Prevention of Significant Air Quality Deterioration Review

Preliminary Determination

May 2023

Facility Name: Faircloth Forest Products
City: Swainsboro
County: Emanuel County
AIRS Number: 04-13-107-00032
Application Number: 644755
Date Application Received: March 3rd, 2022

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 Faircloth Forest Products (hereinafter "facility") for a permit to construct a direct-fired continuous lumber drying kiln (ID No. DK02) at the existing sawmill. The proposed drying kiln has a maximum design capacity of 80 MMbf/yr and would be powered by a 40 MMBtu/hr wood-fired burner. The project also includes an upgrade to the existing cyclone (ID No. CD01) in order to handle waste from the increased throughput from the reman mill (ID No. REM).

The proposed continuous drying kiln (ID No. DK02) was originally permitted under the one-time doubling provision for avoidance of Prevention of Significant Deterioration (PSD) review with the issuance of Permit Amendment No. 2421-107-0032-V-02-2. During an inspection in 2022, it was found out that Faircloth Forest Products (AIRS No. 10700032) is under common control alongside LJR Forest Products (AIRS No. 10700030). The PSD one-time doubling provision should have already been applied when Faircloth Forest Products were initially permitted by SIP Permit No. 2421-107-0032-E-01-0. When Continuous Kiln KL02 was proposed, the combined site was already major under PSD for volatile organic compounds (VOC). Since the addition of Continuous Kiln DK02 would result in a VOC emission increase above the VOC PSD significant emission rate (SER), DK02 is now subject to a retroactive PSD review for VOC.

The proposed project would also result in an increase in particulate matter ($PM/PM_{10}/PM_{2.5}$) emissions from the facility. The sources of these increases in emissions include the proposed continuous lumber drying kiln (ID No. DK02), the existing sawmill (ID No. SM01), and the existing reman mill (ID No. REM). Additional emissions of carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2), and total greenhouse gases (Total GHG) are also expected from DK02. Potential emission increases for these pollutants are all below the associated PSD SERs.

The Faircloth Forest Products facility is located in Emanuel County, which is classified as "attainment" or "unclassifiable" for SO_2, $PM_{2.5}$ and PM_{10}, NO_X, CO, and ozone (VOC).

The EPD review of the data submitted by Faircloth Forest Products related to the proposed modifications indicates that the project will be in compliance with all applicable state and federal air quality regulations.

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

It has been determined through approved modeling techniques that the estimated emissions will not cause or contribute to a violation of any ambient air standard or allowable PSD increment in the area surrounding the facility. 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 Faircloth Forest Products for the modifications necessary to install the new continuous drying kiln (ID No. DK02) and upgrade the existing reman mill cyclone (ID No. CD01). Various conditions have been

incorporated into the current Title V operating permit to ensure and confirm compliance with all applicable air quality regulations. This Preliminary Determination also acts as a narrative for the Title V Permit.

1.0 INTRODUCTION – FACILITY INFORMATION AND EMISSIONS DATA

On February 28, 2022, Faircloth Forest Products (hereafter "facility") submitted an application for an air quality permit to install an 80 MMbf/yr continuous lumber drying kiln (ID No. DK02) and to modify the existing reman mill cyclone (ID No. CD01) to accommodate increased throughput. The kiln was originally permitted under one-time doubling with the issuance of Permit Amendment No. 2421-107-0032-V-02-2 and is now retroactively undergoing PSD review. The facility is located at 201 Pinetree Trail in Swainsboro, Emanuel County.

Table 1-1 summarizes the Title V major source status for the facility.

