

**NORTH CAROLINA DIVISION OF
AIR QUALITY**

Application Review – Preliminary Review

Issue Date:

Region: Washington Regional Office
County: Martin
NC Facility ID: 5900069
Inspector's Name: Kurt Tidd
Date of Last Inspection: 08/31/2021
Compliance Code: 3 / Compliance - inspection

<p>Facility Data</p> <p>Applicant (Facility's Name): Domtar Paper Company, LLC</p> <p>Facility Address: Domtar Paper Company, LLC NC Highway 149 North Plymouth, NC 27962</p> <p>SIC: 2611 / Pulp Mills NAICS: 322121 / Paper (except Newsprint) Mills</p> <p>Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V</p>	<p>Permit Applicability (this application only)</p> <p>SIP: NSPS: NESHAP: PSD: PSD Avoidance: NC Toxics: 112(r): Other:</p>
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Contact Data			Application Data
Facility Contact	Authorized Contact	Technical Contact	<p>Application Number: 5900069.19B Date Received: 02/28/2019 Application Type: Modification Application Schedule: PSD Existing Permit Data Existing Permit Number: 04291/T49 Existing Permit Issue Date: 06/14/2021 Existing Permit Expiration Date: 05/31/2026</p>
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Total Actual emissions in TONS/YEAR:							
CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2019	1034.23	1405.70	623.24	3188.97	391.60	377.44	269.74 [Methanol (methyl alcohol)]
2018	871.97	1627.04	696.56	7218.26	504.99	376.70	255.86 [Methanol (methyl alcohol)]
2017	769.95	1806.43	701.08	8676.89	551.61	439.55	302.47 [Methanol (methyl alcohol)]
2016	715.26	1828.25	722.00	8993.07	531.43	458.32	323.65 [Methanol (methyl alcohol)]
2015	739.44	1875.67	806.12	6803.05	557.95	473.97	353.81 [Methanol (methyl alcohol)]

<p>Review Engineer: Heather Sands</p> <p>Review Engineer's Signature: _____ Date: _____</p>	<p>Comments / Recommendations:</p> <p>Issue 04291/T50 Permit Issue Date: Permit Expiration Date: 05/31/2026</p>
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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. 04291T49, with an expiration date of May 31, 2026, 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. Proposed Project Description

The North Carolina Division of Air Quality (DAQ) received a copy of Permit Application No. 5900069.19B for a Prevention of Significant Deterioration (PSD) modification from Domtar on February 28, 2019. The application was considered complete for processing on April 3, 2019. On December 27, 2019, DAQ received an addendum to Permit Application No. 5900069.19B. On September 10, 2020, DAQ received a second addendum to Permit Application No. 5900069.19B that superseded the December 2019 addendum. The remaining discussion in this Preliminary Determination describes the proposed project as described in the original February 2019 application with the changes identified in the September 10, 2020, addendum.

This permit application is a major new source review (NSR) construction and operation air permit modification request for a proposed Lignin Solids Removal Plant (LSRP) Reconfiguration Project (LSRP Project). Domtar is proposing to redesign the LSRP by performing the following:

- Redesign the system to route a portion of process gases to a new two-phase packed bed caustic scrubber;
- Replace select tanks to improve operation of the plant by reducing corrosion and avoiding over pressurization of the existing high-volume low-concentration (HVLC) system.
- Add a dust collection system, including a wet cyclone to control acidic dust created during operation of the No. 2 Lignin Filter.

A summary of the LSRP source configuration pre- and post-project is presented in Table 1. As shown in Table 1, Domtar is requesting revisions to the tank naming conventions to be more consistent with the names used by operating staff.

Main Sources and HVLC Sources

To avoid operational challenges caused by the current control system configuration of the LSRP, Domtar is proposing to redirect several sources currently captured and controlled in the HVLC system to a new two-phase packed bed caustic scrubber. The scrubber will be designed to reduce emissions of hydrogen sulfide (H₂S) and methyl mercaptan (MMC). Each tank will be connected directly to the scrubber header and pipe sizes will be modified as needed. Spent caustic solution will be circulated back to the mill's white liquor system. As shown in Table 1, the following "Main Sources" will be routed to the scrubber (NOTE: the emission source descriptions below are the new descriptions requested by Domtar and new emission source ID Nos.):

- No. 1 Feed Liquor Cooler, ID No. ES-09-27-1100
- No. 1 Lignin Filter Filtrate Storage Tank, ID No. ES-09-27-1200
- Lignin Slurry Conditioning Tank, ID No. ES-09-27-1800
- Lignin Slurry Buffer Tank, ID No. ES-09-27-2000
- No. 1 Lignin Filter Cloth Wash Tank, ID No. ES-09-27-2300
- No. 1 Lignin Filter Filtrate Tank, ID No. ES-09-27-2400
- No. 1 Lignin Filter Filtrate Buffer Tank, ID No. ES-09-27-2500
- No. 1 Lignin Filter Horizontal Conveyor, ID No. ES-09-27-2610
- No. 1 Lignin Filter Incline Conveyor, ID No. ES-09-27-2620
- No. 2 Lignin Filter Acidic Filtrate Tank, ID No. ES-09-27-3200

Table 1. Summary of LSRP Modification Project Emission Source Changes

Permitted Equipment Prior to the LSRP Project (Permit No. T49)				Revised Emission Source Description	Equipment Modifications
Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description		
<i>Main Sources: These sources will be controlled in the Proposed Two-Phase Packed Bed Caustic Scrubber (ID No. CD-09-27-3800)</i>					
ES-09-27-1100	40% Black Liquor Cooler	ES-65-25-0310 or ES-64-25-0290 or ES-10-25-0110 or CD-64-22-2000	HVLC Collection System controlled by: No. 2 Hog Fuel Boiler or No. 1 Hog Fuel Boiler or No. 5 Recovery Boiler or Thermal Oxidizer	No. 1 Feed Liquor Cooler	None
ES-09-27-1200	Filtrate 1 Storage Tank			No. 1 Lignin Filter Filtrate Storage Tank	Fit with agitators to prevent solids buildup.
ES-09-27-1800	Agitated Conditioning Tank			Lignin Slurry Conditioning Tank	Replace with a taller tank to achieve more surge capacity and metallurgy will be improved due to corrosion. Fit with agitators to prevent solids buildup.
ES-09-27-2000	Agitated Buffer Tank			Lignin Slurry Buffer Tank	Replace with a taller tank to achieve more surge capacity and metallurgy will be improved due to corrosion. Fit with agitators to prevent solids buildup.
ES-09-27-2300	Cloth Wash Water Tank 1			No. 1 Lignin Filter Cloth Wash Tank	The No. 1 Lignin Filter Cloth Wash Tank will be purged to one of the alkaline filtrate tanks via the existing No. 1 Lignin Filter Cloth Wash Recirculation Pump to prevent overflow. Fit with agitators to prevent solids update.
ES-09-27-2400	Filtrate Tank 1			No. 1 Lignin Filter Filtrate Tank	Fit with agitators to prevent solids update.
ES-09-27-2500	Filtrate 1 Buffer Tank			No. 1 Lignin Filter Filtrate Buffer Tank	Fit with agitators to prevent solids update.
ES-09-27-2600	Lignin Lump Breaker			Lignin Lump Breaker	None
ES-09-27-2610	Dewatered Lignin Conveyor 1			No. 1 Lignin Filter Horizontal Conveyor	None
ES-09-27-2620	Dewatered Lignin Conveyor 2			No. 1 Lignin Filter Incline Conveyor	None
ES-09-27-2660	Lignin Rotary Feeder			Lignin Rotary Feeder	None
ES-09-27-2800	Agitated Acid Conditioning Tank	ES-09-27-1400	Carbonator Tower (white liquor scrubber) which is vented to the HVLC System	No. 2 Lignin Filter Acidic Filtrate Tank (new ID No. ES-09-27-3200)	The current Agitated Acid Conditioning Tank will be repurposed to replace the Stage 2 Filtrate Tank 2 as the No. 2 Lignin Filter Acidic Filtrate Tank with a new emission source (ID No. ES-09-27-3200). LVHC loop seal will be routed to the No. 2 Lignin Filter Acidic Filtrate Tank.
ES-09-27-2100	LRP Primary Filter Press	Partially controlled by vacuum pull to HVLC System		No. 1 Lignin Filter	Add chambers to the filter to reach design capacity.
				Acidic Lignin Conditioning Tank (ID No. ES-09-27-2800)	The current Agitated Acid Conditioning Tank will be repurposed to replace the Stage 2 Filtrate Tank 2 as the No. 2 Lignin Filter Acidic Filtrate Tank with a new emission source ID (ID No. ES-09-27-3200). A new tank will be built and will serve as the new Acidic Lignin Conditioning Tank (ID No. ES-09-27-2800) with improved metallurgy due to corrosion, increased surge capacity, and constant recirculation via a new dedicated pump for H ₂ S stripping. NOTE: According to the

Table 1. Summary of LSRP Modification Project Emission Source Changes

Permitted Equipment Prior to the LSRP Project (Permit No. T49)				Revised Emission Source Description	Equipment Modifications
Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description		
					proposed project description in the February 2019 permit application, this tank was routed to the HVLC System. According to the September 2020 addendum, due to a design change, this tank will be controlled in the proposed caustic scrubber.
ES-09-27-3100	Cloth Wash Water Tank 2	NA	NA	No. 2 Lignin Filter Cloth Wash Tank	The No. 2 Lignin Filter Cloth Wash Tank experiences issues with solids buildup. To manage this, a larger tank drain, agitator, and recirculating shear pump will be installed to grind up solids and suspend them in the tank.
HVLC Sources: These sources will be controlled by routing to the HVLC Collection System and controlled in the No. 2 Hog Fuel Boiler, ID No. ES-65-25-0310 (with No. 1 Hog Fuel Boiler, No. 5 Recovery Boiler, and Thermal Oxidizer as backup)- no changes to the controls					
ES-09-27-2700	Agitated Acid Conditioning Tank	ES-09-27-1400	Carbonator Tower (white liquor scrubber)	Lignin Acidification Tank	None
ES-09-27-2770	Acidification Overflow/Foam Tank			Lignin Foam Tank	None
ES-09-27-1400	Carbonator Tower	ES-65-25-0310 or ES-64-25-0290 or ES-10-25-0110 or CD-64-22-2000	HVLC Collection System controlled by: No. 2 Hog Fuel Boiler or No. 1 Hog Fuel Boiler or No. 5 Recovery Boiler or Thermal Oxidizer	Feed Liquor Carbonator	None
Other Sources: These sources will be controlled in a Dust Collection System, including a Wet Cyclone (ID No. CD-09-27-3900)					
ES-09-27-3000	LRP Press Building Fugitives (Filter Press 2A)	NA	NA	No. 2 Lignin Filter	Add chambers to the filter press to reach design capacity. The dust collection system will prevent the majority of emissions from escaping the LRP Lignin Conveyor No. 3 (ID No. IES-09-27-3400). Existing wall fans will evacuate any remaining emissions from the building.
IES-09-27-3400 ^b	LRP Lignin Conveyor No. 3	NA	NA	No. 2 Lignin Filter Horizontal Conveyor	Purged gases from dust collector are routed to the process, therefore the dust collector does not exhaust directly to the atmosphere.
Other Sources: These sources will be controlled by Work Practices					
ES-09-27-1000	40% Black Liquor Tank	NA	NA	Lignin Feed Liquor Tank	Replace tank to improve metallurgy due to corrosion and fit with an agitator to prevent solids buildup
IES-09-27-2900 ^b	Wash Water Tank	NA	NA	Acid Wash Water Tank	None.
IES-09-27-3700 ^b	Acid Sump Pit	NA	NA	Lignin Acid Area Sump	None
IES-09-27-3600 ^b	Alkaline Sump Pit	NA	NA	Lignin Liquor Area Sump	None

^a HVLC System routes collected vapors 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).

^b Insignificant activities.

- Lignin Lump Breaker (ID No. ES-09-27-2600)
- Lignin Rotary Feeder (ID No. ES-09-27-2660)

It should be noted that the September 2020 addendum included a design change for the control of the Acidic Lignin Conditioning Tank (ID No. ES-09-27-2800). Instead of being controlled in the HVLC system, this tank will also be controlled in the new two-phase packed scrubber. In addition, Domtar is proposing to vent two formerly uncontrolled tanks - the No. 2 Lignin Filter Cloth Wash Tank (ID No. ES-09-27-3100) and the No. 1 Lignin Filter (ID No. ES-09-27-2100)¹ - to the scrubber.

The “HVLC Sources,” Lignin Acidification Tank (ID No. ES-09-27-2700) and Lignin Foam Tank (ID No. ES-09-27-2770) will remain connected to the mill HVLC system. In the current configuration, these tanks are routed through the Feed Liquor Carbonator (ID No. ES-09-27-1400) prior to being collected in the HVLC system. This configuration will remain the same with the redesigned process.

In their comments on the draft permit, received December 15, 2021, Domtar requested that the Lignin Rotary Feeder (ID No. ES-09-27-2660) and Lignin Lump Breaker (ID No. ES-09-27-2600) be added to the list of Main Sources. According to Domtar, these two sources were inadvertently omitted from the list of sources currently routed to the HVLC system and they will be routed to the proposed scrubber as part of this project. The HVLC system emissions and post-project emissions from the scrubber were quantified at the outlet of each control device.

