NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review – Preliminary Determination

Issue Date: DRAFT

Region: Washington Regional Office
County: Martin
NC Facility ID: 5900069
Inspector's Name: Betsy Huddleston
Date of Last Inspection: 02/28/2018
Compliance Code: B / Violation - emissions

Facility Data

Applicant (Facility's Name): Domtar Paper Company, LLC

Facility Address:
Domtar Paper Company, LLC
NC Highway 149 North
Plymouth, NC 27962

SIC: 2611 / Pulp Mills
NAICS: 322121 / Paper (except Newsprint) Mills

Facility Classification: Before: Title V **After:**
Fee Classification: Before: Title V **After:**

Permit Applicability (this application only)

SIP: 15A NCAC 2D .0503, .0504, .0530
NSPS: N/A
NESHAP: N/A
PSD: Yes
PSD Avoidance:
NC Toxics: 15A NCAC 2D .1100, 2Q .0711
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Diane Hardison Environmental Manager (252) 793-8611 PO Box 747 Plymouth, NC 27962	Everick Spence Mill Manager (252) 793-8111 PO Box 747 Plymouth, NC 27962	Diane Hardison Environmental Manager (252) 793-8611 PO Box 747 Plymouth, NC 27962

Application Data

Application Number: 5900069.16C
Date Received: 10/25/2016
Application Type: Modification
Application Schedule: PSD

Existing Permit Data
Existing Permit Number: 04291/T45
Existing Permit Issue Date: 10/31/2017
Existing Permit Expiration Date: 09/30/2022

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2016	715.26	1828.25	722.00	8993.07	531.43	467.26	323.65 [Methanol (methyl alcohol)]
2015	739.44	1875.67	806.12	6803.05	557.95	473.97	353.81 [Methanol (methyl alcohol)]
2014	664.83	2029.18	756.56	5434.00	577.58	425.40	321.19 [Methanol (methyl alcohol)]
2013	715.41	1998.32	646.18	4201.37	617.74	376.63	270.62 [Methanol (methyl alcohol)]
2012	684.06	1974.11	582.85	2424.90	868.32	370.29	270.54 [Methanol (methyl alcohol)]

Review Engineer: Heather Sands

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue 04291/T46
Permit Issue Date:
Permit Expiration Date:

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I. Introduction and Purpose of Application

A. Facility Description and Proposed Change

Domtar Paper Company, LLC (Domtar) currently holds Title V Permit No. 04291T45, with an expiration date the earlier of ***September 30, 2022*** or the renewal of Permit No. 04291T42 has been issued or denied, for a Kraft pulp mill located in Plymouth, Martin County, North Carolina. The mill primarily produces bleached fluff pulp. Production operations onsite include wood pulping, pulp bleaching, and fluff pulp making. Other support operations include black liquor recovery, lime production, a woodyard, wastewater treatment, and power/steam generation.

1. Prevention of Significant Deterioration Project

The North Carolina Division of Air Quality (NC DAQ) received a copy of Permit Application No. 5900069.16C for a Prevention of Significant Determination (PSD) modification from Domtar Paper Company, LLC (Domtar), on October 25, 2016. The application was considered administratively complete for processing on November 1, 2016. This permit application is a retroactive major New Source Review (NSR) construction and operation air permit modification request for a permit application originally submitted in November 2011 (5900069.12D). The original permit application (No. 5900069.12D) requested a permit modification for the Lignin Solids Removal Process (LSRP) project, including the following:

- Construction and operation of a Lignin Solids Dewatering Process, including the following pieces of equipment:
  - Precipitation tanks;
  - Two filter presses with associated tanks; and
  - Chemical additive systems.

  To mitigate emissions and obtain stable operation of the new operation, some process configurations were changed to the original design under approval of NC DAQ. The updated process flow diagram is considered Confidential Business Information and will not be discussed. This diagram has been reviewed and Domtar has addressed relevant changes with respect to emissions elsewhere in this permit application.
- Permitted use of lignin as a fuel in the Nos. 1 and 2 Hog Fuel Boilers.
- Permitted use of natural gas as a fuel for the No. 5 Recovery Boiler, No. 5 Lime Kiln, and Nos. 1 and 2 Hog Fuel Boilers.
- Removal of coal as a permitted fuel for the hog fuel boilers.
- Permitted use of No. 2 fuel oil for the No. 5 Lime Kiln and the Nos. 1 and 2 Hog Fuel Boilers.
- Shutdown of No. 1 Package Boiler.
- Shutdown of No. 4 Paper Machine and associated tanks and equipment.

Except as discussed for the process configuration of the LSRP above, Domtar stated that each part of the project listed above was performed in accordance with the original November 2011 application.

The LSRP was first permitted under Permit Revision T39. In the associated permit application,[1] Domtar submitted a PSD applicability analysis that demonstrated that this project did not result in emission increases that exceeded the PSD significance emission rate (SER) and that the project was not a major project under NSR. As stated in the 2016 permit application, following the completion of the LSRP Project, Domtar determined via testing that, as built, the total reduced sulfur (TRS) and hydrogen sulfide (H_2S) emissions were higher than estimated for the permit application. Domtar revised their PSD applicability analysis and determined that the LSRP Project resulted in increases of 25.9 tons per year (tpy) for TRS emissions and 26.8 tpy of H_2S emissions, both of which exceeded the 10 tpy PSD SER for each pollutant. As a result, the original LSRP Project should have been subject to review and processing under 15A NCAC 02D .0530 (PSD). Therefore, on July 20, 2015, Domtar entered into a Special Order of Consent (SOC) Agreement with DAQ (SOC 2015-01) to address the compliance issues associated with exceeding the PSD SER. Domtar submitted this retroactive PSD permit application to satisfy a part of the SOC Agreement.

[1] The original permit application was received in November 2011 and was initially assigned Permit Application No. 5900069.11A and was subsequently renumbered to Permit Application No. 5900069.12D.

In accordance with PSD requirements, Domtar has conducted a Best Achievable Control Technology (BACT) analysis, additional impacts (i.e., soils, vegetation, visibility) analyses, and to the extent necessary, a Class I area analysis.

2. Permit Renewal and Expiration Date

Domtar submitted an application for a permit renewal on July 27, 2016, at least nine months prior to the expiration date of April 30, 2017. Therefore, the application shield as specified under 15A NCAC 2Q .0512(b) remains in effect. Because the renewed permit has not yet been issued, the expiration date was changed to September 30, 2022 when Air Permit No. 04291T44 was issued on October 31, 2017. A footnote was also added to the permit stating, "This permit shall expire on the earlier of September 30, 2022, or the renewal of Permit No. 04291T42 has been issued or denied."

B. Plant Location

The Domtar Plymouth Mill is located in Martin County. The current Section 107 attainment status designations for areas in the State of North Carolina are summarized in 40 CFR 80.334. Martin County is classified as better than national standards for total suspended particulates (TSP) and for sulfur dioxide (SO_2). The entire State of North Carolina is designated as "unclassifiable/attainment" for carbon monoxide (CO) and ozone (1-hour standard). Martin County is designated as "unclassifiable/attainment" for ozone (1997 and 2008 8-hour standards) and $PM_{2.5}$ (annual and 1997 and 2006 24-hour primary and secondary standards). Martin County is designated as "cannot be classified or better than national standards" for nitrogen dioxide (NO_2). Based on these designations, Domtar is not located in an area designated as "nonattainment" for any pollutant regulated under the National Ambient Air Quality Standards (NAAQS).

C. Permitting History since Issuance of Title V Permit

Permit	Issue Date	Description
04291T37	May 31, 2012	Initial Title V Permit was issued with an expiration date of June 30, 2017.
04291T38	June 27, 2012	Air permit modification processed as an administrative amendment to correct several typographic errors.

04291T39	October 17, 2012	Air permit processed as the first step of a two-step significant permit modification under 15A NCAC 02Q .0501(b)(2) for the addition of the following:
		• Add Lignin Dewatering Process as a new source including:
		  o precipitation tanks
		  o 2 filter presses and associated tanks
		  o chemical additive system
		• Permit lignin, natural gas and No. 2 fuel oil to be fired by the Nos.1 and 2 Hog Fuel Boilers;
		• Permit natural gas to be fired by the No. 5 Recovery Boiler; and
		• Permit natural gas and No. 2 oil to be fired in the No. 5 Lime Kiln.
		• Remove coal as a permitted fuel for the Nos. 1 and 2 Hog Fuel Boilers.
		• Shutdown No. 1 Package Boiler and remove from permit.
		• Shutdown the No. 4 Paper Machine and associated tanks and equipment and remove from permit.
		• Clarify the No. 5 Lime kiln production limit.
		• Update the State air toxics including new emissions points and changes in air toxics emissions.
		• Update conditions associated with PSD applicability [under 2D .0530(u)] required as a result of the applicability including the netting analysis.
		• Corrected the permit expiration date to April 30, 2017.

Permit	Issue Date	Description
04291T40	February 19, 2014	Air permit processed as the first step of a two-step significant permit modification under 15A NCAC 02Q .0501(b)(2) to revise toxic air pollutant emission limits to enable the sewering of condensate streams from the concentrator surface condenser and the 5th effect of the No. 6 Evaporator, as well as the C3 stream (3rd effect of the concentrators).
04291T41	September 10, 2014	Air permit processed as a significant modification for the following: • The second step of a two-step significant modification for the Lignin Solids Dewatering Process and the addition of lignin, natural gas and No. 2 fuel oil as fuels in the Nos. 1 and 2 Hog Fuel Boilers; the addition of natural gas as a fuel for the No. 5 Recovery Boiler; and the addition of natural gas and No. 2 fuel oil as fuels for the No. 5 Lime Kiln. (Permit No. T39) • The addition of the portable log chipper(s) (ES-TEMP-CHIP); • A revision of the monitoring condition for the electroscrubbers controlling emissions from the hog fuel boilers; • Revisions to the lime kiln testing requirement for fuel oil used only as a backup fuel; • Correction of the toxic air pollutant permit limits to reflect the modeled rates in the most recent compliance demonstration; • A revision of the VE monitoring frequency for the wood yard operations; and • Removal of toxic permit limits for MACT affected sources. • The second step of a two-step significant modification for the foul condensate sewering. (Permit No. T40)
04291T42	July 10, 2015	Air permit processed as the following: • Administrative amendment to correct some of the language in the current permit, issued September 10, 2014. • Step one of a two-step significant modification under 15A NCAC 02Q .0501(b)(2) to: o Add new soap storage tank, black liquor separation tank, and railcar load out station; and o Remove peroxide stages from the No. 7 bleach plant scrubber.
04291T43	June 6, 2016	Air permit processed as a significant modification under 15A NCAC 02Q .0501(c)(1) for revisions to the 112(j) emission limits for the Nos. 1 and 2 Hog Fuel Boilers.
04291T44	October 31, 2017	Air permit processed as the first step of a two-step significant modification under 15A NCAC 02Q .0501(b)(2) for the installation of a steam box on the NC5 pulp drying machine and a secondary turpentine decanting system.
04291T45	August 15, 2018	Air permit processed as the first step of a two-step significant modification under 15A NCAC 02Q .0501(b)(2) for a mill optimization project.

