Prevention of Significant Air Quality Deterioration Review
Of the Rayonier Wood Products LLC-Swainsboro Sawmill
Swainsboro, Georgia (Emanuel County)

PRELIMINARY DETERMINATION
Permit Application No. 16512
April 12, 2007

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program (SSPP)
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SUMMARY

Rayonier Wood Products LLC-Swainsboro Sawmill operates a lumber mill located in Swainsboro, Georgia, which is currently limited to 118.421 million board-feet per year (MMbd-ft/yr) for PSD avoidance purposes. The facility is proposing an expansion project in which lumber production capacity would be increased. The facility has requested authorization to modify their two lumber drying kilns (Source Codes DK07 and DK08) to employ continuous drying, instead of batch drying, by increasing their length and adding a mechanism to move stacks of green wood through the kilns on two tracks in opposite direction. This will increase the annual lumber production capacity of the facility to 220 million MMbd-ft/yr. This increase in production will result in increases in emissions of particulate matter (PM) and volatile organic compounds (VOC) over the PSD thresholds of 25 and 40 tpy, respectively, making this proposed modification subject to the requirements of New Source Review for air quality impacts. Specifically, Best Available Control Technology (BACT) and air quality analyses are required under the Prevention of Significant Deterioration (PSD) permitting program, as administered by the Georgia Environmental Protection Division ("the Division" or "EPD"), and Georgia's Rules for Air Quality Control. A PSD review is also required to remove the existing PSD avoidance limits on the kilns, according to 40 CFR 52.21(r)(4). In accordance with 40 CFR Part 70 regulations, a significant modification to the Tile V permit must be issued for the proposed changes.

The Swainsboro Sawmill is an existing major source, with potential to emit VOCs greater than 250 tons per year, due to drying kilns and associated fuel burning equipment. The facility went through a PSD review and was issued a PSD permit on November 5, 1998 for the construction and operation of a lumber mill. The Swainsboro Sawmill would have triggered another PSD review in November of 2004, when a permit amendment was issued that authorized the facility to construct and operate two new wood gasifier direct heated lumber drying kilns (DK07 and DK08), had the facility not opted to take a production limit to keep the increase in VOCs emitted from the new lumber drying kilns below the PSD 40 tpy significant level. Air Quality Permit Amendment No. 2421-107-0011-V-02-2 limited the annual lumber drying throughput of these kilns to 118.421 MMbd-ft. [Note that there had been offsetting emissions reductions of 186 tpy VOC from the hot oil heater and six dry kilns that were removed, with the installation of new two kilns. That allowed the net VOC emission increase to be only 39 tpy.]

The existing sawmill is considered to be a major source under PSD regulations for VOC emissions. EPD has reviewed the current application to modify the Title V Permit for the proposed project. The increase in the production limits constitutes a relaxation of the limit, mentioned above, taken by Rayonier in 2004 to avoid PSD review. In accordance with the PSD rules now in effect for Georgia projects, relaxation requires that the past reconstruction of kilns be assessed "as though construction had not yet commenced on the ... modification." Based on the comparison of the past actual emissions and future potential emissions from the modified kilns at the increased production rate, the emission increases of PM and VOCs will both exceed PSD significance levels, which will trigger new source review (NSR) under federal and state regulations. The proposed project is therefore considered a major modification to a major source. The Swainsboro Sawmill proposed that the BACT for this modification is the proper and efficient operation of the combustion systems, and that no add-on emission control devices should be required. Therefore, the emissions from the kilns will essentially be limited by the new capacity of the lumber drying kilns.

The Swainsboro Sawmill is located in Emanuel County, which is classified "attainment" or "unclassified" for the criteria air pollutants of PM_{10}, SO_2, NO_x, CO and ozone (with VOC and NO_x being the pollutants of concern) in accordance with Section 107 of the Clean Air Act, as amended August 1997. Note that this county is also classified as "attainment" for the $PM_{2.5}$ and 8-hour ozone standards.

It is the Preliminary Determination of the Division that the current proposal provides for the application of best available control technology (BACT) for the control of PM and VOC emissions from the kilns as required by Federal PSD regulation 40 CFR 52.21(j). However, the Division also determined that a system of monitoring must be carried out in order to minimize PM and VOC emissions.

The EPD review of the data submitted by the Rayonier Wood Products LLC-Swainsboro Sawmill, related to the proposed modification, indicates that the project will be in compliance with all applicable state and federal air quality regulations.

An air quality analysis was not required, other than for PM and VOC, since the increase in emissions of all other pollutants was not significant. It has been determined that the proposal will not cause impairment of visibility or detrimental effects on soils or vegetation. Also, any air quality impacts produced by project-related growth should be inconsequential.

The preliminary determination indicates that the Swainsboro Sawmill should be authorized to increase the allowable production in its two direct fired lumber drying kilns, from 118.421 million board feet per year to 220 million board feet per year, by modifying them from batch type to continuous operation. Additional permit conditions will be made a part of the Permit to assure that PM and VOC emissions are minimized and insure and confirm compliance with all applicable regulations. A copy of the Draft Permit Amendment is attached in Appendix A.

1.0 INTRODUCTION

Rayonier Wood Products LLC. (Rayonier) submitted an application dated December 22, 2005 (Application No. PSD-16512, received on Dec 28, 2005), and an updated application, received on March 13, 2006*, to amend the air quality permit issued to the Swainsboro Sawmill facility located in Swainsboro, Emanuel County to authorize the modification of its existing lumber drying kilns, as indicated below:

(1) Modification of Lumber Drying Kilns (Source Codes DK07 and DK08): To modify each of the two existing direct fired, batch operated, kilns (Source Codes DK07 and DK08) to allow continuous operation, by increasing their length to about three (3) times their existing length and by adding a mechanism to move stacks of green wood through each kiln on two tracks. Carts carrying the wood will travel on two side-by-side parallel tracks, moving countercurrent to each other, which will increase the heat efficiency of the drying operation. The continuous operation will allow the kilns to operate at a continuous rate and therefore more efficiently and with greater control of drying parameters. In addition to increasing the kiln length, the floor baffles will be reconfigured to accept a slightly wider stack of lumber.

(2) Production Increase: To authorize increasing the allowable lumber drying capacity of the mill from 118.421 to 220.0 MMbd-ft/yr.

The Swainsboro Sawmill is located in Swainsboro, Emanuel County, which is an attainment area for all criteria air pollutants. The Swainsboro Sawmill facility is a lumber mill (SIC Code 2421) that processes timber through the sawmill to produce finished dimensional wood products.

Any proposed project at the plant is required to undergo a PSD applicability analysis in order to determine if the project triggers a PSD review for any pollutant. Sawmills are not one of the 28 named source categories whose PSD threshold is 100 tons per year, so the major source threshold is 250 tons per year. The Swainsboro Sawmill emits in excess of 250 tons per year of at least one criteria pollutant (VOC). The facility is therefore considered a major source under the PSD program. As a major source, any project that results in a significant increase of any PSD regulated compound triggers a PSD review.

If approved, the modification of the lumber drying kilns and removal of the current production limit on the kilns will allow the kilns to dry up to 220.0 million board feet per year. This increase in production capacity will result in potential emission increases of PM and VOC over the PSD significance levels of 25 and 40 tons per year, respectively, so this modification is therefore subject to a PSD review. Thus the requested increase in production and the process modifications are considered a major modification to a major source for VOCs and PM.

For each pollutant subject to PSD review, the following analyses are required:

(1) Ambient monitoring analysis, unless the net increase in emissions due to the modification causes impacts that are below specified significant impact levels (SILs);

(2) Application of best available control technology (BACT) for each new or modified emissions unit, for each pollutant subject to PSD review;

(3) Air quality impact analysis, unless the net increase in emissions due to the modification causes impacts which are below specified significant impact levels (SILs); and

(4) Additional impact analysis (e.g., impact on soils, vegetation, visibility), including impacts on PSD Class I areas.

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*Additional information was also submitted by the facility, by their letters dated March 1, 2006; May 12, 2006; June 22, 2006; July 11, 2006; and February 14, 2007.

2.0 PROJECT DESCRIPTION

Rayonier is proposing to modify both of its existing direct-fired drying kilns at its Swainsboro, Georgia. The facility is located at 8796 GA Highway 297, Swainsboro, Georgia, 30401 in Emanuel County. The Swainsboro Sawmill's permit application dated March 2006 and supporting data are included in Appendix B. The following sections describe the facility and proposed project in more detail.

2.1 History

The Rayonier Wood Products LLC-Swainsboro Sawmill (aka Rayonier Inc. Swainsboro Sawmill) was issued PSD Permit No. 2421-107-0011-P-01-0 on November 5, 1998, to construct a natural gas fired hot oil heater, six lumber dry kilns, and a planer mill. The hot oil from the gas-fired heater was to indirectly heat five of these dry kilns, and the sixth kiln was to be heated with the exhaust gases from that heater.

Initial Title V Permit No. 2421-107-0011-V-01-0, including the newly permitted equipment, was issued to the facility on September 28, 2001.

The Swainsboro Sawmill then submitted an application, requesting a permit to construct and operate two direct-fired dry kilns (DK07 and DK08), each to be heated with a 23.41 MMBtu/hr wood gasifier, to replace the six existing kilns. These two new kilns were permitted via a PSD-avoidance Title V Significant Modification Permit Amendment No. 2421-107-0011-V-02-2, effective December 31, 2004. The purpose was to install two wood fired kilns to replace six natural gas indirect-fired dry kilns in order to reduce Rayonier's dependency on fossil fuel. As part of the removal of the six dry kilns (DK01 through DK06), the 75 MMBtu/hr hot oil heater, which provided heat to the existing kilns, was also to be decommissioned and removed. Therefore, Permit Amendment No. 2421-107-0011-V-02-2 removed associated fuel firing limits. Production through the new kilns was limited to 118,421,000 board feet (BF) of lumber per any 12 consecutive months, for PSD avoidance purposes. The two new kilns began operating in January 2005.

2.2 Existing operations

Rayonier currently operates two wood gasifier direct-fired lumber dry kilns at the Swainsboro sawmill facility with a permitted production limit of 118,421,000 BF per year, operating under Title V Operating Permit Amendment No. 2421-107-0011-V-02-2, effective December 31, 2004. Each existing dry kiln has a combustion unit with a gasifier (with bypass stack), and a blend chamber. The units gasify green sawdust in a specially designed retort. The gas is burned to supply the heat needed to dry green lumber. The bypass stack is only used during startup and shutdown conditions, while loading and unloading the kiln, and not during normal operation of the kiln. Wood is rolled into the kilns on rail cars, where it takes 22 to 24 hours to dry, from an approximate moisture content of 50 percent down to 19 percent.

Each kiln has twenty-four roof vents, twelve vents on each side of the roof, along the length of the kiln. Each vent opens and closes automatically by computer control to adjust the relative humidity and temperature during the drying process. The vents are not considered stacks, since they only open intermittently, but do represent the points of final release of combustion gases as well as gases generated by the drying of the wood. The approximate discharge height from the base of the kiln to the roof vents is 27 feet.

In addition to the kilns, the facility has systems to receive green logs and to debark, saw and chip the green logs. The sawing and chipping operation produces chips, which are sent to a chip bin for shipment offsite, and also produces green sawdust, which is pneumatically sent to a bin with a cyclone. The green sawdust is used as fuel for the kilns.

Dried dimensional lumber is sent to a planer mill where it is sized to various specifications. The operation produces shavings, which are pneumatically sent to a shavings bin, which has a cyclone and baghouse as control devices. These are sold off site. The facility also has conveyors, a storage area for dimensional lumber, and other related equipment.

2.3 Proposed Modification

As stated above, Rayonier is proposing to automate the log set-up line, and modify each existing kiln to take wider lumber stacks and to become a continuous drying operation, instead of a batch operation, in order to increase the production capacity to 220,000,000 bd-ft/yr. Sawdust will continue to be gasified to supply heat to dry the lumber in the kiln.

Once modified, all the existing roof vents will be sealed shut, except for 4 on each end. The roof vents that remain operable will not be considered stacks and will only open intermittently if at all. The approximate discharge height from the base of the kiln to the remaining roof vents will still be 27 feet. However, most of the emissions of air pollutants will be through the entry doors on each end of the kilns (with an opening only large enough to allow timber cart-loads of lumber to enter and exit).

The gasifiers for each kiln will continue to have a bypass stack; these have been normally used during change-out of the batch, roughly once per day. However, since the modified kilns are to operate on a continuous basis, the bypass stack will only be used during cold startups, shutdowns and malfunctions.

NOTE: The facility provided the following details about their proposed continuous kilns, by their letter dated March 1, 2006, which was also sent by e-mail dated 3-1-2006.

“A drawing provided attempts to depict the kilns. They [the 2 kilns] will be identical. The reference to the roof vents that will remain has unintentionally misled one to believe that these roof vents are the exit point for the kiln gases. Our information from the prototype is that these vents never open. We are considering retaining them for assurance and for safety against any possible overpressure. The rather thin skin on the kiln is non-structural and will not stand pressure differences.

“What gas exits the kiln does so through the opening at each end of each kiln. You can see we expect there to be about a 2 foot wide gap between the stacks of lumber and the sides and top of the door and about a 4 foot wide gap in the center separating the stack of moving lumber. In an attempt to slow down the gases exiting some sort of curtain material will be hung between the lumber and the wall and door overhead. This will not be very effective at sealing the opening. In fact the opening cannot be sealed as explained above, the kiln shell will not stand pressure differences.”

2.4 Air Emission Estimates and Pollution Control Equipment

The dry kilns do not currently and will not use any add-on control equipment. Emissions from the kilns consist mainly of VOCs that are released through the exit doors. PM emissions from the sawdust conveying system, which conveys the fuel for the gasifiers from the sawmill to the fuel storage silo, is controlled with a cyclone. PM emissions from the shavings conveying system (the shavings generated as the dried lumber is being planed into dimensional lumber in the planer mill) are to be controlled by a cyclone, followed by a baghouse. Even with the requested increase in the overall production capacity, the hourly capacity of the planer and the storage bins will remain the same. Therefore, hourly PM emissions should not increase. However, in order to process more lumber, the planer mills would then have to operate more hours per week. Annual PM emissions from this system are therefore expected to increase in proportion to the kiln production capacity increase.

Based on the information provided, the Swainsboro Sawmill’s proposed modifications, as specified per Georgia Air Quality Application No. 16512, are classified as a major modification under PSD because of the net increase in PM and VOC emissions from the facility. Since Rayonier is proposing to increase the federally enforceable limit of 118,421,000 bd-ft/yr, which was taken to avoid PSD review, to 220,000,000 bd-ft/yr (220,000 Mbd-ft/yr), the current project must be reviewed as if construction of the two existing direct-fired kilns had not yet occurred [40 CFR 52.21(r)(4)] (refer also to Section 4.0 below). Therefore, the baseline emissions were calculated as if the direct-fired kilns had not been constructed and the old kilns were still in place. Past actual (baseline) emissions were determined for the six indirect-heated dry lumber kilns, with emission factors reflective of the natural gas combustion equipment that had previously been used to dry the wood.

The past actual annual emission rates from the lumber kilns are presented in Table 2-1, as reported in the applications and additional submittals. There are two components to the total emissions. The first is emissions due to natural gas combusted to heat oil. The second component is emissions resulting from the drying of the lumber in the kilns.

According to the application, the VOC emission factor for lumber kilns was determined from the National Council for Air and Stream Improvement (NCASI) published test data in Technical Bulletin (TB) No. 845 titled *A comparative Study of VOC Emissions from Small-Scale and Full-Scale Lumber Kilns Drying Southern Pine* (May 2002). This publication contains the most recent VOC emission factors for direct- and indirect-fired kilns. The average VOC emission rate for full-scale direct and indirect-heated kilns is 3.8 and 3.5 lbs VOC as carbon per thousand BF, respectively. For other pollutants, emission factors were also obtained from AP-42 and unpublished test data obtained from NCASI.

The facility, by their letter dated March 1, 2006, submitted the following response to a request for clarification regarding the difference between "VOC as carbon" and "total VOC" emission factors.

"The technical development of the VOC emissions from lumber dry kilns was based on measurements of the emissions from full-size and smaller prototype kilns on an as carbon basis. One could question the scientific integrity of simply changing the units of any emission standard such that is inconsistent with the information on which that emission factor is based.

