Prevention of Significant Air Quality Deterioration Review

Preliminary Determination

July 18, 2018

Facility Name: Georgia-Pacific Wood Products LLC (Warrenton Lumber Plant)
City: Warrenton
County: Warren
AIRS Number: 04-13-301-00003
Application Number: TV-237752
Date Application Received: APRIL 20, 2018

Review Conducted by:
State of Georgia - Department of Natural Resources
Environmental Protection Division - Air Protection Branch
Stationary Source Permitting Program

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SUMMARY

The Environmental Protection Division (EPD) has reviewed the application submitted by Georgia-Pacific Wood Products Warrenton Plant for a permit to construct and operate two direct-fired continuous drying kilns (205 and 206), sawdust fuel silo No. 2 (205A), to replace the existing sawmill (101) with a new sawmill (103) and existing planer mill (301) with a new planer mill (300) and for shutting down batch drying kiln 202 as part of the revised Phase II expansion which has already been permitted. The proposed project will increase production from the drying kilns at the Warrenton plant to 394,500 MBF/yr. The continuous kilns 205 will be fired with sawdust fuel with a fuel oil startup and continuous kiln 206 will be fired with natural gas. For operational flexibility, one batch drying kiln (203) and the natural gas package boiler (400C) will be retained and used on a limited basis. The other remaining batch drying kiln (202) will be removed from the operation as a part of Phase II project expansion.

Georgia-Pacific's Warrenton Plant is located in Warren County, which is classified as "attainment" or "unclassifiable" for SO_2, $PM_{2.5}$ and PM_{10}, NO_X, CO, and ozone (VOC).

The proposed project will result in an increase in emissions from the facility since production from the drying kilns will increase to 394,500 MBF/year from the current 240,000 MBF/year. The modification of the Warrenton Lumber facility to drying kilns and boilers will result in a net emissions increase in PM – 8.53 tpy, PM_{10} – 14.8 tpy, $PM_{2.5}$ – 8.8 tpy and VOC – 844 tpy. A Prevention of Significant Deterioration (PSD) analysis was performed for the facility for all pollutants to determine if any increase was above the "significance" level. The net VOC emissions increase was above the PSD significant level threshold of 40 tons per year.

The EPD review of the data submitted by Georgia-Pacific Warrenton plant related to the proposed modifications indicates that the project will be in compliance with all applicable state and federal air quality regulations.

It is the preliminary determination of EPD that Georgia-Pacific's proposal provides for the application of Best Available Control Technology (BACT) for the control of VOC as required by federal PSD regulation 40 CFR 52.21(j).

It has been determined through approved modeling techniques that the estimated emissions will not cause or contribute to a violation of any ambient air standard in the area surrounding the facility. It was further determined that the proposal will not cause impairment of visibility or detrimental effects on soils or vegetation. Any air quality impacts produced by project-related growth should be inconsequential.

This Preliminary Determination concludes that an Air Quality Permit should be issued to Georgia-Pacific's Warrenton Plant for revised Phase II plant expansion necessary to increase the drying capacity at the Warrenton Lumber plant to 394,500 MBF/year.

Various conditions have been incorporated into the current Title V operating permit to ensure and confirm compliance with all applicable air quality regulations. This Preliminary Determination also acts as a narrative for the Title V Permit amendment (PSD permit) of Warrenton plant's air quality permit.

1.0 INTRODUCTION – FACILITY INFORMATION AND EMISSIONS DATA

On April 20, 2018, Georgia-Pacific's Warrenton Plant (hereafter Warrenton Lumber facility) submitted an application for an air quality permit to increase the drying capacity of the Warrenton Plant to 394,500 MBF/year. The facility is located at 331 Thomson Hwy. NE in Warrenton, Warren County.

The original Phase II of the project approved in 2015 involved:

- Debarker (102) (New) - The CNS debarker will be replaced with a high speed ring debarker.

- Interior Saws (101) (New) – The remaining interior saws including the CNS, VSA, and Slasher Saw will be replaced with more efficient modern saws.

- Sawdust and Chip Handling (Modified/New) – sawdust and chip material transfer systems will continue to be upgraded to more efficiently convey these materials as needed with the Phase II upgrades.

- Natural gas package boiler (400B) to be shutdown upon startup of continuous drying kilns 205 and 206.

- Continuous drying Kiln 205 (new) – A second dual fuel continuous kiln 205 will be constructed. Kiln 205 will have approximately 120 million board foot (MMBF) annual drying capacity and be equipped with a 35 MMBTU/hr sawdust gasifier burner and/or natural gas burner (7 MMBTU/hr).

- Batch Kilns (202 and 203) (Removed) - Upon completing the shakedown of the second CDK, the remaining steam heated Batch Kilns (202 & 203) will be shutdown and removed from the site.

- Planer Mill (300/302/PMC1/PMC2) - The CNS planer will be replaced with a new high-speed planer, trim hog, and planer shaving conveying systems

The revised Phase II of project proposed in the PSD permit application No. TV-257752 consists of:

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- Debarker (101) (New) – The existing debarker (102S) will be replaced with a high-speed ring debarker (101).

- Sizing Saws (102S) (New) – The existing sizing saws (102S) will be replaced with a new log bucking saw (102).

- Sawmill (103) (New) – The existing sawmill (101) and associated big chipper (103S), small chipper (104S), and bark/sawdust/chip handling system will be replaced with a new sawmill (103).

- Continuous Kiln (205) (New) – The continuous kiln (205) will have a maximum hourly and annual design capacities of 20 MBF/hr and 131,500 MBF/yr respectively and will be equipped with a 40 MMBtu/hr sawdust gasifier burner. Diesel fuel will be used as a startup fuel for this kiln.

- Continuous Kiln (206) (New) – The continuous kiln (206) will have a maximum hourly and annual design capacities of 20 MBF/hr and 131,500 MBF/yr respectively and will be equipped with a 40 MMBtu/hr natural gas burner.

- Sawdust Fuel Silo (205A) (New) – Installation of a new sawdust fuel silo (205A) equipped with cyclofilter to provide sawdust to the continuous kiln (205).

- **Batch Kiln (203) (Existing)** – The batch drying kiln (203) will be retained and used on a limited basis. The projected annual production for the batch drying kiln (203) will be 33,000 MBF.

- **Natural Gas Package Boiler (400C) (Existing)** – The natural gas package boiler (400C) will be retained to supply steam for the batch drying kiln (203) in its limited operations mode. The annual natural gas consumption in the package boiler (400C) will be limited to 129 million Cu. Ft./year.

- Batch Kiln (202) (Removed) – Upon completing the shakedown of the continuous kilns (205 and 206), the batch drying kiln (202) will be shutdown and removed from the site.

- Planer Mill (300/302/PMC1/PMC2) (New) – The existing planer mill (301) will be replaced with a new high-speed planer (300), trim hog, and planer shaving conveying systems (pneumatic and mechanical). The planer shaving and material separation units (PMC1 & PMC2) will be replaced with a new cyclofilter.

Through its new source review procedure, EPD evaluated Warrenton Plant's proposal for compliance with State and Federal requirements EPD's findings have been assembled in this Preliminary Determination.

Table 1-1: Title V Major Source Status

Pollutant	Is the Pollutant Emitted?	If emitted, what is the facility's Title V status for the Pollutant?		
		Major Source Status	Major Source Requesting SM Status	Non-Major Source Status
PM	yes			✓
PM_{10}	yes			✓
$PM_{2.5}$	yes			✓
SO_2	yes			✓
VOC	yes	✓		
NO_x	yes			✓
CO	yes	✓		
Individual HAP	yes	✓		
Total HAPs	yes	✓		
Total GHGs	yes			✓

Table 1-2 below lists all current Title V permits, all amendments, 502(b)(10) changes, and off-permit changes, issued to the facility, based on a review of the "Permit" file(s) on the facility found in the Air Branch office.

Table 1-2: List of Current Permits, Amendments, and Off-Permit Changes

Permit Number and/or Off-Permit Change	Date of Issuance/ Effectiveness	Purpose of Issuance
2421-301-0003-V-04-0	May 16, 2016	Title V Renewal

The emission increases were calculated for two operating scenarios.

Scenario I involves operation of the three continuous kilns at a rate of 131.5 MMBF/year along with the new sawdust fuel silos (204A and 205A), the new sawmill (103) and planer mill (300) and **no operation of the batch kiln 203 and the package boiler 400C**.

Scenario II involves operation of all three continuous kilns (204, 205 and 206) at a level of 120.5 MMBF/year each, operation of the batch kiln 203 at 33 MMBF/year and operation of the gas-fired package boiler 400C at a natural gas consumption rate of 129 million Cu.Ft./year along with the new sawdust fuel silos (204A and 205A), the new sawmill (103) and planer mill (300).

The total combined future production from all drying kilns is 394.5 MMBF/year under both scenarios.

