STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Verso Androscoggin LLC
Franklin County
Jay, Maine
A-203-77-9-A

Departmental
Findings of Fact and Order
New Source Review
Amendment #9

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

I. REGISTRATION

A. Introduction

FACILITY	Verso Androscoggin LLC
PART 70 LICENSE NUMBER	A-203-70-A-I
LICENSE TYPE	Chapter 115 (06-096 CMR 115) Minor Modification
NAICS CODES	322121
NATURE OF BUSINESS	Pulp and Paper Mill
FACILITY LOCATION	Jay, Maine
PART 70 LICENSE ISSUANCE DATE	January 12, 2005
NSR AMENDMENT ISSUANCE DATE	March 30, 2010
PART 70 LICENSE EXPIRATION DATE	January 12, 2010

B. Amendment Description

Verso Androscoggin LLC (Verso Androscoggin) of Jay, Maine submitted an application dated December 17, 2009 to convert the A Digester Chip Bin (A Chip Bin) from using only fresh steam to being able to use flash steam and clean condensate flash steam as alternatives to fresh steam, to install a new A-side Flash Tank, and to convert the B Digester Chip Bin (B Chip Bin) from using only fresh steam to being able to use clean condensate flash steam as an alternative to fresh steam.

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The primary purpose of the project is to conserve energy at the facility by reducing the use of 60 pound fresh steam by an amount representing approximately 18 MMBtu/hr. The project is made economically feasible, in part by a grant awarded by the U.S. Department of Energy.

On the A Digester System, the project includes installing new piping and controls to divert A Digester secondary flash steam and clean condensate flash steam from the A Digester's liquor heater to the A Chip Bin as an alternative to the 60 pound fresh steam currently used for pre-steaming the chips. The system to collect and treat the chip bin emissions will be modified to achieve control of the chip bin exhaust; because the A Digester's secondary flash steam will contain non-condensable gases (NCGs). New separators and scrubbers will remove fines and other particulate from the chip bin gas. The gas flow from the chip bin will be passed through a closed condenser/heat exchanger to lower the gas temperature to 90 degrees Fahrenheit, which will condense any water, turpentine, or methanol in the gas stream and will reduce the risk of fire or explosion. Foul condensate from the new condenser/heat exchanger will be piped to the Mill's Foul Condensate Collection Tank for treatment in the Waste Water Treatment Plant (WWTP).

Currently gas collected from the A Chip Bin is mixed with other dilute NCG streams as part of the mill's High Volume Low Concentration (HVLC) treatment system. Increasing the amount of NCGs in the HVLC system will likely exceed the capacity of the existing treatment device, the mill's Regenerative Thermal Oxidizer (RTO). As a result (and to meet the regulatory uptime requirements for LVHC systems), the A Chip Bin gas will be introduced into the flame zone in either of the mill's lime kilns. This also includes a new, dedicated piping system to convey the gas from the condenser/heat exchanger to the control device.

A new flash tank will be installed on the A Digester. By installing a new flash tank and reconfiguring the existing flash tanks into a parallel secondary arrangement, the new configuration will maximize flash steam and will reduce black liquor carryover. Emissions from the new flash tank will be collected and controlled in the mill's existing closed vent Low Volume High Concentration (LVHC) system.

On the B Digester System, the project includes installing new piping and controls to divert non-contact clean condensate flash steam from the B Digester's liquor heater to the B Chip Bin replacing a portion of the 60 pound fresh steam that is currently used for pre-steaming chips.

C. Emission Equipment

The following equipment is addressed in this air emission license:

Process Equipment

Equipment	Production Rate	Pollution Control Equipment
A Chip Bin	N/A	Condenser/White Liquor Scrubber/"A" & "B" Lime Kilns
A Flash Tank	N/A	"A" & "B" Lime Kilns
B Chip Bin	NA	Condenser/RTO/Wet Scrubber
LVHC Source Group	N/A	"A" & "B" Lime Kilns
HVLC Source Group	N/A	RTO/Wet Scrubber
Condensates Source Group	N/A	Wastewater Treatment Plant

[1] ADTUBP/day means air dried tons of unbleached pulp per day

D. Application Classification

Minor/Major Modification Determination

The modification of a major source is considered a major modification based on whether or not expected emissions increases exceed the "Significant Emission Increase Levels" as given in *Definitions Regulation*, 06-096 CMR 100 (last amended December 24, 2005).

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 this test are as follows:

Pollutant	Average Past Actual Emissions 2007/2008 (ton/year)	Potential Emissions (ton/year)	Net Change (ton/year)	Significance Level (ton/year)
VOC*	368	389	21	40
TRS	1.1	3.1	2	10

* VOC emission values include HAPs

Note: The above numbers are for the air emission units addressed in this license amendment, only. None of the other air emission units at the facility are affected by this amendment.

