Prevention of Significant Air Quality Deterioration Review
Of Weyerhaeuser – Port Wentworth Mill
Located in Chatham County, Georgia

PRELIMINARY DETERMINATION
SIP Permit Application No. 16155
December 2005

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

Stationary Source Permitting Program (SSPP)
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SUMMARY

The Environmental Protection Division (EPD) has reviewed the application submitted by Weyerhaeuser to modify the dryer at the Port Wentworth Mill. The proposed project will increase the production capacity of the market pulp machine, which currently acts as a bottleneck for the mill. Current annual production is 950 air-dried metric tons of pulp per day (ADMTPD) or 1,047 air-dried short tons of pulp per day (ADSTPD), although the mill is permitted for an a capacity of 1,200 ADSTPD. Thus, the proposed project will allow the mill to operate at its intended (and permitted) production level and will not actually result in an increase in the permitted capacity of the mill.

Physical changes to the market pulp machine that will be made as part of the proposed project will include, but not necessarily be limited to, the following:

- The addition of eight (8) new dryer decks;
- Steam system pressure increase modifications;
- The addition of a new dryer heat recovery system; and
- Upgraded drivers (if needed).

The dryer extension will be mounted directly onto the existing dryer's top drying deck, and the steam distribution header, exhaust plenum and roof panels will be relocated onto the new extension. The new, extended dryer will have integrated turning roll drives and a tape threading system and will function as a single, larger dryer. Once the new dryer steam supply line is completed, the existing steam supply line will be routed to the digester to improve temperature control by modifying the existing liquor heater system; this will improve pulp quality and uniformity.

The proposed project will result in an increase in emissions from the mill. The sources of these increases in emissions include the modified dryer unit of the market pulp machine, debottlenecked production units elsewhere in the production line, and ancillary process equipment such as the steam-generating units that that support the market pulp machine dryer.

The Port Wentworth mill is located in Chatham County, which is classified as "attainment" or "unclassifiable" for SO_2, $PM_{2.5}$ and PM_{10}, NO_X, CO, and ozone (VOC) in accordance with Section 107 of the Clean Air Act, as amended August 1977.

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

It is the preliminary determination of the EPD that the proposal provides for the application of Best Available Control Technology (BACT) for the control of VOC, the only criteria pollutant or precursor whose increased emissions are triggering the BACT review requirement, as required by federal Prevention of Significant Deterioration (PSD) regulation 40 CFR 52.21(j).

It has been determined through approved modeling techniques that the estimated emissions will not cause or contribute to a violation of any ambient air standard or allowable PSD increment in the area surrounding the facility (no Class I area is located within 200 km of the facility). It has further been determined that the proposal will not cause impairment of visibility or detrimental effects on soils or vegetation. Any air quality impacts produced by project-related growth should be inconsequential.

This Preliminary Determination concludes that an Air Quality Permit should be issued to Weyerhaeuser – Port Wentworth Mill for the modifications necessary to increase production at the mill. Various conditions have been incorporated into the current Title V operating permit to ensure and confirm compliance with all applicable air quality regulations. A copy of the draft permit amendment is included in Appendix A.

1.0 INTRODUCTION

On April 13, 2005, Weyerhaeuser – Port Wentworth Mill (hereafter Weyerhaeuser) submitted an application for an air quality permit to conduct certain modifications to the dryer of the market pulp machine at the existing pulp mill such that production capacity is increased from the current level 1,047 ADSTPD to the originally permitted level of 1,200 ADSTPD. The mill is located at Bonnybridge Road in Port Wentworth, near Savannah in Chatham County.

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

Table 1: Emissions Increases from the Production Increase Project

Pollutant	Potential Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review
PM	217	25	Yes
PM_{10}	217	15	Yes
VOC	185	40	Yes
NO_X	894	40	Yes
CO	967	100	Yes
SO_2	255	40	Yes
TRS	9.82	10	No
Pb	0.02	0.6	No
Fluorides	0.11	3	No
H_2S	2.77	10	No
SAM	4.34	7	No

The net increases were calculated by subtracting the past actual emissions (based upon the annual average emissions from January 2003 through December 2004) from the future potential emissions of the market pulp machine and associated emission increases from non-modified equipment. Table 2 details this emissions summary. The emissions calculations for Tables 1 and 2 can be found in detail in the facility's PSD application (see Appendix D of Application No. 16155). The detailed emissions calculations identify the non-modified production equipment that will experience increases in emissions as a result of the modifications to the market pulp machine dryer. These calculations have been reviewed and approved by the Division.

Table 2: Net Change in Emissions Due to the Major PSD Modification

Pollutant	Increase from Dryer of Market Pulp Machine (tpy)		Associated Units Increase (tpy)	Total Increase (tpy)
	Past Actual	Future Potential		
PM/PM_{10}	--	--	217	217
VOC	31.7	46.3	171	185
NO_X	--	--	894	894
CO	--	--	967	967
SO_2	--	--	255	255
TRS	1.49	2.17	9.14	9.82
Pb	--	--	0.02	0.02
Fluorides	--	--	0.11	0.11
H_2S	--	--	2.77	2.77
SAM	--	--	4.34	4.34

Based on the information presented in Tables 1 and 2 above, Weyerhaeuser's proposed modification, as specified per Georgia Air Quality Application No. 16155, is classified as a major modification under PSD because the potential emissions of PM and PM_{10} exceed 25 and 15 tpy, respectively; VOC, NO_X, and SO_2 exceed 40 tpy each; and CO exceeds 100 tpy.

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

2.0 PROCESS DESCRIPTION

On April 13, 2005, Weyerhaeuser submitted an application for an air quality permit to conduct modifications on the dryer of the market pulp machine at the Port Wentworth mill such that production capacity is increased from its current level of 1,047 ADSTPD to the originally permitted level of 1,200 ADSTPD. The modifications will take place at Bonnybridge Road, in Port Wentworth, which is located in Chatham County, Georgia.

The proposed project will consist of physical changes to the market pulp machine that will include, but not necessarily be limited to, the following:

- The addition of eight (8) new dryer decks;
- Steam system pressure increase modifications;
- The addition of a new dryer heat recovery system; and
- Upgraded drivers (if needed).

The dryer extension will be mounted directly onto the existing dryer's top drying deck, and the steam distribution header, exhaust plenum and roof panels will be relocated onto the new extension. The new, extended dryer will have integrated turning roll drives and a tape threading system and will function as a single, larger dryer.

The proposed project will result in an increase in emissions from the mill. The sources of these increases in emissions include the modified dryer unit of the market pulp machine, debottlenecked production units elsewhere in the production line, and ancillary process equipment such as the steam-generating units that that support the market pulp machine dryer.

The Weyerhaeuser permit application and supporting documentation are included in Appendix A and can be found online at www.georgiaair.org/airpermit.

3.0 REVIEW OF APPLICABLE RULES AND REGULATIONS

<u>State Rules</u>

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

Georgia Rule (b) [391-3-1-.02(2)(b)] is a general rule limiting the opacity of emissions from a source to less than 40 percent. This regulation applies to the Market Pulp Machine, including the dryer that is being modified as part of this project. This modification will have no impact on the regulatory applicability of Rule (b) to the Market Pulp Machine or its ability to comply with the opacity standard of the rule. Condition 3.4.13 of the facility's initial Title V operating permit incorporates this opacity standard.

Georgia Rule (e) [391-3-1-.02(2)(e)], commonly known as the process weight rule, limits PM emissions based on either of one of three equations, depending on the process input rate and age of the equipment, where E = emission rate (lb/hr) and P = process input rate (ton/hr). The Market Pulp Machine is subject to the standard expressed by the following equation in Georgia Rule (e), which is incorporated as Condition No. 3.4.14 of the facility's initial Title V operating permit.

$$\textit{For } P > 30 \textit{ ton/hr}, \quad E = 55 \times P^{0.11} - 40$$

This modification will have no effect on the applicability of Rule (e) to the Market Pulp Machine or its ability to comply with the particulate matter emissions standard of the rule.

Federal Rule - PSD

The regulations for PSD in 40 CFR 52.21 require that any new major source or modification of an existing major source be reviewed to determine the potential emissions of all pollutants subject to regulations under the Clean Air Act. The PSD review requirements apply to any new or modified source which belongs to one of 28 specific source categories having potential emissions of 100 tons per year or more of any regulated pollutant, or to all other sources having potential emissions of 250 tons per year or more of any regulated pollutant. They also apply to any modification of a major stationary source which results in a significant net emission increase of any regulated pollutant.

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

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

Definition of BACT

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

The BACT determination should, at a minimum, meet two core requirements.[1] The first core requirement is that the determination follow a "top-down" selection approach. The second core requirement is that the selection of a particular control system as BACT must be justified in terms of the statutory criteria and supported by the record and must explain the basis for the rejection of other more stringent candidate control systems.

[1] The discussion of the core requirements is taken from the Preamble to the Proposed NSR Reform, 61 FR 38272.

EPD's procedures for performing a top down BACT analysis are set forth in EPA's Draft New Source Review Workshop Manual (Manual), dated October 1990. One critical step in the BACT analysis is to determine if a control option is technically feasible.[2] 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 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 construction. 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 permitting 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 dissimilar source type. Consequently, technologies in the pilot scale testing stages of development are not considered available for BACT.

As mentioned before, the Manual also requires available technologies to be applicable to the source type under construction 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 for an applicant to make a demonstration on the contrary. For example, an 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.

According to the Environmental Appeals Board (see <u>In re: Kawaihae Cogeneration Project</u>, 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 Administration has explained that the primary purpose of the collateral impacts clause is… to temper the stringency of the technological 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 identified by EPA per BACT guidelines are listed below:

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

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[2] Discussion on technical feasibility is taken from the PSD Final Determination for AES Londonberry, L.L.C., Rockingham County, New Hampshire, authored by the U.S. EPA Region I, Air Permits Program.

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

NEW SOURCE PERFORMANCE STANDARDS

Federal Rule – 40 CFR 60 Subpart A

40 CFR 60 Subpart A, *General Provisions*, imposes generally applicable provisions for initial notifications, initial compliance testing, monitoring, and recordkeeping requirements. Although some equipment at the facility is subject to certain New Source Performance Standards and by extension Subpart A, the Market Pulp Machine is not subject to any specific New Source Performance Standards or the General Provisions of Subpart A.

Federal Rule – 40 CFR 60 Subparts D, Da, Db, and Dc

40 CFR 60 Subpart D, Da, Db, and Dc, *Standards of Performance for Industrial-Commerical-Institutional Steam Generating Units*, provide standards of performance for steam generators and steam generating units for which construction commenced after the applicable dates defined in each rule. The dryer on the Market Pulp Machine is not considered a steam-generating unit as defined in 40 CFR 60.41, 40 CFR 60.41a, 40 CFR 60.41b, or 40 CFR 6041c and is therefore not subject to any of these New Source Performance Standards.

Federal Rule – 40 CFR 60 Subpart BB

40 CFR 60 Subpart BB, *Standards of Performance for Kraft Pulp Mills*, provides performance standards for emission units at Kraft pulp mills, including digester systems, brownstock washer systems, multiple-effect evaporator systems, recovery boilers, smelt dissolving tanks, lime kilns, and condensate stripping systems (including the stripper condenser, feed tank, and column condensate tanks). Applicability is limited to emission units constructed or modified after September 24, 1976. The Market Pulp Machine that is the subject of this determination is not an affected source as defined in Subpart BB and is therefore not subject to this New Source Performance Standard.

Federal Rule – All Other NSPS

New Source Performance Standards are developed for particular industrial source categories or types of equipment. Other than the NSPS for developed for steam generating units (Subparts D, Da, Db, and Dc) and petroleum/volatile organic liquid storage tanks (Subparts K, Ka, and Kb), the applicability of a particular NSPS to a facility can readily be ascertained based on the industrial source category to which the facility belongs. All other NSPS subparts besides Subpart BB are categorically not applicable to Kraft pulp mills or the Market Pulp Machine that is the subject of this determination. Therefore, there are no New Source Performance Standards that apply to the Market Pulp Machine.

National Emissions Standards for Hazardous Air Pollutants

Federal Rule – 40 CFR 61 Subparts A & E

40 CFR 61 Subpart E, *Emission Standard for Mercury*, and the associated *General Provisions* of 40 CFR 61 Subpart A, apply to the No. 4 Combination Boiler at the mill. The market pulp machine and dryer are not subject to any requirements of this MACT standard, and the proposed modification will not alter the applicability of this standard to the market pulp machine or any other equipment at the mill.