Baseline Emissions:

The definition of baseline actual emissions is the average emission rate, in tons per year, at which the emission unit actually emitted the pollutant during any consecutive 24-month period selected by the facility within the 10-year period immediately preceding the date a complete permit application was received by EPD.

The ten year baseline period is from 2005 to 2015 when the PSD permit application for both phases of Warrenton plant expansion was submitted. The baseline period for the batch kiln 203 in the 2015 PSD permit application was from June 2005 to May 2007. The BAE was calculated using representative emission factors for all pollutants, as detailed in Appendix B of the PSD permit application and throughput information from actual production data for this period. For the PSD analysis the projected actual production for the batch drying kiln (203) is 33,000 MBF/yr which is also the potential emission for the batch kiln 203 in Scenario I.

Future Emissions:

GP used the hybrid method and is using the “baseline actual-to-potential” test for the new continuous kilns (204, 205, and 206), sawdust fuel silos (204A and 205A), natural gas package boiler (400C), sawmill (103) and planer mill (300) sources and the “baseline actual-to-projected actual” test for the existing batch drying kiln (203) as a affected source by the proposed project.

This same approach was used three years ago in 2015 while considering emissions from Phase I and the original Phase II of the Warrenton Plant expansion.

The Warrenton Lumber facility plans to operate the existing indirect-fired batch drying kiln (203) on a limited basis (33 MMBF/year) in the future and pollutant emission increases associated with the existing batch drying kiln (203) have also been calculated as part of the PSD applicability analysis as an "affected source". The batch drying kiln 203 is an "affected source" due to the proposed installation of a new sawmill (103).

Potential emission were estimated for all new sources for the revised Phase II of the expansion for the two new continuous kilns (205, 206) and the sawdust fuel silo 205A along with the continuous kiln (204), sawdust fuel silo (204A) and natural gas package boiler (400C) from the Phase I of the project and are included in revised Phase II project emissions analysis.

Note that due to the limited use of the gas package boiler, the PTE for this source is based on a heat input of 129 million Cu.Ft./year in Scenario II (kiln 203 drying limit of 33 MMBF/year).

Step 1 of PSD Analysis:

Under Step 1 of the PSD analysis, the emissions increase for the project were calculated by summing the individual emission increases of the proposed new sources as well as the affected existing source emission increases.

The net increases were calculated by subtracting the past actual emissions (based upon the annual average emissions from June 2005 to May 2007) from the future projected actual emissions of the sawmill, planer mill and the drying kilns and associated emission increases from non-modified equipment for existing affected sources.

For the batch drying kiln (203) emission increases were calculated as the difference between the future projected actual emissions (PAE) at 33 MMBF/year and baseline actual emissions (BAE) at 29.4 MMBF/year. These total project emission increases were then compared to the PSD SERs to identify pollutants that trigger further review.

A detailed summary of emissions increases from Step 1 for both scenarios is presented in detail in Appendix B of the PSD permit application and is summarized in Table 1-3 below As shown in Tables 1-3 below, the proposed project would exceed the PSD SER for PM, PM_{10}, $PM_{2.5}$, CO and VOC.

Table 1-3: Emissions Increases from the Project (before netting) Step 1 of PSD analysis

Pollutant	Emission Increases under Scenario 1 (tpy)	Emission Increases under Scenario 2 (tpy))	Worst Case Potential Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review
PM	27.71	27.00	27.71	25	Yes
PM_{10}	27.13	26.34	27.13	15	Yes
$PM_{2.5}$	17.66	17.22	17.66	10	Yes

Pollutant	Emission Increases under Scenario 1 (tpy)	Emission Increases under Scenario 2 (tpy))	Worst Case Potential Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review
VOC	1082.90	1002.53	1083	40	Yes
NO_X	34.95	37.30	37.30	40	No
CO	195.47	200.76	200.7	100	Yes
SO_2	1.22	1.25	1.25	40	No
TRS	N/A	N/A	N/A	10	No
Pb	1.23E-02	1.23E-02	0.0012	0.6	No
Fluorides	N/A	N/A	N/A	3	No
H_2S	N/A	N/A	N/A	10	No
SAM	4.41E-07	0.00	4.4E-07	7	No
Total CO2e	93,944	101,491	101,491		

Step 2 of the PSD Analysis

As the projected emission increases are significant for PM, PM_{10}, $PM_{2.5}$, CO and VOC from Step 1 of the PSD analysis, A step 2 netting analysis was performed for these pollutants to account for any contemporaneous increases and decreases in the 5 year contemporaneous period.

The contemporaneous period for the Warrenton Plant expansion project ranges from May 2010 through June 2015 when the application was submitted for Phase II expansion.

The baseline period of June 2005 through May 2007 was selected for sources included in the contemporaneous period similar to the baseline period used for emissions calculation during Step 1 of the PSD permitting applicability analysis for simplicity.

Current Project Decrease resulted from: Shutdown of the wood-fired boiler 400B, associated ash handling system, and sawdust conveying and loading (105B), Removal of the batch drying kilns (201 (complete) and (202 on completion of Phase II of the expansion) from operation, removal of sizing saws and debarker (102S), removal of existing sawmill (101) and associated big chipper (103S), small chipper (104S), and bark/sawdust/chip handling system, removal of the existing planer mill (301) and associated shaving handling system and non-use of the current roads for the chips/shaving/bark delivery trucks travel.

Emission increase from the Mobile Grinder and Core Mill Installation and operation. PTE emissions from these projects were included in the netting analysis.

The Step 2 Netting Emission Analysis is presented in detail in Appendix B of the PSD permit application for both scenarios of the revised Phase II Warrenton plant expansion and is summarized in Table 1-4 and Table 1-5 for each scenario below.

Based on the information presented in Table 1-4 and Table 1-5, Georgia-Pacific Warrenton's proposed modification, as specified in Georgia Air Quality Application No. TV-237752, is classified as a major modification under PSD because the net potential emissions of VOC exceed the PSD significant emission rate of 40 tpy under both the operating Scenarios.

Table 1-4: Net Emissions Increases from the Project (after netting) - Scenario 1

Pollutant	Emission Increase (tpy)	Emission Decrease (tpy)	Net Emission Increase/Decrease (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review
PM	27.71	19.73	8.53	25	No
PM_{10}	27.13	12.38	14.75	15	No
$PM_{2.5}$	17.66	8.82	8.84	10	No
CO	195.47	367.05	-171.58	100	No
VOC	1082.90	238.35	**843.95**	40	**Yes**
Total CO2e	93944	48056	45,888	75,000	No

Table 1-5: Net Emissions Increases from the Project (after netting) - Scenario 2

Pollutant	Emission Increase (tpy)	Emission Decrease (tpy)	Net Emission Increase/Decrease (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review
PM	27.00	18.99	8.01	25	No
PM_{10}	26.34	12.85	14.29	15	No
$PM_{2.5}$	17.22	8.5	8.72	10	No
CO	200.76	367.04	-166.28	100	No
VOC	1002.53	158.24	**844.29**	40	**Yes**
Total CO2e	101,491	48,055	53,436	75000	No

2.0 PROCESS DESCRIPTION

According to the Georgia-Pacific PSD permit Application TV-237752 dated April 20, 2018, Georgia-Pacific proposed to increase the drying capacity of the lumber kilns at the Warrenton plant to 394,500 MBF/year from the currently permitted 240,000 MBF/year.
As a part of the revised Phase II Warrenton plant expansion, GP proposed to install two continuous direct-fired dual path kilns (205 and 206), install a new sawmill (103) and planer mill (300) and shut down the existing sawmill (101) and planer mill (301). For operational flexibility, one batch drying kiln (203) and the natural gas package boiler (400C) will be retained and used on a limited basis without increasing the proposed drying capacity in Scenario I of the PSD permit application.

The operation of the batch drying kiln (203) will not increase the proposed annual production of 394,500 MBF of dried lumber for the facility as the batch drying kiln (203)

and the the three continuous kilns (204, 205, and 206) will operate at reduced capacities to stay below the 394,500 MBF/year drying limit. The other remaining batch drying kiln (202) will be removed from the operation as a part of Phase II project expansion. The revised scope of the Phase II is as described in the Introduction Section 1 of this determination.

The Georgia-Pacific Warrenton permit application and supporting documentation are included in Appendix A of this Preliminary Determination and can be found online at www.georgiaair.org/airpermit.

3.0 REVIEW OF APPLICABLE RULES AND REGULATIONS

State Rules

Visible Emissions – Rule (b)

This regulation limits visible emissions to 40 percent from facility sources except the boiler 400C unless regulated elsewhere.

This generally applicable requirement applies to all point sources except the gas-fired package boiler at the Warrenton plant. The proposed project will not change the applicability of this rule, and the Warrenton plant will continue to demonstrate compliance as required in the current Title V Permit. Additionally, the new emission sources such as the planer mill, sawdust fuel silo will be required to comply with this regulation.