Therefore, this amendment is determined to be a minor modification under *Minor and Major Source Air Emission License Regulations* 06-096 CMR 115 (last amended December 24, 2005) since the changes being made are not addressed or prohibited in the Part 70 air emission license. This amendment will be incorporated into the Part 70 air emission license no later than 12 months from commencement of the requested operation.

New Source Performance Standards Applicability

The Environmental Protection Agency's (EPA's) New Source Performance Standards (NSPS) regulations set uniform emission limitations for industrial categories or sub-categories of sources. The A Digester flash steam and clean condensate flash steam and the B Digester clean condensate flash steam conversions could trigger NSPS requirements if the emissions units belong to a source category as defined in 40 CFR Part 60 and the project will involve a modification of the units. According to NSPS applicability criteria, the A Digester and B Digester Systems are potentially subject to NSPS subpart 40 CFR 60 Subpart BB – "*Standards of Performance for Kraft Pulp Mills*". The A and B Digester systems are not currently subject to NSPS because they were originally installed in 1965 and 1976, respectively, prior to the trigger date of September 24, 1976.

Under NSPS regulations, *modification* means "any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted."

The Subpart BB standard, which applies to digester systems, is a total reduced sulfur (TRS) emission rate. "Modification" applies to any physical or operational change to an existing digester system which results in an increase in the TRS emission rate to the atmosphere. Emission rate is expressed as lb/hr of TRS discharged into the atmosphere (See 40 CFR Section 60.14(b).) Under normal operating conditions, the NCGs from both the A and B Digester systems will continue to be collected and controlled, and there will be no increase in hourly mass emissions of TRS from the digester systems. However, during "low/empty" chip bin vents on the A Digester System, there is the potential for an increase in TRS emissions. Because flash steam will not be used in the B Digester Chip Bin and because clean condensate flash steam is equivalent to fresh steam, no change in hourly emissions will occur on the B Digester System. The capacity of the digesters will not increase as a result of implementing the proposed projects.

Therefore, the proposed projects represent a modification to the A Digester System, but do not represent a modification to the B Digester System for the purposes of NSPS applicability.

Because the A Digester Chip Bin project has the potential to result in an increase in the emission rate of TRS during "low/empty" chip bin vents, the A Digester System project triggers the applicability requirements of 40 CFR Subpart BB for digester systems. The A Digester System meets the Subpart BB standard for control of TRS emissions in that "The gases are …combusted in a lime kiln not subject to the provisions of this subpart, and are subjected to a minimum temperature of 650 °C (1200 °F) for at least 0.5 second" (see 40 CFR Section 60.283(a)(1)(iii)). There are no performance test requirements associated with combusting the LVHC NCGs in the lime kilns. Some Subpart BB notification, reporting and recordkeeping requirements apply, however, the notification requirements will be the only additional applicable requirements as the mill currently complies with the applicable reporting and recordkeeping requirements under 06-096 CMR 124 (*Total Reduced Sulfur Control from Kraft Pulp Mills*) and EPA's Maximum Achievable Control Technology (MACT) standards found in 40 CFR 63 Subpart S "*National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry*".

Under NSPS regulations, *reconstruction* means "the replacement of components of an affected or a previously non-affected source to such an extent that the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source."

The estimated cost of the proposed A Digester Chip Bin project is approximately $6.9 million dollars. The estimated cost of the proposed B Digester Chip Bin project is approximately $88,400 dollars. The cost of an entirely new digester system is estimated to be approximately within the range of $45 to 55 million dollars; thus, the proposed project costs are 15% and 0.2%, respectively of the cost of a new comparable digester system. Because the fixed capital cost of the digester reconstruction does not exceed 50% of the fixed capital cost that would be required to construct a comparable new system, this project does not meet the definition of "reconstruction" as defined in the 40 CFR § 60.15.

Because the cost of the mill's A Digester Chip Bin and B Digester Chip Bin projects are each less than 50% of the cost of a new digester system, the digester systems are not being reconstructed. Therefore, the B Digester System is not subject to 40 CFR Part 60, Subpart BB.

<u>Maximum Achievable Control Technology (MACT) Standards Applicability</u>
Maximum Achievable control Technology (MACT) Standards, found in 40 CFR 63, Subpart S "*National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry*", are technology-based air emission standards that apply to certain major sources of hazardous air pollutants (HAPs) within source-specific industries. Verso Paper is considered to be a major source of HAPs because it has the potential to emit 10 tons per year of any single HAP, or 25 tons per year of a mixture of HAPs.

A & B Digesters
A review of MACT applicability criteria indicates that the A Digester and B Digester systems are MACT affected LVHC Sources.