D. Application Chronology

Date	Event
February 20, 2015	DAQ issued a Notice of Violation/Notice of Recommended Enforcement (NOV/NRE) for failure to submit a permit application for PSD for the Lignin Recovery Process and combustion fuels project prior to commencing construction.
July 20, 2015	Domtar entered into an SOC (Consent No. SOC 2015-01) with DAQ to address the February 20, 2015, NOV/NRE. One milestone associated with the SOC was to submit an application by September 1, 2016, to retroactively re-permit the LSRP at its design or originally-permitted capacity with an updated PSD applicability analysis.
June 24, 2016	Domtar requested that DAQ change the interim date of September 1, 2016, for submittal of a retroactive PSD permit application, to November 1, 2016.

Date	Event
June 28, 2016	DAQ granted Domtar's June 24th request to extend the milestone date for submittal of the PSD permit application to November 1, 2016.
October 25, 2016	DAQ received PSD Permit Application No. 5900069.16C.
November 1, 2016	DAQ issued a permit acknowledgement letter to Domtar.
November 16, 2016	Preapplication meeting between DAQ and Domtar.
November 16, 2016	Domtar submitted revised permit application text.
November 16, 2016	Tom Anderson of the Air Quality Analysis Branch of NC DAQ emailed personnel from US Forest Service, the Fish and Wildlife Services, and the National Park Service informing them of the project.
November 16, 2016	Ms. Jill Webster, of the Fish and Wildlife Service, responded: "Based on the information included in the form, the Fish and Wildlife Service does not request a Class I analysis for Swanquarter. However, should emissions or project change, please contact me directly so that we might reevaluate the proposed project."
November 18, 2016	DAQ issued a letter to Domtar indicated that the PSD application was deemed complete.
November 18, 2016	A copy of the PSD permit application was sent to Heather Ceron of EPA Region 4.
December 15 and 16, 2016	Mr. Matthew Porter, DAQ/AQAB, submitted an additional information request to Domtar to address comments and request modeling data necessary to approve the H_2S and methyl mercaptan (MMC) toxics modeling analysis.
February 28, 2017	Domtar (through their consultant, AECOM) submitted a revised H_2S and MMC modeling analysis addressing the December 2016, additional information request.
March 3 through March 9, 2017	Mr. Porter submitted an additional information request to Domtar to address comments on the February 28th submittal.
March 16, 2017	Ms. Heather Sands, DAQ, requested the emissions calculations to aid in the review of the permit application.
March 16, 2017	Domtar (through their consultant, AECOM) submitted the PSD emissions calculation workbook.
March 27, 2017	Ms. Heather Sands, DAQ, requested background documentation for the BACT analysis cost calculations to aid in the review of the permit application.
March 31, 2017	Domtar submitted background information for the BACT analysis cost calculations.
April 17, 2017	Ms. Sands requested additional information to address comments on the PSD emissions and BACT cost analyses submitted with the permit application. Ms. Sands participated in a telephone call with Ms. Sheryl Watkins, AECOM, to provide comments on the spreadsheets.
June 5, 2017	Domtar (through their consultant, AECOM) submitted a revised H_2S and MMC modeling analysis addressing the March 2017, additional information request.
June 7, 2017	Domtar (through their consultant, AECOM) submitted the revised PSD emissions calculations.
July 19, 2017	Ms. Sands requested additional information to address comments on the June 7th PSD emissions calculations.
August 1, 2017	Domtar (through their consultant, AECOM) submitted revisions to the emissions associated with the modeling to address the July 19th additional information request.
August 2, 2017	Domtar submitted a correction to the modeled H_2S and MMC emissions from the 40 percent Black Liquor Tank.
August 31, 2017	Mr. Porter issued a memorandum approving the H_2S and MMC modeling analysis.
XXXX YY, 2018	Draft permit and permit review submitted to Applicant and Washington Regional Office (WaRO) for review
XXXX YY, 2018	WaRO comments were received. ***Enter summary of comments (if necessary, add to section below)***
XXXX YY, 2018	Comments from Applicant were received. ***Enter summary of comments (if necessary, add to section below).***
XXXX YY, 2018	Draft Permit and Preliminary Determination forwarded to public notice.

II. Modified Emission Sources and Emissions Estimates

As discussed above, the LSRP Project primarily included the installation of a new lignin dewatering process to extract black liquor at the evaporators and fuel switching at several sources. The following discussion summarizes the original LSRP Project along with an update on the project as completed and the impact the LSRP Project had on emissions.

A. Lignin Dewatering Process

The lignin dewatering process was designed to extract lignin from the black liquor stream to reduce the organic content that must be combusted by the recovery boiler to recover the spent cooking chemicals. Domtar stated that the process would allow the mill to increase pulp mill production without increasing loading on the recovery boiler. This maximum lignin production rate was stated to be 32,850 oven dried metric tons (ODMT) per year. An additional fan was installed for collection of high-volume low concentration (HVLC) off-gasses from certain lignin dewatering process sources to be controlled in the Hog Fuel Boilers.

In response to the SOC and to mitigate emissions and to stabilize production, Domtar incorporated emissions from the No. 2 Filter Press Filtrate Tank into the HVLC collection system for combustion in the Nos. 1 and 2 Hog Fuel Boilers.[2] Domtar provided an updated process flow diagram that is considered confidential business information (CBI). Table 1 presents the sources of emissions as listed in the permit.

The LSRP emits particulate matter (PM), PM less than 10 micrometers (PM_{10}), PM less than 2.5 micrometers ($PM_{2.5}$), volatile organic compounds (VOCs), sulfur dioxide (SO_2), carbon monoxide (CO), TRS, H_2S, sulfuric acid mist (H_2SO_4), lead, and greenhouse gases (GHG), including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The LSRP was a new process, therefore, increases in all of these compounds resulted from the project. With this permit application, Domtar provided emissions based on a maximum production of 32,850 ODMT lignin per year. Domtar conducted extensive testing in and around the LSRP process to determine emission factors for H_2S and TRS. The factors developed included a 50 percent safety factor. Domtar also used published emission factors for the emissions of other compounds from similar sources, such as black liquor tanks. The TRS and H_2S emissions from the LSRP sources are presented in Table 1.

B. Fuel Changes

In the original permit application, Domtar also requested changes to the permitted fuels burned in several sources. Coal was removed as a permitted fuel source for the Nos. 1 and 2 Hog Fuel Boilers. No. 2 fuel oil was added as a permitted fuel for the No. 5 Lime Kiln and the Nos. 1 and 2 Hog Fuel Boilers. Natural gas service was provided to the mill for the Nos. 1 and 2 Hog Fuel Boilers, the No. 5 Recovery Boiler, and the No. 5 Lime Kiln. Domtar stated that the natural gas conversions were completed for all sources, except for the No. 5 Recovery Boiler.

The No. 5 Recovery Boiler is currently equipped with eight fuel oil burners. In the original 2011 permit application, Domtar indicated that natural gas burners would be added to the No. 5 Recovery Boiler. In the current permit application (No. 5900069.16C), Domtar proposed that at least four (but potentially all eight) burners would be replaced with dual fuel burners that can fire natural gas or ultra-low sulfur (ULS) distillate fuel oil, but not both fuels at the same time. Additionally, between four and six additional natural gas burners will be added to the Recovery Boiler in a location designed to support burnout of the smelt by providing a more consistent heat distribution in the furnace when only natural gas used as the auxiliary fuel source.

C. Sources Removed from Service

As part of the original November 2011 permit application, Domtar stated their intention of removing the No. 4 Paper Machine and the No. 1 Package Boiler from service, resulting in a decrease of emissions of $PM/PM_{10}/PM_{2.5}$, VOC, SO_2, CO, TRS, H_2S, H_2SO_4, lead, and GHG, including CO_2, CH_4, and N_2O. In the current application, Domtar stated that both sources have now been removed from service.

[2] This modification was incorporated into Permit No. T42, issued in July 2015.

Table 1. Lignin Solids Removal Process Emission Sources

Emission Source ID	Emission Source Description	Control Device Description	TRS Emissions, as H_2S (tpy)	H_2S Emissions (tpy)
ES-09-27-1000	LRP 40% Black Liquor Tank	N/A	0.63	0.21
ES-09-27-1100	40% Black Liquor Cooler	HVLC collection system to No. 2 Hog Fuel Boiler (primary) or No. 1 Hog Fuel Boiler (secondary) or No. 5 Recovery Boiler (as backup) or Thermal Oxidizer (as backup)	3.09	2.98
ES-09-27-1200	Filtrate 1 Storage Tank			
ES-09-27-1400	Carbonator Tower, including:			
ES-09-27-2700	*Agitated Acidification Tank*			
ES-09-27-2770	*Acidification Overflow/Foam Tank*			
ES-09-27-2800	*Agitated Acid Conditioning Tank*			
ES-09-27-1800	Agitated Conditioning Tank			
ES-09-27-2000	Agitated Buffer Tank			
ES-09-27-2100	LRP Primary Filter Press[3]			
ES-09-27-2300	Cloth Wash Water Tank 1			
ES-09-27-2400	Filtrate Tank 1			
ES-09-27-2500	Filtrate 1 Buffer Tank			
ES-09-27-2610	Dewatered Lignin Conveyor 1			
ES-09-27-2620	Dewatered Lignin Conveyor 2			
ES-09-27-3200	LRP Secondary Filtrate Tank			
ES-09-27-3000	LRP Press Building Fugitives (Filter Press 2)	N/A	21.1	19.3
ES-09-27-3100	LRP Secondary Cloth Wash Tank	N/A	0.53	0.51
IES-09-27-3700	Acid Sump Pit	N/A	0.55	0.53
IES-09-27-3600	Alkaline Sump Pit	N/A		
		Total Emissions from LSRP	**25.9**	**23.53**

[3] LRP Primary Filter Press is partially controlled by vacuum pull to HVLC System

D. NC-5 Pulp Machine

In the November 2011 permit application, Domtar requested approval for the installation of additional dryer cans on the dry end of the NC-5 Pulp Machine to bring the machine drying capacity up to the originally designed specification. To reduce capital expenditures when the machine was modified in 2010 (Permit Application No. 5900069.09B), Domtar had decided to minimize the number of dryer cans in the design, based on engineering judgement that sufficient drying could be achieved with fewer cans and still produce the targeted output. However, once the machine was restarted, actual operation of the machine demonstrated that the targeted production was not achievable with the existing number of cans.

