compliance Status) has been submitted.

1. Each tune-up shall be conducted at a frequency specified by the rule and based on the size, age, and operations of the boiler. See chart below:

Boiler Category	Tune-Up Frequency
New Biomass fired boiler (Boiler #3)	Every 2 years
Existing Oil fired boilers with a heat input capacity of > 5MMBtu/hr (Boilers #1 and #2)	Every 2 years
Existing Oil fired boilers with a heat input capacity of ≤ 5MMBtu/hr (Boilers #4 - #7)	Every 5 years

[40 CFR Part 63.11223(a) and Table 2]

2. The tune-up compliance report shall be maintained onsite and, if requested, submitted to EPA. The report shall contain the concentration of CO in the effluent stream (ppmv) and oxygen in volume percent, measured at high fire or typical operating load, before and after the boiler tune-up, a description of any corrective actions taken as part of the tune-up of the boiler, and the types and amounts of fuels used over the 12 months prior to the tune-up of the boiler. [40 CFR Part 63.11223(b)(6)]

   The compliance report shall also include the company name and address; a compliance statement signed by a responsible official certifying truth, accuracy, and completeness; and a description of any deviations and corrective actions. [40 CFR Part 63.11225(b)]

iii. Energy Assessment

Boilers #1 and #2 are existing oil-fired boilers over 10 MMBtu/hr and therefore are subject to the energy assessment requirements as follows:

(a) A one-time energy assessment shall be performed by a qualified energy assessor on the applicable boilers no later than March 21, 2014. [40 CFR Part 63.11196(a)(3)]

(b) The energy assessment shall include a visual inspection of the boiler system; an evaluation of operating characteristics of the affected boiler systems, specifications of energy use systems, operating and maintenance procedures, and unusual operating constraints; an inventory of major energy use systems consuming energy from

affected boiler(s) and which are under control of the boiler owner or operator; a review of available architectural and engineering plans, facility operation and maintenance procedures and logs, and fuel usage; a list of major energy conservation measures that are within the facility's control; a list of the energy savings potential of the energy conservation measures identified; and a comprehensive report detailing the ways to improve efficiency, the cost of specific improvements, benefits, and the time frame for recouping those investments.
[40 CFR Part 63, Table 2(4)]

(c) A Notification of Compliance Status shall be submitted to EPA no later than July 19, 2014. [40 CFR Part 63.11225(a)(4) and 40 CFR Part 63.11214(c)]

b. Recordkeeping

Records shall be maintained consistent with the requirements of 40 CFR Part 63 Subpart JJJJJJ including the following [40 CFR Part 63.11225(c)]: copies of notifications and reports with supporting compliance documentation; identification of each boiler, the date of tune-up, procedures followed for tune-up, and the manufacturer's specifications to which the boiler was tuned; documentation of fuel type(s) used monthly by each boiler; the occurrence and duration of each malfunction of the boiler; and actions taken during periods of malfunction to minimize emissions and actions taken to restore the malfunctioning boiler to its usual manner of operation. Records shall be in a form suitable and readily available for expeditious review.

Note: EPA will require submission of Notification of Compliance Status reports for tune-ups and energy assessments through their electronic reporting system. However, the system will not be in place until October 2013, so sources may submit the written NOCS to the EPA Administrator. [63.1125(a)(4)(vi)]

E. Fugitive Emissions

Visible emissions from a fugitive emission source (including stockpiles and roadways) shall not exceed an opacity of 20%, except for no more than five (5) minutes in any 1-hour period. Compliance shall be determined by an aggregate of the individual fifteen (15)-second opacity observations which exceed 20% in any one (1) hour.

F. General Process Emissions

Visible emissions from any general process source shall not exceed an opacity of 20% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 1-hour period.