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
2421-107-0032-V-02-0	September 21, 2018	Operation of the lumber mill
2421-107-0032-V-02-2	March 2, 2021	The construction and operation of a new direct-fired continuous dry kiln and two additional cyclones on the Reman Mill

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 below:

Table 1-3: Emissions Increases from the Project

Pollutant	Baseline Years	Potential Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review
PM	n/a	23.3	25	No
PM_{10}	n/a	13.0	15	No
$PM_{2.5}$	n/a	9.7	10	No
VOC	n/a	**160.0**	**40**	**Yes**
NO_X	n/a	11.0	40	No
CO	n/a	17.4	100	No
SO_2	n/a	4.4	40	No
TRS	n/a	n/a	10	n/a
Pb	n/a	n/a	0.6	n/a
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
Total GHG	n/a	36,714	75,000	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. For the purpose of this application, the existing facility's potential emissions were used to represent past actual emissions. The net increases were calculated by subtracting the past potential emissions from the future projected actual emissions of the entire facility after the modification, including the proposed continuous drying kiln (ID No. DK02). Table 1-4 details this emissions summary. The emissions calculations for Tables 1-3 and 1-4 can be found in detail in the facility's PSD application (see Appendix C of Application No. 644755). These calculations have been reviewed and approved by the Division.

Table 1-4: Net Change in Emissions Due to the Major PSD Modification

Pollutant	Increase from Kiln DK02 (tpy)		Associated Units Increase (tpy)	Total Increase (tpy)
	Past Actual	Future Actual		
PM	0	5.6	17.6	23.3
PM_{10}	0	4.16	8.8	13.0
$PM_{2.5}$	0	4.16	5.5	9.7
VOC	0	160.0	0	160.0
NO_X	0	11.0	0	11.0
CO	0	17.4	0	17.4
SO_2	0	4.38	0	4.38
TRS	n/a	n/a	n/a	n/a
Pb	n/a	n/a	n/a	n/a
Fluorides	n/a	n/a	n/a	n/a
H_2S	n/a	n/a	n/a	n/a
SAM	n/a	n/a	n/a	n/a
Total GHG	0	36,714	0	36,714

Based on the information presented in Tables 1-3 and 1-4 above, the facility's proposed modification, as specified per Georgia Air Quality Application No. 644755, is classified as a major modification under PSD because the VOC emissions increase exceeds the PSD SER threshold of 40 tpy. Note that the combined site of Faircloth Forest Products and LJR Forest Products was already PSD major for VOC prior to the installation of DK02.

Table 1-5 below summarizes the PTE for all criteria pollutants, single/combined HAP, and Total GHG after the proposed modification.

Table 1-5: Facility-wide PTE After the Proposed Modification

Pollutant	PTE (tpy)
PM	55.3
PM_{10}	30.6
$PM_{2.5}$	23.5
VOC	344.0
NO_X	23.7
CO	37.3
SO_2	8.76
Single HAP	13.8
Combined HAP	22.4
Total GHG	73,428

Through its new source review procedure, EPD has evaluated the facility'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. 644755, the facility has proposed to install a direct-fired continuous drying kiln (ID No. DK02) with a 40 MMBtu/hr wood-fired burner. The kiln would have a maximum throughput capacity of 80 MMbf/yr. The installation of the proposed kiln would result in a throughput increase at the existing sawmill (ID No. SM01) and reman mill (ID No. REM); to accommodate this, the reman mill cyclone (ID No. CD01) would be upgraded. No other equipment at the facility would be modified.

All previously applicable rules and regulations continue to apply to the facility, and no new regulations apply to the modification.

The facility's permit application and supporting documentation can be found online at **https://epd.georgia.gov/psd112gnaa-nsrpcp-permits-database.**

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) continues 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 391-3-1-.02(2)(b), Visible Emissions

The proposed continuous lumber drying kiln (ID No. DK02) would be subject to Georgia Rule (b). Significant PM emissions are not expected from operation of the kiln, and therefore, the kiln is expected to comply with the limits of Georgia Rule (b).

Georgia Rule 391-3-1-.02(2)(d), Fuel-Burning Equipment

According to the definition specified in GRAQC 391-3-1-.01(cc), "fuel-burning equipment" includes equipment that "furnishes process heat indirectly, through transfer by fluids or transmissions through process vessel walls." Because the continuous lumber drying kiln's burner (ID No. DK02) provides direct heat to the kiln through the combustion of fuel and does not provide heat via the heating of another medium, it does not qualify as fuel-burning equipment and is therefore not subject to the PM emission limits of Georgia Rule (d).