Fuel-Burning Equipment – Rules (d) and (g)

Georgia Rule (d)(2) regulates emissions of PM from fuel-burning equipment constructed after January 1, 1972 and heat input values equal to or greater than 10 MMBtu/hr, and equal to or less than 250 MMBtu/hr according to the formula:
$P = 0.5(10/R)^{0.5}$,
where R is the heat input rate in MMBtu/hr and P is the allowable emission rate in lb/MMBtu.

The natural gas package boiler (400C) is subject to this regulation. As shown in Table 4-1 below, PM emissions generated by the natural gas package boiler (400C) are well below the allowable PM emissions under this standard. PM emissions and Opacity are never a issue with gas-fired boilers.

Table 4-1: Emissions of PM from Fuel Burning Equipment

Emission Unit	**Maximum BTU Rating (MMBtu/hr)**	**Allowable PM Emissions per 391-3-1-02(2)(d)2.(ii) (lb/MMBtu)**	**PTE PM Emissions (lb/MMBtu)**
Natural Gas Package Boiler (400C)	37.53	2.58E-01	1.85E-03

Georgia Rule (d)3. limits opacity from the fuel-burning equipment constructed or extensively modified after January 1, 1972 to 20% except for one six minute period per hour of not more than 27% opacity. The natural gas package boiler (400C) is subject to this regulation and will comply with this opacity limit since natural gas is a clean fuel.

Georgia Rule (d)4 regulates emissions of NO_X from fuel-burning equipment equal to or greater than 250 MMBtu/hr of heat input that is constructed or extensively modified after January 1, 1972. The natural gas package boiler (400C) heat input is less than 250 MMBtu/hr, and therefore is not subject to this regulation.

Georgia Rule (g)2. limits fuel sulfur content for the fuel-burning sources constructed or extensively modified after January 1, 1972 to 2.5% sulfur by weight.

The natural gas package boiler (400C) is subject to this regulation and is expected to comply with fuel sulfur content limit since natural gas has negligible sulfur content. This rule applies to the burners in the continuous direct-fired drying kilns (204, 205 and 206).

Georgia Rule (e) regulates emissions of PM from manufacturing processes. All units not subject to the fuel-burning equipment PM emissions at the facility are subject to this generally applicable requirement as follows:

$E = 4.1P^{0.67}$ (P <= 30 ton/hr)
$E = 55P^{0.11} - 40$ (P > 30 ton/hr)
Where P is the process input weight rate in tons/hr and E is the allowable emission rate in lb/hr.

The proposed new debarker (101), log bucking (102), sawmill (103), all drying kilns (203, 204, 205 and 206), sawdust fuel silos (204A and 205A), and planer mill (300) will be subject to this regulation. Allowable PM emissions under this regulation for these equipment is listed in Table 4-2.

Table 4-2: PM Emission Rates from Manufacturing Processes

Emission Unit	**Maximum Process Weight per Hour (tons/hr)**	**Maximum Allowable PM Emissions per 391-3-1-.02(2)(e) (lb/hr)**	**PTE PM Emissions (lb/hr)**
Debarker (101)	29.6	39.68	0.09
Log Bucking (102)	0.58	2.85	0.58
Sawmill (103)	115.7	52.75	0.75
Continuous Kiln No. 4 (204)*	48.3	44.26	1.43
Continuous Kiln No. 5 (205)*	48.3	44.26	1.43
Continuous Kiln No. 6 (206)*	48.3	44.26	0.33
Sawdust Fuel Silo (204A)	25.4	35.85	0.11
Sawdust Fuel Silo (205A)	25.4	35.85	0.11
Planer Mill (300)	11.3	20.86	0.85

*Process weight calculations are based on Pine wood Density = 58 lb/ft^3; Lumber (tons) = 20 (MBF/hr) x (1000 BF/1 MBF) x (1 Ft3/12 BF) x (lb/ft^3 Wood Density) x (1 ton/2,000 lbs)

The fugitive dust Rule (n) stipulates that all persons responsible for any operation, process, handling, transportation or storage facility which may result in fugitive dust shall take all reasonable precautions to prevent such dust from becoming airborne. Some reasonable precautions which could be taken to prevent dust from becoming airborne is also listed in this rule. Fugitive emission opacity is limited to 20% per this rule.

Georgia Rules (tt), (yy), (lll), (rrr) does not apply to the Warrenton Plant since it is located in an attainment area.

Federal Rules

New Source Performance Standards (NSPS)

The natural gas package boiler (400C) has a heat input rating greater than 10 MMBtu/hr and less than 100 MMBtu/hr, and was constructed after June 9, 1989. Therefore, this boiler is subject to NSPS Subpart A (general provisions) and Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units) and applicable requirements of this NSPS are included in the current permit. This NSPS has only a notification requirement for gas-fired boilers.

There are no NSPS standards that apply specifically to lumber mills or drying kilns at lumber mills.

National Emissions Standards For Hazardous Air Pollutants (NESHAPs)

NESHAPs, federal regulations found in Title 40 Parts 61 and 63 of the CFR (Code of Federal Regulations), are emission standards for HAPs that apply to major sources of HAPs (facilities that exceed the major source thresholds of 10 tpy of a single HAP and 25 tpy of any combination of HAPs) or specifically designated area sources under Part 63. The Warrenton Lumber facility is a major source of HAPs.

All affected sources subject to a source-specific subpart under 40 CFR Part 63 are subject to the general provisions of Subpart A. Subpart A requires initial notification and performance testing, recordkeeping, monitoring, provides reference methods, and mandates general control device requirements for all other subparts as applicable.

Because various other Part 63 subparts are applicable to the proposed project, the provisions of Subpart A also apply to the proposed project.

The Warrenton plant is subject to the Plywood and Composite Wood Products (PCWP) Maximum Achievable Control Technology (MACT) standard, 40 CFR 63 Subpart DDDD. This rule applies to any PCWP manufacturing facility which is a major source of HAP emissions. drying kilns at lumber mills are within the affected sources under the PCWP MACT pursuant to 40 CFR 63.2232(b); therefore, the existing batch kiln (203), continuous kilns (204, 205 and 206) are subject to this rule. However, no control requirements are specified by this rule for lumber kilns except initial notification requirements.
The PSD permit application and the startup notification required by the permit satisfies the initial notification requirement.

Per 40 CFR 63.9(b)(1)(iii), this PSD permit application for approval of construction serves as that initial notification for the proposed new continuous kilns.

Per 40 CFR 63.9(b)(4)(v), this allowance requires a notification of the actual date of startup of the source, delivered or postmarked within 15 calendar days after that date. The startup notification will be submitted for the proposed new continuous kilns (205 and 206) following construction and will be required by the PSD permit.

40 CFR 63 Subpart DDDDD the major source NESHAP for Industrial-Commercial-Institutional Boilers and Process Heaters (Boiler MACT) applies to boilers and process heaters located at major HAP sources like the Warrenton Plant. The natural gas package boiler (400C) is subject to and in compliance with this major source Boiler MACT rule.

Startup and Shutdown and Excess Emissions

Excess emission provisions for startup, shutdown, and malfunction are provided in Georgia Rule 391-3-1-.02(2)(a)7. The facility cannot anticipate or predict malfunctions. However, the facility is required to minimize emissions during periods of startup, shutdown, and malfunction.

Compliance Assurance Monitoring

The proposed Sawdust Fuel Silos (204A and 205A) and the Planer Mill (300) will be equipped with cyclofilters that operate as inherent process equipment (product collectors) as the primary purpose of the cyclofilters is material recovery. The cyclofilters are product collectors. Therefore a CAM plan will not be required for these cyclofilters.

Therefore this applicability evaluation only addresses the drying kilns, sawdust fuel silos or planer mill, does not employ any air pollution control devices; therefore, the CAM requirements are not triggered by the revised Phase II expansion of the Warrenton plant (proposed modification).

PSD (Prevention of significant deterioration)

The regulations for PSD in 40 CFR 52.21 require that any new major source or modification of an existing major source be reviewed to determine the potential emissions of all pollutants subject to regulations under the Clean Air Act.

The PSD review requirements apply to any new or modified source which belongs to one of 28 specific source categories having potential emissions of 100 tons per year or more of any regulated pollutant or to all other sources having potential emissions of 250 tons per year or more of any regulated pollutant. Lumber mills are not included in the list of 28 source categories. They also apply to any modification of a major stationary source which results in a significant net emission increase of any regulated pollutant.

Georgia has adopted a regulatory program for PSD permits, which the United States Environmental Protection Agency (EPA) has approved as part of Georgia's State Implementation Plan (SIP).

This regulatory program is located in the Georgia Rules at 391-3-1-.02(7). This means that Georgia EPD issues PSD permits for new major sources pursuant to the requirements of Georgia's regulations.