In the current permit application (No. 5900069.16C), Domtar stated that this project had not yet occurred and requested the installation of additional dryer cans. Domtar explained that dryer cans use process steam to aid in the removal of moisture from the product and the steam does not contact the pulp product. Therefore, the dryer cans are not a source of emissions and additional dryer cans would not result in an increase in emissions over what was projected in the NC-5 Project permit application and neither pulp production nor steam usage would increase over baseline rates from the NC-5 Project and the addition of more dryer cans. Increases in steam usage were addressed in the NC-5 Project Permit Application (No. 5900069.09B) and are reflected in the netting analysis conducted to determine PSD applicability (see Section IV.A). DAQ does not object to the addition of additional dryer cans since they are not emissions sources and there will be no changes to the emissions estimated for the original project.

III. Project Regulatory Review

The original permit application (No. 5900069.12D) for the LSRP Project was processed and Permit No. 04921T39 was issued as the first step of a two-step significant modification under 15A NCAC 02Q .0501(b)(2). Subsequently, Domtar submitted Permit Application No. 5900069.13A for the second step of the two-step significant modification and after the required public and EPA notice and comment period, Permit No. 04921T41 was issued on September 10, 2014. A detailed regulatory review was conducted for this project to issue permits T39 and T41. As Domtar has stated in this current permit application (No. 5900069.16C), the project was completed as stated in the original permit applications. As such, the complete regulatory applicability analysis that was previously conducted and approved via the notice and comment period still applies and will not be repeated in this Preliminary Determination.

The following paragraphs address the PM Standards for the Nos. 1 and 2 Hog Fuel Boilers, the NC toxics program associated with this project, the existing PSD avoidance condition associated with this project and new PSD condition (developed as specified in Section IV).

A. PM Standards for Nos. 1 and 2 Hog Fuel Boilers

North Carolina regulation 15A NCAC 02D .0503, "Particulates from Fuel Burning Indirect Heat Exchangers," applies to particulate matter emissions from fuel combustion that are discharged from any stack or chimney into the atmosphere. The current permit does not include a condition for 15A NCAC 02D .0503 for the Nos. 1 and 2 Hog Fuel Boilers. The purpose of this regulatory review is to evaluate the applicability of NCAC 02D .0503 to these boilers.

When firing fossil fuels (i.e., natural gas and fuel oil) or fossil fuels in combination with hog fuel, the Nos. 1 and 2 Hog Fuel Boilers are subject to PM standards under North Carolina Regulations under 15A NCAC 02D .0524 and the federal New Source Performance Standards (NSPS) under 40 CFR Part 60, Subpart D. According to 15A NCAC 02D .0524,

> …sources subject to new source performance standards promulgated in 40 CFR Part 60 shall comply with emission standards, monitoring and reporting requirements, maintenance requirements, notification and recordkeeping requirements, performance test requirements, test method and procedural provisions, and any other provisions, as required therein, rather than with any otherwise-applicable rule in this Section which would be in conflict therewith.

In other words, some sources of pollutants regulated under NSPS (02D .0524) are not subject to other rules in Section 02D .0500.

Both Subpart D and 02D .0503 regulate particulate matter. However, the pollutant regulated by Subpart D is filterable PM, as measured by 40 CFR Part 60, Appendix A, Method 5 [40 CFR 60.46(b)(2)]. The pollutant regulated by 02D .0503 is TSP, which is the combination of filterable and condensable PM. Because the pollutant being regulated by 02D .0524 is a subset of TSP, the emission limit under 02D .0503 is not in conflict with 02D .0524. Furthermore, when firing natural gas alone, the PM standards under Subpart D do not apply to the power boiler [40 CFR 60.42(d)]. Therefore, 02D .0503 applies to the Nos. 1 and 2 Hog Fuel Boilers and a condition needs to be added to the permit.

Under 02D .0503, the particulate matter emission limit is calculated using the following equation:

$$E = 1.090 \times Q^{-0.2594}$$

Where:

E = allowable emissions limit for total suspended particulate matter (TSP) in lb/million Btu; and

Q = maximum heat input in million Btu/hr. The maximum heat input is the total heat content of all fuels and is the sum of maximum heat input of all fuel burning indirect heat exchangers at a plant site which are in operation, under construction, or permitted when determining the allowable emission limit for each fuel burning indirect heat exchanger.

As shown in the equation above, the maximum heat input, Q, is defined as the maximum heat input of all fuels and the sum of maximum heat input of all fuel burning indirect heat exchangers (i.e., boilers) at a plant site in operation or permitted when determining the allowable limit for each boiler. When the No. 1 Hog Fuel Boiler was installed in 1977, the Riley Boiler was permitted and operating at the Domtar mill. Therefore, the value of Q is calculated as the sum of the maximum heat input of the No. 1 Hog Fuel Boiler (1,021 MMBtu/hr) and the Riley Boiler (624 MMBtu/hr).[4] Therefore, the value of Q is calculated for the No. 1 Hog Fuel Boiler as follows:

$$Q = \Sigma [\text{max heat input}]_{\text{(Riley and No. 1 Hog Fuel Boilers)}} = 624 \text{ MMBtu/hr} + 1{,}021 \text{ MMBtu/hr} = 1{,}645 \text{ MMBtu/hr}$$

The PM limit for the Nos. 1 Hog Fuel Boiler when firing natural gas alone or oil alone is calculated as follows:

$$E = 1.090 \times [1{,}645 \text{ MMBtu/hr}]^{-0.2594}$$
$$E = 0.160 \text{ lb PM/MMBtu}$$

The No. 2 Hog Fuel Boiler was installed in 1982, with a maximum heat input of 889 MMBtu/hr and the Riley Boiler and No. 1 Hog Fuel Boiler were both still operating. Therefore, the value of Q for the No. 2 Hog Fuel Boiler is calculated as follows:

$$Q = \Sigma [\text{max heat input}]_{\text{(Riley, Nos. 1 and 2 Hog Fuel Boilers)}} = 624 \text{ MMBtu/hr} + 1{,}021 \text{ MMBtu/hr} + 884 \text{ MMBtu/hr}$$
$$= 2{,}534 \text{ MMBtu/hr}$$

Therefore, the PM limit for the No. 2 Hog Fuel Boiler when firing natural gas alone or oil alone is calculated as follows:

$$E = 1.090 \times [2{,}534 \text{ MMBtu/hr}]^{-0.2594}$$
$$E = 0.143 \text{ lb PM/MMBtu}$$

The Riley Boiler was decommissioned after 1983 (in 2006). Per 02D .0503, the PM limits associated with the Nos. 1 and 2 Hog Fuel Boilers would not change with Riley Boiler's decommissioning.

Due to the inherently low PM emissions from natural gas combustion, no control is necessary to comply with the limit. No testing, monitoring, recordkeeping, or reporting will be required for natural gas combustion alone in the Nos. 1 and 2 Hog Fuel Boilers.

[4] Heat input data provided by B. Huddleston, WaRO and confirmed by D. Hardison, Domtar, via email on 02/19/2019.

Per 02D .0504(f), for fuel burning equipment that burns both wood and other fuels in combination, or for wood and other fuel burning equipment that is operated such that emissions are measured on a combined basis, shall be calculated by the following equation in 02D .0503(f):

$E_C = [(E_W)(Q_W) + (E_O)(Q_O)] / Q_t$

Where:

- E_C = the emission limit for combination or combined emission source(s) in lb/million Btu.
- E_W = plant site emission limit for wood only as determined by Rule .0504 of this Section in lb/million Btu.
  - = 0.22 lb/MMBtu (see below)
- E_O = the plant site emission limit for other fuels only as determined by 02D .0503(c) in lb/million Btu.
  - = 0.160 lb/MMBtu for No. 1 Hog Fuel Boiler
  - = 0.143 lb/MMBtu for No. 2 Hog Fuel Boiler
- Q_W = the actual wood heat input to the combination or combined emission source(s) in Btu/hr.
  - = 1,724 MMBtu/hr
- Q_O = the actual other fuels heat input to the combination or combined emission source(s) in Btu/hr.
  - = 1,910 MMBtu/hr
- Q_t = $Q_W + Q_O$ and is the actual total heat input to combination or combined emission source(s) in Btu/hr.
  - = 3,634 MMBtu/hr.

The current permit (T45) has permit conditions for 15A NCAC 02D .0504 (Particulates from Wood Burning Indirect Heat Exchangers) when firing wood alone. The Nos. 1 and 2 Hog Fuel Boilers have PM limits under 02D .0504 using the following equation:

$E = 1.1698\ Q^{-0.2230}$

Where:

- Q = maximum heat input in million Btu/hour.
  - = 1,724 MMBtu/hr (No. 1 Hog Fuel Boiler maximum heat input is 835 MMBtu/hr and No. 2 Hog Fuel Boiler maximum heat input is 889 MMBtu/hr).
- E = allowable emission limit for particulate matter in lb/million Btu
  - = 0.22 lb/MMBtu

Domtar adds lignin to the hog fuel pile and burned with the hog fuel. Therefore, the limit in 02D .0504 covers lignin firing in the boilers and no changes to this condition is necessary.

B. Toxic Air Pollutant Condition under 15A NCAC 02D .1100 AND 02Q .0700

Domtar previously triggered a toxics analysis and compliance with the acceptable ambient levels (AALs) was demonstrated for the toxic air pollutants (TAPs) with emissions greater than the TAP permitted emission rate (TPER). Compliance was demonstrated on a source-by-source basis for the facility and the current permit contains both facility wide and source-by-source TAP limits.