Georgia Rule 391-3-1-.02(2)(e), Particulate Emissions from Manufacturing Processes

The continuous lumber drying kiln (ID No. DK02) is also subject to Georgia Rule (e), which limits the emission of PM from all manufacturing processes according to the following equations:

$E = 4.1 * P^{0.67}$ for process input weight rate up to and including 30 tons per hour.
$E = 55 * P^{0.11} - 40$ for process input weight rate above 30 tons per hour.

Where E equals the allowable PM emission rate in pounds per hour and P equals the process input weight rate in tons per hour.

Compliance with the GA Rule (e) PM emission standards is expected as follows.

Name/ID No.	Process Input Weight Rate (P) (bf/hr.)	Process Input Weight Rate (P) (tons/hr.)	Allowable Emission Rate (E) (lbs. PM / hr.)
Continuous Drying Kiln DK02	9,132	18.2	$E = 4.1 * (18.3)^{0.67} = 28.7$

Assumptions:
1 ft^3 = 12 bf
Wood Density = 48 lbs./ft^3

Process Input Weight Rate:
80,000,000 bf/yr.
= 9,132 bf/hr.
= (9,132 bf/hr.) * (1 ft^3/12 bf) * (48 lbs./ft^3) * (1 ton/2,000 lbs.)
= 18.2 tph

PM Emission Rate of the proposed continuous drying kiln (ID No. DK02):
= (0.14 lb. PM/1000 bf)*(9,132 bf/hr.)
= 1.28 lbs. PM/hr. < 28.7 lbs. PM/hr.

Georgia Rule 391-3-1-.02(2)(g), Sulfur Dioxide

The direct-fired continuous lumber drying kiln (ID No. DK02) is subject to Georgia Rule (g). Georgia Rule (g) limits fuel-burning sources with a heat input capacity less than 100 MMBtu/hr to burning fuels containing less than 2.5 percent sulfur. The kiln's burner fires only waste wood, which has a fuel sulfur content of less than 2.5%. Therefore, compliance with the fuel sulfur limits of Georgia Rule (g) is expected.

Georgia Rule 391-3-1-.02(2)(tt), VOC Emissions from Major Sources

Georgia Rule (tt) limits VOC emissions from major sources. The facility is located in Emanuel County, which is not one of the named counties subject to the requirements of Georgia Rule (tt). Therefore, it does not apply.

Federal Rule - PSD

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

No New Source Performance Standards (NSPS) are applicable to the continuous drying kiln (ID No. DK02).

National Emissions Standards For Hazardous Air Pollutants

Per 40 CFR 63.2231, because the facility is a major source of single HAP emissions and produces kiln-dried lumber, Continuous Drying Kiln DK02 is subject to 40 CFR 63 Subpart DDDD – National Emissions Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products. Lumber kilns are not subject to any of the compliance options specified in Tables 1A or 1B to Subpart DDDD, any of the operating requirements specified in Table 2 to Subpart DDDD, or any of the work practice requirements specified in Table 3 to Subpart DDDD. According to 40

CFR 63.2252, Continuous Drying Kiln DK02 is only subject to the initial notification requirements specified in 40 CFR 63.9(b).

Continuous Drying Kiln DK02 is also subject to 40 CFR 63 Subpart A – General Provisions.

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 continuous lumber drying kiln (ID No. DK02) associated with the proposed project would most likely result 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 40 CFR 64, the *Compliance Assurance Monitoring* Regulations (CAM), facilities are required to prepare and submit monitoring plans for certain emission units with the Title V application. The CAM Plans provide an on-going and reasonable assurance of compliance with emission limits. 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.

Therefore, this applicability evaluation only addresses the continuous lumber drying kiln (ID No. DK02), 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 would result in emissions that are significant enough to trigger PSD review for the following pollutants: VOC.

Definition of BACT

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

EPA's 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.

Continuous Drying Kiln DK02- Background

The proposed continuous lumber drying kiln (ID No. DK02) is fired directly by a 40 MMBtu/hr wood-fired burner. The burner combusts waste bark produced on-site. The kiln has a design maximum drying capacity of 80 MMbf/yr. No control equipment is associated with the kiln.