The PSD regulations require that any major stationary source or major modification subject to the regulations meet the following requirements:

- Application of BACT (Best Available Control Technology) for each regulated pollutant that would be emitted in significant amounts;
- Analysis of the ambient air impact;
- Analysis of the impact on soils, vegetation, and visibility;
- Analysis of the impact on Class I areas; and
- Public notification of the proposed plant in a newspaper of general circulation

The above required Analysis is provided in Section 4 through Section 7 of this Preliminary Determination

4.0 CONTROL TECHNOLOGY REVIEW

The proposed project will result in emissions that are significant enough to trigger PSD review for VOC. As VOC is the only PSD-regulated pollutant to have net emission increase exceed the applicable PSD SER (significant emission rate) and a BACT analysis is only required for modified or new units. A VOC BACT analysis is only required for the proposed two new continuous kilns (205 and 206). There will be no other new or modified sources of VOC at the facility as a result of revised Phase II of the proposed project.

Definition of BACT

The PSD regulation requires that BACT be applied to all regulated air pollutants emitted in significant amounts. Section 169 of the Clean Air Act defines BACT as an emission limitation reflecting the maximum degree of reduction that the permitting authority (in this case, EPD), on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such a facility through application of production processes and available methods, systems, and techniques. In all cases BACT must establish emission limitations or specific design characteristics at least as stringent as applicable New Source Performance Standards (NSPS). In addition, if EPD determines that there is no economically reasonable or technologically feasible way to measure the emissions, and hence to impose and enforceable emissions standard, it may require the source to use a design, equipment, work practice or operations standard or combination thereof, to reduce emissions of the pollutant to the maximum extent practicable.

EPA's New Source Review (NSR) Workshop Manual includes guidance on the 5-step top-down process for determining BACT.

In general, Georgia EPD requires PSD permit applicants to use the top-down process in the BACT analysis, which EPA reviews. The five steps of a top-down BACT review procedure identified by EPA per BACT guidelines are:

Step 1: Identification of all control technologies;
Step 2: Elimination of technically infeasible options;
Step 3: Ranking of remaining control technologies by control effectiveness;
Step 4: Evaluation of the most effective controls and documentation of results; and
Step 5: BACT selection

The following is a discussion of the applicable federal rules and regulations pertaining to the equipment that is the subject of this preliminary determination, which is then followed by the top-down BACT analysis.

Direct-Fired Continuous Drying Kilns 205 and 206- Background

The direct-fired continuous drying kilns 205 and 206 are the only proposed equipment that emit VOC in significant amounts and are subject to the control technology review. The drying kilns don't have any add-on VOC controls.

Continuous Kilns 205 and 206 – VOC Emissions

Georgia-Pacific's Proposal

Georgia-Pacific's Warrenton Plant has followed U.S. EPA's recommended five-step "top-down" process to complete the BACT assessment for the proposed new continuous kilns (205 and 206).

Georgia-Pacific investigated potentially applicable emission control technologies by reviewing U.S. EPA's RACT/BACT/LAER Clearinghouse (RBLC database), technical literature, control equipment vendor information, and by using process knowledge and engineering experience from similar types of units in operation at other GP-owned facilities.

Georgia-Pacific searched the RBLC database to identify the emission control technologies and emission rates determined by permitting authorities as BACT for the wood products industry, wood lumber kilns (Process Code 30.800 in the RBLC). Georgia-Pacific found that no "add-on" control technologies have been implemented as part of a PSD or LAER permitting effort to control VOC emissions from lumber drying kilns regardless of drying method.

The RBLC findings is included in Table C-10 in Appendix C of the PSD permit application.
None of the lumber drying kilns at any of GP's manufacturing facilities utilize "add-on" pollution controls to remove VOC emissions. In addition no lumber kilns operating in the U.S. utilize "add-on" pollution controls to remove VOCs since the technology for VOC control of kiln emissions is technically unfeasible and not cost effective.

While "add-on" controls have not been demonstrated for lumber drying kilns, the following control technologies have been demonstrated to reduce VOC emissions from other industrial processes.

The exhaust streams generated by the proposed new continuous kilns 205 and 206 equipped with direct fired sawdust gasifier would need to be treated for particulate matter emissions (emitted from lumber drying) prior to consideration of thermal and catalytic oxidizers for VOC control.

Step 1 – Identification of Control Technologies

- Wet Electrostatic Precipitator (WESP) followed by Thermal Oxidation
- WESP followed by Catalytic Oxidation
- Condensation
- Carbon Adsorption
- Wet Scrubbing
- Biofiltration
- Proper Kiln Design and Operation

EPD has reviewed the above identification (by Georgia-Pacific) of potential control technologies for VOC control and the Division agrees with the findings.

EPD Review – VOC Control for direct-fired continuous drying kilns 205 and 206

Step 2 – Elimination of Technically Infeasible Control Options:

Wet electrostatic precipitator (WESP) followed by Catalytic Oxidation is not feasible due to the potential for blinding and poisoning of the catalyst. Blinding occurs when particulates build-up and coat the catalyst. Blinding prevents oxidation of VOC emissions in catalyst. Catalytic oxidation using an RCO is not a viable control technology for this type of exhaust gas stream due to the PM, metals and acidic content of the exhaust gases, even with the use of a WESP. Based on this analysis, Wet ESP followed by a Catalytic Oxidizer control technology is considered technically infeasible.

• Poisoning occurs when heavy metals in the gas stream become chemically bound to the catalyst and reduce the surface area for oxidation of VOC emissions.

• Condensation is not feasible because of the low temperature required of the exhaust stream with the potential of freezing the water vapor in the gas stream. Condensation requires that the exhaust stream be cooled to a temperature low enough that the vapor pressure of the exhaust gases is lower than the VOC concentration of the exhaust gases.
• The primary constituent of the VOC in the exhaust gas stream from the lumber kilns is terpenes, which would require the temperature of the exhaust stream to be lowered to well below 32 °F in order to have a vapor pressure low enough to use condensation.
A temperature of 32 °F would cause the water vapor in the exhaust stream to freeze, and the resulting ice particles would clog the condensation unit. As such, condensation is not technically feasible to control VOC emissions from a lumber kiln.

Carbon Adsorption is not feasible because of the high humidity of the exhaust stream. The presence of water in exhaust gases will decrease the ability of VOCs to be absorbed. As previously mentioned, exhaust gases from lumber drying kilns have a relative humidity of 100%; therefore, the humidity of the exhaust gas will compete with VOC adsorption and greatly reduce the VOC control efficiency of the unit.

Terpenes, the primary VOC constituent in kiln exhaust gases, must be thermally desorbed. As a result, the temperatures necessary for desorption are excessively high and would likely damage any commercially-available adsorption media. The adsorption capacity of an activated carbon system is higher with lower exhaust gas temperatures since desorption takes place near the boiling point of the VOC within the exhaust gas.

As previously mentioned, GP proposes to heat the exhaust gas above 200 °F to prevent any condensation of the exhaust gas stream taking place in the ductwork. This temperature is above the boiling point for some of the VOC components within the exhaust gas (e.g. formaldehyde and methanol). Therefore, VOC control is expected to be greatly reduced at this high exhaust temperature. It is also likely that the "stickies" contained in the kiln exhaust gas stream would plug the activated carbon bed with a build-up of condensable PM. Based on all of these reasons, Carbon adsorption control technology is considered technically infeasible.

Wet Scrubbing is not feasible because this requires water soluble VOC compounds to be controlled and the constituents of the gas stream are not water soluble.
The adsorption media could easily be plugged. The primary VOC constituents of kiln exhaust gases, pinenes and terpenes, which are not water soluble. Therefore, these constituents would not be easily adsorbed in a wet scrubber, and the VOC removal efficiency would be quite low, on the order of 10-20%. In addition, the viscous nature of the "stickies" within the exhaust gas will easily plug the scrubber absorption media. Therefore, wet scrubbing control technology is considered technically feasible.

Biofiltration is not feasible due to the inconsistent flow of the exhaust stream and also the potential to buildup of insoluble VOC compounds within the biofilter bed which could plug the media.

No vendor has designed a biofiltration system to remove VOC emissions from an exhaust gas stream with characteristics similar to those from a lumber drying kiln.

As previously discussed, to prevent condensation and the buildup of "stickies" inside of the exhaust ductwork between the kiln and control equipment, GP believes it would be necessary to heat the kiln exhaust gases to temperatures above that which condensation would occur or above 200 ^{o}F.

Exhaust gas stream temperatures well above 105 °F would kill the bacteria contained in the filter media of the biofilter and thereby render the biofilter system ineffective.

The primary constituents in the exhaust gas are pinenes and terpenes, which are insoluble in water. The biofilter will be ineffective at breaking down pinenes and terpenes.

Additionally, due to the highly viscous nature ("sticky") of these compounds, VOCs are expected to build-up within the biofilter bed, plugging the media and reducing its effectiveness. The use of biofiltration to remove VOCs from a lumber kiln exhaust gas stream is therefore deemed technically infeasible.

The Division agrees with the applicant that the use of wet electrostatic precipitator (WESP) followed by catalytic oxidation, condensation, carbon adsorption, wet scrubbing and biofiltration are technically infeasible.