"Nevertheless, we feel either factor mentioned by Jim Little would be OK. The 3.8 lb VOC per thousand board feet ("lb/MBF") emissions factor greatly overstates the emissions for these kilns, as it is an emission factor developed for batch kilns where emissions were released to atmosphere through roof vents that were just above the lumber with little opportunity to condense before exiting the kiln. As we mentioned before and as you can see from the plan view of the kilns at the top of the attached drawing, air is drawing from the kiln and recirculated to the blend box where hot combustion gases are mixed to reduce temperature that prevent burning the wood or starting fires.

"The new continuous type of kiln requires the gases pass down along the length of the kiln extracting the latent heat of condensation to preheat the incoming lumber. Just before exiting the kilns the gases are at approximately ambient conditions or at 100 ^{o}F or less. The predominant VOC from pine is alpha pinene which as a boiling point of approximate 350 ^{o}F. Much of this will probably condense on the wood, as alpha and beta pinene are insoluble in water. This will stay with the shavings when the wood is planed. From our experience with condensing methanol, at 100 ^{o}F virtually 100% of the methanol will be condensed. It is very water-soluble and will stay with the water.

"Using the batch kiln emission factor for these continuous kilns has overestimated VOC emissions. Quantification is not available and would be very difficult."

The Division agrees that it is possible that VOC and methanol emissions will be different from a continuous drying kiln, compared with other kilns. It is also considered likely that the emissions will be lower, for the reasons submitted by Rayonier. It must be particularly noted that lower exit temperatures will make it more likely that organic compounds will condense and be removed from the kilns in the water that is recovered. During a recent visit to the only existing dimensional softwood continuous kiln (Pollard Lumber in Washington), it was noted that (1) exhaust from the ends of the kilns was not very hot; indeed it was possible to stand very near the exhaust and let it cover you like a cloud and (2) that a great deal of water was flowing from the ends of the kiln.

[According to Mr. Pollard, the conventional kiln does generate some water, but it is not enough to require capture and treatment. With their continuous kiln, they are collecting 4000 gallons a day, which they use in the plant.]

Notwithstanding the above, it was clear that quantifying the reduction of organics in the air emissions would be difficult and expensive, so the extent of any reduction is unknown. In order to be conservative, EPD cannot use a lower emission factor unless and until it is demonstrated, at this or some other facility. As per EPA's comment on a PSD permit regarding another lumber mill in Georgia, EPD believes that it must use a VOC emission factor no lower than 3.8 lbs and 3.5 lbs. VOC, as carbon, per thousand BF, for direct-heated and indirect-heated kilns, which is in accordance with the published NCASI data. These rates must then be converted to total VOCs. The Division has determined that a VOC (as carbon) emission factor of 3.8 lb /MBF is conservatively equivalent to 4.6 lb of total VOC/MBF, per calculations found in Section 7.1 of this preliminary determination.

The future potential emission rates from direct-heated lumber kilns are presented in Tables 2-2 and 2-3. Future potential hourly emissions, as shown in Table 2-3, are based on a throughput of 26,200 M BF/hour. This rate is based on a total throughput of 220,000 MBF/yr, but calculated assuming 8400 hours/year operating schedule (220,000 MBF/yr *1/8400 hrs). The kilns are allowed to operate 8760 hours/year. The 8400 hours/year operating schedule is used to estimate worst-case short-term emissions. Future potential annual emissions, as shown in Table 2-4, are based on a total throughput of 220,000 MBF/yr of lumber.

TABLE 2-1

PAST ACTUAL ANNUAL EMISSIONS FROM THE SIX NATURAL GAS INDIRECT-FIRED KILNS

Regulated Pollutant	Emission Factors	Ref.	Activity Factor [b]	Annual Emissions (TPY)
Particulate Matter (PM)	7.6 lb/10^6 scf	1	332 10^6 scf/yr	1.26
	0.082 lb/MBF	5	100,000 MBF/yr	4.10
				Total PM = 5.36
Particulate Matter (PM_{10})	3.8 lb/10^6 scf [c]	1	332 10^6 scf/yr	0.63
	0.041 lb/MBF [c]	5	100,000 MBF/yr	2.05
				Total PM_{10} = 2.68
Sulfur dioxide	0.6 lb/10^6 scf	3	332 10^6 scf/yr	0.10
Nitrogen oxides	100 lb/10^6 scf	2	332 10^6 scf/yr	16.60
Carbon monoxide	84 lb/10^6scf	2	332 10^6 scf/yr	13.94
Volatile Organic Compounds (VOC) [a]	0.5 lb/10^6 scf	3	32 10^6 scf/yr	0.91
	3.5 lb/MBF	4	100,000 MBF/yr	175.00
	4.2 lb/MBF	2	100,000 MBF/yr	210.00*
				Total VOC = 175.91 **Total VOC = 210.91***

NOTES:
The above emission estimate is as provided in PSD Application No. 16512 and additional updates.
*VOC emissions as estimated by EPD, based on total VOC emission factor of 4.2 lb/MBF for indirect-fired kilns.

References:
1. AP-42 emission factor for natural gas combustion, Table 1.4-2.
2. AP-42 emission factor for small boilers (<100 MMBtu) with uncontrolled emissions, Table 1.4-1.
3. AP-42 emission factor for natural gas combustion, Table 1.4-2.
4. From NCASI Technical Bulletin 845, for indirect-heated lumber dry kilns using average of full-scale kiln data.

5. Based on average of values obtained from unpublished NCASI data on indirect/steam-heated lumber kilns (see Appendix A)

Footnotes:
a. The AP-42 factor is 5.5 lb/10^6 scf for natural gas combustion, and the NCASI factor for indirect-heated kilns is 3.5 lbs VOCs, as carbon, per MBF.
b. Based on the average of the two years of data, just prior to the shutting down of the 6 kilns heated by the gas-fired hot oil heater, corresponding to 332 million cubic feet of natural gas usage per year and 100 MMBF of lumber usage per year.
c. Assuming that PM_{10} is 50% of PM. This assumption is based on EPA's PM Calculator for various wood dryer source classification codes (see Appendix C).

TABLE 2-2

FUTURE POTENTIAL HOURLY EMISSIONS FROM THE TWO CONTINUOUS GASIFIER DRYING KILNS

Regulated Pollutant	Emission Factor	Ref.	Activity Factor	Hourly Emissions (lb/hr) [c]
Particulate Matter (PM)	0.300 lb/MBF	2	26.2 MBF/hr	7.86
Particulate Matter (PM_{10})	0.150 lb/MBF [d]	2	26.2 MBF/hr	3.93
Sulfur dioxide	0.025 lb/MMBtu	3	157.20 MMBtu/hr[b]	3.93
Nitrogen oxides	0.049 lb/MBF	2	26.2 MBF/hr	1.28
Carbon monoxide	0.264 lb/MBF	2	26.2 MBF/hr	6.92
Volatile Organic Compounds[a]	3.8 lb/MBF	1	26.2 MBF/hr	99.56
Formaldehyde	0.049 lb/MBF	2	26.2 MBF/hr	1.28
Methanol	0.161 lb/MBF	1	26.2 MBF/hr	4.2 2
Phenol	0.0103 lb/MBF	2	26.2 MBF/hr	0.27
Total HAPs	0.220 lb/MBF	2	26.2 MBF/hr	5.76

NOTE: Emission estimates as provided in PSD Application No. 16512.

References:
1. Based on average values from NCASI Technical Bulletin No. 845 (see Appendix B).
2. Based on the average of published and unpublished NCASI formaldehyde emissions data (see Appendix B).
3. AP-42 Table 1.6-2 for wood residue combustion in boilers, with no controls.

Footnotes:
a. VOC as carbon.
b. Based on a total throughput of 633.6 MBF/charge, a heating value of 4,500 Btu/lb for wood/bark, and an industry estimate of 3,300 Btu required to dry a BF of Southern Yellow Pine from 50% to 19% moisture.
c. Hourly emissions through both kilns.
d. Assuming that PM_{10} is 50% of PM. This assumption is based on EPA's PM Calculator for various wood dryer source classification codes (see Appendix C)
e. Based on 220,000 MBF/yr and 8,400 operating hours per year.

TABLE 2-3

FUTURE POTENTIAL ANNUAL EMISSIONS FROM THE TWO CONTINUOUS GASIFIER DRYING KILNS

Regulated Pollutant	Emission Factors	Ref.	Activity Factor	Annual Emissions (TPY)	
				Per the Facility	Per EPD*
Particulate Matter (PM)	0.300 lb/MBF	2	220,000 MBF/yr	33.00	34.43
Particulate Matter (PM_{10})	0.150 lb/MBF [c]	2	220,000 MBF/yr	16.50	17.21
Sulfur dioxide	0.025 lb/MMBtu	3	726,000 MMBtu/yr [b]	9.08	17.21
Nitrogen oxides	0.049 lb/MBF	2	220,000 MBF/yr	5.39	15.51
Carbon monoxide	0.264 lb/MBF	2	220,000 MBF/yr	29.04	76.87
Volatile Organic Compounds	3.8 lb/MBF [a] 4.6 lb/MBF**	1	220,000 MBF/yr	418.00	527.88**
Formaldehyde	0.049 lb/MBF	2	220,000 MBF/yr	5.39	11.83
Methanol	0.161 lb/MBF	1	220,000 MBF/yr	17.71	18.40
Phenol	0.0103 lb/MBF	2	220,000 MBF/yr	1.13	2.10
Total HAPs	0.220 lb/MBF	2	220,000 MBF/yr	24.20	24.44

NOTES:
Emission estimate as provided in PSD Application No. 16512.
*Annual emissions calculated by EPD, from the hourly emissions estimate by the facility, as indicated in Table 2-3, based on 8760 hrs/year operation, using the equation: lb/hr*8760 hrs/yr.
**VOC estimated by using emission factor of 4.6 lbs/MBF in place of 3.8 lbs/MBF factor used by the facility.

References:
1. Based on average values from NCASI Technical Bulletin No. 845 (see Appendix B).
2. Based on the highest average of unpublished NCASI data (see Appendix B).
3. AP-42 Table 1.6-2 for wood residue combustion. Factor represents boilers with no controls.

Footnotes:
a. VOC as carbon.
b. Based on a throughput of 220,000 MBF/yr, a heating value of 4,500 Btu/lb for wood/bark, and an industry estimate of 3,300 Btu required to dry a BF of Southern Yellow Pine from 50% to 19% moisture.
c. PM_{10} represents 50% of PM. Assumption based on EPA's PM Calculator for various wood dryer source classification codes (see Appendix C).

3.0 PROCESS DESCRIPTION

Currently, the Swainsboro Sawmill is a standard lumber mill producing kiln-dry dimension softwood lumber for construction purposes. The facility receives raw pine logs, which are debarked and then cut into appropriate dimensions in the sawmill. Green lumber is stacked and fed in batches to the direct-fired drying kilns for 12 to 24 hours of drying. The green dimensional lumber is dried in one of two direct-fired (batch type) kilns, from approximately 50 percent to 19 percent moisture content using high temperature drying. The dried lumber is planed and then sorted by length, size, and grade, and bundled for shipment. The two kilns are direct fired, using green sawdust as fuel.

Secondary products generated at this facility are wood chips, sawdust, bark, and shavings. The majority of the green sawdust is used as fuel for the wood-fired lumber kilns. The remainder of the green sawdust and the wood particles from the cutting and planing of dried wood are sold and transported to offsite customers.

4.0 PSD APPLICABILITY

The Swainsboro Sawmill is currently classified as a major source under the PSD definition of major source because it has the potential to emit at least one pollutant (in this case, VOC) regulated under the Act in amounts equal to or exceeding the specified threshold, which is predicated on the source's industrial category (the threshold is 250 tpy for VOC). A major modification is a physical change or change in the method of operation at an existing major source that causes a significant "net emissions increase at the source of any pollutant regulated under the Act." Thus, the proposed modification project is subject to PSD review for those pollutants whose emissions will increase above the corresponding PSD significance level. The simplest way to determine whether a significant increase will occur, is to compare past-actual emissions with future-potential emissions. The facility determined the past-actual emissions from the six natural gas indirect-fired kilns and the future-potential emissions from the two continuous lumber drying kilns. Table 4-1 summarizes the projected increases in pollutants, per information submitted by the facility by their PSD Application No. 16512 (received on December 28, 2005; updated on March 13, 2006), which was expanded upon in subsequent submittals of additional information. [Note: Some of the data in Table 4-1 is different than submitted by Rayonier, due to EPD calculations. See below]

It can be seen from Table 4-1 that the net emission increases of PM and VOC exceed the specified PSD significance rates. These exceedances trigger a PSD review for PM and VOC emissions. It can be seen from Table 4-1 that, as per information submitted by the facility by letter dated June 22, 2006 and February 14, 2007, the PM_{10} emission increase does not exceed the specified PSD significant rate of 15 tpy; therefore, PM_{10} is not subject to PSD.

However, the initial permit application did not present a clear-cut case with regard to PM and PM10 emissions increases. Given that the significance levels for PM and PM10 are only 25 tpy and 15 tpy, which is low compared to other significance levels, EPD carefully reviewed Rayonier's assumptions and calculations to assure that the modification was major for PM and deminimis for PM10. Note that there was some difficulty in establishing what the current PM and PM10 emissions are and what the increases would be. That is because of the dearth of knowledge regarding PM emissions emitting from kilns, as well as from the type of baghouse used to control emissions from the planer mill system. In the initial Title V application, emissions from the planer mill system were not included. [Note: the planer mill generates large amounts of wood waste, mainly shavings, which are pneumatically collected from the planer mill. The material collected is unloaded through a cyclone into a hopper; the emissions from the cyclone are then blown into a positive pressure baghouse whose catch is dropped into the same hopper.]

According to the application, the existing (past actual) production rate through the indirect heated kilns was 100 MMBF/year and the future potential production rate through the modified kilns is to be 220 MMBF/year. In their initial application, Rayonier estimated that the PM emission increase from the new kilns would be 38.1 tpy, which is greater than the PM significance level of 25 tons per year (see table 4-3 in application). On the other hand, Rayonier estimated that the PM_{10} emission increase would be 13.9 tpy, less than the 15 tons per year respectively (see table 4-3 in application). Note that the planer mill was not included in this evaluation.

There are no published EPA-approved AP-42 emission factors from kilns. For the past-actual kiln emissions, they calculated PM emissions using the emission rate of 0.082 lb PM per thousand BF, which the application explains is based on average of values obtained from unpublished NCASI data on indirect-heated lumber kilns. Rayonier also assumed that the emissions of PM10 would be ½ of that of PM. PM emissions from the combustion of natural gas to produce the steam were calculated, using the AP-42 emission factor of 7.6 lb/106 scf for PM and PM10. The application indicated that it fired 332 x 10^6 scf/yr of natural gas to dry 100 MMBF/year; the emissions of PM from that was calculated to be 1.26 tpy. [Note: the applicant then assumed that PM10 emissions from natural gas combustion would be ½ that of PM; however, AP-42 makes it clear that PM = PM10: "All PM (total, condensable, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM10, PM2.5 or PM1 emissions."] For the kilns, the past actual emission rate is then calculated to be 5.36 tpy PM and 3.31 tpy PM10.

Likewise, using the unpublished NCASI kiln data for direct-heated kilns, Rayonier calculated the uncontrolled future annual potential emission rates of PM and PM_{10} from the continuous lumber drying kilns to be 33 tpy and 16.5 tpy, respectively. This was done using an emission factor of 0.300 lb/MBF, "Based on the highest average of unpublished NCASI data." PM10 was assumed to be ½ of PM, thus having an emission factor of 0.150 lbs/MBF. Total future potential emissions from the proposed project were estimated to be 41.8 tpy and 16.53 tpy of PM and PM10, respectively. The total increase (future potential, less past actual) was calculated to be 38.1 tpy PM and 13.22 tpy PM10. [Note that their application stated that past actual PM_{10} was 13.8 tpy; as indicated above, this was too high, because they had incorrectly calculated the past actual emissions]

EPD added the increase in emissions from the planer mill baghouse, based upon a nominal emission rate of 0.01 grains/dscf (PM=PM10, since from baghouse). With a baghouse air flow exit rate of 48000 cfm, the hourly emission rate was calculated to be 0.0685 lb/minute or 4.11 lb/hour. EPD assumed that it took 2000 hours per year to plane all lumber in the past (100 MMBF/year) and the future production would be 220% of that. The past-actual emission rate would then be 4.11 tons per year. The future potential rate (at 4500 hours) would then 9.25 tpy. The increase is then 5.14 tpy PM10. This would mean that the PM increase would total 41.5 tpy and the PM10 increase would total 19.04 tpy. That would put the PM10 increase over the PSD deminimis level of 15 tpy.