Under MACT, *reconstruction* means "the replacement of components of an affected or a previously nonaffected source to such an extent that: (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and (2) It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) ... of section 112 of the Act." Because the cost of the mill's A Digester and B Digester projects are each less than 50% of the cost of a new digester system, the A Digester and B Digester are not being reconstructed. Therefore, the A Digester and B Digester are not subject to the new source requirements of 40 CFR Part 63, Subpart S. However, the Subpart S MACT requirements for new and existing LVHC Sources are the same.

A Chip Bin
Chip bin vents differ from the other LVHC sources in that they contain oxygen at levels approaching the oxygen level of atmospheric air. Hence, they are typically collected as part of the HVLC system. However, according to the definitions of the 40 CFR Part 63, Subpart S, vent gases from chip pre-steaming vessels utilizing flash steam or live steam are part of the "digester system", which is considered part of the LVHC system, and the collection and treatment of these gases is required.

Use of flash steam results in the A Chip Bin becoming a "named" LVHC source. Subpart S requires the collection of the chip bin gases at all times when flash steam is being used, except for periods of startup, shutdown, and malfunction of the LVHC source control device.

The A Chip Bin project also includes the use of clean condensate flash steam. The Department finds that clean condensate flash steam is equivalent to fresh steam (see discussion under B Chip Bin write-up).

B Chip Bin
As discussed above, chip bin vents contain oxygen at levels approaching the oxygen level of atmospheric air, and, when collected, are typically done so as part of the HVLC system. The B Digester "full" chip bin vents are currently collected as HVLC gases and are controlled in the RTO.

Under Subpart S, the current B Digester chip steaming configuration allows for the exemption of "full" chip bin vents from LVHC requirements because the B Digester Chip Bin uses fresh steam. The "full" chip bin LVHC vent exemption status is based on the following:

i. Ensures fresh, non-process steam use on the chip bins;
ii. Ensures fresh, non-process steam use on the low pressure feeder pocket purge;
iii. Ensures wood chip level in the bin is high enough to condense/absorb LVHC emissions; and,
iv. Monitors the time of actual chip bin vents caused by chip bin chip levels dropping low enough to cause LVHC gas collection bypass– as indicated by high temperature in the top of the chip bins(s) and delivery fan cut off while the digester system is in operation.

The mill proposes to use clean condensate flash steam in the B Chip Bin. For the purposes of meeting current air permit requirements and Subpart S, the use of clean condensate flash steam is equivalent to using fresh steam due to the following:

i. The source of clean condensate flash steam is from indirect black liquor heaters, and it is clean non-contact steam;
ii. Clean condensate flash steam is typically returned to the power plant with the clean condensate return to be used as boiler feedwater;
iii. Clean condensate flash steam is monitored for contamination (black liquor contamination due to tube rupture in the black liquor heater) via continuous conductivity monitoring. In the event that contamination is detected by a conductivity reading of 10 micromhos[1] or greater, the flash steam condensate is diverted to the sewer immediately. Currently, the immediate diversion to the sewer takes place to protect the power house steam turbines from contamination. This diversion to the sewer is controlled on the pulp mill DCS and has been reliable. The A and B Digester clean condensate tanks have not been contaminated with dirty condensate for at least the last 10 years. The practice of diverting to the sewer will continue after piping the clean condensate flash steam to the digesters; and

iv. The "full" B Chip Bin is currently collected with the HVLC source group for 06-096 CMR 124 Total Reduced Sulfur (TRS) compliance.

[1] 10 micromhos is equivalent to 6.85 mg/L black liquor solids on a bone dry basis, based on mill lab test data.

LVHC Source Control

Currently, the A Chip Bin NCG gases are collected and controlled with the Mill's HVLC system which has a 4 percent vent allowance, because "full" chip bins which use fresh steam are exempt from LVHC system control requirement of Subpart S. The use of flash steam for chip pre-steaming requires a modification to the A Chip Bin's NCG gas collection and treatment system to meet the 1 percent vent allowance in Subpart S for LVHC systems. Because of safety concerns, the A Chip Bin NCGs will be collected and conveyed to a control device in a separate closed vent collection system. Even though the A Chip Bin is a "named" LVHC Source, the A Chip Bin gases will be conveyed to the control device in the dilute or HVLC state. Chip bin vent gases are in the HVLC state because of the high oxygen levels in the chip bin, the chips absorb NCGs, and a condenser (heat exchanger) is used to remove condensable gases. In addition, excess air (sweep air) is entrained in the collection system to maintain the gases in a HVLC state.

To address safety concerns, the design requirements for chip bin vent collection are more stringent, especially in softwood pulp mills, where the potential exists for significant turpentine carryover, especially during periods when the chip level in the bin is low. Since the design philosophy is to keep the combustibles below their respective lower explosive limits (LELs), it is customary to condense the turpentine before the gases are combined with the HVLC gas stream. Equipment used in typical chip bin collection systems serve the following purposes (NCASI 2003):

i. Fiber separator to curb fiber carryover;

ii. Condenser/heat exchanger for condensation and separation of turpentine from the gas stream;

iii. Steam ejector for the motive force to transport gases to the control device or common header; and

iv. Mist eliminator to remove entrained moisture.

