Prevention of Significant Air Quality Deterioration Review
Of Norbord Georgia OSB
located in Cordele, Crisp County, Georgia

PRELIMINARY DETERMINATION
SIP Permit Application No. 15812
Title V Permit Application No. 15812
April 2005

Reviewing Authority

Georgia Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Ron Methier – Chief, Air Protection Branch

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SUMMARY

Norbord Georgia, Inc. (Norbord) operates an oriented strandboard (OSB) facility located near Cordele, Georgia in Crisp County. Norbord is proposing an expansion project in which the OSB production capacity would be significantly increased by construction of a new production line. This production line would include two rotary dryers, a wood-fired energy system (natural gas backup), an additional press, and six baghouses associated with handling, blending, forming, and finishing. Because of the magnitude of proposed air emissions, the project is subject to New Source Review for air quality impacts, specifically Best Available Control Technology (BACT) and air quality analyses are required under the Prevention of Significant Deterioration (PSD) permitting program as administered by the Georgia Environmental Protection Division (abbreviated as either "the Division" or "EPD") and Georgia's Rules for Air Quality Control. In addition, this expansion is subject to the 40 CFR Part 70 regulation for Significant Modifications.

EPD has reviewed Norbord's application in light of the applicable rules/regulations. The energy system/dryers combined stack will be controlled by a wet electrostatic precipitator (WESP) operated in series with a regenerative thermal oxidizer (RTO). The board press will be controlled by either an RTO, regenerative catalytic oxidizer (RCO), or a thermal catalytic oxidizer (TCO). An RTO, RCO, and TCO offer equivalent control. The handling, blending, forming and finishing operations will be controlled by baghouses. Ancillary equipment includes a diesel-fired emergency generator, edge coating line, resin storage tanks, and a grinding operation.

The estimated potential emissions of regulated pollutants from the Norbord expansion are as follows: Particulate Matter with an aerodynamic diameter less than 10 microns (PM_{10}) = 197 tons per year; Particulate Matter (PM) = 197 tons per year; Nitrogen Oxides (NOx) = 433 tons per year; Carbon Monoxide (CO) = 451 tons per year; Sulfur Dioxide (SO_2) =14.7 tons per year; Volatile Organic Compounds (VOC) = 466 tons per year; Lead (Pb) = 0; Sulfuric Acid Mist (H_2SO_4) = 0.

The location of the facility in Crisp County is classified as "attainment" for PM_{10}, NOx, CO, SO_2 and Ozone in accordance with Section 107 of the Clean Air Act, as amended August 1977.

The EPD review of the data submitted by Norbord for the construction and operation of a second production line indicates that compliance with all applicable State and Federal air quality regulations will be achieved.

It is the Preliminary Determination of EPD that the proposal provides for the application of best available control technology (BACT) for the control of NOx, CO, PM, PM10, and VOC as required by Federal PSD regulation 40 CFR 52.21(j).

It has been determined through approved modeling techniques, that the estimated emissions will not cause or contribute to a violation of any ambient air standard or allowable PSD increment. 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.

The Preliminary Determination indicates that an Air Quality Permit should be issued to Norbord for their plant expansion. Various conditions will be made a part of the permit to construct and operate in order to insure and confirm compliance with all applicable regulations. A copy of the draft permit is provided in Appendix A.

1.0 APPLICATION INFORMATION

Applicant Name and Address

Norbord Georgia OSB
964 Highway 280 West
Cordele, Crisp County, Georgia

Authorized Representative: Jim Black, Vice President-Southern Operations

November 5, 2004	Date of PSD/Title V Application (Assigned No. 15812)
December 20, 2004	Representatives from Norbord, Trinity Consultants, and EPD met to discuss questions pertaining to the air quality application number 15812
January 6, 2005	Letter from EPD to Norbord requesting additional information
February 3, 2005	Norbord's written response to EPD's January 6, 2005 letter
February 11, 2005	Air Dispersion Modeling Update from Norbord (Received Feb. 16, 2005)
February 11, 2005	Class I Modeling Analysis submitted by Norbord (Received Feb. 16, 2005)
February 16, 2005	Record of Telephone Conversation between EPD (Susan Jenkins) and Bob Vanwassen (Wellons) regarding the use of SNCR to control NOx emissions from a wood fired Wellons.
February 16, 2005	Record of Telephone Conversation between EPD (Susan Jenkins) and Scott Standefer (PPC Industries) regarding the use of biofiltration at an OSB Plant.
March 24, 2005	Electronic Mail from Norbord (Phillip Towles) to EPD (Susan Jenkins and John Yntema) regarding the use of SNCR to control NOx emissions from a wood-fired energy system at a wood products plant.
March 25, 2005	Electronic Mail from EPD (John Yntema) to Norbord (Phillip Towles) regarding the technical feasibility of using SNCR on the proposed wood-fired energy system to be used at the Norbord Expansion in Cordele
March 28, 2005	Record of Telephone Conversation between EPD (John Yntema) and Phillip Towles (Norbord) and Jim Teaford (Teaford Company) regarding the use of SNCR on the proposed wood-fired energy system to be used at the Norbord Expansion in Cordele

This facility was originally permitted in 1989 as Masonite Corporation (International Paper). The existing facility footprint includes a Wellons furnace that heats four rotary wood flake dryers, a board press, and associated process equipment.