Federal Rule – 40 CFR 63 Subpart A

40 CFR 63 Subpart A, *General Provisions*, imposes generally applicable provision for initial notifications, initial compliance testing, monitoring, and recordkeeping requirements. The facility must comply with the general provisions because equipment at the facility is subject to 40 CFR 63 Subpart S, 40 CFR 63 Subpart MM, 40 CFR 63 Subpart EEEE, and 40 CFR 63 Subpart DDDDD (the compliance deadlines for Subparts EEEE and DDDDD are in 2007). Equipment subject to these rules includes the recovery boiler, evaporator system, digester system, wash press, and filtrate tank. The market pulp machine, including the dryer, is not directly subject to any of the requirements of the aforementioned MACT standards. The proposed modification will not alter the applicability of Subpart A to the market pulp machine or any other process equipment at the mill.

Federal Rule – 40 CFR 63 Subpart S

40 CFR 63 Subpart S, *National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry*, requires that air emissions from various pulping and bleaching process operations, as well as condensate emissions, be collected and treated. The Port Wentworth mill is subject to Subpart S; process equipment subject to specific requirements of this MACT standard include the No. 4 Combination Boiler, the No. 3 Recovery Boiler, the No. 2 Lime Kiln, the Chip Bin, the Market Pulp Kamyr Continuous Digester, the No. 3 Evaporator Set, the Steam Stripper, The Concentrator System, the Pulp Diffusion Washer, the Pulp Knotter/Screening Units, the Pulp Decker, the Intermediate Liquor Storage Tank, the Strong Liquor Storage Tank, the Unscreened Stock Tanks, the Blow Tank, the Salt Cake Mix Tank, the WBL Storage Tanks, and the Bleach Plant. However, the Market Pulp Machine is not subject to any specific requirements of this MACT standard, and the proposed modifications will not affect the applicability of Subpart S to the Market Pulp Machine or any other process equipment at the mill.

Federal Rule – 40 CFR 63 Subpart MM

40 CFR 63 Subpart MM, National Emission Standards for Hazardous Air Pollutants for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills, requires the reduction of HAP emissions from the combustion sources at pulp mills that are major HAP sources. Specifically, the subpart requires HAP reduction from new or existing recovery boilers, smelt tanks, and lime kilns. The No. 3 Recovery Boiler, the No. 2 Lime Kiln, and the No. 3 Smelt Dissolving Tank at the mill are subject to specific requirements under this MACT standard. The Market Pulp Machine, however, is not subject to this MACT standard, and the proposed modifications will not affect the applicability of Subpart MM to the Market Pulp Machine or any other process equipment at the mill.

Federal Rule – 40 CFR 63 Subpart EEEE

40 CFR 63 Subpart EEEE, *National Emission Standards for Hazardous Air Pollutants for Organic Liquid Distribution*, regulates HAP emissions from organic liquid distribution tanks, loading racks, equipment leak components, and transport vehicles. In an earlier permitting action, the bleaching system methanol tank is subject to this regulation. Since that permit amendment was issued, however, the USEPA has issued a determination that methanol storage tanks at pulp mills are regulated under Subpart S and are therefore not subject to Subpart EEEE. (June 22, 2005, Federal Register, Vol. 70, No. 119, pages 36,141 – 36,147). The Market Pulp Machine will not be subject to this MACT standard, and the proposed project will not affect the applicability of Subpart EEEE to the Market Pulp Machine or any other process equipment at the mill.

Federal Rule – 40 CFR 63 Subpart DDDDD

40 CFR 63 Subpart DDDDD, *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process*, regulates HAP emissions from solid, liquid, and gaseous fuel fired boilers and indirect process heaters that are located at the facility that are major sources of HAPs. The No. 4 Combination Boiler appears to be the only unit at the mill that will be subject to this subpart. The recovery boiler is not subject to this regulation because it is regulated under 40 CFR 63 Subpart MM. Likewise, the Market Pulp Machine will not be subject to this MACT standard, and the proposed project will not affect the applicability of Subpart EEEE to the Market Pulp Machine or any other process equipment at the mill.

Federal Rule – 40 CFR 64

Under 40 CFR 64, the *Compliance Assurance Monitoring* Regulations (CAM), facilities are required to prepare and submit monitoring plans for certain emission units with the Title V application. The CAM Plans provide an on-going and reasonable assurance of compliance with emission limits. Under the general applicability criteria, this regulation applies to units that use a control device to achieve compliance with an emission limit and whose pre-controlled emissions levels exceed the major source thresholds under the Title V permitting program. Although other units may potentially be subject to CAM upon renewal of the Title V operating permit, such units are not being modified under the proposed project and need not be considered for CAM applicability at this time. Therefore, this applicability evaluation only addresses the Market Pulp Machine, which does not employ any air pollution control devices; therefore, the CAM requirements are not triggered by the proposed modification.

4.0 CONTROL TECHNOLOGY REVIEW

The proposed project will result in increased emissions of a number of pollutants, including particulate matter, VOC, NOx, CO, SO_2, TRS, lead, fluorides, H_2S, and SAM. However, only the increased emissions for particulate matter, VOC, NOx, CO, and SO_2 are significant enough to trigger PSD review. Of these, the only emissions that are emitted by the process equipment undergoing physical modifications under the proposed project are VOC. Therefore, the control technology review is limited to the VOC emissions from the Market Pulp Machine.

Market Pulp Machine - Background

The Market Pulp Machine (Source Code MP01) forms and dries a pulp sheet, which is then finished by cutting and baling. It was manufactured and installed in 1991. The maximum hourly input rate is 60 tons of pulp per hour, and the maximum annual input rate is 438,000 tons of pulp per year. Primary emissions from the Market Pulp Machine are VOC and, to a lesser extent, total reduced sulfur compounds (TRS).

Because only VOC emissions increases from the Market Pulp Machine have triggered PSD applicability, only VOC emissions were evaluated for Best Available Control Technology (BACT). The increase in TRS emissions from the Market Pulp Machine that will result from the proposed modification does not exceed the PSD significant modification threshold; therefore TRS emissions from the Market Pulp Machine were not evaluated for BACT-level controls.

Market Pulp Machine – VOC Emissions

VOC emissions from the Market Pulp Machine are chiefly the result of evaporative losses from the pulp as it is being dried. In addition to a wide rang of organic material, exhaust gases from the drying operations of the Market Pulp Machine are characterized by a high relative humidity, which results from the large amounts of water being driven off during the drying process. Therefore, exhaust gases from the Market Pulp Machine consist mainly of air and water vapor. The Market Pulp Machine is not equipped with any emission control devices; the VOC emissions are too dilute and the air flow too high for VOC abatement to be practical or economical.

Step 1: Identification of All Control Technologies

Weyerhaeuser identified potentially applicable VOC control technologies based on a review of information published in technical journals and trade literature, information provided by prospective control technology vendors, and experience in conducting control technology review for similar types of equipment. Taking into account the physical and operational characteristics of the dryer of the Market Pulp Machine, the candidate control options are listed below:

Option 1: Thermal Oxidation
Option 2: Catalytic Oxidation
Option 3: Carbon Adsorption
Option 4: Polymer Adsorption
Option 5: Hybrid Adsorption/Oxidation Systems
Option 6: Wet Scrubbing
Option 7: Biofiltration
Option 8: Condensation
Option 9: Good Operating Practices

Thermal Oxidation

In thermal oxidizers, VOC is oxidized to CO_2 and water vapor at a high temperature with a residence time between one-half second and one second. Thermal oxidizers can be designed as conventional thermal units, recuperative units, or regenerative thermal oxidizers (RTOs). A conventional thermal oxidizer does not have heat recovery capability. Therefore, the fuel cost for a conventional thermal oxidizer is extremely high and is not suitable for high volume flow applications. In a recuperative unit, the contaminated inlet air is preheated by the combustion exhaust gas stream through a heat exchanger. It is common now to design an RTO with a thermal recovery efficiency 95 percent. RTOs are commonly used to control VOC emissions in high-volume gas streams with low particulate matter concentrations.

An RTO generally consists of at least two chambers packed with ceramic media. The VOC laden gas enters one hot ceramic bed where the gas is heated to the desired combustion temperature. Auxiliary fuel may be required in this stage, depending on the heating value of the inlet gas. After reacting in the combustion zone, the gas then passes through the other ceramic bed, where the heat released from combustion is recovered and stored in the bed. The process flow is then switched so that the polluted gas is preheated by the ceramic bed. The system is operated in an alternating cycle, recovering up to 95 percent of the thermal energy during normal operation.

Catalytic Oxidation
Similar to an RTO, a regenerative catalytic oxidizer (RCO) oxidizes VOC to CO_2 and water vapor. However, an RCO uses catalysts to lower the activation energy required for the oxidation so that the oxidation can be accomplished at a lower temperature than in an RTO. As a result, the necessity for auxiliary fuel is lower than for an RTO. This technology is acceptable only for exhaust streams with a low particulate content and that do not contain chemical compounds that could “poison” the catalyst used in the oxidizer.

Carbon Adsorption
Carbon adsorption can potentially be used to remove VOC from exhaust gas streams. The core component of a carbon adsorption system is an activated carbon bed contained in a steel vessel. The VOC gas passes through the carbon bed where the VOC is adsorbed on the activated carbon. The cleaned gas is discharged to the atmosphere. The spent carbon is regenerated either at an on-site regeneration facility or by an off-site activated carbon supplier. Spend carbon is regenerated by using steam to displace adsorbed organic compounds at high temperatures.

Polymer Adsorption
Similar in concept and design to carbon adsorption systems, polymer adsorption systems can potentially be used to remove VOC from exhaust gas streams. The core component of a polymer adsorption system is synthetic polymer, such as a zeolyte or molecular sieve, designed to adsorb the target VOC. The polymer can be contained in fixed beds, fluidized beds, or fluidized beds in series with counter-current flow to VOC laden gas. The VOC laden gas passes through the polymer bed where the VOC is adsorbed on the polymer. The clean gas is discharged to the atmosphere. The spent polymer is regenerated by applying heat to displace the adsorbed organic compounds at high temperatures. The VOC is either recovered or burned in a separate device.

Hybrid Adsorption/Oxidation Systems
Hybrid adsorption/oxidation systems can potentially be used to remove and treat VOC from exhaust gas streams via a combination of an adsorption process used to remove the VOC from the gas stream, followed by oxidation to dispose of the VOC. Such systems can make the oxidation of VOC laden gas streams more economical by concentrating the VOC before incinerating it; thus reducing or eliminating the need for secondary fuels to maintain the optimum oxidation temperature in the oxidizer. A common design for these hybrid systems consists of a rotary concentrator, in which the VOC laden discharge gas stream is vented through a rotating wheel containing the adsorbent. As the adsorbent becomes saturated, the wheel rotates such that fresh adsorbent is available for the gas stream, and the saturated adsorbent is desorbed. The desorbed VOC, now in a more concentrated form, is discharged to a thermal or catalytic oxidizer. Rotary concentrators are commonly used to control VOC emissions from spray applications, which are characterized by high air flow rates and low VOC concentrations. They can achieve reduction efficiencies of up to 99 percent, with a design outlet concentration of less than 20 ppm VOC (as carbon).

Wet Scrubbing
Scrubbing of gas or vapor pollutants from a gas stream is usually accomplished in a packed column (or other type of column) where pollutants are absorbed by countercurrent flow of a scrubbing liquid. Because wet scrubbing most commonly uses water as the scrubbing liquid, wet scrubbing is only effective for water soluble VOC compounds. The VOC laden water is then treated to remove the VOC and returned to the scrubber.

Biofiltration
Biofiltration is a relatively recent air pollution control technology in which off-gases containing biodegradable organic compounds are vented, under controlled temperature and humidity through a special filter media containing microorganisms. As the exhaust gases pass through the biofilter, VOC is absorbed onto the filter media, and the microorganisms break down the compounds and transform them into CO_2 and water with varying efficiency. This application

cannot be applied in processes where the exhaust gas stream contains chemical compounds that are toxic to the microorganisms used in the filter media.

Condensation
Some control devices reduce VOC emissions by cooling the exhaust gas stream below the boiling point of the VOC constituents, thereby condensing the VOC into the liquid phase. Two common types of condensers used are surface condensers, in which the coolant does not come into direct contact with the gas stream, and contact condensers, in which the liquid coolant is sprayed into the gas stream. Most surface condensers are of the shell and tube design, in which the coolant is circulated through tubes and the VOC compounds condense within the outer shell. The coolant used in surface condensers may be recycled in a closed loop and direct recovery of the VOC from the gas stream is possible. In contact condensers, however, the spent coolant is contaminated with the condensed VOC and further processing is required to recover the VOC and the coolant. When used on mono-solvent systems, the condensed VOC liquid product can be recovered and reused or sold. However, if polymerizing materials are present in the system, fouling on the heat-transfer surfaces will occur. The lower the boiling point of the VOC to be recovered, the less practical and more expensive condensation becomes.