Other Sources

In addition to the modifications to the HVLC system and the addition of a new scrubber, Domtar is proposing modifications to reduce the amount of dust generated in the LSRP. Acidic dust, created when the lignin wetcake is dropped from the No. 2 Lignin Filter onto the No. 2 Lignin Filter Horizontal Conveyor during LSRP operation, along with low concentrations of H₂S, is currently exhausted from the No. 2 Lignin Filter to the atmosphere via building exhaust fans. Domtar is proposing to collect dust and gas from the No. 2 Lignin Filter Horizontal Conveyor and truck loading area and route these sources to a dust collection scrubber. The dust collection scrubber will remove particulates from the process area without releasing them to the atmosphere and return them to the process. The gases controlled by the dust collection scrubber will bypass the new caustic scrubber and be vented through a common stack on the new caustic scrubber exhaust. Domtar expects that the dust collection system will prevent the majority of H₂S emissions from the No. 2 Lignin Filter from escaping the conveyor chute and existing wall fans will evacuate any remaining H₂S emissions from the building.

The No. 2 Lignin Filter Horizontal Conveyor discussed above is not a significant source of TRS and H₂S emissions (it is an insignificant activity and emits less than 5 tpy of each pollutant), as such, they remain uncontrolled sources of TRS and H₂S. Emissions of TRS and H₂S from the following sources will also remain uncontrolled, several of which are insignificant activities per 15A NCAC 02Q .0503(8) because uncontrolled emissions less than 5 tons per year (tpy):

- No. 2 Lignin Filter
- Lignin Feed Liquor Tank
- Acid Wash Water Tank (insignificant activity)
- Lignin Acid Area Sump (insignificant activity)
- Lignin Liquor Area Sump (insignificant activity)

¹ This filter is currently partially controlled by vacuum pull to the HVLC System.

Table 2. Lignin Modification Project Emissions of TRS Compounds Only (tpy)^a

Emission Source Description ^b	Uncontrolled emissions (tpy)					Control Efficiency (%)	Controlled emissions (tpy)				
	TRS ^c	H ₂ S	MMC	DMS	DMDS		TRS	H ₂ S	MMC	DMS	DMDS
Sources Routed to Proposed Scrubber: <ul style="list-style-type: none"> • No. 1 Feed Liquor Cooler • No. 1 Lignin Filter Filtrate Storage Tank • Lignin Slurry Conditioning Tank • Lignin Slurry Buffer Tank • No. 1 Lignin Filter Cloth Wash Tank • No. 1 Lignin Filter Filtrate Tank • No. 1 Lignin Filter Filtrate Buffer Tank • No. 1 Lignin Filter Horizontal Conveyor • No. 1 Lignin Filter Incline Conveyor • No. 2 Lignin Filter Acidic Filtrate Tank • No. 1 Lignin Filter • Acidic Lignin Conditioning Tank • No. 2 Lignin Filter Cloth Wash Tank 	541	467	62.9	6.8	4.4	95 (H ₂ S) 75 (MMC) 90 (TRS) ^d	50.8 (11.6 lb/hr)	23.6 (5.4 lb/hr)	15.9	6.8	4.4
Sources Routed to HVLC Collection System: <ul style="list-style-type: none"> • Lignin Acidification Tank • Lignin Foam Tank • Feed Liquor Carbonator 	61	53	5	2	1	98	1.3	1.1	0.11	0.03	0.02
Other LSRP Sources											
No. 2 Lignin Filter Press <ul style="list-style-type: none"> • No. 2 Lignin Filter • No. 2 Lignin Filter Horizontal Conveyor 	1.9	1.9	Not emitted	Not emitted	Not emitted	None	1.9	1.4 ^e	Not emitted	Not emitted	Not emitted
LSRP LVHC Drain Loop and No. 1 Filtrate Sump: <ul style="list-style-type: none"> • Acid Sump Pit • Alkaline Sump Pit 	0.28	0.27	5.9x10 ⁻³	1.55x10 ⁻³	1.41x10 ⁻³	None	0.28	0.27	5.92x10 ⁻³	1.55x10 ⁻³	1.41x10 ⁻³
Lignin Feed Liquor Tank	0.89	0.21	4.4x10 ⁻⁴	0.41	0.27	None	0.89	0.21	4.38x10 ⁻⁴	0.41	0.27
Sum of Emissions from Other Sources	3.1	2.4	6.4 x10⁻³	0.42	0.27	None	2.6	2.0	6.4 x10⁻³	0.42	0.27

NOTE: Slight discrepancies may be due to rounding.

^aEmissions from September 2020 Amendment (Tables 7 and 8 and Table 1 of Appendix D) and Table 10 of February 2019 application.

^bPost-modification descriptions presented in Table 1, above.

^cTRS calculated as a sum of compounds: hydrogen sulfide (H₂S), methyl mercaptan (MMC), dimethyl sulfide (DMS) and dimethyl disulfide (DMDS). NOTE: MMC, DMS, and DDMS emissions were not presented separately for the No. 2 Lignin Filter Press, LSRP LVHC Drain Loop and No. 1 Filtrate Sump sources, and the Lignin Feed Liquor Tank.

^dTRS removal efficiency is back-calculated by applying the emission reduction for H₂S and MMC as guaranteed by the vendor and assuming that the scrubber will not remove the DMS and DMDS.

^e NOTE: 0.5 tpy of uncontrolled H₂S emissions from the Lignin Filter Press sources are accounted for in the total controlled emissions from the scrubber stack.

2. Additional Proposed Changes Associated with LSRP Project

The September 2020 addendum included the following changes:

- An update to the projected actual fuel usage for the No. 1 Hog Fuel Boiler to align with the Mill Optimization Project² projected actual fuel usage;
- An update to emission factors associated with both the Nos. 1 and 2 Hog Fuel Boilers using the most recently published National Council for Air and Stream Improvement (NCASI) factors; and
- A correction to an error in certain site-specific emission factors.

Emissions of total reduced sulfur (TRS), H₂S, MMC, dimethyl sulfide (DMS) and dimethyl disulfide (DMDS) are calculated for the proposed changes and are presented in Table 2.

B. Plant Location

The Domtar Plymouth Mill is located in Martin County. The current Clean Air Act Section 107 attainment status designations for areas in the State of North Carolina are summarized in 40 CFR 81.334. Martin County is classified as better than national standards for total suspended particulates (TSP) and for sulfur dioxide (SO₂). 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 (NO₂). 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

The following is a summary of the permitting history since the initial 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: <ul style="list-style-type: none"> • Add Lignin Dewatering Process as a new source including: <ul style="list-style-type: none"> ○ precipitation tanks ○ 2 filter presses and associated tanks ○ 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.

² On June 9, 2020, DAQ received Permit Application No. 5900069.20A for the second step of a two-step permit application associated with the Mill Optimization Project, and Permit No. 04291T49 was issued on June 14, 2021. With Permit Application No. 5900069.20A, Domtar requested permit changes regarding the hog fuel boiler permitted fuels and the addition of an alternate operating scenario for the No. 1 Hog Fuel Boiler.

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 sewerage of condensate streams from the concentrator surface condenser and the 5 th effect of the No. 6 Evaporator, as well as the C3 stream (3 rd effect of the concentrators).
04291T41	September 10, 2014	Air permit processed as a significant modification for the following: <ul style="list-style-type: none"> • 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 visible emission monitoring frequency for the wood yard operations; • Removal of toxic permit limits for MACT affected sources; and • The second step of a two-step significant modification for the foul condensate sewerage. (Permit No. T40)
04291T42	July 10, 2015	Air permit processed as follows: <ul style="list-style-type: none"> • Administrative amendment to correct permitting language, and • Step one of a two-step significant modification under 15A NCAC 02Q .0501(b)(2) to: <ul style="list-style-type: none"> ○ Add new soap storage tank, black liquor separation tank, and railcar load out station; and ○ 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)(2) 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.
04291T46	April 18, 2019	Air permit processed as a PSD Permit for the construction of the Lignin Recovery Process, including the following: <ul style="list-style-type: none"> • Construction and operation of a Lignin Solids Dewatering Process. The project included the following pieces of equipment: <ul style="list-style-type: none"> ○ Precipitation tanks; ○ Two filter presses with associated tanks; and ○ Chemical additive systems. • 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.
04291T47	August 6, 2019	Air permit processed as follows: <ul style="list-style-type: none"> • Step 2 of a two-step significant modification submitted under 15A NCAC 02Q .0501(b)(2) to add a soap storage tank, a black liquor separation tank, and railcar load out station, as well as remove peroxide stages from the No. 7 Bleach Plant Scrubber. • One-step significant modification submitted to change inspection frequencies for the multiclones associated with the Nos. 1 and 2 Hog Fuel Boilers, and the dry electrostatic precipitators (ESPs) associated with the No. 5 Recovery Boiler. • A 502(b)(10) change involving the replacement of three tanks in the lignin solids removal plant (LSRP). The tanks will keep the same permit ID numbers. • Step 2 of a two-step significant modification submitted under 15A NCAC 02Q .0501(b)(2) for two unrelated projects: the installation of a steam box on the NC-5 pulp drying machine and a secondary turpentine decanting system.

Permit	Issue Date	Description
04291T48	September 14, 2020	Air permit processed as a Reopening for cause permit modification under 15A NCAC 02Q .0517(a)(4) to address permit language associated with the 2006 PSD significant modification that was inadvertently removed from the Title V Air Permit No. 04291T37, issued May 31, 2012.
04291T49	June 14, 2021	Air permit processed as follows: <ul style="list-style-type: none"> Renewal application with modification to extend timing for completion of internal inspection requirements for pressure equipment on the No. 5 Recovery Boiler and the Nos. 1 and 2 Hog Fuel Boilers and removal of PSD avoidance limitation on the No. 2 Hog Fuel Boiler due to a change in permitted fuel mix. Step 2 of a two-step significant modification submitted under 15A NCAC 02Q .0501(b)(2) for the mill optimization project. A 502(b)(10) change for the installation of a lime mud reclaim conveyor. An administrative amendment to revise the operating load limit for the No. 2 Hog Fuel Boiler based on results of a performance test and fuel analysis.

D. Application Chronology

Date	Event
September 26, 2018	Preapplication meeting between DAQ and Domtar.
September 26, 2018	Tom Anderson of the Air Quality Analysis Branch (AQAB) of DAQ emailed personnel from US Forest Service, the Fish and Wildlife Services, and the National Park Service informing them of the project.
February 28, 2019	DAQ received PSD Permit Application No. 5900069.19B in Washington Regional Office.
March 5, 2019	DAQ Central Office received PSD Permit Application No. 5900069.19B.
March 5, 2019	DAQ issued a permit acknowledgement letter to Domtar.
April 3, 2019	DAQ issued a letter to Domtar indicated that the PSD application was deemed complete.
April 3, 2019	DAQ issued a letter to Andrea Stacy, National Park Service, Air Resource Division notifying FLM of receipt of permit application.
April 3, 2019	A copy of the PSD permit application was sent to Heather Ceron of EPA Region 4.
May 24, 2019	Mr. Matthew Porter, DAQ/AQAB, submitted an additional information request to Domtar to address comments and request modeling data necessary to approve the NAAQS modeling analysis.
June 6, 2019	Domtar (through their consultant, AECOM) submitted a revised NAAQS modeling analysis addressing the May 24, 2019, additional information request.
June 10, 2019	Mr. Porter submitted an additional information request to Domtar to address comments on the June 6 th submittal.
June 26, 2019	Representatives from DAQ conducted a site visit at the Domtar mill to tour the process.
July 3, 2019	Domtar (through their consultant, AECOM) responded to the June 10 th information request but did not submit revised modeling. Domtar maintained that the June 6 th submittal was still the most recent and appropriate modeling.
July 17, 2019	DAQ participated in a conference call with Domtar and their new consultant, All4, to discuss the NAAQS modeling.
July 22, 2019	Domtar (through their consultant, All4) submitted additional information in support of their approach to the NAAQS modeling.
September 27, 2019	Domtar submitted a NAAQS modeling protocol to the AQAB.
October 28, 2019	Mr. Porter sent a letter to Domtar approving the modeling protocol, provided comments on the protocol were addressed.
December 27, 2019	Domtar submitted an addendum to the original permit application. Per this addendum, NAAQS modeling is no longer necessary because the project revisions resulted in changes to nitrogen oxides (NO _x) and sulfur dioxide (SO ₂) emissions after the project such that PSD review was no longer triggered. Air toxics modeling analysis was included.
March 13, 2020	Mr. Porter issued a memorandum approving the air toxics modeling analysis.
September 10, 2020	Domtar submitted a second addendum to the original permit application. This application supersedes the December 27, 2019, addendum. A revised air toxics modeling analysis was included.
November 17, 2020	Mr. Porter issued a memorandum approving the air toxics modeling analysis.
September 23, 2021	Draft permit and preliminary determination submitted to Domtar and Washington Regional Office (WaRO) for review.
October 22, 2021	WaRO comments were received.

Date	Event
October 8, 2021	Comments from Applicant were received. <i>Enter summary of comments (if necessary, add to section below).</i>
December 7, 2021	Draft revised permit and Preliminary Determination provided to Domtar for review.
December 14, 2021	Comments from Applicant were received. Comments were addressed and any necessary additional discussion provided in the relevant sections of this document.
XXXX YY, 2019	Draft Permit and Preliminary Determination forwarded to public notice.