2.0 PROJECT DESCRIPTION

On November 5, 2004, Norbord Georgia, Inc. – Norbord Georgia OSB ["Norbord"] submitted an application for an air quality permit to construct and operate a plant expansion capable of producing up to 650 million square feet per year (MMsf/yr) on a 3/8" basis of oriented strandboard. The plant expansion will include: Debarker and flaker system; bark handling and storage; two rotary dryers; wood-fired energy system (natural gas backup) with thermal oil heater (not equipped with its own burner); flake handling system; forming and blending operation; one board press; with sander, saw, and finishing lines; dry fuel relay and storage; one 750-hp emergency diesel generator, one edge coating line, one grinding operation, and two enclosed resin storage tanks. The Norbord plant expansion application and supporting data are included in Appendix B.

The manufacturing begins with whole logs which are cut to length. The logs are then debarked and carried to stationary saws where they are cut into lengths in preparation for the flaker. The wood flakes may pass through green screens to remove fines and differentiate core and surface material, or they may be conveyed directly to wet flake storage bins (Source Codes GB05 and GB06) to await processing through the wood flake dryers (Source Codes RD05 and RD06).

The new dryer system will comprise two rotary dryers (Source Codes RD05 and RD06) and the dryer system will be designed to process up to 52 Oven-Dried-Tons (ODT) per hour. Each dryer will receive heat energy from a wood-fired energy system (Source Code ES02), and each dryer will be equipped with a natural gas burner rated at approximately 80 MMBtu/hr. The dryer burners would only be used for emergency situations when the energy system was not operational. The wood flakes are dried to a low moisture content to compensate for moisture which is later gained by adding resins and other additives. After drying, the dried flakes are conveyed pneumatically from the dryer, separated from the gas stream at the primary cyclones, and screened to remove fines and to separate the flakes by size. Undersized material is sent to a storage area for use as fuel. The screened flakes are stored in dry bins (Source Codes DB05 and DB06). Each dryer will exhaust to a wet electrostatic precipitator (WESP) and to a regenerative thermal oxidizer (RTO).

The new energy system (Source Code ES02) will be similar to the unit currently in operations at the mill. The new energy system contains a fixed-grate wood fired burner (primary burner rated at approximately 285 MMBtu/hr) which supplies direct heat energy to dryers, thermal oil heater, and indirect heat energy to the board press. The new energy system will exhaust through the dryers. The energy system is also equipped with a natural gas fired burner which is only used to aid in starting up the energy system from a complete shutdown. This burner is not large enough to supply process heat on its own. The energy system is equipped with a bypass stack which is only utilized as part of the fire protection mechanism for the unit. If the energy system was to experience a fire and/or temperature greatly exceeding normal operation, the bypass stack would automatically be opened for safety. Note: The energy system does not meet the definition of "*fuel-burning equipment*" as found in Georgia Rule 391-3-1-.01(ccc) because most of the heat energy from the combustion of fuels is transferred directly to the dryers and not indirectly.

The new flake handling system will screen the flakes, after being dried, for fines removal as done at the existing facility. The flake handling system will exhaust through a cyclone and baghouse operating in series.

The new blending system will mix the dried flakes with wax and resin as done at the existing facility. The blending and forming operations will also include mat trimming. The blending, forming, and mat trimming operations will exhaust through a cyclone and baghouse operating in series.

The new board press system will be designed to support 650 MMsf of annual OSB production on a 3/8" basis. The board press exhaust will be routed to a pretreatment system and an oxidizer (either an RTO, a regenerative catalytic oxidizer, or a thermal catalytic oxidizer).

The new sander and saw lines (Tongue and Groove and Globe Line) will sand, trim, and route the OSB panels as done at the existing facility. The sander and saw lines will be controlled by a cyclone and baghouse operating in series.

The new finishing operations will seal the edges of the OSB sheets with a coating prior to shipment and transportation to arrest moisture penetration. Finishing operations include stenciling of the Norbord logo prior to shipment. An aluminum foil backing may also be applied.

The new dry fuel relay and storage system will comprise two components. The first component will pneumatically transport the sanding, trimming, and routing remnants from the sander and saw lines. The second component will pneumatically transport this material (in addition to dust collection and dry fines from the forming and flake screening baghouses) to a storage bin for eventual combustion in the energy system. The first dry fuel relay system will exhaust to a cyclone and baghouse operating in series. The second dry fuel relay system will be controlled by a bin vent system on the receiving silo.

