STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Verso Bucksport, LLC
Hancock County
Bucksport, Maine
A-22-77-4-A

Departmental
Findings of Fact and Order
New Source Review
Amendment #3

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., Section 344 and Section 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

FACILITY	Verso Bucksport LLC (Verso Bucksport)
PART 70 LICENSE NUMBER	A-22-70-A-I
LICENSE TYPE	Chapter 115 Major Modification
NAICS CODES	322121 (pulp mill producing paper)
NATURE OF BUSINESS	Groundwood and thermomechanical pulp, papermaking
FACILITY LOCATION	Main Street, Bucksport, Maine
PART 70 LICENSE ISSUANCE DATE	December 30, 2004
NSR AMENDMENT ISSUANCE DATE	November 29, 2010

B. Amendment Description

Verso Bucksport has submitted a major modification to modify the biomass feed rate in Boiler 8 to allow for the use of additional biomass fuel (from 26 tons/hr to approximately 80 tons/hr) in order to produce additional energy with a new 25 MW turbine. Both coal and tire derived fuel will be removed as licensed fuels, and fuel oil will be limited to 1.5 million gallons per year.

This amendment includes PM, SO_2, NO_X, and CO Best Available Control Technology (BACT) findings, VOC Lowest Achievable Emission Rate (LAER) findings, VOC offsets, and an ambient air quality analysis.

C. Emission Equipment

The equipment addressed in this air emission license is the 814 MMBtu/hr multi-fuel Boiler 8. The proposed modifications are as follows:

	Current Boiler 8	Proposed Boiler 8
Capacity:	814 MMBtu/hr	- 814 MMBtu/hr
Fuels:	- biomass - #6 and #2 fuel oil, waste oil - natural gas - coal - tire derived fuel	- increase biomass feed rate - 1.5 million gallons annual fuel oil limit - natural gas - discontinuation of coal and tire derived fuel
Control Equipment:	- Multiple centrifugal cyclones - Electrostatic Precipitator (ESP) - low NO_X burners	- Multiple centrifugal cyclones - ESP - low NO_X burners - Selective Non-catalytic Reduction (SNCR)

D. Application Classification

The application for Verso Bucksport seeks to modify a Best Available Control Technology (BACT) analysis performed per New Source Review. The application does not violate any applicable federal or state requirements and does not reduce monitoring, reporting, testing or record keeping.

The modification of a major source is considered a major modification based on whether or not expected emissions increases exceed the "Significant Emission Increase Levels" as given in *Definitions Regulation*, 06-096 CMR 100 (as amended).

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

Pollutant	Past Actuals [a] (tons/yr) 2007	2008	Future License [b] (ton/year)	Net Change (ton/year)	Significance Level (ton/year)
PM	18.2	15.5	95.3	78	25
PM_{10}	18.2	15.5	95.3	78	15
SO_2	490.3	334.7	243.9	-169	40
NO_x	357.2	302.9	476.3	146	40
CO	224.1	190.7	952.7	745	100
VOC	70	59.6	158.8	94	40

[a] 2007 and 2008 numbers are calculated using actual fuel use; emission factors used for NO_X and CO are based on CEMS data, for CO and VOC are based on license limits; and for PM are based on stack test results.

[b] Proposed allowables (future license) are based on license limits and operational caps.

Note: The above numbers are for Boiler 8 only. None of the other equipment at the facility is affected by this amendment.

This amendment is determined to be a major modification for PM/PM_{10}, NO_X, CO, and VOC. The amendment has been processed under *Minor and Major Source Air Emission License Regulations* 06-096 CMR 115 (as amended) since the changes being made are not prohibited in the Part 70 air emission license. This amendment will need to be incorporated into the Part 70 air emission license no later than 12 months from commencement of the requested operation.

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

Process Description

The increase in biomass usage in Boiler 8 to approximately 80 tons/hour will require various combustion changes to the boiler, including upgrades to the overfire air system.

The increased biomass usage will necessitate a capacity upgrade of the existing biomass handling and storage system. The additions to the biomass handling and storage system will be: a new truck dumper with a live bottom bin and back rake; a new scalping screen and hog for biomass from the new truck dumper; and an additional biomass storage pile.

The new turbine generator will be a 25 MW condensing single casing turbine with a generator gear reducer. The generator (generator 5) will be cooled with a brushless excitation system. The condenser will utilize steam eductors for air removal and vertical turbine pumps will transfer condensate from the condenser hotwell to an existing condensate collection tank in the boiler building. Circulation water pumps will supply river water for cooling from the existing dump condenser cooling water line.

B. Boiler 8

Boiler 8 is an 814 MMBtu/hr boiler construction started in 1982 and operations began in 1984. The unit is licensed to fire fuel oil (including specification waste oil, off-specification waste oil, and #6 and #2 fuel oil), natural gas, tire derived fuel, bituminous coal, and biomass (including wood waste, wood chips, bark, paper mill sludge, waste papers, and fiber core ends). Boiler 8 is controlled by multiple centrifugal cyclones, an electrostatic precipitator (ESP), and low NO_X burners for oil and gas. Emissions exit through a 362 ft stack.

Verso Bucksport has requested to make upgrades to the boiler to be able to increase the biomass firing rate to approximately 80 tons/hr (from 26 tons/hr) in order to generate steam from renewable resources to drive a new approximately 25 MW turbine. The proposed emissions assume a peak heat input rate of 814 MMBtu/hr and a 725 MMBtu/hr average rating with an annual fuel oil limit of 1.5 million gallons. Coal and tire derived fuel will be discontinued once the changes to the boiler are in place.

