Prevention of Significant Air Quality Deterioration Review

Preliminary Determination

September 2015

Facility Name: Georgia-Pacific Wood Products LLC (Warrenton Chip-N-Saw Facility)
City: Warrenton
County: Warren
AIRS Number: 04-13-301-00003
Application Number: TV- 40117
Date Application Received: May 01, 2015

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, LLC (Warrenton Chip-N-Saw Plant aka CNS Plant) for a permit to construct and operate two direct-fired continuous dual path lumber drying kilns in a phased manner, retire the existing wood-fired boiler and three batch drying kilns in a phased manner and to operate a natural gas-fired boiler during the first phase of the project to provide steam to batch kilns 202 and 203.

The proposed project will be carried out in two phases. In Phase 1 a natural gas-fired package boiler 400C will be brought on site and started up and operated before removing the existing wood-fired boiler 400B and the batch drying kiln 201 will be removed. Natural gas-fired boiler 400C will provide steam for operating the remaining two batch kilns 202 and 203. Steam coils will be raised in drying kiln 203 during Phase 1, efficiency upgrades to drying kiln 202 will also be performed during Phase 1. A new continuous direct-fired dual path kiln (204) will be constructed and started up during phase 1. During Phase 1 a new sawdust silo, bark screen, bark hog, bark truck loadout, two additional sizing saws, second small chipper and auto grader in the planer mill will be installed. The existing trim saw, chipping edger, planer trim saw, small chipper and drum screen will be replaced with more efficient or larger capacity units.

During Phase 2 a second new continuous direct-fired dual path kiln 205 similar to kiln 204 will be constructed and started up before shutting down of the natural gas-fired package boiler (400C) and batch drying kilns 202 and 203. In this phase the debarker, several interior sawmill saws, planer, planer mill cyclone and various material handling systems will be replaced with more efficient or larger capacity units.

The proposed project will result in an increase in emissions from the facility. The sources of these increases in emissions include the two direct-fired dual path continuous drying kilns and the natural gas-fired package boiler 400C. The drying capacity of the kilns will increase to 170 MMBF/year during phase I and to 240 MMBF/year during phase II.

The modification of the Warrenton CNS Plant due to this project will result in the following net emissions increases (tons per year) in (Phase I: PM – 17.8, PM_{10} – 10.1, PM $_{2.5}$ -1.6, VOC – 192.5, GHG – 4055. In Phase 2 the net emissions increases will be: PM – 11.9, PM_{10} – 14.3, PM $_{2.5}$ - 8.1, VOC – 383.8, GHG – 23375. 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 VOC emissions increase in both phases of the project was above the PSD significant level threshold of 40 tons/year.

The Georgia-Pacific Warrenton CNS 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).

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

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

Approved modeling techniques have determined that the estimated emissions will not cause or contribute to a violation of any ambient air standard in the area surrounding the Warrenton CNS plant. It has further been 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 Warrenton CNS plant for the modifications necessary to increase the drying capacity of the drying kilns, for replacement of the batch kilns with continuous kilns and for removal of the wood-fired boiler and three batch kilns.

Various conditions have been incorporated into the current Title V operating permit to ensure and confirm compliance with all applicable air quality regulations. A copy of the draft permit amendment is included in Appendix A of this determination. This Preliminary Determination also acts as a narrative for the Title V Permit Amendment (Significant Modification with Construction).

1.0 INTRODUCTION – FACILITY INFORMATION AND EMISSIONS DATA

On May 4, 2015, Georgia-Pacific Warrenton CNS plant (hereafter Warrenton CNS plant) submitted an application for an air quality permit to replace the batch drying kilns with direct-fired continuous drying kilns and for retiring the wood-fired boiler. The facility is located at 331 Thomson Highway NE in Warrenton (Warren County).

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	✓		
TRS	No			
H_2S	No			
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-03-0	April 6, 2011	Renewal Title V Permit

Based on the proposed project description and data provided in the permit application, the estimated incremental increases of regulated pollutants from the facility are listed in Table 1-3 and Table 1-3A below:

Table 1-3: Net Emissions Increases from Phase 1 of the Project

Pollutant	Baseline Years	Potential Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review
PM	3/2013 to 2/2015	17.8	25	No
PM_{10}	3/2013 to 2/2015	10.1	15	No
$PM_{2.5}$	3/2013 to 2/2015	1.6	10	No
VOC	3/2013 to 2/2015	192.5	40	Yes
NO_X	3/2013 to 2/2015	-2.6	40	No
CO	3/2013 to 2/2015	-287.7	100	No
SO_2	3/2013 to 2/2015	-5.2	40	No
TRS	N/A	N/A	10	N/A
Pb	3/2013 to 2/2015	0	0.6	No
Fluorides	N/A	N/A	3	N/A
H_2S	N/A	N/A	10	N/A
SAM	N/A	N/A	7	N/A
GHG	3/2013 to 2/2015	4055	75000	No

Table 1-3A: Net Emissions Increases from Phase 2 of the Project

Pollutant	Baseline Years	Potential Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review
PM	3/2013 to 2/2015	11.9	25	No
PM_{10}	3/2013 to 2/2015	14.3	15	No
$PM_{2.5}$	3/2013 to 2/2015	8.1	10	No
VOC	3/2013 to 2/2015	383.8	40	Yes
NO_X	3/2013 to 2/2015	-10.2	40	No
CO	3/2013 to 2/2015	-216.9	100	No
SO_2	3/2013 to 2/2015	-3.6	40	No
TRS	N/A	N/A	10	N/A
Pb	3/2013 to 2/2015	0	0.6	No
Fluorides	N/A	N/A	3	N/A
H_2S	N/A	N/A	10	N/A
SAM	N/A	N/A	7	N/A
GHG	3/2013 to 2/2015	23375	75000	No

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 proceeding the date a complete permit application was received by EPD.

The net increases were calculated by subtracting the past actual emissions (based upon the annual average emissions from March 2013 to February 2015) from the future projected actual emissions of the batch kilns 202 and 203 and associated emission increases from non-modified equipment. Table 1-4 of the permit application details this emissions summary. The emissions calculations for Tables 1-3 and 1-3A can be found in detail in the facility's PSD application (see Appendix B of Application No. 40117).

Georgia-Pacific (GP) chose the hybrid method and is using the "baseline actual-to-projected actual" test for all of the existing emission units.

Total baseline actual emissions (BAE) for the modified or affected sources were calculated from the 24-month annualized baseline period of March 2013 to February 2015 using representative emission factors for all pollutants, as detailed in Appendix B of the PSD permit application. Throughput information was based on actual production data for this period.

For modifications to existing units, GP has calculated emission increases as the difference between the future projected actual emissions (PAE) and baseline actual emissions (BAE).

Potential emissions were calculated for all new sources and were included in Phase I and Phase II project emissions analyses. The increases in pollutant emissions from all of the "affected sources" were calculated based on the projected production for Phase I and the potential production capacity of the facility for Phase II.

Under Step 1 of the PSD analysis, the emissions increases for the project are calculated by summing the individual emission increases of all new or modified emission units as well as the associated emission increases. These total project emission increases are then compared to the PSD significant emission rates (SERs) to identify pollutants that trigger further review. A summary of emissions increases for Phase I and Phase II are presented in Appendix B of the PSD permit application.

As shown in the Phase I and Phase II Step 1 Tables in Appendix B of the PSD permit application, when considered alone, the proposed projects under Phase I would trigger PSD permitting requirements for PM, PM_{10}, $PM_{2.5}$, and VOC and under Phase II for PM, PM_{10}, $PM_{2.5}$, CO and VOC. Therefore, a Step 2 netting analysis was performed for these pollutants

The Phase I and Phase II Step 2 Netting Emission Analysis tables presented below in Tables 1-3 and 1-3A provide summaries of the final PSD applicability assessment for the projects. As shown in these tables PSD permitting is required only for VOC.

These calculations have been reviewed and approved by the Division.

Based on the information presented in Tables 1-3 and 1-3A above, Warrenton CNS's proposed modification, as specified per Georgia Air Quality PSD Permit Application No. 40117, is classified as a major modification under PSD because the potential emissions of VOC exceed the significant net emission increase of 40 tons per year for both Phase 1 and Phase 2 of the project.

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

2.0 PROCESS DESCRIPTION

According to Application No. 40117, Warrenton (CNS plant) has proposed to replace all three batch drying kilns with two direct-fired dual path continuous kilns and for retiring the wood-fired boiler 400B. Given appropriate market conditions, the complete expansion project will take place over the course of the next several years. For simplicity of permitting, GP has broken the project into two phases, anticipating no more than 18 months will separate the completion of one phase and the beginning of the second. Details of Phase I and Phase II are provided below.

The first phase (Phase I) of the project will include the shutdown of the wood-fired boiler and one of the three existing Batch Kiln 201. A rental natural gas-fired Package Boiler will provide steam to Batch Kilns 202 and 203 until Phase II of the project is implemented.

Phase I will also include the addition of a new continuous dual path kiln 204 and upgrade and modernization of several sawmill and planer mill process units. Total future production is expected to be 170 MMBF upon completion of Phase I based on a design capacity of 120 MMBF from the new kiln 204 and projected actual production of 50 MMBF from the existing kilns 202 and 203.

Refer to the descriptions below of each project comprising Phase I.

- Sizing Saws (102S) (Modification) - Two sizing saws will be added to the existing sizing saw located after the debarker. The saws will not add additional cuts to the logs, but will add efficiency to the process to allow two cuts to be made simultaneously, rather than the one existing saw making the 2 cuts concurrently. A total of four sizing saws (one before the debarker and three after) will exist at the facility after the project.

- Trim Saw (101), Edger (106) (New) – The existing trim saw and chipping edger will be replaced with more efficient units. The edger will be changed from a chipping edger that produces chips and sawdust to a board edger that has a saw as the primary edging mechanism and a chipper as the second edging mechanism. The board edger will produce sawdust, chips and wood strips.

- Small Chippers (104S) (New) – The small chipper and corresponding cyclone (currently serving the trim saw) will be replaced with a bottom or side discharging chipper that discharges chips and sawdust to a target box and then to a conveyor. The new small chipper will not be equipped with a cyclone. A second bottom or side discharging small chipper will be installed to serve the new board edger.