Good Operating Practices
A properly operated pulp machine minimizes VOC formation. Good operating practices (GOP) for a pulp machine consist essentially of controlling the generation of VOC that emanates from the additives used in the process.

Step 2: Elimination of Technically Infeasible Options

Option 1: Thermal Oxidation

Thermal oxidizers (including RTOs) have been widely used as VOC control technology in applications such as surface coating. Incorporating a thermal oxidizer to control emissions from the pulp dryer would essentially entail adding a combustion chamber to the dryer exhaust, where the exhaust stream would be heated to a temperature at which the VOC would be oxidized. Even then, due to the fugitive nature of the emissions of the dryer, not all of the VOC emitted from the Market Pulp Machine would be captured and treated by the oxidizer.

Regenerative thermal oxidizers are only effective when the exhaust stream contains VOC in concentrations exceeding 300 ppmv. The VOC concentration of the pulp machine dryer exhaust is approximately 9 ppmv, which is too low to make thermal oxidation effective or practical. In addition, VOC emissions from pulp machines are difficult to capture because of the large size of the machines and the fugitive nature of their emissions. Capturing the fugitive emissions from the pulp machine for control by any add-on control device, such as a thermal oxidizer, would be technically difficult to accomplish.

A review of the RACT/BACT/LAER Clearinghouse (RBLC) confirms that thermal oxidation is technically infeasible for this application; no other pulp dryers or paper machines utilize this technology to control emissions of VOC. Therefore, thermal oxidation is considered technically infeasible for the pulp machine and is not considered further in this analysis.

Option 2: Catalytic Oxidation

Catalytic oxidation is very similar in concept to thermal oxidation for control of VOC emissions from pulp machines, and its application can achieve similar reduction efficiencies. However, as with thermal oxidation, catalytic oxidation is only effective when the exhaust gas stream contains VOC in concentrations greater than 300 ppmv. As previously stated, the VOC concentration of the pulp machine dryer exhaust, at 9 ppmv VOC concentration, is significantly lower than the minimum threshold concentration required for effective catalytic oxidation. Therefore, the application of catalytic oxidation is not technically feasible due to the high volume of the exhaust gas and its low concentration of VOC.

Furthermore, VOC emissions from pulp machines are difficult to capture because of the large size of the machines and the fugitive nature of their emissions. Capturing the fugitive emissions from the pulp machine for control by any add-on control device, such as a catalytic oxidizer, would be technically difficult to accomplish.

A review of the RACT/BACT/LAER Clearinghouse (RBLC) confirms that catalytic oxidation is technically infeasible for this application; no other pulp dryers or paper machines utilize this technology to control emissions of VOC. Therefore, catalytic oxidation is considered technically infeasible for the pulp machine and is not considered further in this analysis.

Option 3: Carbon Adsorption

VOC has a strong affinity for the surface of activated carbon in a carbon adsorption control device. However, this affinity is inversely proportional to the temperature of the exhaust gas stream. Carbon adsorption is not recommended for exhaust streams with high humidity and temperatures above 150 °F. Carbon adsorption is most effective when VOC inlet concentrations are between 100 and 5,000 ppm, and the gas stream is cool and at moderate or low relative humidity. The gas stream from the pulp machine, in contrast, is at or near saturation with water vapor at a temperature of approximately 150 Fahrenheit degrees. In addition, the VOC concentration of the pulp machine exhaust gas stream is significantly lower than the optimum carbon adsorption operating range. Therefore, the performance of the carbon adsorber under these conditions would be greatly reduced.

Furthermore, the primary VOC emitted by the pulp machine is methanol. It has been demonstrated that carbon adsorption is a poor choice for controlling methanol emissions because of the poor adsorption isotherm for methanol. Activated carbon and zeolites can be used in combination to improve the control efficiency, but overall reduction is still relatively low, compared to reduction of VOC compounds with a higher affinity for adsorption onto the activated carbon or other media.

Finally, the VOC emissions from pulp machines are difficult to capture because of the large size of the machines and the fugitive nature of their emissions. Capturing the fugitive emissions from the pulp machine for control by any add-on control device, such as a carbon adsorber, would be technically difficult to accomplish.

A review of the RACT/BACT/LAER Clearinghouse (RBLC) confirms that carbon adsorption is technically infeasible for this application; no other pulp dryers or paper machines utilize this technology to control emissions of VOC. Therefore, carbon adsorption is considered technically infeasible for the pulp machine and is not considered further in this analysis.

Option 4: Polymer Adsorption

Polymer adsorption is very similar to carbon adsorption in concept; however, synthetic polymers or other exotic materials are used as adsorption media in lieu of activated carbon. While polymer adsorption can be more effective than adsorption using activated carbon in reducing VOC emissions from an exhaust stream with a high relative humidity, the maximum inlet temperature for polymer adsorption is limited to 120 Fahrenheit degrees. The exhaust gas stream temperature of the pulp machine exceeds this value by 30 degrees or more. As a result, Weyerhaeuser would have to install heat exchangers or similar devices between the pulp machine and the adsorber to cool the exhaust stream below 120 degrees to make this control system operable.

Even at temperatures below 120 Fahrenheit degrees, however, the use of polymer adsorption technology would not be very effective at reducing the VOC concentration of the pulp machine exhaust because at only 9 ppmv, the VOC concentration of the exhaust gas stream is significantly lower than the minimum optimal concentration recommended for application of this technology.

Furthermore, VOC emissions from pulp machines are difficult to capture because of the large size of the machines and the fugitive nature of their emissions. Capturing the fugitive emissions from the pulp machine for control by any add-on control device, such as a polymer adsorption system, would be technically difficult to accomplish.

A review of the RACT/BACT/LAER Clearinghouse (RBLC) confirms that polymer adsorption is technically infeasible for this application; no other pulp dryers or paper machines utilize this technology to control emissions of VOC. Therefore, polymer adsorption is considered technically infeasible for the pulp machine and is not considered further in this analysis.

Option 5: Hybrid Adsorption/Oxidation Systems

Hybrid adsorption/oxidation systems are designed to collect and temporarily hold VOC emissions from discharge streams using activated carbon or other adsorption media. Once the adsorption media is saturated, it is desorbed and the VOC is routed through an oxidizer at a higher concentration than that of the original discharge stream. The chief benefit of the application of this technology is the reduced energy demand of the oxidation stage, since the concentration of the VOC stream entering the oxidizer is significantly higher than that of the discharge stream leaving the process equipment being controlled.

However, this control technology is still limited by the constraints of both the adsorption and oxidation technologies that comprise it. In fact, such systems are typically designed to reduce VOC emissions to levels of approximately 20 ppm, whereas the VOC concentration of the discharge stream of the pulp machine dryer is already significantly below that value at 9 ppm. Thus, for the same reasons discussed above for both the adsorption and oxidation technologies, the application of a hybrid adsorption/oxidation system to abate VOC emissions from the Market Pulp Machine would not be effective and would be technically difficult to accomplish.

A review of the RACT/BACT/LAER Clearinghouse (RBLC) confirms that rotary concentrators and other types of hybrid adsorption/oxidation systems are technically infeasible for this application; no other pulp dryers or paper machines utilize this technology to control emissions of VOC. Therefore, the use of a rotary concentrator is considered technically infeasible for the pulp machine and is not considered further in this analysis.

Option 6: Wet Scrubbing

Conventional packed bed, wet scrubbers re-circulate a large flow of the scrubbant liquid to conserve water and energy and to reduce the amount of waste. However, recycling the scrubbing liquid diminishes the ability of the control device to capture certain VOC compounds. Such scrubbing systems are ineffective at controlling methanol, the primary VOC compound in the dryer’s exhaust, because of methanol’s relatively high Henry’s law constant. An alternative, once-through water scrubber can achieve reasonable methanol control efficiency, but performance with respect to control of other non-hydrophilic VOCs is unknown. Pinenes and terpenes, for example, are constituents in pulp machine exhausts, and this type of scrubber is expected to be ineffective for these compounds based on their chemical properties.

Moreover, there are many other types of VOC in the pulp machine gas discharge stream that also need to be controlled. Designing a scrubbing system and formulating a scrubbing reagent for all of these VOC compounds is technically infeasible.

In addition, VOC emissions from pulp machines are difficult to capture because of the large size of the machines and the fugitive nature of their emissions. Therefore, capturing emissions from the Market Pulp Machine for control by any add-on control device, such as wet scrubbing, would be technically difficult to achieve.

A review of the RACT/BACT/LAER Clearinghouse (RBLC) confirms that wet scrubbing is technically infeasible for this application; no other pulp dryers or paper machines utilize this technology to control emissions of VOC. Therefore, the use of wet scrubbing is considered technically infeasible for the pulp machine and is not considered further in this analysis.

Option 7: Biofiltration

Since Biofiltration is a biological, as opposed to physical or chemical, technology, it is highly sensitive to process conditions. Biofilters work best with saturated gas streams at approximately 90 to 100 Fahrenheit degrees in temperature, with a consistent flowrate and concentration of organic compounds. Because the gas stream from the pulp machine is approximately 150 Fahrenheit degrees, the gas stream would have to be cooled before being fed to the biofilter, which would release a relatively large amount of heat energy and result in the generation of a large amount of water. Additionally, based on the large exhaust gas flowrates from the dryer, a substantial amount of space would be needed to locate a biofilter.

The engineering problems associated with cooling the pulp machine exhaust stream to an acceptable temperature for the biofilter are significant. Biofiltration is an unproven technology with regard to applications for the exhaust streams from pulp machines, and no installations on dryers are known.

In addition, VOC emissions from pulp machines are difficult to capture because of the large size of the machines and the fugitive nature of their emissions. Therefore, capturing emissions from the Market Pulp Machine for control by any add-on control device, such as a biofilter, would be technically difficult to achieve.

A review of the RACT/BACT/LAER Clearinghouse (RBLC) confirms that biofiltration is technically infeasible for this application; no other pulp dryers or paper machines utilize this technology to control emissions of VOC. Therefore, the use of biofiltration is considered technically infeasible for the pulp machine and is not considered further in this analysis.

Option 8: Condensation

Condensation is most efficient when the VOC stream is concentrated (greater than 300 ppm VOC) and when the VOC compounds present in the stream have boiling points greater than 100 Fahrenheit degrees. When these conditions do exist, the removal efficiency of a condenser is highly dependent on the emission stream characteristics, including the nature of the VOC in question, VOC concentration, and type of coolant used. The presence of various pollutants in the exhaust stream complicates the application of a condenser, as multiple condensers in series would be required to capture all of the VOC. Thus, the practicality of using a condenser as a control device on a pulp machine is limited due to the high number of VOC compounds with varying characteristics.

Although a condenser could effectively be used to remove methanol, with a boiling point of approximately 150 Fahrenheit degrees, the exit concentration is less than the 300 ppm threshold needed for efficient operation of the condenser.

In addition, VOC emissions from pulp machines are difficult to capture because of the large size of the machines and the fugitive nature of their emissions. Therefore, capturing emissions from the Market Pulp Machine for control by any add-on control device, such as a condenser, would be technically difficult to achieve.

A review of the RACT/BACT/LAER Clearinghouse (RBLC) confirms that condensation is technically infeasible for this application; no other pulp dryers or paper machines utilize this technology to control emissions of VOC. Therefore, the use of condensation is considered technically infeasible for the pulp machine and is not considered further in this analysis.

Step 3: Ranking the Remaining Control Technologies by Control Effectiveness

Table 3: Ranking of Control Technology

Control Technology Ranking	Control Technology	Control Efficiency
1	Good Operating Practices	N/A

Step 4: Evaluating the Most Effective Controls and Documentation

The application of good operating practices is the only control technology that is feasible for the control of VOC emissions from the Market Pulp Machine.

Step 5: Selection of BACT

Weyerhaeuser is proposing to use good operating practices on the Market Pulp Machine as BACT. In addition, Weyerhaeuser conducted a review of BACT limits for VOC emitted from pulp machines. No numeric limits were imposed for any previous permits listed in the RBLC for VOC emissions from pulp machines or pulp dryers. Thus, because of the already low concentration of VOC in the exhaust stream from the pulp machine at the mill, the difficulty of monitoring VOC emissions from the dryer, and the absence of any precedent, a numeric BACT emission limit is not necessary. In addition, due to the fact that the mill uses low toxicity additives approved by the Food and Drug Administration (FDA), no changes to the additives used are expected to be required in order to implement GOP for the pulp machine.