In a permit application received March 6, 2018 (Permit Application No. 18A), Domtar conducted a complete facility-wide analysis to determine which TAPs were emitted in amounts greater than the TPER for each averaging period after proposed mill optimization modifications. As a part of that analysis, Domtar determined that 29 compounds exceed the associated TPER and submitted a modeling analysis for those 29 TAPs. The baseline modeling was conducted to represent current emission factors and equipment throughputs. Twenty-nine TAPs were modeled from point, area, and volume sources. Revised optimization factors for each TAP were developed such that the maximum modeled output is 98 percent of the AAL. DAQ reviewed the provided modeling analysis and determined that the results demonstrate compliance assuming the source parameters and pollutant emissions rates are correct. The modeling was approved on April 30, 2018 and associated TAP limits were incorporated into Permit No. 04291T45, issued August 15, 2018.

Because the emissions modeled represent the most current facility emission sources, including the sources that were added under the original permit application submitted for the LSRP project (Permit Application No. 5900069.12D), as well as any changes to the mill that have been processed since the 2011 permit application, no changes to the TAP limits in the permit are necessary as a part of this permitting action.

C. PSD Avoidance under 15A NCAC 02D .0530(u)

In the original permit application (No. 5900069.12D), Domtar used projected actual emissions (PAE) for the purposes of demonstrating that the project did not result in a significant increase in emissions over baseline actual emissions. A permit condition [15A NCAC 02D .0530(u)] was added to the permit to avoid the applicability of PSD. This condition is a tracking condition, requiring Domtar to submit reports to the WaRO for the ten years following regular operation after the change. The .0530(u) condition requires Domtar to report pulp production through the fiberlines as compared to the projected production of 536,657 air dried (unbleached) metric tons per year (ADMT/year).

With this retroactive permit application (No. 5900069.16C), Domtar continued to use PAE for the purposes of demonstrating that the project did not result in a significant increase over baseline actual emissions for all NSR regulated pollutants, except for TRS and H_2S. This avoidance of applicability to PSD condition is necessary to ensure that PAEs for the remaining NSR regulated pollutants are not exceeded. Therefore, no changes to the .0530(u) condition in Section 2.2 D.1 will be necessary as a part of this permitting action.

D. Prevention of Significant Deterioration under 15A NCAC 02D .0530

Because the Domtar facility is located in Martin County, which is in attainment for all NAAQS pollutants, the planned modification and its emissions are required to be assessed in accordance with PSD requirements. Domtar is a major stationary source for PSD purposes, and the TRS and H_2S emission increases that resulted from this modification exceed the significance levels as listed in 40 CFR 51.166(b)(23)(i). Thus, the LSRP operations are subject to a BACT Analysis. As discussed in greater detail in Section IV, the BACT limit for the LSRP operations is 25.9 tpy of TRS (as H_2S) and 23.6 tpy of H_2S from the LSRP and a maximum production rate or 32,850 oven dried metric tons of lignin solids per year (12-month running total).

IV. Prevention of Significant Deterioration

The goal of PSD regulations is to ensure the air quality in clean (i.e., attainment) areas does not significantly deteriorate while maintaining a margin for future industrial growth. The PSD regulations focus on industrial facilities, both new and modified, that create large increases in the emission of certain pollutants. The EPA promulgated final regulations governing the PSD in the Federal Register published August 7, 1980. Effective March 25, 1982, the DAQ received full authority from the EPA to implement PSD regulations in the state.

A. PSD Applicability

Under PSD requirements all major new or modified stationary sources of air pollutants regulated and listed in this section of the Clean Air Act must be reviewed and approved by the permitting authority prior to construction. A major stationary source is defined as any one of 28 named source categories that has the potential to emit 100 tons per year of any regulated pollutant or any other stationary source that has the potential to emit 250 tons per year of any PSD regulated pollutant. Domtar is a pulp mill, which is one of the 28 listed source categories with major source thresholds of 100 tons per consecutive 12-month period, under 40 CFR 51.166 (b)(1)(i)(a) and therefore is a major stationary source for PSD purposes. Therefore, the emission increases as a result of this modification must be compared to the significance levels as listed in 40 CFR 51.166 (b)(23)(i) to determine which pollutants must undergo a PSD review. The compounds emitted by sources that are new and modified by the LSRP Project as well as sources affected by the project and currently regulated under the federal PSD program along with their PSD significant emission rates (SER), as provided in the permit application, are presented in Table 2.

In the revised permit application for the LSRP Project (No. 5900069.16C), Domtar provided a retroactive PSD applicability analysis to determine if any regulated compounds would be subject to PSD review. Emission

Table 2. Summary of Project Emissions Increases from Lignin Dewatering Project at Domtar – Plymouth Mill

	PSD Emissions (tpy)												GHG Emissions (tpy)			
	VOC	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_X**	**CO**	**H_2S**	**TRS (as H_2S)[a]**	**F**	**H_2SO_4**	**Pb**	**CO_2**	**CH_4**	**N_2O**	**CO_2e[e]**
Baseline Emissions	528	1,193	621	504	4,145	3,110	1,610	136	169	5.55	26.2	0.0773	1.01E+07	93.6	95.7	1.01E+07
Accommodated Emissions (for Modified & Affected Units)	494	1,207	629	510	2,729	3,178	1,629	136	171	10.4	22.9	0.0775	9.30E+06	94.2	2,727	1.01E+07
Projected Actual Emissions (for Modified & Affected Units)	548	1,032	556	456	1,110	3,415	1,663	163	204	0.107	25.8	0.0641	9.80E+06	105	103	9.83E+06
Project Emissions Increases	53.6	-175	-72.7	-54.5	-1,619	237	34.3	26.8	33.4	-10.3	2.91	-0.01	4.91E+05	10.5	-2,624	-2.91E+05
PSD Significant Emission Rates	40	25	15	10	40	40	100	10	10	3	7	0.6				7.50E+04
Is Netting Necessary?	Yes	No	No	No	No	Yes	No	Yes	Yes	No	No	No				No
Contemporaneous Increases/Decreases[b]	-46.3	---	---	---	---	-1,058	---	4.56	-7.52	---	---	---				---
Net Emissions Increase	7.3	---	---	---	---	-821	---	26.8	25.9	---	---	---				---
Is PSD review required?	**No**	---	---	---	---	**No**	---	**Yes**	**Yes**	---	---	---				---

[a]The emission increases presented in the permit application were calculated for TRS (as H_2S), meaning that the TRS emissions were calculated by converting individual compounds [methyl mercaptan (MMC), dimethyl sulfide (DMS), and dimethyl disulfide (DMDS)] to the H_2S equivalent using molecular weight and molar sulfur compound ratios. Total reduced sulfur is regulated by 60 CFR Part 60, Subpart BB, which was issued under section 111 of the Clean Air Act, making TRS a Regulated NSR Pollutant [40 CFR 51.166(b)(49)(ii)]. In Subpart BB, TRS is defined as "…the sum of the sulfur compounds hydrogen sulfide, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide, that are …measured by Method 16." The results of Method 16 are reported as the sum of the individual compounds (see Data Analysis and Calculations section of EPA Method 16). Therefore, based on the definition of regulated NSR pollutant and the TRS definition in Subpart BB, TRS should be reported as the sum of the individual compounds. However, revising the TRS emissions in this table would not result in a change in the determination that PSD review was required.

[b]See Table 3, below, for a summary of project emissions included in the contemporaneous netting.

increases were calculated using a comparison of baseline actual emissions (BAE) to PAE as allowed under 15A NCAC 02D .0530. Per the definition of PAE, the PAE do not include the emissions that existing emission units could have accommodated (CHA) during the baseline period and that are unrelated to the project. Domtar also included emission reductions associated with the removal of coal as a permitted fuel with the "in-project" netting calculations. Other proposed emission reductions were included as contemporaneous netting (also called "Step 2" netting calculations).

For the LSRP Project, Domtar selected 2006-2007 as the two-year period for which baseline emissions would be calculated. During this two-year period, Domtar had the highest two-year production of the five years prior to the original November 2011 application. As allowed under 02D .0530(b)(1), a ten-year period is allowed if it is more representative of normal source operation. Therefore, the selected baseline is within the 10-years prior to this retroactive application and NC DAQ is in agreement with Domtar's approach to selection of baseline.

As allowed under section 51.166(b)(40)(i)(*c*), the emissions that could have been accommodated during the baseline period and that are unrelated to the project can be excluded from the projected actual emissions. The CHA emissions for the Nos. 6 and 7 Fiberlines are based on annualized peak production during the baseline period, considering future demand growth. The pulp production that the mill could have accommodated during the baseline period is 499,796 oven dried tons of pulp (ODTP) per year. The removal of lignin from the black liquor prior to the recovery boiler results in a potential increase in pulp production of 6.5% without significant impact to the throughput of the chemical recovery section of the Mill. Though the pulp production increase has not been realized from the project, the effects of the project on operations has been realized through an increase in available alkali in the recovery process. For the purpose of PSD applicability, this increase in pulping chemical availability via the chemical recovery process has been translated to the mill's projected actual production (annual average basis) reaching 536,657 air dried metric tons of unbleached pulp per year (ADMTUP/yr) for the combined Nos. 6 and 7 Fiberlines to calculate projected actual emissions from the project as a worst case.

Table 2 presents the revised project increases in emissions. Baseline actual emissions were recalculated for the No. 6 and 7 Fiberlines, Chemical Recovery, Power Operations, Papermaking Operations, Woodyard Operations, and the Maintenance and Utility activities. Emissions accommodated during the baseline represent the highest actual annual emissions during the two baseline years. The accommodated emissions are not related to the proposed energy projects.

Projected actual emissions were also recalculated for all of the affected sources using a 6.5 percent increase across all production rates in the mill and projected post-project fuel use with the exception of the chemical recovery area. Projected actual emissions from the chemical recovery area are based on maximum design operating rates for that equipment. Because natural gas burners have not been installed in the No. 5 Recovery Boiler, the PAE for the No. 5 Recovery Boiler was calculated for just No. 2 fuel oil. Actual emissions increases and decreases were calculated for projects occurring during the 7-year contemporaneous period for use in netting, as necessary. Potential emissions have been calculated from the new lignin dewatering process.