- Shaker Screen (105) New – The existing drum screen will be replaced with a shaker screen to mechanically sort sawdust, chips and oversized chips from the CNS, VSA, and small chipper. Oversized chips will be fed back to the small chipper for further chipping.

- Stacker (New) - GP will be relocating a green lumber stacker from an idled mill. While the stacker is not an emission source itself, the new stack will add reliability to sawmill operations.

- Sawdust and Chip Handling (Modified/New) – sawdust and chip material transfer systems will be upgraded to more efficiently convey these materials as needed with green end and sawmill upgrades mentioned above.

- Continuous Kiln (204) (New) – A new dual fuel (green sawdust and natural gas) direct-fired CDK (204) will be constructed. The CDK 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). The plant is evaluating whether the new kiln will be fueled by sawdust only, natural gas only, or a combination sawdust/natural gas burner. An individual sawdust or natural gas burner will not exceed 35 MMBTU/hr.

A combination sawdust/ natural gas burner would be comprised of a 35 MMBtu/hr sawdust burner with a small 7.0 MMBtu/hr natural gas burner for a total of 42 MMBtu/hr from both fuels. All three burner scenarios are represented in the project emissions analysis and the worst case emissions are represented in the toxics modeling.

- Batch Kilns (201-203) (Modified/Removed) - Upon completing the shakedown of the new CDK, existing Batch Kiln 201 will be shut down and removed from the site. Warrenton CNS plans to modify existing Batch Kiln 203 to raise the steam heating coils within the kiln to allow for taller stacks of lumber. This modification is expected to increase capacity of Batch Kiln 203 to 40 - 50 MMBF annual drying capacity. The plant is still evaluating whether Batch Kiln No. 202 will also undergo modifications to improve drying efficiency and be utilized with Batch Kiln 203. The projected annual production for Batch Kilns 202 and 203 will be 50 MMBF once the new CDK has gone through the shakedown period and entered normal operation.

- Natural gas-fired Package Boiler (400C) (New) – A rental NG-fired Package Boiler will be brought onsite to supply steam to Batch Kilns 202 and 203. Warrenton CNS is still evaluating the steam demand for Phase I of the project. The proposed plan is to bring a 20,000 pound steam Package Boiler to provide steam only to Batch Kiln 203 until modifications are completed on Batch Kiln 202. Once the second batch kiln is brought back online, a 30,000 pound steam Package Boiler will replace the 20,000 pound boiler. Emissions for the 30,000 pound Package Boiler are presented in the project calculations and regulatory applicability for both boiler sizes is evaluated. The rental boiler and Batch Kilns 202 and 203 will be removed from the site when the second CDK is added under Phase II.

- Sawdust Fuel Cyclone (105C) (New) – A new high efficiency sawdust fuel cyclone (105C) will be added to provide sawdust to the new continuous dual path direct-fired kiln 204 and a second future continuous dual path direct-fired kiln 205 to be added in Phase II.

- Wood-fired Boiler (400B) & Boiler Sawdust Cyclone (105B) (Removed)– The wood-fired boiler with multiclone and ESP, as well as associated flyash hopper , fly ash storage and associated conveyors, will be removed from the site after the startup and shakedown of the new continuous dual path direct-fired kiln. The existing sawdust boiler fuel cyclone (105B) will also be removed from the site.

- Bark Handling (105) (Modified/New) – Warrenton CNS is still evaluating modifications to the bark handling system since the plant will need to ship bark waste generated by the process after the wood-fired boiler is decommissioned. Currently bark, removed by the debarker, is mechanically conveyed to the fuel house. Warrenton CNS may continue to utilize the existing conveyor system to the fuel house and use front end loaders to load the bark for offsite shipment. Another option being considered is to add a bark screen, bark hog, bark surge bin and truck load with associated new mechanical conveyors to move the bark from the debarker to each of the aforementioned equipment.

- Planer Trim Saw (301) (New) - The existing planer trim saw will be replaced with a new high speed trim saw. The new trim saw, like the existing trim saw, will be controlled with a misting system as well as a vacuum from PMC1 to pull any remaining particulate matter not controlled by the mist system to PMC1.

- Lumber Autograder, lug loader and ink-jet printers (New) – Warrenton CNS currently uses manual graders to evaluate boards exiting the planer. Automatic lumber grading is a relatively new technology that uses a combination of cameras and laser scanners to identify the defects in the board and make the trim and grade decision. While the autograder, lug loader and ink jet printers are not emission sources themselves, they will provide potential throughput improvements from increased board feed rates.

- Roads (500) – A new gravel path extending just north of the log truck circle and around the back side of the logyard will be constructed to allow trucks to transport bark, sawdust and chips offsite from the green end process.

The goal of the second phase (Phase II) of the overall expansion project will be to increase drying capacity of the plant to 240 MMBF/year. This will occur with the addition of a second continuous kiln 205 (similar to the continuous kiln 204), removal of Batch Kilns 202 and 203 and the natural gas-fired package boiler (400C) after the startup of the second continuous dual path direct-fired kiln 205. Further upgrades and modernization of the green end, sawmill and planer mill process units will occur to meet the new plant's kiln drying capacity. Warrenton CNS is still evaluating the extent of the expansion project and scope changes are possible as mentioned above. At present, the components comprising Phase II are listed below.

- Debarker (102) (New) - The CNS debarker will be replaced with a high speed ring debarker. The high speed debarker is a partially enclosed machine equipped with a series of feed rolls and a rotating knife arm assembly. The debarker is utilized to remove the bark covering of logs traveling through the machine.

- Interior Saws (101) (New) – The remaining interior saws including the CNS, VSA, and Slasher Saw will be replaced with more efficient modern saws that will optimize log positioning for chipping, cutting, and profiling.

- 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.

- Continuous 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). As with kiln 204, GP will evaluate whether the new kiln will be fueled by sawdust only, natural gas only, or a combination sawdust/natural gas burner.

- 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 (pneumatic and mechanical). The planer shaving and material separation units (PMC1 & PMC2) will be replaced with larger capacity air separation units to accommodate additional material throughput.

- Roads (500) – The gravel road used by log delivery trucks on the south side of the log yard and the gravel road installed on the north side of the logyard during Phase I for sawdust, chip and bark removal, will be paved under Phase II to help mitigate dust generated by the increase in truck traffic due to the mill expansion.

The GP Warrenton CNS plant 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

Georgia Rule for Air Quality Control (Georgia Rule) 391-3-1-.03(1) requires that any person prior to beginning the construction or modification of any facility which may result in an increase in air pollution shall obtain a permit for the construction or modification of such facility from the Director upon a determination by the Director that the facility can reasonably be expected to comply with all the provisions of the Act and the rules and regulations promulgated thereunder. Georgia Rule 391-3-1-.03(8)(b) states that no permit to construct a new stationary source or modify an existing stationary source shall be issued unless such proposed source meets all the requirements for review and for obtaining a permit prescribed in Title I, Part C of the Federal Act [i.e., Prevention of Significant Deterioration of Air Quality (PSD)], and Section 391-3-1-.02(7) of the Georgia Rules (i.e., PSD).

- Georgia Rule (b) [391-3-1-.02(2)(b)] – The new continuous direct-fired lumber kiln will be subject to the 40% opacity limit and will be added to Condition 3.4.1 in Air Quality Permit No. 2421-301-0003-V-03-0.

- Georgia Rule (d) [391-3-1-.02(2)(d)] – The new natural gas-fired boiler 400C will be subject to the 20% opacity limit and will be added to Condition 3.4.3 in Air Quality Permit No. 2421-301-0003-V-03-0. Rule (d) also has PM limits for boiler emissions.

- Georgia Rule (e) [391-3-1-.02(2)(e)] – The continuous direct-fired lumber kilns will be subject to the particulate matter emission limit and will be added to Condition 3.4.2 in Air Quality Permit No. 2421-301-0003-V-03-0. The kiln will be equipped with a sawdust gasifier. No controls are present on the kilns for particulate matter emissions. In practice almost 80% of the particulate matter (PM) will settle inside the drying kiln on the lumber being dried and only 20% of the PM will be released to the atmosphere from the kiln vents (for batch kilns) and kiln doors (for continuous kilns).

- Georgia Rule (g) [391-3-1-.02(2)(g)] – The new continuous direct-fired lumber kiln will be subject to the 2.5% sulfur limit which will be a new condition in the permit amendment. This limit applies to all fuel burning sources and fuel burning equipment with heat input capacities less than 100 MMBtu/hr. Each kiln is equipped with a single burner fired with green sawdust. No controls are present on the kilns for sulfur dioxide emissions. Based on available technical literature, the kilns typically burn sawdust containing less than 2.5 percent sulfur; therefore it was concluded that the facility will be in compliance with Georgia Rule (g). The package boiler 400C will be fired with natural gas which has extremely low sulfur content and will easily comply with Georgia Rule (g).

- Georgia Rule (n) [391-3-1-.02(2)(n)] – The new fuel silo will be subject to the fugitive dust limit which are Conditions 3.4.6 and 3.4.7 in Air Quality Permit No. 2421-301-0003-V-03-0. This limit requires reasonable precautions to prevent dust and limits the fugitive dust to a 20% opacity limit. The sawdust fuel silo will be equipped with a cyclone to reduce fugitive dust.

<u>Federal Rule - PSD</u>

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. 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. It also means that Georgia EPD considers, but is not legally bound to accept, EPA comments or guidance. A commonly used source of EPA guidance on PSD permitting is EPA's Draft October 1990 New Source Review Workshop Manual for Prevention of Significant Deterioration and Nonattainment Area Permitting (NSR Workshop Manual). The NSR Workshop Manual is a comprehensive guidance document on the entire PSD permitting process.

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

- Application of BACT 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 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.

New Source Performance Standards (NSPS)

NSPS Subpart A requires initial notification and performance testing, recordkeeping and monitoring and provides reference methods and mandates general control device requirements for all other subparts as applicable. The rental boiler (400C) will be subject to all applicable requirements of NSPS Subpart Dc. Subpart Dc does not contain any PM or SO_2 emission standards for boilers that burn 100% natural gas, and since PM and SO_2 are the only pollutants regulated under Subpart Dc there are no emissions limits that apply. Warrenton CNS will be required to maintain monthly records of the amount of natural gas used according to 40 CFR 60.48c(g)(2) if the boiler is subject to NSPS Dc.