II. New/Modified/Affected Emission Sources and Emissions Estimates

As stated in the permit application, the LSRP is an emerging technology that will produce a salable organic byproduct. As noted in Section I.C, above, Domtar initially submitted a permit application for the LSRP (permitted in 2012)³ and began operation in 2013. Since its initial startup, Domtar has had issues with reliability, maintenance, and operation of the LSRP. With this project, Domtar is proposing to modify the LSRP to achieve safe and reliable operation. The project includes a redesign of the system to route a portion of process gases to a new two-phase packed bed caustic scrubber; the addition of a dust collection system; and the replacement of select tanks to improve operation of the plant by reducing corrosion and avoiding over pressurization of the existing high-volume low-concentration (HVLC) system. The following discussion summarizes the impact the LSRP Project had on emissions and sources of emission factors.

Detailed emission calculations are presented in Tables 1 through 37 in Appendix B of Permit Application No. 5900069.19B. Tables 1 through 8, 16A, 16B, and 21 through 23 were revised due to the changes described above for the September 2020 addendum. These revised tables plus new Tables 38 and 39 are presented in Attachment 1 of the September 2020 addendum.

A. LSRP Sources

The LSRP Sources primarily emit volatile organic compounds (VOCs), TRS, H₂S, and a small amount of carbon monoxide (CO). Particulate matter (PM), PM less than 10 micrometers (PM₁₀), and PM less than 2.5 micrometers (PM_{2.5}) are emitted in small amounts from the lignin handling associated with storage and transfer of the lignin to the hog fuel piles. Emissions of sulfur dioxide (SO₂) and greenhouse gases (GHG) as carbon dioxide equivalents (CO₂e) are generated when HVLC gases are controlled in a combustion device. Emissions were estimated using various methods and sources, including:

- Environmental Protection Agency (EPA) publications, including AP-42 Compilation of Air Emission Factors (5th Edition, Revised);
- NCASI data;
- Site specific and vendor data; and
- EPA's Mandatory Greenhouse Gas Reporting Regulations.

The proposed project will increase emissions from LSRP sources by operating the plant closer to its full organic byproduct capacity of 38,581 oven dry tons of lignin solids per year (ODT/yr).

B. Sources Affected by the LSRP Project

The increase in production of the LSRP will result in an expected decrease in black liquor solids production from the chemical recovery process by 18,500 tons of black liquor solids per year (TBLs/yr). Additional steam required to operate the LSRP will require an increase in steam production from the Nos. 1 and 2 Hog Fuel Boilers, which will be provided by an increase of 36,000 bone dry tons per year (BDT/yr) of blended hog fuel.

³ Although the LSRP was initially permitted in 2012, Domtar entered into an SOC with DAQ that required Domtar to submit a retroactive PSD permit application for this process. The retroactive PSD application was treated as if it was submitted in 2011 (e.g., baseline emissions were estimated using the 5-year period ending in 2011). The corresponding PSD permit was issued in April 2019.

The existing sources affected by the LSRP Project are the Nos. 1 and 2 Hog Fuel Boilers (and corresponding hog fuel management systems and ash collection systems), No. 5 Recovery Boiler, North and South Smelt Tanks, Salt Cake Mix Tank, and No. 5 Precipitator Mix Tank. These sources emit PM, PM₁₀, PM_{2.5}, VOCs, SO₂, CO, TRS, H₂S, H₂SO₄, lead, and GHG, including carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Emissions were estimated using various methods and sources. Sources included:

- EPA publications, including AP-42 Compilation of Air Emission Factors (5th Edition, Revised);
- NCASI data;
- Site specific and vendor data; and
- EPA's Mandatory Greenhouse Gas Reporting Regulations.

III. Project Regulatory Review

This permit modification potentially impacts several regulations applicable to the new and modified sources: the LSRP sources, the Nos. 1 and 2 Hog Fuel Boilers (and associated hog fuel management systems and ash collection systems), the No. 5 Recovery Boiler, the North and South Smelt Tanks, the Salt Cake Mix Tank, and the No. 5 Precipitator Mix Tank. Although the proposed LSRP Project is expected to result in a decrease in black liquor solids production, Domtar conservatively estimated that there will be no change in emissions from the recovery boiler, smelt tanks and the mix tanks. Therefore, no regulatory review was conducted for these sources. The following discussion summarizes the regulatory review and necessary permit modifications on a source-specific basis for the remaining sources. The regulatory review of the toxic air pollutant (TAP) requirements under 15A NCAC 02D .1100 is presented in Section III.D, below.

A. Nos. 1 and 2 Hog Fuel Boilers

The Nos. 1 and 2 Hog Fuel Boilers are subject to the following State regulations:

- 15A NCAC 02D .0503: Particulates from Fuel Burning Indirect Heat Exchangers;
- 15A NCAC 02D .0504: Particulates from Wood Burning Indirect Heat Exchangers;
- 15A NCAC 02D .0516: Sulfur Dioxide Emissions from Combustion Sources;
- 15A NCAC 02D .0524: New Source Performance Standards (40 CFR Part 60, Subpart D);
- 15A NCAC 02D .0530: Prevention of Significant Deterioration (Best Available Control Technology Limits);
- 15A NCAC 02D .0317: Avoidance Conditions for 15A NCAC 02D .0530: Prevention of Significant Deterioration (NO_x Emissions);
- 15A NCAC 02D .0614: Compliance Assurance Monitoring; and
- 15A NCAC 02D .1111: Maximum Achievable Control Technology.

The Nos. 1 and 2 Hog Fuel Boilers are affected sources under the LSRP Project. Neither boiler is being modified; however, Domtar is expecting to reduce the utilization of the No. 1 Hog Fuel Boiler over time. The increase in steam requirements for the LSRP will result in an estimated 339,000 BDT/yr of blended hog fuel combusted in the No. 2 Hog Fuel Boiler, which is an increase of approximately 36,000 BDT/yr over what the hog fuel boiler could have burned during the baseline period.

The reduction in use of the No. 1 Hog Fuel Boiler and the estimated increase in utilization of the No. 2 Hog Fuel Boiler do not require any changes to the permit conditions associated with the regulations listed above. Compliance is expected for these sources.

B. Sources Associated with Hog Fuel Boilers

The following sources associated with the No. 2 Hog Fuel Boiler will also see increased utilization due to the increased need for steam as a result of the LSRP Project:

- No. 2 Hog Fuel Conveying
- Hogged Fuel Storage Pile at Boilers
- No. 2 Hog Fuel Ash Transport Steam Exhauster
- No. 2 Hog Fuel Ash Silo
- No. 2 Hog Fuel Scrubber Ash Silo

The sources listed above are subject to the following State regulations:

- 15A NCAC 02D .0515: Particulates from Miscellaneous Industrial Processes;
- 15A NCAC 02D .0521: Control of Visible Emissions;
- 15A NCAC 02D .0614: Compliance Assurance Monitoring; and
- 15A NCAC 02D .0530(u): Use of Projected Actual Emissions.

The estimated increase in utilization of the support equipment for the No. 2 Hog Fuel Boiler do not require any changes to the permit conditions associated with the regulations listed above. Compliance is expected for these sources.

C. LSRP Sources

The new and modified sources in the LSRP are presented in Table 1. The LSRP sources will potentially be subject to the following State regulations:

- 15A NCAC 02D .0516: Sulfur Dioxide Emissions from Combustion Sources;
- 15A NCAC 02D .0521: Control of Visible Emissions;
- 15A NCAC 02D .0530: Prevention of Significant Deterioration;
- 15A NCAC 02D .0530(u): Use of Projected Actual Emissions;
- 15A NCAC 02D .1100: Control of Toxic Air Pollutants; and
- 15A NCAC 02D .0614: Compliance Assurance Monitoring

Conditions in the permit with respect to these regulations are summarized below.

In their comments on the draft permit, received October 10, 2021, Domtar requested that the permit retain the condition for the LSRP sources prior to the beginning of normal operation of the reconfigured process and startup of the two-phase packed bed caustic scrubber. This would enable the mill to continue to operate the current plant configuration as permitted until such time that the proposed LSRP Project is completed. To address these concerns Section 2.1 T was added to the permit to represent the proposed LSRP project and Section 2.1 Q was retained to represent the current mill configuration. Section 2.1 Q would only be applicable until the normal operation of the proposed scrubber begins after which, Section 2.1 T would apply. Conditions for the regulations identified above are discussed for both conditions below.

1. 15A NCAC 02D .0516: Sulfur Dioxide Emissions from Combustion Sources

This regulation applies to combustion sources. Emissions are limited to 2.3 pounds per million British thermal units (lb/MMBtu) heat input. Sulfur dioxide formed by the combustion of waste gases are included when determining compliance.

The sources controlled in the HVLC system (including the LSRP sources) are routed to one of the following control devices: No. 1 Hog Fuel Boiler, No. 2 Hog Fuel Boiler, No. 5 Recovery Boiler or Thermal Oxidizer. The Nos. 1 and 2 Hog Fuel Boiler are subject to SO₂ limits when firing oil or oil and

wood residue according to new source performance standards (NSPS) per 15A NCAC 02D .0524 (40 CFR Part 60, Subpart D). When firing wood alone, the hog fuel boilers are subject to SO₂ standards under 02D .0516. The No. 5 Recovery Boiler is also subject to the SO₂ standards under 02D .0516. These standards (both the NSPS and 02D .0516) apply at the outlet of the boilers and include SO₂ emissions that result from the combustion of the HVLC and other gases being controlled in these combustion sources.

Similarly, the SO₂ limit is determined at the outlet of the Thermal Oxidizer. Aside from a small amount of sulfur in the natural gas that is used as supplemental fuel, the primary source of SO₂ emissions from the Thermal Oxidizer is the sulfur containing gases. Therefore, this limit applies to all sources at the mill that are routed through the HVLC gas collection system when controlled in the Thermal Oxidizer, including the LSRP sources (the permitted Main Sources and the HVLC sources associated with the proposed project) and the HVLC gases collected from the fiberlines. To clarify the intent of this provision, Section 2.1 J.1 of the current permit was updated to specify what sources would need to be included in the compliance demonstration.

To demonstrate compliance with 02D .0516, Domtar is required to determine the SO₂ emissions in terms of lb/MMBtu. In their comments on the draft permit, Domtar indicated that it would not be feasible to determine the actual heat content of the HVLC component gases and requested that DAQ allow the use of NCASI heat content data in determining compliance with the limit. A provision was added to Section 2.1 J.1 requires DAQ approval of the method for determining the Btu content of the waste gases. Ongoing compliance is demonstrated by keeping records and submitting a summary report of the calculation of lb/MMBtu heat content from burning natural gas and the waste gases in the Thermal Oxidizer. No further changes are necessary, and compliance is expected.

2. 15A NCAC 02D .0521: Control of Visible Emissions

This regulation applies to fuel burning operations and industrial processes where visible emissions can be reasonably expected to occur. Sources manufactured after July 1, 1971, have a visible emissions limit of 20 percent opacity when averaged over a 6-minute period. The 6-minute averaging periods may exceed 20 percent if no 6-min period exceeds 87 percent opacity, no more than one six-minute period exceeds 20 percent opacity in one hour, and no more than 4 6-minute periods exceed 20 percent in any 24-hour period.

Because the Thermal Oxidizer was installed after 1971, the oxidizer is subject to the 20 percent opacity limit. The opacity is determined at the outlet of the Thermal Oxidizer; therefore, this limit applies to all sources at the mill that are controlled in the Thermal Oxidizer, including the proposed LSRP sources HVLC sources, the HVLC gases collected from the fiberlines, and the currently permitted LSRP Main Sources. Therefore, a 02D .0521 condition was added for the HVLC Collection System Sources in Section 2.1 J of the permit, as well as in Section 2.1 Q and new Section 2.1 T.

Because the sources being controlled in the Thermal Oxidizer are anticipated to have low potential for visible emissions, no monitoring, recordkeeping and reporting is required.

3. 15A NCAC 02D .0530: Prevention of Significant Deterioration

As described above, the purpose of this permit application is to request a permit modification for a proposed reconfiguration of the LSRP. Section IV, below, addresses changes to the PSD permit condition for these sources.

4. 15A NCAC 02D .0530(u): Use of Projected Actual Emissions

The current permit (T49) has a 15A NCAC 02D .0530(u) condition for the LSRP Sources that was associated with the 2011 project to install the process. Domtar is required to maintain records of pulp production through the fiberlines to ensure that the annual pulp production does not exceed 536,657 air-dried (unbleached) metric tons per year and report any exceedance of this parameter. The reporting requirement is required for 10 years.

Domtar also relied upon the use of projected actual emissions for several of the sources that are affected by the LSRP Project. Therefore, a 02D .0530(u) condition will be necessary for these LSRP sources and will replace the current 02D .0530(u) condition in Section 2.2 C of the permit. Domtar will be required to maintain records of annual Lead, NO_x, PM, PM₁₀, PM_{PM2.5}, SO₂, H₂SO₄ mist, VOC, Fluorides, and carbon dioxide equivalents (CO₂e) in tons per year, on a calendar basis. The reporting requirement will be required for 10 years after commencement of regular operation of the new two-phase packed bed caustic scrubber. Domtar will also be required to submit a comparison of actual emissions to the PAE.