New Source Performance Standards (NSPS) Requirements

Boiler 8 is subject to NSPS 40 CFR Part 60 Subpart A, *General Provisions* and Subpart D, *Standards of Performance For Fossil Fuel Fired Steam Generators For Which Construction Is Commenced After August 17, 1971.* After the proposed changes, Boiler 8 will continue to be subject to 40 CFR Part 60 Subpart D.

The boiler changes will not trigger additional requirements under NSPS 40 CFR Part 60 for new sources since the changes do not meet the definitions of a modification or a reconstruction. Under NSPS 40 CFR §60.14(a), modification is

results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of section 111 of the Act.." and 40 CFR §60.14(b) states "...Emission rate shall be expressed as kg/hr of any pollutant discharged into the atmosphere for which a standard is applicable." Emission rates in lb/MMBtu and lb/hr will either be reduced or remain the same as currently licensed as a result of the upgrades to Boiler 8, therefore the proposed changes do not qualify as a modification under NSPS. Under NSPS 40 CFR §60.15(b), reconstruction is defined as "... the replacement of components of an existing facility to such an extent that: (1) The fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable entirely new facility, and (2) It is technologically and economically feasible to meet the applicable standards set forth in Part 60/Part 63." 40 CFR §60.15(c) further defines 'fixed capital cost' as "the capital needed to provide all the appreciable components". Based on preliminary estimates and engineering by a third party, the cost of the Boiler 8 changes attributable to the boiler and the wood handling infrastructure, including the equipment, materials, labor, and engineering (excluding the turbine and condensers) is approximately $17,031,000 (40% of the $42,096,000 estimated project cost). The cost of a new 814 MMBtu/hr biomass boiler and corresponding material handing system is approximately $73,000,000 based on EPA's September 2007 CHP Biomass Catalog, Chapter 5 scaled to a 814 MMBtu/hr boiler. The proposed Boiler 8 modifications are 23% of the cost to construct a new facility, therefore the Boiler 8 upgrades do not meet the definition of reconstruction under NSPS.

National Emission Standards for Hazardous Air Pollutants (NESHAP) Requirements

The Boiler 8 upgrades will not trigger new source requirements under MACT (Maximum Achievable Control Technology), based on the definitions in 40 CFR §63.2 which are similar to the NSPS definitions. Boiler 8 may be subject to the proposed 40 CFR Part 63, Subpart DDDDD, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial and Institutional Boilers and Process Heaters once the regulation is promulgated.

Acid Rain Program

The Acid Rain Program (Title IV of the Clean Air Act of 1990) addresses reductions of SO_2 and NO_X emissions from electric generating utility units. 40 CFR §72.2 defines a utility unit as a fossil fuel fired combustion device owned or operated by a utility: "(1) That serves a generator in any State that produces electricity for sale, or (2) That during 1985, served a generator in any State that produced electricity for sale.....(4) Notwithstanding paragraphs (1) and (2) of this definition, a unit that cogenerates steam and electricity is not a utility unit for

purposes of the Acid Rain Program, unless the unit is constructed for the purpose of supplying, or commences construction after November 15, 1990 and supplies, more than one-third of its potential electrical output capacity and more than 25 MWe output to any power distribution system for sale." 40 CFR §72.6(b)(4)(i) clarifies further and states that this type of cogeneration unit is not considered an affected unit "...A cogeneration facility which: (i) For a unit that commenced construction on or prior to November 15, 1990, was constructed for the purpose of supplying equal to or less than one-third its potential electrical output capacity or equal to or less than 219,000 MWe-hrs actual electric output on an annual basis to any utility power distribution system for sale (on a gross basis)..." For Boiler 8, historically Generator 3 has never exceeded 219,000 MW-hrs of annual output for sale (this is the only unit supplied by Boiler 8 which sells to the grid). Future power generation projections anticipate that Generator 3 in combination with the proposed Generator 5 will not exceed the 219,000 MW-hrs or 1/3 capacity for electrical sales threshold. Therefore, Boiler 8 meets the exemption criteria for the Acid Rain Program.

Best Available Control Technology (BACT)

Verso Bucksport submitted a BACT analysis as part of the license application. EPA's RACT/BACT/LAER Clearinghouse was reviewed for requirements on similar units. Verso Bucksport also included a review of 12 recent Maine air emission licenses for biomass boilers. This information, along with economic impact, technical feasibility, and environmental impact, was used to determine the available control technologies and corresponding levels of control for the boiler.

The summary of the BACT analysis for Boiler 8 is the following:

$PM/PM_{10}/PM_{2.5}$ - Options for controlling particulate matter from biomass boilers include mechanical collectors, wet scrubbers, electrostatic precipitators (ESPs), fabric filters, and good combustion control. The most effective PM control equipment being successfully applied to biomass boilers are ESPs (90-99% removal). The other types of control equipment have lower removal rates.

PM limits for biomass boilers recently licensed in Maine ranged from 0.02 lb/MMBtu to 0.036 lb/MMBtu with varying averaging times. PM limits for biomass boilers in EPA's BACT/RACT/LAER Clearinghouse ranged from 0.012 lb/MMBtu (LAER and not yet built) to 0.14 lb/MMBtu with varying averaging times.