EPD discussed this with Rayonier. They had not calculated the increase from the planer mill because Rayonier maintains that the increases from the planer mill should not be counted as part of the PSD increases, since the planer mill was not being modified. This is illustrated by the following quotation in a letter from Dave Tudor of Rayonier.

"In any event, no modifications are being made to the planer mill. Emission increases are due only to increases in the hours of operation. These are exempt from counting for PSD review as they are created by demand growth. No BACT limit is required, nor is there a requirement or need for an additional permit limit for PSD avoidance. I think it would still only be subject to the process weight rate emission standard."

The Division did not agree that the planer mill system emission increase would only be due to demand growth. We believe that most of the increased usage (and emissions) would be due to de-bottlenecking of the planer, allowed by the kiln capacity increases. However, we admitted that we did not know all the facts, so EPD offered Rayonier the opportunity to submit a demonstration that this increase would be due to demand growth, as defined by federal regulations. Rayonier responded, stating that, while they continue to believe that this increase from the planer will be due to "demand growth," they had determined that the increase would be small enough so that the overall modification would not be subject to PSD for PM10. They submitted additional emissions data on February 14, 2007.

Note: Rayonier did not need to dispute whether the increases of PM are subject to PSD. It is clear that there are no feasible PM controls for kilns. Also, the PM emissions increase is to be relatively small, so almost no expense for an add-on control system would be found to be reasonable. Therefore, PM BACT for the kilns is no add-on control equipment. No modeling is required since there are no NAAQS for PM emissions. With regard to PM10, BACT would also likely be no control. Also, BACT is not needed for the planer mill system, since it is not being modified, merely being used more. However, there is a PM10 NAAQS, so if the overall increase exceeded 15 tpy, then they would be required to carry out computer modeling. Therefore, Rayonier was motivated to do further research to demonstrate that the increase would be less than 15 tpy.

The Division reviewed the planer mill PM data, starting from the initial submittal until now. In a letter dated May 12, 2006 Rayonier estimated the planer mill PM emissions, based on an estimate that the additional 120 MM board-feet of lumber being processed would generate an additional 30,557 tons per year of shavings. They assumed that the cyclone and baghouse had 90% and 99.9% collection efficiencies, respectively. The total PM/PM10 emissions were estimated to be 3.06 tons per year. Added to the kiln increase, this would represent an overall PM10 increase of 16.33 tpy. However, after being asked about this, in a letter dated June 22, 2006, Rayonier described the material collected as being mostly of shaved material, considerably larger than PM10. [It is sold for animal bedding.] They therefore believed they would be justified in assuming 99% removal by the cyclone.

With the baghouse capturing 99.9% of the remaining material, their new emission increase estimate was 0.306 lb/hr PM/PM10. Based on that, the total PM_{10} emissions increase from the project would therefore be 13.5 tpy (13.2 + 0.3); this is less than the 15 tpy threshold, by a margin of more than 1 tpy.

This seemed possible to EPD, but we wanted to require a compliance test to make sure. However, Rayonier explained that the baghouse is forced draft and does not have a stack. While it is possible to test such a unit, it is difficult and costly. EPD requested that the facility either perform a test or submit further verification.

On February 15, 2007, EPD received a document from Golder Associates, on Rayonier's behalf, with additional data. Based on the average large particle size of the shavings, they estimated that the cyclone was 99.2% efficient and the baghouse was 99.996%. They determined the cyclone efficiency (which appears reasonable), based on the cyclone efficiency calculation method as referred in "Air pollution Control-A Design Approach" by Cooper and Alley. Note that in the calculations, the Permittee used the particle size distribution for wood shavings from the literature. The Permittee used a baghouse efficiency of 99.996% (which is considered to be very high), based on the baghouse manufacturer's specifications. By applying the control efficiencies as indicated above, the net increase in PM_{10} emissions and the total PM_{10} emissions from the planer mill can be calculated, as follow:

PM_{10} = 30,557 TPY (increase in shavings) * 0.008 (99.2% cyclone efficiency) * 0.00004 (99.996% baghouse efficiency) = 0.01 TPY,

PM_{10} = 56,036 TPY (total shavings produced) * 0.008 (99.2% cyclone efficiency) * 0.00004 (99.996% baghouse efficiency) = 0.01793 (or 0.02 TPY).

Even knowing that most of material consists of curled wooden shavings, the baghouse removal efficiency seems high. However, the emission rate need not be nearly this low for the overall PM10 increase to be deminimis. As is spelled out below below, an allowable emission rate of 1.36 lb/hour of PM from the planer mill (equivalent to 0.003 gr/scf) would not trigger PSD for PM10. This is equivalent to an overall control efficiency of 99.995 percent. That is high, but it has been demonstrated in other situations, with similar equipment.

For instance, in their February 14 letter, Golder provided a summary of a set of test results conducted by Richard Boubel on September 4, 1974 on a similar Clarkes Pneu-Air filter. The document submitted reported the average of two tests (with nearly identical results, it said), for a baghouse with air volume of 26,295 SCFM. The PM10 emission rate was 0.00088 grains/dscf (0.2054 lb/hr). The overall efficiency was 99.9964%.

With that, it is concluded that the emissions from the planer mill baghouse do not cause the project's PM10 increase to exceed the PSD deminimis level. With the revised increase in PM emissions (ignoring the planer, for a moment) estimated at 13.22 TPY (see Table 4.1), the facility is allowed a PM10 emissions increase, from the planer mill system, of 1.78 TPY (15 TPY threshold minus 13.22). It is assumed that the upgraded plant will operate the planer mill no more than 3000 hrs/yr more than it had, compared to before the modification, for a total of 5000 hrs/yr. With a PSD avoidance limit of 1.13 lb/hr PM10, and a limit on hours that allows an increase of no more than 3000 additional hrs per year, the increased pte is 1.7 tons/year. The total allowable PM10 increase is then 14.92 tpy. The facility is required to keep records of the hours of operation of the planer; and if they ever go over 5000 in 12 months, they should inform the Division, to give EPD the option of requiring a test to verify the PM emission rate.

As indicated above, the baghouse is forced draft and has no stack, so testing will not be required at this time. However, the EPD reserves the right to request testing, if in the future, if it believes that PM emissions exceed the allowable. The Division believes that when the baghouse is operating as designed, it is very likely to comply with the PM10 limit. Therefore, the permit will include a requirement for daily VE checks.

Note that the Georgia DNR Board adopted a number of changes to the Georgia Air Quality Rules, which became effective on March 19, 2006. The rules apply to any permit that had not been finalized as of that date, and are therefore applicable to Rayonier's PSD permit. Under the changes, the method used to calculate the emission increases, with regard to NSR, has changed for most situations. However, because the facility is requesting that their existing PSD avoidance limit of 118,000 MBF/yr be relaxed, and a new limit of 220,000 MBF/yr be set, the calculation of the emission increase must be done as before. The applicability of PSD to this type of modification did not change under the amended rules.

Table 4-1

Estimated increase in PSD regulated pollutants from the Swainsboro Sawmill Kilns

Source Description	Pollutant Emission Rate (TPY)					
	SO_2	NO_x	CO	PM	PM_{10}	VOC
Future Potential Emissions Modified Gasifier Drying kilns [a]	9.1	5.39	29.0	41.8	16.53	418.0 (527.9)*
Planer mill cyclone and baghouse Emissions Increase	-	-	-	1.7	1.7[b]	minimal
Baseline Actual Emissions Old Indirect-Fired Kilns [c]	0.1	16.6	13.9	5.4	3.31	175.9 (210.9)*
Increase Due to Project	**9.0**	**-11.2**	**15.1**	**38.1**	**14.92**	**242.1 (317.0)***
PSD Significant Emission Rate	**40**	**40**	**100**	**25**	**15**	**40**
PSD Review Triggered?	No	No	No	**Yes**	No	**Yes**

NOTES:
Emission estimate as provided in PSD Application No. 16512 and updates.
*Increase in emissions, as calculated by EPD, are indicated in parenthesis.

Footnotes:
a. Total future potential emissions for two kilns producing 220,000 MBF/yr.
b. Assuming: 56,036 TPY wood shavings for future potential, and 25,479 TPY wood shavings for baseline actual; cyclone control efficiency of 99.2% for PM10; baghouse control efficiency of 99.996%; and 3000 hrs/yr of additional planer mill operational hours.
c. Baseline is calculated using the average of two years of past data (2003-2004). During that period, 332 million cubic feet of natural gas per year were burned for kiln heating to dry 100,000 MBF of lumber per year.

5.0 REVIEW OF APPLICABLE RULES AND REGULATIONS

Georgia Rule for Air Quality Control (Georgia Rule) 391-3-1-.03(1)

Applicability: 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 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 there under.

Georgia Rule 391-3-1-.03(8)(b)

Applicability: Georgia Rule 391-3-1-.03(8)(b) specifies 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.

Georgia Rule 391-3-1-.03(10) – Title V Operating Permits

Applicability: Georgia Rule 391-3-1-.03(10) specifies that the provisions of this section shall apply to any source and the owner and operator of any such source subject to any requirements under 40 CFR 70 as amended.

Georgia Rule 391-3-1-.02(2)(e) – Particulate Matter Emission from Manufacturing Processes

Georgia Rule (e), commonly known as the process weight rate rule, limits PM emissions from kilns and other manufacturing processes. The Permittee may not discharge or cause the discharge into the atmosphere from each of the lumber dry kilns (DK07 and DK08), or any other process, any gases that contain particulate matter in excess of the rate derived from one of the following equations (new equipment being that which was placed into service after 1968):

1) The allowable PM emissions rate for new equipment with input rates up to and including 30 tons per hour (TPH) is expressed by the following equation:

$E = 4.1P^{0.67}$, where E equals the allowable PM emission rate in pounds per hour (lb/hr) and P equals the maximum process input weight in TPH.

2) The allowable PM emissions rate for new equipment with input rates above 30 TPH is expressed by the following equation:

$E = 55P^{0.11} – 40$, where E equals the allowable PM emission rate in lb/hr and P equals the maximum process input weight in TPH.

a) Allowable PM Emissions from modified Kilns (DK07 and DK08): Based on the wet weight of green lumber of 5 lb/BF and a maximum production rate of 13.1 MBF/hr through each kiln, the maximum process input weight for each kiln is 32.75 TPH, which equals to 18.01 TPH @ 5% moisture content (with 5% moisture being considered the dry input weight of wood). Therefore, at maximum production, the allowable PM emission rate from each kiln is 35.59 lb/hr, as calculated below:

$$P = 32.75 \text{ TPH @50\% moisture} = 32.75 [1 – (.50 – 0.05)] = 32.75 * 0.55 = 18.01 \text{ TPH}$$

$$E = 55P^{0.11} – 40 = 55 (18.01)^{0.11} = 75.59 – 40.0 = 35.59 \text{ lb/hr}$$

b) Allowable PM Emissions from the existing Planer Mill (PM01): Based on the dry lumber input weight rate of 51.19 tons per hour @ 5% moisture content (actual weight 56.25 tph @19% moisture) calculated for the planer mill, as indicated in the narrative for initial Title V Permit No. 2421-107-0011-V-01-0l, at maximum production, the allowable PM emission rate from the planer mill is not allowed to exceed 44.80 lb/hr, as calculated below:

$$E = 55P^{0.11} - 40 = 55\ (51.19)^{0.11} - 40 = 84.80 - 40.0 = 44.80 \text{ lb/hr}$$

Georgia Rule 391-3-1-.02(2)(b) – Visible Emissions

Applicability: Georgia Rule 391-3-1-.02(2)(b) [a.k.a. Georgia Rule (b)] is an applicable requirement for the lumber drying kilns and the planer mill because said units are subject to at least one other emission standard in Georgia Rule 391-3-1-.02(2) [Georgia Rule (e) or (g)]

Emission Standard: Georgia Rule (b) is a general rule limiting the visible emissions from processes (including kilns and the planer mill at this plant) to not equal or exceed forty (40) percent.

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

Applicability: The wood fired burners which will provide drying heat to the kilns do not meet the definition of "fuel-burning equipment" as found in Georgia Rule 391-3-1-.01(cc), because the heat energy from the combustion of fuels is transferred directly to the lumber drying kilns and not indirectly. Therefore, lumber drying kilns are not subject to Rule (d).

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

Applicability: Georgia Rule 391-3-1-.02(2)(g) [a.k.a. Georgia Rule (g)] applies to all "fuel burning" sources. The "fuel burning" sources at the Swainsboro Sawmill include wood fired burners installed to provide direct heat to the drying kilns.

Emission Standard: The fuel sulfur content limit for fuels burned in the kilns must not exceed 2.5 percent sulfur by weight, in accordance with Georgia Rule 391-3-1-.02(2)(g)2, for each fuel burning source below 100 MMBtu/hr of heat input per hour. Since only wood is used as fuel in these kilns, the sulfur content will always be much less than 2.5%.

40 CFR 60, Subparts Dc – Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units

Applicability: The affected facility to which Subpart Dc applies is each steam generating-unit that commences construction, modification, or reconstruction after June 9, 1989, and that has a maximum design heat input capacity of 100 MMBtu/hr or less, but greater than or equal to 10 MMBtu/hr.

The lumber drying kilns (DK07 and DK08) are heated with wood fired combustion systems. The combustion systems are not subject to Subpart Dc, as these are not steam generating units or process heaters, as per 40 CFR 60 Subpart Dc. Note that, as the combustion systems are not boilers, therefore 40 CFR 63, Subpart DDDDD-National Emission Standards for Institutional Boilers and Process Heaters is also not applicable.

40 CFR Part 63, Subpart DDDD – National Emission Standard for Hazardous Air Pollutants for Plywood and Composite Wood Products

Applicability: Subpart DDDD regulates HAP emissions from Plywood and Composite Wood Products (PCWP) facilities that are major sources of HAPs. The PCWP MACT, published in the Federal Register (Vol. 69, No. 146/Friday, July 30, 2004), indicates that the MACT is applicable to sawmills with lumber kilns (SIC # 2421), which are major for HAPs. At this facility, the potential formaldehyde and methanol emissions are each over 10 tons per year, and potential total HAPs are more than 25 tons per year. These are the major source thresholds for any single HAP and total HAPs, so this facility is major for HAPs and the MACT is applicable.

The provisions of 40 CFR 63, Subpart DDDD include no control requirements for lumber kilns. However, the rule indicates that facilities with non-colocated lumber kilns (i.e., lumber kilns located at stand-alone kiln-dried lumber manufacturing facilities or at any other type of facility), which are classified as major sources of HAP, must submit an initial notification form by January 26, 2005. The Permittee submitted the required initial notification on December 13, 2004.

Georgia Rule 391-3-1-.02(7) – Prevention of Significant Deterioration

Applicability: Georgia Rule 391-3-1-.02(7) adopts by reference 40 CFR 52.21. PSD requires 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 for 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, and any other source having potential emissions of 250 tons per year or more of any regulated pollutant; or modification of a major stationary source which results in a significant net emission increase of any regulated pollutant. [Note that a lumber mill is not one of the 28 named source categories under PSD.] The Swainsboro Sawmill is an existing major source under PSD.

A PSD review is also required in order to dissolve any PSD avoidance limit. This facility accepted a limit on its six drying kilns to avoid PSD review at the time of their construction in the year 2000, and then again accepted a limit on two kilns (DK07 and DK08), which replaced six kilns, in the year 2004. To dissolve that limit, the PSD significant emission rates apply in assessing PSD applicability for the installation of upgraded kilns DK07 and DK08 in 2000.

Based on the information in the various tables above, Swainsboro Sawmill's proposal to increased production capacity is classified as a PSD major modification for VOC and PM. The PSD regulations require that any major stationary source or major modification subject to the regulations meet the following requirements:

- Application of Best Available Control Technology (BACT) for each regulated air pollutant that would be emitted in significant amounts (significance levels);
- 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 modification in a newspaper of general circulation.

Emission Limitation: Georgia Rule 391-3-1-.02(b)(7) incorporates and adopts by reference, among other things, the definition of BACT in 40 CFR 52.21(b)(12). BACT, as defined in 40 CFR 52.21(b)(12), means:

An emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under [the] Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of [BACT] result in emissions of any pollutant, which would exceed the emissions allowed by any applicable standard under 40 CFR parts 60 and 61. If the Administrator determines the technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of [BACT]. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.

Federal Rule – 40 CFR 64 – Compliance Assurance Monitoring

Applicability: 40 CFR 64, Compliance Assurance Monitoring applies to pollutant specific emission units (PSEUs) as defined in the subpart. PSEUs are units for which there exists an emission standard for which there is a Part 64 control device and where the pre-control potential emission rate is equal to or greater than 100 percent of the major source threshold. The frequency of data collection under Part 64 depends on whether the controlled potential to emit exceeds 100 tons per year, in which case it is considered to be a "large PSEU." For modifications, CAM plans are only required for large PSEUs. All other PSEUs are addressed during permit renewal.