5. 15A NCAC 02D .1100: Control of Toxic Air Pollutants

The regulatory review of the requirements under 15A NCAC 02D .1100 is discussed in Section III.D, below. Compliance is expected for these sources.

6. 15A NCAC 02D .0614: Compliance Assurance Monitoring

The regulatory review of the requirements under 15A NCAC 02D .0614 is discussed in Section III.E, below. Compliance is expected for these sources.

D. Toxic Air Pollutant Analysis

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. 5900069.18A), Domtar submitted a complete facility-wide analysis to determine which TAPs were emitted in amounts greater than the TPER for each averaging period after a mill optimization project. 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 modeling was approved on April 30, 2018 and associated TAP limits were incorporated into Permit No. 04291T45, issued August 15, 2018. The optimized limits in Section 2.2 D.2 of the current permit were retained for the currently configured facility. These limits will be effective until such time that the normal operation of the proposed two-phase packed bed scrubber begins.

Since a comprehensive TAP modeling analysis was recently conducted, Domtar only evaluated compounds that were emitted from the LSRP sources plus the No. 5 Recovery Boiler, which had some changes to the stack parameters. The TPER analysis is presented in Table 3 for the TAPs evaluated.

In the February 2019 original permit application, Domtar provided a revised modeling analysis for the proposed LSRP Project for the pollutants identified in Table 3 for which modeling was required. The September 2020 addendum included revisions to this modeling analysis due to increased emissions from the scrubber stack and decreases in emissions from the No. 2 Hog Fuel Boiler and the Thermal Oxidizer due to the design change in the control of the Acidic Lignin Conditioning Tank as described above. The modeling was conducted using the same assumptions and methodology as the February 2019 modeling

analysis but used the most recent meteorological data files for Martin County. The information in Table 3 reflects the revisions to the modeling for these TAPs.

DAQ has reviewed the provided modeling analysis and determined that the results demonstrate compliance assuming the source parameters and pollutant emissions rates. The February 2019 modeling analysis was reviewed and approved on March 13, 2020, and the September 2020 revisions were reviewed and approved on November 17, 2020.^{4,5} The toxics limits associated with the proposed LSRP Project were added to Section 2.2 D.3 and will become effective upon startup of the proposed scrubber.

Table 3. Summary of TPER Analysis and Baseline Modeling Results^a

TAP ^b	Averaging Period	Total Potential Emissions (lb/averaging period)	TPER (lb/averaging period)	Modeling Required (Y/N)?	Baseline Concentration (µg/m ³)	Percent of AAL
Source: Modeling Presented in February 2019 Permit Application						
Ammonia	1-Hour	24.23	0.68	Y	526.53	19.50%
Arsenic (& compounds)	Annual	67.35	0.053	Y	2.01x10 ⁻⁰³	1.09%
Benzo(a)pyrene	Annual	0.73	2.2	N		
Beryllium	Annual	62.28	0.28	Y	1.12x10 ⁻⁰⁵	0.27%
Butadiene, 1,3-	Annual	264.40	11	Y	0.01	3.23%
Cadmium	Annual	92.18	0.37	Y	2.48x10 ⁻⁰⁵	0.45%
Chlorobenzene	24-Hour	1.43	46	N		
Chromium VI (soluble chromate compounds)	24-Hour	0.39	0.013	Y	5.98x10 ⁻⁰⁴	0.10%
1,2-Dichloroethane (Ethylene Dichloride)	Annual	637	260	Y	4.67x10 ⁻⁰²	1.23%
1,4-Dichlorobenzene	1-Hour	0.004	16.8	N		
Fluoride	24-Hour	22.3	0.34	Y	0.13	0.05%
	1-Hour	0.93	0.064	Y	0.02	0.13%
Hydrogen Chloride	1-Hour	11.45	0.18	Y	10.23	1.46%
Manganese (& compounds)	24-Hour	10.33	0.63	Y	0.01	0.03%
Mercury	24-Hour	0.21	0.013	Y	3.15x10 ⁻⁰⁴	0.05%
Methyl Ethyl Ketone	24-Hour	46	78	N		
	1-Hour	1.9	22.4	N		
Methyl Isobutyl Ketone	24-Hour	35.43	52.00	N		
	1-Hour	1.48	7.6	N		
Methyl Chloroform	24-Hour	2.13	250.0	N		
	1-Hour	0.09	64.0	N		
Methylene Chloride	Annual	4,167	1600	Y	27.62	1.62%
	1-Hour	0.48	0.39	Y	0.60	2.49%
Nickel (metal)	24-Hour	0.41	0.13	Y	4.43x10 ⁻⁰⁴	0.01%
Styrene	1-Hour	1.57	2.7	N		
Sulfuric Acid	24-Hour	67	0.25	Y	0.038	0.38%
	1-Hour	2.81	0.025	Y	0.07	0.59%

⁴ Memorandum from Porter, M., AQAB, to H. Sands, RCO, and Permit Coordinator, WaRO. Review of Dispersion Modeling Air Toxics Analysis for Domtar Paper Company, LLC - Plymouth Mill. Plymouth, NC, Martin County. March 13, 2020.

⁵ Memorandum from Porter, M., AQAB, to H. Sands, RCO, and Permit Coordinator, WaRO. Review of Dispersion Modeling Air Toxics Analysis for Domtar Paper Company, LLC - Plymouth Mill. Plymouth, NC, Martin County. November 17, 2020.

Table 3. Summary of TPER Analysis and Baseline Modeling Results^a

TAP ^b	Averaging Period	Total Potential Emissions (lb/averaging period)	TPER (lb/averaging period)	Modeling Required (Y/N)?	Baseline Concentration (µg/m ³)	Percent of AAL
1,1,2,2-Tetrachloroethane	Annual	3.97	430	N		
Tetrachloroethylene (Perchloroethylene)	Annual	1437.64	13000	N		
Toluene	24-Hour	50.61	98.0	N		
	1-Hour	2.11	14.4	N		
Trichloroethylene	Annual	1,660	4000	N		
Trichlorofluoromethane	1-Hour	3.86E-02	140	N		
Vinyl Chloride	Annual	333.46	26	Y	2.0x10 ⁻⁰⁴	0.05%
Vinylidene Chloride	24-Hour	2.09E-01	2.5	N		
Xylene	24-Hour	47.25	57	N		
	1-Hour	1.96	16.4	N		
Source: Modeling Presented in September 2020 Addendum						
Acetaldehyde	1-Hour	11.02	6.8	Y	709.12	2.63%
Acrolein	1-Hour	0.50	0.02	Y	4.16	5.20%
Benzene	Annual	6,153	8.1	Y	5x10⁻⁰²	44.38%
Carbon disulfide	24-Hour	64.57	3.90	Y	18.09	9.73%
Carbon tetrachloride	Annual	997	460	Y	0.18	2.69%
Chloroform	Annual	8,367	290	Y	1.44	33.54%
Formaldehyde	1-Hour	2.98	0.04	Y	15.98	10.65%
n-Hexane	24-Hour	147.29	23	Y	0.18	0.02%
Hydrogen Sulfide	24-Hour	713.2	1.7	Y	61.54	51.29%
Methyl Mercaptan	1-Hour	7.09	0.013	Y	42.34	84.67%
Phenol	1-Hour	3.51	0.24	Y	17.24	1.81%

^a Shaded rows are TAP for which the facility-wide emissions are greater than the TPER. Bolded rows are TAP for which the baseline concentration was greater than 9.8 of the applicable AAL.

^b The following TAPs are not emitted from sources affected by the LSRP Project and the No. 5 Recovery Boiler and therefore, were not evaluated in this analysis: Chlorine, Cresol, Di(2-ethylhexyl)phthalate, hexachlorodibenzo-p-dioxin, hydrogen fluoride, nitric acid, pentafluorophenol, and trichlorofluoromethane.

To allow for operational flexibility, permitted emission rates were developed for each source by optimizing the emissions such that the peak modeled concentration would be no higher than 98 percent of the applicable AAL. Permit limits are normally established on source-by-source bases; in this case however, where facility-wide maximum modeled concentration was 9.8 percent or less of the AAL, the compliance margin was considered to be sufficiently high to ensure compliance with the AAL on a facility-wide basis. Therefore, facility-wide emission limits were established for TAPs for which the maximum modeled concentration was 9.8 percent or less of the AAL.

Facility-wide emission limits are presented in Table 2.2 E.2.a of the current permit (T49) for the TAPs with baseline concentration 9.8 percent of the AAL or less (as identified in Table 3, above) and the source-by-source emission limits are presented in Table 2.2 E.2.b of the current permit. In the modeling analysis for the LSRP Project, the baseline concentration of six TAP (ammonia, benzene, chloroform, formaldehyde, hydrogen sulfide, and methyl mercaptan) was greater than 9.8 percent of the AAL. These TAP are shown in bold in Table 3. Domtar provided revised TAP limits (see Attachment 4 of the

September 2020 addendum) and requested that Section 2.2 E.2 be updated to reflect the current modeling analysis.

DAQ reviewed the proposed TAP limits developed based on the modeling and updated the tables in the permit in this permitting action.

E. Compliance Assurance Monitoring

The compliance assurance monitoring (CAM) rule requires owners and operators to conduct monitoring to provide a reasonable assurance of compliance with applicable requirements under the Clean Air Act. Monitoring focuses on emissions units that rely on pollution control device equipment to achieve compliance with applicable standards. An emission unit is subject to CAM, under 40 CFR Part 64 and 15A NCAC 02D .0614, if all the following three conditions are met:

- The unit is subject to any (non-exempt, e.g., pre-November 15, 1990, Section 111 or 112 standard) emission limitation or standard for the applicable regulated pollutant.
- The unit uses any control device to achieve compliance with any such emission limitation or standard.
- The unit's pre-control potential emission rate exceeds 100 percent of the amount required for a source to be classified as a major source; i.e., either 100 tpy (for criteria pollutants) or 10 tpy of any individual/25 tpy of any combination of HAP.

A CAM analysis is usually reserved for Title V renewal permitting actions unless the unit is considered a large pollutant-specific emissions units (PSEUs). If defined as a large PSEU, that CAM analysis should be part of an application for a significant permit revision for those PSEUs for which the permit revision is applicable [40 CFR 64.5(a)(2)]. A PSEU is considered large if it has a post-control potential to emit a regulated pollutant greater than 100 percent of the amount for a source to be classified as a major source [40 CFR 64.5(a)].

As part of the LSRP Project, Domtar proposed to control LSRP Main Process Tanks with a caustic scrubber, and the Carbonator Tower will remain connected to the HVLC system and controlled in a combustion device. As will be discussed in Section IV.C.5, below, Domtar proposed that these control devices will be used to comply with BACT limits under 15A NCAC 02D .0530 for TRS and H₂S. According to the permit application (No. 5900069.19B), the post-control TRS and H₂S emissions are less than the major source threshold of 100 tpy. Therefore, these sources are not considered large PSEUs and CAM does not need to be addressed until the next permit renewal.

IV. Prevention of Significant Deterioration

A. PSD Applicability

The PSD regulations apply to new major stationary sources or existing major sources that propose a major modification. Under PSD requirements all major new or modified stationary sources of air pollutants regulated under 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. The Domtar pulp mill 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 is a major stationary source for PSD purposes. Therefore, this project must be evaluated to determine whether the physical modifications to the lignin process are considered a major modification under PSD and which pollutants must undergo a PSD review.

A project is considered a major modification if there is a physical change in or a change in the method of operation of a major stationary source that would result in both a significant emissions increase and a significant net emissions increase. In order to determine whether a project results in a significant increase, the NC regulations under 15A NCAC 02D .0530 allow for project netting. Under project netting, emission increases and decreases from all emission units that are defined as part of the project are compared to the PSD significance levels as listed in 40 CFR 51.166 (b)(23)(i). In their permit application, Domtar provided a PSD applicability analysis to determine if any regulated compounds would be subject to PSD review. Generally, emission increases are calculated by comparing baseline actual emissions (BAE) to potential to emit (PTE). In certain cases, the PSD regulations allow sources to use projected actual emissions (PAE) instead of PTE for existing modified and affected sources. To calculate the emission increases, Domtar identified the new sources, as well as the existing sources that would be modified or affected by this proposed project (see Table 1, above).

Domtar calculated the emission increases associated with the LSRP Project using a comparison of BAE to either PTE or 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. The following discussion addresses these calculations.

1. Baseline Actual Emissions

The first step of the applicability analysis is to determine the emissions prior to the project, known as the BAE. According to 15A NCAC 02D .0530, BAE are defined as "...the average rate, in tons per year, at which the emission unit actually emitted the pollutant during any 24-month period...within the five-year period immediately preceding the date that a complete permit application is received by the Division...." For the LSRP Project, Domtar selected April 2016 to March 2018 as the two-year baseline period during which the operating rates would be used to calculate BAE (see Attachment 1 of the September 2020 addendum). The baseline operating rates from the modified and affected sources include: lignin solids production; blended hog fuel and natural gas fuel usage in the Nos. 1 and 2 Hog Fuel Boiler; amount of lignin added to the bark pile; and black liquor solids firing rate and No. 2 fuel oil fuel usage in the No. 5 Recovery Boiler. The selected baseline is within the 5-year period of the submission of a complete permit application, and DAQ is in agreement with Domtar's approach to the selection of baseline.