Table 1. Emissions Summary of the Norbord Expansion

Air Pollutant	Total Emissions TPY	PSD Significant Emissions Level	Is BACT Required?
CO	451 – (a)	100	YES
NOx	433 – (a)	40	YES
SO2	14.7 – (a)	40	NO
PM/PM10	197 – (a)	25/15	YES
VOC	466 – (a)	40	YES
Lead	0 – (b)	0.60	NO
H2SO4	0 – (b)	7	NO
Formaldehyde	26 – (b)	NA	NA
Phenol	18 – (b)	NA	NA
MeOH	81 – (b)	NA	NA
Total HAPs	140 – (b)	NA	NA

(a) Data taken from Table 1 of February 3, 2005 Letter to EPD
(b) Data taken from Appendix C – Emissions Calculations

Through its new source review procedure, the Division has evaluated the Norbord expansion proposal for compliance with State and Federal requirements. The findings of the Division have been assembled in this Preliminary Determination.

3.0 REVIEW OF APPLICABLE RULES AND REGULATIONS

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

Applicability: Georgia Rule 391-3-1-.03(1) requires that any person prior to beginning the construction or modification of any facility which may result in air pollution shall obtain a permit for the construction or modification of such facility from the Director upon a determination by the Director that the facility can reasonably be expected to comply with all the provisions of the Act and the rules and regulations promulgated thereunder.

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

Applicability: Georgia Rule 391-3-1-.03(8)(b) specifies that no permit to construct a new stationary source or modify an existing stationary source shall be issued unless such proposed source meets all the requirements for review and for obtaining a permit prescribed in Title I, Part C of the Federal Act.

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

Applicability: Georgia Rule 391-3-1-.02(2)(b) [a.k.a Georgia Rule (b)] is an applicable requirement for the green bins, energy system, dryers, screens, dry bins, flake blenders, forming line and prepress, board press/unloader, saw and sander systems, and dry fuel storage silo, additional emergency generator, edge coating line, and grinding operation because said units are subject to another emission standard in Georgia Rule 391-3-1-.02(2)[i.e., Georgia Rule 391-3-1-.02(2)(e) and (g)].

Emission Standard: Georgia Rule (b) limits visible emissions to not equal or exceed forty (40) percent from said units.

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

Applicability: The new energy system does not meet the definition of "fuel-burning equipment" as found in Georgia Rule 391-3-1-.01(ccc) because most of the heat energy from the combustion of fuels is transferred directly to the dryers and not indirectly. In addition, the natural gas burners in the new rotary dryers are not subject to Georgia Rule (d) because these burners supply direct heat energy.

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

Applicability: Norbord proposed Georgia Rule (e) process groupings in their February 7, 2005 submittal, and the Georgia Rule (e) Process Groups are noted in the table below, showing each process group emission standard.

Emission Standard: The following numerical values for the allowable and maximum anticipated emission rates are taken from Table 2 of Norbord's February 3, 2005 letter to EPD.

Equipment ID	Description	Rule (e) Allowable PM Emission Rate (lb/hr)	Max. Anticipated PM Emissions (lb/hr)
GB05, RD05, ES02, RS05, DB05	Green Bin #5 through Dry Bin #5	35.43	10.29
GB06, RD06, ES02, RS06, DB06	Green Bin #6 through Dry Bin #6	35.43	10.29
FB05, FB06, FLP2, PRS2, L2SS, L2SD, HPW2, DFS2	Blenders, Board Press, Trimming/Finishing Operations through the Dry Fuel System	45.72	7.73

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

Applicability: Georgia Rule 391-3-1-.02(2)(g) [a.k.a. Georgia Rule (g)] applies to all "fuel burning" sources. The "fuel burning" sources at the proposed site include the energy system and emergency diesel generator.

Emission Standard: The fuel sulfur content limit for fuels burned in the energy system is 3 percent sulfur by weight in accordance with Georgia Rule 391-3-1-.02(2)(g)2 for equipment rated at 100 MMBtu/hr or greater. The fuel sulfur content limit for fuels burned in the emergency diesel generator is 2.5 percent by weight in accordance with Georgia Rule (g)2 for equipment rated lower than 100 MMBtu/hr.

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

Applicability: The affected facility to which subpart Db applies is each steam generating-unit that commences construction, modification, or reconstruction after June 19, 1984, and that has a heat input capacity from fuels combusted in the steam generating unit of greater than 100 MMBtu/hr.

Norbord questioned the applicability of NSPS Db to the energy system, as described on page 4-4 of the application. A review of EPA's Applicability Determination Index was performed to ascertain whether the energy system met the NSPS Db or Dc definition for *steam generating unit*.

As noted earlier, the energy system will be a wood fired combustion system with backup natural gas burners for startup operations and emergency situations. The system includes a 285 MMBtu/hr heat input combustion unit. The energy system provides hot process air to the two new single pass rotary dryers to accomplish flake drying. In addition the energy system provides hot process air (indirectly) to the thermal oil heater to provide thermal oil for the press plates and various air reheat coils.

A *steam generating unit* is defined as follows in 40 CFR 60.14b:

"*Steam generating unit* means a device that combusts any fuel or byproduct/waste to produce steam or to heat water or any other heat transfer medium. This term includes any municipal-type solid waste incinerator with a heat recovery steam generating unit or any steam generating unit that combusts fuel and is part of a cogeneration system or a combined cycle system. This term does not include process heaters as they are defined in this subpart."