Conclusion – VOC Control

The Division has determined that Weyerhaeuser's proposal to use good operating practices to minimize the emissions of VOC constitutes BACT. No specific, numeric emission limit is being established. As previously stated, Weyerhaeuser is already making efforts to reduce the quantity and toxicity of VOC emissions from the pulp machine.

Summary – VOC Control Technology Review for the Market Pulp Machine Dryer

To fulfill the PSD permitting requirements for VOC, a BACT analysis was conducted for the modified Market Pulp Machine dryer. The BACT selection for the pulp machine is summarized below in Table 4:

Table 4: BACT Summary for the Proposed Modified Market Pulp Machine

Pollutant	Control Technology	Proposed BACT Limit
VOC	Good Operating Practices	N/A

5.0 TESTING AND MONITORING REQUIREMENTS

Testing Requirements:

Because no specific, numeric VOC emission rate is being established, there are no applicable testing requirements being imposed.

Monitoring Requirements:

Because no specific, numeric VOC emission rate is being established, there are no applicable monitoring requirements being imposed.

CAM Applicability:

Because the Market Pulp Machine emissions are not abated by any air pollution control device, CAM is not applicable and is not being triggered by the proposed modification. Therefore, no CAM provisions are being incorporated into the facility's permit.

6.0 AMBIENT AIR QUALITY REVIEW

An air quality analysis is required to determine the ambient impacts associated with the construction and operation of the proposed modifications. The main purpose of the air quality analysis is to demonstrate that emissions emitted from the proposed modifications, in conjunction with other applicable emissions from existing sources (including secondary emissions from growth associated with the new project), will not cause or contribute to a violation of any applicable National Ambient Air Quality Standard (NAAQS) or PSD increment in a Class I or Class II area. NAAQS exist for NO_2, CO, $PM_{2.5,}$, PM_{10}, SO_2, Ozone (O_3), and lead. PSD increments exist for SO_2, NO_2, and PM_{10}.

The proposed project at the Weyerhaeuser mill triggers PSD review for NO_X, CO, SO_2, PM_{10}, and VOC. An air quality analysis was conducted to demonstrate the facility's compliance with the NAAQS and PSD Increment standards for NO_X, CO, SO_2, and PM_{10}. An additional analysis was conducted to demonstrate compliance with the Georgia air toxics program. This section of the application discusses the air quality analysis requirements, methodologies, and results. Supporting documentation may be found in the Air Quality Dispersion Report of the application and in the additional information packages.

<u>Modeling Requirements</u>

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

The proposed project will cause net emission increases of NO_X, CO, SO_2, PM_{10}, and VOC that are greater than the applicable PSD Significant Emission Rates. Therefore, air dispersion modeling analyses are required to demonstrate compliance with the NAAQS and PSD Increment. VOC does not have established PSD modeling significance levels (MSL) (an ambient concentration expressed in either $\mu g/m^3$ or ppm), and modeling is not required for VOC emissions. However, the project will likely have no impact on ozone attainment in the area based on data from the monitored levels of ozone in Chatham County (the three-year average, fourth highest 8-hour ozone level for the Savannah monitor is 0.069 ppm, below the current 0.08 ppm standard) and the level of emissions increases that will result from the proposed project. The southeast is generally NO_X limited with respect to ground level ozone formation.

<u>Significance Analysis: Ambient Monitoring Requirements and Source Inventories</u>

Initially, a Significance Analysis is conducted to determine if the NO_X, CO, SO_2, or PM_{10} emissions increases at the Weyerhaeuser mill would significantly impact the area surrounding the facility. Maximum ground-level concentrations are compared to the pollutant-specific U.S. EPA-established monitoring significant level (MSL). The MSL for the pollutants of concern are summarized in Table 5.

If a significant impact (i.e., an ambient impact above the MSL) does not result, no further modeling analyses would be conducted for that pollutant for NAAQS or PSD Increment. If a significant impact does result, further refined modeling would be completed to demonstrate that the proposed project would not cause or contribute to a violation of the NAAQS or consume more than the available Class II Increment.

Under current U.S. EPA policies, the maximum impacts due to the emissions increases from a project are also assessed against monitoring *de minimis* levels to determine whether pre-construction monitoring should be considered. These monitoring *de minimis* levels are also listed in Table 5. If either the predicted modeled impact from an emission increase or the existing ambient concentration is less than the monitoring *de minimis* concentration, the permitting agency has the discretionary authority to exempt an applicant from pre-construction ambient monitoring. This evaluation is required for NO_X, CO, SO_2, and PM_{10}.

If any off-site pollutant impacts calculated in the Significance Analysis exceed the MSL, a Significant Impact Area (SIA) would be determined. The SIA encompasses a circle centered on the mill with a radius extending out to (1) the farthest location where the emissions increase of a pollutant from the project causes a significant ambient impact, or (2) a distance of 50 km, whichever is less. All sources within a distance of 50 km of the edge of a SIA are assumed to potentially contribute to ground-level concentrations within the SIA and would be evaluated for possible inclusion in the NAAQS and PSD Increment analyses.

Table 5: Summary of Modeling Significance Levels

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

NAAQS Analysis

The primary NAAQS are the maximum concentration ceilings, measured in terms of total concentration of pollutant in the atmosphere, which define the "levels of air quality which the U.S. EPA judges are necessary, with an adequate margin of safety, to protect the public health." Secondary NAAQS define the levels that "protect the public welfare from any known or anticipated adverse effects of a pollutant." The primary and secondary NAAQS, listed in Table 6 below, are equivalent for NO_X, PM_{10}, and SO_2; no secondary NAAQS have been developed for CO.

Table 6: Summary of National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS	
		Primary / Secondary (ug/m^3)	Primary / Secondary (ppm)
PM_{10}	Annual	50 / 50	--
	24-Hour	150 / 150	--
SO_2	Annual	--	0.03 / None
	24-Hour	--	0.14 / None
	3-Hour	--	None / 0.5
NO_X	Annual	--	0.053 / 0.053
CO	8-Hour	--	9 / None
	1-Hour	--	35 / None

If the maximum pollutant impact calculated in the Significance Analysis exceeds the MSL at an off-property receptor, a NAAQS analysis is required. The NAAQS analysis would include the potential emissions from all emission units at the Weyerhaeuser mill, except for units that are generally exempt from permitting requirements and are normally operated only in emergency situations. The emissions modeled for this analysis would reflect the results of the BACT analysis for the modified emission unit. Mill emissions would then be combined with the allowable emissions of sources included in the regional source inventory. The resulting impacts, added to appropriate background concentrations, would be assessed against the applicable NAAQS to demonstrate compliance. For an annual average NAAQS analysis, the highest modeled concentration among five consecutive years of meteorological data would be assessed, while the highest second-high impact would be assessed for the short-term averaging periods.

PSD Increment Analysis

The PSD Increments were established to "prevent deterioration" of air quality in certain areas of the country where air quality was better than the NAAQS. To achieve this goal, U.S. EPA established PSD Increments for certain pollutants. The sum of the PSD Increment concentration and a baseline concentration defines a "reduced" ambient standard, either lower than or equal to the NAAQS that must be met in an attainment area. Significant deterioration is said to have occurred if the change in emissions occurring since the baseline date results in an off-property impact greater than the PSD Increment (i.e., the increased emissions "consume" more that the available PSD Increment).

U.S. EPA has established PSD Increments for NO_X, SO_2, and PM_{10}; no increments have been established for CO. The PSD Increments are further broken into Class I, II, and III Increments. The Weyerhaeuser mill is located in a Class II area. The PSD Increments are listed in Table 7.

Table 7: Summary of PSD Increments

Pollutant	Averaging Period	PSD Increment	
		Class I (ug/m^3)	Class II (ug/m^3)
PM_{10}	Annual	4	17
	24-Hour	8	30
SO_2	Annual	2	20
	24-Hour	5	91
	3-Hour	25	512
NO_X	Annual	2.5	25

To demonstrate compliance with the PSD Increments, the increment-affecting emissions (i.e., all emissions increases or decreases after the appropriate baseline date) from the mill and those sources in the regional inventory would be modeled to demonstrate compliance with the PSD Class II increment for any pollutant greater than the MSL in the Significance Analysis. For an annual average analysis, the highest incremental impact will be used. For a short-term average analysis, the highest second-high impact will be used.

The determination of whether an emissions change at a given source consumes or expands increment is based on the source classification (major or minor) and the time the change occurs in relation to baseline dates. The major source baseline date for NO_X is February 8, 1988, and the major source baseline for SO_2 and PM_{10} is January 5, 1975. Emission changes at major sources that occur after the major source baseline dates affect Increment. In contrast, emission changes at minor sources only affect Increment after the minor source baseline date, which is set at the time when the first PSD application is completed in a given area, usually arranged on a county-by-county basis. The minor source baseline dates have been set for PM_{10} and SO_2 as January 30, 1980, and for NO_2 as April 12, 1991. However, to be conservative, the increment analysis conducted by the applicant as part of this submission includes all emission changes at major sources and minor sources since the major source baseline date, regardless of the county-specific minor source baseline dates.

Four emission points will realize net emissions increases of each visibility-affecting pollutant associated with the proposed modification: the No. 2 Lime Kiln, the No. 3 Recovery Boiler, the No. 3 Smelt Tank, and the No. 4 Power Boiler. All other emission points and fugitive PM emissions are considered de minimis and were excluded from the analysis since emission increases are less than 5 tpy of each pollutant.

Modeling Methodology

Selection of Model

Two levels of air quality dispersion model sophistication exist: screening and refined dispersion modeling. Normally, screening modeling is performed to determine the need for refined modeling. When results from a screening model indicate potentially adverse impacts, a refined modeling analysis is performed. A refined modeling analysis can provide a more accurate estimate of a source's impact and requires more detailed and precise input data than does a screening model. Given the magnitude of emissions increases from the proposed project, refined modeling was relied upon to predict impacts.

A refined dispersion model requires several data inputs, including the quantity of emissions, meteorological history, and the initial conditions (e.g., velocity, flowrate, and temperature) of the stack exhaust to the atmosphere. Building structures that obstruct wind flow near emission points might cause stack discharges to become caught in the turbulent wakes of these structures, leading to downwash of the plumes. In addition, wind blowing around a building creates zones of turbulence that are greater than if the building were absent. These effects of building downwash inhibit dispersion and generally cause higher ground level pollutant concentrations. Therefore, building configurations near emission sources are also a data input into the model.

The dispersion modeling analyses was conducted using the latest version (dated 04269) of the ISC-PRIME model. ISC-PRIME is a public-domain model made available by the U.S. EPA that incorporates enhanced plume rise/building downwash algorithms into the U.S. EPA's commonly used Industrial Source Complex Short-Term Version 3 (ISCST3) model. Wind tunnel and field studies have demonstrated that the algorithms contained in ISC-PRIME more accurately depict building downwash situations than ISCST3.

Although ISC-PRIME is not currently an approved model under Appendix W, the model's superior handling of building downwash and addressing cavity regions made it an appropriate model for this project. Since ISC-PRIME is not currently an approved model under Appendix W, its use in permit applications requires U.S. EPA's approval, as well as the submittal of a notice to the Georgia EPD. Weyerhaeuser and the Division have received approval from the U.S. EPA to use ISC-PRIME for the purposes of modeling in support of this PSD permit application. Detailed information on the default options used in the modeling analysis are available in the modeling report attached to the permit application.

Treatment of Terrain

Topographical features of the area immediately surrounding the mill are essentially flat, and no complex terrain is located nearby. Complex terrain is defined as any terrain elevation exceeding stacktop height. Complex terrain is further sub-categorized into intermediate terrain (terrain elevation less than final plume rise height) and true complex terrain (terrain elevation greater than final plume rise height). A designation of terrain at a particular receptor is source dependent, since it depends on an individual source's release height. Because no complex terrain is located in the modeling domain, an evaluation of terrain types was not warranted for this analysis. The ISC-PRIME model ran in regulatory default mode with the elevated terrain heights option enabled.

Terrain elevations based on Digital Elevation Model (DEM) data obtained from the USGS was input into the ISC-PRIME model for each receptor. The DEM data consists of arrays of regularly spaced elevations and correspond to the 1:24,000 topographic quadrangle map series. The points in the array of elevations are at 30-meter intervals and are interpolated to determine elevations at the defined 100-meter, 200-meter, and 500-meter receptor intervals. All data obtained from the DEM files was checked for completeness and accuracy against elevations corresponding to USGS 1:24,000 scale topographical quadrangle maps. Any missing or erroneous data discovered during this check was replaced by direct extrapolation from USGS maps.