National Emissions Standards For Hazardous Air Pollutants (NESHAP)

Warrenton CNS is a major source of HAPs. 40 CFR 63 Subpart A (General Provisions) requires initial notification and performance testing, recordkeeping, monitoring, provides reference methods and mandates general control device requirements for all other subparts as applicable. If other Part 63 subparts are applicable, the provisions of Subpart A also apply.

Warrenton CNS plant is subject to the Plywood and Composite Wood Products (PCWP) Maximum Achievable Control Technology (MACT) standard, 40 CFR 63, Subpart DDDD (4D). This rule applies to any PCWP manufacturing facility located at a major source of HAP emissions. Lumber kilns are within the affected sources under the PCWP MACT pursuant to 40 CFR 63.2232(b); therefore, the lumber kilns are subject to this rule. However, no control requirements are specified by the rule for either existing or new/reconstructed lumber kilns, so this project will not change the applicability of PCWP MACT to the mill.

Boiler MACT: The compliance date for Boiler MACT is January 31, 2016.

GP will comply with the applicable requirements for the manufactured year of the rental boiler (400C) that is brought onsite by the Boiler MACT compliance date.

The existing wood-fired boiler (400B) is subject to the Boiler MACT rules. However, Warrenton CNS plans to decommission the boiler prior to the required compliance date.

State and Federal – 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. Excess emissions from the two batch kilns 202 and 203 associated with the proposed project would most likely results from a malfunction of the associated control equipment. The facility cannot anticipate or predict malfunctions. However, the facility is required to minimize emissions during periods of startup, shutdown, and malfunction.

Federal Rule – 40 CFR 64 – Compliance Assurance Monitoring

Under the general applicability criteria, this regulation applies to units that use a control device to achieve compliance with an emission limit and whose pre-controlled emissions levels exceed the major source thresholds under the Title V permitting program. Although other units may potentially be subject to CAM upon renewal of the Title V operating permit, such units are not being modified under the proposed project and need not be considered for CAM applicability at this time. The natural gas-fired boiler 400C does not have a control device and is not subject to CAM.

Therefore, this applicability evaluation only addresses the existing batch kilns 202 and 203 and the natural gas-fired boiler 400C, which does not employ any air pollution control devices; therefore, the CAM requirements are not triggered by the proposed modification.

4.0 CONTROL TECHNOLOGY REVIEW

The proposed project will result in emissions that are significant enough to trigger PSD review for VOC.

Indirect-Fired Batch Lumber Kilns 202 and 203 - Background

Existing Batch Lumber Kilns are being upgraded during Phase I of the 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 (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 an 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 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 listed below:

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: Selection of BACT.

Indirect-Fired Batch Lumber Kilns 202 and 203 – VOC Emissions

This analysis applies to determine BACT for VOC emissions from the modified batch lumber kilns 202 and 203.

GP operates a number of batch lumber drying kilns across the US. None of the batch lumber drying kilns at any of GP's manufacturing facilities utilize controls to remove VOCs. In addition, to the best of EPD's knowledge, no lumber kilns operating in the US utilize pollution controls to remove VOCs.

GP's Proposal

Step 1 – Identification of Potential Control Techniques:

While add-on controls have not been demonstrated for lumber drying kilns, the following control technologies have been demonstrated to remove VOC emissions for other industrial processes. GP has suggested the following BACT for control of VOC emissions. An analysis of these technologies can be found in Section 5.3.1.1 (pages 5-9 through 5-11) of the PSD application:

- Thermal Oxidation
- Catalytic Oxidation
- Condensation
- Carbon Adsorption
- Wet Scrubbing
- Biofiltration
- Proper Kiln Design and Operation

The Division has reviewed Step 1 of the applicant's analysis and the Division agrees with the findings.

Step 2 – Elimination of Technically Infeasible Control Options:

Each control technology presented in Step 1 is considered and those that are clearly technically infeasible are eliminated. If a control technology has been installed and operated successfully on a similar emission source, then it is assumed to have been demonstrated in practice and is considered technically feasible. If the control technology has not been demonstrated on a similar source, then the applicant must determine if the technology is available and applicable to the emission source under consideration.

A control technology is eliminated from further consideration if it can be shown that the technology has not been demonstrated on similar emission sources and that it also is not commercially available or cannot be applied to the emissions source under consideration. As stated in Section 5.1.2 of this BACT analysis, eliminating a control technology requires clear documentation of the technical difficulties that would preclude the use of the control option being evaluated, using physical, chemical, and engineering principles.

It is not technically feasible to capture the exhaust gases from a Batch Kiln and operate the kiln with the proper level of quality control. Since the exhaust gases cannot be captured and directed through a single exhaust stack, it is not technically feasible to utilize an "add-on" pollution control device.

Step 3 – Rank Remaining Control Technologies by Control Efficiency:

In the third step of the top-down analysis, the remaining technically feasible control technologies are ranked in order of their control efficiency. As previously discussed, since it is not feasible to capture exhaust gases from a Batch Kiln during the drying process, no add-on pollution control devices would be considered technically feasible. Therefore, the only remaining control technology for consideration is proper design and operation of the Batch Kilns.

Step 4 – Cost Effectiveness Evaluation of Control Technologies:

Since all add-on pollution control devices were eliminated in Step 2, the only remaining feasible control technology listed in Step 3 is "proper design and operation" of the batch lumber kiln. Since this control option is considered the top (and only remaining) control option for a batch lumber kiln, a cost effectiveness evaluation is not required.

Step 5 –BACT Selection:

Based on the technical infeasibility of any add-on control devices for a batch kiln, "proper design and operation" of the batch lumber kilns is being proposed as BACT. This determination is consistent with the information contained in the RBLC (see Table 5-14 in Appendix C of PSD application 40117), which indicates that no control technologies have been implemented to control VOC emissions from lumber drying kilns.

There is no applicable NSPS for batch lumber drying kilns. However, batch lumber kilns are considered "affected sources" under 40 CFR 63, Subpart DDDD – National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products (PCWP). There are no applicable emission limits or pollution controls that have been established for batch lumber kilns under the PCWP NESHAP.

GP is proposing a BACT VOC emission limit for Batch Kilns 202 and 203 at the Warrenton GA CNS plant based on an emission factor of 4.28 lb/MBF (as carbon). This emission limit will be achieved through the proper design and operation of the kilns and minimizing over-drying while meeting relevant lumber moisture specifications. This limit is within the range of BACT determinations listed in Table 5.14 in Appendix C of the PSD permit application 40117, which summarizes the BACT limits in PSD permits issued to other batch lumber kilns around the country which show a range from 3.5 to 7.0 lb VOC/MBF. The variation in emission rates among the entries in the database can be explained by several factors.

First, VOC emission rates from lumber kilns vary due to different species of lumber used throughout the country. Second, lumber kilns designed by different manufacturers operate with different targets for moisture content and use different drying temperatures. As a result, the VOC emission rates for lumber kilns will vary due to changes in these two variables.

No add-on pollution controls have been applied to batch kilns and VOC emissions from all batch lumber kilns are emitted directly to atmosphere from the kiln exhaust vents located on the roof of the kilns.

BACT Determination for Continuous Direct-Fired Lumber Kilns 204 and 205 - Background

Direct-fired dual path continuous kiln 204 will be constructed and operated during Phase I of the project. The second Direct-fired dual path continuous kiln 205 will be constructed and operated during Phase II of the project.

Batch kiln 201 will be removed after construction and startup of continuous drying kiln 204. Batch kilns 202 and 203 will be removed after the direct-fired dual path continuous kiln 205 is constructed and started up.

The dual path continuous direct-fired lumber kilns (204 and 205) drying capacity is 120 MMBF/yr (each) with a 35 MMBtu/hr sawdust gasifier and/or a 7 MMBtu/hr natural gas-fired burner, fuel silo and associated equipment. Heat from the dried lumber coming out of the kiln preheats the green lumber entering the kiln on the second track.

Continuous Direct-Fired Dual Path Lumber Kilns 204 and 205 – VOC Emissions

GP's Proposal

Step 1 – Identification of Potential Control Techniques:

GP has suggested the following BACT for control of VOC emissions from the new direct-fried continuous dual path kilns 204 and 205. An analysis of these technologies can be found in Section 5.3 (pages 5-13 through 5-21) of the PSD permit application.

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

The Division has reviewed Step 1 of the applicant's analysis and the Division agrees with the findings.

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.
- 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. The applicant's analysis can be found on page 5-15 of the PSD permit Application 40117.
- 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. The applicant's analysis can be found on page 5-18 of the PSD permit Application 40117.
- Carbon Adsorption is not feasible because of the high humidity of the exhaust stream. The applicant's analysis can be found on page 5-18 of the PSD permit Application 40117.
- 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 applicant's analysis can be found on page 5-19 of the PSD permit Application 40117.
- 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. The applicant's analysis can be found on page 5-19 of the PSD permit Application 40117.

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 of Remaining Control Technologies:

The following is a ranking of the control technologies based on control effectiveness found on page 5-20 of the PSD permit application.

Table 4-1: Efficiency Ranking of Feasible Control Technologies

Rank	Control Technology	Potential Control Efficiency (%)
1	Wet Electrostatic Precipitator (WESP) followed by Regenerative Thermal Oxidizer (RTO)	95%
2	Proper Maintenance and Work Practices	Base Case

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.

Step 4 – Evaluation of Most Stringent Controls:

The applicant provided an analysis of the wet electrostatic precipitator (WESP) followed by thermal oxidation on pages 5-20, 5-21 and in Appendix C of the PSD permit application. The applicant calculated the annualized cost of the RTO and WESP as $10,359 per ton of VOC removed. The cost of the RTO and WESP exceeds the benefit of the VOC reduction.

The Division agrees with the applicant that the RTO and WESP costs exceed the benefit of the VOC reduction.

Step 5 – BACT Selection:

The applicant has identified BACT as Proper Maintenance and Work Practices. Pages 5-21 and 5-22 in the PSD permit application describe the BACT selection.