Because wet electrostatic precipitator (WESP) followed by thermal oxidation was found to be technically feasible, it was evaluated further for BACT

Step 3 – Rank Remaining Control Technologies:

The following is a ranking of the control technologies based on control effectiveness found in Section 5.3 of the PSD permit application.

- WESP/RTO = 97%
- RTO alone for gas-fired kiln = 97%
- Work Practices = base case, no additional reduction

The list also includes "Proper Maintenance and Work Practices." The efficiency of this method varies according to industry.

The Division agrees with the applicant that the RTO is ranked as the most effective control technology to use with the continuous kilns for VOC control from a control efficiency perspective.

Step 4 – Evaluation of Most Stringent Controls:

A cost effectiveness evaluation was prepared for the WESP/RTO combination on the proposed new continuous kiln with sawdust firing and with an RTO alone for the gas-only option (Kiln 206), as these are the only add-on control technologies that are deemed potentially to be technically feasible.

The applicant provided an analysis of the wet electrostatic precipitator (WESP) followed by thermal oxidation in section 5.4 of the PSD permit application. The applicant calculated the annualized cost of the RTO and WESP as $12,800 per ton of VOC as carbon (C) removed based on the results in the detailed cost effectiveness tables in Appendix C of the PSD permit application. The cost of the RTO and WESP exceeds the benefit of the VOC reduction. In addition, RTO results in generation of NOx and CO emissions. NOx is a ozone precursor.
The cost of controlling VOC emissions with a RTO for the proposed new continuous kiln (206) equipped with direct-fired natural gas burner is estimated at approximately $9,200 per ton of VOC as carbon (C).

This cost effectiveness value is largely due to the cost of heating the lumber kiln exhaust air to a temperature of approximately 200 °F to prevent condensation and the formation of "stickies" in the exhaust ductwork for the kiln exhaust leading into the control system.

Based on the high cost effectiveness value for removing VOCs from the continuous lumber kiln (205) using a WESP followed by an RTO or using a RTO to remove VOC emissions from the natural gas fired continuous kiln (206), Georgia-Pacific does not believe it is economically feasible to use these control technologies.

EPD concurs with this cost effectiveness analysis/finding. The Division agrees with Georgia-Pacific that the RTO and WESP costs exceed the benefit of the VOC reduction from the continuous kiln 205 and the RTO costs exceeds the benefit of the VOC reduction from the continuous kiln 206.

In addition, there are energy and environmental impacts associated with the use and combustion of natural gas in the RTO.

The combustion of natural gas as an RTO fuel would create additional NO_X , CO and CO_2 emissions. The generation of these emissions simply to reduce VOC emissions may result in a net negative environmental effect.

The US Southeast is NO_X limited with respect to ozone formation. Therefore small increases in NO_X (i.e., generated from natural gas combustion of an RTO) could result in increased ozone, while relatively larger increases in VOC will likely not result in ozone increases.
The control technologies require energy to operate fans to move the exhaust gases through a significant amount of ductwork, requiring significant electricity for a WESP/RTO control system.
The indirect heated ducting and the RTO also require the use of supplemental fuel to heat the ductwork and maintain the appropriate combustion temperature within the RTO.

The only economically cost effective control technology for removing VOC emissions from the proposed new continuous kilns is the use of "proper design and operating practices".

Since this control option is the top remaining BACT control technology after showing that other "add-on" control systems are not technically or economically viable/feasible, a cost effectiveness evaluation is not required for the BACT selection.

Step 5 – BACT Selection:

Results of the top-down BACT analysis indicate that there are no demonstrated control techniques in practice, numerous technical challenges and no cost-effective add-on control technologies for removing VOC emissions from lumber drying kilns exhaust and consequently the BACT proposed for the proposed new continuous kilns is "no control" with the use of "proper design and operating practices" as BACT.

The proposed BACT work practices for the proposed new continuous kiln consist of (1) proper kiln maintenance and (2) minimizing over-drying while meeting the relevant lumber moisture specifications.

The applicant has identified BACT as Proper Maintenance and Work Practices. Section 5.5 of the PSD permit application to describe the BACT selection.

The applicant has proposed a VOC emission factor of 4.28 lb/MBF (as carbon) as BACT and will use it to calculate VOC emissions from the continuous direct-fired lumber kilns. Georgia-Pacific will have a combined 394,500 MMBF/yr production limit for the three continuous kilns. This limit is based on potential throughput for the continuous direct-fired lumber kiln per year and is not a PSD avoidance limit.

BACT is generally an emission limit. However in the case of continuous kilns which are an emerging technology, enough test data does not exist to impose a limit on the facility. Therefore, BACT in this case is not a numerical value but proper maintenance and work practices. Work practices will include proper maintenance of the kiln and the wood gasifier and minimizing over-drying and recordkeeping of good combustion practices.

GP proposes to develop and implement an operating and maintenance plan (O&M plan) within 180 days of start-up of the continuous kilns. The development of site specific plans for proper kiln operation and maintenance is consistent with recent BACT determinations in EPA Region 4.

Limiting over-drying has a direct impact on the minimization of VOC emissions.
The VOCs emitted from southern pine lumber drying consist of approximately 80-90% terpenes and pinenes which are native compounds in the wood. Emissions of these compounds are largely proportional to the amount of moisture removed from the lumber as it is dried inside the kiln.

GP proposes to demonstrate compliance with these work practices by measuring the moisture content of the kiln dried lumber as it comes out of the planer mill.

Due to seasonal variability of wood moisture content and drying times, GP proposes a rolling 12-month average for comparison to the established moisture content target. In addition to monitoring moisture content, following a preventative maintenance plan (PMP) will assist in minimizing VOC emissions. Proper maintenance of kiln equipment ensures optimal drying conditions which minimizes the possibility of over-drying.

EPD Review – VOC Control

The Division reviewed all of the RBLC entries for VOC from continuous lumber drying kilns since 2002 (see Appendix C of the application). This review showed that none of the entries require an add-on control device for VOC and that BACT is Proper Maintenance and Operating Practices.

Moreover it should also be noted that VOC emissions from the proposed new continuous lumber kilns are small compared to the biogenic (naturally occurring) VOC emissions generated by the forested areas in the vicinity of the Warrenton plant and consequently any reduction of VOC emissions from the proposed new continuous lumber kiln will have a negligible effect upon ozone formation and ozone concentrations in the area.

Conclusion – VOC Control

The BACT selection for the dual path direct-fired continuous kilns is proper maintenance and work practices and are incorporated in Condition 3.5.3 of the permit amendment. This condition contains general work practice standards for the continuous wood drying kilns and scheduled maintenance activities.

VOC emissions for the project were presented on a WPP1 basis per William Wehrum's 2006 memo and EPA's subsequent July 2007 Interim VOC Measurement Protocol for the Wood Products Industry. However, the data within the RBLC predates these two guidance documents and presents VOC emissions on a carbon basis. To remain consistent with the previous BACT analyses, the BACT analysis was performed using project VOC emissions on a carbon basis.

GP proposes a VOC emission limit of 4.28 lb/MBF as Carbon as BACT for the new continuous kilns 205 and 206.

This BACT limit applies during all operating conditions as there are no significant changes to the VOC emissions generated by the kilns during startup and shutdown compared to normal operation. The BACT selection for the continuous drying kilns 205 and 206 is summarized below in Table 4-1:

Table 4-1: BACT Summary for the continuous drying kilns 205 and 206

Pollutant	Control Technology	Proposed BACT Limit	Averaging Time	Compliance Determination Method
VOC	Proper kiln design and operation.	4.28 lb VOC/MBF as carbon	Annual	Continuous monitoring of moisture of the dried lumber as it comes out of the planer mills.

The reduction of VOC emissions from a lumber kiln and the very small quantities of HAPs and toxic air pollutants (TAPs) would have a negligible impact on air quality in the vicinity of the Warrenton plant.
Under the PSD program, VOCs are regulated to prevent significant deterioration of air quality due to ozone formation. Ozone is formed in the atmosphere due to atmospheric chemical reactions of NO_X and VOCs that are oxidized in the presence of sunlight. The facility is located in a lightly populated and developed area of Georgia and ambient concentrations of ozone in this area are in attainment with the NAAQS.

5.0 TESTING AND MONITORING REQUIREMENTS

Testing Requirements:

There are no applicable testing requirements being imposed for the new continuous kilns 205 and 206.

Monitoring Requirements:

Georgia-Pacific will monitor the moisture content of lumber as it comes of the planar mill.

CAM Applicability:

CAM is only applicable to emission units that have potential emissions greater than the major source threshold, located at a major source, use a control device to control a pollutant emitted in an amount greater than the major source threshold for that pollutant, and have a specific emission standard for that pollutant.

Because the drying kilns do not have add-on control equipment for controlling VOC emissions the continuous kilns are not subject to CAM.