Each kiln is a PSEU for VOCs since pre-controlled potential emission rates of VOCs from each kiln are equal to or greater than 100 percent of the major source threshold; however, kilns have no control devices. Therefore, CAM is not applicable. The planer mill shaving system (PC01) is a PSEU for PM/PM_{10}; it is controlled by a baghouse (BH01). This PSEU has pre-controlled PM/PM_{10} emissions exceeding the major source threshold of 100 tons per year. However, post-control emissions are less than 100 tpy. Therefore, CAM is not applicable at this time.

6.0 BEST AVAILABLE CONTROL TECHNOLOGY (BACT) ANALYSIS

6.1 Requirements

The PSD regulations require 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, which the permitting authority on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such a modification 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 (NSPSs). In addition, if EPD determines there is no economically reasonable or technologically feasible way to measure the emissions to enforce an emission 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.

EPD uses the top down BACT analysis approach as described in the Draft New Source Review Workshop Manual (Manual), dated October 1990, published by the United States Environmental Protection Agency (US EPA). One critical step in the BACT analysis is to determine if a control option is technically feasible. If a control is determined to be infeasible, it is eliminated from further consideration. The Manual applies several criteria for determining technical feasibility. The first is straightforward. If the control has been installed and operated by the type of source under review, it is considered demonstrated and technically feasible.

For controls not demonstrated using this straightforward approach, the Manual applies a more complex approach that involves two concepts for determining technical feasibility: availability and applicability. A technology is considered available if it can be obtained through commercial channels. An available control is applicable if it can be reasonably installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible.

The Manual provides some guidance for determining availability. For example, a control is generally considered available if it has reached the licensing and commercial sales stages of development. However, the Manual further provides that a source would not be required to experience extended time delays or resource penalties to allow research to be conducted on new technologies. In addition, the applicant is not expected to experience extended trials learning how to apply a technology on a totally new and dissimilar source type. Consequently, technologies in the pilot scale testing stages of development are not considered available for BACT.

The Manual also requires available technologies to be applicable to the source type under consideration before a control is considered technically feasible. For example, deployment of the control technology on the existing source with similar gas stream characteristics is generally a sufficient basis for concluding technical feasibility. However, even in this instance, the Manual would allow an applicant to make a demonstration to the contrary. For example, the applicant could show that unresolved technical difficulties with applying a control to the source under consideration (e.g., size of the unit, location of the proposed site and operating problems related to the specific circumstances of the source) make a control technically infeasible. A demonstration of technical infeasibility is ultimately based on a technical assessment considering physical, chemical and engineering principles, and/or empirical data showing that the technology would not work on the emissions unit under review, or that unresolvable technical difficulty would preclude the successful deployment of the technique.

According to the Environmental Appeals Board (See In re Kawaihae Cogeneration Project, 7 E.A.D. 107 at page 1996, EAB 1997), the section on "collateral environmental impacts" of a proposed technology has been interpreted to mean that "if application of a control system results directly in the release (or removal) of pollutants that are not currently regulated under the Act, the net environmental impact of such emissions is eligible for consideration in making the BACT determination." The Appeals Board continues, "The Administrator has explained that the primary purpose of the collateral impacts clause 'is...to temper the stringency of the technology requirements whenever one or more of the specified collateral impacts – energy, environmental or economic – renders the use of the most effective technology inappropriate." Lastly, the Appeals Board states, "Unless it is demonstrated to the satisfaction of the permit issuer that such unusual circumstances exist, then the permit applicant must use the most effective technology."

The five steps of a top-down BACT review procedure, as identified by United States Environmental Protection Agency per BACT guidelines, are listed below:

Step 1: Identify all control technologies
Step 2: Eliminate technically infeasible options
Step 3: Rank remaining control technologies by control effectiveness
Step 4: Evaluate the most effective controls and document results
Step 5: Select BACT

In the case of the proposed project, the modifications to the existing direct-fired dry kilns are physical modifications. As a result, BACT applies to each direct-fired dry kiln. PM and VOC emissions from the dry kilns require a BACT analysis. In their initial application, the facility calculated emission increases from only the kilns under modification, not including the emissions from the planer mill. This was incorrect, since that facility will be processing the additional lumber to be dried by the modified kilns. Thus emissions will be higher. Of the PSD pollutants, only PM emissions will be increased from the planer mill. Since the net emission increase of PM from the kilns is already more than the PSD threshold of 25 tpy, this did not alter the PSD review, because BACT applies only to the units actually being modified, not debottlecked units or units undergoing increased utilization.

The BACT analysis is presented in the following sections.

6.2 The "Top-Down BACT" Process:

Common VOC control methods are:

1. Carbon Adsorption,

2. Incineration: Thermal, Catalytic, and regenerative thermal oxidizer (RTO)

The major disadvantages that would be posed for the above common VOC control methods are as follows:

Carbon Adsorption: Carbon adsorption would not be practical because of the high moisture content of the exhaust air from the kilns.

Incineration: An incinerator would be excessively expensive to build and operate because of the high moisture content, high flow rate, low VOC concentration, and low exit temperature of the exhaust air. Essentially all of the heat needed to achieve oxidation temperature would have to be furnished by combustion of an auxiliary fuel, which would be cost prohibitive with the high flow rates and moisture content involved, and would generate additional air pollutants including NO_x and CO.

The facility submitted a top down BACT analysis for VOC emissions from the kilns by their letter dated July 5, 2006. As per their analysis, no add-on controls were identified as technically feasible for lumber kilns. It concluded, regarding BACT:

"It is technologically and economically infeasible to accurately measure VOC emissions from the doors at each end of each kiln. PSD regulations allow for a design, equipment, work practice, or operational standard to be implemented if the measurement of emissions is infeasible. Therefore, Rayonier is proposing that proper maintenance and operation of the kilns through good combustion practices satisfy the BACT requirement. Both direct-fired continuous lumber kilns at Rayonier will employ this control technique. In this case, no VOC BACT emission limit is proposed because of the infeasibility of measuring VOC emissions from the kilns."

In conclusion, the top down BACT process indicates that there are no economically feasible controls for operation of a lumber drying kiln.

6.3 BACT Data Review for Lumber Drying Kilns

The combustion system exhausts to the atmosphere through the kilns and therefore a BACT review for the kilns, in combination with the energy system, was performed. The energy system/kilns combine an uncontrolled wood combustion exhaust stream, discharged through kiln vents and/or doors, consisting of wood dust, mineral dust, aerosols of organic substances, aerosols of mineral salts, ash, combustion gases, and products of incomplete combustion.

Rayonier has identified available control technologies by reviewing the EPA's RACT/BACT/LAER clearinghouse (RBLC) database. They found 2 listings for PM and 6 listings for VOC determinations made for lumber mills (see Tables 6.1 and 6.2 of this document). The Division's search of the clearinghouse data for lumber drying kilns (Code 30.008, which includes both direct-fired and indirect-fired kilns) found 9 facilities with lumber drying kilns for PM emissions, and 31 such facilities for VOC emissions (see Tables 6-3 and 6-4 of this document), in addition to the facilities indicated in Tables 6.1 and 6.2. [Note: From the EPA's RBLC data for wood lumber kilns, it is not always possible to identify the type of kilns (i.e., direct fired or indirect fired). Therefore, EPD's search was for both types of kilns.] None of the kilns used add-on controls.

The EPD has concluded from the literature review that, so far as is known, no direct fired (flue gas heated) or indirect fired (steam-heated) lumber dry kilns in the U.S. are equipped to control VOC emissions. This conclusion is based on the following:

(1) A review of the U. S. Environmental Protection Agency (EPA) RACT/BACT/ LAER Clearinghouse, which disclosed no entries for lumber dry kilns having control equipment for PM or VOC.

(2) A review of National Council of the Paper Industry for Air and Steam Improvement (NCASI) documents,

(3) A review of PSD documents received from South Carolina and Alabama, and

(4) A review of recent lumber kiln projects in Georgia, which received PSD permits, all of which were permitted without VOC controls, following BACT determinations.

The summary of BACT determinations for the lumber drying kilns identified in the RBLC search (Tables 6-1 through 6-4) indicates that emission limits for these BACT determinations ranged from 0.02 to 0.66 lb PM/MBF and 3.5 to 5.2 lb VOC/MBF. The search further indicates that the operation of wood drying kilns (both direct-fired and indirect-fired) without PM and VOC controls is the only economically feasible approach and is consistent with approved industry practices for other new kiln projects. However, EPD found a number of PSD determinations that included BACT emission limits and require good operating practices, routine equipment inspection, and record keeping.

TABLE 6-1

SUMMARY OF BACT DETERMINATIONS IDENTIFIED BY RAYONIER FOR PM EMISSIONS FROM LUMBER DRYING KILNS

Company	State	Permit No.	Permit Issue Date	Throughput	Emission Limits	Control Equipment	Kiln Type
GEORGIA-PACIFIC CORP. EL DORADO SAWMILL	AR	703-AOP-R1	11/7/2002	90,000 TPY	32.3 LB/CHARGE	NONE	3 Direct-fired; 4 Steam-heated
WEYERHAEUSER CO.	MS	2280-00050	12/28/2000	222.5 MMBF/YR 35 MMBF/YR	0.61 LB/MBF 0.61 LB/MBF	NONE NONE	5 Direct-fired; 1 Direct-fired

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, September 29, 2005.

TABLE 6-2

SUMMARY OF BACT DETERMINATIONS IDENTIFIED BY RAYONIER FOR VOC EMISSIONS FROM LUMBER DRYING KILNS

Company	State	Permit No.	Permit Issue Date	Throughput	Emission Limits	Control Equipment	Kiln Type
ELLIOTT SAWMILLING CO.	SC	1280-0004-CH	5/23/2004	53 MMBF/YR	4.5 LB/MBF	NONE	Direct-fired
GEORGIA-PACIFIC CORP. EL DORADO SAWMILL	AR	703-AOP-R1	11/7/2002	90,000 TPY	5,572 LB/CHARGE	NONE	3 Direct-fired; 4 Steam-heated
INTERNATIONAL PAPER CO. - MORTON LUMBER MILL	MS	2420-00031	9/5/2001	30 MMBF/YR 52.55 MMBF/YR	5.2 LB/MBF 5.2 LB/MBF	NONE NONE	1 Direct-fired 3 Direct-fired
CHARLES INGRAM LUMBER CO.	SC	1040-0016-CB	8/15/2001	110 MMBF/YR	192.5 TPY	NONE	Direct-fired
WEYERHAEUSER CO.	MS	2280-00050	12/28/2000	222.5 MMBF/YR 35 MMBF/YR	4.2 LB/MBF 4.2 LB/MBF	NONE NONE	5 Direct-fired 1 Direct-fired
BIBLER BROTHERS LUMBER CO.	AR	1628-AOP-R1	11/24/1998	70 MMBF/YR	3.5 LB/MBF	NONE	2 Direct-fired; 1 Steam-heated

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, September 29, 2005

Table 6-3

SUMMARY OF ADDITIONAL BACT DETERMINATIONS FOR PM EMISSIONS FROM LUMBER DRYING KILNS

Facility Name	RBLC ID	State	Date Permit Issued	Control Requirement	PM Emission Limit	Notes
International Paper Company/ Leola Lumber Mill	AR-0064	AR	11/1/02	No	32.30 lb/charge	-
Weyerhaeuser Company	AL-0157	AL	10/2/97	No	0.066 lb/hr	BACT-PSD (2 kilns)
McMillan Bloedel Packaging	AL-0119	AL	5/28/98	No	0.066 lb/hr	High temperature drying kiln
Hankins Lumber Company	MS-0034	MS	9/24/96	No	0.25 lb/hr	BACT-PSD (5 kilns)
Weyerhaeuser Co.-Wright City Mill	OK-0082	OK	6/19/98	No	10.72 TPY	BACT-PSD (3 kilns)
Weyerhaeuser Co.-Wright City Mill	OK-0081	OK	12/10/96	No	4.0 lb/hr	Pine lumber kiln
Temple Inland Forest Products Corp	TX-0292	TX	8/6/00	No	0.34 lb/hr	BACT-PSD Limit for each unit (4 kilns)
Champion International Corp-Camden Complex	TX-0367	TX	11/12/98	No	0.71 lh/hr	BACT-PSD Limit for each unit (3 steam heated kilns)
Sierra Pacific Industries	WA-0327	WA	1/25/06	No	4 TPY (PM_{10})	BACT-PSD (7 kilns)

Note: P = Good operating practices, routine equipment inspection, and/or record keeping for operation of kilns.

Table 6-4

SUMMARY OF BACT DETERMINATIONS FOR VOC EMISSIONS FROM LUMBER DRYING KILNS

Facility Name	RBLC ID	State	Date Permit Issued	Control Requirement	VOC Emission Limit (lb/Mbf)	Notes
Bowater, Inc./Albertville Sawmill	AL-0195	AL	6/4/03	No (P)	7.0	BACT-PSD (2 steam heated kilns)
Weyerhaeuser Company	AL-0157	AL	10/2/97	No	4.52	BACT-PSD (2 steam heated kilns)
Weyerhaeuser Company	AL-0079	AL	10/28/94	No	4.52	Retroactive PSD
Gulf States Paper Corp.	AL-0122	AL	10/14/98	No	5.48	BACT-PSD
Macmillan Bloedel Packaging	AL-0119	AL	5/28/98	No	4.52	BACT-PSD High temperature drying kiln
West Frazier (South), Inc.	AR-0065	AR	11/7/02	No	3.5	BACT-PSD (Steam heated kiln)
International Paper Company/ Leola Lumber Mill	AR-0064	AR	11/1/02	No	423 lb/charge	BACT-PSD (Steam heated kiln)
Potlatch Corporation-Ozan unit	AR-0046	AR	3/8/01	No	3.5	BACT-PSD
Potlatch Corp- Ozan Unit	AR-0083	AR	3/8/01	No (P)	3.5	BACT-PSD (2 kilns)
Freeman/Bibler Bros.	AR-0032	AR	11/24/98	No (P) (Clean Fuel)	3.5	BACT- PSD (Clean Fuel)
Potlatch Corporation	AR-0073	AR	9/8/95	No	-	BACT-PSD
Deltic Timber Corp.-Waldo Unit	AR-0080	AR	1/12/05	No	3.5	BACT-PSD (5 steam heated kilns)

Rayonier, Inc.-Swainsboro	GA-0122	GA	11/5/98	(P)	None	BACT-PSD
West Frasier (South), Inc-Joyce mill	LA-0181	LA	7/19/04	No (P)	367.77 lb/hr	BACT-PSD (4 steam heated kilns)
Willamette Industries, Inc.	LA-0116	LA	8/18/98	No	33.33	BACT-PSD
Hood Industries, Inc-Couhatta sawmill	LA-0181	LA	7/13/05	No	28 lb/hr	BACT-PSD (Max limit)
Hankins Lumber Company	MS-0034	MS	9/24/96	No	0.25 lb/hr	BACT-PSD (5 kilns)
Hankins Lumber Company	MS-0034	MS	9/24/96	No	3.6	BACT-PSD (5 kilns)
Weyerhaeuser Company	MS-0035	MS	8/27/97	No	4.0	-
Weyerhaeuser Co.-Wright City Mill	OK-0061	OK	3/15/95	No	-	BACT-PSD
Weyerhaeuser Co.-Wright City Mill	OK-0081	OK	12/10/96	No	31 lb/hour	Pine lumber drying kiln
Weyerhaeuser Co.-Wright City Mill	OK-0082	OK	6/19/98	No	162.84 TPY	BACT-PSD (3 kilns)
Collum's Lumber Mill	SC-0059	SC	4/8/02	No	195 PTY	LAER Limit for both kilns
New South Lumber Company-Conway Plant	SC-0090	SC	9/5/03	No (P)	4.2	BACT-PSD (5 steam heated kilns)
New South Lumber Company-Camden Plant	SC-0082	SC	3/7/03	No (P)	4.2	BACT-PSD (5 steam heated kilns)
Chesterfield Lumber Comp.	SC-0050	SC	4/10/00	No	3.5	LAER Determination

Willamette-Chester Division	SC-0052	SC	9/30/99	No	3.8	BACT-PSD
Elliot Sawmill Comp.	SC-0085	SC	5/2/04	No (P)	4.5	BACT-PSD
Temple Inland Forest Products Corp	TX-0292	TX	8/06/00	No	11.46 lb/hr	BACT-PSD Limit for each unit (4 kilns)
Champion International Corp-Camden Complex	TX-0367	TX	11/12/98	No	28.80 lb/hr	BACT-PSD 3 kilns steam heated
Sierra Pacific Industries	WA-0327	WA	1/25/06	No (P)	54 TPY	BACT-PSD (7 kilns)

Note: P = Good operating practices, routine equipment inspection, and/or record keeping for operation of kilns.