As shown in Table 2, the project increases in emissions, considering CHA, of VOC, NO_X, TRS and H_2S exceeded their associated SER. Other PSD regulated pollutants' emissions increases did not exceed their associated SERs or emissions decreased or are not emitted as part of this modification. As allowed under the PSD regulations, Domtar considered contemporaneous emission increases and decreases in the seven-year period prior to the commencement of construction, which cannot occur until the permit is issued [40 CFR 51.166(a)(1)(xvi)]. The permit associated with the original project permit application was issued in October 2012 (T39), therefore the contemporaneous time period began in October 2005. Table 3 presents the contemporaneous increases and decreases in VOC, NO_X, H_2S, and TRS emissions from following projects:[5]

- Shutdown of the NC1 Paper Machine (2006);
- Shutdown of Riley Boiler (2006);

[5] NOTE: In both the original permit application (No. 5900069.12D) and the retroactive permit application (No. 5900069.16C), emissions from the Woodyard Modernization Project from 2004 were included in the contemporaneous increases and decreases. This project is outside the contemporaneous window and was removed.

Table 3. Contemporaneous Emission Increases and Decreases

Source Description	Reference	Year of Project	Emissions Increases or Decreases (tpy)			
			VOC	NO_X	H_2S	TRS
Shutdown NC1 Paper Machine	a	2006	-53.65			-6.41
Riley Boiler Shutdown	b	2006	-1.61	-1666.50	-0.04	-0.18
No. 2 Hog Fuel Boiler LVHC/SOG burning	b	2006	1.20	10.00	5.90	11.30
Package Boiler Modifications	b	2006	8.00	618.80	0.00	0.00
Shutdown Secondary Fiber Line	a	2006	-63.06			-12.57
Shutdown SSDF	a	2006	-0.07		-0.02	-0.02
Plymouth Mill NC-5 Project	c	2010	96.54	0.00	0.23	7.94
Shutdown of NC-4 Paper Machine	d	2010	-33.34			-5.91
Package Boiler Shutdown	e	2011	-0.32	-20.10	-1.50	-1.67
Net Change in Emissions			**-46.31**	**-1057.8**	**4.57**	**-7.52**

References:

a. Average actual 2004/2005 emissions reported in the AEI.

b. Energy Savings Project permit application. - Project Emissions are based on potential LVHC burning as stated in the application. NOTE: Package boiler emissions were obtained from Preliminary Determination Review for Permit No. R33, Issued December 29, 2006.

c. Minor NSR construction and operation air permit request - Project Emissions are based on potential throughput of NC5

d. Average actual 2004/2005 and 2005-2006 emissions reported in the AEI.

e. Average actual 2008/2009 emissions reported in the AEI.

- No. 2 Hog Fuel Boiler LVHC/SOG burning addition (2006);
- Shutdown of Secondary Fiber Line (2006);
- Shutdown Secondary Sludge Dewatering Facility (2006);
- Modification to the Package Boiler (2008);[6]
- NC-5 Expansion Project (2010);
- Shutdown of NC-4 Paper Machine (2010); and
- Shutdown of Package Boiler (2011).

After considering the contemporaneous increases, TRS and H_2S emissions increases exceeded the associated SER of 10 tons per year for the project. DAQ has conducted a detailed review of the emission calculations presented in Tables 2 and 3 and the background documentation presented in the permit application. DAQ agrees with Domtar's calculations that demonstrate that the project resulted in significant increases in TRS and H_2S emissions and that increases in other regulated NSR pollutants are not significant.

Based on the PSD applicability analysis, Domtar conducted the required BACT determination for TRS and H_2S and additional impacts analysis, including effects on soils, vegetation, and visibility.

B. BACT Analysis

Under PSD regulations, the determination of the necessary emission control equipment is developed through a BACT review. The regulations define BACT as:

> An emissions limitation... based on the maximum degree of reduction for each pollutant... which would be emitted from any proposed major stationary source or major modification which the reviewing authority, on a case-by-case basis, taking into account energy, environment, and economic impacts and other costs, determines is achievable... for control of such a pollutant. [40 CFR 51.166 (b)(12)]

The BACT requirements are intended to ensure that the control systems incorporated in the design of the proposed facility reflect the latest control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the facility. Additionally, the BACT analysis may consider the impacts of non-criteria pollutants and unregulated toxic air pollutants, if any are emitted, when making the BACT decision for regulated pollutants. Each pollutant subject to a PSD review must meet the criteria of BACT, which refers to the maximum amount of emission reduction currently possible with respect to technical application and economic, energy, and environmental considerations. The pollutants subject to PSD review for the LSRP Project at the Domtar mill are H_2S and TRS.

Because equipment within categories of sources vary widely, it is difficult to establish a uniform BACT determination for a particular pollutant or source. Economics, energy, and environment in combination with the unique functions of the source and engineering design, require BACT to be determined on a case-by-case basis. In most instances BACT may be defined through an emission limitation. In cases where this is impossible, BACT can be defined by the use of a particular type of control device and its achievable emission reduction efficiency. In no event can a technology be recommended that would not comply with any applicable standard of performance established pursuant to section 111 or 112 of the Clean Air Act.

The BACT analysis performed for Domtar included five basic steps:

1) identify all control technologies,
2) eliminate technically infeasible options,
3) rank remaining control technologies by control efficiencies,
4) evaluate the most effective controls and document results, and
5) select BACT.

The first step in this approach is to develop a comprehensive listing of control technologies for each applicable pollutant. Step 2 is a demonstration of technical feasibility to ensure the technology evaluated was appropriate for

[6] NOTE: In both the original permit application (No. 5900069.12D) and the retroactive permit application (No. 5900069.16C), the contemporaneous emissions increases and decreases did not include the modification to the Package Boiler. Although this source was removed in 2011, the actual-to-potential emission increases still are required to be included in the netting calculations. Data for the emissions increases related to the modifications to the package boilers were included in the associated preliminary determination permit review for this project (R33), issued December 29, 2006.

the characteristic gas stream to be treated. Step 3 ranks the remaining control technologies by control effectiveness, including the control efficiencies (percent of pollutant removed), expected emission rate (tons per year and pounds per hour), expected emission reduction (tons per year), economic impacts (cost effectiveness), environmental impacts (including emission of toxic or hazardous air contaminants), and energy impacts (benefits or disadvantages). Step 4 is a case-by-case evaluation of energy, environmental, and economic impacts. Step 5 requires the selection of BACT for the emission source. While the steps are similar to EPA's top-down process, unlike the EPA decision process, NC DAQ follows statutory mandate that economics, energy, and environmental impacts of candidate technologies be evaluated. Because H_2S is a component of TRS, the control technologies will be considered together.

C. BACT Analysis for TRS/H_2S Emissions from the LSRP

This analysis is being conducted retroactively for sources that have already been installed as part of a process to extract lignin from the liquor recovery stream during the chemical recovery process. As currently installed, emissions from all but a few sources are controlled by combustion in either the No. 1 or No. 2 Hog Fuel Boiler. The remaining uncontrolled sources include the Filter Press Building (which encompasses the No. 1 Filter Press, the No. 2 Filter Press, and the No. 3 Conveyor) and the No. 2 Filter Press Cloth Wash Tank. Domtar performed the BACT analysis for controlling the Filter Press Building and the No. 2 Filter Press Cloth Wash Tank combined and for controlling only the No. 1 Filter Press.

1. Identify Control Technologies

A first step in a BACT analysis is to identify candidate control technologies. One of the resources NC DAQ uses to identify control technologies, is the BACT, Reasonably Available Control Technology (RACT), or Lowest Achievable Emission Reduction (LAER) Clearinghouse (RBLC). However, the RBLC typically does not include sufficient documentation to determine if any particular emission rate has been achieved in practice or demonstrated. Additionally, the RBLC fails to provide how each permitting agency considered the statutorily-required environmental, economic, and energy impacts of the various candidate technologies. Without this information, NC DAQ recommends that the best use of the RBLC is to identify technologies that might be installed to reduce a regulated pollutant.

In their permit application (No. 5900069.16C), Domtar described their process for identification of control technologies. Specifically, the following categories of control technologies were searched to identify candidate control alternatives:

- Demonstrated add-on control technologies applied to the same emissions units at other similar source types;
- Add-on controls not demonstrated for the source category in question, but transferred from other source categories with similar emission stream characteristics;
- Process controls such as combustion or alternate production processes;
- Add-on control devices serving multiple emission units in parallel; and
- Equipment or work practices, especially for fugitive or area emission sources where add-on controls are not feasible.

The LSRP at the Domtar mill is the first commercial-scale plant of its kind; therefore, no regulatory decisions for LSRP operations were included in the RBLC. As such, Domtar focused their investigation on similar types of sources. Table 5-2 of the permit application presented the RBLC search results and includes over 90 entries for the control of TRS and hydrogen sulfide. The search of the RBLC identified three technologies commonly used to reduce TRS and H_2S emissions from all types of processes: incineration, pollution prevention by limiting the sulfur content of the process feed streams, and wet scrubbing. NC DAQ also accessed the RBLC database and agrees with Domtar's evaluation of control technologies available to reduce TRS and H_2S emissions.

Incineration

The following means of incineration at the Domtar mill were explored: incorporation of emissions into an HVLC collection system and combustion in the No. 5 Recovery Boiler; installation of a new regenerative thermal oxidizer (RTO), or installation of a new regenerative catalytic oxidizer (RCO).

- *Combustion in the No. 5 Recovery Boiler:* The TRS/H_2S laden gases from the LSRP are similar in characteristics and nature to the HVLC gases currently required to be controlled to demonstrate compliance with the pulp and paper national emission standard for hazardous air pollutants (NESHAP) under 40 CFR Part 63, Subpart S. At the time of the LSRP project, Domtar was permitted to control HVLC gases in the No. 5 Recovery Boiler as a backup control device for the hog fuel boilers. An engineering evaluation of the capacity of the existing system determined that the HVLC system was operating its maximum collection capacity and could not accept gases from the remaining uncontrolled sources. As a result, the only option was to construct an additional system to collect and burn the gases in the recovery boiler.[7]
- *Thermal Oxidization (TO):* In a thermal oxidizer, compounds are oxidized at high temperature to form carbon dioxide (CO_2) and water. A thermal oxidizer can be regenerative or recuperative. In a regenerative thermal oxidizer (RTO), heat is recovered by alternatively passing the hot exhaust gases and the cool inlet gasses through a fixed bed. In a recuperative oxidizer, heat is recovered by passing the hot exhaust gases through a non-contact air-to-air heat exchanger, to heat the incoming air to the oxidizer. A recuperative thermal oxidizer can achieve emission reductions of 95 to 99 percent or higher, while a recuperative oxidizer emission reduction typically ranges from 90 to 99 percent.
- *Regenerative Catalytic Oxidation (RCO):* Catalytic oxidizers use a catalyst to promote the oxidization of compounds to CO_2 and water, at typically lower temperatures than thermal oxidizers. Emission reductions of 98 to 99 percent can be achieved but are somewhat dependent on catalyst volume.