The sawdust fuel silos also do not have add on pollution control for PM. The cyclofilters downstream of the sawdust fuel silos and the planer mill are inherent process control equipment whose main purpose is product collection/recovery. CAM is not applicable to the saw dust fuel silos and the planer mill and CAM is not triggered by the proposed modification. Therefore, no CAM provisions are being incorporated into the facility's permit.

6.0 AMBIENT AIR QUALITY REVIEW

An air quality analysis is required to determine the ambient impacts associated with the construction and operation of the proposed modifications. The main purpose of the air quality analysis is to demonstrate that emissions from the proposed modifications in conjunction with other applicable emissions from existing sources (including secondary emissions from growth associated with the new project) will not cause or contribute to a violation of any applicable National Ambient Air Quality Standard (NAAQS). NAAQS exist for NO_2, CO, $PM_{2.5}$, PM_{10}, SO_2, Ozone (O_3), and lead. PSD increments exist for SO_2, NO_2, and PM_{10}. There is no NAAQS and PSD increments for VOC.

The proposed project at the Georgia-Pacific's Warrenton plant triggers PSD review for VOC. An analysis was conducted to demonstrate compliance with the Georgia air toxics program.

This section of the preliminary determination discusses the air quality analysis requirements, methodologies, and results. Supporting documentation may be found in the Air Quality Dispersion Report of the application and in the additional information packages.

Modeling Analysis

The air quality modeling analysis was conducted in accordance with Appendix W of Title 40 of the Code of Federal Regulations (CFR) §51, *Guideline on Air Quality Models*, and Georgia EPD's *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions (Revised)*.

The proposed project will cause net emission increases of VOC that are greater than the applicable PSD Significant Emission Rates (SERs). VOC does not have established PSD modeling significance levels (MSL) (an ambient concentration expressed in either $\mu g/m^3$ or ppm). Modeling is not required for VOC emissions; however, the project will likely have no impact on ozone attainment in the area based on data from the monitored levels of ozone in Columbia County at Evans-Riverside Park which is approximately 32 miles away from the Warrenton plant to the northeast, located at 4431 Hardy McManus Road in Evans, Georgia (AQS ID 13-073-0001) and the level of emissions increases that will result from the proposed project. The southeast is generally NO_X limited with respect to ground level ozone formation.

The monitored ozone data at the Evans-Riverside Park demonstrates that the monitor has measured ambient ozone concentrations in attainment with the ozone NAAQS and also indicated a downward trend and improved ozone air quality over the last 10 or more years.

The PSD permit application shows that the proposed project at Warrenton Lumber facility will increase VOC emissions (1,082.9 tons under maximum emission Scenario I) in Warren County by approximately 11% compared to the existing inventory (9,801 tons), a relatively low amount, along with emissions being below the critical air quality threshold per the draft U.S. EPA and Georgia EPD MERP (modeled emission rate for precursors) guidance, the increase in VOC emissions from the proposed project is not expected to significantly affect ozone concentrations in the vicinity of or downwind of Warrenton plant.

The most conservative (lowest) 8-hour ozone VOC MERP value is 3980 tpy. The project emission increase of 1082.9 tpy VOC equates to 27% of the critical air quality threshold (1 ppb), hence an insignificant impact on secondary ozone formation.

Significance Analysis: Ambient Monitoring Requirements and Source Inventories

Initially, a Significance Analysis was conducted to determine if the VOC emissions increases at the Georgia-Pacific's Warrenton plant would significantly impact the area surrounding the facility. Maximum ground-level concentrations are compared to the pollutant-specific U.S. EPA-established Significant Impact Level (SIL). The SIL for the pollutants of concern are summarized in Table 6-1. If a significant impact (i.e., an ambient impact above the SIL) does not result, no further modeling analyses would be conducted for that pollutant for NAAQS or PSD Increment.

Under current U.S. EPA policies, the maximum impacts due to the emissions increases from a project are also assessed against monitoring *de minimis* levels to determine whether pre-construction monitoring should be considered. These monitoring *de minimis* levels are also listed in Table 6-1.

Table 6-1: Summary of Modeling Significance Levels

Pollutant	Averaging Period	PSD Significant Impact Level (ug/m^3)	PSD Monitoring Deminimis Concentration (ug/m^3)
PM_{10}	Annual	1	--
	24-Hour	5	10
SO_2	Annual	1	--
	24-Hour	5	13
	3-Hour	25	--
NO_X	Annual	1	14
CO	8-Hour	500	575
	1-Hour	2000	--
TRS	1-Hour	---	10

Table 6-1 shows that there is no significance levels for VOC. There is no NAAQS or PSD increments for VOC. Therefore, a significance analysis was not required for VOC emission increases due to the revised Phase II expansion of the Warrenton plant.

Class I Area Analysis

Class I areas are areas of particular value from a natural, scenic, recreational, and/or historical perspective. PSD permitting regulations afford Class I areas additional protection against adverse impacts on PSD increments and air quality related values (e.g., visibility and deposition).

EPA and Federal Land Manager guidance generally requires that sources located within 300 km of one or more Class I areas evaluate whether PSD Class I increments and certain air quality related values be adversely affected. There are seven Class I areas located within a 300 km radius of Warrenton CNS plant (approximate distances listed):

Shining Rock Wilderness	210 km
Great Smoky Mountain National Park	215 km
Cohutta Wilderness	230 km
Joyce Kilmer Slickrock Wilderness	240 km
Wolf Island National Wildlife Refuge	260 km
Cape Romain National Wildlife Refuge	280 km
Okefenokee National Wildlife Refuge	300 km

Historically, a distance of 100 km has been used to define "near", but more recently, a distance of 200 kilometers has been used for all facilities that do not combust coal.

The proposed project would cause a significant net emissions increase only of VOC, which is not a visibility or deposition-affecting pollutant and for which there are no Class I PSD increment.

For this reason and because the project would not cause significant increases of NO_X, SO_2, or PM that may affect visibility or deposition and for which PSD Class I Increments have been established, Class I area impact analysis is not required.

The nearest Class I Area to the facility, Shining Rock Wilderness area is more than 210 kilometers away from the Warrenton plant.

The magnitude of the emissions from the proposed project does not warrant a review of impacts at this distance. Therefore, no Class I Increment consumption of Air Quality Related Values (AQRV) analyses were performed.

Class II Area Impact Analysis

VOC is the only criteria pollutant with emissions greater than the SER (40 tpy), therefore neither Class II area significant impact analysis, nor monitoring *De Minimis* concentration analysis are required. In addition, the potential soil and vegetation impacts and the Class II visibility analysis are not required.

7.0 ADDITIONAL IMPACT ANALYSES

PSD requires an analysis of impairment to visibility, soils, and vegetation that will occur as a result of a modification to the facility and an analysis of the air quality impact projected for the area as a result of the general commercial, residential and other growth associated with the proposed project.

Soils and Vegetation

This analysis is required only for those pollutants for which PSD review is triggered. According to *A Screening Procedure for the Impacts of Air Pollution on Plants, Soils and Animals*, the relevant pollutants for soils and vegetation are NO_2, SO_2 and CO. The project triggers PSD review for VOC only and does not have a significant net emissions increase of NO_2, SO_2 or CO. Therefore, a soils and vegetation analysis is not necessary because no significant impacts are expected.

Growth

Although the proposed project is expected to employ temporary workers for construction activities, negligible growth during construction is expected and minimal long-term growth (i.e., general commercial, residential, industrial or other secondary growth in the area) is expected following the completion of the project because no additional employees will be required to operate the modified plant. Therefore, no analysis of secondary impacts from associated growth is warranted for this project.

Visibility

Visibility impairment is any perceptible change in visibility (visual range, contrast, atmospheric color, etc.) from that which would have existed under natural conditions. Poor visibility is caused when fine solid or liquid particles, usually in the form of volatile organics, nitrogen oxides or sulfur oxides absorb or scatter light.

This light scattering or absorption actually reduces the amount of light received from viewed objects and scatters ambient light in the line of sight. This scattered ambient light appears as haze.

Another form of visibility impairment in the form of plume blight occurs when particles and light-absorbing gases are confined to a single elevated haze layer or coherent plume.

Plume blight, a white, gray or brown plume clearly visible against a background sky or other dark object usually can be traced to a single source such as a smoke stack.
Georgia's SIP and Georgia *Rules for Air Quality Control* provide no specific prohibitions against visibility impairment other than regulations limiting source opacity and protecting visibility at federally protected Class I areas.

The PSD regulations require an evaluation of the impact of project emissions on visibility in Class II areas. The analysis is required only for those pollutants for which PSD review is triggered. The relevant pollutants for visibility are PM, NO_X and SO_2.

The project triggers PSD review for VOC only and does not have a significant net emissions increase of PM, NO_X and SO_2. Therefore, a visibility analysis is not necessary because no significant impacts are expected.