Verso Bucksport shall continue to use an ESP on Boiler 8 and meet a BACT emission limit for PM/PM_{10} of 0.03 lb/MMBtu (24.4 lb/hr).

This limit is more stringent than the PM/PM_{10} NSPS 40 CFR Part 60, Subpart D standard of 0.1 lb/MMBtu and the 0.06 lb/MMBtu standard in *Fuel Burning Equipment Particulate Emission Standard*, 06-096 CMR 103 (as amended). Boiler 8 is currently licensed at a PM limit of 0.06 lb/MMBtu.

Verso Bucksport shall perform two $PM_{2.5}$ stack tests within a 16 month period after the start of operation of the upgraded boiler. The stack tests shall be performed in accordance with the appropriate EPA method or other method as approved by EPA and the Department. Verso Bucksport shall submit an amendment application to the Department which shall include a proposed $PM_{2.5}$ limit for the boiler within 6 months of the last test date.

SO_2 – The options for controlling sulfur dioxide from boilers include wet scrubbers, spray dryer absorbers, sulfur-absorbing bed compounds such as limestone or dolomite, dry sorbent injection followed by either a fabric filter or ESP, and low sulfur fuels with good combustion controls. This boiler will not be firing high sulfur fuels such as coal and tire derived fuel. Due to the small quantity of SO_2 emissions from biomass, the fuel oil limit, and the extensive cost of controls, post combustion controls were not justified as BACT.

Verso Bucksport shall meet the currently licensed BACT SO_2 limit of 0.8 lb/MMBtu (651.2 lb/hr).

NO_X - Combustion control options for controlling nitrogen oxides from biomass boilers include overfire air ports, low excess air firing, water injection into the furnace, and Ecotube technology. Post–combustion control options include selective catalytic reduction (SCR), regenerative selective catalytic reduction (R-SCR), and selective non-catalytic reduction (SNCR). All three post combustion control technologies consist of urea (or ammonia) injection into the flue gas to selectively reduce NO_X to nitrogen and water.

SCR, which uses ammonia as a reducing agent and a catalyst placed in the flue gas stream at a specific temperature, was determined to be technically feasible for this boiler. SCR systems are normally placed prior to other air pollution control equipment, however the use of wood as a fuel creates fine particulate matter that would likely plug an SCR catalyst and reduce the effectiveness of the SCR system. Also, ammonia salts would likely be formed from the reaction of acid gases and residual ammonia, adding to the plugging of the catalyst. These problems would require frequent catalyst replacement which results in high operating costs. Based on the operating temperature requirements for SCR (600°F) and the high

particulate loading of a biomass boiler, a post particulate control reheat system would be required and therefore R-SCR was further analyzed as a BACT option, rather than the traditional SCR system.

R-SCR, which is a combination of standard SCR technology and the regenerative heat recovery technology utilized with Regenerative Thermal Oxidizers (RTOs), was considered technically feasible for this boiler. An R-SCR system would be located downstream of the ESP to minimize particulate binding. However, with cooler stack temperatures at this location, additional heat must be added for optimum catalytic performance. An R-SCR system also requires considerable space to allow the ammonia reagent to mix with the flue gas prior to contacting the catalyst to ensure NO_X removal efficiency.

R-SCR was rejected as BACT due to high operating costs, including high additional heat requirements, efficiency losses from excessive back pressure, chemical usage, and catalyst replacement. R-SCR (estimated as being equivalent cost to SCR) was estimated having a direct annual cost of $1,501,482 and indirect annual cost of $2,868,563 (total annual cost of $4,370,046), and a cost effectiveness value of $7478 per ton of NO_X removed. The cost effectiveness was based on a control efficiency of 70%.

SNCR uses injection of ammonia or urea into the flue gas downstream of the combustion zone. The high temperature of the injection zone supports high chemical reaction so that a catalyst is not required. The cost effectiveness of an SNCR system was estimated to be $2468 per ton of NO_X removed, based on a control efficiency of 50% (removing 344 tons of NO_X). Although there are environmental impacts (unreacted ammonia emissions known as ammonia slip) and energy impacts (additional electric power used and fuel combusted), SNCR was considered a viable BACT option.

Wood biomass boilers in the Northeast have been issued permits with the limits in the range of 0.065 to 0.0752 lb/MMBtu (with various averaging times and justifications) using Selective Catalytic Reduction (SCR), Selective Non-Catalytic Reduction (SNCR), or modified configurations of these controls. These limits were included in Verso's BACT analysis and were found to be neither technically nor economically feasible for Boiler 8 as described above. The permits incorporating modified SCR/SNCR technologies fell into one or more of the following three categories which do not apply to Boiler 8: (1) subject to LAER; (2) electing to install the technology to meet a given State's Renewable Portfolio Standard (RPS);

and /or (3) have not yet been constructed and have not proven simultaneous compliance with current NO_X, CO, and NH_3 BACT limits.

Boiler 8 differs from the facilities that have been permitted with modified SCR/SNCR for the following reasons:

- it is not subject to LAER;
- it is a retrofit of an existing boiler;
- it will be fitted with a multi-level fuel feed system including biomass suspension firing with is substantively unique;
- it serves a manufacturing plant and therefore swings based on changing demand, unlike a base-loaded electric utility operation which is more steady state;
- it is a multifuel boiler licensed to burn a broad range of sludge and woody biomass with variable moisture contents and fossil fuels;
- it must simultaneously meet restrictive NO_X, CO, and NH_3 standards; and
- the lb/MMBtu limit includes startup and shutdown conditions.