Meteorological Data

The ISC-PRIME dispersion modeling analysis was conducted using 1982 through 1986 pre-processed meteorological data based on surface observations taken from Savannah, Georgia (Station 03822) and upper air measurements from Waycross, Georgia (Station 13861). This meteorological data was obtained from Georgia EPD and is the data set preferred by the Division for ISC modeling of sources located in coastal Georgia. The anemometer height for surface measurements at Savannah during this period was 30 feet (9.144 meters).

Land Use Analysis

The land type near the mill needed to be classified as either urban or rural so that appropriate dispersion parameters could be used within the ISC-PRIME modeling analysis. Two land classification procedures, one based on land-use criteria and the other based on population density, can be used to determine the appropriate application of either urban or rural dispersion coefficients in a modeling analysis. Of the two, the land-use procedure is preferred by U.S. EPA.

As recommended by the Division for previous modeling analyses conducted at the mill, a simplified Auer land use analysis was performed for the area surrounding the mill by drawing a 3-km circle around the center of the mill (please refer to the area map provided in Appendix A of the permit application). Since over 50 percent of the land in the area within the 3-km radius is shown as undeveloped land on the USGS map, the land sue was classified as rural for this analysis. Accordingly, rural dispersion coefficients and mixing heights were specified in the ISC-PRIME model.

Receptor Grids

In the air dispersion modeling analyses, ground-level concentrations were calculated within two Cartesian receptor grids and at receptors placed along the property line. The property line receptors were spaced 100 meters apart, starting at an arbitrary point on the boundary. The property boundary encompasses all area under Weyerhaeuser's control to which the general public does not have access. None of the roads at the mill site are considered to be accessible to the general public, including the portion of Bonnybridge Road that leads into the facility. Facility guards monitor the property at all times to ensure that unauthorized people do not gain access to the property.

The two Cartesian grids covered a region extending from all edges of the mill boundary to the point where impacts from the project were determined to be no longer significant. The receptor grids that were used in this analysis included the following:

1. A property line grid consisting of evenly spaced receptors 100 meters apart that were placed along the respective mill boundary;

2. A fine grid containing receptors spaced 100 meters apart that extended one kilometer from the facility boundary, exclusive of on-site receptors; and

3. A course grid containing receptors spaced 1,000 meters apart that extended ten kilometers from the facility boundary, exclusive of receptors on-site and on the fine grid.

At the request of the Division, Weyerhaeuser utilized the same receptor grids that had been used previously in a toxics modeling analysis conducted for the facility in January 2005.

Representation of Emission Sources

Coordinate System

In all PSD modeling analyses input and output files, the location of emission sources, structures, and receptors were represented in the Universal Transverse Mercator (UTM) coordinate system. The UTM grid divides the world into coordinates that are measured in north meters (measured from the equator) and east meters (measured from the central meridian of a particular zone, which is set at 500 km). The central location of the mill is approximately 484.7 km East and 3,557.3 km North in Zone 17. All coordinates used in this modeling analysis were based on the North American Datum of 1927 (NAD27) in order to coincide with the DEM data that was obtained in this coordinate system.

Source Types and Parameters

The ISCST3 dispersion model allows for emissions units to be represented as point, area, or volume sources. For point sources with unobstructed vertical releases, it is appropriate to use actual stack parameters (i.e., height, diameter, exhaust gas temperature, and gas exit velocity) in the modeling analyses. There are several types of point sources at the mill, including unobstructed vertical, angled vertical, horizontal, and downward releases.

All point sources were modeled with actual stack parameters, except for gas exit velocity. For unobstructed vertical releases, the actual velocity was modeled. For point sources with angled vertical releases, only the vertical component of the exit velocity was modeled. For horizontal and downward releases, discharges were modeled at a velocity of 0.003 feet per second (0.001 meters per second), in accordance with U.S. EPA guidance. As a conservative representation of such sources, the actual stack diameter was modeled, and stack-tip downwash was enabled as a regulatory default option, even though U.S. EPA guidance suggests that such sources should be modeled by turning off stack-tip downwash. Using the default representation is more conservative, since the model will subtract from the physical release height of the source due to stack-tip downwash, even though the effect does not occur for horizontal stacks. A summary of source parameters used in the modeling analysis is included in Appendix B of the Class II air quality dispersion modeling report submitted with the permit application.

The emission rates modeled in the significance analysis were set equal to the emission increases associated with the dryer project. The particulate matter emission rates calculated as part of the PSD permit application were refined to determine the PM10 fraction and to include the condensable particulate matter. Several other refinements were made to the particulate matter emissions calculations as well. Appendix C of the Class II air quality dispersion modeling report submitted with the permit application contains details of the revised emission increase calculations for the mill used in the analysis and lists the emission rates modeled in the significance analysis.

The emission rates modeled in the full impact analysis were set equal to the potential emissions of the mill, which were provided with the permit application. For this modeling analysis, the particulate matter emission rates calculated as part of the permit application were refined to determine the PM10 fraction and to include condensable particulate matter. Several other refinements were made to the particulate matter emission calculations and short-term potential emission rates where required. Detailed data on the potential emission rates modeled in the full impact analysis is provided in Appendix D of the Class II air quality dispersion modeling report submitted with the application.

GEP Stack Height Analysis

The U.S. EPA has promulgated stack height regulations that restrict the use of stack heights in excess of “Good Engineering Practice” (GEP) in air dispersion modeling analyses. Under these regulations, that portion of a stack in excess of the GEP height is generally not creditable when modeling to determine source impacts. This requirement essentially prevents the use of excessively tall stacks to reduce groundlevel pollutant concentrations. In general, the lowest GEP stack height for any source is 65 meters by default. However, there are several stacks at the mill whose height exceeds 65 meters. The combination boiler has one stack with a height of 96.6 meters, and the recover boiler and smelt dissolving tank each have two stacks with heights of 96.6 meters. Due to the proximity of these stacks to a large structure (the taller portion of the recovery boiler building), the GEP height of each of these stacks is calculated to be 150 meters. Therefore, although the height of these stacks exceeds the 65 meter default GEP stack height, they still conform to U.S. EPA GEP stack height conventions. Consequently, the actual stack heights for the discharges from the combination boiler, recovery boiler and smelt tank were used in the modeling analysis. All other point source stacks have release heights below 65 meters. Therefore, all point sources were modeled at their actual release heights.

<u>Modeling Results</u>

Tables 8 and 9 show that the proposed project will not cause ambient impacts of NO_X, CO, or PM_{10} above the appropriate MSLs. Because the emissions increases from the proposed project result in ambient impacts less than the MSLs, no further PSD analyses were conducted for these pollutants. However, ambient impacts above the MSLs were predicted for SO_2 for the 3-hour and 24-hour averaging periods, requiring NAAQS and Increment analyses be performed for SO_2. TRS does not have an MSL.

Table 8: Class II Significance Analysis Results – Comparison to MSLs

Pollutant	Averaging Period	Year*	UTM East (km)	UTM North (km)	Maximum Impact (ug/m^3)	MSL (ug/m^3)	Significant?
NO_2	Annual	1986	484.680	3,559.632	0.50	1	No
PM_{10}	24-hour	1985	484.380	3,556.732	**5.05**	**5**	**Yes**
	Annual	1984	485.237	3,557.822	0.60	1	No
SO_2	3-hour	1986	484.980	3,556.932	11.77	25	No
	24-hour	1983	484.967	3,557.214	**5.82**	**5**	**Yes**
	Annual	1986	484.680	3,559.632	0.19	1	No
CO	1-hour	1986	485.580	3,557.432	100.27	2,000	No
	8-hour	1985	485.280	3,557.232	35.78	500	No

*Denotes year of maximum impact during the period modeled

Table 9: Significance Analysis Results – Comparison to Monitoring *De Minimis* Levels

Pollutant	Averaging Period	Year*	UTM East (km)	UTM North (km)	Monitoring De Minimis Level (ug/m^3)	Modeled Maximum Impact (ug/m^3)	Significant?
NO_2	Annual	1986	484.680	3,559.632	14	0.50	No
PM_{10}	24-hour	1985	484.380	3,556.732	10	5.05	No
SO_2	24-hour	1983	484.957	3,557.214	13	5.82	No
CO	8-hour	1985	485.280	3,557.232	575	35.78	No

*Denotes year of maximum impact during the period modeled

As indicated in the tables above, maximum modeled impacts were below the corresponding MSLs for both CO and NO_2. However, maximum modeled impacts were above the MSLs for the 24-hour averaging period for both SO_2 and PM_{10}. Therefore, a Full Impact Analysis was conducted for all three averaging periods (3-hour, 24-hour, and annual) for $SO_2$and two averaging periods (24-hour and annual) for PM_{10}.

Because all maximum modeled impacts are below the corresponding *de minimis* concentrations, no pre-construction monitoring is required for NO_2, PM_{10}, SO_2, or CO.

<u>Significant Impact Area</u>

For any off-site pollutant impact calculated in the Significance Analysis that exceeds the MSL, a Significant Impact Area (SIA) must be determined. The SIA encompasses a circle centered on the facility being modeled with a radius extending out to the lesser of either: 1) the farthest location where the emissions increase of a pollutant from the proposed project causes a significant ambient impact, or 2) a distance of 50 kilometers. All sources of the pollutants in question within the SIA plus an additional 50 kilometers are assumed to potentially contribute to ground-level concentrations and must be evaluated for possible inclusion in the NAAQS and Increment Analysis.

Based on the results of the Significance Analysis, the distance between the mill and the furthest receptor from the mill that showed a modeled concentration exceeding the corresponding MSL was determined to be less than 0.5 kilometers for both SO2 and PM10. To be conservative, regional source inventories for both of these pollutants were prepared for sources located within 55 kilometers of the mill. Therefore, sources from the following counties were evaluated for inclusion in the Full Impact Analysis:

Bryan County, Georgia
Bulloch County, Georgia
Chatham County, Georgia
Effingham County, Georgia
Evans County, Georgia

Liberty County, Georgia
Beaufort County, South Carolina
Hampton County, South Carolina
Jasper County, South Carolina

NAAQS and Increment Modeling

The next step in completing the NAAQS and Increment analyses was the development of a regional source inventory. Nearby sources that have the potential to contribute significantly within the mill's SIA are ideally included in this regional inventory. Weyerhaeuser requested and received an inventory of NAAQS and PSD Increment sources from Georgia EPD. Weyerhaeuser reviewed the data received and calculated the distance from the mill to each facility in the inventory. All sources more than 50 km outside the SIA were excluded. The appropriate regional source emissions inventory for the aforementioned counties located in South Carolina was obtained from the South Carolina Department of Health and Environmental Control.

The distance from the mill of each source listed in the regional inventories was calculated, and all sources located more than 55 kilometers from the mill were excluded from the analysis. Additionally, pursuant to the "20D Rule," facilities outside the SIA were also excluded from the inventory if the entire facility's emissions (expressed in tons per year) were less than 20 times the distance (expressed in kilometers) from the facility to the edge of the SIA. In applying the 20D Rule, facilities in close proximity to each other (within approximately 5 kilometers of each other) were considered as one source.

The regional source inventory used in the analysis is included in the application and the attached modeling report.

NAAQS Analysis

In the NAAQS analysis, impacts within the mill's SIA due to the potential emissions from all sources at the mill and those sources included in the regional inventory were calculated. Since the modeled ambient air concentrations only reflect impacts from industrial sources, a "background" concentration was added to the modeled concentrations prior to assessing compliance with the NAAQS.

The results of the NAAQS analysis are shown in Table 10. For the short-term averaging periods, the impacts are the highest second-high impacts. For the annual averaging period, the impacts are the highest impact. When the total impact at all significant receptors within the SIA are below the corresponding NAAQS, compliance is demonstrated.

Table 10: NAAQS Analysis Results

Pollutant	Averaging Period	Year *	UTM East (km)	UTM North (km)	Maximum Impact (ug/m^3)	Background (ug/m^3)	Total Impact (ug/m^3)	NAAQS (ug/m^3)	Exceed NAAQS?
SO_2	3-hour	1984	483.880	3,556.232	372.37	115	487.37	1,300	No
	24-hour	1984	484.280	3,559.332	95.60	51	146.60	365	No
	Annual	1982	486.380	3,556.232	14.46	8.1	22.56	80	No
PM_{10}	24-hour	1984	486.480	3,556.532	104.98	38	142.98	150	No
	Annual	1984	486.480	3,556.232	19.00	20	39.01	50	No

* Denotes year of maximum impact during the period modeled.

As indicated in Table 10 above, the total modeled impact for the 24-hour averaging period for PM_{10} exceeds the corresponding NAAQS. All of the other total modeled impacts at all significant receptors within the SIA are below the corresponding NAAQS.