8.0 GEORGIA AIR TOXIC AIR POLLUTANT MODELING DEMONSTRATION

Georgia EPD regulates the emissions of toxic air pollutant (TAP) emissions through a program covered by the provisions of *Georgia Rules for Air Quality Control*, 391-3-1-.02(2)(a)3.(ii). A TAP is defined as any substance that may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. Procedures governing the Georgia EPD's review of TAP emissions as part of air permit reviews are contained in the agency's "*Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions (Revised)*."

Determination of Toxic Air Pollutant Impact

AACs for all TAPs considered in the analysis were obtained from the Georgia EPD database with the exception of methanol which was supplemented with information from U.S. EPA.

Based on a review of more recent information in the U.S. EPA Integrated Risk Informational System (IRIS) database, GP found that U.S. EPA added an annual Reference Concentration for Inhalation Exposure (RfC) of 20 mg/m^3 (or 20,000 $\mu g/m^3$) in September 2013. Therefore, methanol modeling results were evaluated relative to this annual AAC as well as the 24-hour AAC provided by Georgia EPD. Note that for formaldehyde, Georgia EPD specifies a range of AACs where the maximum of the range is 1.1 $\mu g/m^3$. Use of this AAC was approved during the meeting between Georgia EPD and GP in March 2018.

Modeling procedures are defined in EPD guidance on modeling and were verified by EPD's modeling group. Modeling was conducted for both Scenario I and Scenario II (as described in Section 3). Table 6-3 of the permit application details which equipment is proposed for operation for each scenario and averaging period.
Short term modeling was conducted with maximum hourly emission rates while annual modeling was conducted with annualized emissions based on annual throughputs for the kilns and annual heat input for the package boiler. Note since Scenario II represents the worst case operating scenario for the short term, that is, all kilns (CDKs and Batch) and the Package Boiler are operating versus only three CDKs in Scenario I, only Scenario II was modeled for comparison to short term AACs.

Emission rates for modeling of acetaldehyde, formaldehyde, and methanol for both scenarios are provided in Table 6-4 and Table 6-5 of the permit application.

AERMOD was applied to determine the short-term and annual maximum concentrations of acetaldehyde, formaldehyde and methanol for comparison to the AACs.

Table 6-8 and Table 6-9 of the permit application compares the maximum modeled concentration per pollutant and averaging period to the applicable AAC for each scenario.

As discussed in Section 6.3 of the permit application, both 24-hour and annual AACs were evaluated for methanol.

The dispersion modeling demonstrated that facility-wide emissions of each evaluated TAP do not result in an exceedance of an AAC with the exception of annual formaldehyde. Therefore, annual formaldehyde concentrations were further evaluated with a site specific risk analysis discussed in the following section.

For annual formaldehyde, the site specific risk analysis was performed by Georgia-Pacific and involved evaluating annual concentrations over nearby residences and comparing all receptors against the 15-minute AAC value. As shown in Table 6-9 of the permit application, the maximum concentrations over all receptors are below the 15-minute AAC value. This result supports the conclusion that acute adverse impacts are not expected to occur.

The "red" receptors where concentrations exceeded the annual AAC were limited to non-residential areas. The discrete residential receptors (more clearly seen in Figures 6-5 and 6-7) had modeled concentrations below the annual AAC.

Because modeled concentrations that exceed the annual average AAC occurred only at locations where chronic exposure to the public is extremely unlikely to occur (i.e., not at residences), and short-term concentrations were modeled below the 15-minute AAC at all receptors, the modeling analysis and risk assessment demonstrate that adverse impacts are not expected to occur due to the project.

8.0 EXPLANATION OF DRAFT PERMIT CONDITIONS

The permit requirements for this proposed facility are included in draft Permit Amendment No. 2421-301-0003-V-04-1.

Section 1.0: Facility Description

The proposed modification (revised Phase II expansion of the Warrenton plant) consists of construction and operation of two new continuous direct-fired lumber drying kilns, replacement of the existing sawmill and planer mill and construction and operation of a sawdust fuel silo.

Section 2.0: Requirements Pertaining to the Entire Facility

No conditions in Section 2.0 are being added, deleted or modified as part of this permit action.

Section 3.0: Requirements for Emission Units

Existing Condition 3.2.1 is amended by limiting drying from all four drying kilns to a combined total of 349.5 MMBF/year and a VOC emission factor of 4.28 lb/MBF (as carbon).

Existing Condition 3.2.2 was deleted in this permit amendment since batch kiln 203 will not be shut down as was predicted in the original Phase II of the project expansion.

New Condition 3.2.3 limits drying in the batch kiln 203 to 33 MMBF/year after startup of the continuous kilns 205 and 206.

New permit Condition 3.2.4 limits burning of natural gas in excess of 129 million Cu.Ft./year in the existing gas-fired package boiler 400C during any consecutive twelve months.

Existing Permit Condition 3.3.2 is amended by removing the wood-fired boiler 400B since it will be removed from the facility.

Existing Condition 3.3.4 and 3.3.5 pertaining to commencement of construction of the revised Phase II expansion of the Warrenton plant are amended by changing the permit application no. to the current PSD permit application No. TV-237752.

Existing Permit Conditions 3.4.1 and 3.4.2 are amended by adding the new continuous kiln CDK 206, Planer Hog (300) and sawdust fuel silos (204A and 205A).

Existing Condition 3.4.3 is amended by removing the wood-fired boiler 400B.

Existing Condition 3.4.4 is deleted since the wood-fired boiler will be removed from service during the revised Phase II expansion.

Existing Condition 3.4.5 is amended by removing wood-fired boiler 400B and drying kilns 204 and 205 since the sulfur content of sawdust is lower than 2.5% and the wood-fired boiler 400B has been shut down.

Existing Condition 3.5.2 is amended by adding the new sawdust fuel silos 204A and 205A, the planer hog 300 and the new cyclofilters SDCF1, SDCF2 and PMCF and removing the chipper 104S and the cyclones WC1 or AWC, CC1 and CC2).

Existing Condition 3.5.3 is amended by adding the new continuous kiln CDK 206 and by requiring a preventive maintenance plan for the continuous lumber drying kilns 204, 205 and 206 at the facility.

Section 4.0: Requirements for Testing

Existing Conditions 4.2.1 and 4.2.2 pertaining to the wood-fired boiler 400B was deleted from the permit amendment since this boiler has been removed from the facility.

Section 5.0: Requirements for Monitoring

Existing Condition 5.2.1 to 5.2.5 were deleted since these conditions pertained to the wood-fired boiler 400 B that has been removed from the facility.

Section 6.0: Other Recordkeeping and Reporting Requirements

The exceedance reporting in Condition 6.1.7.b was amended by revising the drying limit for the batch kiln 203, the combined total drying limit for all four kilns and the natural gas consumption limit for the package boiler 400C.

The existing excursion condition 6.1.7.c.i was updated by including the new cyclofilters and removing the existing multiclones. All excursion conditions for the wood-fired boiler 400B were removed from the permit.

Conditions 6.2.1 and 6.2.2 pertaining to the wood-fired boiler was removed from the permit.

Condition 6.2.3 was amended by adding the new continuous drying kiln CDK 206 and by removing the gas-fired package boiler 400C since this boiler has been installed and is in operation.

Existing Conditions 6.2.6 and 6.2.7 were amended by adding the new continuous drying kiln CDK 206.

Condition 6.2.8 was amended by revising the monthly drying limit for batch kiln 203 to 2.75 MMBF and the gas consumption in the gas-fired package boiler 400C to 10.75 million Cu.Ft.

Condition 6.2.9 is amended by revising the monthly combined total continuous drying kiln production limit to 32.87 MMBF for all four drying kilns.

Section 7.0: Other Specific Requirements

No conditions in Section 7.0 were added, deleted or modified as part of this permit action.

APPENDIX A

EPD'S PSD Dispersion Modeling and Air Toxics Assessment Review

MEMORANDUM

May 25, 2018

To: Manny Patel, Seetharaman Ganapathy
Thru: Di Tian
From: Yan Huang
Subject: PSD Modeling Review for Georgia-Pacific Wood Products LLC – Warrenton Lumber Mill Expansion Project, Warrenton, Warren County, GA

GENERAL INFORMATION

Georgia-Pacific Wood Products LLC – Warrenton Lumber Mill (GP-Warrenton) submitted a permit application for the construction and operation of a phased expansion in May 2015. The permit was issued which authorized both phases of the proposed expansion project in November 2015. Based on the current lumber demand, the applicant is proposing to revise Phase II of its expansion project to install two new continuous direct-fired dual path kilns, a new sawmill and planner mill, and shut down the existing sawmill and planner mill. The projected emission increase from such expansion trigger PSD for VOC. Air dispersion modeling for this modification application was conducted by GP-Warrenton's consultant, AECOM, to assess conformance of proposed emission limits for the subject emission sources on site with the Georgia Air Toxics Guideline and the applicable federal Prevention of Significant Deterioration (PSD) air quality standards.