Continuous Drying Kiln DK02 – VOC Emissions

Applicant's Proposal

The proposed continuous lumber drying kiln (ID No. DK02) will produce VOC emissions from both the combustion of wood wase in the burner and the drying of lumber.

Step 1: Identify all control technologies

The facility considered VOC emissions control techniques/technologies as noted below.

Option 1: Thermal Incineration Option 2: Oxidation Catalyst Option 3: Biofiltration option 4: VOC Recovery (Adsorption, absorption, and condensing) Option 5: No Control (Good combustion practices, proper design and operation, and best management practices)

Option 1: Thermal Incineration

Thermal incineration is a process by which organic compounds are combusted at sufficiently high temperature and adequate residence time. Based on the type of heat recovery employed, thermal incineration systems are categorized into regenerative systems and recuperative systems. Regenerative systems utilize direct-contact ceramic heat exchangers, wherein the exhaust gas is heated to a desired combustion temperature before the combustion heat is recovered and stored. Recuperative systems use a primary heat exchanger to preheat the incoming vent stream with recovered heat from the exiting stream. Typical VOC reduction efficiencies range from 60 to 90%.

Option 2: Oxidation Catalyst

The VOC formation process typically involves an interruption in the fuel oxidation process; oxidation catalyst technology facilitates the final step in the oxidation process over a precious metal catalyst bed. Oxidation catalyst systems are typically installed directly into the exhaust streams, where the gases pass over a monolith honeycomb substrate coated with the platinum group metals (PGM) compounds, reducing the amount of VOCs leaving the exhaust. Typical VOC reduction efficiencies range from 60 to 90%.

Option 3: Biofiltration

Biofiltration involves the use of microbes that remove organics from the exhaust gas stream by feeding on the organic material and converting to water and carbon dioxide. The exhaust gas stream is directed through the bed media in which the microbes live. Organics are adsorbed by moisture in the bed media and come into contact with the microbes. The microbes reduce the concentration of organics by consuming the organic material. The clean air is then discharged into the atmosphere. Typical VOC reduction efficiencies range from 60 to 90%.

Option 4: VOC Recovery

Three of the most common VOC recovery systems are adsorption, absorption, and condensing. Adsorption is the process by which molecules collect on and adhere to the surface of an adsorbent solid (most often, activated carbon, which has a large surface area) due to physical and/or chemical forces. Absorption systems use a liquid solvent to selectively remove certain constituents of exhaust gas. Condensing systems utilize a refrigeration source to cool VOCs in the exhaust stream from a gaseous to a liquid phase to be recovered separately.

Adsorption is most effective for controlling VOC concentrations of 500 ppm to one-fourth of the Lower Explosion Limit (LEL). Absorption systems are most effective for pollutant concentrations between 250 and 10,000 ppm. Condensing systems are most effective for VOC concentrations between 5,000 and 10,000 ppm.

Option 5: No Controls

The BACT definition allows the consideration of methods, systems, and/or techniques as alternatives to add-on control devices. "Good combustion practices and best management practices" are presented as the minimum acceptable BACT methods when all other controls have been eliminated; these techniques for process control and optimization include the necessary process monitoring instruments, process control equipment, and scheduling of equipment inspection and maintenance in accordance with manufacturer's recommendations. Process controls are used to maintain proper moisture and temperature settings to optimize the kiln drying operation. Proper kiln temperature and humidity settings can minimize VOC emitted from the kilns.

Step 2: Eliminate technically infeasible options

Option 1: Thermal Incineration

The exhaust gas stream from a typical lumber kiln has a temperature of around 220 ºF and a high moisture content, making incineration (which is most effective at relatively high temperatures and low moisture content) unsuitable for VOC reduction from lumber kiln exhaust. There are no known applications demonstrating thermal incineration (regardless of the presence of a catalyst) to be a safe and effective method of VOC abatement for lumber kilns. Therefore, thermal incineration is deemed to be technically infeasible for this process.

Option 2: Oxidation Catalyst

Similarly, oxidation catalyst systems are most effective for exhaust streams with high temperatures and low moisture levels, making the relatively low temperatures and high moisture levels of lumber kiln exhaust unsuitable for these systems. Therefore, oxidation catalysts are deemed to be technically infeasible for this process.