A key fact used in this applicability determination is that some of the exhaust from the energy system is used to heat thermal oil in the thermal oil heater. Based on that fact, the energy system is classified a *steam generating unit* under NSPS Db in this analysis.

40 CFR Part 60 Subpart Db Emission Standards: Please refer to the following table:

Air Pollutant	Standard	Averaging Period
Sulfur Dioxide	None	NA

Air Pollutant	Standard	Averaging Period
Particulate Matter	0.10 lb/MMBtu – 60.43b(c)(1) 0.03 lb/MMBtu – 60.43b(h) - PROPOSED	Test Method per 60.46b(d) Does not apply during periods of startup, shutdown, or malfunction.
Opacity	20% except for one six-minute average of 27% - 60.43b(f)	Test Method per 60.46b(d) Does not apply during periods of startup, shutdown, or malfunction. Continuous Monitoring System for measuring the opacity of emissions and recording the output of the system.

40 CFR 63, Subpart DDDDD – National Emission Standards for Institutional Boilers and Process Heaters

Applicability: The *affected source* of this subpart is the collection of all existing, new or reconstructed industrial, commercial, and institutional boilers and process heaters within a subcategory located at a major source as defined in 63.7575. Terms and their definitions that are used as part of this applicability determination are noted below:

"*Boiler* means an enclosed device using controlled flame combustion and having the primary purpose of recovering thermal energy in the form of steam or hot water. Waste heat boilers are excluded from this definition."

"*Process heater* means an enclosed device using controlled flame, that is not a boiler, and the unit's primary purpose is to transfer heat indirectly to a process material (liquid, gas, or solid) or to a heat transfer material for use in a process unit, instead of generating steam. Process heaters are devices in which the combustion gases do not directly come into contact with process materials. Process heaters do not include units used for comfort heat or space heat, food preparation for on-site consumption, or autoclaves."

The energy system does not meet the Subpart DDDDD definition of *boiler*. In addition, the energy system does not meet the definition of *process heater* as a portion of its exhaust gases come into contact with process materials.

As a further part of this analysis, Norbord submitted a "Boiler MACT" applicability determination request to EPA Headquarters in Washington, D.C. dated October 11, 2004. EPA has not responded to Norbord's request as of the date of issuance of this Preliminary Determination. Norbord asserts in their October 2004 letter that the proposed energy system is subject to 40 CFR Part 63 – Subpart DDDD [e.g., PCWP MACT] and not the "Boiler MACT", as the energy system is considered part of the dryers.

At this time, based on available information, EPD concurs with Norbord that the energy system is not subject to the "Boiler MACT".

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

Subpart DDDD [a.k.a. "4D"] regulates HAP emissions from Plywood and Composite Wood Products (PCWP) facilities that are major sources. The proposed expansion at Norbord constitutes a PCWP facility. The proposed expansion is located at an existing major source for individual and total HAPs. In addition, the proposed expansion is a major source for individual and total HAPs.

This review investigated whether the expansion would constitute an *existing affected source,* a *new affected source*, or a *reconstructed affected source*. Per 40 CFR 63.2292, an:

"*Affected source* means the collection of dryers, refiners, blenders, formers, presses, board coolers, and other process units associated with the manufacturing of plywood and composite wood products...."

Since the plant expansion is taking place at an *existing affected* source it, would not constitute a *new affected source* or a *reconstructed affected source*. Thus, the plant expansion would constitute an *existing affected source* with a compliance date of October 1, 2007 per 40 CFR 63.2232. The PCWP MACT outlines three potential methods of demonstrating compliance with the regulation. The first way to demonstrate compliance is a production-based limit on HAP emissions, the second is an add-on control system compliance option with concentration or percent reduction limit for the outlet of an add-on control system, and the third is an emissions averaging compliance option which applies to existing sources only. Each *affected source* need meet only one of the three compliance options.

Norbord is in the process of evaluating compliance options as well as the possibility of demonstrating that the *affected source* belongs in a low-risk subcategory. If Norbord chooses the latter option, Norbord must demonstrate to EPA that their *affected source* is low risk by using the look-up tables in appendix B to 40 CFR 63 Subpart DDDD. Appendix B to Subpart DDDD also specifies which process units and pollutants must be included in the low-risk demonstration, emissions testing methods, the criteria for determining if an *affected source* is low risk, the risk assessment methodology (look-up table analysis or site-specific risk analysis), the contents of the low-risk demonstration, the schedule for submitting and obtaining approval of the low-risk demonstration, and methods for ensuring that the *affected source* remains in the low-risk subcategory. If Norbord demonstrates that their *affected source* is part of the delisted low-risk subcategory of PCWP manufacturing facilities, then Norbord's *affected sources* are not subject to the MACT compliance options, operating requirements, and work practice requirements in Subpart DDDD. In that case, Norbord would have to have federally enforceable conditions, reflecting the parameters used in the EPA-approved demonstration, incorporated into their Title V permit to ensure that their *affected source* remains low risk.