6.4 BACT Review For Particulate Matter (PM)

6.4.1 Proposed Control Technology

The exhaust from kilns consists of material from the drying of wood as well as from the combustion of fuel. The combustion system exhausts to the atmosphere through the direct-fired kilns. The gases exhausted consist of wood dust, mineral dust, aerosols of organic substances, aerosols of mineral salts, ash, combustion gases, and products of incomplete combustion.

The proposed method of minimizing PM emissions is proper operation of each combustion system.

6.4.2 BACT Analysis

Previous BACT Determinations

A PM BACT review for the kilns, in combination with the energy system, was performed. As part of the BACT analysis, a review was performed of previous BACT determinations for lumber dry kilns listed in the RBLC on EPA's web page. A summary of the PM BACT determinations for direct-fired dry kilns that were reviewed is presented in Table 6-1 and 6-3. Table 6-1 contains PM emission limits at two facilities; one has a limit on PM emissions from six direct-fired kilns of 0.61 lb/MBF; the other has a PM limit of 32.3 lb/charge (unknown charge amount for that kiln). The data in Table 6-3 contains PM emission limits from a number of other facilities with kilns. It shows data in the form of pounds per charge, pounds per hour and tons per year. The limits appear to vary a lot from kiln to kiln, ranging from 0.66 lb/hr to 4.0 lb/hr. However, since kilns vary in capacity, and no production information was included, there is no way to know what the emission limits are, per unit of production. In any case, there is no indication that any add-on controls were used; PM BACT determinations for direct-fired lumber kilns have all been based on proper maintenance and operation of the kilns.

Control Technology Feasibility

There is no technically feasible add-on control technology for PM emissions from lumber kilns. Emissions from the kiln vents are fugitive emissions; to collect and control these emissions would be technically and economically infeasible.

6.4.3 BACT Selection

As alluded to above, all (or most all) of the kiln emissions come out the two ends. On each end, on one track, carts will be being slowly rolled into the kiln. Also on each end, carts will be rolling out on the other track. While it is likely advisable to seal each end as well as possible (in order to reduce in-leakage of cold dry air and to maintain a constant flow of hot air through the kiln), it is not possible to seal the ends. Therefore, while it may be possible to use a probe to get some idea of the concentration of the pollutants near the ends of the kilns, it is technologically and economically infeasible to accurately measure PM emissions from the openings at the doors at each end of a dry kiln. PSD regulations allow for a design, equipment, work practice, or operational standards to be implemented if the measurement of the emissions is infeasible. Therefore, Rayonier has proposed proper maintenance and operation of the kilns to satisfy the BACT requirement. In this case, no PM BACT limit is proposed because it is infeasible to measure PM emissions from the kilns.

6.5 BACT Review For Volatile Organic Compounds (VOC)

The combustion system exhausts to the atmosphere through the kilns. A BACT review for the kilns, in combination with the energy system, was performed. The energy system/kiln's combined uncontrolled exhaust streams are discharged through kiln doors (and through vents during malfunctions). Rayonier has attempted to identify available control technologies by reviewing the EPA's RBLC database.

6.5.1 Proposed Control Technology

The proposed control technology to limit VOC emissions is proper maintenance and operation of the kilns.

6.5.2 BACT Analysis

Previous BACT Determinations

As part of the BACT analysis, a review was performed of previous BACT determinations for VOC emissions from lumber dry kilns listed in the RBLC on EPA's web page. None of these kilns are similar to the design for the kilns proposed in this application. However, Rayonier believes that the exhaust from the kilns is comparable to those being reviewed, with regard to reviewing add-on technologies. A summary of the VOC BACT determinations for direct-fired dry kilns that were reviewed is presented in Tables 6-2 and 6-4. The VOC BACT emission limits for direct-fired kilns identified in the RBLC search range from 3.5 lb/MBF to 5.2 lb/MBF. The difference in emissions is likely due to the difference in kiln design capacity and operation, and the type of wood being dried. According to these previous determinations, the VOC BACT determinations for direct-fired lumber kilns have all been based on proper maintenance and operation of the kilns (i.e., no add-on control equipment).

Control Technology Feasibility

To collect and control these emissions appears to be technically infeasible and not economically viable. To date, no lumber drying kiln has installed any add-on control equipment. However, as indicated above, the design of the proposed modified kilns is different from all existing kilns that have gone through PSD permitting. Therefore the arguments regarding the feasibility and economics of capturing and controlling emissions were examined more closely for this proposal.

The possible methods of control include incineration (thermal or catalytic), condensation, and biofilter. Catalytic incineration can be excluded as technologically infeasible for this exhaust, because it contains products of the combustion of wood, some of which would contaminate the catalyst.

With regard to fume incineration, one argument against using that for conventional kilns is that they are batch processes. While removal of water from the wood is fairly constant through the 17 to 24 hours of a batch (except start-up and shut-down), VOC emissions vary during that time. Also, the volume of the exhaust air varies over the batch period. This argument is not relevant for a continuous kiln, since it is expected to emit a fairly constant exhaust volume with a VOC content that should not vary much over the period of a compliance test; this is exactly what works best in a control device. However, like conventional kilns, the exhaust stream will contain a dilute concentration of VOCs at 100% humidity, which is not conducive for an incineration device. Another problem with incinerating the exhaust of a conventional kiln exhaust is that the temperature of the exhaust air is relatively low, compared to the temperature needed to incinerate the VOCs in the exhaust. A great deal of energy would have to be expended to raise the exhaust to a combustion temperature. This will be even more the case for a continuous kiln, one of whose virtues is to require less heat to dry the wood, so that the temperature of the exhaust air could be under 200F. In the case of a continuous kiln, the exhaust occurs through the openings left between the wood going in and out of the kiln doors, which must always stay open, unlike conventional kilns that emit through roof ducts. While it is conceivable to capture the exhaust on each end, by extending the ends of each kiln and ducting the air out of a stack instead of letting it exhaust out the doors, it is unknown whether this would work. At this time, there is only one existing continuous lumber kiln and one continuous pole kiln in existence. It is possible that, if this design proliferates, a means to capture and control exhaust could be devised. At this time, it is considered not feasible.

Note: The most cost-effective means of destroying the VOCs from drying wood is probably a biofilter. The reasons are that the exhaust would be nearly ideal, (1) warm (but not hot) and (2) saturated with moisture. However, the cost of constructing and operating a biofilter, or any control device, would be prohibitive because the concentration of the pollutants is low and the air volume is high.

6.5.3 BACT Selection

Rayonier has proposed proper maintenance and operation of the kilns, using good combustion practices, to satisfy the BACT requirement. Believing that operation and maintenance of the kilns affects VOC emissions, the Division proposes proper maintenance and operation of kilns as BACT.

7.0 BACT SUMMARY FOR LUMBER DRYING KILNS

7.1 Volatile Organic Compounds (VOC) BACT Summary

Emissions of VOCs (primarily terpenes) result from the drying of green wood. Such emissions will increase as a result of the increased kiln throughput at the Swainsboro Sawmill. The net increase in potential VOC emissions is projected to be 242 tpy, as estimated by the facility, or 317 tpy as estimated by the Division. Because this increase exceeds the PSD significance level for VOC (i.e., 40 tpy), affected VOC emissions sources must apply BACT.

BACT for both the kilns requires no add-on control devices. As illustrated in Tables 6.1 through 6.4, there have been no instances in which air emissions controls were required for a lumber drying kiln, either as a BACT or LAER requirement.

EPA approved emission factors for emissions from lumber drying kilns have not been finalized at present; this work is in progress. Based on this source's initial Title V Permit and modifications, VOCs from drying southern yellow pine lumber is currently estimated to be 3.8 lbs VOC as carbon/1000 board feet for direct fired lumber kilns, which EPD has determined is equivalent to a VOC rate of 4.6 lbs/1000 BF*. This emission factor was deemed acceptable for regulatory applicability purposes. However, Rayonier will need to reevaluate the compliance status of this source with respect to applicable air regulatory requirements after final publication of an EPA approved emission factor and, if requested, submit compliance documentation to the Division.

With the current determinations, BACT for both the kilns (DK07 and DK08) at the Swainsboro Sawmill is "No Control" with "Good Operating Practices." The uncontrolled VOC emissions will be estimated using an emission factor of 4.6 lbs/MBF. Based on information provided in the Swainsboro Sawmill's permit application, the maximum lumber drying capacity of the kilns is to be 220 MMBF/yr. Thus this permit amendment allows an increase of the production limit on the lumber drying kilns from 118.421 MMBF to 220 MMBF per year. The kilns are required to be operated with good operating practices to minimize the VOC emissions. The Division believes that this determination is consistent with recent BACT determinations.

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*NCASI Technical Bulletin No. 845 (May 2002) indicates that VOCs from drying southern yellow pine are estimated to be 3.8 lbs VOC (as carbon)/MBF for direct-fired lumber kilns. Since there is no testing data from any kiln at this particular facility, the NCASI emission factor is converted to the total VOCs, as advised by EPA regarding a PSD permit recently issued by Georgia EPD, per the following calculation:

Total VOCs = VOC as carbon * 1.133 + weight of methanol + weight of formaldehyde
= 3.8 X 1.133 + 0.16 lbs of methanol/MBF + 0.103 lbs of formaldehyde /MBF
= 4.305 + 0.16 + 0.103 = 4.568 (~ 4.6 lbs of VOCs)/1,000bd-ft.

Note that VOC is measured by EPA Method 25A, which uses a Flame Ionization Detector (FID). Methanol and formaldehyde have very small relative response factors in a FID. Since their contribution is virtually not detected, they must be determined separately and added when calculating total VOCs.

The factor 1.133 is the factor to be used for converting VOC (as carbon) to actual VOCs, using the formula and molecular weight of terpenes and equals to 136 amu (weight of terpenes)/120 amu (the gram atomic weight of C in terpenes). The conversion of lumber drying kiln VOC emissions, on an "as carbon" basis, to actual emissions, is based upon information contained in a PSD permit issued to the New South Lumber Company, Inc.-Camden Plant, Cassatt, S.C. (TV-1380-0025).

Because there are no feasible control technologies for wood kilns, EPD believes that work practice standards must be considered. Within the past 3 years, the Division found that South Carolina had included a set of such standards in two of its PSD permits for wood kilns. EPD obtained a copy of these standards and has included some version of them in two sawmill PSD permits. EPD had initially proposed (to Rayonier) that work practice conditions including these standards be put into this permit. However, Rayonier indicated by their letter dated July 11, 2006, that, while these are useful maintenance procedures, the proposed work practice conditions for operation of the kilns are not related to minimizing air emissions and thus should not be included in the air quality permit. The facility proposed to only monitor the combustion chamber exit temperature and the blend box exit temperature. Addressing some of the work practice standards, the facility has indicated that:

- Wet bulb temperature set point is not useful to monitor. The wet bulb temperature is more related to the moisture content of the wood (regulated control the removal of moisture from the wood), not the temperature wood achieves.

- Thermometers, baffles, and fans help make sure that a dry kiln dries wood consistently. However, these are not related to the amount of VOCs emitted.

- The combustion chamber and blend box temperatures, which can affect VOC emissions, so monitoring these could minimize emissions.

EPD consulted with EPA Region 4, regarding the above comments from the facility. Previously, Region 4 had stated that they were strongly in favor of EPD including all the originally proposed South Carolina work practice conditions in Georgia's sawmill PSD permits; it had found these conditions acceptable in two of Georgia's most recent sawmill permits. However, they now agree that fewer monitoring parameters are sufficient to ensure that emissions are minimized, perhaps just the combustion chamber and blend box temperatures. EPD agrees that these two parameters are worth monitoring, but does not believe they are sufficient. It is true that monitoring the combustion zone will assure complete combustion of the wood, thus minimizing the emissions of products of incomplete combustion (some of which are VOCs). However, these VOCs are a small part of the total VOC emissions due to kiln drying. EPD believes that certain other parameters, such as wet and dry bulb reading, schedule drying temperatures, and final moisture content of the wood, should be monitored by Rayonier to minimize VOC emissions from the kilns. Accordingly, the permit includes some monitoring conditions for operation of the kilns.

7.2 Particulate Matter (PM) BACT Summary

As stated above, BACT for both the kilns (DK07 and DK08) at the Swainsboro Sawmill is "No Control" with "Good Operating Practices." The uncontrolled PM/PM_{10} emissions can be estimated using an emission factor of 0.300 and 0.150 lbs/MBF for PM and PM_{10}, respectively, to estimate the future annual potential (until EPA approves AP-42 emission factors are published). According to data submitted by Dave Tudor, the following are averages of PM testing (3 runs each) conducted by NACASI, including NCASI unpublished data for direct fired lumber kilns;

Kiln No.	PM	CPM	Total (PM+CPM)
1and 2	0.152	0.143	0.295 or 0.300 lb/MBF

Rayonier used the above PM emission factor to estimate potential PM/ PM_{10} emissions and then assumed that PM_{10} emissions are 50 percent of PM emissions.

8.0 PSD-PRELIMINARY DETERMINATION

It is the Preliminary Determination of the Division that the proposal provides for the application of best available control technology (BACT) for the control of PM and VOC emissions from the kilns as required by Federal PSD regulation 40 CFR 52.21(j).

The EPD review of the data submitted by Rayonier, related to the proposed modification to the Swainsboro Sawmill, indicates that the project will be in compliance with all applicable state and federal air quality regulations.

Since the increase in emissions of all criteria pollutants, other than PM and VOC, will be less than the corresponding PSD significance levels, ambient air quality modeling was not conducted. It has been determined that the proposal will not cause impairment of visibility or detrimental effects on soils or vegetation. Also, any air quality impacts produced by project-related growth should be inconsequential.

Under the PSD rules, no significant air quality concentration for ozone monitoring has been established. Instead, applicants with a net emissions increase of 100 tons/year or more of VOCs subject to PSD, would be required to perform an ambient impact analysis, including pre-construction data. Since Rayonier's net emission increase of VOCs is 317.0 tons per year, which is more than 100 tons per year, Rayonier was required to perform an ambient impact analysis. Note that Rayonier has not done pre-construction ambient ozone monitoring, but has used existing data from established EPD monitoring stations. An exemption from the pre-construction ambient monitoring requirements is available under the PSD regulations, and the facility has requested this exemption under 40 CFR 52.21(i)(8), in their PSD application. Since the facility qualifies for this exemption, due to the use of valid existing monitoring data, EPD determined that this exemption should be granted.

The preliminary determination indicates that the Air Quality Permit for the Swainsboro Sawmill should be amended to remove operating production limitations on the kilns (Emission Unit ID Nos. DK07 and DK08), and to authorize the proposed changes to convert the kilns from batch to continuous operation, which will allow an increase in the lumber production capacity of the mill. Additional permit conditions will be made a part of the Permit to insure and confirm compliance with all applicable regulations. A copy of the Draft Permit Amendment is attached in Appendix A.

9.0 AIR QUALITY REVIEW REQUIREMENTS AND ANALYSIS

9.1 General

PSD requires a demonstration that the allowable emissions from the proposed source, in conjunction with all other applicable emissions increases or decreases, will not cause or contribute to a violation of:

1. Any National Ambient Air Quality Standard (NAAQS) in any air quality control region (AQCR); or

2. Any applicable maximum allowable increase over the baseline concentration in any area (i.e., PSD Increment).

In addition to the above, an applicant for a PSD permit is required to assess the impacts of noncriteria regulated pollutants.

For Swainsboro Sawmill's proposed lumber dry kiln modification, only emission increases of PM and VOC exceed the significant emission levels established by the PSD regulation. VOCs are recognized as precursor compounds that contribute to the secondary atmospheric formation of the criteria pollutant, ozone (O_3). Unlike the other criteria pollutants, there is no established NAAQS for VOCs.

9.2 Monitoring Requirements

In accordance with requirements of 40 CFR 52.21(m) and GA Rule 391-3-1(7)(b)9, any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate (see Table 9-1). As discussed in Section 4.0, PM and VOC emissions are subject to PSD pre-construction monitoring requirements for the proposed modification because the net increase in emissions due to the project exceeds the PSD significant emission rate for these pollutants. Ambient air monitoring for a period of up to 1 year is generally appropriate to satisfy the PSD monitoring requirements. A minimum of 4 months of data is required. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided in EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (1987).