<u>Increment Analysis</u>

As noted previously, Weyerhaeuser elected to conservatively assume the NAAQS inventory was equivalent to the Increment inventory. Therefore, the modeled impacts from the NAAQS run were evaluated to determine whether compliance with the Increment was demonstrated. The results are presented in Table 11.

Table 11: Increment Analysis Results

Pollutant	Averaging Period	Year*	UTM East (km)	UTM North (km)	Maximum Impact (ug/m^3)	Increment (ug/m^3)	Exceed Increment?
SO_2	3-hour	1983	485.280	3,557.232	245.33	512	No
	24-hour	1983	485.280	3,557.232	90.68	91	No
	Annual	1983	485.580	3,557.032	13.618	20	No
PM_{10}	24-hour	1982	484.080	3,556.132	17.9	30	No
	Annual	1982	484.080	3,556.132	3.9	17	No
NOx	Annual	1986	484.680	3,559.632	0.50	25	No

* Denotes year of maximum impact during the period modeled.

Table 11 demonstrates that the impacts are below the corresponding increments for each of the three averaging periods for SO_2 and for both the 24-hour and annual averaging period for PM_{10}, even with the conservative modeling assumption that all NAAQS sources were Increment sources.

In the modeling report submitted by the applicant, the modeled 24-hour PM_{10} impacts exceeded the associated NAAQS and increment values. However, none of the modeled exceedances reported by the applicant occurred at the receptor located at 484,380 meters East and 3,556,732 meters North (Zone 17) in the year 1985. This receptor was the only receptor with modeled impacts exceeding the MSL in the Significance Analysis. Therefore, despite the modeled 24-hour PM_{10} exceedances of the NAAQS and increment values, the proposed dryer modification project will not result in or contribute to any NAAQS or increment violations since the impacts from this project are not significant at the locations and times when the NAAQS or increment are exceeded.

At the Division's request, Weyerhaeuser prepared tables containing all modeled exceedances of the 24-hour NAAQS and increment for PM_{10}. These tables were submitted as Appendix H of the Class II Air Quality Dispersion Modeling Report submitted with the permit application. The data in these tables indicate that the maximum percentage of the NAAQS, adjusted for the contribution of regional background sources, consumed by only the mill's emission points is less than or equal to 7 percent at those receptors with modeled NAAQS exceedances. Likewise, the maximum percentage of the increment consumed by only the mill's sources is less than or equal to 50 percent at those receptors with modeled increment exceedances. The increment consumption percentage would have been much smaller if Weyerhaeuser had modeled increment-expanding sources as part of the analysis. Instead, no increment-expanding sources were modeled even though significant reductions in PM_{10} emissions have been made at the mill since the major source baseline date.

Subsequent modeling performed by EPD does not indicate an exceedance of either the associated NAAQS or increment for the 24-hour PM_{10} standard.

Ambient Monitoring Requirements

The impacts for NO_X, CO, SO_2, and PM_{10} quantified in Table 8 of the Significance Analysis are compared to the Monitoring *de minimis* concentrations, shown in Table 9 to determine if ambient monitoring requirements need to be considered as part of this permit action. Because all maximum modeled impacts are below the corresponding de minimis concentrations, no pre-construction monitoring is required for NO_2, PM_{10}, SO_2, or CO.

As noted previously, the VOC *de minimis* concentration is mass-based (100 tpy) rather than ambient concentration-based (ppm or $\mu g/m^3$). Projected VOC emissions increases resulting from the proposed modification exceed 100 tpy; however, the current Georgia EPD ozone monitoring network (which includes monitors in Chatham County) will provide sufficient ozone data such that no pre-construction or post-construction ozone monitoring is necessary.

Class I Area Analysis

Federal Class I areas are regions of special national or regional value from a natural, scenic, recreational, or historic perspective. Class I areas are afforded the highest degree of protection among the types of areas classified under the PSD regulations. U.S. EPA has established policies and procedures that generally restrict consideration of impacts of a PSD source on Class I Increments to facilities that are located near a federal Class I area. Historically, a distance of 100 km has been used to define "near", but more recently, a distance of 200 kilometers has been used for all facilities that do not combust coal.

The three Class I areas within approximately 200 kilometers of the Port Wentworth mill are the Wolf Island National Wildlife Refuge (NWR), located approximately 85 kilometers south of the mill along Georgia's coast; the Okefenokee NWR, located approximately 170 kilometers south-southwest of the mill along the Georgia-Florida border; and the Cape Romain NWR, approximately 170 kilometers to the northeast of the mill along South Carolina's coast. The U.S. Fish and Wildlife Service (FWS) is the designated Federal Land Manager (FLM) responsible for oversight of all three of these Class I areas.

In conducting the Class I Area Analysis, Weyerhaeuser made an evaluation of major increment consuming and expanding sources at the mill. The results of this evaluation are presented in Tables 12 and 13 below:

Table 12: Summary of Major Increment-Consuming Sources

Emission Unit	Increment Consuming?			Emission Rates (tpy)		
	SO_2	PM	NOx	SO_2	PM	NOx
No.3 Recovery Boiler (RE01)	Yes	Yes	Yes*	2,190	206	311
No. 3 Smelt Tank (SM01)	Yes	Yes	Yes*	14	93	14
No. 2 Lime Kiln (LK01)	Yes	Yes	Yes*	217	73	137
No. 4 Power Boiler (PB04)	Yes	Yes	Yes	1,479	240	1,202
			Totals:	3,900	612	1,664

* These units were installed prior to February 8, 1988. Therefore, only increases in emissions from these units realized as a result of physical modifications or changes in the method of operation were considered to be increment-consuming.

Table 13: Summary of Major Increment-Expanding Sources

Emission Unit	Increment Expanding?			Emission Rates (tpy)		
	SO_2	PM	NOx	SO_2	PM	NOx
Bark Burner	Yes	Yes	Yes	158	215	285
No. 1. Lime Kiln	Yes	Yes	No	35	108	--
Nos. 1 & 2 Smelt Tanks	Yes	Yes	No	--	166	--
No. 1 Power Boiler	Yes	Yes	Yes	1,778	188	424
Nos. 2 & 3 Power Boilers	Yes	Yes	Yes	306	129	1,235
Old No. 1 Power Boiler	Yes	Yes	No	1,467	153	--
Old No. 2 Power Boiler	Yes	Yes	No	1,467	153	--
			Totals:	5,211	1,112	1,944

Table 14 summarizes the net changes in increment consumption values since the two baseline dates of January 5, 1975, and February 8, 1988. As indicated in the table, the net change in increment-affecting emissions has been negative for SO_2 , PM, and NOx. Therefore, the overall impact on air quality at nearby Class I areas due to emissions changes from the mill since the baseline dates to the completion of the proposed dryer project has been decreased emissions of SO_2 , PM, and NOx.

Table 14: Summary of Net Change in Increment Consumption

	Pollutant		
	SO_2	PM	NOx
Increment-Consuming Emission Rates (tpy)	3,900	612	1,664
Increment-Expanding Emission Rates (tpy)	-5,211	-1,112	-1,944
Net Increment Affecting Emissions (tpy)	-1,311	-498	-280

Table 15 summarizes the emissions increases associated with the proposed pulp machine dryer project for PSD and AQRV pollutants.

Table 15: Dryer Project Equipment and Emissions Inventory

	Emissions Increases (tpy)			
Emissions Source	SO_2	H_2SO_4	PM_{10}*	NOx
No. 2 Lime Kiln	18.2	< 0.01	50.5	49.4
No. 3 Recovery Boiler	129	3.26	12.4	45.0
No. 3 Smelt Tank	4.89	0.05	35.5	4.89
No. 4 Power Boiler	103	1.03	157	795
Total Emissions Increase (tpy):	256	4.34	257	894

* Sum of both filterable and condensable particulate emissions.

<u>Model and Parameter Selection:</u>

The preferred model for analyzing long-range pollutant transport (i.e., distances greater than 50 kilometers) is the CALPUFF modeling system. The latest U.S. EPA-approved version (Version 040716) of the CALPUFF model was used to determine the possible impacts of the proposed pulp machine dryer project on Class I Increment and AQRV at the three identified Class I areas in the vicinity of the mill. The beta version of CALPUFF was used to avoid many known bugs in the preceding regulatory Version 030402. Most notably, the Class I analysis was conducted using a Lambert Conformal Coordinate (LCC) system representation, which is appropriate for a modeling domain of the size considered in this analysis. LCC system representation is not supported in the previous regulatory Version 030402.

CALPUFF is a multi-layer, multi-species, non-steady-state, Langrangian puff model, which can simulate the effects of temporal and spatial-varying meteorological conditions on pollutant transport, transformation, and removal. For this refined analysis, meteorological fields generated by CALMET were used as inputs to the CALPUFF model to ensure that the effects of terrain and spatially varying surface characteristics on meteorology were considered.

In addition to the meteorological data, the CALPUFF model uses several other input files to specify source and receptor parameters. The selection and control of CALPUFF options are determined by user-specific inputs contained in the control file. This file contains all of the necessary information to define a model run (e.g., starting date, run length, grid specifications, technical options, and output options). The air quality modeling was performed using CALPUFF default options unless otherwise noted, as specified in the federal *Guideline* and IQAQM documents. Detailed information on the modeling domain, meteorological data, background concentrations, and model implementation are included in the Class I PSD Increment and Air Quality Related Values Analysis submitted with the permit application.

The Division's Class I modeling was performed using the more conservative ISC-Prime (version 04269) model; for this reason the Division's modeling results, although still below applicable thresholds, were higher than those reported by the applicant.

Results – Class I Significance Analysis Results

As indicated in Table 16 below, the significance level is not exceeded for any of the pollutants.

Table 16: Class I Significance Analysis Results – Comparison to MSLs

Pollutant	Averaging Period	Year*	UTM East (km)	UTM North (km)	Maximum Impact (ug/m^3)	MSL (ug/m^3)	Significant?
NO_2	Annual	1983	470.279	3,469.634	0.01468	0.1	No
PM_{10}	24-hour	1983	469.487	3,469.636	0.16086	0.3	No
	Annual	1983	471.072	3,469.632	0.00657	0.2	No
SO_2	3-hour	1984	471.072	3,469.632	0.67572	1.0	No
	24-hour	1983	469.487	3,469.636	0.14203	0.2	No
	Annual	1983	469.487	3,469.636	0.00576	0.1	No

*Denotes year of maximum impact during the period modeled

Results – Class I Increment Analysis:

The results of the Class I PSD Increment Analysis prepared by the Division are presented below in Table 17. Although these impact levels are higher than those obtained through the applicant's CALPUFF modeling, they are still well below the allowable increment thresholds.

Table 17: Class I Increment Analysis Summary

Pollutant	Averaging Period	Year*	UTM East (km)	UTM North (km)	Maximum Impact (ug/m^3)	Increment (ug/m^3)	Exceed Increment?
SO_2	3-hour	1984	471.072	3,469.632	0.67572	25	No
	24-hour	1983	469.487	3,469.636	0.14203	5	No
	Annual	1986	484.680	3,559.632	0.19	2	No
PM_{10}	24-hour	1983	469.487	3,469.636	0.16086	8	No
	Annual	1983	471.072	3,469.632	0.00657	4	No
NOx	Annual	1983	470.279	3,469.634	0.01468	2.5	No

Results – Deposition Analysis:

The maximum predicted sulfur and nitrogen depositions at the Wolf Island, Okefenokee, and Cape Romain areas are presented in Table 18. The results of the deposition analysis show that the predicted sulfur and nitrogen deposition impacts are well below the threshold screening values.

Table 18: Sulfur and Nitrogen Deposition Impacts

Class I Area & Species	Deposition Assessment Threshold (kg/ha/yr)	1990 Modeled Deposition (kg/ha/yr)	1992 Modeled Deposition (kg/ha/yr)	1996 Modeled Deposition (kg/ha/yr)
Wolf Island				
Total Sulfur	0.01	0.00142	0.00148	0.00117
Total Nitrogen	0.01	0.00162	0.00145	0.00141
Okefenokee				
Total Sulfur	0.01	0.000875	0.00107	0.00122
Total Nitrogen	0.01	0.00107	0.00157	0.00161
Cape Romain				
Total Sulfur	0.01	0.00143	0.00159	0.00236
Total Nitrogen	0.01	0.00146	0.00193	0.00237

Results – Regional Haze Analysis:

The 24-hour average visibility impacts predicted by CALPUFF for the Okefenokee, Wolf Island, and Cape Romain Class I areas are presented in Tables 19 through 21below. Table 19 presents the 24-hour average peak visibility change using the U.S. EPA background concentrations and Method 2 processing. These results indicate that the 5 percent threshold is exceeded for six 24-hour averaging periods at Cape Romain.