40 CFR 63 Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

Applicability: Subpart ZZZZ (a.k.a. "4Z") applies to any existing, new, or reconstructed stationary *reciprocating internal combustion engines (RICE)* with a site-rating of more than 500 brake horsepower (bhp) located at a major source of HAP emissions. A new emergency stationary RICE does not need to meet the requirements of Part 63 Subpart ZZZZ except for the initial notification requirements of Part 63.6645(d). The proposed emergency generator satisfies the latter exemption and is therefore only subject to the initial notification requirements of Part 63.6645(d).

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

Applicability: Georgia Rule 391-3-1-.02(7) adopts by reference 40 CFR 52.21. The Norbord expansion is to be constructed at the existing Norbord facility. The proposed expansion and the existing Norbord plant in Cordele are one site for purposes of assessing PSD applicability because they are located on contiguous property, operate under common control, and operate under the same industrial grouping (i.e., two digit SIC code). Norbord is an existing major source under PSD. Therefore, the PSD significant emission rates apply in assessing PSD applicability. Based on the information in Table 1, the Norbord expansion is classified as a PSD major modification for carbon monoxide, nitrogen oxides, particulate matter, particulate matter less than 10 microns in diameter, and volatile organic compounds.

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

- ✓ Application of best available control technology (BACT) for each regulated 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
- ✓ Public notification of the proposed plant in a newspaper of general circulation.

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

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

4.0 BACT REVIEW – DRYERS IN COMBINATION WITH ENERGY SYSTEM

The energy system exhausts to the atmosphere through the rotary dryers and, as such, a BACT review for the dryers in combination with the energy system was performed for NOx, CO, PM/PM10, VOC, and visible emissions.

The energy system/dryers combined stack uncontrolled exhaust stream pollutants can be considered to consist of wood dust; mineral dust; aerosols of organic substances; aerosols of mineral salts, ashes and gases; and products of incomplete combustion (Reference: July 1999 edition of **PanelWorld** Article by Joe Stipek). Other literature references concur with this **PanelWorld** article, most notably AP-42. The aerosol portions include condensable PM and some VOCs and these aerosol portions leave the uncontrolled stack as a vapor but condense at normal atmospheric temperatures to form liquid particles or mist that creates a visible blue haze. Both the VOCs and condensable PM are primarily compounds evaporated from the wood in the dryers, with a minor constituent being combustion products. Operational factors affecting VOC emissions include wood species, the "green nature" of the wood processes, and dryer operating temperature (see the IP OSB-Cordele – December 3, 1998 Letter to EPD). Literature also indicates that NOx emissions from wood combustion are primarily caused by the "fuel-bound nitrogen" in the wood fired in the energy system, rather than by thermal NOx due to high temperature and the nitrogen in the air of the boiler.

CO emissions are primarily caused by the energy system and partial combustion of the VOC emissions during the drying process. It is important to note that operating conditions of the energy system that are desirable for CO reduction may result in an increase of NOx emissions. Based on an earlier study performed at this facility (when facility was owned and operated by IP-Masonite), the existing Wellons contributes from 15% to 70% of the total CO emissions from the Wellons/Dryer system, and the dryers contribute from 30% to 85% of the total CO emissions. [Refer to Application No. 6661 – BACT Analysis for CO emissions – October 29, 1996].

Top-Down BACT Alternatives: The applicant considered the following Best Available Control Technology alternatives for NOx, CO, VOCs, and PM/PM10 as specified, in part, in Table 3 of Norbord's February 3, 2005 letter to EPD.

Air Pollutant	BACT Alternatives
NOx	Selective Non-Catalytic Reduction (SNCR) Selective Catalytic Reduction (SCR) Low NOx Burner Technology Water/Steam Injection Flue Gas Recirculation Reduced Air Preheat Staged Combustion with OFA Low Excess Air/Oxygen Trim Proper Design/Operation

Air Pollutant	BACT Alternatives
CO	Regenerative Catalytic Oxidation (RCO) Thermal Catalytic Oxidation (TCO) Regenerative Thermal Oxidation (RTO) Proper Design/Operation
VOCs	RCO TCO RTO Biofilter Technology Proper Design/Operation
PM/PM10	Baghouse Dry Electrostatic Precipitation (ESP) Wet ESP Multiclones Cyclones Electrified Filterbed RTO Proper Design/Operation

Technical Feasibility Analysis – Infeasible Options:
SNCR: An SNCR process is based on the reaction of NOx with ammonia or urea to reduce the NOx to nitrogen and water, and the SNCR process typically works well with an exhaust stream temperature of approximately 1,600 to 2,200 deg F. According to AP-42 (September 2003 Edition), the application of SNCR to residue wood-fired boilers has been accomplished. However, according to the Teaford Company, temperatures need to be controlled differently in a furnace, such as proposed by Norbord, as compared to a boiler so there is some question as to whether SNCR could be effective at this facility. In a boiler, heat is removed through the water/steam tubes in the walls; in a furnace, the walls are refractory lined to hold and reflect heat.