An exemption from the pre-construction ambient monitoring requirements is available if certain criteria are met. If the predicted increase in ambient concentrations, due to the proposed modification, is less than specified *de minimis* concentrations, then the modification can be exempted from the pre-construction air monitoring requirements for that pollutant. In addition, if no *de minimis* monitoring concentration is specified for a pollutant, that pollutant is exempt from the preconstruction air monitoring requirements [40 CFR 52.21(i)(8)(ii)]. No PSD *de minimis* monitoring concentration exists for VOCs; however, an increase in VOC emissions of 100 TPY or more requires a monitoring analysis for O_3. The predicted increase in VOC emissions due to the proposed modification is greater than 100 TPY, as presented in Table 6-1, and therefore a monitoring analysis for O_3 is required. Rayonier used existing data to do this, as indicated in Section 9.3.

9.3 Modeling

In general, EPD assesses the ambient impact of a source through the use of mathematical dispersion models. The models are based upon the assumption that the dispersion of pollutants is primarily a function of: wind speed and direction; atmospheric stability conditions; and the characteristics of the effective point discharge of the exhaust plume. To predict ambient air concentrations, the models simulate the plume exhausting from the stack, rising a certain distance in the atmosphere, leveling off, and continuing downwind over relatively flat terrain. The concentrations of pollutants are assumed to have Gaussian distribution about the downwind axis centerline of the plume.

Designated EPA models normally must be used in performing the impact analysis. Specific applications for other than EPA-approved models require EPA's consultation and prior approval. Guidance for the use and application of dispersion models is presented in the EPA publication *Guideline on Air Quality Models* (EPA, 1980).

In analyzing the air quality impact of the modifications, the U.S. EPA Industrial Source Complex Short-Term Version 3 (ISCST3) model is normally used for modeling. It is a Gaussian plume dispersion model that estimates hour-by-hour ground-level concentrations of emissions from an elevated source. The model provides maximum 24-hour and annual average concentrations for receptors located on many grid types around the source for various downwind distances. The model also takes into account the effect of downwash caused by nearby buildings and structures.

9.4 Increment Consumption

In 1977, EPA promulgated PSD regulations related to the requirements for classifications, increments, and area designations as set forth by Congress. A PSD increment "is the maximum allowable increase in concentration that is allowed to occur above a baseline concentration for a pollutant." The PSD regulations establish specific maximum allowable increases in ambient concentrations (or increments) for PM_{10}, NO_x, SO_2, and CO for all areas in compliance with the NAAQS. All areas of the country are categorized as a function of overall use. The regulations were designed to prevent significant air quality deterioration by specifying allowable incremental changes in PM_{10}, NO_X, SO_2 and CO concentrations within each area category. EPA has established three air quality classifications as a function of land use:

1. Class I Areas - Those areas where almost any deterioration of current air quality is unwanted, and little or no industrial development is normally allowed (e.g., national parks, wilderness areas, etc.);

2. Class II Areas - Those areas where moderate, well-controlled energy or industrial growth is desired without air quality deterioration up to the NAAQS (all attainment areas that are not Class I areas were originally designated as Class II areas); and

3. Class III Areas - Those areas where substantial energy or industrial development is intended and where modest increases in ambient concentrations above Class II increments, but below the NAAQS, would be allowed (designation to Class III must follow strict redesignation procedures).

The current federal PSD increments (µg/m3) for different area classifications are shown in Table 9.1. Class I increments are the most stringent, allowing the smallest amount of air quality deterioration, while the Class II increments allow moderate deterioration. Georgia EPD has adopted the EPA class designations and allowable PSD increments for TSP, SO_2, and NO_2. There are no Class III PSD areas currently designated.

Emanuel County and all other attainment areas in Georgia not designated as Class I areas, are designated as Class II areas. The nearest Class I area to this facility is the Wolf Island NWR, located approximately 158.6 km southeast of the project site. Wolf Island NWR is located in McIntosh County, approximately 12 miles east of the town of Darien. The Wolf Island NWR is a 5,126-acre migratory bird refuge composed of Wolf Island (4,519 acres), Egg Island (593 acres), and Little Egg Island (14 acres). The next closest Class I area is Okefenokee NWA, located within the Okefenokee National Wildlife Refuge approximately 160.8 km from the project site. Because no Federal increments are established for O_3 and PM, increment consumption is not evaluated for VOC and PM sources. There is an increment for PM_{10}, but this is not a PSD pollutant for this Rayonier application, since the increase in PM_{10} emissions is less than the significance threshold of 15 tpy. Therefore, increment consumption has not been evaluated for PM_{10}.

9.5 Significant Impact Analysis

The first step in the air quality analysis was to determine whether the incremental ambient impacts due to new emissions from the project were greater than US EPA-prescribed Modeling Significance Levels. This "significance analysis" is used to determine if the facility could forgo a full-scale impact analysis to demonstrate compliance with the NAAQS and PSD Class II Increments.

To address compliance with AAQS and PSD Class I and II increments, a source impact analysis must be performed. However, this analysis is not required for a specific pollutant if the net increases of the impacts, as a result of the new source or modification, are below significant impact levels (aka "SILs"), as presented in Table 9-1. The SILs are threshold levels that are used to determine the level of air impact analyses needed for the project. If an impact is predicted to be less than significant, then the impact is assumed not to have a significant adverse effect on air quality. Additional modeling, taking into account other emission sources, is not required for that pollutant. However, if the impact of any pollutant(s) is/are predicted to be greater than the SIL(s), additional modeling, including other emission sources (as specified in EPA guidance), is required in order to demonstrate compliance with AAQS and PSD increment(s).

EPA has issued guidance related to SILs for Class I areas, as shown in Table 9-1. Although these levels have not been officially promulgated as part of the PSD review process and may not be binding for states in performing PSD reviews, the levels serve as a guideline in assessing a source's impact(s) on a Class I area..

Various periods of time of records for meteorological data can be used for impact analyses. A 5-year period is normally used, with a corresponding evaluation of "highest, second-highest" short-term concentrations for comparison to AAQS or PSD increments. The meteorological data are selected based on an evaluation of measured weather data from a nearby weather station that represents weather conditions at the project site. The criteria used in this evaluation include: determining the distance of the project site to the weather station; evaluating topographical and land use features between the locations; and determining the availability of required weather parameters. The term "highest, second-highest" (HSH) refers to the highest of the second-highest concentrations at all receptors (*i.e.*, the highest concentration at each receptor is discarded). The second-highest concentration is important because each short-term AAQS specifies that the standard should not be exceeded at any location more than once a year. On the other hand, if fewer than 5 years of meteorological data are used in the modeling analysis, the highest concentration at each receptor normally must be used for comparison to air quality standards.

The term "baseline concentration" evolved from federal and State PSD regulations and refers to a concentration level corresponding to a specified baseline date and certain baseline sources. By definition, in the PSD regulations as amended August 7, 1980, baseline concentration means the ambient concentration level that exists in the baseline area at the time of the applicable baseline date. A baseline concentration is determined for each pollutant for which a baseline date is established and includes:

- The actual emissions representative of facilities in existence on the applicable baseline date; and
- The allowable emissions of major stationary facilities that commenced construction before January 6, 1975, for SO_2 and PM_{10}, or February 8, 1988, for NO_2, but that were not in operation by the applicable baseline date.

The following emissions are not included in the baseline concentration, and therefore, do affect PSD increment consumption:

- Actual emissions from any major stationary facility on which construction commenced after January 6, 1975, for SO_2 and PM_{10}, and after February 8, 1988, for NO_2; and
- Actual emission increases and decreases at any stationary facility occurring after the baseline date.

In reference to the baseline concentration, the term "baseline date" actually refers to three different types of dates:

- The major facility baseline date, which is January 6, 1975, in the cases of SO_2 and PM_{10}, and February 8, 1988, in the case of NO_2;

- The trigger date, which is August 7, 1977 for SO_2 and PM_{10}, and February 8, 1988, for NO_2; and

- The minor facility baseline date, which is the earliest date after the trigger date on which a major stationary facility or major modification subject to PSD regulations submits a complete PSD application.

9.6 National and State Ambient Air Quality Standards

Areas of the country that have ambient concentrations consistently less than a standard are designated as "attainment areas," while those where monitoring indicates air quality is worse than a standard are known as "nonattainment areas." The designation of an area has particular importance for a proposed project, as it determines the type of permit review the application must undergo.

The existing applicable national and Georgia AAQS are presented in Table 9-1. Primary national AAQS were promulgated to protect the public health; secondary national AAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in violation of an AAQS are designated as nonattainment areas and new or modified sources to be located in or near these areas may be subject to more stringent air permitting requirements.

Georgia has adopted State AAQS in the Official Code of Georgia Annotated (GA Rule) Section 391-3-1. These standards are the same as the national AAQS. Emanuel County is classified as an attainment area.

Compliance with any AAQS is based upon the total estimated air quality impact from all possible sources, which is the sum of the ambient estimates resulting from existing sources of air pollution (modeled source impacts plus measured background concentrations) and the modeled ambient impact caused by the applicant's proposed emission increases and associated growth. It is important to note that the air quality cannot be allowed to deteriorate beyond the concentration allowed by the applicable AAQS, even if not all of the PSD increment is consumed.

Since the Swainsboro Sawmill, in Emanuel County, is outside the Atlanta ozone non-attainment area, EPD does not require an ambient air quality impact analysis from VOC sources regarding the secondary formation of O_3. While there is no PM AAQS, there are AAQS for PM_{10} and $PM_{2.5}$. However, the increases of PM_{10} and $PM_{2.5}$ are less than the 15 tpy thresholds. [According to current EPA guidance, the emission rate of $PM_{2.5}$ is assumed to be the same as PM_{10}, and the significance level is presumed to be the same for PM_{10} and $PM_{2.5}$.] Therefore, the Swainsboro Sawmill did not conduct dispersion modeling analysis for O_3 or $PM_{10}/PM_{2.5}$ impacts from this facility.

9.7 Ambient Data

The nearest monitor to the Rayonier Swainsboro Sawmill that measures O_3 concentrations is located in Augusta, GA (Monitor No. 13-245-0091), approximately 106 km from the project site. The next nearest monitors are located in Macon, GA and Savannah, GA (Monitor Nos. 13-051-0012 and 13-021-0021, respectively), approximately 118 and 131 km from the project site, respectively. These monitoring stations measure concentrations according to EPA procedures.

On July 18, 1997, EPA promulgated a revised AAQS for O_3. The new O_3 standard was modified to 0.085 ppm for an 8-hour average, achieved when the 3-year average of the fourth-highest concentration is equal to or less than 0.085 ppm. Only the 8-hour O_3 standard remains applicable in Georgia.

The 1-hour and 8-hour O_3 concentrations for 2002 through 2004 are shown in Table 9-3. Based on the O_3 monitoring concentrations measured over the last several years in Augusta, GA, the region is in attainment with both the old 1-hour O_3 AAQS and the new 8-hour O_3 AAQS.

9.8 GEP Stack Height Impact Analysis

The height of each existing stack at the Rayonier/Swainsboro facility is below the de minimis GEP. There are no stacks associated with the modified kilns. Therefore, no consideration was required to be taken to adjust the height of any emission point for modeling; all modeling was done using actual stack and emission characteristics.

TABLE 9-1
NATIONAL AND STATE AAQS, ALLOWABLE PSD INCREMENTS, AND SIGNIFICANT IMPACT LEVELS (µg/m3)

Pollutant	Averaging Time	AAQS			PSD Increments		Significant Impact Levels [d]	
		National Primary Standard	National Secondary Standard	State of Georgia	Class I	Class II	Class I	Class II
Particulate Matter (PM_{10})	Annual Arithmetic Mean	50	50	50	4	17	0.2	1
	24-Hour Maximum[b]	150[b]	150[b]	150[b]	8	30	0.3	5
Particulate Matter ($PM_{2.5}$)[a]	Annual Arithmetic Mean	15	15	15	N/A	N/A	N/A	N/A
	24-Hour Maximum[b]	65	65	65	N/A	N/A	N/A	N/A
Sulfur Dioxide	Annual Arithmetic Mean	80	N/A	80	2	20	0.1	1
	24-Hour Maximum[b]	365[b]	N/A	365[b]	5	91	0.2	5
	3-Hour Maximum[b]	N/A	1,300[b]	1,300[b]	25	512	1	25
Carbon Monoxide	8-Hour Maximum[b]	10,000[b]	10,000[b]	10,000[b]	N/A	N/A	N/A	500
	1-Hour Maximum[b]	40,000[b]	40,000[b]	40,000[b]	N/A	N/A	N/A	2,000
Nitrogen Oxide	Annual Arithmetic Mean	100	100	100	2.5	25	0.1	1
Ozone (O_3) [a]	1-Hour Maximum[b]	235[c]	235[c]	235[c]	N/A	N/A	N/A	N/A
	8-Hour Maximum[b]	157	157	157	N/A	N/A	N/A	N/A
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5	N/A	N/A	N/A	N/A

Sources: Federal Register Vol. 43, No. 118, June 19, 1978; 40 CFR 50; 40 CFR 52.21; GA Rule 391-3-1.

Notes:
N/A = Not applicable because no standard exists.
PM_{10} = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.
$PM_{2.5}$ = particulate matter with aerodynamic diameter less than or equal to 2.5 micrometers.

a. On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, $PM_{2.5}$ standards were introduced with a 24-hour standard of 65 µg/m3 (3-year average of 98th percentile) and an annual standard of 15 µg/m3 (3-year average at community monitors). The ozone standard was set at be 0.08 ppm (157 µg/m3) for an 8-hour average, achieved when the 3-year average of 99th percentile is 0.08 ppm or less. Georgia has adopted both these standards.
b. Except for the PM_{10} AAQS, short-term maximum concentrations are not to be exceeded more than once per year (these do not apply to significant impact levels). The PM_{10} 24-hour AAQS is attained when the expected number of days per year with a 24-hour concentration above 150 µg/m3 is equal to or less than 1. For modeling purposes, compliance is based on the sixth-highest 24-hour average value over a 5-year period.
c. Achieved when the expected number of days per year with concentrations above the standard is fewer than 1.
d. Maximum concentrations.

TABLE 9-2

PSD SIGNIFICANT EMISSION RATES AND *DE MINIMIS* MONITORING CONCENTRATIONS

Pollutant	**Significant Emission Rate (TPY)**	**De Minimis Monitoring Concentration[a] (μg/m3)**
Sulfur Dioxide	40	13, 24-hour
Particulate Matter [PM (TSP)]	25	N/A
Particulate Matter (PM_{10})	15	10, 24-hour
Nitrogen Dioxide	40	14, annual
Carbon Monoxide	100	575, 8-hour
Volatile Organic Compounds [Ozone (O_3)] [b]	40	100TPY
Lead	0.6	0.1, 3-month
Sulfuric Acid Mist	7	NM
Total Fluorides	3	0.25, 24-hour
Total Reduced Sulfur	10	10, 1-hour
Reduced Sulfur Compounds	10	10, 1-hour
Hydrogen Sulfide	10	0.2, 1-hour
Mercury	0.1	0.25, 24-hour
MWC Organics	3.5x10-6	NM
MWC Metals	15	NM
MWC Acid Gases	40	NM
MSW Landfill Gases	50	NM

Sources: 40 CFR 52.21; GA Rule 391-3-1.

Notes:
Ambient monitoring requirements for any pollutant may be exempted if the impact of the increase in emissions is less than *de minimis* monitoring concentration.
N/A = Not applicable.
NM = No ambient measurement method established; therefore, no *de minimis* concentration has been established.
μg/m3 = micrograms per cubic meter.
MWC = Municipal waste combustor
MSW = Municipal solid waste

Footnotes:

a. Short-term concentrations are not to be exceeded.
b. No *de minimis* concentration; an increase in VOC emissions of 100 TPY or more will require an ambient impact analysis, including pre-application monitoring data. This only applies in areas determined to be non-attainment for ozone.