2. Potential to Emit and Projected Actual Emissions

The next step in the applicability process is to determine the post-project emissions from the new, modified, and affected sources. For existing sources, these post-project emissions can be calculated as either PAE or PTE. Generally, PTE is a measure of a unit's maximum potential emissions given its physical and operational design and is calculated for a unit under the assumption that the emission source would operate year-round at its maximum capacity. Enforceable restrictions on operations or emissions that restrict a unit's capacity to emit a pollutant may be considered. Under the PSD regulations, PTE is used as the measure of post-project emissions for both new and existing sources. However, the PSD regulations also provide the option of using PAE for existing sources. Projected actual emissions are defined as the highest annual emissions of a pollutant that the emission source is projected to emit in the 5 years (in some circumstances, such as increasing a unit's design capacity or PTE for that pollutant, 10 years) following the date the unit resumes regular operation after the project [40 CFR 51.166(b)(40)(i)].

Domtar used the maximum capacity of the Lignin Plant of 35,000 oven dried metric tons per year (38,581 ODT/yr) to calculate post-project emissions from the modified and reconfigured LSRP sources. Therefore, these post-project emissions are considered PTE.

For the remaining existing sources at the mill, Domtar estimated post-project emissions from the hog fuel boilers and associated equipment, the No. 5 Recovery Boiler and its associated equipment, and the smelt tanks. Domtar estimated that there would be a decrease in black liquor solids production (and therefore decrease in black liquor solids firing rate in the No. 5 Recovery Boiler) of 18,500 tons of black liquor solids (TBSL) per day, and an increase of 36,000 BDT/yr in blended hog fuel fired in the No. 2 Hog Fuel Boiler due to the improved lignin removal efficiency resulting in an increased need for steam. In addition, Domtar is projecting that there will be a significant reduction in the hog fuel fired in the No. 1 Hog Fuel Boiler and that they will transition this boiler to a primarily gas-fired backup unit. Therefore, PAE from the No. 1 Hog Fuel Boiler were projected based on a decreased hog fuel firing rate of 37,266 BDT/yr and an increase in natural gas usage to 455 million standard cubic feet per year (MMscf/yr).

The post-project emissions from the following existing sources were represented as PAE: No. 1 Hog Fuel Boiler, No. 2 Hog Fuel Boiler and its associated equipment (i.e., hog fuel conveyors, ash handling system, etc.), No. 5 Recovery Boiler and its associated equipment (i.e., salt cake mix tank, precipitator mix tank, feed liquor system, etc.), and the North and South Smelt Tanks. It should be noted that Domtar did not calculate the decreased utilization of the No. 1 Hog Fuel Boiler associated equipment.

To determine an emission source's PAE, the PSD regulations allow for the exclusion of the "...portion of the unit's emissions following the project that an existing unit could have accommodated during the [baseline period] and that are also unrelated to the particular project, including any increased utilization due to product demand growth" [40 CFR 51.166(b)(40)(ii)(c)]. To determine whether emissions can be excluded the following needs to be considered:⁶

- Prior to the project, could the affected unit have emitted up to projected actual emissions if called upon? and
- Are post-project emissions above BAE unrelated to the project? Emission increases are likely to be related to the project if the project will:
 - change the emission factor.
 - increase production capacity.
 - increase utilization of production capacity.
 - increase demand for the product.
 - improve efficiency and/or economics.
 - increase reliability.

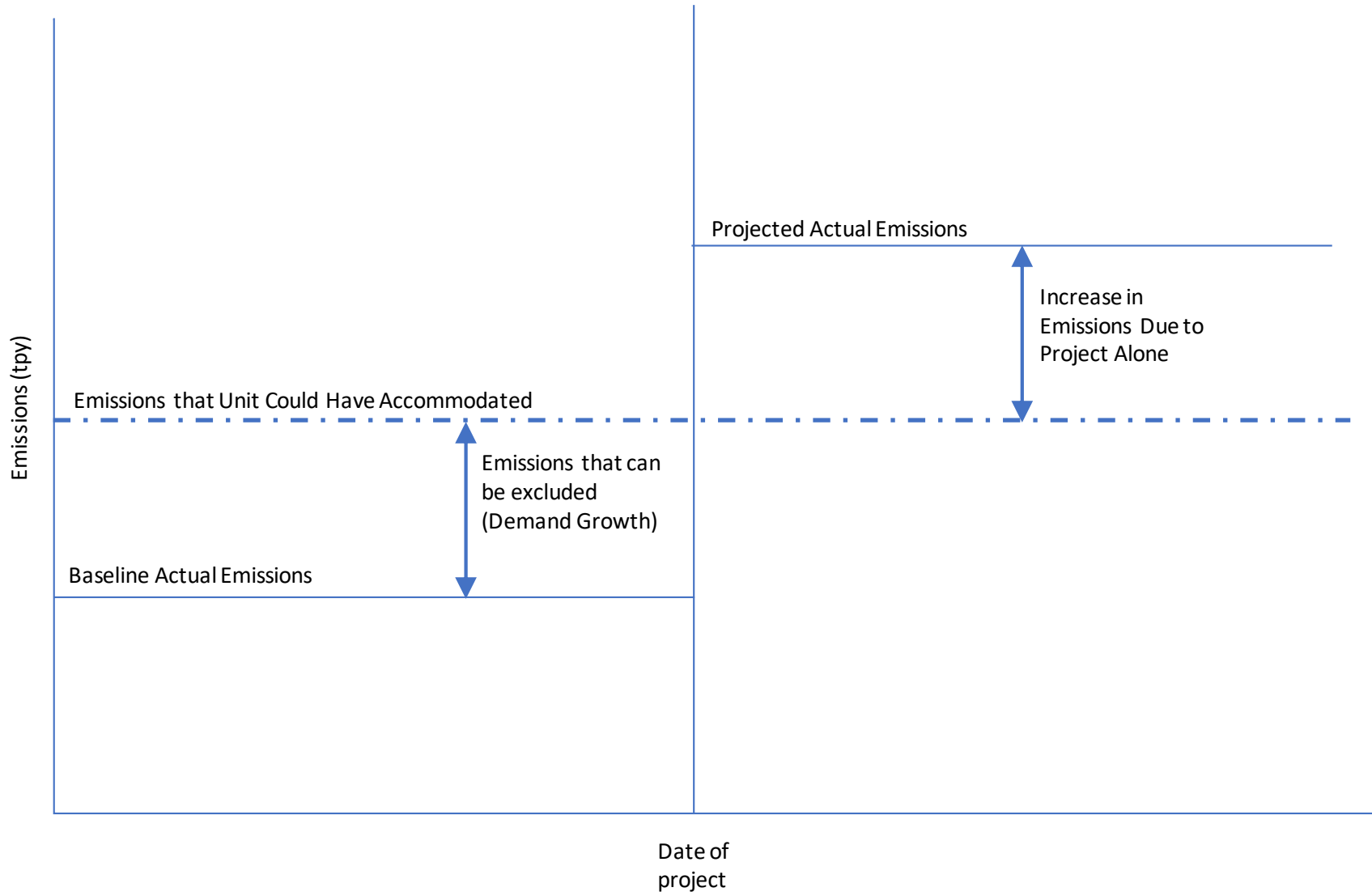
The concept of demand growth (DG) is illustrated in Figure 1. For the purposes of determining what a specific emissions unit could have accommodated, an analysis of production and emissions levels the unit is realistically capable of sustaining during the selected baseline period is necessary. Existing EPA guidance⁷ suggests the highest average monthly operating level during the 24-month baseline period can be used to represent the level of operation that the unit could be accommodated.

As discussed in the September 2020 addendum, the LSRP Project involves an energy balancing component to meet the increased steam required for the increase in operation of the LSRP. This balancing component includes increasing the usage of the No. 2 Hog Fuel Boiler as well as Domtar's plans to reduce the firing of hog fuel in the No. 1 Hog Fuel Boiler as they transition to using this boiler as primarily a natural gas boiler. Therefore, Domtar did not use the DG exclusion for calculating project emission increases from the No. 1 Hog Fuel Boiler.

⁶ NSR Manual. August 2017.

⁷ Letter and enclosures from Worley, G.M, Chief, Air Permits Section, Region 4, US EPA to M. Robinson, Plant Manager, Georgia-Pacific Wood Products LLC. March 18, 2010. Available online at <https://www.epa.gov/sites/default/files/2015-07/documents/demandgrowth.pdf>

Figure 1. Demand Growth Exclusion and Could Have Accommodated



Domtar also evaluated the level of operation that the No. 2 Hog Fuel Boiler could have achieved separately for natural gas and hog fuel (the fuels primarily fired in this boiler). During the baseline period, the No. 2 Hog Fuel Boiler had the highest hog fuel usage during the month of January 2017, annualized to 302,807 dry tons per year, or 5,045,671 MMBtu/yr.^{8,9} For natural gas combustion in the No. 2 Hog Fuel Boiler, Domtar stated in their analysis that they did not use the DG exclusion.

Finally, the LSRP Project is also expected to reduce the amount of black liquor solids and No. 2 fuel oil burned in the No. 5 Recovery Boiler. For the purposes of this evaluation, Domtar did not take credit for that reduction and instead post-project emissions PAE were estimated to be equal to the amount the No. 5 Recovery Boiler CHA during the baseline period.

3. Project Increase Calculations

As previously discussed, the NC regulations under 15A NCAC 02D .0530 allow for project netting to determine whether a project is considered a major modification. Under project netting, emission increases and decreases from all emission units that are defined as part of the project are compared to the PSD significance levels as listed in 40 CFR 51.166 (b)(23)(i). The net increases in emissions from the LSRP Project are presented in Table 4. The sources included in the netting analysis were presented in Tables 3, 4, and 5 of Attachment 1 of the September 2020 addendum.

Baseline actual emissions were calculated for the affected sources during the 24-month baseline period of April 2016 to March 2018. Post-project emissions were calculated by using PTE for the LSRP sources and PAE for the remaining affected sources. The emissions affected sources could have accommodated during the baseline period were excluded from PAE as discussed above. The increase in emissions due to the project for an emissions unit were calculated using the following equation:

$$\begin{aligned} \text{Emissions} &= \text{Emissions that} - \text{BAE} \\ \text{Due to DG} &= \text{Unit CHA} \\ \\ \text{Project Emissions} &= \text{PAE} - \text{DG} - \text{BAE} = \text{PAE} - (\text{CHA} - \text{BAE}) - \text{BAE} = \text{PAE} - \text{CHA} \\ \text{Increase} & \end{aligned}$$

As shown in Table 4, the project increases in emissions, considering CHA, of TRS and H₂S exceeded their associated SER. DAQ has conducted a detailed review of the emission calculations and the background documentation is presented in Permit Application No. 5900069.19B and the September 2020 addendum. DAQ agrees with Domtar's calculations that demonstrate that the project resulted in significant increases in TRS and H₂S emissions and that increases in other regulated NSR pollutants are not significant. Based on the PSD applicability analysis shown in Table 4, Domtar conducted the required BACT determination for TRS and H₂S and additional impacts analysis, including effects on soils, vegetation, and visibility.

⁸ It should be noted that in their calculation, Domtar annualized the monthly hog fuel usage by dividing by the number of days in the month and multiplying by 365 days per year, resulting in a rate of 302,807 dry tons per year. While it is preferable to annualize the fuel usage by multiplying the monthly rate by 12 months per year, resulting in a hog fuel usage rate of 308,616 dry tons, Domtar's approach was more conservative because it underestimated the demand growth (i.e., the difference between the rate that could have been accommodated by the No. 2 Hog Fuel Boiler and the 24-month average during the baseline period).

⁹ Calculated using a site-specific heating value of 16,663,000 Btu/dry ton of hog fuel.

Table 4. Summary of Project Emissions Increases from Lignin Solids Removal Plant Reconfiguration Project at Domtar – Plymouth Mill

	PSD Emissions (tpy) ^{a,b}												
	VOC	PM	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	H ₂ S	TRS (as H ₂ S) ^c	F	H ₂ SO ₄	Pb	CO _{2e} ^d
Baseline Actual Emissions (April 2016 through March 2018)	153	469	392	338	100	1,775	8,776	12.7	16.3	0.244	9.91	6.00x10 ⁻⁰²	2,079,220
Could have Accommodated Emissions (for Modified & Affected Units)	166	512	437	373	101	1,985	9,193	12.8	16.6	0.293	10.35	8.00x10 ⁻⁰²	2,297,290
Projected Actual Emissions (for Modified & Affected Units)^e	195	457	366	297	127	1,815	7,012	31.1	52.7	0.222	10.09	8.61x10 ⁻⁰²	2,142,738
Project Emissions Increases	28.8	-54.6	-71.78	-75.8	25.9	-170	-2,181	18.2	36.1	-0.0714	-0.263	6.10x10 ⁻⁰³	-154,552
PSD Significant Emission Rates	40	25	15	10	40	40	100	10	10	3	7	0.6	75,000
Is PSD review required?	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No

^aFluorides were not evaluated due to the DAQ position that fluorides include all inorganic fluoride compounds except hydrogen fluoride.

^bEmissions presented in Attachment 1 of the September 2020 addendum.