In Georgia, Langboard MDF – Willacoochee operates a fluidized bed energy system whose NOx emissions are controlled by SNCR for PSD Avoidance purposes. EPD contacted Langboard to learn more about how SNCR was working at their MDF facility. According to plant personnel, the SNCR is operational and is tied into a NOx continuous emissions monitoring system. Langboard utilizes a process control system which monitors the ammonia injection rate based on the NOx concentration recorded at the NOx CEMS. Langboard does agree with Norbord that the presence of ammonia in the energy system exhaust can "kill" the resin used in making wood products.

However, according to the Teaford Company, wood-fired furnaces, such as the one proposed for use at Norbord, must be maintained at a lower temperature than 1,600 deg F in order to assure that the ash (with a high sodium content) does not melt into slag. It was pointed out that the existing wood-fired furnace at Norbord is not allowed to get over 1,500 deg F.

Norbord maintained that SNCR is not technically feasible for controlling NOx in this instance because: (1) the energy system is not capable of maintaining temperatures within the aforementioned range because of such factors as the variable heat and moisture content of the wood fuel; (2) ammonia slip is a strong possibility and the presence of ammonia in the hot air routed to the dryers will have an unknown but likely deleterious effect on the quality and stability of the final product; (3) the presence of ammonia could have adverse affects on air pollution control technologies used to control other criteria air pollutants in the exhaust stream. While the Division recognizes that the temperature of the exhaust stream is a difficulty, it seems that item number 1 alone may not technically eliminate SNCR, since SNCR has been used in wood-fired energy systems (such as the systems manufactured by Wellons, Inc.). However, it appears that the control efficiency which is achievable is not high enough to justify requiring it as BACT. The Division has been unable to find studies which specifically address items 2 and 3; however, the Division finds the applicant's claims plausible and therefore the Division concurs that the use of SNCR is not technically feasible in this instance.

SCR: The SCR process is based on the reaction of NOx with ammonia in the presence of a catalyst to form nitrogen and water. An SCR system typically works well with an exhaust stream temperature of approximately 550 to 750 deg F. The applicant noted that SCR is not technically feasible for controlling NOx emissions from wood combustion because the flue gas temperature downstream of the rotary dryers is expected to be below the aforementioned range. The Division concurs with the facility's findings.

Water/Steam Injection: Water/steam injection is the process of injecting water or steam into the combustion chamber so as to act as a thermal ballast to the combustion process. The applicant noted that the use of water/steam injection, in this instance, is not technically feasible because the introduction of moisture into the wood fired energy system is would reduce the efficiency of the wood fired energy system, in drying wood strands in the rotary dryers. The Division concurs with this.

Low NOx Burners: Low NOx burners work by controlling the air to fuel ratio in different areas of the flame. According to the applicant, low NOx burners are applicable to combustion devices with circular burner designs. The energy system wood fired burners are not circular in design. With that in mind, the applicant asserted that the use of low NOx burners for the proposed energy system is not technically feasible. The Division concurs with this.

Reduced Air Preheat: Reduced air preheat reduces NOx emissions from a burner unit by lowering the flame temperature in the burner. The applicant noted that reduced air preheat only has merit in combustion units utilizing natural gas or low-nitrogen-content fuel oils, especially when thermal NOx predominates. With that in mind, the Division concurs that reduced air preheat is not technically feasible for wood combustion.

Regenerative Catalytic Oxidation: Incinerator technology can reduce CO and VOC emissions by destroying these constituents at high temperatures. However, the RCO technology may accelerate the rate of CO and VOC oxidation and allow for their destruction at lower temperatures. Norbord noted that RCO technology is generally not considered technically feasible for the combined energy system/dryers combined stack due to the level of PM and PM10 loading, unless preceded by a hot ESP. Norbord is currently experimenting with RCOs on dryers at other facilities which may impact determinations in the future. The Division concurs that RCO is not technically feasible at this time.

Thermal Catalytic Oxidation: TCO technology can reduce CO and VOC emissions by destroying these constituents at high temperatures. A TCO is a combination of an RTO and RCO. Norbord noted that TCO technology is generally not considered technically feasible for the combined energy system/dryers combined stack, due to the level of PM and PM10 loading, unless preceded by a hot ESP. Norbord's current experiment with RCOs on dryers at other facilities may impact future determinations regarding the technical feasibility of TCO's.

Biofilter Technology: According to AP-42 (Section 10.6.1-5 – March 2002), this type of technology uses microorganisms immobilized in a biofilm layer on a porous packing such as bark, wood chips, or synthetic media. As the contaminated vapor stream passes through the biofilter media, pollutants are transferred from the vapor to the biofilm and, through microbiological degradation, are converted to carbon dioxide, water, and salts. According to PPC Industries in Texas (a manufacturer of biofilter systems for the wood products industry), the use of biofilter technology to control VOC emissions from the stack in question is not technically feasible because (1) the exhaust stream has a high PM content and (2) the temperature of the exhaust stream at saturation is still too hot (i.e., >105 deg F) for use with such technology. With that in mind, the Division concurs that the use of biofilter technology to minimize VOC emissions from the combined stack of the energy system and dryers is not technically feasible.