Pollution Prevention – Limit Sulfur Content of Inlet Stream

Total reduced sulfur compounds, which include methyl mercaptan (MMC), dimethyl sulfide (DMS), dimethyl disulfide (DMDS), and H_2S are present in black liquor. These compounds form in the pulping process during the breakdown of lignin (the compound that forms the structure of wood and bark). TRS compounds remain soluble in caustic solutions, such as black liquor. To achieve lignin precipitation in the LSRP, the pH of the solution is lowered to make it more acidic. This change in pH results in TRS compounds volatilizing and being emitted from the process. For many years, the pulp and paper industry has reduced the emissions of these sulfur-containing compounds from the chemical recovery process using a process called black liquor oxidization (BLO). In mills with direct-contact evaporation (DCE), TRS compounds are stripped from the black liquor when hot flue gases from the recovery boiler contact the black liquor. The BLO system reduces the stripping of TRS compounds by stabilizing the sulfur compounds prior to the DCE. In this process, TRS compounds are oxidized prior to combustion by exposing the compounds to oxygen, hydrogen peroxide, or ambient air to convert the sulfides to less volatile sulfates or thiosulfates in solution. The reduction of TRS compounds in the liquor entering the LSRP would lower TRS compound (including H_2S emissions) emissions when the pH is lowered.

Wet Scrubbing

Wet scrubbers are a commonly used control technology for reducing TRS emissions, and especially H_SS from process vent gas streams. A caustic scrubber liquor neutralizes and removes the acid gases in the vent stream. At pulp mills, white liquor is frequently used as the caustic solution in the scrubber as it is readily available. Domtar estimated that the emission reduction associated with the white liquor scrubber would be 98 percent for H_2S and 90 percent for MMC. Because DMS and DMDS are more volatile compounds, Domtar did not take credit for any reduction in emissions the wet scrubber would achieve for these compounds.

2. Eliminate Technically Infeasible Options

As noted above, three control technologies were considered in this BACT analysis: incineration, limiting the sulfur content of the process feed stream via black liquor oxidation, and wet scrubbing. Each of these were considered for technical feasibility.

[7] In a 2018, DAQ issued a permit modification (Permit No. 04291T45) for a mill optimization project (in response to Permit Application No. 5900069.18A). As a part of that the mill optimization project, Domtar was considering shutting down the No. 1 Hog Fuel Boiler, which currently serves as a control device for HVLC gases collected from the pulp mill and some LSRP sources. To ensure that pulp mill sources achieve continued compliance with the applicable regulations, Domtar proposed the installation of a new thermal oxidizer as a backup HVLC system control device. At the time the retroactive PSD permit application was submitted in November 2016, Domtar was not considering the thermal oxidizer and as such it was not included in their BACT analysis. This new oxidizer was sized to control the existing HVLC system and would not have the capacity to control the uncontrolled LSRP sources and was therefore not considered in this evaluation.

Black Liquor Oxidation

Domtar contracted with a vendor to provide recommendations associated with options for using black liquor oxidation to reduce the sulfur content of the process feed stream and evaluated these recommendations for technical feasibility. The result of this evaluation was that black liquor oxidation was determined to be technically infeasible as an option to reduce TRS and H_2S emission from LSRP sources. This determination was based on the following:

- Oxidation of black liquor with hydrogen peroxide would result in an approximately 50 percent reduction in lignin yield and had the following issues:
  - Oxidizing the black liquor with hydrogen peroxide reduces the ability to lower pH of the feed stream slurry, which is necessary to precipitate lignin out of solution.
  - Oxidation of the sulfur compounds dilutes the feedstock necessitating additional steps in the recovery process.
  - Use of hydrogen peroxide could result in explosion hazards due to violent oxidation of organics in the liquor.
- Black liquor oxidation using ambient air or pure oxygen forms thiosulfates and Domtar estimates it would result in a 5 percent reduction in lignin yield. However, thiosulfate is not stable in an acidic solution and degrades to sulfur and sulfur dioxide.[8] This would result in the following concerns:
  - The potential presence of SO_2 will require additional equipment to protect process employees and could cause corrosion of process equipment.
  - The potential presence of SO_2 could pose a greater explosion hazard than TRS compounds.
  - Large quantities of thiosulfates would be sent back into the process, creating losses in the heating value of the liquor and reduce recovery boiler efficiency as well as corrosion potential.
  - Oxidation also has been shown to result in significant foaming of the liquor and increases in hazardous air pollutant (HAP) emissions.
- Domtar conducted trials using pure oxygen to attempt to use the black liquor oxidation control technology. The trials were found to be unsuccessful because:
  - To reduce the issues with the presence of thiosulfate, the oxidation would need to be continued until the reduced sulfur compounds were converted to sulfates.
  - During the trials, lower explosive limit (LEL) meters that were installed on the process began to alarm well before attaining complete conversion to sulfates and SO_2 was detected.

Due to the issues described above, Domtar concluded, and DAQ agrees with this conclusion, that black liquor oxidation was not technically feasible.

Incineration and Wet Scrubbing

Domtar determined that incineration and wet scrubbing were technically feasible and would be further considered in the BACT analysis. Specifically, Domtar stated:

- Use of oxidizer technology to reduce emissions from HVLC gases is well-known and is currently used throughout the industry in similar types of applications. The use of RCO had some risk of catalyst fouling due to the presence of ammonia and sulfur compounds.
- Destruction of LSRP gases in the recovery boiler is a proven technology used in many mills and is technically feasible.

3. Rank Remaining Control Technologies by Effectiveness

The remaining technically feasible control technologies for removing TRS and H_2S emissions from the uncontrolled LSRP sources were ranked from the most stringent to the least stringent, as shown in Table 4, below. Domtar provided the control efficiencies for the various add-on controls. DAQ has reviewed the detailed cost calculations in Appendix E of the permit application (No. 5900069.16C).

[8] Flinn Scientific, Inc. Publication No. 91860. *Rate of Reaction of Sodium Thiosulfate and Hydrochloric Acid*. 2017. Available online at https://www.flinnsci.com/api/library/Download/78da6c8204aa48a294bd9a51844543ad

Table 4. Technically Feasible Control Technologies Ranked by Control Efficiency

Control Technology	Approximate Control Efficiency (%)
Recovery Boiler	TRS and H_2S: 98
Regenerative Thermal Oxidizer	TRS and H_2S: 98
Regenerative Catalytic Oxidizer	TRS and H_2S: 98
Wet Scrubbing	MMC: 90 H_2S: 98

4. Evaluate Technically Feasible Control Options

A cost analysis, consistent with the Clean Air Act, was performed on the add-on control technologies that were shown to be technically feasible. As stated above, sources identified to be controlled included the Filter Press Building and the No. 2 Filter Press Cloth Wash Tank. Because the primary source of emissions in the Filter Press Building is the No. 1 Filter Press Enclosure, Domtar also included cost analyses for controlling that source as well.

Assumptions Used in the Cost Analysis

To perform the cost analysis, it was necessary to make engineering judgments concerning the various add-on controls. Assumptions used in performing this analysis are included in the detailed cost calculations presented in Appendix E of the permit application (No. 5900069.16C). All cost estimates were prepared using potential TRS and H_2S emission rates for the LSRP operations. Annual operational hours were assumed to be 8,760 per year.

Cost Effectiveness

The cost impacts of controlling equipment emissions with add-on controls are presented in Table 5, below. The cost impacts were estimated using the Office of Air Quality Planning and Standards (OAQPS) Control Cost Manual (OCCM),[9] past permitting experience, EPA Technology Fact Sheet for oxidizers, test data, and vender quotes. All costs provided in the CCM were updated to 2015 dollars using the Consumer Price Index Price Inflation calculator.[10]

Energy and Environmental Impacts

Although each of the potentially feasible add-on control devices evaluated provides reductions in TRS and H_2S emissions, the devices also have associated negative energy and/or secondary environmental impacts. Secondary environmental impacts are increases in pollutants that result from the use of the control technology. The energy and secondary environmental impacts are presented in Table 6, below, for each add-on control alternative. In the case of combustion (thermal and catalytic oxidization, as well as in the recovery boiler), the destruction of TRS compounds would result in increases in SO_2 emissions. Assuming a 100 percent conversion of TRS compounds to SO_2, estimates of SO_2 increases were estimated by multiplying the TRS (as H_2S) emissions in Table 5, below, by the SO_2 molecular weight (64 lb SO_2/lbmole of SO_2) and dividing by the H_2S molecular weight (34 lb/lbmole). Although increases in other regulated compounds, such as NO_X or CO, can be attributed to the combustion of natural gas, they are orders of magnitude lower than the increase in SO_2 emissions.

5. Selection of BACT for Uncontrolled LSRP Sources

As shown in Table 5, the cost effectiveness associated with all identified technically feasible add-on control technologies was greater than $20,000/ton. These cost effectiveness values make each of these technologies cost prohibitive. Furthermore, the negative secondary environmental impacts presented in Table 6 for combustion control technologies also eliminate these sources from consideration as BACT. Therefore, Domtar proposed TRS and H_2S limits, which are based on test data from the facility and potential production rates (See Table 1, above). Specifically, Domtar proposed BACT limits of 25.9 tpy of TRS (as H_2S) and 23.6 tpy of H_2S from the LSRP and a maximum production rate or 32,850 oven dried metric tons of lignin solids per year. These limits will apply on a 12-month rolling basis.

[9] Office of Air Quality Planning and Standards Cost Control Manual. Sixth Edition. EPA-450/3-90-006. Office of Air Quality Planning and Standards, Environmental Protection Agency, Research Triangle Park, North Carolina. January 2002.
[10] Consumer Price Index Calculator developed by the US Department of Labor Bureau of Labor Statistics.