NO_X limits for biomass boilers recently licensed in Maine ranged from 0.0752 lb/MMBtu to 0.3 lb/MMBtu with varying averaging times, control devices, and reasons for the limits.

Verso Bucksport proposed SNCR on Boiler 8. The Department determined the NO_X BACT emission limits to be 244.2 lb/hr (calculated using 0.3 lb/MMBtu) on an hourly basis and 0.15 lb/MMBtu on a 30 day rolling average for all fuels.

This is more stringent than the current license limit which has separate emission rates for the various fuels based on 40 CFR Part 60, Subpart D (0.2 lb/MMBtu on a 3-hr rolling average for gaseous fuels, 0.3 lb/MMBtu on a 3-hr rolling average for oil or a combination of natural gas, TDF, oil, or biomass, and 0.45 lb/MMBtu on a 24-hr block average for coal or a combination of coal, TDF, and biomass).

CO - The options for controlling carbon monoxide from a biomass boiler include an oxidation catalyst, thermal oxidation, and good combustion control. CO emissions result from incomplete combustion.

An oxidation catalyst lowers the activation energy necessary for CO to react with available oxygen in the boiler exhaust to produce CO_2. An oxidation catalyst is more typically applied to boilers without a high particulate matter emission rate since the catalyst should be placed before the PM control device to take advantage of the optimum temperature for catalyst activation. For a biomass boiler, the oxidation catalyst would

need to be placed after a PM control device which would mean reheating the flue gas. An oxidation catalyst was estimated having a direct annual cost of $742,790, indirect annual cost of $2,249,104, total annual cost of $2,99,895, and a cost effectiveness value of $6,281 per ton of CO removed (removing 476 tons of CO). The cost effectiveness was based on a control efficiency of 50%. Based on the economics, the energy impacts of firing additional fuel to support the reheat burners, and the environmental impacts of additional emissions, an oxidation catalyst was not proposed as BACT.

Thermal oxidation reduces CO emissions by using high temperature post combustion. The application of additional thermal oxidation for Boiler 8 would require additional fuel usage and would result in additional secondary emissions. This type of additional control is usually not found on biomass boilers, and is essentially occurring in Boiler 8 already. Thermal oxidation was not considered further as a viable BACT option.

Good combustion practices include optimizing combustion conditions such as residence time, temperature, and mixing to reduce CO emissions.

CO limits for biomass boilers recently licensed in Maine ranged from 0.08 lb/MMBtu to 1.5 lb/MMBtu with varying averaging times. CO limits for biomass boilers in EPA's BACT/RACT/LAER Clearinghouse ranged from 0.1 lb/MMBtu to 0.78 lb/MMBtu with varying averaging times.

Verso Bucksport proposed to use good combustion practices to minimize CO emissions. The Department determined the CO BACT emission limits to be 435 lb/hr on a 24 hour block average basis (based on 0.6 lb/MMBtu and 725 MMBtu/hr) and 0.30 lb/MMBtu on a 30 day rolling average.

This is an increase over the current license limit which is 0.16 lb/MMBtu.

Ammonia – Unreacted ammonia (ammonia slip) from the SNCR system shall be limited to a BACT emission rate of 40 ppm from startup of the upgraded boiler until 24 months later when the limit shall be 20 ppm.

Opacity – Visible emissions from Boiler 8 shall not exceed 20% opacity on a six (6) minute block average basis, except one (1) six (6) minute block average in a 1-hour block period of not more than 27% opacity.

To minimize opacity as an indicator of particulate matter emissions, Verso Bucksport shall use an indicator set point of 10% opacity. Specifically, when an opacity reading of greater than 10% for ten consecutive six-minute block average periods is reached, Verso Bucksport will check the

particulate control parameters of the multiple centrifugal cyclones and the ESP. An opacity reading of greater than 10% for ten consecutive six-minute block average periods will be considered an excursion that shall be reported in the quarterly report, along with corrective action. This shall not apply during startup, shutdown, and malfunction. Excursion shall have the definition as stated in 40 CFR §64.1 (an excursion is not necessarily an exceedance). The Department may amend or remove this requirement upon written justification from the facility.

Lowest Achievable Emission Rate (LAER)

Verso Bucksport is subject to LAER for VOCs. Per the definition in 06-096 CMR 100, LAER is the more stringent rate of emissions based on (1) the most stringent emission limitation contained in the implementation plan of any State for that class or category of source, unless the owner or operator of the proposed source demonstrates that those limitations are not achievable; or (2) the most stringent emission limitation which is achieved in practice by that class or category of source, whichever is more stringent.

VOC - The options for controlling volatile organic compounds from industrial process where VOCs are emitted through evaporation of solvents include incineration, catalytic oxidation, adsorption, and condensation. However, no add-on pollution control technologies are typically used to control VOC from boilers since boiler combustion chambers act as incineration units to combust the majority of VOCs. Because of the low quantity and concentration of VOC in the flue gas, add-on control technologies are not considered technically feasible for the biomass boiler.

Verso Bucksport proposed to use good combustion practices to minimize VOC emissions. The LAER emission limit for VOC from Boiler 8 is determined to be the existing 0.05 lb/MMBtu limit (40.7 lb/hr).

Verso Bucksport will obtain offsets for the VOC emissions as set forth in section II(C) below.