Fabric Filter Technology: Fabric filter technology, such as a baghouse, can control PM/PM10 emissions. The use of a baghouse, in this case, is not technically feasible because the combined exhaust could have a moisture content high enough to routinely plug the fabric filter.

Dry Electrostatic Precipitation: Dry electrostatic precipitation, ESP, can control PM/PM10 emissions. An ESP is not technically feasible, in this instance, because the uncontrolled exhaust gas stream contains sticky, condensable components.

Technical Feasibility Analysis –Feasible Options:
Low Excess Air/Oxygen Trim: Low excess air/oxygen trim involves reducing the excess air level to the point of some constraint, such as CO formation. The applicant noted that low excess air/oxygen trim is a technically feasible option for control of NOx and CO emissions from the energy system.

Regenerative Thermal Oxidation: RTO technology can reduce CO, VOC, and PM/PM10, visible emissions by destroying these constituents at high temperatures. According to **PanelWorld** (September 1998), a direct wood-fired dryer (as in the case of this proposal) can produce sub-micron alkaline-earth metal particulate (salts) which can carry over to the RTO resulting in plugging with an increase in pressure drop and eventual degradation of the heat exchange media. Thus, the RTO should be preceded by another type of exhaust cleaning. With that in mind, RTO technology with a pre-filter is technically feasible for controlling CO, VOC, and PM/PM10 emissions and opacity.

FGR: Flue gas recirculation is a combustion design technique used to reduce the temperature of combustion, thereby reducing thermal NOx formation. The applicant noted that, based on the wood fuel combusted, thermal NOx is expected to be only a minor constituent of total NOx formation in the energy system and therefore would have little impact on reducing NOx emissions from the combustion of wood. A telephone conversation with the maker of energy systems for wood product plants concurs that while FGR is not very effective in this situation, FGR can be used in a wood-fired energy system. FGR technology is technically feasible.

Wet Electrostatic Precipitation: The use of a WESP is technically feasible for the control of VOCs and PM/PM10, as evidenced by its use and performance at other OSB plants in Georgia.

High Efficiency Multiclones: The use of high efficiency multiclones is technically feasible for control of PM/PM10 emissions.

Electrified Filterbed (EFB): EFB technology has been implemented at several OSB plants in the US and Canada based on a literature search. EFB technology consists of ionizing the dust and aerosols in the exhaust stream onto the surface of another very small solid media by electrostatic forces. The solid media is then conveyed to another portion of the EFB to be cleaned (i.e, dust/aerosols are removed from the solid media) and the solid media is recycled back into the EFB. The collected dust is then transferred to a hopper for waste storage. EFB technology is technically feasible for the removal of PM/PM10 and condensable VOCs.

Proper Design/Operation of the Energy System and Wood Flake Dryers: This option is technically feasible. The term *Proper Design/Operation* implies, in this case, maintaining an energy system combustion zone temperature which minimizes the formation of both NOx and CO.

Ranking the Technically Feasible Alternatives:

Air Pollutant	Feasible BACT Alternatives
NOx	(1) Flue Gas Recirculation and/or Low Excess Air/Oxygen Trim and/or Proper Design/Operation Note: All three options are considered to produce equivalent results.
CO	(1) Regenerative Thermal Oxidation (RTO) (2) Proper Design/Operation
VOCs	(1) RTO (2) Proper Design/Operation
PM/PM10 (Which includes condensable VOCs)	(1) Wet ESP followed by an RTO (2) Multiclones/Cyclones followed by an EFB (3) Proper Design/Operation

Emission Standard Analysis: The following table specifies the applicant's determination of what the short-term BACT emission rates would be for NOx, CO, VOC, and PM/PM10 from the combined energy system/dryers stack with the technically feasible control strategies. The numerical values representing the proposed scenario are taken from Appendix C of Norbord's November 2004 application and Table 6 of Norbord's February 3, 2005 letter to EPD.

Air Pollutant	Control Technology	AP-42 lb/ODT Soft Woods	AP-42 lb/ODT Hard Woods	Existing Operation lb/ODT – (a) (lb/hr)	Proposal lb/ODT (lb/hr)
NOx	RTO/Proper Design FGR Low Excess Air Proper Design	0.78 - - 0.70	0.42 - - 0.63	- - 0.65 (26.26) -	- 1.51(78.4) 1.51(78.4) (131)
CO	RTO/Proper Design Proper Design	1.8 5.3	1.5 5.5	- 2.53 (102.21)	1.51 (78.4) 314
VOC	RTO/Proper Design Proper Design	0.32 8.1	0.26 2.1	- 3.47 (140)	0.66 (59.8)-(b) (598)