^cThe emission increases presented in the permit application were calculated for TRS (as H₂S), meaning that the TRS emissions were calculated by converting individual compounds [methyl mercaptan, dimethyl sulfide, and dimethyl disulfide] to the H₂S 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.

^d Carbon dioxide equivalent (CO_{2e}) emissions are calculated using the following formula: CO_{2e} = CO₂ emissions + methane (CH₄) emissions * 25 + nitrous oxide (N₂O) emissions * 298

<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

^e Post-project emissions were calculated by using PTE for the LSRP sources and PAE for the remaining affected sources.

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 TRS and H₂S.

Because equipment within categories of sources varies 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 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, DAQ follows statutory mandate that economics, energy, and environmental impacts of candidate technologies be evaluated. Because H₂S is a component of TRS, the control technologies will be considered together for those two pollutants.

C. BACT Analysis for TRS/H₂S Emissions from the LSRP

Domtar is currently operating the LSRP Plant under a BACT limit for TRS and H₂S emissions. The current permit (T49) contains a 12-month running total TRS (as H₂S) limit of 25.9 tons per year and a 12-

month running total H₂S limit of 23.6 tons per year. Several of the LSRP emissions sources at the Domtar mill are currently routed to the HVLC system for combustion.

With the proposed LSRP Project, Domtar is proposing to address operational issues by reconfiguring the process by which lignin is extracted from the liquor recovery stream. According to the permit application, the current configuration resulted in over-pressurization of the HVLC system. To address this, Domtar is proposing to remove several sources from the HVLC collection system, with four sources remaining routed to the hog fuel boilers for combustion. The control scenarios pre- and post-project are presented in Table 1, above. Domtar identified three groups of sources that emit TRS and H₂S: (1) LSRP sources planned for control in proposed caustic scrubber; (2) LSRP sources collected in the HVLC system and controlled in the hog fuel boilers; and (3) Other LSRP Sources controlled by work practices. The sources that will be routed through the dust collection system are sources of particulate matter and not TRS and H₂S. Therefore, they will not be evaluated for BACT.

1. Identify Control Technologies

The first step in the BACT analysis is to identify candidate control technologies. One of the resources 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, DAQ recommends that the best use of the RBLC is to identify technologies that might be installed to reduce emissions of a regulated pollutant.

In their permit application (No. 5900069.19B), Domtar described their process for identifying 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.

As described in the permit application, 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 5-1 of the February 2019 permit application presented the RBLC search results and includes over 60 entries for the control of TRS and hydrogen sulfide prior to 2018. In their search of the RBLC, Domtar identified the following three technologies commonly used to reduce TRS and H₂S emissions from all types of processes: incineration (which converts the sulfur in the TRS and H₂S to SO₂), pollution prevention by limiting the sulfur content of the process feed streams, and wet scrubbing. DAQ also accessed the RBLC database for all entries prior up to July 21, 2021, which resulted in the same sources identified by Domtar. As such, DAQ agrees with Domtar's identification of control technologies available to reduce TRS and H₂S emissions.

Incineration

The TRS/H₂S laden gases from the LSRP are similar in characteristics and nature to the HVLC gases which are 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. Subpart S requires HAP emission reduction of 98 percent in a combustion device (i.e., thermal oxidizer) or combustion in a lime kiln, recovery boiler, or boiler. Although Domtar is currently permitted to control HVLC gases in the Nos. 1 and 2 Hog Fuel Boilers, No. 5 Recovery Boiler, or the backup Thermal Oxidizer, the existing HVLC system is configured to send these gases to the No. 2 Hog Fuel Boiler or the backup Thermal Oxidizer.

Domtar explored the following means of incineration to reduce emissions of TRS and H₂S from the LSRP sources: combustion in the No. 5 Recovery Boiler; combustion in the backup Thermal Oxidizer; installation of a new regenerative thermal oxidizer (RTO), or installation of a new regenerative catalytic oxidizer (RCO). Domtar described each of these in Section 5.2.1 of their permit application. The following discussion summarizes the information in the application.

- *Combustion in the No. 5 Recovery Boiler:* Recovery boilers are one of the control techniques identified in Subpart S as a compliance option for HVLC systems. Currently, the HVLC system is controlled in the hog fuel boilers or the backup Thermal Oxidizer. Domtar conducted an engineering evaluation of whether it was feasible to collect the remaining uncontrolled LSRP system sources identified in Table 1 in the HVLC system.¹⁰ This evaluation concluded that the capacity of the existing HVLC system was at its maximum and could not accept gases from the LSRP sources identified as not already being collected in the HVLC system. As a result, the only option would be to construct an additional system to collect and burn the gases in the No. 5 Recovery Boiler.¹¹
- *Thermal Oxidization (TO):* In thermal oxidizers, compounds are oxidized at high temperature to form carbon dioxide (CO₂) and water (steam). In a thermal oxidizer, gases are burned in a combustion chamber. 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 thermal oxidizer can achieve reductions of around 95 to 98 percent. A regenerative 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 CO₂ 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.

Wet Scrubbing

Wet scrubbing removes air pollutants by inertial or diffusional impaction, chemical reaction, or absorption into liquid solvent. Wet scrubbers are a commonly used control technology for reducing TRS emissions, and especially H₂S from process vent gas streams. A caustic scrubber liquor neutralizes and removes the acid gases in the vent stream. The scrubber emission reduction is generally different for compounds depending on the reactivity with the scrubber solution and the volatility of the compounds.

¹⁰ This engineering evaluation was conducted when the LSRP system was originally permitted under PSD (Permit No. 04291T46, issued April 18, 2019). There have been no changes to the mill since the initial engineering evaluation that would change this determination.

¹¹ 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.

Specifically, Domtar estimates that the removal of H₂S would be higher than that of MMC and because DMS and DMDS are more volatile compounds, the wet scrubber would not be expected to provide emission reduction for these compounds. According to their permit application, the caustic scrubber vendor guaranteed a 95-percent emission reduction for H₂S and a 70- to 75-percent emission reduction for methyl mercaptan. The overall TRS removal efficiency was calculated by determining the scrubber outlet TRS emissions as the sum of controlled TRS compounds using the vendor guaranteed scrubber efficiencies (95 percent for H₂S, 75 percent for MMC and zero percent for DMS and DMDS).

Pollution Prevention – Limit Sulfur Content of Inlet Stream

As discussed in the permit application, for many years, the pulp and paper industry has reduced the emissions of reduced 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 pure oxygen, hydrogen peroxide, or ambient air to convert the sulfides to less volatile sulfates or thiosulfates in solution. Total reduced sulfur compounds, which include MMC, DMS, DMDS, and H₂S 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. As stated in the permit application, similar to the premise behind the use of an acidic buffer for removal of SO₂ in EPA Method 16, reduced sulfur compound emissions will not remain soluble in acidic solutions. 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.

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.

Limit Sulfur Content of Inlet Stream

In the February 2019 permit application, Domtar referred to their 2016 retroactive initial PSD permit application for the 2011 installation of the LSRP system where they described the options for limiting sulfur content in the inlet stream. 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 H₂S emission from LSRP sources. As discussed in the 2016 retroactive PSD permit application, 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.¹² This would result in the following concerns:

- The potential presence of SO₂ will require additional equipment to protect process employees and could cause corrosion of process equipment.
- The potential presence of SO₂ 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 SO₂ was detected.

Due to the issues described above, Domtar concluded, and DAQ agrees with this conclusion, that black liquor oxidation was not technically feasible for pollution prevention. The LSRP Project being proposed with the February 2019 application does not change this conclusion.

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:

- Destruction of LSRP gases in the recovery boiler is a proven technology used by many mills and is technologically feasible.
- Use of oxidizer technology (either thermal oxidizer or RTO) 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 pose some risk of catalyst fouling due to the presence of ammonia and sulfur compounds forming ammonium bisulfate on the catalyst layer, which would result in dramatic reductions in destruction efficiency and intensive maintenance activities.
- Due to the potential for generation of SO₂ emissions (Domtar estimated that SO₂ emissions from the destruction of TRS compounds would be greater than 900 tpy), a scrubber would be required for all thermal oxidation options.
- The backup Thermal Oxidizer was specifically designed to handle the capacity of the existing HVLC system and Domtar engineering determined that the HVLC collection system would not be able to handle the flow rate associated with the additional LSRP sources. Therefore, use of the backup thermal oxidizer was considered technically infeasible.

3. Rank Remaining Control Technologies by Control Efficiency

The technically feasible control technologies for removing TRS and H₂S emissions from the LSRP sources were ranked from the most stringent to the least stringent, as shown in Table 5, below. Domtar provided the control efficiencies for the various add-on controls. The 98-percent control efficiencies for thermal oxidizers and the recovery boiler shown in Table 5, are consistent with removal efficiencies for this type of control device (as discussed in Section IV.C.1, above) and are equivalent to the Subpart S emission reduction standard for HVLC sources. Because DMS and DMDS are more volatile compounds,

¹² 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>

Domtar did not take credit for any reduction in emissions the wet scrubber would achieve for these compounds.

Table 5. Technically Feasible Control Technologies Ranked by Control Efficiency

Control Technology	Approximate Control Efficiency (%)
Regenerative thermal oxidizer followed by wet scrubber	TRS and H ₂ S: 98
Thermal oxidizer followed by wet scrubber	TRS and H ₂ S: 98
Recovery Boiler	TRS and H ₂ S: 98
Wet Scrubbing ^a	MMC: 75 H ₂ S: 95 TRS: 90 ^b

^aVendor guaranteed removal efficiency for MMC and H₂S.

^bThe TRS percent emission reduction was back-calculated by applying the vendor guaranteed MMC and H₂S emission reductions and the assumption that DMS and DMDS would not be controlled to the uncontrolled emissions for each individual compound.

4. Evaluate Technically Feasible Control Options

To evaluate the 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. Domtar conducted this analysis for the sources in two groups: (1) LSRP Sources Proposed to be Routed to a Caustic Scrubber, and (2) Other LSRP Sources (identified in Table 1, above).

As identified in Table 1, above, the Carbonator – Feed Liquor will continue to be collected in the HVLC system and primarily controlled in the No. 2 Hog Fuel Boiler. Furthermore, several sources will remain routed to the HVLC system. A cost analysis will not be conducted for these sources. See Section IV.C.5, below for additional discussion.

The following sections present the cost analysis conducted for the LSRP sources, a summary of the economic impacts associated with the project, and a summary of environmental and energy impacts.

a. Cost Analysis

The cost analysis for controlling emissions with add-on controls is summarized in Table 6, below. The cost impacts were estimated using the EPA Air Pollution Control Cost Manual (OCCM) guidance,¹³ past permitting experience, EPA Technology Fact Sheet for oxidizers, test data, and vendor quotes. In their comments on the draft preliminary determination, Domtar confirmed that most of the cost information was provided in 2018 dollars, except for the incremental cost for the “other LSRP Sources.” The cost with controlling these sources was provided in a 2017 quote from SEI. The SEI quote included additional cost to control the No. 2 Filter Press Area which includes press enclosure, fan, ductwork, and installation totaling \$529,550. According to Domtar, had the 2017 quote been scaled based on the Chemical Engineering Plant Cost Index from 2017 (567.5) to 2018 (603.1) dollars, the cost would have been higher and the conclusion that the incremental cost of control in not cost effective would remain the same. Domtar amortized the costs over a 20-year life at 9 percent interest, unless otherwise specified. The interest rate is based on previous Domtar projects. The life expectancy was provided by Domtar staff.

¹³ EPA Air Pollution Cost Control Manual. Sixth and Seventh Editions. Office of Air Quality Planning and Standards, Environmental Protection Agency, Research Triangle Park, North Carolina. <https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution>

Table 6. Economic Impact Analysis for LSRP Project^a

Add-On Control Technology	TRS Emission Reduction (tpy) ^b	H ₂ S Emission Reduction (tpy)	Economic Impacts					
			Total Capital Cost (\$) ^c	Total Annual Cost (\$/yr) ^d	TRS Cost Effectiveness (\$/ton) ^b	H ₂ S Cost Effectiveness (\$/ton)	Incremental TRS Cost Effectiveness (\$/ton) ^e	Incremental H ₂ S Cost Effectiveness (\$/ton) ^e
LSRP SOURCES TO BE ROUTED TO PROPOSED SCRUBBER^f								
Caustic Scrubber	491	444	\$4,068,491	\$751,604	\$1,530	\$1,693	N/A	N/A
TO + Caustic Scrubber	540	467	\$6,187,699	\$2,094,334	\$3,877	\$4,487	\$27,340	\$58,644
RTO + Scrubber	540	467	\$5,892,491	\$1,972,038	\$3,650	\$4,225	\$24,850	\$53,303
Incineration in Recovery Boiler	540	468	\$5,791,453	\$1,228,178	\$2,317	\$2,682	\$12,197	\$33,997
OTHER LSRP SOURCES^f								
Incineration in Recovery Boiler	3.00	2.33	\$879,550	\$96,352	\$32,102	\$41,429	N/A	N/A
Caustic Scrubber	2.91	2.25	\$879,550	\$96,352	\$33,115	\$42,737	N/A	N/A
TO + Caustic Scrubber	3.06	2.37	\$879,550	\$96,352	\$31,491	\$40,641	N/A	N/A
RTO + Scrubber	3.06	2.37	\$879,550	\$96,352	\$31,491	\$40,641	N/A	N/A

^aRevised Attachment 3, Tables 6 and 7, from September 2020 addendum to Permit Application No. 5900069.19B.