Control Equipment

Emissions from Boiler 8 will be controlled with multiple centrifugal cyclones, an ESP, low NO_X burners for oil and gas, an SNCR system, and good combustion control.

Periodic Monitoring

Periodic monitoring for boiler 8 shall consist of maintaining fuel use records, fuel oil sulfur percent by weight, a log of ESP secondary T/R voltage and current

readings, stack testing for particulate matter every two years , and inspection and maintenance of pollution control equipment (including following a multiclone maintenance plan). Note that the periodic monitoring in this license relating to the ESP for Boiler 8 may be superceded by the monitoring requirements of 40 CFR Part 63, Subpart DDDDD once promulgated.

CEMS and COMS

Continuous emission monitors (CEMs) shall be required for NO_X, SO_2, CO, CO_2 or O_2, and a continuous opacity monitor (COM) shall be required for opacity. The CEMs and COM shall be operated in accordance with Verso Bucksport's monitoring plan, incorporating 40 CFR §60.45 and *Source Surveillance*, 06-096 CMR 117 (as amended).

C. VOC Offsets

Verso Bucksport must obtain offsets for the proposed VOC increase of 94 tons/year. Per *Growth Offset Regulation*, 06-096 CMR 113 (last amended April 18, 1999), major sources located within the geographical bounds of an area which is designated as nonattainment under the former one-hour federal ozone standard or under the eight-hour federal ozone standard, whichever is in effect, or in the Ozone Transport Region must obtain offset credits. This includes sources proposing a modification that would result in a significant emissions increase of the nonattainment pollutant after the application of LAER. The offset credit must be permanent, enforceable, surplus, real and a quantifiable reduction.

For the proposed Boiler 8 upgrade, Verso Bucksport must obtain reduction credits for VOC, but not NO_X. The facility is located within the Section 182(f) 'NO_X waiver' area and is therefore exempt from obtaining offsets for NO_X emissions.

Since Verso Bucksport is in the NO_X waiver area, NO_X credits may be used to offset VOC emissions to the extent allowed under the Clean Air Act. The same number of offset credits must be obtained whether NO_X of VOC credits are used. All trades involving VOC offset credits or an increase in VOC emissions requiring offsets must be presented to the Board of Environmental Protection prior to Department approval and the offset credit reductions must be federally enforceable by the time the air emission license for the user is issued.

Verso Bucksport has proposed to permanently shutdown Boiler 7 (226 MMBtu/hr, oil fired) to obtain the offsets for the Boiler 8 project. Using the established VOC offset ratio of 1.15 to 1, Verso Bucksport must obtain 108.1 tons to offset the 94 ton VOC increase. Offset credits may be generated based on actual emission reductions for any consecutive 24-month period after May 31, 1994. Boiler 7 NO_X credits were calculated based on 1997 and 1998 fuel oil data.

An average of 8,366,000 gallons of #6 fuel was used (8,541,000 gallons in 1997 and 8,191,000 gallons in 1998). Actual NO_X emissions were calculated to be 170.5 ton/year (using historic NO_X CEM data of 0.27 lb/MMBtu). 06-096 CMR 113, section 5(D) requires an adjustment to the base credit by applying a compliance assurance multiplier reflecting the method of measurement. Use of CEM data has a 0.95 compliance assurance multiplier; therefore, the NO_X offset credit available from Boiler 7 is 162 tons/year. 06-096 CMR 113, section 4(K) allows the use of offset credits from shutdowns provided that the source using the offset credits demonstrates to MEDEP that the use of these offset credits will result in a net air quality benefit in Maine, as compared with emissions prior to the shutdown. The NO_X reductions from permanently shutting down Boiler 7 have not been previously accounted for or used in netting calculations. The Department certifies that the emissions from the permanent shutdown of Boiler 7 can be used to offset the upgraded Boiler 8 VOC emissions.

D. 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 2(J)(2)(d), 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.

III. AMBIENT AIR QUALITY ANALYSIS

A. Overview

A refined modeling analysis was performed to show that emissions from Verso Bucksport, in conjunction with other sources, will not cause or contribute to violations of Maine and National Ambient Air Quality Standards (MAAQS/NAAQS) for PM_{10}, NO_2 or CO. Since SO_2 impacts were adequately addressed as part of a previous modeling analysis and because no emissions increase in SO_2 will occur, no MAAQS and NAAQS SO_2 analyses were required.

It has been determined that Verso Bucksport does not consume SO_2, PM_{10} or NO_2 increment, therefore, no Class I or Class II increment analyses were required.

Based upon the distance from Verso Bucksport to the nearest Class I area (38 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 five-year hourly on-site meteorological database was used in the AERMOD-PRIME refined modeling analysis. Five years of wind and temperature data were collected at heights of 15 and 100 meters at the Verso Bucksport monitoring site from 1988-1992. When possible, surface data collected at the Bangor NWS site were substituted for missing on-site data. All other missing data were interpolated or coded as missing, per USEPA guidance. In addition, hourly Bangor NWS data, from the same time period, were also used to supplement the primary surface dataset for the required variables that were not explicitly collected at the Verso monitoring site.

The surface meteorological data was combined with concurrent hourly cloud cover and upper-air data obtained from the Portland 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 using AERSURFACE from procedures recommended by USEPA.