The applicant has proposed a VOC emission factor of 4.28 lb/MBF (as carbon) and will use it to calculate VOC emissions from the continuous direct-fired lumber kilns. Georgia-Pacific will have a combined 240 MMBF/yr production limit for the two 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.

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.

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.

BACT Determination for Natural Gas-Fired Package Boiler (400C)

Warrenton CNS plant may utilize a 20,000 pound steam/hr or a 30,000 pound steam/hr natural-gas fired boiler, depending whether one or two of the existing batch kilns will be operated (during Phase I of the project). Both boiler's VOC emission profile and operation would be comparable on a lb/MMBtu basis.

The following analysis is based on either boiler with cost estimates based on the 30,000 pound steam/hr boiler as the use of the larger boiler would result in a lower cost effectiveness value.

Step 1 - Identification of Control Technologies

There are several approaches that can be used to reduce VOC emissions from boilers. The first involves combustion modification techniques and a second approach involves the addition of post-combustion (add-on pollution) controls. The third technique involves the use of "good combustion practices". All three of these approaches are addressed in the following sections in the BACT analysis.

Combustion Modification using Overfire Air

The reduction in VOC emissions realized from this technique is highly dependent upon the uncontrolled VOC concentration, combustion chamber oxygen content, distribution of the air (e.g., portion of the air introduced through the burners versus through the overfire air ports), and type and method of fuel being fired.

The use of an overfire air system ensures that complete combustion takes place, usually in the upper portion of a boiler's combustion chamber to reduce the level of VOCs in the boiler exhaust gases.

The use of an overfire air system in a natural gas-fired boiler can reduce VOC emissions up to 25% compared to VOC emission levels in boilers without an overfire air system.

Post Combustion (add-on) Control using Oxidation Catalyst

The primary post-combustion technique used to reduce VOC emissions is the use of an oxidation catalyst system. These conventional systems can provide approximately 75% reduction of VOC emissions by passing the boiler flue gas exhaust through a catalyst bed that converts the exhaust gases to carbon dioxide and water vapor.

These systems work best if the flue gas exhaust temperature is within the range of 600-1,100 degrees Fahrenheit (°F), with an optimum temperature of about 800°F. If the exhaust gas stream temperature of the combustion device in question is lower than the optimum temperature range, then additional heat is needed in order to raise the temperature to the desired level.

This may add significant operating costs to the control system since fuel must be burned in order to supply the additional heat.

Good Combustion Practices

Another approach that can be used to minimize VOC emissions from boilers is the use of "good combustion practices". Examples of "good combustion practices" for a natural gas-fired boiler include operator practices, maintenance practices, maintaining proper stoichiometric fuel-to-air ratios, monitoring of fuel quality and consistency, temperature, and combustion air distribution. Additionally, a start-up, shutdown and malfunction plan should be developed and followed to ensure that emissions are minimized to the maximum extent practicable during these periods of operation. All of these factors can affect the pollutant emission rate generated by the boiler, as well as the boiler combustion efficiency.

By following these "good combustion practices", VOC emissions will be minimized. There is no specific percent reduction that can be given for using good combustion practices, however, without their use, VOC emissions from a natural gas-fired boiler could increase by a factor of 100% or more as compared to a boiler that uses good combustion practices. It is in the facility's interest to use good combustion practices so that boiler efficiency is not compromised.

Step 2 – Technical Feasibility Analysis

All control technologies discussed above are technically feasible.

Step 3 – Ranking Control Technologies by Control Effectiveness

Table 5-1 presents hierarchy of VOC control Technology for natural gas-fired boiler 400C

Control Technology	**Control Efficiency**
Oxidation Catalyst	75%
Overfire Air System	Up to 25%
Good Combustion Practices	No specific value

Step 4 – Cost Effectiveness Evaluation of Remaining Control Technologies

This step of the BACT process is necessary when the top control is not selected as BACT. Step 4 determines the economic impact of the feasible control options listed in Step 3 and then selects the most appropriate technology as BACT for the Package Boiler. The economic analysis is based on cost data supplied by the equipment suppliers, GP experience at other locations, and the use of cost estimating spreadsheets contained in Chapter 2 of EPA's Office of Air Quality Planning & Standards (OAQPS) Control Cost Manual, 6th Edition, January 2002 (Chapter 2-Cost Estimating Methodology).

Oxidation Catalyst

Georgia-Pacific prorated an estimate for a system designed for use with a recovery furnace that will be converted to burn 100% natural gas at one of its paper mills in Alabama.

Costs were scaled based on ratio of exhaust gas flow between the converted recovery furnace to a gas-fired boiler and the proposed package boiler for the CNS plant and then used the “rule of six tenths” to calculate the estimated cost for installing an oxidation catalyst system for the proposed package boiler.

The temperature of boiler exhaust will have to raised from 550 ^{o}F to 800 ^{o}F for the oxidation catalyst to optimally reduce boiler exhaust VOC emissions. The use of a duct burner to raise the boiler exhaust temperature to 800 ^{o}F would require the facility to burn 3 MMBtu natural gas per hour costing $105,120 per year based on a natural gas cost of $4/MMBtu. Assuming a minimum VOC reduction of 75% will give a cost effectiveness of $256,000/ton of VOC removed. This amount is above any reasonable level of cost for reducing VOC emissions from the package boiler.

Therefore it is economically infeasible to use an oxidation catalyst to remove VOC emissions from the boiler exhaust from the natural-gas fired package boiler at the CNS plant. Therefore this option is removed from further consideration in the BACT analysis.

Overfire Air System

VOC emissions from the package boiler will be minimized to a level equivalent to what would be possible with the installation of an overfire air system. Therefore a cost-effectiveness analysis was not performed for an overfire air system.

Good Combustion Practices

Georgia-Pacific has proposed to use good combustion practices for the proposed package boiler at all times the boiler is operated. Since this is the last feasible option in the BACT determination a cost-effectiveness analysis is not needed.

Step 5 – BACT Selection:

The applicant has determined BACT as Good Combustion Practices. Pages 5-4 through 5-7 in the PSD Permit application describe the BACT selection.

The applicant will use a VOC emission factor of 0.0054 lb VOC/MMBtu to calculate VOC emissions from the gas-fired package boiler. This limit is based on AP-42 emission factor for small natural-gas fired industrial boilers (AP-42 Table 1.4-2). This value is within the range of BACT entries for VOC emissions from natural gas-fired boilers in the RBLC database.

5.0 TESTING and MONITORING REQUIREMENTS

Testing Requirements:

There are no applicable testing requirements being imposed for the kilns and the natural gas-fired boiler.

Monitoring Requirements:

Georgia-Pacific is required to develop and implement a work practice and preventive maintenance program for lumber drying kilns including the continuous direct-fired lumber kilns (204 and 205) to assure efficient operation of the kilns.

The continuous direct-fired lumber kilns (204 and 205) are subject to Georgia Rules 391-3-1-.02(2)(b) for Visible Emissions and (e) for Particulate Matter. The kilns will be equipped with a gasifier which will burn sawdust. No controls are present on the continuous direct-fired lumber kilns for Particulate Matter or VOC emissions.

The continuous direct-fired lumber kilns are subject to Georgia Rules 391-3-1-.02(2)(g)2 for Sulfur Dioxide. The kilns are equipped with a gasifier which will burn sawdust. No controls are present on the continuous direct-fired lumber kilns for Sulfur Dioxide emissions. Based on available technical literature, sawdust burned in this type of kiln contains less than 2.5 percent sulfur; therefore it was concluded that no monitoring for sulfur dioxide is required by the permit.

CAM Applicability:

Because the drying kilns and natural gas-fired package boiler do not have any control device for controlling VOC, CAM is not applicable and is not being triggered by the proposed modification. Therefore, no CAM provisions are being incorporated into the facility's permit in this permit amendment.

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) or PSD increment in a Class I or Class II area. 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}.

The proposed project at the Georgia-Pacific's Warrenton CNS plant triggers PSD review for VOC only since this is the only chemical that is emitted ar rates greater than Significant Emission Rates (SER) for PSD purposes. VOC does not have established PSD modeling significance levels (MSL) (an ambient concentration expressed in either $\mu g/m^3$ or ppm). Therefore, modeling is not required for VOC emissions. However, an ozone analysis is required since VOC emissions are greater than 100 tpy in both phases of the proposed project.

An additional analysis was conducted to demonstrate compliance with the Georgia air toxics program.

Modeling Methodology

Details on the dispersion model, including meteorological data, source data, and receptors can be found in EPD's PSD Dispersion Modeling and Air Toxics Assessment Review in Appendix C of this Preliminary Determination and in Section 6.4 of the PSD permit application.

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

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.

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 for the proposed modification. In addition, the potential soil and vegetation impacts and the Class II visibility analysis are also not required for the proposed modification.

Ozone Analysis

Since no significant air quality concentration has been established for ozone impact analysis, PSD permit applicants with a proposed net emission increase of 100 tons/year or more of VOC 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 modification is expected to emit 384 tpy VOC during phase II of the proposed expansion. Because the proposed project triggers PSD review for VOC, an ambient impact analysis for ozone is required. In addition, as the emissions of VOC exceed the monitoring de minimis level of 100 tpy, an evaluation is required to determine if representative ozone data are available in lieu of pre-construction ozone monitoring.

Two ambient ozone monitors operated by Georgia EPD in the Augusta Core Based Statistical Area (CBSA) at Evans (AIRS ID 13-073-0001) and Bungalow Road (AIRS ID 13-245-0091) that are within 60 km and generally downwind from (i.e., to the east of) the Warrenton CNS plant. The concentrations from the two monitors provide a representative indication of ozone concentrations in the general vicinity, and downwind from the Warrenton CNS plant. Georgia EPD's 2014 Ambient Monitoring Plan[25] describes the siting, exposure, measurement techniques and frequency and related technical details for each monitor. The existence of representative monitors with current data that were collected appropriately precludes the need for additional pre-construction ambient ozone monitoring.

GP reviewed the current and historical design values[26] for each monitor, which represents the 3-year average of the 4th highest daily 8-hour concentration, relative to the ozone NAAQS of 75 parts per billion (ppb).