The proposed system for the mill's A Chip Bin will also include a white liquor scrubber to reduce total reduced sulfur (TRS) compounds sent to the combustion control device (lime kilns).

The potential for turpentine carryover does exist during process upsets or periods when the condenser/heat exchanger is not operating properly. To prevent unsafe conditions along the gas collection pipe run, block and vent valves are used to isolate the source when unsafe conditions exist, as indicated by high rising temperatures at the exit of the condenser or high temperatures in the top of the chip bin. Temperature monitoring will be used to monitor for LVHC vents from the chip bin.

Controlling the A Chip Bin NCGs, a LVHC named source, in the mill's HVLC control device, the RTO where the "full" A Chip Bin is currently controlled, without vent time exemptions, can not meet the MACT uptime requirements for the LVHC system. This is due to the required downtime of the RTO for maintenance, which is non-exempt downtime; not startup, shutdown, and malfunction (SSM) downtime. The HVLC system control equipment downtime is greater than one (1) percent, due to required maintenance. Thus, the A Chip Bin HVLC gases will be re-piped, collected, and controlled in the mill's lime kilns. The two lime kilns and continued ability to operate the lime kilns in tertiary mode (no mud load to the kiln) provide primary and backup control to ensure compliance with the one percent vent allowance.

The new A Digester Flash Tank NCGs will be collected and controlled in the existing LVHC closed vent collection system. The current system meets the closed vent collection and control requirements of Subpart S. The "full" B Chip Bin will continue to be collected as a HVLC source and will be controlled in the RTO.

<u>06-096 CMR 124 Applicability</u>

Verso Androscoggin's existing air emission license excludes both the A and B Chip Bins from the Mill's "LVHC system" for purposes of determining compliance with the LVHC collection, treatment, and reporting requirements contained in 06-096 CMR 124. After the conversion to using flash steam and clean condensate flash steam for chip pre-steaming, the A and B chip bin vents will still occur in both the LVHC and HVLC states.

In the 2005 HVLC MACT project air license application, the mill proposed that BPT did not require control of the chip bins under 06-096 CMR 124 LVHC requirements due to the high cost of controlling "low/empty" chip bin vents. This economic analysis has been redone and updated in the context of this project. Verso Androscoggin proposes that it remains economically infeasible to control chip bin vents when they are in the LVHC state. During normal operation the chips absorb steam and vent gases from the digester. In addition, during normal operation a condenser is used to remove steam and condensable gases from the chip bin exhaust stream. During startup, shutdown, and malfunction events when the level in the chip bin is lowered, the chip bin exhaust must bypass the condenser because the total volume of exhaust gases and steam load exceeds the capacity of the condenser. The BACT economic analysis shows that control of "low/empty" chip bins is not economically feasible (that a condenser sized for "low/empty" chip bin vents is not cost effective).

In 06-096 CMR 124, LVHC vent time is limited to one (1) percent of operating time. There are no startup, shutdown, malfunction (SSM) exemptions in 06-096 CMR 124; thus, the mill seeks a finding by the Department that "low/empty" chip bins are not required to be controlled and, therefore, "low/empty" chip bin vents are not considered for purposes of determining compliance with the 1% venting allowance for LVHC systems in 06-096 CMR 124. Furthermore, because the A Chip Bin vents will always be considered to be in the LVHC state after the flash steam project implementation, the mill seeks a determination from the Department that BPT would not require control of the A Chip Bin and, therefore, A Chip bin vents are not considered for purposes of determining compliance with the 1% LVHC exemption in 06-096 CMR 124. A determination that BPT does not require control of the A Chip Bin under 06-096 CMR 124 is also supported by the following proposed operating practices:

i. During startup, the A Chip Bin will use fresh steam and uncontaminated clean condensate flash steam.

ii. During digester malfunctions and low chip bin levels during shutdown, the A Digester will use fresh steam and clean non-contact steam in the chip bin and pocket purge to minimize emissions. The A Chip Bin will switch to fresh steam (which includes the use of uncontaminated clean condensate flash steam) during LVHC control system downtimes which can not immediately be resolved.

iii. The A Chip Bin closed vent collection system will be equipped with a white liquor scrubber to minimize TRS emissions during vents caused by lime kiln control equipment malfunctions. A Chip Bin gases will pass through the white liquor scrubber before venting.

iv. Any "full" chip bin vents associated with the control device (lime kilns) will be reported as a "Main Header" vent of the entire LVHC system.

06-096 CMR 124 requires LVHC collection systems to have a primary control strategy and a backup control strategy. Although Verso Androscoggin believes 06-096 CMR 124 does not require control of the A Chip Bin, upon completion of this project the A Chip Bin vent gases will be collected and controlled in the lime kilns with a primary, a secondary, and a tertiary strategy.