This memo discusses the procedures used to review the supporting dispersion modeling. VOC is the only pollutant with projected emissions in excess of the Significant Emission Rate (SER). Ozone ambient impact analysis over the project area and secondary ozone formation analysis shows no adverse impacts from the proposed project VOC emissions. The air toxic impacts of the three most significant Toxic Air Pollutants (TAPs) from the proposed project do not exceed their applicable Acceptable Ambient Concentrations (AACs), except for Formaldehyde at the annual averaging period. A site specific risk assessment at the dense grid of 10-m spaced receptors was performed and the MGLC does not exceed the AAC at any residential locations. The results of these modeling evaluations are summarized in the following sections of this memorandum.

INPUT DATA

1. **Meteorological Data** – The hourly meteorological data (2012-2016) used in this review were generated and provided by the GA EPD (http://epd.georgia.gov/air/georgia-aermet-meteorological-data). The data were processed from the meteorological measurement data obtained from Augusta Daniel Field Airport NWS surface station, and Peachtree City – Falcon field NWS upper air station, GA, using the AERSURFACE (v.13016), AERMINUTE (v.15272), and AERMET (v. 16216) with the adjusted surface friction velocity option (ADJ_U*). The Augusta Daniel Field Airport is approximately 60 kilometers to the east of the GP-Warrenton facility and therefore this dataset is representative for the project site.

2. **Source Data** – Emission unit physical parameters, criteria and TAP emission rates were provided by the applicant and have been subjected to GA EPD engineering review. Tables 6-1, 6-2, 6-4, and 6-5 from the application summarized modeled point and volume source parameters and the facility-wide TAP emission from the proposed project. The emissions from the proposed new continuous dry kilns (CDK #4, #5, and #6) are partitioned on an 80/20 basis with 80% of the emissions being discharged from the powered stack and 20% out the kiln doors at each end of the kiln. The kiln stacks were modeled as point sources and emissions from the open kiln ends were modeled as volume sources to represent the non-vertical discharge. The emissions from the existing batch kiln via both the rooftop vents and the kiln opening were modeled as one large volume source that covered the size of building using the initial plume dimensions based on building dimensions following the AERMOD user guidance.

The toxic impacts from two emission scenarios were evaluated. Table 6-3 of the application details which equipment is proposed for operation for each scenario and averaging period. Short term modeling was conducted with maximum hourly emission rates while annual modeling was conducted with annualized emissions based on annual throughputs for the kilns and annual heat input for the package boiler.

3. **Receptor Locations** – Discrete receptors with 50-meter intervals were placed on a Cartesian grid along the fence-line. Receptors extend outwards from the fence line at 100-meter intervals to approximately 2 kilometer, at 250-meter intervals to approximately 5 kilometer, at 500-meter intervals to approximately 10 kilometer, and at 1000-meter intervals to approximately 20km. This domain is sufficient to capture the maximum impact. All receptor locations are represented in the Universal Transverse Mercator projections, Zone 17, North American Datum 1983.

   A dense grid of 10-m spaced receptors was added over residences to the west-northwest of the GP-Warrenton Lumber facility property line, along with additional discrete risk receptors over residential property to the south of property line, to verify that concentrations over these houses are below applicable AACs.

4. **Terrain Elevation** – Topography was found to be generally flat in the site vicinity. Terrain data from USGS 1-sec National Elevation Dataset (NED) CONUS were extracted to obtain the elevations of all sources and receptors by AERMAP terrain processor (version 11103). The resulting elevation data were verified by comparing contoured receptor elevations with Google satellite map.

5. **Building Downwash** – The potential effect for building downwash was evaluated via the "Good Engineering Practice (GEP)" stack height analysis, and was based on the scaled site plan included in the application using the BPIPPRM program (version 04274). The BPIPPRM model was used to derive building dimensions for downwash assessment and the assessment of cavity-region concentrations appropriate for the AERMOD model.

6. **Class I Areas** – Eight Class I areas exist within a 300 km range from the GP-Warrenton facility, these are: Great Smoky Mountain National Park; Shining Rock, Cohutta, Joyce Kilmer-Slickrock, and Linville Gorge Wilderness areas; and, Wolf Island, Okefenokee, and Cape Romain National Wildlife Refuges. Among these, Shining Rock Wilderness Area is the closest, located approximately 215 km north from the facility. There are no PSD increments or air quality related values for VOC. Therefore, a Class I area PSD review is not required.

CLASS II AREA IMPACT ANALYSIS

VOC is the only criteria pollutant with emissions greater than the SER (40 tpy), therefore neither Class II area significant impact analysis, nor monitoring *De Minimis* concentration analysis are required. In addition, the potential soil and vegetation impacts and the Class II visibility analysis are not required.

Ozone Impact Analysis

PSD permit applicants with a proposed net emission increase of 100 tons/year or more of VOC and/or NOx are required to conduct an ambient air impact analysis that includes pre-application monitoring data to determine the current state of the ambient air conditions for this pollutant.

The proposed GP-Warrenton expansion project is expected to emit 1,082.9 tpy VOC. The nearest ozone monitor to GP-Warrenton is located approximately 51.5 km north-east at Evans-Riverside Park, Evans, Georgia (AQS ID 13-073-0001). Given this proximity and regional nature of background ozone, the GA EPD Evans-Riverside Park monitor provides a representative indication of ozone concentrations in the vicinity of GP-Warrenton facility. The applicant examined the 3-year rolling average ozone concentration at this monitor. The latest design value (i.e. 3-year average of 4th highest maximum daily 8-hour ozone concentrations during 2015-2017) is 59 ppb. This area is in attainment with the 2015 ozone National Ambient Air Quality Standard (NAAQS) of 70 ppb.

As required by the 2017 revisions to EPA's *Guideline on Air Quality Models* (Appendix W), the applicant evaluated the impact of the projected VOC emissions on secondary ozone formation. The applicant followed EPA's "*Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier l Demonstration Tool for Ozone and PM2.5 under the PSD Permitting Program*" (December 2, 2016), and GA EPD's *"Guidance on the Use of EPA's MERPs to Account for Secondary Formation in Georgia*" (February 12, 2018). According to GA EPD's guidance document, the most conservative (lowest) VOC MERP value for ozone in Georgia is 3,980 tpy. The projected emission increase of 1,082.9 tpy VOC equates to an ozone impact of 0.27 ppb (= 1,082.9/3,980 * 1 ppb). This impact is below the ozone significant impact level (SIL) of 1 ppb.

AIR TOXICS ASSESSMENT

The primary TAP emissions from lumber mills are Acetaldehyde, Formaldehyde, and Methanol. The annual, 24-hour, and 15-minute AACs of the TAPs were reviewed based on U.S. EPA IRIS reference concentration (RfC), OSHA Permissible Exposure (PEL), ACGIH Threshold Limit Values (TLV) including STEL (short term exposure limit) or ceiling limit, and NIOSH Recommended Standards (REL) according to the Georgia Air Toxics Guideline. The modeled MGLCs were calculated using the AERMOD dispersion model (version 16216r) for 1-hour, 24-hour, and annual averaging periods. Note the impact from the Scenario II results the higher concentrations for both short and annual averaging periods.

Table 1 summarizes the AAC levels and MGLCs of the TAPs from the Scenario II. The maximum 15-min impact is based on the maximum 1-hour modeled impact multiplied by a factor of 1.32. The modeled MGLCs for all three TAPs are below their respective AAC levels except for the Formaldehyde at the annual averaging period. A site specific risk assessment at the dense grid of 10-m spaced receptors was performed and the MGLC does not exceed the ACC at any residential receptors. Figure 1a and 1b (excerpted from application) illustrated the modeled maximum annual formaldehyde concentration from the scenario II. The 'red' receptors where concentrations exceeded the annual AAC were limited to non-residential areas. Therefore, the applicant meets the applicable Georgia Air Toxics Guideline.

Table 1. Modeled MGLCs and the Respective AACs at Annual, 24-hr, and 15-min Averaging Periods

Pollutant	CAS	Averaging Period	AAC ($\mu g/m^3$)	MGLC ($\mu g/m^3$)	Averaging Period	AAC ($\mu g/m^3$)	MGLC ($\mu g/m^3$)
Acetaldehyde	75070	Annual	4.55	2.65	15-min	4,500	207.85
Formaldehyde	50000	Annual	1.1	2.28	15-min	245	112.99
Methanol	67561	24-hr	619	227.67	15-min	1333.56	248.28

Note: All concentrations are the highest 1st high modeled impacts for all 5 model years.

CONCLUSIONS

The air quality analysis reviewed and described in the above sections demonstrates the conformance of the project's air pollutant impacts with Class I and Class II PSD NAAQS regulations and GA EPD's Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions. The additional air quality impact on soil, vegetation, and visibility is expected to be very minimal.

For these reasons, it is recommended a permit to be issued based on the project design and operating hours described in the application.

Figure 1a (left) and 1b (right, near field) Modeled Annual Formaldehyde Concentration – Scenario II
The 'red' receptors where concentrations exceeded the annual AAC