Option 3: Biofiltration

Microbes used in biofiltration require a temperature range between 60 ºF and 105 ºF to survive. The high temperatures of the exhaust gas from lumber drying kilns (around 220 ºF) would kill the microbes and render the system useless. Additionally, the terpenes that make up VOC emissions from lumber drying kilns are poorly soluble in water, and therefore will not be able to come into contact with the microbes by being absorbed by moisture in the bed. Therefore, biofiltration is deemed to be technically infeasible for this process.

Option 4: VOC Recovery

All three recovery technologies (adsorption, absorption, and condensing) require exhaust streams heavily laden with VOC. The low VOC content of the lumber kiln exhaust, in addition to the

difficulty in condensing the long-chain terpenes found in lumber kiln exhaust make VOC recovery techniques unsuitable. Therefore, VOC recovery is deemed to be technically infeasible for this process.

Step 3: Ranking the Remaining Control Technologies by Control Effectiveness

In this step of the top down BACT analysis, the remaining technically feasible options are ranked in order of their control efficiencies. As demonstrated in Step 2, the only technically feasible control technology is shown below:

Table 4-1: Ranking of VOC Control Technology for Continuous Drying Kiln DK02

Control Technology Ranking	Control Technology	Control Efficiency
Option 5	No Control (Good combustion practices, proper design and operation, and best management practices)	Variable due to design

Step 4: Evaluating the Most Effective Controls and Documentation

Since the only technically feasible BACT option is good combustion practices and best management practices, further evaluation of controls is not necessary.

Step 5: Selection of BACT

The applicant has identified the selected BACT as good combustion practices and best management practices. No adverse energy, environmental, or economic impacts are associated with the selected VOC BACT.

EPD Review – VOC Control

The Division agrees with the facility that thermal incineration and oxidation catalysts are technically infeasible because of the relatively low temperature and high moisture content of the exhaust gas from the kiln. The Division also agrees that biofiltration is technically infeasible because of the low water solubility of the terpenes making up VOC emissions. The relatively low concentration of VOCs in lumber kiln exhaust also renders most VOC recovery options (adsorption, absorption, and condensing) inefficient. Condensation is technically infeasible because lowering the temperature of the exhaust gas below 32 ºF would damage the condenser. Additionally, plugging of the control equipment by viscous condensate can potentially disrupt the effectiveness of carbon adsorption and condensation.

Currently, there is no VOC BACT emission limit in place for continuous lumber drying kilns. The VOC content of wood varies depending on a wide range of factors, and VOC emissions from kilns are difficult to fully contain, resulting in inconsistent results when testing. As such, not enough test data exists to impose an emission limit.

Therefore, in lieu of a numerical BACT emission limit, the continuous lumber drying kiln (ID No. DK02) will be subject to good combustion practices and best management practices as the only

feasible BACT option; this is consistent with the BACT typically used for continuous lumber kilns. The facility will be required to develop and implement a Site-Specific Kiln Emissions Management Plan (KEMP) for the continuous drying kiln (ID No. DK02).

VOC does not have any National Ambient Air Quality Standards (NAAQS). Although VOC is a precursor of ozone, which has an 8-hour NAAQS, the formation of ground-level ozone is also dependent on the presence of NOx. Georgia is located in a NOx-limited area, and as such, any increase in VOC emissions from the proposed project is not expected to significantly impact the concentration of ozone in the area surrounding the facility. Because of this, and because the chosen VOC BACT option does not include the use of any control devices, the Division has determined that the proposed VOC BACT need not include a short-term VOC emission limit.

The Division will consider the design throughput limit of Continuous Kiln DK02 (80 MMbf/yr) to be the long-term BACT limit. This limit is included in Condition 3.2.2 of the proposed permit amendment.