Table 7-1 in the PSD permit application summarizes these values and demonstrates that each monitor measures ambient ozone concentrations in attainment with the applicable NAAQS and has trended toward improved ozone air quality over the last 10 or more years. The latest three-year design value (2012-2014) average of 4th highest annual values is 65 ppb for both the Evans site and the Bungalow site. This area is in attainment with the 8-hour ozone standard (75 ppb).

The proposed project at Warrenton CNS will increase VOC emissions (383.8 tons) in Warren County by 3.9% compared to the existing inventory, a relatively insignificant amount.

Because ozone formation is NO_x limited in the southeast, 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 CNS plant. Further, NO_x emissions are primarily emitted from mobile and industrial sources.

The proposed project will not cause a permanent increase in mobile source traffic in the area and as an industrial source has a net decrease of NO_x emissions.

Furthermore, the net emissions increase of VOC caused by the project is even less relative to VOC emissions in Columbia and Richmond Counties, where the Evans and Bungalow Road ozone monitors are located, that demonstrate attainment and improved air quality relative to the ozone NAAQS.

Because the project will cause a net decrease of NO_X emissions and the significant net emissions increase in VOC emissions is small relative to the existing background emissions inventory, ozone concentrations in the vicinity of Warrenton CNS plant are not expected to be significantly affected by the proposed project.

Georgia Toxic Air Pollutant Modeling Analysis

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)*."

The impacts of facility-wide toxic air pollutant (TAP) emissions at the GP Warrenton CNS facility were evaluated to demonstrate compliance according to the Georgia Air Toxics Guideline (http://www.georgiaair.org/airpermit/html/otherforms/toxicguide.htm). The annual, 24-hour and 15-minute AACs of 4 TAPs were reviewed based on U.S. EPA IRIS reference concentration (RfC) and OSHA Permissible Exposure (PEL). The modeled maximum ground-level concentrations (MGLCs) were calculated using the ISCST3 dispersion model (version 02035), and the hourly and annual emission rates were used for short term (1-hour and 24-hour) and annual averaging periods, respectively. There are three emission sources in the model. Each source was modeled at a normalized emission rate.
Note that the sources with multiple stacks were modeled at 1 g/s divided by the number of stacks in the source. Model results for each source were then multiplied by their respective emission rate for each TAP. The AAC for acrolein was updated from the value published on the GA EPD website (new GA EPD annual acrolein AAC is 0.15 µg/m³).

Table I in the enclosed modeling review summarizes the AAC levels and MGLCs of the TAPs at the above three averaging periods. Note that the maximum 15-min impact is based on the maximum 1-hour modeled impact multiplied by a factor of 1.32. As shown in the Table I, all modeled TAPs are below their respective AAC levels except for the MGLC of Formaldehyde at the annual averaging period. According to Georgia Air Toxics Guideline, a site specific risk assessment is required to be conducted by the applicant if the modeled MGLC of any TAP is greater than the AAC level.

The applicant submitted the site risk assessment for Formaldehyde on June 30, 2015. As seen in Figure 2 of the risk assessment submitted by Georgia-Pacific, the modeled maximum annual concentration for Formaldehyde does not exceed the AAC at any nearby residential areas. Therefore, the applicant passes the site specific risk assessment.

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. The Air Toxics analysis shows conformance with the 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, EPD's modeling review recommended that a permit to be issued based on the project design and operating hours described in the application.

Modeling Results

Air dispersion modeling for this modification was conducted by Georgia-Pacific Environmental Affairs to assess conformance of proposed emission limits for the subject emission point sources on site with the Georgia Air Toxics Guideline and applicable federal Prevention of Significant Deterioration (PSD) air quality standards. VOC is the only criteria pollutant with projected emissions in excess of the Significant Emission Rate (SER). Ozone ambient impact analysis over the project area shows no adverse impacts from the proposed project VOC emissions.

The results of these modeling evaluations are detailed in the attached modeling review memorandum (Appendix C) by EPD's modeling unit.

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

The applicant submitted an analysis of the potential adverse impacts of increased VOC emissions on soils and vegetation (see Section 7.1.2 of Application No. 40117) in the areas surrounding the facility. The 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*[24], 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 required because no significant impacts are expected. The analysis concluded that any adverse impacts are expected to be insignificant. The Division agrees with the applicant's conclusion.

Growth

The purpose of a growth analysis is to predict how much new growth is likely to occur as a result of the project and the resulting air quality impacts from this growth. The growth analysis evaluates the impact associated with the project on the general commercial, residential, and industrial growth within the project vicinity.

PSD requires an assessment of the secondary impacts from applicable projects. Although the proposed project is expected to employ approximately 25 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 mill. 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.

VOC emissions do not impact visibility. Therefore the project will not impact Class I and Class II visibility for purposes of PSD review of the project (See Section 7.1.3 of Application 40117).

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 EXPLANATION OF DRAFT PERMIT CONDITIONS

The permit requirements for this proposed facility are included in draft Permit Amendment No. 2421-301-0003-V-03-1.

Section 1.0: Facility Description

This modification consists of a plant expansion in a phased manner. In the first phase the wood-fired boiler 400B and associated ash handling system will be shut down after a natural gas-fired package boiler 400C becomes operational. Batch drying kiln 201 will also be shut down after a new direct-fired continuous dual path kiln 204 becomes operational. The continuous kiln will be dual fueled (sawdust and natural gas) and will be equipped with a 35 MMBtu/hr sawdust gasifier burner and/or natural gas burner (7 MMBtu/hr).

The natural gas-fired boiler 400C will provide steam (up to 30,000 lb/hr) for operating the improved batch kilns 202 and 203. The steam coils in the batch kiln 203 will be raised for handling a larger charge. Efficiency upgrades will be made to the batch drying kiln 202. The continuous dual path kiln 204 will have a drying capacity of 120 MMBF/year.

This phase will also have a new sawdust silo, bark screen, bark hog, bark truck loadout, two additional sizing saws, second small chipper and auto grader in the planer mill. In this phase existing trim saw, chipping edger, planer trim saw, small chipper and drum screen will be replaced with more efficient or larger capacity units. After addition of the direct-fired continuous kiln 204 the drying capacity of the facility will be 170 MMBF/year.

In the second phase a new direct-fired continuous dual path kiln 205 similar to kiln 204 will be constructed and operated. After the direct-fired continuous kiln 205 becomes operational the natural gas-fired package boiler 400C and the batch drying kilns 202 and 203 will be removed from the facility. In this phase the debarker, several interior sawmill saws, planer, planer mill cyclone and various material handling systems will be replaced with more efficient or larger capacity units. At the end of this phase maximum drying capacity of the kilns will be 240 MMBF/year.

Section 2.0: Requirements Pertaining to the Entire Facility

There is no change to Section 2.0 permit conditions in this permit amendment.
The current permit has no facilitywide permit conditions.

Section 3.0: Requirements for Emission Units

Emission Units		Specific Limitations/Requirements		Air Pollution Control Devices	
ID No.	Description	Applicable Requirements/Standards	Corresponding Permit Conditions	ID No.	Description
400C	Natural gas Package Boiler 39 MMBtu/hr (Removed in Phase 2)	40 CFR 52.21 PSD/BACT GA Rule 391-3-1-.02(2)(d) GA Rule 391-3-1-.02(2)(g) *40 CFR 60 Subparts A and Dc *40 CFR 63 Subparts A and 5D	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.4.3, 3.5.1, 5.2.7, 6.2.4	None	None
202	Drying Kiln No. 2 Indirect steam heated 1973 (Removed in Phase 2)	40 CFR 52.21 PSD/BACT 40 CFR 63 Subpart A 40 CFR 63 Subpart DDDD GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e)	3.2.2, 3.3.1, 3.3.2, 3.3.4, 3.3.5, 3.3.6, 3.4.1, 3.4.2, 3.5.3, 6.2.5, 6.2.6 6.2.7, 6.2.8	None	None
203	Drying Kiln No. 3 Indirect steam heated 1976 (Removed in Phase 2)	40 CFR 52.21 PSD/BACT 40 CFR 63 Subpart A 40 CFR 63 Subpart DDDD GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e)	3.2.2, 3.3.1, 3.3.4, 3.3.5, 3.3.6, 3.4.1, 3.4.2, 3.5.3, 6.2.5, 6.2.6, 6.2.7, 6.2.8	None	None
204	Drying Kiln No. 4 direct-fired dual path continuous kiln 120 MMBF/yr with 42 MMBtu/hr burner (Operational starting Phase 1)	40 CFR 63 Subpart A 40 CFR 63 Subpart DDDD 40 CFR 52.21 PSD/BACT GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e) GA Rule 391-3-1-.02(2)(g)	3.2.1, 3.3.1, 3.3.4, 3.3.5, 3.3.6, 3.4.1, 3.4.2, 3.5.3, 6.2.3, 6.2.5, 6.2.6, 6.2.7, 6.2.9	None	None
205	Drying Kiln No. 5 direct-fired dual path continuous kiln 120 MMBF/yr with 42 MMBtu/hr burner (Operational starting Phase 2)	40 CFR 63 Subpart A 40 CFR 63 Subpart DDDD 40 CFR 52.21 PSD/BACT GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e) GA Rule 391-3-1-.02(2)(g)	3.2.1, 3.3.1, 3.3.4, 3.3.5, 3.3.6, 3.4.1, 3.4.2, 3.5.3, 6.2.3, 6.2.5, 6.2.6, 6.2.7, 6.2.9	None	None
205B	Sawdust Fuel Silo	GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e)	3.3.4, 3.3.5, 3.4.1, 3.4.2, 3.5.2, 6.1.7c.	SC1	sawdust fuel cyclone
102	High speed ring Debarker	GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e)	3.3.4, 3.3.5, 3.4.1, 3.4.2.	None	None
103S	Big Chipper 1989	GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e)	3.4.1, 3.4.2, 3.5.2, 6.1.7.c.	CC1	Cyclone
104S	Small Chippers 2015	GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e)	3.3.4, 3.3.5, 3.4.1, 3.4.2.	None	None
105A	Chip Conveying and Loading 2015	GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e)	3.3.4, 3.3.5, 3.4.1, 3.4.2, 3.5.2, 6.1.7c.	WC1 or AWC	Chip Rail/truck loading cyclone or Auxiliary loading cyclone

Emission Units		Specific Limitations/Requirements		Air Pollution Control Devices	
ID No.	Description	Applicable Requirements/Standards	Corresponding Permit Conditions	ID No.	Description
105C	Sawdust Conveying and Loading 2015	GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e)	3.3.4, 3.3.5, 3.4.1, 3.4.2, 3.5.2, 6.1.7c.	SC1 or SC2	sawdust fuel cyclone or Sawdust truck loading cyclone
300	Planer Mill (235 tph) 2015	GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e)	3.3.4, 3.3.5, 3.4.1, 3.4.2, 3.5.2.	PMC1 PMC2 Dual Shavings Cyclone	
302P	Planer Mill Trim Hog with saw dust conveying 2015	GA Rule 391-3-1-.02(2)(b) GA Rule 391-3-1-.02(2)(e)			

* Potentially applicable regulation
Generally applicable requirements contained in this permit may also apply to emission units listed above. The lists of applicable requirements/standards and corresponding permit conditions are intended as a compliance tool and may not be definitive.