After review of the information submitted by Verso Androscoggin, the Department finds that emissions from the A and B Chip Bins are not subject to the LVHC collection system requirements under 06-096 CMR 124.

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 (last amended December 24, 2005). 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.

Before proceeding with the control requirements for each unit, a general process description is provided to identify where the equipment fits into the process.

Process Description

Verso Androscoggin's pulp and paper mill produces bleached kraft pulp and groundwood pulp which are used to produce a wide variety of paper grades. The bleached kraft pulp is produced in two separate process lines, designated "A" and "B". Groundwood pulp is produced in another separate process line.

Logs and wood chips are received in the Woodyard area, where they are stored and processed for eventual use in the Pulp Mill or Groundwood Mill. Logs destined for the Pulp Mill are debarked and chipped, then transferred to chip storage silos or chip storage piles. Chips are fed from the silos to a set of screens, and then sent on to the pulp mill.

The Pulp Mill consists of two separate, parallel kraft chemical pulping process lines. Screened chips from the Woodyard are sent to one of the two process lines, designated Pulp Mill "A" and Pulp Mill "B". The "A" line includes the A Chip Bin, a continuous digester, brown stock washing/screening units, pulp storage tanks, process liquid storage tanks and a pulp bleaching system, designated Bleach Plant "A". The "B" side includes the B Chip Bin, a continuous digester, diffusion washing units, screening units, pulp storage tanks, process liquid storage tanks and a pulp bleaching system designated Bleach Plant "B". The chips are reacted with white liquor in the digester to form pulp, which is then washed and screened in brown stock washers and chemically whitened in a series of reaction towers and washers that make up the Bleach Plants. Pulp entering Bleach Plant "A" also passes through an oxygen delignification system that removes additional lignin. The Bleach Plants also receive pulp reclaimed from the Paper Mill and the Wastewater Treatment Plant. Chlorine Dioxide (ClO_2) used in the bleaching process is manufactured in a separate process system. A dual scrubber system controls emissions from certain of the units in the Bleach Plant and the ClO_2 generation system.

Weak black liquor received from the Pulp Mills is fed to Multiple-effect Evaporators where it is concentrated to a solids level that will support combustion. In the Recovery Boilers the black liquor is reduced to form a smelt, which flows out the bottom of the boilers into the Smelt Dissolving Tanks, where it is dissolved to form green liquor. The green liquor is in turn reacted with lime (CaO) to form white liquor and lime mud ($CaCO_3$). The white liquor is stored for subsequent use in the digesters while the lime mud is oxidized in the Lime Kilns to recover lime.

Non-condensable gases (NCGs) collected throughout the process from certain units in the Pulp Mill (referred to as the low volume, high concentration source group (LVHC Source Group)) are sent to the Lime Kilns where they are reduced by means of combustion. The high-volume, low-concentration (HVLC) emission streams from certain other units (referred to as the high volume, low concentration source group (HVLC Source Group)) are collected and sent to the Regenerative Thermal Oxidizer (RTO) where they are reduced by means of incineration.

Condensable gases (foul condensates) generated from units within the pulp mills, including the digesters, evaporators, and concentrators are collected and treated in accordance with 40 CFR Part 63, Subpart S. Foul condensates are collected to meet the 11.1 lbs of methanol per oven dry ton pulp (ODTP) collection requirement and the 10.2 lbs of methanol/ODTP treatment requirement for the Androscoggin Mill. The mill's closed collection system is comprised of the network of piping, sewer lines, drains, junction boxes, etc. which are used to convey the foul condensates to a biological wastewater treatment unit (the aeration lagoon). The mill's closed collection system specifically includes the Main Condensate Collection Tank and Hardpipe. The modifications to the A Chip Bin and the installation of the new flash tank on the A Digester will not affect how foul condensates are physically collected and controlled within the mill's existing Foul Condensate Collection and Control System.

The main pollutants of concern from the air emission units addressed in this license amendment are volatile organic compounds (VOCs), total reduced sulfur compounds (TRS), and hazardous air pollutants (HAPs) including methanol, acetaldehyde, and methyl ethyl ketone. Continuous digesters systems release gases continuously from several sources. In digester systems which use steam in the chip bins, the chip bins can emit gases containing VOCs, HAPs, and TRS. If low pressure flash steam is used in the chip bin, this contributes to the TRS compounds. Flash tank vents also contain TRS compounds, VOCs, and HAPs.