Table 19: Peak 24-Hour Average Visibility Degradation – Method 2

Class I Area & Metric	Critical Single Source Extinction Change	1990 Modeled Extinction Change	1992 Modeled Extinction Change	1996 Modeled Extinction Change
Wolf Island				
Visibility Extinction (%)	5	7.46	4.64	6.79
Days Over 5% Threshold	--	2	0	4
Okefenokee				
Visibility Extinction (%)	5	3.12	4.37	3.94
Days Over 5% Threshold	--	0	0	0
Cape Romain				
Visibility Extinction (%)	5	5.61	9.52	3.62
Days Over 5% Threshold	--	2	1	0

Table 20 summarizes the same model results interpreted using the 98th percentile metric as promulgated by U.S. EPA for determination causation and contribution of visibility impairment under the Regional Haze Rule. There are no visibility impairment events exceeding 5 percent change at the 98th percentile for the three years of meteorological data modeled, indicating that the frequency and duration of the exceedances of the 24-hour averaging periods presented above in Table 19 is not significant.

Table 20: 98th Percentile 24-Hour Average Visibility Degradation – Method 2

Class I Area & Metric	Critical Single Source Extinction Change	1990 Modeled Extinction Change	1992 Modeled Extinction Change	1996 Modeled Extinction Change	3-Year 98th Percentile
Wolf Island					
Visibility Extinction (%)	5	2.45	1.78	1.97	2.19
Days Over 5% Threshold	--	0	0	0	0
Okefenokee				4	
Visibility Extinction (%)	5	1.09	1.39	2.02	1.77
Days Over 5% Threshold	--	0	0	0	0
Cape Romain					
Visibility Extinction (%)	5	1.97	1.50	1.27	1.68
Days Over 5% Threshold	--	0	0	0	0

Table 21 summarizes the model results processed using Method 7, which indicate only one peak 24-hour average visibility change exceeding 5 percent at Wolf Island and no other exceedances of the threshold. These Method 7 post-processing results indicate only one peak visibility impairment event over 5 percent, compared to nine total peak visibility impairment events over the 5 percent threshold using Method 2 post-processing in Table 19 above. This analysis suggests that peak modeled visibility impairment events identified using Method 2 result from naturally occurring obscuration, such as clouds, fog, or precipitation. Interpretation of Method 2 results using the 98th percentile as presented in Table 20 indicates that excluding peak events, which may be attributable to natural or anthropogenic visibility impairment, results in a level of visibility impairment well below the 5 percent threshold.

Table 21: Peak 24-Hour Average Visibility Degradation – Method 7

Class I Area & Metric	Critical Single Source Extinction Change	1990 Modeled Extinction Change	1992 Modeled Extinction Change	1996 Modeled Extinction Change
Wolf Island				
Visibility Extinction (%)	5	1.52	3.27	5.89
Days Over 5% Threshold	--	0	0	1
Okefenokee				
Visibility Extinction (%)	5	3.12	3.44	3.94
Days Over 5% Threshold	--	0	0	0
Cape Romain				
Visibility Extinction (%)	5	2.15	1.687	1.68
Days Over 5% Threshold	--	0	0	0

Based on the results of the modeling presented in Tables 19 through 21 above, Weyerhaeuser concluded that the Port Wentworth Mill does not cause or significantly contribute to visibility impairment at the Wolf Island, Cape Romain, or Okefenokee Class I areas.

7.0 ADDITIONAL IMPACT ANALYSES

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

Soils and Vegetation:

The effect of a proposed project's emissions on local soils and vegetation is often addressed through comparison of modeled impacts to the secondary NAAQS. The secondary NAAQS were established to protect general public welfare and the environment. Impacts below the secondary NAAQS are assumed to indicate a lack of adverse impacts on soils and vegetation. As discussed in Part 6.0 of this determination, the modeled ambient impacts associated with the proposed project are below the MSLs. Therefore, no negative impacts on soils and vegetation are anticipated to result from the implementation of the proposed project.

Growth:

The purpose of a growth analysis is to predict how much new growth is likely to occur as a result of the project and the resulting air quality impacts from this growth. No adverse impacts on growth are anticipated from the project since any workforce growth and associated residential and commercial growth that would be associated with the proposed project (expected to be minimal) would not cause a quantifiable impact on the air quality of the area surrounding the facility.

Visibility:

Visibility impairment is any perceptible change in visibility (visual range, contrast, atmospheric color, etc.) from that which would have existed under natural conditions. Poor visibility is caused when fine solid or liquid particles, usually in the form of volatile organics, nitrogen oxides, or sulfur oxides, absorb or scatter light. This light scattering or absorption actually reduces the amount of light received from viewed objects and scatters ambient light in the line of sight. This scattered ambient light appears as haze.

Another form of visibility impairment in the form of plume blight occurs when particles and light-absorbing gases are confined to a single elevated haze layer or coherent plume. Plume blight, a white, gray, or brown plume clearly visible against a background sky or other dark object, usually can be traced to a single source such as a smoke stack.

Georgia's SIP and Georgia *Rules for Air Quality Control* provide no specific prohibitions against visibility impairment other than regulations limiting source opacity and protecting visibility at federally protected Class I areas. To otherwise demonstrate that visibility impairment will not result from continued operation of the mill, the VISCREEN model was used to assess potential impacts on ambient visibility at sensitive receptors within the SIA of the Port Wentworth Mill. Table 22 provides the locations of these sensitive receptors and their respective distances from the mill.

Table 22: Sensitive Receptors for Visibility Analysis

Receptor Location	Distance to the Mill (km)
Wormsloe Historic Site (WHS)	20.86
Skidaway Island State Park (SISP)	25.57
Fort McAllister Historic Park (FMHP)	29.73
Fort Morris Historic Site (FMHS)	45.00
Savannah/Hilton Head International Airport (SAV)	12.19
Hunter Army Airfield (HAA)	16.53
Wright Army Airfield (Fort Stewart) (WAA)	48.63

Since there is no ambient visibility protection standard for Class II areas, this analysis is presented for informational purposes only and predicted impacts in excess of screening criteria are not considered "adverse impacts" nor cause further refined analyses to be conducted.

The primary variables that affect whether a plume is visible or not at a certain location are (1) quantity of emissions, (2) types of emissions, (3) relative location of source and observer, and (4) the background visibility range. For this exhaust plume visibility analysis, a Level-1 visibility analysis was performed using the latest version of the EPA VISCREEN model according to the guidelines published in the *Workbook for Plume Visual Impact Screening and Analysis* (EPA-450/4-88-015). The VISCREEN model is designed specifically to determine whether a plume from a facility may be visible from a given vantage point. VISCREEN performs visibility calculations for two assumed plume- viewing backgrounds (horizon sky and a dark terrain object). The model assumes that the terrain object is perfectly black and located adjacent to the plume on the side of the centerline opposite the observer.

In the visibility analysis, the total project NO_X and PM_{10} emissions increases were modeled using the VISCREEN plume visibility model to determine the impacts. For both views inside and outside the Class II area, calculations are performed by the model for the two assumed plume-viewing backgrounds. The VISCREEN model output shows separate tables for inside and outside the Class II area. Each table contains several variables: theta, azi, distance, alpha, critical and actual plume delta E, and critical and actual plume contrast. These variables are defined as:

1. *Theta* – Scattering angle (the angle between direction solar radiation and the line of sight). If the observer is looking directly at the sun, theta equals zero degrees. If the observer is looking away from the sun, theta equals 180 degrees.

2. *Azi* – The azimuthal angle between the line connecting the observer and the line of sight.

3. *Alpha* – The vertical angle between the line of sight and the plume centerline.

4. *delta E* – Used to characterize the perceptibility of a plume on the basis of the color difference between the plume and a viewing background. A delta E of less than 2.0 signifies that the plume is not perceptible.

5. *Contrast* – The contrast at a given wavelength of two colored objects such as plume/sky or plume/terrain.

Table 23: Level I VISCREEN Results

Receptor		Max Visual Impact Inside Class II Area				Max Visual Impact Outside Class II Area				Level II Analysis Required?
		Delta E		Contrast		Delta E		Contrast		
		Plume	Critical	Plume	Critical	Plume	Critical	Plume	Critical	
WHS	Sky	3.629	2.000	0.009	0.050	3.898	2.000	0.011	0.050	Yes
	Sky	1.213	2.000	-0.021	0.050	1.219	2.000	-0.024	0.050	No
	Terrain	1.696	2.000	0.022	0.050	2.683	2.000	0.029	0.050	Yes
	Terrain	0.361	2.000	0.014	0.050	0.754	2.000	0.028	0.050	No
SISP	Sky	2.853	2.000	0.008	0.050	2.936	2.000	0.008	0.050	Yes
	Sky	0.922	2.000	-0.017	0.050	0.922	2.000	-0.018	0.050	No
	Terrain	1.111	2.000	0.015	0.050	1.386	2.000	0.014	0.050	No
	Terrain	0.243	2.000	0.010	0.050	0.394	2.000	0.014	0.050	No
FMHP	Sky	2.334	2.000	0.006	0.050	2.370	2.000	0.007	0.050	Yes
	Sky	0.732	2.000	-0.014	0.050	0.734	2.000	-0.015	0.050	No
	Terrain	0.788	2.000	0.011	0.050	0.908	2.000	0.013	0.050	No
	Terrain	0.174	2.000	0.008	0.050	0.209	2.000	0.009	0.050	No
FMHS	Sky	1.137	2.000	0.003	0.050	1.191	2.000	0.004	0.050	No
	Sky	0.318	2.000	-0.008	0.050	0.332	2.000	-0.008	0.050	No
	Terrain	0.254	2.000	0.003	0.050	0.308	2.000	0.004	0.050	No
	Terrain	0.058	2.000	0.003	0.050	0.072	2.000	0.004	0.050	No
SAV	Sky	6.547	2.000	0.017	0.050	8.188	2.000	0.022	0.050	Yes
	Sky	2.191	2.000	-0.038	0.050	2.616	2.000	-0.050	0.050	Yes
	Terrain	4.350	2.000	0.046	0.050	9.299	2.000	0.112	0.050	Yes
	Terrain	0.823	2.000	0.026	0.050	2.486	2.000	0.106	0.050	Yes
HAA	Sky	4.661	2.000	0.012	0.050	5.402	2.000	0.015	0.050	Yes
	Sky	1.539	2.000	-0.027	0.050	1.683	2.000	-0.033	0.050	No
	Terrain	2.620	2.000	0.031	0.050	4.946	2.000	0.056	0.050	Yes
	Terrain	0.534	2.000	0.019	0.050	1.365	2.000	0.055	0.050	Yes
WAA	Sky	0.906	2.000	0.003	0.050	0.965	2.000	0.003	0.050	No
	Sky	0.247	2.000	-0.006	0.050	0.257	2.000	-0.07	0.050	No
	Terrain	0.186	2.000	0.003	0.050	0.241	2.000	0.003	0.050	No
	Terrain	0.043	2.000	0.002	0.050	0.057	2.000	0.003	0.050	No

The analysis is generally considered satisfactory if *delta E* and *Contrast* are less than critical values of 2.0 and 0.05, respectively, both of which are Class I, not Class II, area thresholds. As Table 22 indicates, the visual impact criteria (*delta E* and *Contrast*) at the affected sensitive receptors are exceeded at five of the sensitive receptors as a result of the proposed project. Therefore, a Level II analysis is required for these receptors.

A Level II analysis refines selected Level I input parameters by using representative wind speed and atmospheric stability conditions in the region encompassing both emission source and the sensitive receptor. In contrast, the Level I analysis assumed worst-case parameters (Pasquill-Gifford stability class F and wind speed of 1.0 meters per second) that are not necessarily indicative of local weather patterns that affect visibility when winds blow emission from the Port Wentworth Mill toward each of these sensitive receptors. For the Level II analysis, the representative meteorological conditions were determined by creating a joint frequency distribution of atmospheric stability and wind speeds during daylight hours (i.e., 7 am to 6 pm) for the five-year data period from 1982 through 1986 made from observations at Savannah, Georgia. This analysis indicated the combination of atmospheric stability and wind speed conditions at each sensitive receptor that is most likely to occur when the wind direction is such that plume impairment would potentially occur.

As an additional refinement to the Level II analysis, the NOx emission rate was scaled by 75 percent following the Ambient Ration Method to account for the conversion of NOx to NO_2 in the atmosphere, since the latter is the specific visibility-impairing species. All other parameters were input as Level I default options. A background visual range of 25 kilometers was used for Port Wentworth.