Point-source parameters used in the modeling 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						
Verso Bucksport						
• Stack 1 (Boilers 5, 6, 7)	3.96	81.99	116.96	2.60	515.471	4935.628
• Stack 2 (Boiler 8)	3.96	110.33	116.96	3.20	515.587	4935.680
• Turbine Stack	3.96	76.20	116.96	5.79	515.644	4935.694

Emission parameters for NAAQS, MAAQS and increment modeling are listed in Table III-2. The emission parameters for Verso Bucksport are based on the

maximum license allowed (worst-case) operating configuration. For the purposes of determining PM_{10}, all PM emissions were conservatively assumed to convert to PM_{10}. For the purposes of determining NO_2 impacts, the Plume Volume Molar Ratio Method (PVMRM) was applied. The PVMRM is the third-tier screening approach which limits the conversion of NO to NO_2 based on the amount of monitored ozone available. Representative ozone data, concurrent with the 1988-1992 meteorological database, was used in the analysis.

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							
Verso Bucksport							
• Stack 1 (Boilers 5, 6, 7)	All	nm	7.80	42.80	3.64	433.00	24.20
• Stack 2 (Boiler 8)	All	nm	3.08	30.77	61.54	439.00	13.60
• Turbine Stack	All	nm	2.14	35.15	15.49	469.26	17.00

C. Single Source Modeling Impacts

AERMOD-PRIME refined modeling, using five years of sequential meteorological data, was performed for a total of nine operating scenarios that represented maximum, typical and minimum operations.

The modeling results for Verso Bucksport alone are shown in Tables III-3. Maximum predicted impacts that exceed their respective significance level are indicated in boldface type. No further modeling was required for pollutants that did not exceed their respective significance levels.

TABLE III-3: Maximum AERMOD-PRIME Impacts from Verso Bucksport 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 ($\mu g/m^3$)
PM_{10}	24-hour	**7.10**	513.980	4933.020	160.05	**5**
	Annual	0.38	514.430	4934.220	154.80	**1**
NO_2	1-hour	**645.53**[1]	-	-	-	**10**[2]
	Annual	**2.48**	514.430	4934.220	154.80	**1**
CO	1-hour	419.70	513.980	4934.120	165.19	**2000**
	8-hour	80.73	513.980	4932.820	170.81	**500**

[1] PVMRM not applied for determining significance impacts. Value based on the average of H1H (high-1st-high) concentrations for each of the five years of meteorological data, regardless of receptor location, per NESCAUM guidance.

[2] Interim Significant Impact Level (SIL) adopted by NESCAUM states

D. Combined Source Modeling Impacts

For predicted modeled impacts from Verso Bucksport 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, listed in Table III-4, are derived from representative rural background data for use in the Eastern Maine region.

TABLE III-4 : Background Concentrations

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)
PM_{10}	24-hour	42[1]
NO_2	1-hour	47[2]
	Annual	2[3]

[1] Background site - Baileyville
[2] MicMac Site - Presque Isle
[3] Cadillac Mountain Site - Acadia National Park

MEDEP examined other area sources whose impacts would be significant in or near Verso Bucksport's significant impact area. Due to the Verso Bucksport's location, extent of the significant impact area and nearby source's emissions, MEDEP has determined that no other sources would be considered for combined source modeling.

For pollutant averaging periods that exceeded significance levels, the maximum modeled impacts for all sources were added with conservative rural background concentrations to demonstrate compliance with MAAQS and NAAQS, as shown in Table III-5. Because impacts for all pollutants using this method meet MAAQS and NAAQS, no further modeling analyses need to be performed.

TABLE III-5 : Maximum AERMOD-PRIME Combined Source 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/ NAAQS ($\mu g/m^3$)
PM_{10}	24-hour	**7.10**	513.980	4933.020	160.05	**42**	**49.10**	**150**
NO_2	1-hour	**94.45**[1]	514.380	4934.270	156.12	**47**	**141.45**	**188**
	Annual	**2.48**	514.430	4934.220	154.80	**2**	**4.48**	**100**

[1] PVMRM applied for determining final maximum predicated impact.

While $PM_{2.5}$ modeling was not explicitly addressed as part of the AERMOD modeling analysis, USEPA determined that Verso Bucksport should demonstrate that they will not cause or contribute to violations of $PM_{2.5}$ NAAQS. Results from the PM_{10} modeling demonstrate that the 24-hour and annual predicted impacts were 7.10 and 0.38 $\mu g/m^3$, respectively. Based upon the very conservative assumption that all PM_{10} emissions are converted to $PM_{2.5}$, these results, when coupled with representative background values of 17 $\mu g/m^3$ and 4.1 $\mu g/m^3$ (24-hour and annual background values, respectively), indicate that Verso Bucksport will not only meet 24-hour and annual PM_{10} NAAQS, but will also meet 24-hour and annual $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$and 15 $\mu g/m^3$.

E. Increment

It has been determined by that Verso Bucksport does not consume SO_2, PM_{10} or NO_2 increment, therefore, Class II SO_2, PM_{10}, and NO_2 increment analyses were not performed.

F. Class I Impacts

Based upon the distance from Verso Bucksport to the nearest Class I area (38 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 Verso Bucksport in its proposed configuration will not cause or contribute to a violation of any MAAQS or NAAQS for SO_2, PM_{10}, NO_2 or CO; or any SO_2, PM_{10} or NO_2 Class I or II increment standard.

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-22-77-4-A pursuant to the preconstruction licensing requirements of 06-096 CMR 115 and subject to the standard and special conditions below.

Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

SPECIFIC CONDITIONS

(1) Boiler 8 Upgrades

Verso Bucksport may upgrade Boiler 8 to allow for increased biomass firing. [06-096 CMR 115, BACT]

(2) Boiler 8 Requirements

These conditions shall be effective once the Boiler 8 starts up after upgrades have been completed, unless otherwise noted.

A. Verso Bucksport is licensed to fire the following fuels in boiler 8 (814 MMBtu/hr): fuel oil (including fuel oil, off-specification waste oil, and specification waste oil), natural gas, and biomass (including wood waste, wood chips, bark, mill waste treatment sludge, paper roll core ends, and waste papers).

1. The fuel oil sulfur content shall not exceed 0.7% by weight, demonstrated through record keeping.
2. Verso Bucksport shall not exceed a fuel oil usage of 1.5 million gallons per year in Boiler 8, based on a 12 month rolling total. Compliance shall be demonstrated through recordkeeping on a monthly and 12 month rolling total.

[MEDEP Chapter 115, BACT]

B. Verso Bucksport shall control particulate matter emissions from Boiler 8 with the operation and maintenance of a multicyclone followed by an electrostatic precipitator (ESP). The ESP is not required to be operated when firing only natural gas in Boiler 8. [06-096 CMR 115, BACT]

C. Verso Bucksport shall control nitrogen oxide emissions from Boiler 8 with the operation and maintenance of an SNCR system. [MEDEP Chapter 115, BACT]

D. Emissions from Boiler 8 shall not exceed the following, with the lb/MMBtu limits effective 9 months after startup of the upgraded boiler (the existing limits shall apply until that time) and the lb/hr limits effective at startup of the upgraded boiler:

	lb/MMBtu	Origin and Authority
PM	0.03	MEDEP 06-096 CMR 115, BACT
SO_2	0.80 (3-hr rolling ave)	40 CFR §60.43
NO_X	0.15 (30 day rolling ave)	MEDEP 06-096 CMR 115, BACT
CO	0.30 (30 day rolling ave)	MEDEP 06-096 CMR 115, BACT

Pollutant	lb/hr	Origin and Authority
PM	24.4	MEDEP 06-096 CMR 115, BACT
PM_{10}	24.4	MEDEP 06-096 CMR 115, BACT
SO_2	651.2	MEDEP 06-096 CMR 115, BACT
NO_X	244.2	MEDEP 06-096 CMR 115, BACT
CO	435 (24-hr block ave)	MEDEP 06-096 CMR 115, BACT
VOC	40.7	MEDEP 06-096 CMR 115, BACT

E. Opacity

1. Verso Bucksport shall operate Boiler 8 such that visible emissions from the stack does not exceed 20% opacity on a six (6) minute block average basis, except one (1) six (6) minute block average in a 1-hour block period of not more than 27% opacity. [40 CFR § 60.42]
2. Verso Bucksport shall use an indicator set point of 10% opacity at which level an inspection of the particulate control parameters of the multiple centrifugal cyclones and EPS will be initiated when an opacity reading of greater than 10% for ten consecutive six-minute block average periods is reached. An opacity reading of greater than 10% for ten consecutive six-minute block average periods will be considered an excursion that shall be reported in the quarterly report, along with corrective action taken. This requirement shall not apply during startup, shutdowns, and malfunctions. [06-096 CMR 115]

F. Ammonia emissions shall not exceed 40 ppm from startup of the upgraded boiler until 24 months later when the limit shall be 20 ppm. Compliance with the ammonia limit shall be demonstrated by a stack test within 12 months of start of operation of the SNCR system, again within 24 months of the initial

test, and by request thereafter. The stack test shall be performed in accordance with the appropriate 40 CFR Part 60, Appendix A Method or other method as approved by EPA and the Department. [06-096 CMR 115, BACT]

G. Compliance with the opacity limit on the Boiler 8 stack shall be demonstrated by a continuous opacity monitoring system (COM) and the COM shall be maintained and operated in accordance with 06-096 CMR 117 and 40 CFR §60.45. [40 CFR §60.45 and 06-096 CMR 117]

H. Verso Bucksport shall perform stack tests every other year on Boiler 8 to determine compliance with the PM emission limits (lb/MMBtu and lb/hr). The first stack test shall occur within 12 months of the start of operation of the upgraded boiler. The stack tests shall be performed in accordance with 40 CFR Part 60, Appendix A, Method 1-5 or other method as approved by EPA and the Department. [MEDEP 06-096 CMR 115, BACT]

Verso Bucksport shall perform two $PM_{2.5}$ stack tests within a 16 month period after the start of operation of the upgraded boiler. The stack tests shall be performed in accordance with the appropriate EPA method or other method as approved by EPA and the Department. Verso Bucksport shall submit an amendment application to the Department which shall include a proposed $PM_{2.5}$ limit for the boiler within 6 months of the last test date. [MEDEP 06-096 CMR 115, BACT]

I. Compliance with the SO_2 lb/MMBtu emission limits for Boiler 8 shall be on a 3-hr rolling average, demonstrated by an SO_2 CEMS. [40 CFR Part 60.45]. Verso Bucksport shall maintain the SO_2 CEMS in accordance with 06-096 CMR 117, and 40 CFR Part 60, Section 60.45. [MEDEP 06-096 CMR 117 and 40 CFR §60.45]