G. Annual Emissions

1. Total Annual Emissions

MSAD #54 shall be restricted to the following annual emissions, based on a calendar year. The tons per year limits were calculated based on combined total of 500,000 gal/yr of No.2 fuel oil used in Boilers #1, #2, #4, #5, #6 and #7, and a maximum operation of 8,760 hr/yr for Boiler #3:

Total Licensed Annual Emissions for the Facility
Tons/year
(used to calculate the annual license fee)

	PM	PM_{10}	SO_2	NO_x	CO	VOC
Boilers #1, #2, #4, #5, #6, #7	4.20	4.20	17.63	5.00	1.25	0.09
Boiler #3	6.84	6.84	0.68	6.02	4.38	0.47
Total TPY	**11.0**	**11.0**	**18.3**	**11.0**	**5.6**	**0.6**

2. Greenhouse Gases

Greenhouse gases are considered regulated pollutants as of January 2, 2011, through 'Tailoring' revisions made to EPA's *Approval and Promulgation of Implementation Plans,* 40 CFR Part 52, Subpart A, §52.21 Prevention of Significant Deterioration of Air Quality rule. Greenhouse gases, as defined in 06-096 CMR 100 (as amended), are the aggregate group of the following gases: Carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. For licensing purposes, greenhouse gases (GHG) are calculated and reported as carbon dioxide equivalents (CO_2e).

Based on the facility's fuel use limit(s), the worst case emission factors from AP-42, IPCC (Intergovernmental Panel on Climate Change), and *Mandatory Greenhouse Gas Reporting*, 40 CFR Part 98, and the global warming potentials contained in 40 CFR Part 98, MSAD #54 is below the major source threshold of 100,000 tons of CO_2e per year. Therefore, no additional licensing requirements are needed to address GHG emissions at this time.

III. AMBIENT AIR QUALITY ANALYSIS

The level of ambient air quality impact modeling required for a minor source shall be determined by the Department on a case-by case basis. In accordance with 06-096 CMR 115, an ambient air quality impact analysis is not required for a minor source if

the total emissions of any pollutant released do not exceed the following levels and there are no extenuating circumstances:

Pollutant	Tons/Year
PM_{10}	25
SO_2	50
NO_x	50
CO	250

The total facility licensed emissions are below the emission levels contained in the table above and there are no extenuating circumstances; therefore, an ambient air quality impact analysis is not required as part of this license.

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, and
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-1080-71-A-N subject to the following conditions.

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.

STANDARD CONDITIONS

(1) Employees and authorized representatives of the Department shall be allowed access to the licensee's premises during business hours, or any time during which any emissions units are in operation, and at such other times as the Department deems necessary for the purpose of performing tests, collecting samples, conducting inspections, or examining and copying records relating to emissions (38 M.R.S.A. §347-C).

(2) The licensee shall acquire a new or amended air emission license prior to commencing construction of a modification, unless specifically provided for in Chapter 115. [06-096 CMR 115]

(3) Approval to construct shall become invalid if the source has not commenced construction within eighteen (18) months after receipt of such approval or if construction is discontinued for a period of eighteen (18) months or more. The Department may extend this time period upon a satisfactory showing that an extension is justified, but may condition such extension upon a review of either the control technology analysis or the ambient air quality standards analysis, or both. [06-096 CMR 115]

(4) The licensee shall establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction, or operation which may result in fugitive dust, and shall submit a description of the program to the Department upon request. [06-096 CMR 115]

(5) The licensee shall pay the annual air emission license fee to the Department, calculated pursuant to Title 38 M.R.S.A. §353-A. [06-096 CMR 115]

(6) The license does not convey any property rights of any sort, or any exclusive privilege. [06-096 CMR 115]

(7) The licensee shall maintain and operate all emission units and air pollution systems required by the air emission license in a manner consistent with good air pollution control practice for minimizing emissions. [06-096 CMR 115]

(8) The licensee shall maintain sufficient records to accurately document compliance with emission standards and license conditions and shall maintain such records for a minimum of six (6) years. The records shall be submitted to the Department upon written request. [06-096 CMR 115]

(9) The licensee shall comply with all terms and conditions of the air emission license. The filing of an appeal by the licensee, the notification of planned changes or anticipated noncompliance by the licensee, or the filing of an application by the licensee for a renewal of a license or amendment shall not stay any condition of the license. [06-096 CMR 115]