Because odorous reduced sulfur compounds are present in the digester relief and blow gases, they are generally collected and treated by combustion to oxidize the TRS to SO_2. LVHC NCGs are typically burned in lime kilns, boilers, or stand-alone thermal oxidizers. HVLC NCGs are usually burned in stand-alone thermal oxidizers, boilers, or recovery furnaces that can accept the larger gas volumes associated with dilute systems. When LVHC NCGs are burned in lime kilns, these gases are typically scrubbed in an alkali scrubber (usually using white liquor) to remove the acidic gases hydrogen sulfide (H_2S) and methyl mercaptan (CH_3SH) prior to incineration to reduce the sulfur input to the kiln. The additional sulfur burden from LVHC NCGs to lime kilns has been associated with ring formation in the kilns. Scrubbers may also be employed prior to thermal oxidizers to reduce the amount of SO_2 formed. Generally, thermal oxidizers have a caustic scrubber after the combustion chamber to remove SO_2 since the amount formed can be significant. Alternative disposal practices employed include venting with the bleach-plant chlorine or chlorine dioxide-stage washer vent gases for chemical oxidation of the sulfur compounds, and, during process upsets, discharge of selected streams to stacks for improved dispersion, thus minimizing the potential for worker exposure to high concentrations of TRS. A few mills use flares for combustion of concentrated NCGs (NCASI 2008). VOC/HAP and TRS controls for chip bin LVHC/HVLC gases and flash tank LVHC gases include condensers, wet scrubbers, and incineration in a combustion unit. Each of these control options is technically feasible for the control of VOC/HAP and TRS emissions.

The table below lists the technically feasible options evaluated by Verso Androscoggin according to control effectiveness.

Control Efficiencies of Technically Feasible Control Technologies

Control Technology	Estimated VOC/HAP Control Efficiency
Condenser	60 - 90%
Combustion - RTO	95 - 99%
Combustion - Lime Kiln	95 - 99%

Use of a condenser and combustion in an RTO or lime kiln are both technically feasible for the control of VOC/HAP and TRS emissions from the A and B Chip Bins. Collection in a closed vent system and combustion in a lime kiln is technically feasible for the control of HAP and TRS emissions from the new A Digester Flash Tank. Use of a white liquor wet scrubber to reduce TRS gases and the sulfur loading to the lime kilns is also technically feasible.

B. A Chip Bin

With the addition of flash steam use in the A Chip Bin, it would become a named LVHC source under 40 CFR Part 63, Subpart S (MACT Standards). The MACT Standards require LVHC sources to be enclosed and vented into a closed-vent system and routed to a control device that reduces HAP emissions by using one of the listed control options in the standard, which includes introducing the HAP emission stream with the primary fuel or into the flame zone of a lime kiln. After investigating various VOC/HAP and TRS emission reduction strategies, Verso Androscoggin proposes that the most stringent combination of control equipment and operational strategies to reduce VOC/HAP and TRS emissions from the A Chip Bin is to collect and treat the A Chip Bin exhaust stream by installing a condenser/heat exchanger to remove the condensable portion of the exhaust stream, a scrubber to reduce TRS emissions prior to combustion, and combustion of the remaining gases in either the A or B Lime Kiln. Verso Androscoggin considered two versions of this combination of control equipment, one system designed to collect and treat VOC/HAP emissions during normal operations (which occur 99+/-% of the time) and a second to collect and treat VOC/HAP emissions not only during normal operations but also during "low/empty" chip bin conditions. The difference between the two options involves a larger direct contact scrubber and a larger non-contact condenser to handle a hotter gas stream during "low/empty" chip bin conditions. The table below shows the cost comparisons between the two options as well as the incremental cost evaluation between the two options.

Control Options Evaluated	% Control VOC	VOC Reduction (TPY)	Cost ($ per ton of VOC removed)	Incremental Cost ($ per ton of VOC removed)
Option 1: Control Equipment Designed to Handle Normal Operating Conditions	99	151.9	5,219	--
Option 2: Control Equipment Designed to Handle Normal and Low/Empty Chip Bin Conditions	100	153.4	7,311	33,086

Incremental costs for control of HAP and TRS emissions between the two options were even higher. Based on the incremental cost between the options, Verso Androscoggin proposes that Option 1 (a combination of control equipment designed to handle normal operating conditions) represents BACT for control of VOC/HAP and TRS emissions from the A Chip Bin.

After review of the information submitted by Verso Androscoggin, the Department finds that BACT for VOC/HAP and TRS emissions from the A Chip Bin is the following:

1. Installation and operation of gas direct contact scrubbers to remove chips and wood dust from the exhaust stream;
2. Installation and operation of a non-contact condenser designed to handle normal operations using flash steam and to condense low chip bin event gas surges up to 190°F in the top of the chip bin;
3. Installation and operation of a steam ejector, mist/steam eliminator system;
4. Installation and operation of a white liquor scrubber for TRS reduction prior to combustion in the lime kilns and for minimizing TRS emissions during A Chip Bin vents;
5. Introducing the NCG emission stream into the flame zone of the A or B Lime Kilns or operating the lime kilns in tertiary mode; and
6. Using fresh steam (and/or clean condensate flash steam) in the A Chip Bin during startup, shutdown, and malfunction events when the gas surge exceeds the design capacity of the condenser and the gases must be vented to the atmosphere.