Conclusion – VOC Control

The BACT selection for the Continuous Drying Kiln (ID No. DK02) is summarized below in Table 4-2:

Table 4-2: BACT Summary for the Continuous Drying Kiln (DK02)

Pollutant	Control Technology	Proposed BACT Limit	Compliance Determination Method
VOC	good combustion practices and best management practices	Site-Specific Kiln Emissions Management Plan	Recordkeeping of Maintenance Practices

5.0 TESTING AND MONITORING REQUIREMENTS

Testing Requirements:

There are no applicable testing requirements being imposed because there is no emission limit associated with the proposed project that would warrant any performance testing.

Monitoring Requirements:

There are no applicable monitor requirements being imposed alongside the modification; however, note that some monitoring requirements may be associated with the development of the Site-Specific Kiln Emissions Management Plan (KEMP) required by Condition 3.2.4.

CAM Applicability:

Because the proposed continuous drying kiln (ID No. DK02) does not have an associated control device, 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.

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 emitted 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 facility triggers PSD review for VOC. 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 emission increases are greater than 100 tpy.

A Toxic Impact Assessment for the entire facility, including the continuous drying kiln (ID No. DK02), was conducted as part of Application No. TV-517390, dated October 28th, 2020. Therefore, no additional toxics analysis is required.

Modeling Requirements

Class I Area Analysis

Federal Class I areas are regions of special national or regional value from a natural, scenic, recreational, or historic perspective. Class I areas are afforded the highest degree of protection among the types of areas classified under the PSD regulations. U.S. EPA has established policies and procedures that generally restrict consideration of impacts of a PSD source on Class I Increments to facilities that are located near a federal Class I area. Historically, a distance of 100 km has been used to define "near", but more recently, a distance of 300 kilometers has been used for all facilities that do not combust coal.

There do not exist any Class I increments or air quality related values (AQRV) for VOC. Therefore, a class I area review is not required.

Class II Area 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 is required.

Ozone Monitoring

Since no significant air quality concentration has been established for the ozone impact analysis, PSD permit applications with a proposed net emission increase of 100 tpy or more of VOC and/or NOx are required to conduct an ambient air impact analysis to determine if existing ozone monitoring data can be used in place of pre-construction monitoring data.

The southeast is generally NO_X limited with respect to ground level ozone formation. NOx emissions are primarily emitted from mobile and industrial sources; however, the proposed project will not cause a permanent increase in mobile source traffic in the area and will result in a minimal increase of NOx emissions from the facility.

Existing ozone monitoring data was taken from the nearest ozone monitor to the facility, at the Macon – Georgia Forestry Commission in Bibb County, Georgia (AQS ID 13-021-0012), which is approximately 70 km west of the facility. Given this proximity, the GA EPD Macon monitor provides a representative background level of ozone for the area near the facility. The applicant examined the 3-year rolling average ozone concentration at this monitor. The latest design value (i.e., 3-year average of 4th highest maximum daily 8-hour ozone concentrations during 2018-2021) is 54 ppb; therefore, this area is in attainment with the 2015 ozone National Ambient Air Quality Standard (NAAQS) of 70 ppb and pre-construction monitoring for ozone is not necessary.

The 2017 revisions to EPA's Guideline on *Air Quality Models* (Appendix W) recommends the use of the Tier 1 approach to analyze impact of the projected VOC and NOx emissions on secondary ozone formation, using the EPA's "*Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier l Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program*" (April 30th, 2019).

The VOC and NOx emissions increases from this project are 160 tpy and 11 tpy, respectively. The most conservative (lowest) VOC and NOx MERP values for the Southeast climate zone are 3,980 tpy and 156 tpy, respectively. The projected emission increases of VOC and NOx equate to the following ozone impact:

$$\left(\frac{160\ tpy\ VOC}{3{,}980\ tpy\ VOC\ MERP} + \frac{11\ tpy\ NOx}{156\ tpy\ NOx\ MERP}\right) * (1\ ppb) = 0.11\ ppb$$

The ozone impact due to the project emission increases is below the corresponding significant impact level (SIL) for Class I and Class II areas of 1 part-per-billion (ppb) and therefore, the project is not expected to have a significant impact on ozone concentrations in the area. No further modeling analysis is required.