(10) The licensee may not use as a defense in an enforcement action that the disruption, cessation, or reduction of licensed operations would have been necessary in order to maintain compliance with the conditions of the air emission license. [06-096 CMR 115]

(11) In accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department, the licensee shall:

A. perform stack testing to demonstrate compliance with the applicable emission standards under circumstances representative of the facility's normal process and operating conditions:
   1. within sixty (60) calendar days of receipt of a notification to test from the Department or EPA, if visible emissions, equipment operating parameters, staff inspection, air monitoring or other cause indicate to the Department that equipment may be operating out of compliance with emission standards or license conditions; or
   2. pursuant to any other requirement of this license to perform stack testing.

B. install or make provisions to install test ports that meet the criteria of 40 CFR Part 60, Appendix A, and test platforms, if necessary, and other accommodations necessary to allow emission testing; and

C. submit a written report to the Department within thirty (30) days from date of test completion.

[06-096 CMR 115]

(12) If the results of a stack test performed under circumstances representative of the facility's normal process and operating conditions indicate emissions in excess of the applicable standards, then:

A. within thirty (30) days following receipt of such test results, the licensee shall re-test the non-complying emission source under circumstances representative of the facility's normal process and operating conditions and in accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department; and

B. the days of violation shall be presumed to include the date of stack test and each and every day of operation thereafter until compliance is demonstrated under normal and representative process and operating conditions, except to the extent that the facility can prove to the satisfaction of the Department that there were intervening days during which no violation occurred or that the violation was not continuing in nature; and

C. the licensee may, upon the approval of the Department following the successful demonstration of compliance at alternative load conditions, operate under such alternative load conditions on an interim basis prior to a demonstration of compliance under normal and representative process and operating conditions.

[06-096 CMR 115]

(13) Notwithstanding any other provisions in the State Implementation Plan approved by the EPA or Section 114(a) of the CAA, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any statute, regulation, or Part 70 license requirement. [06-096 CMR 115]

(14) The licensee shall maintain records of malfunctions, failures, downtime, and any other similar change in operation of air pollution control systems or the emissions unit itself that would affect emissions and that is not consistent with the terms and

conditions of the air emission license. The licensee shall notify the Department within two (2) days or the next state working day, whichever is later, of such occasions where such changes result in an increase of emissions. The licensee shall report all excess emissions in the units of the applicable emission limitation. [06-096 CMR 115]

(15) Upon written request from the Department, the licensee shall establish and maintain such records, make such reports, install, use and maintain such monitoring equipment, sample such emissions (in accordance with such methods, at such locations, at such intervals, and in such a manner as the Department shall prescribe), and provide other information as the Department may reasonably require to determine the licensee's compliance status. [06-096 CMR 115]

SPECIFIC CONDITIONS

(16) **Boilers #1, #2, #4, #5, #6 and #7**

A. Fuel

1. Total fuel use for Boilers #1, #2, #4, #5, #6 and #7 shall not exceed 500,000 gal/yr of No. 2 fuel oil, based on a calendar year. [06-096 CMR 115, BACT]
2. Prior to January 1, 2016 or the date specified in 38 MRSA §603-A(2)(A)(3), the No. 2 fuel oil fired in the boilers shall be ASTM D396 compliant (max. sulfur content of 0.5% by weight). [06-096 CMR 115, BACT]
3. Beginning January 1, 2016 or on the date specified in 38 MRSA §603-A(2)(A)(3), the facility shall fire No. 2 fuel oil with a maximum sulfur content limit of 0.005% by weight (50 ppm). [38 MRSA §603-A(2)(A)(3)]
4. Beginning January 1, 2018 or on the date specified in 38 MRSA §603-A(2)(A)(3), the facility shall fire No. 2 fuel oil with a maximum sulfur content limit of 0.0015% by weight (15 ppm). [38 MRSA §603-A(2)(A)(3)]
5. Compliance shall be demonstrated by fuel records from the supplier showing the quantity, type, and the percent sulfur of the fuel delivered. Records of annual fuel use shall be kept on a monthly and calendar year basis. [06-096 CMR 115, BACT]