C. <u>A Digester Flash Tank</u>

Verso Androscoggin proposes that the installation and operation of a closed vent collection system with treatment by combustion in either the A or B Lime Kiln represents BACT for emissions from the A Digester Flash Tank.

The Department agrees and finds that the installation and operation of a closed vent collection system with treatment by combustion in either the A or B Lime Kiln represents BACT for emissions from the A Digester Flash Tank.

D. B Chip Bin

Emissions from the B Chip Bin during normal operating conditions (i.e., "full" chip bin emissions) are currently collected and treated in the HVLC system which consists of incineration of the dilute NCGs in the RTO followed by a wet scrubber for control of SO_2 emissions. The only time where "full" chip bin emissions are not controlled is when the HVLC System is down due to maintenance, startup and shutdown events associated with the B Digester, and malfunction events. As with the A Chip Bin, "low/empty" chip bin conditions necessitate venting of emissions from the B Chip Bin because the elevated exhaust gas temperatures exceed the capacity of the condenser, however, these conditions typically represent less than one percent of the operating time.

Verso Androscoggin considered collecting and treating emissions from the B Chip Bin in the same manner as they are proposing to collect and treat emissions from the A Chip Bin. However, the cost of installing the collection and control equipment necessary to treat emissions in the A or B Lime Kiln was determined to be at a cost of between $27,000 and $38,500 per ton of methanol removed and between $46,000 and $65,000 per ton of VOC removed.

Based on these costs, Verso Androscoggin proposes that the current method of collection and control in the RTO represents BACT for control of VOC/HAP and TRS emissions from the B Chip Bin.

After review of the information submitted by Verso Androscoggin, the Department finds that BACT for VOC/HAP and TRS emissions from the B Chip Bin is the current method of collection and control in the RTO (HVLC System).

E. Foul Condensates

The mill's existing condensate streams from the Pre-evaporator, the A and B Digester Flash Steam Condensers, and the A and B Multi-Effect Evaporators are collected and routed via a closed system to a sealed condensate collection tank that has a storage capacity of 41,500 gallons (cylindrical tank, 10 feet in diameter and 22 feet high). The condensate collection tank is used as a flow process tank to regulate the flow of condensate in a closed pipeline to the mill's aerated wastewater treatment lagoon. As a result, the captured condensates bypass any open-air release points along the way to the wastewater treatment aeration lagoon. At the aeration lagoon, the condensates are discharged below the surface of the lagoon. This system is referred to as the "hard piping" option.

Condensates from the digesters and evaporators and concentrators are collected to meet the 11.1 lb methanol per oven dry ton pulp (ODTP) collection requirement and the 10.2 lbs/ton ODTP MACT Standard treatment requirement for the Androscoggin Mill. The mill's wastewater treatment lagoon meets the existing 10.2 lbs/ton ODTP treatment requirement.

Verso Androscoggin investigated the use of steam strippers for the treatment of condensates. Steam strippers are used in the industry to remove TRS and methanol from the foul condensate stream and approximately 60% of US Kraft mills have steam strippers. The application of steam stripping to an existing source, however, is complex and site specific. Each mill is unique and presents distinct challenges which include consideration of the collection process streams to be treated, selection of the most attractive treatment alternative that could be a stand alone system or integrated with the black liquor concentration process, as well as the source of steam to be used. The cost of a steam stripping system to treat a significant portion of the foul condensate stream is at least $17 million; thus, Verso Androscoggin proposes that this option is not economically feasible for BACT.

In an anaerobic digester, gaseous oxygen is prevented from entering the system through physical containment in sealed tanks. Anaerobes are then forced to access oxygen from sources other than the surrounding air. The oxygen source for these microorganisms can be the organic material itself or the inorganic oxides from within the foul condensate stream. The technical expertise required to maintain anaerobic digesters, coupled with high capital costs and lower process efficiencies, have so far limited the level of its industrial application as a waste treatment technology and control technology for foul condensate streams. The use of an anaerobic digester to control these emissions would not be economically feasible and may not even be effective until multiple trials are run, if at all.

Verso Androscoggin proposes that there are no technically or economically feasible alternative emissions control technologies that are as effective or economically and technically feasible for application to the foul condensate stream generated as a result of the proposed modification to the A Digester system than the existing hard pipe option. Because there are no existing economically and technically feasible control technology alternatives that will offer better control than what is already being achieved, Verso Androscoggin proposes that the Condensate Source Group is receiving BACT through hard piping of the foul condensates to the wastewater treatment aeration lagoon.

Based on review of the information submitted by Verso Androscoggin, the Department finds that the existing method of condensate collection and hard piping of the foul condensates to the wastewater treatment aeration lagoon for treatment represents BACT for the Condensate Source Group.