Table 5. Summary of Cost Effectiveness Calculations for Technically Feasible Add-On Control Technologies to Control TRS and H_2S Emissions from LSRP Process

Add-On Control Technology	TRS Emission Reduction (tpy)[a]	H_2S Emission Reduction (tpy)	Economic Impacts			
			Total Capital Cost ($)	Total Annual Cost ($/yr)	TRS Cost Effectiveness ($/ton)[a]	H_2S Cost Effectiveness ($/ton)
RCO – No. 1 Filter Press Only	17.0	16.0	1,747,171	1,364,368	80,380	85,096
RCO – Remaining Uncontrolled Sources[b]	21.2	19.4	3,437,961	1,686,150	79,665	86,802
RTO – Remaining Uncontrolled Sources[b]	21.2	19.4	3,437,961	1,682,339	79,485	86,606
RTO – No. 1 Filter Press Only	17.0	16.0	1,747,171	1,344,890	79,233	83,881
No. 5 Recovery Boiler – Remaining Uncontrolled Sources[b]	21.2	19.4	5,296,800	1,240,302	58,600	63,850
No. 5 Recovery Boiler – No. 1 Filter Press Only	17.0	16.0	3,445,103	963,387	56,757	60,087
White Liquor Scrubber – Remaining Uncontrolled Sources[b]	20.2[c]	19.4	2,121,000	478,970	23,696	24,657
White Liquor Scrubber – No. 1 Filter Press Only	16.4[c]	16.0	1,349,857	363,648	22,232	22,681

[a] Domtar calculated TRS Emission Reduction for TRS (as H_2S). The numbers presented in this table were not recalculated for TRS as the sum of the individual compounds because a recalculation would not impact the cost effectiveness values enough to change the economic impact results (see Appendix A).

[b] The remaining uncontrolled sources are the Filter Press Building and the No. 2 Filter Press Cloth Wash Tank.

[c] The white liquor scrubber does not reduce emissions of dimethyl sulfide and dimethyl disulfide. Therefore, the TRS emissions presented for control of the white liquor scrubber only include H_2S and methyl mercaptan. Emission reduction calculated by applying the individual emission reduction of 98 percent for H_2S and 90 percent for MMC.

Table 6. Summary of Environmental Impacts Associated with Technically Feasible Control Technologies[a]

Control Alternatives	Adverse Impacts From Other Air Pollutants?[b] (Yes/No)	SO_2 Generated (ton/yr)[b]	Hazardous Waste Impacts? (Yes/No)	Energy Impacts	
				Electrical (kW*hr/yr)	Fuel (MM Btu/yr)
RCO on No. 1 Filter Press Enclosure	Yes	32.0	No	5,487,989	16,071
RCO on remaining uncontrolled sources	Yes	39.8	No	5,487,989	32,290
RTO on remaining uncontrolled sources	Yes	39.8	No	5,487,989	39,628
RTO on No. 1 Filter Press Enclosure	Yes	32.0	No	5,487,989	19,723
Incineration of all remining uncontrolled sources in Recovery Boiler	Yes	39.8	No	1,960,488	0
Incineration of No. 1 Filter Press Emissions in Recovery Boiler	Yes	32.0	No	1,960,488	0
White Liquor Scrubber on remaining uncontrolled sources	No	0.0	No	490,122	0
White Liquor Scrubber on No. 1 Filter Press Enclosure	No	0.0	No	490,122	0

[a] Source is Table E-12 of Permit Application No. 5900069.16C.

[b] Determination of whether adverse impacts are caused by control alternative. "Yes" response indicates that criteria or hazardous air pollutants are emitted. In the case of the RCO and RTO, increases of combustion pollutants, including NO_X, SO_2, $PM/PM_{10}/PM_{2.5}$, CO, and VOCs, are expected.

[c] TRS (as H_2S) Emissions presented in Table 5, above, converted to SO_2 Emissions. SO_2 emissions will not be formed in the white liquor scrubber.

D. PSD Air Quality Impact Analysis

PSD regulations [40 CFR 51.166(k)] require an applicant to perform an ambient impact analysis to demonstrate, (1) that no NAAQS will be exceeded at any location and during any time period where the proposed new source or modification will have significant impact; and (2) that the proposed new source or modification, in combination with other increment-affecting sources, will not cause any allowable PSD increment to be exceeded. PSD regulation 40 CFR 51.166(m) requires analysis of ambient air quality in the impact area of the proposed source or modification for all pollutants (including those for which no NAAQS exist) with emissions increases in significant [40 CFR 51.166(b)(23)] quantities.

1. Potential Emissions

The regulated NSR pollutants that increased above the SER were TRS and H_2S. There are no established NAAQS for these compounds and therefore no associated PSD increment.

2. Non-Regulated Pollutant Impact Analysis

The LSRP sources emit TRS compounds, including H_2S, MMC, DMS, and DMDS. During negotiations of the SOC, Domtar provided an air dispersion modeling analysis that compared potential emissions of the TRS compounds for which North Carolina has established acceptable ambient levels (AALs), H_2S and MMC, to those associated AALs.

The modeling was updated using 2016 test data for the lignin dewatering process sources. This modeling included a 50 percent safety margin. Wastewater sources, which are exempt for NC TAPs modeling per 15A NCAC 02Q .0702, were also included in this modeling. Results from the modeling showed that the maximum impact for H_2S was 94.7 $\mu g/m^3$, which is 78.9 percent of the current AAL for H_2S. The maximum impact for MMC was 36.7 $\mu g/m^3$, which is 73.3 percent of the current AAL for MMC. These results indicate that there was no unacceptable risk to human health or the environment at the maximum potential emission rates of the LSRP. The modeling was reviewed and approved by Mr. Matt Porter, with the Air Quality Analysis Branch (AQAB).[11]

E. Additional Impact Analysis

PSD regulations [40 CFR 51.166(k)] also require a discussion of additional impacts and evaluation of potential impacts at Class I areas. The additional impact analysis generally has four parts as follows:

- Visibility impairment,
- Growth,
- Soils impacts, and
- Vegetation impacts.

Class I areas are federally protected areas for which more stringent air quality standards apply to protect unique natural, cultural, recreational, and/or historic values. The nearest Class I area is Swanquarter National Wilderness Area, which is located approximately 56 km from the facility.

1. Visibility Impairment

Visibility impairment is primarily a function of PM and NOx emissions. Domtar is not subject to PSD review for any pollutants other than TRS and H_2S. Because there are no significant increases of visibility-affecting pollutants, no analysis of visibility impairment is required for this project.

[11] Memorandum from Porter, M., NC DAQ/AQAB to H. Sands, NC DAQ/Permitting Section. Review of Dispersion Modeling Analysis for Domtar Plymouth Lignin Solids Removal Process and Other Energy Improvements, Domtar Paper Company – Plymouth Mill. August 31, 2017.

2. Growth Analysis

The growth analysis includes the projection of the associated industrial, commercial and residential source emissions that will occur in the area due to modification of the source. Domtar stated that the addition of the new process benefits the economy by providing jobs for 13 individuals within the community. As the market for the raw material begins to mature, additional insignificant air impacts will occur due to transportation of the material to customers. Transportation is anticipated to be performed by truck and may utilize trucks that would typically leave the facility empty after delivering raw materials. DAQ agreed with Domtar's conclusion that the addition of the LSRP was not projected to significantly impact commercial, industrial, or residential growth within the community.

3. Soils and Vegetation

Domtar presented two available studies to document the impact of reduced sulfur compounds on soils and vegetation, specifically ones that focus primarily on H_2S. In a 1978 study performed by Ray Thompson and Gerrit Kats of the University of California, Statewide Air Pollution Research Center in Riverside California,[12] the effects of continuous fumigation of crops and forest plants with hydrogen sulfide was evaluated. According to this study, significant negative impacts to vegetation can occur at prolonged elevated concentrations above 300 parts per billion (ppb) in ambient air. However, the study also revealed that at lower concentrations (30 to 100 ppb), hydrogen sulfide exposure to crops significantly increased the crop yield and supported accelerated growth. Another study conducted by Frederick Dooley of the University of Washington in in 2013[13] confirmed these observations. Dooley utilized low doses of hydrogen sulfide (1 ppb) in water to treat seeds and seedlings which resulted in increased growth and yield of the species tested with germination rates increasing from 40 percent up to 60-70 percent. The maximum potential modeled concentrations beyond the fence line for the Domtar Mill including potential emissions for the new LSRP are roughly 67 ppb at the highest receptor. This modeled concentration falls within the range of concentrations shown to have a positive impact on crop yield. Therefore, studies indicate that, at the predicted modeled concentrations, the impacts to these environmental media are shown to be beneficial based on the results of the two studies identified above. DAQ has reviewed these studies and did not identify any additional studies related to reduced sulfur compound impacts on soils and vegetation. DAQ agrees with Domtar's conclusion that there is no detrimental impact expected from the proposed project.

4. Class I Impact Analysis

PSD Class I impact analyses contain evaluations of Air Quality Related Values (AQRV) and PSD increment, where applicable. AQRV are typically defined as visibility (both near-field plume impairment and/or regional haze) and acidic deposition. As previously discussed, there will be no signification increases of any visibility–affecting pollutants because of this modification. Thus, no visibility analysis is warranted. A copy of the application was sent to the Federal Land Manager and no comments on the proposed project were received.

There are also no significant increases of any deposition-related pollutants (SO_2 or NO_X) expected as result of this modification. Therefore, no deposition analysis is required.

Finally, there are no modeling related standards for TRS and H_2S (e.g. NAAQS or PSD increments). Therefore, no Class I or Class II area dispersion modeling analyses are required for this permit modification.

F. Public Participation Requirements

In accordance with 40 CFR 51.166(q), Public Participation, the reviewing authority (NC DAQ) shall meet the following:

(1) Make a preliminary determination whether construction should be approved, approved with conditions, or disapproved.

[12] Ray Thompson, C & Kats, Gerrit. (1978). Effects of H2S fumigation on crop and forest plants. Environmental Science & Technology - ENVIRON SCI TECHNOL. 12. 10.1021/es60141a001.
[13] Dooley, Frederick & P Nair, Suven & Ward, Peter. (2013). Increased Growth and Germination Success in Plants following Hydrogen Sulfide Administration. PloS one. 8. e62048. 10.1371/journal.pone.0062048.

This document satisfies this requirement providing a preliminary determination that construction should be approved consistent with the permit conditions described herein.

(2) Make available in at least one location in each region in which the proposed source would be constructed, a copy of all materials the applicant submitted, a copy of the preliminary determination, and a copy or summary of other materials, if any, considered in making the preliminary determination.

This preliminary determination, application, and draft permit will be made available in the Washington Regional Office and in the Raleigh Central Office, with the addresses provided below.