J. Compliance with the NO_X lb/MMBtu emission limits for Boiler 8 shall be on a 30 day rolling average, demonstrated by a NO_X CEMS. Startup and shutdown shall be included in determining the 30 day rolling arithmetic average emission rates. [40 CFR §60.45]. Verso Buckport shall maintain the NO_X CEMS in accordance with 06-096 CMR 117 and 40 CFR §60.45. [MEDEP 06-096 CMR 117 and 40 CFR §60.45]

K. Compliance with the CO lb/MMBtu and lb/hr emission limits for Boiler 8 shall be on a 30 day rolling average and a 24-hr block average, respectively, demonstrated by a CO CEMS. Startup and shutdown shall be included in determining the 30 day rolling and 24-hr block arithmetic average emission rates. Verso Buckport shall maintain the CO CEMS in accordance with 06-096 CMR 117. [MEDEP 06-096 CMR 117]

L. Calculation Corrections

1. For no more than six (6) hours during start-up, Verso Bucksport may make the following calculation corrections for Boiler 8:
   a. Stack O_2 levels that exceed 14.0% may be replaced with a value of 14.0
   b. Stack CO_2 levels less than 5.0% may be replaced with a value of 5.0
   c. Hourly lb/MMBtu averages for SO_2, NO_X, and CO may be recalculated if the observed stack O_2 is greater than 14.0% and/or the observed stack CO_2 is less than 5.0% for no more than six (6) hours during start-up.
   d. The recalculated hourly lb/MMBtu averages may be used for compliance purposes.
2. While operating in warm standby mode firing natural gas without producing usable steam (boiler pressure is less than or equal to header pressure), Verso Bucksport may make the following calculation corrections for Boiler 8:
   a. Stack O_2 levels that exceed 14.0% may be replaced with a value of 14.0
   b. Hourly lb/MMBtu averages for SO_2 and NO_X may be recalculated if the observed stack O_2 is greater than 14.0% during warm standby mode firing natural gas without producing usable steam.
   c. The recalculated hourly lb/MMBtu averages may be used for compliance purposes.

   [06-096 CMR 115, BACT]

M. For Boiler 8, exceedances of the opacity limit during the first six hours following the initiation of start-up from cold start-up, warm standby where no usable steam is being produced (boiler pressure is less than or equal to header pressure), or planned shutdown shall be exempt by the Department, provided that operating records are available to demonstrate that the facility was being operated to minimize emissions and, in the case of warm standby, to demonstrate that no usable steam was being produced. The total exemptions shall not be greater than 10 exceedences, based on 6 minute averages. Any person claiming an exemption shall have the burden of proving that any excess emissions were not caused entirely, or in part, by poor maintenance, careless operation, poor design or any other reasonably preventable condition. [06-096 CMR 115, BACT]

N. Boiler 8 Periodic Monitoring

1. Verso Bucksport shall maintain monthly records of all fuels used in the boiler. The fuel oil use records shall include sulfur content, demonstrated by fuel analysis (es) from the supplier for each delivery. The waste oil use records may be on a monthly mill total basis and not a per boiler basis.

2. Verso Buckport shall keep records of the results of the analysis(es) of representative waste oil sample(s) and shall test representative samples annually or more frequently if changes occur in the process that may effect the composition of the waste oil collected. The results of the analyses shall be kept on-site.
3. Verso Bucksport shall maintain a log of the ESP secondary T/R voltage and current meter reading and record the voltage and current meter reading once per day. The periodic monitoring in this license relating to the boiler 8 ESP will be superceded by the continuous monitoring system requirements of 40 CFR Part 63, Subpart DDDDD once the regulation is promulgated.
4. Verso Bucksport shall maintain a log detailing all routine and non-routine maintenance on the ESP. Verso Bucksport shall keep a log documenting the date and nature of all ESP failures.
5. Verso Bucksport shall keep a log(s) and maintain the Boiler 8 multiclones according to the plan previously submitted to the Department.

[MEDEP Chapter 115, BACT]

O. Boiler 8 is subject to and shall comply with the applicable requirements of the Federal New Source Performance Standards 40 CFR Part 60, Subpart A (General Provisions) and Subpart D. [40 CFR Part 60, Subparts A and D]

P. Verso Bucksport shall meet any applicable standards of 40 CFR Part 63, Subpart DDDDD once the regulation is promulgated.

(3) **Offsets (Boiler 7)**

1. Verso Bucksport shall permanently disable Boiler 7. Boiler 7 will no longer be a licensed source (effective once Boiler 8 starts up after its upgrades have been completed).

2. The Department certifies that the shutdown of Boiler 7 generates offset credits of 162 tons of NO_X.

3. Verso Bucksport shall use 108.1 tons of the Boiler 7 offset credits for the 94 tons increase of VOC from the Boiler 8 upgrade (at the 1.15 to 1 ratio).

[06-096 CMR 113]

(4) **Part 70 License Amendment**

Verso Bucksport shall apply for a Part 70 license amendment within 12 months of commencing operation after the Boiler 8 upgrades occur as provided in 40 CFR Part 70.5. [06-096 CMR 140]

DONE AND DATED IN AUGUSTA, MAINE THIS 29th DAY OF November, 2010.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Beth Nagusky
BETH NAGUSKY, ACTING COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: July 26, 2010
Date of application acceptance: July 28, 2010

Date filed with the Board of Environmental Protection:

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