^bDomtar calculated TRS Emission Reduction for TRS (as H₂S). 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.

^cAdditional Cost to control the No. 2 Filter Press Area includes press enclosure, fan, ductwork and installation per SEI Quote May 12, 2017. Cost of electrical equipment, piping, engineering, and installation of piping and electrical provided by Domtar 12/13/2018.

^dCapital Recovery = (CR) is 0.1095 *TCI (assuming a 20 yr life @ 9% interest).

^eIncremental cost effectiveness of selecting the listed control scenario vs. the caustic scrubber control scenario.

^fEmission sources included in these groupings are presented in Table 1, above.

To perform the cost analysis, Domtar made engineering judgments concerning the various add-on controls. Assumptions used in performing this analysis are included in the revised detailed cost calculations presented in Attachment 3 of the September 2020 addendum to Permit Application No. 5900069.19B. All cost estimates were prepared using potential TRS and H₂S emission rates for the LSRP operations. Annual operational hours were assumed to be 8,760 per year. At DAQ's request, Domtar provided the background information for the cost estimates, and these are presented in Appendix A of this Preliminary Determination.

DAQ has reviewed the revised cost calculations in Attachment 3 of the September 2020 addendum and agrees with the calculations and assumptions used in generating these costs.

LSRP Sources Planned for Control in the Proposed Scrubber

The LSRP sources that are proposed to be controlled in the scrubber are identified in Table 1, above. The costs were estimated for the controls identified as being technically feasible for the gases Domtar intends to control in the proposed scrubber. The following discussion summarizes how cost estimates were prepared for each control technology evaluated for this cost analysis.

- Caustic scrubber
 - Capital costs for the caustic scrubber were provided by the scrubber vendor and includes equipment, installation, and engineering. Noncondensable gases (NCG) piping costs were provided from the NHWL Engineering, Inc. estimate.
 - Operating costs were calculated using the methodology from the OCCM¹³ and site-specific data for wages and utilities.
 - Fan and pump sizes were provided by the scrubber vendor.
 - Annual cost for caustic was considered to be minimal because the caustic required for the scrubber operation (approximately 2 million pounds) is a small percentage of the overall caustic purchased by the mill (approximately 44 million pounds) for makeup cooking chemical (white liquor) to be used in the digesters. It is also anticipated that the spent caustic from the scrubber will be recycled into the white liquor system.
- Thermal Oxidizer Followed by Caustic Scrubber
 - Capital costs for the thermal oxidizer include cost of equipment, installation, and engineering and were estimated based on the vendor quote for the Mill Optimization Project. The capital cost by the vendor was adjusted by a factor of 0.6 based on the ratio of volumetric flow rate between that used to generate the quote and the LSRP sources proposed to be controlled.
 - NCG piping costs were provided by the NHWL estimate.
 - Operating costs were calculated using the operating cost methodology in the OCCM¹³ and site-specific wages and utility costs.
 - Incinerator control options included the capital and annual costs associated with a caustic scrubber to reduce the estimated sulfur dioxide emissions expected to be generated by the oxidation of the TRS compounds in the incinerator.
 - The gas volume entering the scrubber is anticipated to be at least as high as that used to size the proposed caustic scrubber because water vapor will be added to the hot gas stream when the oxidizer exhaust is quenched.
- Regenerative Thermal Oxidizer followed by Caustic Scrubber
 - Capital costs for the RTO include cost of equipment, installation, and engineering and were estimated based on a vendor quote.
 - NCG piping costs were provided by the NHWL Engineering, Inc. estimate.
 - Foundation cost and operating costs were calculated using the methodology in the OCCM¹³ and site-specific wages and utility costs.

- RTO control options included the capital and annual costs associated with a caustic scrubber to reduce the estimated sulfur dioxide emissions expected to be generated by the oxidation of the TRS compounds.
- The gas volume entering the scrubber is anticipated to be at least as high as that used to size the proposed caustic scrubber because water vapor will be added to the hot gas stream when the oxidizer exhaust is quenched.
- For the RTO, the vendor consulted for the project raised concerns regarding sulfuric acid condensation due to the high sulfur content of the stream being combusted and lower operating temperatures throughout the RTO in the heat recovery cycle. Therefore, the material used in the vendor quote was hastelloy steel clad. Domtar researched the issue and requested an extended warranty on the materials of construction. The vendor was willing to guarantee the integrity of the system for two years. Therefore, the RTO was amortized over two years.
- Recovery Boiler
 - Capital costs provided by a vendor included ductwork to collect vapors and modifications to the recovery boiler to accommodate the proposed changes.
 - Operating costs were calculated using the OCCM¹³ methodology and site-specific data for wages and utility costs.

Other LSRP Sources

As shown in Table 1, above, the Other LSRP Sources are the: No. 2 Lignin Filter, and the uncontrolled insignificant activities (No. 2 Lignin Filter Horizontal Conveyor, Acid Wash Water Tank, Lignin Acid Area Sump, and Lignin Liquor Area Sump). In the revised cost estimates provided in the September 2020 addendum to Permit Application No. 5900069.19B, Domtar provided TRS and H₂S emission estimates for all of these sources except for the Acid Wash Water Tank. This tank stores primarily mill water and dilute sulfuric acid.^{14,15} The analysis included cost of routing only the No. 2 Lignin Filter Area to the control technologies identified as being technically feasible to reduce TRS and H₂S emissions (see Section IV.C.2, above).

Domtar estimated the cost of an enclosure (including the ductwork, piping, and electrical equipment) required to collect and transport Lignin Filter Area gases to the control device. The potential cost associated with controlling these emissions in any of the control devices evaluated for the sources being routed to the proposed scrubber (above) was not included. To be conservative, the additional cost of reducing fugitive emissions from the Lignin Feed Liquor Tank and drainage sumps were included in the cost effectiveness analysis, but the additional cost to collect and control these emissions were not included.

b. Summary of Economic Impacts

The summary of the economic impacts was also evaluated separately for sources planned to be controlled in the caustic scrubber and other LSRP sources. The impacts are presented in Table 6, above.

LSRP Sources Planned for Control in the Proposed Scrubber

The economic impact was determined by calculating the cost effectiveness for each control scenario by dividing the total annual cost by the emission reduction associated with each pollutant. As shown in Table 6, above, the cost effectiveness of each control scenario ranged from approximately \$1,693 to \$3,877 per ton of TRS and from approximately \$1,693 to \$4,487 per ton of H₂S. The caustic scrubber had

¹⁴ Email from Claire Corta, P.E., All4 Inc. to Heather Sands, NC DEQ/DAQ. Re: Another Question. August 10, 2021. (See Appendix A of this Preliminary Determination)

¹⁵ In their comments on the draft Preliminary Determination, Domtar stated that there are no emissions increases from the Acid Wash Water Tank because the vapor pressure of sulfuric acid at the given concentration is close to 0; therefore, Domtar expects no emissions of sulfuric acid from this source. This approach is consistent with what has been reported in the AEI.

the lowest cost effectiveness of the control scenarios for both TRS and H₂S. Domtar also calculated an incremental cost effectiveness, which is a ratio of the difference in annual cost between two control devices divided by the difference in control device performance (i.e., emission reduction). Incremental cost effectiveness was calculated for each combustion control scenario as compared to the caustic scrubber. As shown in Table 6, above, the incremental cost effectiveness to further control the LSRP gases ranged from approximately \$12,197 to \$27,340 per ton of TRS and approximately \$33,997 to \$58,644 per ton of H₂S. Because of the high incremental cost effectiveness values to control TRS and H₂S using the combustion control scenarios, these controls were not considered for BACT.

Other LSRP Sources

In the permit application, Domtar stated that the vent gas flow rate from the Other LSRP Sources (approximately 11,000 cfm) is similar to the LSRP Sources Planned for Control the Proposed Scrubber flow rate (approximately 12,000 cfm), while the concentration of the TRS gases from Other LSRP Sources (approximately 5 ppm) is significantly lower than the concentration of the TRS gases from the Main LSRP Process Tanks (approximately 1,000 ppm). The cost effectiveness values calculated for controlling the Other LSRP Sources are presented in Table 6, above. The annualized costs presented in Table 6 were associated with collecting and transporting the vent gases from the No. 2 Lignin Filter Area to a control device. The costs did not include the increased cost that would be associated with the installation of a larger control device designed to handle twice the flow rate of the main LSRP tanks. The cost effectiveness of controlling the No. 2 Lignin Filter Area is greater than \$30,000 per ton of both TRS and H₂S for every control scenario. DAQ agrees with Domtar's evaluation that these cost effectiveness values are cost prohibitive.

c. Energy and Environmental Impacts

Although each of the potentially feasible add-on control devices evaluated provide reductions in TRS and H₂S 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 7, 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 SO₂ emissions. Assuming a 100 percent conversion of TRS compounds to SO₂ (a conservative assumption), SO₂ increases were estimated by multiplying the TRS (as H₂S) emissions in Table 7, below, by the SO₂ molecular weight (64 lb SO₂/lbmole of SO₂) and dividing by the H₂S molecular weight (34 lb/lbmole). Additionally, operation of any of the technically feasible control technologies would increase electricity usage and the operation of the regenerative thermal oxidizer or thermal oxidizer would increase natural gas consumption and would increase NO_x and GHG emissions. There are no other notable environmental impacts associated with the any of the control scenarios evaluated, such as significant generation or disposal of hazardous or solid wastes.

5. Selection of BACT for the LSRP Process Sources

As shown in Table 6 above and discussed in Section IV.C.4, the caustic scrubber was considered to be a cost-effective method of control and Domtar is proposing to select the use of a caustic packed bed scrubber as BACT for the LSRP Sources Planned for Control in the Proposed Scrubber (identified in Table 1, above). Emissions from the Feed Liquor Carbonator¹⁶ will continue to be collected in the HVLC system and controlled in a combustion device (permitted as the No. 2 Hog Fuel Boiler, No. 1 Hog Fuel Boiler, No. 5 Recovery Boiler, or Thermal Oxidizer). A cost analysis was not conducted for this source as there will be no additional costs associated with the use of this existing control scenario, making the cost

¹⁶ The Lignin Acidification Tank and Lignin Foam Tank are routed through the Carbonator tower.

Table 7. 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) ^c	NO _x Generated (ton/yr) ^d	CO ₂ Generated (ton/yr) ^e	Hazardous Waste Impacts? (Yes/No)	Energy Impacts	
						Electrical (kW*hr/yr)	Fuel (MM Btu/yr)
Incineration in Recovery Boiler	Yes	48	0	0	No	1,960,488	0
Caustic Scrubber	No	0.0	0	0	No	506,459	0
Thermal Oxidizer plus Caustic Scrubber	Yes	48	5	11,760	No	873,066	201,486
Regenerative Thermal Oxidizer	Yes	48	< 5	< 11,760	No	506,459	minimal

^a Source is Table 8, revised Appendix D of September 2020 addendum to Permit Application No. 5900069.19B.

^b Determination of whether adverse impacts are caused by control alternative. "Yes" response indicates that criteria or hazardous air pollutants are emitted.

^c TRS (as H₂S) Emissions presented in Table 5, above, converted to SO₂ Emissions. SO₂ emissions will not be formed in the caustic scrubber. Assumes 95% Control of SO₂ by scrubbing or recovery Boiler.

^d NO_x emissions estimated using US EPA AP-42, Fifth Edition, Volume 1, Chapter 1, Table 1.4-1 for Low NO_x Burners.

^e 40 CFR Part 98, Subpart C, Table C-1, Default Natural Gas CO₂ Emission Factor.

effectiveness zero. Therefore, Domtar has selected the use of a combustion device as BACT for the Feed Liquor Carbonator.

Finally, the technically feasible control scenarios were found to be not economically feasible for the control of the Other LSRP Sources. Therefore, BACT for these sources is considered no control.

BACT Limits for Main Sources

A summary of proposed BACT emission limits and compliance methods for all LSRP sources is presented in Table 8. As shown in Table 8, the proposed BACT emission limits for the LSRP Sources Planned for Control in the Proposed Scrubber are 11.6 pounds of TRS (as the sum of compounds) per hour and 5.4 pounds of H₂S per hour. The emission limits are based on the emissions contained in the September 2019 Application Addendum, Attachment 3, Table 5-2 and are calculated on a 24-hour block average basis. In their comments on the draft Preliminary Determination, Domtar stated the reason the emission limit is on a 24-hour average is that the lignin plant is a batch process and emissions are variable over a 24-hr period. The cycle time for each filter alone, typically varies from ~ 30 minutes to an hour, and they operate in series. A 3-hour average is too short to capture the emissions variability for all sources. Domtar will work with DAQ via submittal of a stack test protocol to develop a plan to test the scrubber to capture the representative emissions scenarios that maximizes production.

To demonstrate compliance with the BACT emission limits, Domtar proposed to monitor the caustic scrubber liquid flow rate and pH. The minimum flow rate and pH will be established during an initial performance test. Continuous compliance will be demonstrated by monitoring the scrubber liquid flow rate and pH on a continuous basis (at least once every 15-minutes). Domtar proposed to semiannual reports documenting periods of noncompliance with the operating parameters.