F. 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 (last amended December 24, 2005), 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.

G. Annual Emissions
The proposed changes will result in no changes to any of the annual emission limits currently contained in Verso Androscoggin's Air Emission Licenses, including any amendments.

III. AMBIENT AIR QUALITY ANALYSIS

Verso Androscoggin previously submitted an ambient air quality analysis demonstrating that emissions from the facility, in conjunction with all other sources, do not violate ambient air quality standards. An additional ambient air quality analysis is not required for 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,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-203-77-9-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) A Chip Bin

A. Applicability

Upon initial use of flash steam, the A Chip Bin and all associated emissions collection and control equipment shall become subject to the following changes in applicability status:

1. The A Chip Bin and all associated equipment of the A Chip Bin closed vent collection system shall become part of the LVHC Source Group and subject to all applicable license conditions associated with the LVHC Source Group contained in Verso Androscoggin's Air Emission Licenses, including any amendments.

2. The A Chip Bin and all associated equipment of the A Chip Bin closed vent collection system shall be subject to all applicable requirements under 40 CFR Part 60, Subpart BB (NSPS for Kraft Pulp Mills).

3. The A Chip Bin and all associated equipment of the A Chip Bin closed vent collection system shall become a LVHC source under 40 CFR Part 63, Subpart S (MACT Standards) and subject to all such applicable requirements.

4. The A Chip Bin and all associated equipment of the A Chip Bin closed vent collection system shall be exempt from both the HVLC and LVHC collection, treatment, and reporting requirements contained in 06-096 CMR 124.

B. Control Equipment

Verso Androscoggin shall install, operate, and maintain the following collection and control equipment for the purpose of collecting and treating emissions from the A Chip Bin during normal operating conditions (i.e., "full" chip bin conditions) whenever flash steam is being utilized:

1. A direct contact scrubber to prevent fiber carryover by removing chips and wood dust from the exhaust stream;

2. A non-contact condenser designed to handle normal operating conditions and to condense low chip bin event gas surges up to 190°F in the top of the chip bin;

3. A white liquor scrubber for TRS reduction prior to combustion in the lime kilns and for minimizing TRS emissions during A Chip Bin vents; and

4. A closed system designed to collect and treat the NCG emission stream from the A Chip Bin either by introduction into the flame zones of the A and B Lime Kilns or by operating the lime kilns in tertiary mode.

[06-096 CMR 115, BACT]

C. Operating Requirements

1. Verso Androscoggin shall use fresh steam and/or clean (uncontaminated) condensate flash steam during "low/empty" chip bin conditions (i.e., startup, shutdown, and malfunction conditions) or during any malfunction resulting in emissions being vented from the A Chip Bin.

2. The source of the clean condensate flash steam shall be the non-contact steam generated from the indirect black liquor heaters. The clean condensate flash steam shall be continuously monitored for conductivity as a measure of contamination. Conductivity readings of 10 micromhos or greater shall be considered an indication that contamination has occurred and shall result in the immediate diversion of the contaminated condensate flash steam to the mill's wastewater treatment plant collection system.

[06-096 CMR 115, BACT]

(2) A Flash Tank

Emissions from the A Flash Tank shall be collected and controlled through the existing LVHC Source group collection and control system.

[06-096 CMR 115, BACT]

(3) B Chip Bin

A. Applicability

The B Chip Bin and all associated emissions collection and control equipment shall remain subject to the HVLC collection, treatment, and reporting requirements contained in 06-096 CMR 124 except during "low/empty" chip bin operating conditions.

B. Control Equipment

Verso Androscoggin shall continue to utilize the HVLC collection and control system (i.e., RTO and associated scrubber) to collect and control emissions during normal operating conditions (i.e., "full" chip bin conditions) of the B Chip Bin. [06-096 CMR 115, BACT]

C. Operating Requirements
   1. Verso Androscoggin shall use fresh steam and/or clean (uncontaminated) condensate flash steam during all chip bin operating conditions.

   2. The source of the clean condensate flash steam shall be the non-contact steam generated from the indirect black liquor heaters. The clean condensate flash steam shall be continuously monitored for conductivity as a measure of contamination. Conductivity readings of 10 micromhos or greater shall be considered an indication that contamination has occurred and shall result in the immediate diversion of the contaminated condensate flash steam to the mill's wastewater treatment plant collection system.

   [06-096 CMR 115, BACT]

DONE AND DATED IN AUGUSTA, MAINE THIS 30th DAY OF March, 2010.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: James P. Brooks for
DAVID P. LITTELL, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: December 21, 2009
Date of application acceptance: January 13, 2010

Date filed with the Board of Environmental Protection:

FILED
MAR 31 2010
BOARD OF ENVIRONMENTAL PROT.
STATE OF MAINE

This Order prepared by Eric Kennedy, Bureau of Air Quality.