TABLE 9-3

SUMMARY OF OZONE MONITORING DATA COLLECTED NEAR THE RAYONIER SWAINSBORO SAWMILL

County	Station ID	Monitor Location	Distance From Rayonier Swainsboro Sawmill (km)	Year	Number of Valid Days	Reported Concentration (ppm) [a]				
						Highest 1-Hour	Highest 8-Hour	Second-Highest 8-Hour	Third-Highest 8-Hour	Fourth-Highest 8-Hour
Richmond	13-245-0091	Augusta, Bungalow Road Elementary School	106	2004	243	0.102	0.089	0.087	0.086	0.080
				2003	245	0.093	0.082	0.080	0.079	0.078
				2002	243	0.112	0.100	0.095	0.079	0.091
Bibb	13-021-0012	Macon, S.E. - Georgia Forestry Service	118	2004	244	0.106	0.093	0.091	0.089	0.086
				2003	245	0.099	0.089	0.084	0.084	0.081
				2002	245	0.120	0.103	0.101	0.093	0.093
Chatham	13-051-0021	Savannah, 2500 E. President Street, Bldg-A	131	2004	204	0.092 [b]	0.076	0.076	0.075	0.071
				2003	242	0.085	0.072	0.072	0.071	0.070
				2002	242	0.095	0.086	0.068	0.066	0.065

Source: GEPD Ambient Monitoring Annual Report, 2002 – 2004, and EPA Air Data Monitor Value Report, 2002 - 2004.

Foot Notes:

a. On July 18, 1997, EPA promulgated a revised AAQS for ozone. The ozone standard was modified to be 0.080 ppm for an 8-hour average; to attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour concentration measured at each monitor within an area over each year must not exceed 0.08 ppm.

b. The EPA Air Data Monitor Value Report for 2004 reports an ozone concentration of 0.092 ppm, while the GEPD Air Monitoring Annual Report for 2004 reports an ozone concentration of 0.081 ppm.

10.0 ADDITIONAL IMPACT ANALYSIS ON THE CLASS I AREAS

10.1 Introduction

As indicated earlier, an ambient air quality impact analysis must be performed for a proposed major source or major modification subject to PSD for each pollutant for which the increase in emissions exceeds the significant emission rate (Table 4.1). The main purpose of the air quality analysis is to demonstrate that emissions from the proposed modification, 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.

The PSD regulations specifically provide for the use of atmospheric dispersion models in performing the impact analysis, which is used for determining compliance with NAAQS and PSD increments. Designated EPA models must normally be used in performing the impact analysis. Specific applications for other than EPA approved models require EPA's consultation and prior approval. Guidance for the use and application of dispersion models is presented in the EPA publication “Guideline on Air Quality Models” (EPA 1993). The source impacts analysis for criteria pollutants may be limited to only the new or modified source, if the net increase in impacts due to the new or modified source is below significance levels; those levels were presented in Table 9.1.

Rayonier is proposing to modify the two existing dry kilns to support a production increase at its Swainsboro Sawmill, located in Emanuel County, Swainsboro, Georgia. The modifications were described in Section 2.0. The facility is subject to the PSD new source review requirements for PM and VOC. This analysis addresses the potential impacts on vegetation, soils, and wildlife in the nearest Class I area due to the proposed project. The nearest Class I area is the Wolf Island National Wildlife Refuge (NWR), located approximately 158.6 km southeast of the project site. Wolf Island NWR is located in McIntosh County, approximately 12 miles east of the town of Darien. The Wolf Island NWR is a 5,126 acre migratory bird refuge composed of Wolf Island (4,519 acres), Egg Island (593 acres), and Little Egg Island (14 acres). The next closest Class I area is Okefenokee National Wilderness Area (NWA), located within the Okefenokee National Wildlife Refuge, approximately 160.8 km from the project site. In addition, potential impacts upon visibility resulting from the proposed project must be assessed. This analysis demonstrates that the increase in impacts due to the proposed project will be extremely low. Regardless of the existing conditions in the vicinity of the Class I areas, the proposed project is not predicted to cause any significant adverse effects.

10.2 AQRV Analysis Methodology

The air quality related values (AQRV) analysis involves predicting worst-case VOC emissions from the modified Swainsboro sawmill, and comparing these emissions to regional VOC emissions and ozone (O_3) concentrations. Using existing ambient O_3 data, expected O_3 levels due to the project can be compared to the lowest observed effect levels for AQRVs or analogous organisms. In conducting the assessment, several assumptions were made as to how pollutants interact with the various matrices (i.e., vegetation, soils, wildlife, and aquatic environment). A screening approach was used to evaluate potential effects by comparing the maximum predicted ambient concentrations of air pollutants of concern with effect threshold limits, for both vegetation and wildlife, as reported in the scientific literature. A literature search was conducted that specifically addressed the effects of air contaminants on plant species reported to occur in the Class I areas. The literature search focused on such species as cabbage palm, eastern red cedar, and lichens, as well as the ecosystems labeled hardwood swamplands and mangrove forest; no specific citations that addressed these were found. Threshold information is not available for all species found in the Wolf Island NWR and Okefenokee NWA, although studies have been performed on a few of the common species and on other similar species that can be used as indicators of effects.

10.3 Identification of AQRVs

Rayonier conducted an AQRV analysis to assess the potential risk to AQRVs of the Wolf Island NWR and Okefenokee NWA due to the proposed Rayonier project. The PSD application indicates that the U.S. Department of the Interior in 1978 administratively defined AQRVs as below:

"All those values possessed by an area except those that are not affected by changes in air quality and include all those assets of an area whose vitality, significance, or integrity is dependent in some way upon the air environment. These values include visibility and those scenic, cultural, biological, and recreational resources of an area that are affected by air quality. Important attributes of an area are those values or assets that make an area significant as a national monument, preserve, or primitive area. They are the assets that are to be preserved if the area is to achieve the purposes for which it was set aside (Federal Register 1978)."

Except for visibility, AQRVs were not specifically defined in the Federal Register. However, the Federal Land Manager (FLM) has identified odor, soil, flora, fauna, cultural resources, geological features, water, and climate in general as AQRVs. Specific AQRVs have not been identified for the Wolf Island NWR and Okefenokee NWA, so this AQRV analysis evaluates the effects of air quality on general vegetation types and wildlife found in the Class I areas.

Vegetation-related AQRVs and their representative species types have been defined as:

• Marshlands – black needlerush, saw grass, salt grass, and salt marsh cordgrass
• Marsh Islands - cabbage palm and eastern red cedar
• Estuarine Habitat - black needlerush, salt marsh cordgrass, and wax myrtle
• Hardwood Swamp – red maple, red bay, sweet bay, and cabbage palm
• Upland Forests – live oak, scrub oak, longleaf pine, slash pine, wax myrtle, and saw palmetto
• Mangrove Swamp – red, white, and black mangrove [Wildlife AQRVs have been identified as endangered species, waterfowl, marsh and waterbirds, shorebirds, reptiles, and mammals.]

10.4 Impacts to Soils

For soils, the potential and hypothesized effects of atmospheric deposition include:

• Increased soil acidification,
• Alteration in cation exchange,
• Loss of base cations, and
• Mobilization of trace metals.

The potential sensitivity of specific soils to atmospheric inputs is related to two factors. First, the physical ability of a soil to conduct water vertically through the soil profile is important in influencing the interaction with deposition. Second, the ability of the soil to resist chemical changes, as measured in terms of pH and soil cation exchange capacity (CEC), is important in determining how a soil responds to atmospheric inputs.

The majority of the soil complexes found in the Wolf Island NWR are inundated by tidal waters, contain a relatively high organic matter content, and have high buffering capacities based on their CEC, base saturation, and bulk density. The regular flooding of these soils regulates the pH, and any change in acidity in the soil would be buffered by this activity. Therefore, they would be relatively insensitive to atmospheric inputs.

The soils of the Okefenokee NWA are generally classified as histosols (peat soils). Histosols are organic and have extremely high buffering capacities based on their CEC, base saturation, and bulk density. However, the freshwater mucks present in the Okefenokee NWA may be sensitive to atmospheric sulfur deposition. Although not tidally influenced, these freshwater mucks are highly organic and therefore have a relatively high intrinsic buffering capacity.

The relatively low sensitivity of the soils to atmospheric inputs, coupled with less than a 4 percent increase in ambient VOC emissions in the Wolf Island NWR and less than a 1 percent increase in ambient VOC emissions in the Okefenokee NWA from the proposed project's emissions (refer to Section 10.5.1), precludes any significant impact on soils.

10.5 Impacts to Vegetation

In general, the effects of air pollutants on vegetation occur primarily from SO_2, NO_2, O_3, and PM_{10}. Effects from minor air contaminants such as fluoride, chlorine, hydrogen chloride, ethylene, ammonia, hydrogen sulfide, CO, and pesticides have also been reported in the literature. The effects of air pollutants are dependent both on the concentration of the contaminant and the duration of the exposure. The term "injury," as opposed to damage, is commonly used to describe all plant responses to air contaminants and will be used in the context of this analysis. Air contaminants are thought to interact primarily with plant foliage, which is considered to be the major pathway of exposure.

Injury to vegetation from exposure to various levels or air contaminants can be termed acute, physiological, or chronic. Acute injury occurs as a result of a short-term exposure to a high contaminant concentration and is typically manifested by visible injury symptoms ranging from chlorosis (discoloration) to necrosis (dead areas). Physiological or latent injury occurs as the result of a long-term exposure to contaminant concentrations below that which results in acute injury symptoms. Chronic injury results from repeated exposure to low concentrations over extended periods of time, often without any visible symptoms, but with some effect on the overall growth and productivity of the plant. In this assessment, 100 percent of the particular air pollutant in the ambient air was assumed to interact with the vegetation. This is a conservative approach.

The response of vegetation and wildlife to atmospheric pollutants is influenced by the concentration of the pollutant, duration of exposure, and frequency of exposures. The pattern of pollutant exposure expected from the facility is that of a few episodes of relatively high ground-level concentration, which occur during certain meteorological conditions interspersed with long periods of extremely low ground-level concentrations. If there are any effects of stack emissions on plants or animals, they will likely arise from the short-term, higher doses. A dose is the product of the concentration of the pollutant and duration of the exposure.

10.5.1 VOC Emissions and Impacts on Ozone

It is difficult to predict what effect the proposed increase in emissions of VOC will have on ambient O_3 concentrations in the Class I areas. VOC and NO_x emissions are precursors to the formation of O_3. O_3 is not directly emitted from fuel combustion, but would be formed down-wind from the facility and other emission sources when VOC and NO_x react with each other or with other molecules of VOC and NO_x in the presence of sunlight. Natural maximum (without man-made sources) ambient concentrations of O_3 are normally in the range of 20 to 39 µg/m3 (0.01 to 0.02 ppm) (Heath, 1975). O_3 can cause various kinds of damage to broad-leaved plants including: tissue collapse, interveinal necrosis and markings on the upper surface leaves know as stippling (pigmented yellow, light tan, red brown, dark brown, red, or purple), flecking (silver or bleached straw white), mottling, chlorosis or bronzing, and bleaching. O_3 can also stunt plant growth and bud formation. On certain plants such as citrus, grape, and tobacco, it is common for leaves to wither and drop early. A literature review suggests that exposure for 4 hours at levels of 0.04 to 11.0 ppm of O_3 will result in plant injury for sensitive plants. The extent of the injury depends on the plant species and environmental conditions prior to and during exposure.

Total VOC emissions in the vicinity of the Wolf Island NWR, which includes Glynn and McIntosh Counties, are approximately 11,057 TPY for stationary and mobile sources [EPA Air Data County Emissions Map for 1999]. The maximum VOC emissions increase due to the project is 418 TPY, which represents less than a 4 percent increase in VOC emissions in the vicinity of the Wolf Island NWR. Total VOC emissions in the vicinity of the Okefenokee NWA, which includes Clinch, Ware, Echols, Carleton, and Duval Counties, are approximately 51,787 TPY for stationary and mobile sources [EPA Air Data County Emissions Map for 1999]. Based on maximum VOC emissions of 418 TPY from the proposed project, there will be less than a 1 percent increase in VOC emissions in the vicinity of the Okefenokee NWA. VOC emissions from the Rayonier project alone, in comparison to VOC emissions from Duval County, will cause less than a 1 percent increase in VOC emissions in the Okefenokee NWA.

Due to the relatively low VOC increases in both Class I areas (less than 4 percent in the Wolf Island NWR and less than 1 percent in the Okefenokee NWA), the effects of O_3 as a result of VOC emissions from the project are expected to be insignificant.

Note: It is known that in the Southeast, Ozone formation is usually NO_x limited.

10.6 Impacts to Wildlife

The major air quality risk to wildlife in the United States is from continuous exposure to pollutants above the National AAQS in non-attainment areas. Risks to wildlife also may occur for wildlife living in the vicinity of an emission source that experiences frequent upsets or episodic conditions resulting from malfunctioning equipment, unique meteorological conditions, or startup operations (Newman and Schreiber, 1988). Under these conditions, chronic effects (*e.g.*, particulate contamination) and acute effects (*e.g.*, injury to health) have been observed (Newman, 1981).

A wide range of physiological and ecological effects to fauna has been reported for gaseous and particulate pollutants (Newman, 1981; Newman and Schreiber, 1988). The most severe of these effects have been observed at concentrations above the secondary AAQS. Physiological and behavioral effects have been observed in experimental animals at or below these standards. Research with primates shows that O_3 penetrates deeper into non-ciliated peripheral pathways and can cause lesions in the respiratory bronchioles and alveolar ducts as concentrations increase from 0.2 to 0.8 ppm (Paterson, 1997). These bronchioles are the most common site for severe damage. In rats, the Type I cells in the proximal alveoli (where gas exchange occurs) were the primary site of action at concentrations between 0.5 and 0.9 ppm (Paterson, 1997). Work with rats and rabbits suggest that the mucus layer that lines the large airways does not protect completely against the effects of O_3, and desquamated cells were found from acute exposures at 0.25, 0.5, and 1.0 ppm. In animal research, O_3 has been found to increase the susceptibility to bacterial pneumonia (Paterson, 1997). During the last decade, there has also been growing concern with the possibility that repeated or long-term exposure to elevated O_3 concentrations may be causing or contributing to irreversible chronic lung injury. However, the project's contribution to ground level O_3 is expected to be very low and dispersed over a large area. Coupled with the historical ambient data and mobility of wildlife, the potential for exposure of wildlife to the facility's impacts that lead to high concentrations of O_3 is extremely low.

10.7 Impacts on Visibility

The CAA Amendments of 1977 provide for implementation of guidelines to prevent visibility impairment in mandatory Class I areas. The guidelines are intended to protect the aesthetic quality of these pristine areas from reduction in visual range and atmospheric discoloration due to various pollutants. Sources of air pollution can cause visible plumes if emissions of PM_{10} and NO_x are sufficiently large. A plume will be visible if its constituents scatter or absorb sufficient light so that the plume is brighter or darker than its viewing background (e.g., the sky or a terrain feature, such as a mountain). PSD Class I areas, such as national parks and wilderness areas, are afforded special visibility protection designed to prevent plume visual impacts to observers within a Class I area.

Visibility is an AQRV for the Wolf Island NWR and Okefenokee NWA. Visibility can take the form of plume blight for nearby areas, or regional haze for long distances (e.g., distances beyond 50 km). Because the Wolf Island NWR and Okefenokee NWA lie more than 50 km from the Rayonier Swainsboro Sawmill, the change in visibility is analyzed as regional haze. However, since VOC and PM are the only pollutants of concern, and PM_{10} and NO_x emissions increases are not predicted to be large, an analysis of regional haze is not included for the proposed project.

11.0 ADDITIONAL IMPACT ANALYSIS FOR THE VICINITY OF THE FACILITY

11.1 Impacts to Soils, Vegetation, and Visibility in the Vicinity of the Rayonier Swainsboro Sawmill

11.1.1 Predicted Air Quality Impacts

No ambient air quality modeling for the proposed project is required. Only PM and VOC emission increases trigger PSD review, and there are no AAQS or significance levels for either of these pollutants. Since VOC emissions are predicted to be greater than 100 tpy, an ambient impact analysis, including pre-application monitoring was required (refer to Section 9.2).

11.1.2 Impacts to Soils

Air contaminants can affect soils through fumigation by gaseous forms, accumulation of compounds transformed from the gaseous state, or by the direct deposition of PM to which certain contaminants are absorbed. According to the Emanuel County Soil Survey (1993), the soils in the vicinity of the Rayonier Sawmill are dominated by Fuquay loamy sand, with Dothan loamy sand and Tifton loamy sand also present in large quantities. Kinston and Bibb soils make up a smaller portion of the soils. The Fuquay loamy sand, Dothan loamy sand, Tifton loamy sand, and Kinston and Bibb soils are described in the Emanuel County Soil Survey as follows:

Fuquay loamy sand – This soil is nearly level and well drained. Typically the upper part of this soil is grayish brown loamy sand approximately 9 inches thick, while the lower portion to a depth of approximately 27 inches is yellowish brown loamy sand. Between the depths of approximately 27 inches to 63 inches, the soil is yellowish brown sandy clay loam with strong brown, red, and very pale brown mottles. This soil has a high water table except during extended dry periods. The available water capacity is low and natural fertility is low. Permeability is rapid in the surface and subsurface layers, moderate in the upper part of the subsoil, and slow in the lower part of the subsoil. Typical vegetation includes loblolly pine, longleaf pine, and slash pine.