The emission unit table contains all equipment involved in Phase I and Phase II of the proposed facility expansion/modification.

New Condition 3.2.1 limits the each continuous kiln 204 and 205 to 120 MMBF of lumber drying each per year. This condition states that VOC emissions for the continuous kilns can be calculated using the NCASI emission factor of 5.49 lb/MBF (WPP1).

New Condition 3.2.2 limits the batch kilns 202 and 203 from drying more than 50 MMBF/year. This condition states that VOC emissions for the batch kilns can be calculated using the NCASI emission factor of 5.49 lb/MBF (WPP1). This condition becomes null and void at the end of phase II of the project when the batch kilns will be removed from service.

Existing Conditions 3.3.1 and 3.3.2 in the current permit have been combined into Condition 3.3.1 stating that the lumber drying kilns at the CNS plant are subject to the Plywood and Composite Wood Product MACT (40 CFR 63 Subparts A and 4D).

New Condition 3.3.2 states that the natural gas-fired package boiler 400C is subject to all applicable provisions of the boiler MACT 40 CFR 63 Subparts A and 5D.

New Condition 3.3.3 states that the natural gas-fired package boiler 400C is subject to all applicable provisions of the boiler NSPS (40 CFR 60 Subparts A and Dc).

New Condition 3.3.4 requires the Permittee to construct of Phase I and Phase II of the expansion project as specified in the PSD permit application.

New Condition 3.3.5 requires commencement of construction of phase I of the proposed expansion within 18 months of the date of the issuance of the PSD permit. Construction cannot be discontinued for more than 18 months and must be completed in a reasonable amount of time. In a phased construction, construction of each phase must commence within 18 months of the projected commencement date for that phase.

New Condition 3.3.6 requires firing of fuel with less than 2.5 wt.% sulfur in the continuous drying kilns and in the package gas-fired boiler.

Existing Condition 3.4.1, 3.4.2 and 3.4.3 are amended to include new sources during the proposed modification project.

Existing Condition 3.4.4 is deleted in this permit amendment since this condition deals with firing used oil in the wood-fired boiler 400B which will be removed/decommissioned during the first phase (Phase I) of the proposed modification after the package boiler 400C is up and running.

Existing Condition 3.4.5 is deleted in this PSD permit since the wood-fired boiler will be removed from the facility after startup of the natural gas-fired boiler 400C.

New Condition 3.5.1 is the VOC emission factor for the natural gas-fired boiler 400C that will be used during Phase I. This factor is the AP-42 emission factor for natural gas-fired small industrial/institutional boiler and is the same or better than the VOC emissions from a natural gas-fired boiler with overfire air. This condition will become null and void at the end of Phase II of the project when boiler 400C is removed from service.

Existing Condition 5.2.3 is amended by removing the reference to wood-fired boiler 400B. This condition requires reporting of any adverse condition that is not corrected within 48 hours as an excursion and was moved to Section 3.5 as Condition 3.5.2 as a work practice requirement for the operation of the cyclones at the facility for optimum control.

New Condition 3.5.3 requires the Permittee to develop and implement a work practice and preventive maintenance plan for the lumber drying kilns (202 through 205). This condition is BACT for the lumber drying kilns. This is existing condition 5.2.3

Section 4.0: Requirements for Testing

Condition 4.1.3 was modified to include a testing reference for wood products. Though testing is not required at this time, this will provide guidance if necessary in the future. This condition requires use of procedures of NCASI Wood Products Protocol 1(WPP1) for determining VOC concentrations in the drying kiln exhaust that has VOC emissions from drying of wood.

New Condition 4.1.4 was added in this amendment requiring Georgia-Pacific to submit performance test results to the US EPA's Central Data Exchange (CDX) using the Compliance and Emissions Data Reporting Interface (CEDRI) in accordance with any applicable NSPS or NESHAP standards (40 CFR 60 or 40 CFR 63) that contain Electronic Data Reporting Requirements

Existing Conditions 4.2.1 and 4.2.2 were deleted in this permit amendment since the wood-fired boiler 400B will be removed from the facility after startup of the gas-fired boiler 400C during the first phase of the proposed modification.

Section 5.0: Requirements for Monitoring

Existing Condition 5.2.1 was deleted since it involves monitoring of the operating parameters for the ESP which controls emissions from the wood-fired boiler 400B that will be removed from the facility (decommissioned) after startup and normal operations of the gas-fired package boiler 400C.

Existing Condition 5.2.2 for the wood-fired boiler 400B multiclone was deleted in this permit amendment since this boiler will be removed from service during phase I of the project.

Existing Condition 5.2.3 was moved to Section 3.5 as Condition 3.5.2 in the amended permit as work practice requirement for the planer mill and chipper cyclones.

Existing Conditions 5.2.4 and 5.2.5 are deleted in this amendment since these are CAM conditions for the wood-fired boiler 400B which will be removed from the facility after startup of the gas-fired boiler 400C during the first phase of the project.

Existing Condition 5.2.6 has been deleted since it pertains to firing of used oil in the wood-fired boiler 400B which will be removed from the facility during Phase I of the proposed expansion.

New Condition 5.2.7 requires the Permittee to monitor the natural gas consumption in the package boiler 400C as required by NSPS Subpart Dc.

<u>Section 6.0: Other Recordkeeping and Reporting Requirements</u>

Condition 6.1.4 was amended to give the Permittee 60 days to submit the compliance reports.

Condition 6.1.7b (exceedance) has been updated to require reporting of continuous kiln processing exceeding 120 MMBF/year for either of the continuous kilns and the exceedance of the drying limit of 50 MMBF/year for the batch kilns 202 and 203.

Condition 6.1.7c has been updated by removing conditions pertaining to the ESP excursion since it will be removed along with the wood-fired boiler 400B.

Existing Conditions 6.2.1 and 6.2.2 were deleted in this permit amendment since they pertain to the ESP and the wood-fired boiler 400B which will be removed from the facility during the first phase of the proposed modification.

New Condition 6.2.3 requires startup notification for the natural gas-fired boiler 400C and the direct-fired continuous kilns 204 and 205 per NSPS Subpart Dc.

New Condition 6.2.4 requires the Permittee to maintain monthly records of natural gas usage in the gas-fired boiler 400C per the requirements of NSPS Subpart Dc. This information can be used to estimate boiler emissions.

New Condition 6.2.5 requires the Permittee to maintain monthly records of the lumber dried in each continuous kiln and the batch kilns 202 and 203 in order to ensure compliance with the limits in Conditions 3.2.3 and 3.2.4.

New Condition 6.2.6 requires the Permittee to calculate the 12-month total of lumber dried in the batch kilns 202 and 203 and in each continuous kiln 204 and 205 each month.

New Condition 6.2.7 requires the Permittee semi-annual reports of the 12-consecutive months total of lumber dried in the batch kilns 202 and 203 and each continuous kiln.

New Condition 6.2.8 requires reporting of any month total lumber dried in excess of 4.16 MMBF for the batch kilns 202 and 203.

New Condition 6.2.9 requires reporting of any monthly lumber drying in excess of 10 MMBF in any continuous kiln.

<u>Section 7.0: Other Specific Requirements</u>

New Condition 7.5.1 identifies the natural-gas fired boiler 400C and the batch drying kilns 202 and 203 as temporary sources since they will be removed from the facility after Phase I of the planned expansion.

Standard template Conditions 8.26.1, 8.27 and 8.28 are added to the Warrenton CNS permit.

APPENDIX A

Draft Revised Title V Operating Permit Amendment
Georgia-Pacific Wood Products – Warrenton CNS Plant
Warrenton (Warren County), Georgia

APPENDIX B

Georgia-Pacific Wood Products – Warrenton CNS Plant
PSD Permit Application and Supporting Data

Contents Include:

1. PSD Permit Application No. 40117, dated May 1, 2015

APPENDIX C

EPD'S PSD Dispersion Modeling and Air Toxics Assessment Review

Georgia Department of Natural Resources
Environmental Protection Division • Air Protection Branch
4244 International Parkway • Suite 120 • Atlanta • Georgia 30354
404/363-7000 • Fax: 404/363-7100
Judson H. Turner, Director

MEMORANDUM
July 15, 2015

To: Seetharaman Ganapathy
Thru: Di Tian
From: Yunhee Kim
Subject: Georgia-Pacific Expansion Project, Warrenton, Warren County, GA
Modification PSD dispersion modeling review

GENERAL INFORMATION

Georgia-Pacific Wood Products, LLC (GP) proposed to operate a phased expansion at the Warrenton CNS (Warrenton CNS) facility in Warrenton, Warren County. This expansion will result in an increase in criteria pollutant and air toxic emissions. Air dispersion modeling for this modification application was conducted by Georgia-Pacific Environmental Affairs to assess conformance of proposed emission limits for the subject emission point sources on site with the Georgia Air Toxics Guideline and 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 criteria pollutant with projected emissions in excess of the Significant Emission Rate (SER). Ozone ambient impact analysis over the project area shows no adverse impacts from the proposed project VOC emissions. Four potential toxic air pollutants (TAPs) were evaluated and the modeled maximum ground level concentrations (MGLCs) of Acetaldehyde, Acrolein, and Methanol do not exceed their applicable Acceptable Ambient Concentrations (AACs). The modeled MGLC of Formaldehyde from the proposed project exceeds its applicable AAC around the fence line of the property. A site specific risk assessment was performed and the MGLC does not exceed the ACC 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 used in this review were surface and upper air observations from Augusta, NWS station, GA and Athens, GA, for the period of 1974-1978. The data were compiled and provided by GA EPD.