B. Emissions shall not exceed the following:

Emission Unit	Pollutant	Standard	Origin and Authority
Boilers #1 & #2	PM	0.12 lb/MMBtu	06-096 CMR 103(2)(B)(1)(a)

C. Emissions shall not exceed the following [06-096 CMR 115, BACT]:

Emission Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Boiler #1	1.51	1.51	6.32	1.79	0.45	0.03
Boiler #2	1.51	1.51	6.32	1.79	0.45	0.03
Boiler #4	0.29	0.29	1.23	0.35	0.09	0.01
Boiler #5	0.29	0.29	1.23	0.35	0.09	0.01
Boiler #6	0.18	0.18	0.77	0.22	0.05	0.01
Boiler #7	0.18	0.18	0.77	0.22	0.05	0.01

D. Visible emissions from each of the No. 2 fuel oil fired boiler stacks (Stacks #1, #3, #4 and #5) shall not exceed 20% opacity on a six (6) minute block average, except for no more than one (1) six (6) minute block averages in a continuous 3-hour period. [06-096 CMR 101]

(17) **Boiler #3**

A. Fuel
1. Boiler #3 shall be limited to 3,285 tons/year of wood pellets at 8% moisture content with a heat content of 8,335 Btu/lb (or equivalent), on a calendar year basis. [06-096 CMR 115, BACT]
2. Compliance may be based on either delivery records, including receipts of wood pellet deliveries and a tally of deliveries each month to represent the fuel consumed for the month, or actual fuel metering data. Records of annual fuel use shall be kept on a monthly and calendar year basis. [06-096 CMR 115, BACT]

B. Emissions shall not exceed the following:

Emission Unit	Pollutant	lb/MMBtu	Origin and Authority
Boiler #3	PM	0.25	06-096 CMR 115, BACT

C. Emissions shall not exceed the following [06-096 CMR 115, BACT]:

Emission Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Boiler #3	1.56	1.56	0.16	1.38	1.00	0.11

D. Visible emissions from Boiler #3 firing wood pellets shall not exceed 20% opacity on a 6-minute block average, except for no more than two (2) six (6) minute block average in a 3-hour period. [06-096 CMR 115, BACT]

E. Ash from Boiler #3 shall be disposed of in accordance with the Bureau of Remediation and Waste Management (BRWM). Ash shall be sufficiently conditioned with water or transported in covered containers so as to prevent fugitive emissions. [06-096 CMR 115, BACT]

(18) **Fugitive Emissions**
Visible emissions from a fugitive emission source (including stockpiles and roadways) shall not exceed an opacity of 20%, except for no more than five (5) minutes in any 1-hour period. Compliance shall be determined by an aggregate of the individual fifteen (15)-second opacity observations which exceed 20% in any one (1) hour. [06-096 CMR 101]

(19) **General Process Sources**
Visible emissions from any general process source shall not exceed an opacity of 20% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 1-hour period. [06-096 CMR 101]

(20) MSAD #54 shall notify the Department within 48 hours and submit a report to the Department on a quarterly basis if a malfunction or breakdown in any component causes a violation of any emission standard (38 M.R.S.A. §605).

DONE AND DATED IN AUGUSTA, MAINE THIS 10 DAY OF June , 2013.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

The term of this license shall be ten (10) years from the signature date above.

[Note: If a complete renewal application, as determined by the Department, is submitted prior to expiration of this license, then pursuant to Title 5 MRSA §10002, all terms and conditions of the license shall remain in effect until the Department takes final action on the renewal of the license.]

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 3/8/2013
Date of application acceptance: 3/20/2013

Date filed with the Board of Environmental Protection:

This Order prepared by Allison M. Hazard, Bureau of Air Quality.

Filed
JUN 11 2013
State of Maine
Board of Environmental Protection