BACT Limits for HVLC Sources

As discussed above, Domtar proposed as BACT the continued collection of emissions from the Carbonator – Feed Liquor (and the associated Lignin Acidification Tank, Lignin Foam Tank, and Acidic Lignin Conditioning Tank, which are routed through the Carbonator) in the HVLC system for control in a combustion device (primarily the No. 2 Hog Fuel Boiler). The proposed BACT emission limits are 1.3 tpy of TRS (as sum of compounds) and 1.1 tpy of H₂S. According to Domtar, uncontrolled emissions were calculated using vendor-supplied flow rates and concentrations, which represent worst case TRS compound uncontrolled emissions and a 50 percent safety factor, and 8,760 hours per year of operation.

Controlled emissions of TRS and H₂S were calculated using a 98-percent emission reduction. As stated previously, the 98-percent emission reduction for combustion devices was assumed for combustion devices based the emission reduction required in the NESHAP, Subpart S for HVLC sources. Under Subpart S, a compliance option for HVLC systems is to be collected in a closed vent system and routed a combustion device. Domtar's current permit identifies the combustion devices as follows:

- The Nos. 1 or 2 Hog Fuel Boilers, operating at a heat input capacity greater than 150 MMBtu/hr, by introducing the HAP emissions stream with the combustion air or with the primary fuel into flame zone; or
- The No. 5 Recovery Boiler, by introducing the HAP emissions stream with the combustion air or with the primary fuel into the flame zone; or
- The Thermal Oxidizer, designed and operated at a minimum temperature of 871°C (1600°F) and a minimum residence time of 0.75 seconds.

As allowed by Supbart S and Section 2.2 A.1 of the current permit (T49), no control device parameter monitoring is required for compliance with the HVLC emission standards if they are routed to the combustion devices listed above. A continuous measurement system (CMS) is used to measure

Table 8. Summary of Proposed BACT

LSRP Emission Source Description ^a	Proposed BACT	TRS (as sum of compounds) BACT Limit	H ₂ S BACT Limit	Monitoring
MAIN SOURCES				
No. 1 Feed Liquor Cooler (ID No. 09-27-1100)	Caustic Scrubber	11.6 lb/hr (24-hr block average)	5.4 lb/hr (24-hr block average)	Monitor scrubber flow rate and pH (24-hr block average)
No. 1 Lignin Filter Filtrate Storage Tank (ID No. ES-09-27-1200)				
Lignin Slurry Conditioning Tank (ID No. ES-09-27-1800)				
Lignin Slurry Buffer Tank (ID No. ES-09-27-2000)				
No. 1 Lignin Filter Cloth Wash Tank (ID No. ES-09-27-2300)				
No. 1 Lignin Filter Filtrate Tank (ID No. ES-09-27-2400)				
No. 1 Lignin Filter Filtrate Buffer Tank (ID No. ES-09-27-2500)				
No. 1 Lignin Filter Horizontal Conveyor (ID No. ES-09-27-2610)				
No. 1 Lignin Filter Incline Conveyor (ID No. ES-09-27-2620)				
No. 2 Lignin Filter Acidic Filtrate Tank (ID No. ES-09-27-3200)				
No. 1 Lignin Filter (ID No. ES-09-27-2100)				
Acidic Lignin Conditioning Tank (ID No. ES-09-27-2800)				
No. 2 Lignin Filter Cloth Wash Tank (ID No. ES-09-27-3100)				

LSRP Emission Source Description ^a	Proposed BACT	TRS (as sum of compounds) BACT Limit	H ₂ S BACT Limit	Monitoring
HVLC SOURCES				
Carbonator-Feed Liquor (ID No. ES-09-27-1400) including: Lignin Acidification Tank (ID No. ES-09-27-2700) Lignin Foam Tank (ID No. ES-09-27-2770)	Existing HVLC collection system to incineration	1.3 tpy	1.1 tpy	None – Capture and control the HVLC streams in the same manner as the current HVLC sources.
OTHER SOURCES				
Lignin Feed Liquor Tank (ID No. ES-09-27-1000)	No additional control	2.6 tpy	2.0 tpy	H ₂ S and TRS Emissions from uncontrolled sources are insignificant. Domtar will report annual lignin production and annual emissions.
No. 2 Lignin Filter (ID No. ES-09-27-3000) ^{b,c}				
No. 2 Lignin Filter Horizontal Conveyor (ID No. IES-09-27-3400) ^c				
Acid Wash Water Tank (ID No. IES-09-27-2900)				
Lignin Acid Area Sump (ID No. IES-09-27-3700)				
Lignin Liquor Area Sump (ID No. IES-09-27-3600)				

^aThe new emission source descriptions requested by Domtar.

^b NOTE: 0.5 tpy of uncontrolled H₂S emissions from the Filter – 2 Lignin Filter) is accounted for in the total exhaust from the scrubber stack.

^c Controlled in the dust collection system (ID No. CD-09-27-3900) and routed to the scrubber stack, bypassing the scrubber. No TRS or H₂S control is expected.

temperature of outlet vent stream when HVLC system gases controlled in the thermal oxidizer. Domtar proposed that no additional monitoring be required to demonstrate compliance with the BACT emission limits for the Carbonator – Feed Liquor (and associated tanks). However, to ensure that the proposed emissions limits are not exceeded, the permit will also contain a limit on LSRP operation. Domtar will not be allowed to operate the LSRP at a rate greater than 38,581 ODT of lignin solids per consecutive 12-month period.

Other Sources

As shown in Table 8, Domtar proposed BACT emission limits for the Lignin Feed Liquor Tank, No. 2 Lignin Filter, No. 2 Lignin Filter Horizontal Conveyor, Acid Wash Water Tank, Lignin Acid Area Sump, and Lignin Liquor Area Sump. As shown above, BACT was determined to be no additional control and Domtar proposed BACT limits of 2.6 tpy of TRS (sum of compounds) and 2.0 tpy of H₂S. The emissions were calculated using site specific test data and flowrate and concentration data from the LSRP vendor.

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 quantities [40 CFR 51.166(b)(23)].

1. Potential Emissions

The regulated NSR pollutants that increased above the SER were TRS and H₂S. 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 H₂S, MMC, DMS, and DMDS. Domtar provided an air dispersion modeling analysis that compared potential emissions of the TRS compounds (H₂S and MMC) for which North Carolina has established AALs, to those associated AALs. Details about this modeling were discussed in Section III.D, above, as part of the TAP analysis.

To be conservative, this modeling included a 50 percent safety margin and also included emissions of H₂S and MMC from wastewater sources at pulp and paper mills, which are exempt for NC TAPs modeling per 15A NCAC 02Q .0702(a)(24). Results from the modeling showed that the maximum impact for H₂S was 61.54 µg/m³, which is 51.29 percent of the current AAL for H₂S. The maximum impact for MMC was 42.34 µg/m³, which is 84.67 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 AQAB.¹⁷

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:

¹⁷ Memorandum from Porter, M., DAQ/AQAB to H. Sands, DAQ/Permitting Section. Review of Dispersion Modeling Analysis for Domtar Paper Company, LLC – Plymouth Mill. November 17, 2020.

- 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 NO_x emissions. Domtar is not subject to PSD review for any pollutants other than TRS and H₂S. Because there are no significant increases of visibility-affecting pollutants, no analysis of visibility impairment is required for this project.

2. Growth Analysis

As stated in the permit application, a growth analysis examines potential emissions from secondary sources associated with the proposed project. While these activities are not directly involved in process operation, the emissions involve those that can reasonably be expected to occur. 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. Secondary emissions do not include emissions from mobile sources and sources that do not impact the same general area as the source under review.

Domtar stated that they do not expect to hire additional employees for the proposed project. Therefore, secondary growth is not expected, and an analysis of this growth was not performed. 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

The project impact on soils and vegetation was analyzed by comparing the maximum modeled concentrations to screening thresholds recommended in EPA's "A Screening Procedure for Impacts of Air Pollution Sources on Plants, Soils and Animals" (EPA-450/2-81-078). In the February 2019 original application, Domtar compared the highest modeled concentrations of NO₂ and SO₂ to the screening concentrations from EPA's screening procedure. The modeled concentrations were well below the screening thresholds. However, with the September 2020 addendum, the PSD applicability analysis was revised to better reflect mill operations (see Section I.A, above) and the LSRP Project no longer triggered PSD review for NO_x and SO₂ emissions.

The project did trigger PSD review for H₂S and TRS. According to the EPA's screening procedure for H₂S emissions, an ambient concentration greater than 28,000 µg/m³ (4-hour average) would trigger an additional detailed review. Because the margin between the maximum modeled H₂S concentration of 61.54 µg/m³ (24-hour average) and the screening concentration is so large, an analysis was not necessary for the impact on soils and vegetation from the increases in H₂S emissions.

The EPA screening procedure does not specify an ambient concentration similar to H₂S for TRS, due to "insufficient data to provide a suitable screening concentration." The EPA screening guidance details that a conclusion regarding whether TRS sulfur compounds "might adversely affect plants, soils, or animals

could not be determined.” Additional evaluation suggested that MMC “might be toxic to plants at concentrations near 150,000 microgram per cubic meter ($\mu\text{g}/\text{m}^3$),” which is several orders of magnitude higher than modeled concentrations. The indeterminant conclusion of TRS impacts on plants and soils and the extremely high impact levels for H_2S and MMC, compared to modeled concentrations, indicate no unacceptable risk to soils and vegetation is expected.

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 significant 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 (DAQ) shall meet the following:

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

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
943 Washington Square Mall
Washington, NC 27889

Raleigh Central Office
217 West Jones Street
Raleigh, NC 27603

In addition, the preliminary determination and draft permit will be made available on the 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.

DAQ prepared a public notice (See Appendix A) 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.

DAQ will send the public notice (see Appendix A) to the Martin County Manager at 305 East Main Street, PO Box 668, Williamston, NC 27892 and manager@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 DAQ public notice (See Appendix A) provides contact information to allow interested persons to submit comments and/or request a public hearing.

The proposed LSRP Project is subject to review under 15A NCAC 02D .0530, "Prevention of Significant Deterioration" (PSD), 15 NCAC 02Q .0518, "Final Action," and 40 CFR 51.166. Because the proposed BACT limits will effectively increase the allowable TRS and H₂S emissions on a ton per year basis, these limits will conflict with the BACT limits for TRS and H₂S in Section 2.1 Q.1 of the current permit (T49). As such, this permitting action is considered a significant permit modification under 15A NCAC 02Q .0516 and the permit application is being processed as a one-step significant permit modification under 15A NCAC 02Q .0501(c), under which a construction and operating permit will be issued. Therefore, per 15A NCAC 02Q .0518, this permit modification is subject to a 45-day review by the Environmental Protection Agency (EPA) in addition to the 30-day public comment period required under 15A NCAC 02Q .0521.

V. Other Issues

A. Compliance

DAQ has reviewed the compliance status of this facility. The most recent inspection was completed on September 30, 2021. Kurt Tidd of the WaRO indicated that the facility appeared to be in compliance with all applicable requirements, with the exception of a notice of violation (NOV) issued on December 17, 2019, as noted below.

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

- A Notice of Deficiency (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/Notice of Recommendation for Enforcement (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, 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. The civil penalty was paid in full and the NOV/NRE was closed on March 3, 2019.
- 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.
- A NOV/NRE was issued on March 4, 2019, for exceedance of the NSPS Subpart D opacity limit on the No. 1 Hog Fuel Boiler, and 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. A civil penalty in the amount of \$22,309, including costs was issued on June 13, 2019. The civil penalty was paid in full and the NOV/NRE was closed on July 12, 2019.
- A NOV was issued on December 17, 2019, for failed stack tests conducted on June 25, 2019, for particulate (filterable) as required by NSPS Subpart BB and NESHAP Subpart MM. Domtar conducted a successful retest on July 31, 2019. DAQ did not pursue a civil penalty as Domtar's quick rescheduling of additional testing was considered. The NOV was resolved as of February 13, 2020.
- An informal NOV was issued on March 16, 2020, for the exceedance of the NO_x emission limit on the No. 2 Hog Fuel Boiler during the November 29, 2019 performance testing. This issue was resolved on May 5, 2020.
- An informal NOV was issued on October 12, 2020, for failure to conduct the tests on the No. 6 and No. 7 bleach plant scrubbers within 60 months of the previous test dates (due August 2020). A performance test was conducted on September 22 and 23, 2020 and indicated compliance. This issue was resolved on October 22, 2020.

The signed Title V Compliance Certification (Form E5) included with the permit application, received on February 28, 2019, indicated that the facility was not in compliance with all applicable requirements. Specifically, at the time of receipt of the permit application, Domtar was 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. The permitting requirements of SOC 2015-01 were satisfied with the issuance of Permit No. 04291T46, issued April 18, 2019, and the SOC was closed effective May 3, 2019.

B. Zoning Requirements

Domtar is located in an area without zoning. Therefore, a Zoning Consistency Determination per 15A NCAC 02Q .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.

In Appendix C of the permit application, Domtar provided an affidavit and proof of publication that the legal notice required under this rule was published on May 25, 2018, in the Williamston Enterprise and on May 30, 2018, 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 August 1, 2018 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. Claire Gaile Corta, 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 \$15,119 was received on February 28, 2019.

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 DAQ, 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.