2. **Source Data –** Emission unit physical parameters, criteria and air toxic pollutant emission rates were provided by the applicant and have been subjected to GA EPD engineering review. In the application, Table 3-1 and 3-2 summarized the net emission increase from the two phase proposed projects. Table 6-1 listed the modeled point source and volume source parameters, and Appendix E listed the TAP emissions.

The GA EPD Stationary Source Permitting Program verified that the only toxic air pollutants that needed to be modeled were: Acetaldehyde, Acrolein, Formaldehyde, and Methanol.

3. **Receptor Locations –** The discrete receptors with 50 meters apart were placed on a Cartesian grid along the property boundary. Receptors extend outwards from the fence line at 100-meter intervals to approximately 3 kilometers, at 500-meter intervals to approximately 5 kilometers, at 1000-meter intervals to 10 kilometers and at 2,000-meter intervals to 20 kilometers from the facility centroid. 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.

4. **Terrain Elevation** – 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 USGS 7.5-minute topographic map contours.

5. **Building Downwash** – GEP building downwash analysis is not required for toxic dispersion modeling analysis.

6. **Class I Areas –** Seven Class I area exists within a 300 km range from GP Warrenton CNS facility, these are: Cohutta Wilderness Area, GA; Shining Rock Wilderness Area, NC; Joyce Kilmer - Slick Rock Wilderness Area, NC/TN; Wolf Island National Wilderness Area, GA; Great Smoky Mountains National Park, NC/TN; Cape Romain National Wilderness Area, SC, and Okefenokee National Wilderness Area, GA. Among these, Shining Rock Wilderness Area is the closest, located approximately 210 km north from the proposed 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

Since no significant air quality concentration has been established for 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 CNS expansion is expected to emit 192.5 tpy VOC for Phase I and 383.8 tpy VOC for Phase II. There are two ozone monitors in Warren County. One is the Augusta Core Based statistical Area (CBSA) at Evans (AIRS ID 13-073-0001) and the other one is Bungalow Road (AIRS ID 13-245-0091) that are within 60 km and generally downwind from the Warrenton CNS. The applicant examined the 3-year rolling average ozone concentration at both monitors. The latest three-year design value (2012-2014) average of 4^{th} high annual values is 65 ppb for Evans site and 65 ppb for Bungalow site. This area is in attainment with the 8-hour ozone standard (75 ppb).

AIR TOXICS ASSESSMENT

The impacts of facility-wide toxic air pollutant (TAP) emissions at the GP Warrenton CNS facility were evaluated to demonstrate compliance according to the Georgia Air Toxics Guideline (http://www.georgiaair.org/airpermit/html/otherforms/toxicguide.htm).

The annual, 24-hour and 15-minute AACs of 4 TAPs were reviewed based on U.S. EPA IRIS reference concentration (RfC) and OSHA Permissible Exposure (PEL). The modeled maximum ground-level concentrations (MGLCs) were calculated using the ISCST3 dispersion model (version 02035), and the hourly and annual emission rates were used for short term (1-hour and 24-hour) and annual averaging periods, respectively. There are three emission sources in the model. Each source was modeled at a normalized emission rate. Note that the sources with multiple stacks were modeled at 1 g/s divided by the number of stacks in the source. Model results for each source were then multiplied by their respective emission rate for each TAP. The AAC for acrolein was updated from the value published on the GA EPD website (new GA EPD annual acrolein AAC is 0.15 µg/m³). Table I summarizes the AAC levels and MGLCs of the TAPs at the above three averaging periods. Note that the maximum 15-min impact is based on the maximum 1-hour modeled impact multiplied by a factor of 1.32. As shown in the Table I, all modeled TAPs are below their respective AAC levels except for the MGLC of Formaldehyde at the annual averaging period. According to Georgia Air Toxics Guideline, a site specific risk assessment is required to be conducted by the applicant if the modeled MGLC of any TAP is greater than the AAC level. The applicant submitted the site risk assessment for Formaldehyde on June 30, 2015. Figure 1 shows a google earth map for GP Warrenton CNS. As seen in Figure 2, the modeled maximum annual concentration for Formaldehyde does not exceed the AAC at any residential areas. Therefore, the applicant passes the site specific risk assessment.

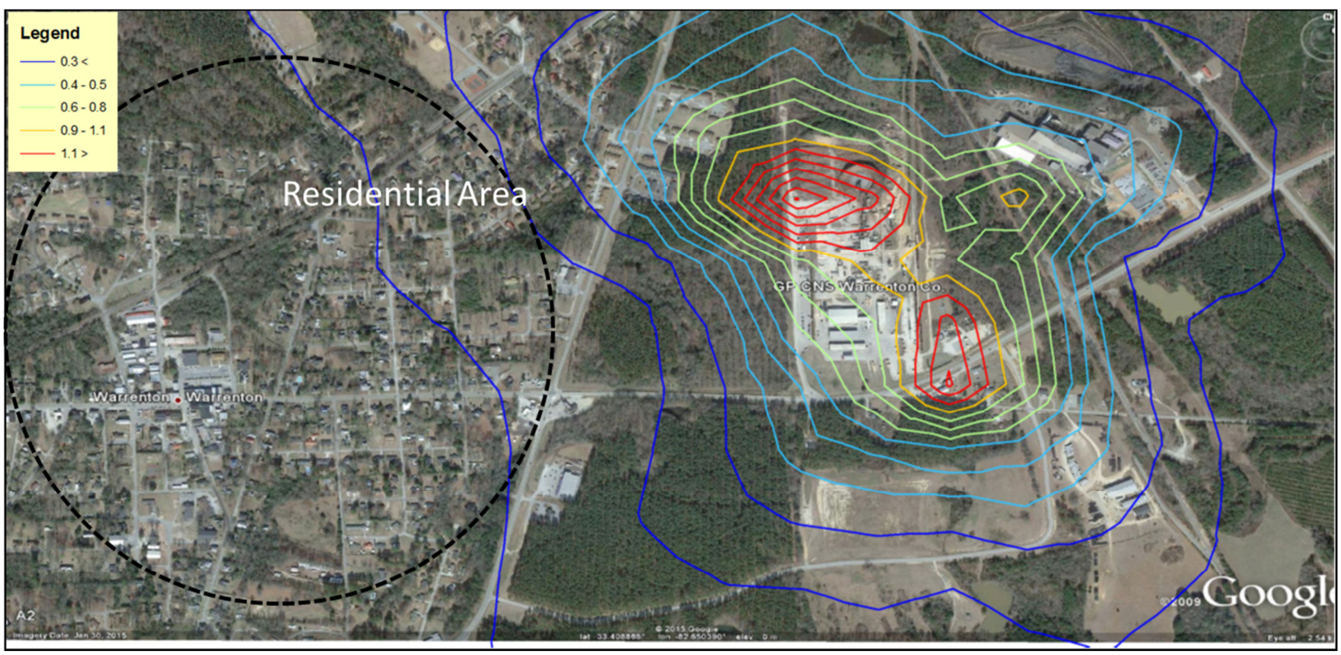
TABLE I. MODELED MGLCS AND THE RESPECTIVE AACS

Pollutants	Total MGLC (µg/m3)			AAC (µg/m3)			Percent of AAC (%)		
	15-Min	24-Hour	Annual	15-Min	24-Hour	Annual	15-Min	24-Hour	Annual
Acetaldehyde	116.48	NA	1.26	4500	NA	4.55	2.59	NA	27.78
Acrolein	14.66	NA	0.15	23	NA	0.15	63.72	NA	98.60
Formaldehyde	196.37	NA	1.97	245	NA	1.1	80.15	NA	179.07
Methanol	592.63	72.19	NA	32800	619	NA	1.81	11.66	NA

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

Figure 1. Google Earth Map for GP Warrenton CNS Woods Products. LLC

Figure 2. Plot of the annual average MGLC of Formaldehyde



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. The Air Toxics analysis shows conformance with the 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.

Georgia-Pacific
Wood Products

Georgia-Pacific Wood Products LLC Warrenton Sawmill 331 Thomson Highway NE
Warrenton, GA 30828-9003
(706) 465-3236

CERTIFIED MAIL NO. 7-01c 000 pool Vici 0036

June 30, 2015

Ms. Di Tian
Air Protection Branch
Georgia Environmental Protection Division
4244 International Parkway, Suite 120
Atlanta, GA 30354

Re: Georgia-Pacific Wood Products LLC — Warrenton, Georgia Chip-N-Saw
Expedited PSD Permit Application for Warrenton Expansion and Wood-fired Boiler Shutdown
Air Taxies Assessment

Dear Ms. Tian:

Georgia-Pacific Wood Products LLC (GP) owns and operates the Warrenton Chip-N-Saw (Warrenton CNS) in Warrenton (Warren County), Georgia. The plant is an existing major stationary source of air emissions and operates under a Title V Operating Permit (No. 2421-3010003-V-03-0) issued April 6, 2011, by the Georgia Environmental Protection Division (EPD). GP submitted a Prevention of Significant Deterioration (PSD) permit application on May 1, 2015, to request authorization to construct and operate an expansion project involving shutdown of the facility's wood-fired boiler and construction of two direct-fired, continuous dry lumber kilns (CDK) and associated material handling equipment.

GP's May 2015 permit application included a screening analysis of toxic air pollutants for which Georgia EPD requested additional information to characterize potential ambient impacts of formaldehyde. GP's original screening analyses demonstrated that ambient impacts of all toxic air pollutants would be below Georgia EPD's ambient acceptable concentrations (AAC) determined from published toxicity data following the methodology of Georgia EPD's *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions' ("Guideline"* hereinafter). GP had proposed an alternative AAC (3.3 $\mu g/m^3$) for annual average impacts of formaldehyde; however, Georgia EPD subsequently requested that GP assess potential impacts using a
previously approved alternative AAC of 1.1 $\mu g/m^3$. The remainder of this letter describes GP's refined modeling analyses and risk assessment for formaldehyde.