Table 24: Level II VISCREEN Results

Receptor		Max Visual Impact Inside Class II Area				Max Visual Impact Outside Class II Area				Critical Values Exceeded?
		Delta E		Contrast		Delta E		Contrast		
		Plume	Critical	Plume	Critical	Plume	Critical	Plume	Critical	
WHS	Sky	0.223	2.000	0.001	0.050	0.400	2.000	0.003	0.050	No
	Sky	0.075	2.000	-0.001	0.050	0.053	2.000	-0.003	0.050	No
	Terrain	0.138	2.000	0.002	0.050	0.506	2.000	0.006	0.050	No
	Terrain	0.026	2.000	0.001	0.050	0.138	2.000	0.006	0.050	No
SISP	Sky	0.171	2.000	0.001	0.050	0.198	2.000	0.002	0.050	No
	Sky	0.056	2.000	-0.001	0.050	0.027	2.000	-0.001	0.050	No
	Terrain	0.086	2.000	0.001	0.050	0.264	2.000	0.003	0.050	No
	Terrain	0.017	2.000	0.001	0.050	0.074	2.000	0.003	0.050	No
FMHP	Sky	0.221	2.000	0.001	0.050	0.400	2.000	0.003	0.050	No
	Sky	0.075	2.000	-0.001	0.050	0.053	2.000	-0.003	0.050	No
	Terrain	0.138	2.000	0.002	0.050	0.506	2.000	0.006	0.050	No
	Terrain	0.026	2.000	0.001	0.050	0.138	2.000	0.006	0.050	No
SAV	Sky	0.295	2.000	0.001	0.050	1.118	2.000	0.007	0.050	No
	Sky	0.093	2.000	-0.002	0.050	0.239	2.000	-0.008	0.050	No
	Terrain	0.270	2.000	0.003	0.050	1.269	2.000	0.017	0.050	No
	Terrain	0.044	2.000	0.001	0.050	0.321	2.000	0.015	0.050	No
HAA	Sky	0.381	2.000	0.002	0.050	0.967	2.000	0.009	0.050	No
	Sky	0.117	2.000	-0.003	0.050	0.129	2.000	-0.007	0.050	No
	Terrain	0.300	2.000	0.003	0.050	1.223	2.000	0.015	0.050	No
	Terrain	0.054	2.000	0.002	0.050	0.320	2.000	0.014	0.050	No

As indicated in Table 24 above, the results of the Level II VISCREEN analysis show that the screening criteria are not exceeded at any of the sensitive receptors when evaluated using the Level II input parameters. Therefore, the proposed modifications to the pulp machine dryer are not anticipated to cause adverse impacts on visibility at the sensitive receptors in the area surrounding the mill.

Furthermore, several potentially sensitive Class II visible plume receptors, such as Wormsloe and Richmond Hill State Parks and Forts Morris and McAllister, are not perceived as critically impacted by potentially visible industrial plumes, particularly from the Port Wentworth Weyerhaeuser facility due to the large (greater than 20 km) distances between the facility and these potential receptors and their proximity to nearby forests.

The runways at the Hunter Army Airfield and Savannah International Airport, as well as the Hopeton Landing Strip, are oriented at high angles to any plumes that may be directly transported from the Weyerhaeuser facility. This precludes the likelihood of an alignment of aircraft, plume, and sun, which is the most common cause of visible plume impairment.

Skidaway Island State Park and Saffold landing strip are both very close to the ocean, which is likely to cause a predominant sea breeze influence on the sites. This is perceived as diminishing the potential for plumes to be visible in the vicinity of these locations.

Moreover, an analysis of the Class II increment inventory at the Weyerhaeuser facility indicates that, since 1975, decreases in actual emissions of visibility-affecting pollutants from the facility far exceed any corresponding increases in potential emissions of these pollutants. Because the perception of industrial plumes has not been an issue in the past, this indicates there is little reason to expect visible industrial plumes from this site will be a substantial future issue.

Georgia Toxic Air Pollutant Modeling Analysis

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

- U.S. EPA Integrated Risk Information System (IRIS) reference concentration (RfC) or unit risk
- Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL)
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV)
- National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (REL)
- Lethal Dose –50% (LD_{50}) Standards

Selection of Toxic Air Pollutants for Modeling

For projects with quantifiable increases in TAP emissions, an air dispersion modeling analysis is generally performed to demonstrate that off-property impacts are less than the established Acceptable Ambient Concentration (AAC) values. The TAP evaluated are restricted to those that may increase due to the proposed project. Thus, the TAP analysis would generally be an assessment of off-property impacts due to mill-wide emissions of any TAP emitted by a mill. To conduct a mill-wide TAP impact evaluation for any pollutant that could conceivably be emitted by the mill is impractical. A literature review would suggest that at least one molecule of hundreds of organic and inorganic chemical compounds could be emitted from the various combustion units. This is understandable given the nature of the black liquor, lime mud, wood, red oil, and NCG gases fed to the combustion sources, and the fact that there are complex chemical reactions and combustion of fuel taking place in some sources (e.g., lime kiln and recovery boiler). The vast majority of compounds potentially emitted however are emitted in only trace amounts that are not reasonably quantifiable.

For the proposed project, Weyerhaeuser quantified emissions of all TAPs emitted from sources at the mill in significant amounts, except for those recently modeled in January 2005 for the retroactive PSD recovery boiler permit application. Because facility-wide potential emissions of these excluded TAPs will not change as a result of the proposed pulp machine dryer project, these previously modeled toxics do not need to be assessed again. Facility-wide potential emissions of all other significant toxics were considered in the ambient impact assessment conducted for this application. Emission rates of toxic pollutants were calculated using emission factors published by NCASI in Technical Bulletin No. 858. The emission factors were used in combination with maximum potential production rates to calculate emissions from the mill. A summary of the emission rates used in the TAP ambient impact analysis is provided in Appendix J of the Class II Air Quality Dispersion Report submitted with the application.

For each TAP identified for further analysis, both the short-term and long-term AAC were calculated following the procedures given in Georgia EPD's *Guideline*. Figure 8-3 contains a flow chart of the process for determining long-term and short-term ambient thresholds. Weyerhaeuser referenced the resources previously detailed to determine the long-term (i.e., annual average) and short-term AAC (i.e., 24-hour or 15-minute). The AACs were verified by the EPD.

Determination of Toxic Air Pollutant Impact

The Georgia EPD *Guideline* recommends a tiered approach to model TAP impacts, beginning with screening analyses using SCREEN3, followed by refined modeling, if necessary, with ISCST3 or ISCLT3.

Initial Screening Analysis Technique

Generally, an initial screening analysis is performed in which the total TAP emission rate is modeled from the stack with the lowest effective release height to obtain the maximum ground level concentration (MGLC). Note the MGLC could occur within the mill boundary for this evaluation method. The individual MGLC is obtained and compared to the smallest AAC. Due to the likelihood that this screening would result in the need for further analysis for most TAP, the analyses were initiated with the secondary screening technique.

Secondary Screening Analysis Technique

For those pollutants that do not pass the initial screening modeling, Georgia TAP Modeling Guidelines recommend additional screening prior to using ISCST3 refined modeling. The second screening technique involves modeling the particular pollutants from each appropriate stack and adding the impact results from each of the stacks. The total impact is then compared to the AAC. That is, a unit emission rate of 1 g/s was modeled from each stack (or representative stack). MGLC impacts from the unit emission rate were scaled using the actual emissions of a particular TAP from a particular stack for each of the modeled stacks using the equation shown below. The impacts from each stack for a particular TAP were then added to reach a total impact, which is then compared to the AAC for that pollutant.

$$Q_2/Q_1 \times (X_1) = X_2$$

where:
Q_1 = the modeled stack emission rate (1 g/s)
Q_2 = the emission rate of individual TAP
X_1 = the MGLC for 1 g/s
X_2 = the MGLC for the individual TAP

For those impacts that were smaller than the appropriate AAC, no significant impact is anticipated, and further modeling was not necessary. For those pollutants that indicated a significant impact is possible, refined modeling was performed to further evaluate the potential for significant impacts. The majority of the TAP screen out and do not require additional refined modeling.

Refined Modeling Methodology

For those pollutants indicating a possible significant impact during the secondary screening, a refined modeling analysis was performed using the modeling setup established for the criteria pollutant PSD modeling analysis. The methodology was the same as presented for the PSD modeling analysis except that downwash was excluded from the TAP analysis, per the Georgia *Guideline*. The maximum impacts of all pollutants are below the applicable AAC.

For the proposed project, Weyerhaeuser conducted dispersion modeling using a similar refined modeling approach to the PDS modeling analysis, with a few exceptions. The ISCST3 model was used in the TAP ambient impact assessment, but in accordance with the Georgia EPD's *Guidelines*, the effects of building downwash were not considered. To obtain 15-minute average impacts, modeled output of 1-hour average concentrations was multiplied by the conversion factor of 1.32 specified by the Division.

A comparison of the maximum modeled ground level concentration for each TAP with the corresponding AAC was made. The results of the TAP ambient impact analysis indicate that the impact of facility-wide TAP emissions that could possibly increase as a result of the proposed dryer project, and that were not modeled previously in January 2005, do not exceed the applicable AACs. Detailed results are presented in

Section 6 of the Class II Ambient Air Quality Dispersion Modeling Report submitted with the application.

8.0 EXPLANATION OF DRAFT PERMIT CONDITIONS

The permit requirements for this proposed facility are included in draft Permit Amendment No. 2611-051-0010-V-01-8.

Section 1.0: Facility Description

The EPD has included a description of the proposed modifications to the Market Pulp Machine dryer, as well as other revisions being made to the facility's Title V operating permit to clarify regulatory applicability requirements pertaining to 40 CFR 60 Subpart Kb and 40 CFR 63 Subpart EEEE. Some conditions pertaining to one-time testing and reporting are also being deleted because their requirements have already been satisfied.

Section 3.0: Requirements for Emission Units

The table of emission units in Section 3.1 is being amended to reflect the proposed modifications to the pulp machine dryer and to clarify regulatory applicability of some units to NSPS Subpart Kb, NESHAP Subpart EEEE, and several satisfied conditions that are being deleted with this permit action.

Condition Nos. 3.3.16 and 3.3.39 are being modified to indicate that the Turpentine Storage Tank (Source Code BY02) is no longer subject to the requirements of 40 CFR Part 60 Subpart Kb. Because the Methanol Storage Tank (Source Code BL13) is still subject to this regulation, these conditions are not being deleted.

Condition No. 3.3.40 is being deleted because this facility is no longer subject to 40 CFR 63 Subpart EEEE due to a recent revision to this rule by U.S. EPA.

Condition No. 3.3.41 is being added to impose BACT requirements for the control of VOC from the Market Pulp Machine. These requirements for control VOC consist of a requirement that the Permittee operate the pulp machine in accordance with good operating practices to minimize VOC emissions.

Section 4.0: Requirements for Testing

Condition Nos. 4.2.8 and 4.2.9 are being deleted from the permit because these testing requirements pertaining to 40 CFR 63 Subpart MM have already been satisfied by the Permittee.

Section 5.0: Requirements for Monitoring

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

Section 6.0: Other Recordkeeping and Reporting Requirements

Condition No. 6.1.7 is being modified to include a reporting requirement in the event that the Market Pulp Machine is not operated in accordance with good operating practices pursuant to Condition No. 3.3.41. This revision is in the form of the addition of clause 6.1.7.b.xix to this Condition.Condition Nos. 6.2.15 and 6.2.24 are being deleted because these reporting requirements have already been satisfied by the Permittee.

Condition No. 6.2.32 is being added to require the Permittee to notify the Division of the dates on which construction of the proposed modifications to the Market Pulp Machine dryer are commenced and completed.

Section 7.0: Other Specific Requirements

Condition No. 7.14.1 is being added to establish a deadline by which this permit amendment shall become null and void if construction on the proposed modifications to the Market Pulp Machine have not commenced.

APPENDIX A

Draft Revised Title V Operating Permit Amendment
Weyerhaeuser – Port Wentworth Mill
Port Wentworth (Chatham County), Georgia

APPENDIX B

Weyerhaeuser Port Wentworth Mill PSD Permit Application and Supporting Data

Contents Include:

1. PSD Permit Application No. 16155, dated April 7, 2005
2. Class II Air Quality Dispersion Modeling Report, dated July 7, 2005
3. Class I PSD Increment and Air Quality Related Values Analysis, dated July 12, 2005
4. Additional Information Package Dated September 19, 2005
5. Additional Information Package Dated October 19, 2005

APPENDIX C

EPD'S PSD Dispersion Modeling and Air Toxics Assessment Review