Dothan loamy sand – This soil is very gently sloping and well drained. Typically the upper part of this soil is brown loamy sand approximately 7 inches thick, while the lower portion to a depth of approximately 13 inches is light yellowish brown loamy sand. Between the depths of approximately 13 inches to 63 inches, the soil is yellowish brown sandy clay loam with strong brown, yellowish red, light brownish gray, and brownish yellow mottles. This soil has a high water table except during extended dry periods. The available water capacity is moderate and natural fertility is low. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part of the subsoil. Typical vegetation includes loblolly pine, longleaf pine, and slash pine.

Tifton loamy sand – This soil is very gently sloping and well drained. Typically the upper part of this soil is dark grayish brown loamy sand approximately 11 inches thick, while the lower portion to a depth of approximately 16 inches is yellowish brown sandy loam. Between the depths of approximately 16 inches to 63 inches, the soil is yellowish brown sandy clay loam with strong brown, yellowish red, and light gray mottles. This soil has a high water table except during extended dry periods. The available water capacity is moderate and natural fertility is low. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part of the subsoil. Typical vegetation includes loblolly pine and slash pine.

Kinston and Bibb soils, frequently flooded – This soil is nearly level and frequently flooded. Typical vegetation includes loblolly pine, slash pine, eastern cottonwood, and yellow poplar. Typically the upper part of Kinston soil is dark grayish brown loam approximately 6 inches thick, while the lower portion to a depth of approximately 23 inches is gray sandy loam with yellowish brown and brownish yellow mottles. From approximately 23 inches to 48 inches, Kinston soil is gray sandy clay loam that has strong brown, yellowish red, and pale brown mottles. From approximately 48 inches to 63 inches, Kinston soil is grayish brown sandy loam that has yellowish brown and pale brown mottles. This soil has a high water table except during extended dry periods. The available water capacity is high, permeability is moderate, and natural fertility is low. Typically the upper part of Bibb soil is very dark grayish brown loam approximately 6 inches thick, while the lower portion to a depth of approximately 14 inches is light brownish gray fine sandy loam. From approximately 14 inches to 43 inches, Bibb soil is light brownish gray sandy loam that has yellowish brown and brown mottles. From approximately 43 inches to 63 inches, Bibb soil is gray loamy sand that has yellowish brown and pale brown mottles. This soil has a high water table except during extended dry periods. The available water capacity is high, permeability is moderate, and natural fertility is moderately low to moderate.

The dominant soil in the vicinity of the Rayonier Swainsboro Sawmill facility, Fuquay loamy sand, is a low organic sandy soil that has a moderate buffering capacity based on cation exchange capacity, base saturation, and percent clay. This means that this soil is moderately sensitive to atmospheric inputs.

The maximum O_3 concentrations in the vicinity of the site are currently below the AAQS (refer to Section 9.3). The proposed project represents less than a 4 percent increase in regional VOC emissions (refer to Section 11.1.3). Therefore, the effects of O_3, as a result of VOC emissions from the proposed project, are expected to be insignificant, and no detrimental effects on soils should occur in the vicinity of the Rayonier Swainsboro Sawmill.

11.1.3 Impacts to Vegetation

Vegetation Analysis

In general, the effects of air pollutants on vegetation occur primarily from SO_2, NO_2, O_3, and PM. Effects from minor air contaminants such as fluoride, chlorine, hydrogen chloride, ethylene, ammonia, hydrogen sulfide, CO, and pesticides have also been reported in the literature. The effects of air pollutants are dependent both on the concentration of the contaminant and the duration of the exposure. The term "injury," as opposed to damage, is commonly used to describe all plant responses to air contaminants and will be used in the context of this analysis. Air contaminants are thought to interact primarily with plant foliage, which is considered to be the major pathway of exposure. Injury to vegetation from exposure to various levels or air contaminants can be termed acute, physiological, or chronic. Acute injury occurs as a result of a short-term exposure to a high contaminant concentration and is typically manifested by visible injury symptoms ranging from chlorosis (discoloration) to necrosis (dead areas). Physiological or latent injury occurs as the result of a long-term exposure to contaminant concentrations below that which results in acute injury symptoms. Chronic injury results from repeated exposure to low concentrations over extended periods of time, often without any visible symptoms, but with some effect on the overall growth and productivity of the plant. In this assessment, 100 percent of the particular air pollutant in the ambient air was assumed to interact with the vegetation. This is a conservative approach.

VOC Emissions and Impacts on O_3

Total VOC emissions in the region (i.e., Bulloch, Burke, Emanuel, Laurens, and Toombs Counties) are approximately 12,818 TPY for stationary and mobile sources [EPA Air Data County Emissions Map for 1999]. The maximum VOC emissions due to the project are 418 TPY, which represents less than a 4 percent increase in regional VOC emissions. Therefore, no adverse effects on vegetation due to the project's VOC emissions are expected.

11.1.4 Impacts Upon Visibility

Sources of air pollution can cause visible plumes if emissions of PM_{10} and NO_x are sufficiently large. A plume will be visible if its constituents scatter or absorb sufficient light so that the plume is brighter or darker than its viewing background (e.g., the sky or a terrain feature, such as a mountain). However, since VOC and PM are the only pollutants of concern, and PM_{10} and NO_x emissions from the added production from the lumber dry kiln are not predicted to be large, no adverse impacts upon visibility in the vicinity of the site are expected to occur.

12.0 HAZARDOUS AIR POLLUTANT/AIR TOXIC REQUIREMENTS

Regulations that have been developed to minimize emissions of so-called hazardous air pollutants (HAPs) are the NESHAPs, initially codified in 40 CFR Part 61. Part 61 contains a listing of those pollutants that have been designated as being hazardous along with standards applicable to specific industries. Unlike the NSPS, NESHAPs are applicable to both new and existing sources that emit pollutants regulated by this part.

The 1990 CAA Amendments significantly expanded the number of HAPs to be regulated. Under the Amendments, 189 (revised to 187) compounds or classes of compounds are to be regulated. Maximum Achievable Control Technology (MACT) standards are to be applied to sources with controlled HAPs emissions of 10 tpy of any single compound or 25 tpy or more of all 187 regulated HAPs in combination. These requirements are codified in 40 CFR 63.

The Plywood and Composite Wood Products (PCWP) NESHAP, 40 CFR Part 63 Subpart DDDD, published in the Federal Register (Vol. 69, No. 146/Friday, July 30, 2004), indicates that the MACT is applicable to sawmills with lumber kilns (SIC # 2421) which are major for HAPs. This facility is major for HAPs and therefore this MACT is applicable. The provisions of 40 CFR 63, Subpart DDDD include no control requirements for lumber kilns. However, the rule indicates that facilities with non-colocated lumber kilns (i.e., lumber kilns located at stand-alone kiln-dried lumber manufacturing facilities or at any other type of facility) that are classified as major sources of HAP were required to submit an initial notification form by January 26, 2005. The Permittee submitted the required initial notification on December 13, 2004.

The impacts of HAPs, along with other air toxics, must also be evaluated through dispersion modeling. The requirement to conduct dispersion modeling for air toxics is in the Georgia Air Toxics Guideline. A toxic air pollutant is defined as any substance, which may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. The impact is evaluated by comparing the modeled results to a threshold limit value for a given air toxic, taking into consideration a safety factor.

An air toxic impact assessment was performed for the proposed modified Swainsboro Sawmill to determine if the offsite concentrations caused by the emissions of hazardous air pollutants (HAPs) from its modified lumber drying kilns could exceed the acceptable ambient concentration (AACs). A report dated April 2006 was submitted, which was received on May 16, 2006. Rayonier's consultant, "Golder Associates, " prepared the modeling report using the Industrial Source Complex Short-term (ISCST3, version 0235, EPS 2002) computer dispersion model to predict the maximum 24-hour and 15-minute average ground level concentrations (referred to as MGLCs) for formaldehyde, methanol and phenol. The permit application included an evaluation of the impacts from the kilns, using a worst-case analysis (air toxics emissions based on design rate of kilns). The results of that modeling demonstrated that the maximum impacts would be well below the acceptable ambient concentrations (AACs). A summary of the modeling results for air toxics submitted by Rayonier is provided in Table 12.

Table 12

Summary of Air Toxics Analysis, As submitted by Rayonier

Air Toxic Pollutant	Averaging Time	Max. Modeled Concentration (µg/m^3)	Acceptable Ambient Concentration (µg/m^3)	Exceeds Guidelines (Yes/No)
Formaldehyde	Annual Conc.	5.24	9.8	No
	Max. 15 min Conc.	129.58	250	No
Methanol	Max. 24-Hour Conc.	121.3	619	No
	Max. 15 min Conc.	831.8	32,800	No
Phenol	Max. 24-Hour Conc.	7.8	45.2	No
	Max. 15 min Conc.	53.5	6,000	No

The modeling report indicates that concentrations were predicted for annual, 24-hour, and 1-hour averaging times to compare to the appropriate AAC. 1-hour average concentrations were multiplied by the averaging time factor of 1.32 to obtain 15-minute concentrations that can be compared to 15-minute AACs. Note that the formaldehyde emissions presented in the latest submittal by the applicant are not identical to those in the original PSD application. The NCASI published emission factor for formaldehyde is 0.103 lb/MBF, against the value of 0.049 lb/MBF used by the facility. This is explained by Rayonier in their letters dated May 12, 2006 and February 14, 2007. For the earlier submission, Rayonier had averaged the emissions from each kiln separately and used the highest average as the emission factor. This conservative approach produced high impacts that exceeded the AACs. The Permittee later found updated unpublished NCASI data, which consisted of test data from two full-scale kilns that indicated formaldehyde emission rates lower than the data for one kiln, previously published by NCASI. Rayonier averaged these, along with the data from the published NCASI data, to determine emission rates. Modeling these concentrations resulted in compliance with the toxic guidelines. However, the EPD did not find that to be sufficiently conservative for the short-term modeling. After further discussion with Rayonier, they agreed to use an average of the kiln results that more conservatively weighted the results for each kiln. By using the newer, recently approved computer model, AIRMOD, they demonstrated compliance with both the short term and long term AACs for all pollutants.

The future average hourly charging rate capacity for each of the kilns was determined to be 26.26 MBF/hr, based on the maximum annual production rate of 220 MMBF/yr. According to the revised emission factors used by the Permittee, per their letter submission dated February 14, 2007, the highest emission rates for HAPs will be as below.

Formaldehyde = 26.2 MBF/hr * 0.049 lb/MBF = 1.28 lb/hr
Methanol = 26.2 MBF/hr * 0.161 lb/MBF = 4.22 lb/hr
Phenol = 26.2 MBF/hr * 0.0103 lb/MBF = 0.27 lb/hr
Total HAPs = 26.2 MBF/hr * 0.220 lb/MBF = 5.77 lb/hr

The modeling conducted by Data and Modeling Unit of the Division (refer to memorandum dated March 1, 2007 from the EPD modeling unit) indicated that the maximum modeled offsite annual average concentration of formaldehyde (evaluated by GA EPD) was 2.87 $\mu g/m^3$, and the short-term (1-hour average) formaldehyde concentration was 121 $\mu g/m^3$, which was adjusted to a 15-minute average concentration of 160 $\mu g/m^3$. These estimated formaldehyde concentrations are lower than the long term AAC of 9.8 $\mu g/m^3$, and short-term ACC of formaldehyde (250 $\mu g/m^3$), respectively. Note that formaldehyde was the closest of the three modeled contaminants to its short-term and long term AAC's. Since the formaldehyde is indicated to comply with the air toxics guidelines, the other contaminants comply as well.

13.0 COMPLIANCE SUMMARY

Rayonier's Swainsboro Sawmill is expected to comply with all applicable statutes and regulations that address each of the modified and new sources that are part of this project. A review of the NSPS and NESHAPs (both Parts 61 and 63) identifies no NSPS or NESHAP that will apply to this project at this time. Dispersion modeling was not required, other than air toxics modeling to comply with Georgia EPD's air toxics policy. A modeling analysis, submitted by Rayonier, demonstrated that they could comply with the Toxics Guidelines. This model was verified by the EPD. In summary, it was determined that the project would have no difficulty in complying with the State of Georgia's air quality regulations.

14.0 EXPLANATION OF DRAFT PERMIT CONDITIONS

The permit requirements for this proposed modification are included in draft Permit Amendment No. 2421-107-0011-V-02-3.

Section 1.0 Facility Description

EPD has included a description of the project in this section of the permit conditions.

Section 3.0 Requirements for Emission Units

Condition No. 3.2.2 is modified to delete references to the PSD avoidance limits. As requested by the Permittee, a production rate of 220.0 million board feet per year (MMBF/year) has been established as the maximum total amount of kiln-dried lumber that can be produced by both kilns (Source Codes DK07 and DK08) combined. Note that, since the emission rate is considered BACT, there is no need to cap the production of lumber per PSD. However, because the capacity of the kilns was included in the toxics modeling, a limit on maximum lumber drying capacity is included in the permit.

New Condition No. 3.2.3 requires the Permittee not to exceed the an emission rate of PM/PM_{10} from the planer baghouse (APCD ID No. BH01) of 1.13 lb/hr, and not to exceed 5000 hours of planer mill operation. These limits are imposed to ensure that the total increase of PM_{10} emissions, due to this modification, will not exceed the significance threshold of 15 tons per year. This is a PSD avoidance limit, as the Permittee has avoided PSD review for this pollutant.

New Condition No. 3.3.4 requires the Permittee to comply with all applicable provisions of the NESHAP, 40 CFR 63 Subpart A and Subpart DDDD, for Plywood and Composite Wood Products.

Section 4.0 Requirements for Testing

Condition 4.2.1 is revoked because it addressed the hot oil heater, which has already been decommissioned.

Section 5.0 Requirements for Monitoring (Related to data Collection)

New Condition No. 5.2.5 requires the Permittee to develop and implement a work practice and preventive maintenance program for lumber drying kilns to assure efficient operation of the kilns

New Condition No. 5.2.6 requires the Permittee to monitor combustion temperatures for six months to establish combustion gas temperatures that indicate good operating conditions for the lumber drying kilns.

Section 6.0 Other Record Keeping and Reporting Requirements

Condition No. 6.1.7 is modified to require reporting any exceedances of the work practice standards in Conditions Nos. 5.2.5 and 6.2.10 for lumber drying kilns.

Condition No. 6.2.2, which referenced the PSD avoidance limit of 9.87 MMBF for lumber drying in both kilns during any month, has been revoked because 220 million bd-ft per year is a reflection of the lumber production capacity of the facility. It seems very unlikely to be exceeded on a monthly basis.

Condition No. 6.2.8, which requires notification of the shutdown and removal of the old oil heated kilns, is deleted because these kilns have been removed.

New Condition No. 6.2.9 requires the Permittee to notify the Division of the shutdown of each kiln for modification and of the initial startup of each modified kiln.

New Condition No. 6.2.10 requires the Permittee to maintain operation and maintenance records related to the work practice and preventive maintenance requirements for the kilns.

New Condition No. 6.2.11 requires the Permittee to maintain operational records related to the planer mill shaving system and lumber drying in kilns.

Section 7.0 Other Specific Requirements

Condition 7.14.1 is deleted because the hot oil heater and six drying kilns (DK01 through DK06) have already been decommissioned.

15.0 ATTACHMENTS

A. Draft PSD Permit

B. PSD Permit Application and Supporting Data

APPENDIX A: Draft PSD Permit

Rayonier Wood Products LLC. -Swainsboro Sawmill (Emanuel County), Georgia

Part 70 Operating Permit Amendment No. 2421-107-0011-V-02-3.

APPENDIX B: PSD Permit Application and Supporting Data

International Paper Company, Inc.-Swainsboro Sawmill (Emanuel County), Georgia

Contents include:

1. PSD/Title V Permit Application No. 16512, which is available on *htt://www.georgiaair.org/airpermit* .
2. A copy of the updated PSD write up, a part of PSD application, submitted by e-mail dated March 13, 2006.
3. Letters dated May 12, 2006, June 22 and 26, 2006, July 5 and 11, 2006, February 14, 2007 submitted to provide additional information
4. Air Toxic Modeling Analysis Report dated April 2006; updated by letter dated February 14, 2007.
5. Air Toxic Assessment Memorandum, dated March 1, 2007, from Data and Modeling unit