Georgia EPD, *"Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions"* June 21, 1998.

Formaldehyde Acceptable Ambient Concentrations

The *Guideline* provides the methodology for determining the AAC for TAPs based on various sources of toxicity data. Georgia EPD has previously recommended an annual average AAC of 1.1 µg/m^3 for assessment of potential chronic (long-term) impacts based on EPA's Integrated Risk Information System (IRIS) risk-based air concentration (RBAC) adjusted for typical inhalation rates.[2]

Potential acute (short-term) impacts of formaldehyde are assessed using the Occupational Safety and Health Administration (OSHA) Short Term Exposure Limit (STEL) of 2 parts per million for 15-minute exposure.[3] Following the *Guideline*, the 15-minute average AAC is obtained by converting the STEL to conventional units and applying a safety factor of 10. Because the averaging period (15-minutes) is consistent with the emission rate basis (i.e., pounds per hour), no adjustment based on potential for public exposure in excess of occupational exposure is necessary.

$$_{15} = \frac{2 \times 30/24.45}{10} = 0.245\ \frac{\text{mg}}{\text{m}^3} = 245\ \frac{\mu\text{g}}{\text{m}^3}$$

Dispersion Modeling Analysis

Refined dispersion modeling analyses for formaldehyde were conducted using the same data resources and techniques as the screening analyses described in GP's original May 2015 permit application. Model input and output files are provided on electronic media enclosed with this submittal. The following summarizes the modeling analyses with an emphasis on sources of formaldehyde.

Dispersion models compute downwind pollutant concentrations by simulating the evolution of a plume over time and space given inputs including the quantity of emissions and the initial conditions (e.g., velocity and temperature) of the stack exhaust to the atmosphere. In accordance with the *Guideline*, the modeling analysis was performed using ISCST3 (version 02035), the Georgia EPD approved computer dispersion model for toxic air pollutant analyses.

Building Downwash

Due to safety factors built into determination of AAC as specified by the *Guideline*, Georgia EPD does not require the use of building downwash calculations with the ISCST3 model. Therefore, no building downwash analysis was conducted.

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2 EPA, Integrated Risk Information System, Formaldehyde. http://www.epa.gov/iris/subst/0419.htm.

3 29 CFR §1910.1048(c)(2).

Dispersion Coefficients

The dispersion environment was determined using the Auer scheme in which the land use within a three kilometer area surrounding the facility was evaluated to determine whether the area is rural or urban. The area surrounding Warrenton CNS is predominantly rural; therefore, rural dispersion coefficients were selected for the modeling analyses.

Meteorological Data

The modeling analysis was conducted using five years of surface meteorological data (1974 through 1978) from Augusta, Georgia, with concurrent upper air data from Athens, Georgia. The pre-processed meteorological data was obtained from Georgia EPD.[4]

Receptors and Terrain

A Cartesian receptor grid extending approximately 20 kilometers (km) from the facility centroid was used in the modeling. The grid receptors consist of the following spacing:

- 50 m intervals along the facility property boundary
- Facility centroid to 3 km spaced at 100 m intervals
- 3 km to 5 km spaced at 500 m intervals
- 5 km to 10 km spaced at 1,000 m intervals
- 10 km to 20 km spaced at 2,000 m intervals

Terrain elevations from the National Elevation Dataset (NED) acquired from USGS[5] were processed with AERMAP (version 11103) to develop the receptor terrain elevations. All receptor locations are represented in the Universal Transverse Mercator projection, Zone 17, North American Datum 1983.

Source Characterization

The ISCST3 dispersion model allows for emissions units to be represented as point, area, or volume sources. Emissions from the Warrenton CNS are released from both well-defined points and fugitive processes. The location and ground level base elevation of each emission point was determined from estimated location of the new CDKs.

Each CDK emits from two stacks (one at each end of the kiln) and from the ends of each kiln that remain open during continuous operations. GP utilized the kiln designer's estimate and observation of comparable operations at other facilities that 80% of the total airflow and emissions is directed up the stacks and 20% of the total airflow and emissions is released through the kiln ends. The kiln stacks were modeled using typical stack parameters and emissions from the open kiln ends were modeled as volume sources to represent the non-vertical discharge.

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4 http://www.georgiaair.org/airpermit/html/sspp/modeling/iscmetdata.htm

5 http://www.mrlc.gov/viewerjs

A ground-based volume source was used to represent these sources using initial plume dimensions based on the building dimensions and guidance provided in Table 3-1 of the *User's Guide for the AMS/EPA Regulatory Model – AERMOD*[6]. Formaldehyde is not emitted from the stencil/logo ink application process that was included in the screening analyses, but not the refined analysis for formaldehyde. Table 1 provides the source parameters for the point and volume sources in the modeling analysis.

Table 1. Source Parameters

Point Sources					
Source	Model ID	Stack Height (m)	Exit Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
CDK No. 1 West Stack	CDK01WS	12.57	316.48	17.73	0.86
CDK No. 1 East Stack	CDK01ES	12.57	316.48	17.73	0.86
CDK No. 2 West Stack	CDK02WS	12.57	316.48	17.73	0.86
CDK No. 2 East Stack	CDK02ES	12.57	316.48	17.73	0.86

Volume Sources				
Source	Model ID	Release Height (m)	Initial Lateral Dimension (m)	Initial Vertical Dimension (m)
CDK No. 1 West Fugitives	CDK01WF	3.05	1.13	1.77
CDK No. 1 East Fugitives	CDK01EF	3.05	1.13	1.77
CDK No. 2 West Fugitives	CDK02WF	3.05	1.13	1.77
CDK No. 2 East Fugitives	CDK02EF	3.05	1.13	1.77

Formaldehyde Emissions

GP's original May 2015 permit application described the basis for estimating potential emissions of formaldehyde from each CDK, which results from fuel combustion and drying lumber. The potential emission rate is calculated using the maximum hourly and annual fuel consumption and production capacities resulting in emission rates of 1.28 pounds per hour and 5.10 tons per year for each CDK. The emission rate for each averaging period was input to the dispersion model and modeled separately by applying the previously described distribution of emissions assuming 80% of the total airflow and emissions is directed up the stacks and 20% of the total airflow and emissions is released through the kiln ends.

	1-hour/15-minute Average		**Annual Average**	
Average Emission Rate	1.28 lb/hr	0.0809 g/s	1.16 lb/hr	0.0734 g/s
Each CDK Stack (80%)	1.03 lb/hr	0.0647 g/s	0.93 lb/hr	0.0587 g/s
Each CDK End (20%)	0.26 lb/hr	0.0162 g/s	0.23 lb/hr	0.0147 g/s

6 EPA, "*User's Guide for the AMS/EPA Regulatory Model-AERMOD*", September 2004.

Dispersion Modeling Results and Risk Assessment

Table 2 summarizes the results of the dispersion modeling analyses indicating the maximum modeled 15-minute average and annual average concentration among all receptors in the modeling grid for each meteorological data year modeled. As specified in the *Guideline*, 15-minute average concentrations were determined by multiplying 1-hour average model results by a 1.32 scaling factor.

Table 2. Formaldehyde Dispersion Modeling Results

Meteorological Data Year	15-minute Average ($\mu g/m^3$)	Annual Average ($\mu g/m^3$)
1974	161.14	1.73
1975	165.30	1.85
1976	163.97	1.90
1977	163.97	1.71
1978	158.74	1.59
Overall	**165.30**	**1.90**
AAC	**245**	**1.1**

As indicated in Table 2, maximum 15-minute average modeled formaldehyde concentrations are below the short-term AAC at all locations in the modeling domain. This result supports the conclusion that acute adverse impacts are not expected to occur.

Figure 1 depicts the location of the modeled annual average concentrations in excess of the AAC in the immediate vicinity of the Warrenton CNS.

Figure 1. Modeled Annual Average Formaldehyde Concentrations.
Red dots denote receptor locations at which modeled concentrations in excess of the annual average AAC are estimated.
Green dots denote receptor locations at which modeled concentrations less than the annual average AAC are estimated.

To assess risks that may be represented by high modeled concentrations, GP examined records from the Warren County Tax Assessors Office[7] to determine the land use of surrounding areas where modeled concentrations in excess of the annual average AAC were estimated. These records confirm observations from the aerial photograph depicted in Figure 1, which indicate that high modeled concentrations are estimated at locations where it is extremely unlikely that a long-term, chronic exposure would occur.

- High modeled concentrations to the east of the Warrenton CNS occur along GP's property boundary formed with an adjoining parcel of industrial land use.
- High modeled concentrations to the south of the Warrenton CNS occur along GP's property boundary formed by a public highway (Georgia Route 12/U.S. Highway 278) and an adjoining parcel of commercial land use.
- High modeled concentrations to the west of the Warrenton CNS occur along GP's property boundary and an adjoining parcel of agricultural land use.
- Modeled concentrations are below the annual average AAC at receptor locations representing the nearest residential land uses to the west-northwest of the facility.

Because long-term modeled concentrations in excess of the annual average AAC are estimated only at locations where chronic exposure is extremely unlikely to occur and because modeled short-term concentrations are estimated below the 15-minute AAC for acute effects at all nearby industrial, commercial, agricultural, and residential locations, the analysis and risk assessment demonstrate that adverse impacts are not expected to occur.

[7] Warren County, Georgia Tax Assessors Office. http://qpublic7.qpublic.net/qpmap4/map.php?county=ga_warren.

Summary and Certification

The refined modeling analyses and risk assessment for formaldehyde presented in this submittal demonstrate that no adverse impacts are expected to occur due to the proposed project at GP's Warrenton CNS. GP appreciates Georgia EPD's prompt attention to the information presented in this submittal and continued expedited review of the facility's permit application. Please do not hesitate to contact Mr. Ryan Gesser at 404-652-6933 to discuss questions, comments, or if any additional information is required.

Based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

cc: Mr. Forrest Denney, Georgia-Pacific Wood Products LLC
Mr. Ryan Gesser, Georgia-Pacific LLC

Sincerely,

Dave Manley
Lumber Area Manager

Enclosure