7.0 ADDITIONAL IMPACT ANALYSES

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

Soils and Vegetation

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

Growth

A growth analysis is conducted to estimate how much residential, commercial, and industrial growth is expected to occur as a result of the modification, and to evaluate the resulting air quality impact. No significant residential, commercial, or industrial growth is anticipated as a result of the project and a growth analysis is not needed.

Visibility

PSD regulations require an evaluation of the impact of project emissions on visibility in Class I Class II areas. The analysis is required only for those pollutants for which PSD review is triggered. The relevant pollutants for visibility are PM, NOx and SO_2. The project triggers PSD review for VOC only and does not have a significant net emission increase of PM, NOx and SO_2. Therefore, a visibility analysis is not needed.

Georgia Toxic Air Pollutant Modeling Analysis

A Toxic Impact Assessment was conducted as part of Application No. TV-517390, dated October 28th, 2020. Please refer to the narrative for Permit Amendment No. 2421-107-0032-V-02-2 for more information.

8.0 EXPLANATION OF DRAFT PERMIT CONDITIONS

The permit requirements for this proposed facility are included in draft Permit Amendment No. 2421-107-0032-V-02-3.

Section 1.0: Facility Description

Faircloth Forest Products is proposing to construct and install a continuous direct-fired lumber drying kiln (ID No. DK02) and to upgrade the existing Reman Mill cyclone (ID No. CD01). Continuous Kiln DK02 is undergoing retroactive PSD review.

Section 2.0: Requirements Pertaining to the Entire Facility

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

Section 3.0: Requirements for Emission Units

Cylones CD02 and CD03 were not installed, and the emission unit table was updated to reflect this.

Emission Units		Applicable Requirements/Standards	Air Pollution Control Devices	
ID No.	**Description**		**ID No.**	**Description**
SM01	Sawmill (includes debarkers, saws and chippers)	391-3-1-.02(2)(b)1. 391-3-1-.02(2)(e)1.(i)	N/A	N/A
DK01	Dry Kiln 1 Direct-fired Continuous kiln with a burner fueled with green sawdust and bark (40 MMBTU/hr)	40 CFR 63 Subpart A 40 CFR 63 Subpart DDDD 391-3-1-.02(2)(b)1. 391-3-1-.02(2)(e)1.(i) 391-3-1-.02(2)(g)2.	N/A	N/A
DK02	**Dry Kiln 2** **Direct-fired continuous kiln with a burner fueled with dry shavings (40 MMBtu/hr)**	40 CFR 63 Subpart A 40 CFR 63 Subpart DDDD 391-3-1-.02(2)(b)1. 391-3-1-.02(2)(e)1.(i) 391-3-1-.02(2)(g)2	N/A	N/A
REM	Reman mill with Reman hogger	391-3-1-.02(2)(b)1. 391-3-1-.02(2)(e)1.(i)	**CD01** ~~CD02~~ ~~CD03~~	**Cyclone 1** ~~**Cyclone 2**~~ ~~**Cyclone 3**~~

*** Modified emission units are in bold**

Modified Condition 3.2.2 was edited to reflect that Continuous Kiln DK02 is not avoiding a PSD review. The one-time doubling provision cannot apply to the construction of the kiln and the 80 MMbf throughput limit is not meant for PSD avoidance. Instead, it is now the long-term VOC BACT limit. Note that the toxic impact assessment (TIA) was conducted based on the hourly emission rates capped by the annual throughput limit; changing this annual throughput limit will require a new TIA.

New Condition 3.2.4 requires the facility to develop and implement a Site-Specific Kiln Emissions Management Plan (KEMP) for Continuous Kiln DK02 in accordance with the chosen BACT.

Section 4.0: Requirements for Testing

No conditions in Section 4.0 are being added, deleted or modified as part of this permit action.

Section 5.0: Requirements for Monitoring

No conditions in Section 5.0 are being added, deleted or modified as part of this permit action.

Section 6.0: Other Recordkeeping and Reporting Requirements

New Condition 6.1.7c.iii. was added to require the facility to report, as an excursion, any adverse condition discovered by the KEMP inspection required by Condition 3.2.4.

APPENDIX A
EPD'S PSD Dispersion Modeling Review