Washington Regional Office	Raleigh Central Office
943 Washington Square Mall	217 West Jones Street
Washington, NC 27889	Raleigh, NC 27603

In addition, the preliminary determination and draft permit will be made available on the NC DAQ public notice webpage.

(3) Notify the public, by advertisement in a newspaper of general circulation in each region in which the proposed source would be constructed, of the application, the preliminary determination, the degree of increment consumption that is expected from the source or modification, and of the opportunity for comment at a public hearing as well as written public comment.

NC DAQ prepared a public notice (See Appendix B) that will be published in a newspaper of general circulation in the region.

(4) Send a copy of the notice of public comment to the applicant, the Administrator and to officials and agencies having cognizance over the location where the proposed construction would occur as follows: Any other State or local air pollution control agencies, the chief executives of the city and county where the source would be located; any comprehensive regional land use planning agency, and any State, Federal Land Manager, or Indian Governing body whose lands may be affected by emissions from the source or modification.

NC DAQ will send the public notice (see Appendix B) to the Martin County Manager at 305 East Main Street, PO Box 668, Williamston, NC 27892 and dbone@martincountyncgov.com as well as those on the official email distribution lists for PSD permit applications.

(5) Provide opportunity for a public hearing for interested persons to appear and submit written or oral comments on the air quality impact of the source, alternatives to it, the control technology required, and other appropriate considerations.

The NC DAQ public notice (See Appendix B) provides contact information to allow interested persons to submit comments and/or request a public hearing.

V. Other Issues

A. Compliance

NC DAQ has reviewed the compliance status of this facility. The most recent inspection was completed during nine site visits between October 10, 2017, and September 30, 2018. Betsy Huddleston of the WaRO indicated that the facility appeared to be in compliance with all applicable requirements, except for the No. 2 Hog Fuel Boiler south electroscrubber voltage monitoring violation (see below for further discussion).

The following is the five-year compliance history for Domtar.

- A Notice of Violation/Notice of Recommendation for Enforcement (NOV/NRE) was issued on June 19, 2014, for NESHAP Subpart S violations pertaining to operation of condensate stripper that was damaged in mid-February 2014. Methanol concentration exceeded the limit for 10 days in March 2014. A civil

penalty in the amount of $11,542, including costs, was issued on December 11, 2014. The civil penalty was paid in full on December 29, 2014.

- A Notice of Violation (NOV) was issued August 25, 2014, for NESHAP Subpart S violations for running the No. 7 Bleach Plant chlorine scrubber for three hours after startup. No Notice of Recommendation for Enforcement (NRE) was issued and this violation has been considered resolved.
- A NOV/NRE was issued on February 20, 2015, for operation of LSRP Process without a PSD permit. Domtar entered into SOC 2015-01 with interim deliverables to bring the facility into compliance. A civil penalty in the amount of $100,000 was issued and Domtar was required to pay $1,000 per month until the SOC is closed when a PSD permit was issued. This permit action will close the SOC.
- A Notice of Deficiency (NOD) was issued on August 28, 2015, because downtime of the NO_X continuous emissions monitoring system (CEMS) installed on the No. 2 Hog Fuel Boiler exceeded the DAQ guideline level of 6 percent for demonstration of proper operation and maintenance practices. The NOD has been resolved.
- A NOD was issued on August 30, 2016, for two MACT Subpart S and Subpart MM related deviations related to the No. 6 Bleach Plant Third Stage Tower and Recovery Boiler corrective action plan check sheets. The NOD has been resolved.
- A NOV was issued on December 9, 2016, because downtime of the NO_X CEMS installed on the No. 2 Hog Fuel Boiler exceeded the DAQ guideline level of 6 percent for demonstration of proper operation and maintenance practices. The NOV was resolved as of January 11, 2017.
- A NOV was issued on February 24, 2017, because downtime of the NO_X CEMS installed on the No. 1 Hog Fuel Boiler exceeded the DAQ guideline level of 6 percent for demonstration of proper operation and maintenance practices. The NOV was resolved as of February 24, 2017.
- A NOV/NRE was issued on September 8, 2017, for exceedance of the NSPS Subpart BB TRS limit on the No. 5 Lime Kiln, exceedance of the NSPS Subpart D NO_X limit on the No. 1 Hog Fuel Boiler, and exceedance of the NSPS Subpart D opacity limit on the No. 1 Hog Fuel Boiler. A civil penalty in the amount of $19,837, including costs, was issued on December 13, 2017. The civil penalty was paid in full and the NOV/NRE was closed on March 3, 2018.
- A NOV was issued on September 7, 2018, was issued for incomplete records associated with secondary voltage monitoring of the No. 2 Hog Fuel Boiler electroscrubber modules. A civil penalty in the amount of $9,456, including costs was issued on February 4, 2019 and is due on March 10, 2019. The case is still active.
- A NOV was issued on November 28, 2018, because downtime of the TRS CEMS installed on the No. 5 Lime Kiln exceeded the DAQ guideline level of 6 percent for demonstration of proper operation and maintenance practices. The NOV was resolved as of January 11, 2019.

The signed Title V Compliance Certification (Form E5) included with the permit application, received on October 25, 2016, indicated that the facility was not in compliance with all applicable requirements. Specifically, Domtar is operating under an SOC for operation of the LSRP Process without a PSD permit. Domtar entered into SOC 2015-01 with interim deliverables to bring the facility into compliance. As such, the required Emission Source Compliance Schedule (Form E4) was also included, stating that a compliance would be followed as specified in SOC 2015-01. This permitting action will satisfy the permitting requirements of SOC 2015-01.

B. Zoning Requirements

Domtar is located in an area without zoning. Therefore, a Zoning Consistency Determination per 2Q .0304(b) was required for this modification. Before submitting a permit application for a new or expanded facility in an area without zoning, the Permittee is required to provide public notification by publishing a legal notice and to post a sign on their property where the new or expanded source is located.

The legal notice is required to be published in a newspaper of general circulation in the area where the source is or will be located at least two weeks before submitting the permit application for the source. The notice must include: the name of the affected facility; the name and address of the permit applicant; and the activity or activities involved in the permit action.

The sign must meet the following as specified by 2Q .0113:

1. The sign shall be at least six square feet in area;
2. It shall be set off the road right-of-way, but no more than 10 feet from the road right-of-way.
3. The bottom of the sign shall be at least six feet above the ground;
4. It shall contain the following information: the name of the affected facility; the name and address of the permit applicant; and the activity or activities involved in the permit action;
5. Lettering shall be a size that the sign can be read by a person with 20/20 vision standing in the center of the road; and
6. The side with the lettering shall face the road, and sign shall be parallel to the road.

This permit application is retroactive to address permitting of the LSRP project, which was constructed in 2013. The Zoning requirements for construction project were fulfilled when the original permit application was submitted in November 2011. In Appendix B of the November 2016, permit application, Domtar provided an affidavit and proof of publication that the legal notice required under this rule was published on September 6, 2011, in the Williamston Enterprise and on September 7, 2011, in the Roanoke Beacon. Domtar also provided a picture of the posted sign meeting the requirements specified above and Domtar stated that the sign was posted on September 9, 2011 and remained in place for more than 30 days following submittal of the permit application. With the legal notices published as stated and the posting of the sign as described above, the zoning requirements were satisfied.

C. Professional Engineer's Seal

A Professional Engineer's seal was included with the application. Amy M. Marshall, a Professional Engineer, who is currently registered in the State of North Carolina, sealed the application for the portions containing the engineering plans, calculations, and all supporting documentation.

D. Application Fee

An application fee in the amount of $14,359 was received.

E. CAA Section 112(r)

Domtar is not subject to Section 112(r) of the Clean Air Act requirements because it does not store any of the regulated substances in quantities above the thresholds in 112(r). This permit modification does not affect the 112(r) status of the facility.

VI. Conclusion

Based on the application submitted and the review of this proposal by NC DAQ, NC DAQ is making a preliminary determination that the project can be approved, and a revised permit issued. After consideration of all comments, a final determination will be made.

APPENDIX A

EVALUATION OF COST EFFECTIVENESS SENSITIVITY TO REVISING TRS VALUES

Evaluation of Cost Effectiveness Sensitivity to Changes in TRS Calculations

The emission increases presented in the permit application were calculated for TRS (as H_2S), meaning that the TRS emissions were calculated by converting individual compounds [methyl mercaptan (MMC), dimethyl sulfide (DMS), and dimethyl disulfide (DMDS)] to the H_2S equivalent using molecular weight and molar sulfur compound ratios. Total reduced sulfur is regulated by 60 CFR Part 60, Subpart BB, which was issued under section 111 of the Clean Air Act, making TRS a Regulated NSR Pollutant [40 CFR 51.166(b)(49)(ii)]. In Subpart BB, TRS is defined as "…the sum of the sulfur compounds hydrogen sulfide, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide, that are …measured by Method 16." The results of Method 16 are reported as the sum of the individual compounds (see Data Analysis and Calculations section of EPA Method 16). Therefore, based on the definition of regulated NSR pollutant and the TRS definition in Subpart BB, TRS should be reported as the sum of the individual compounds. However, revising the TRS emissions in the project emissions increases would not result in a change in the determination that PSD review was required.

In some cases, the change in TRS emissions from the "as H_2S" calculation to the sum of individual could result in TRS emissions that are higher than reported in the permit application. When it comes to calculating cost effectiveness, higher emission could result in a decrease in the cost effectiveness value. Therefore, it was necessary to determine how much the change in calculation of TRS emissions would change the cost effectiveness evaluation. The following table shows the TRS emissions (as H_2S) as compared to the sum of individual emissions and the impact on cost effectiveness for controlling the Press Building Sources and the No. 2 Filter Press Cloth Wash Tank in the No. 5 Recovery Boiler. As shown in the table, the cost effectiveness associated with controlling these sources in the Recovery Boiler was not impacted enough to consider this control technology as BACT. Therefore, it was not necessary to change the calculations to present TRS as the sum of the individual compounds.

TRS Compound	Emissions (tpy)	Emission Reduction (tpy)	TRS Cost Effectiveness ($/ton)
H_2S	19.9	19.5	
DMS	0.956	0.937	
DMDS	0.870	0.853	
MMC	0.866	0.849	
TRS (as H_2S)	21.6	21.2	58,600
TRS Individual Compounds	22.5	22.1	56,183

Appendix B

Public Notice of Preliminary Determination

Insert Public Notice of Preliminary Determination