Air Pollutant	Control Technology	AP-42 lb/ODT Soft Woods	AP-42 lb/ODT Hard Woods	Existing Operation lb/ODT – (a) (lb/hr)	Proposal lb/ODT (lb/hr)
PM/ PM10	WESP/RTO	0.149	0.169	-	0.67 (28.5)-(c)
	RTO	0.40	-	-	-
	WESP	0.89	0.63	-	(57.0)
	EFB	1.04	2.38	1.51 (61)	(57.0)
	EFB/RTO	-	0.51	-	-
	ESP	-	-	-	(57.0)
	MCLO/EFB	-	-	-	(28.5)
	MCLO	2.81	5.58	-	-
	Proper Design	8.1	6.1	-	(570)

(a) Data taken from Initial Title V Permit Application for the facility.
(b) Proposal also includes 90% VOC reduction
(c) Proposal is also 0.02 gr/dscf

The following table specifies the applicant's determination of what the short-term BACT emission rates would be for NOx, CO, VOC, and PM/PM10 from the combined energy system/dryers stack with the technically feasible control strategies, in comparison to identical/equivalent operations. Note: Emissions are compared on a pound per hour basis rather than a pound per heat input because of the lack of data available to make the conversion.

Air Pollutant	Control Technology	Facility Name or Agency Name	Emissions
NOx Proposal is 78.4 lb/hr	Uncontrolled See Note 1	Existing Norbord Operation - October 21, 1998 Test Data	12.7 lb/hr at dryer running at 19.66 tons per hour
	Uncontrolled	LP Carthage OSB Mill – Panola, Texas	65.7 lb/hr - DRAFT
	Uncontrolled	GP OSB – Fordyce, Arkansas	100 lb/hr
CO Proposal is 78.4 lb/hr	RTO	GP OSB – Fordyce, Arkansas	46.0 lb/hr
	Uncontrolled	Existing Norbord Operation - September 11, 1997 Test Data	117.3 lb/hr at dryer running at 16.0 tons per hour
	Uncontrolled See Note 1	Existing Norbord Operation - October 21, 1998 Test Data	121.94 lb/hr at dryer running at 19.66 tons per hour
	Not Specified	LP Carthage OSB Mill – Panola, Texas	600 lb/hr - DRAFT
VOC Proposal is 59.8 lb/hr	WESP	EPA Region 4 – November 6, 1989	60% Reduction
	Not Specified	LP Carthage OSB Mill – Panola, Texas	32.2 lb/hr (DRAFT)

Air Pollutant	Control Technology	Facility Name or Agency Name	Emissions
	RTO	GP OSB-Fordyce, Arkansas	173 lb/hr
	Not Specified	LP – Hanceville, Alabama	254 lb/hr
	Uncontrolled	Existing Norbord Operation - September 11, 1997 Test Data	262.3 lb/hr at dryer running at 16.0 tons per hour.
	WESP See Note 2	July 2000 Test Data	281.6 lb/hr
	Uncontrolled See Note 1	Existing Norbord Operation - October 21, 1998 Test Data	439.1 lb/hr at dryer running at 19.66 tons per hour
PM/PM10 Proposal is 28.5 lb/hr or 0.02 gr/dscf	WESP	EPA Region 4 – November 6, 1989	0.02 gr/dscf
	Not Specified	LP Carthage OSB Mill – Panola, Texas	29.5 lb/hr - DRAFT
	Not Specified	LP – Hanceville, Alabama	31.0 lb/hr
	WESP	Existing Norbord Operation - September 11, 1997 Test Data	41.7 at dryer running at 16.0 tons per hour.
	WESP See Note 1	Existing Norbord Operation - October 21, 1998 Test Data	64.10 lb/hr at dryer running at 19.66 tons per hour
	RTO	GP OSB – Fordyce, Arkansas	102 lb/hr

(1) – 1998 Tests while running 90% Southern Yellow Pine

(2) - 2000 Testing after upgrade to the WESP and the installation of improved product moisture detection instrumentation. The latter proved to be highly effective in the prevention of over-drying of the wood flakes, a situation that can result in excess VOC emissions.

Energy Impacts: The applicant did not identify any energy impacts associated with the technically feasible control options for CO, VOC, or PM/PM10. The applicant indicated there would be an energy penalty with the use of FGR to minimize NOx emissions; however, the applicant did not quantify that penalty.

Environmental Impacts: The applicant did not identify any environmental impacts associated with the technically feasible control options for NOx, CO, VOC, or PM/PM10.

Economic Impacts: The applicant chose to implement the most stringent control technology option and therefore no economic analysis is included in this review.

NOx BACT Limit: The applicant's short term NOx BACT limit proposal of 78.4 lb/hr seems to be high when compared to the existing Norbord limit of 30 lb/hr for a 210 MMBtu/hr energy system exhausting through four rotary flake dryers. However, NOx may be emitted in significantly higher quantities when certain types of wood residue are combusted or when operating conditions are poor. In addition, according to AP-42, NOx emissions from wet bark and wood boilers are typically lower (approximately one-half), in comparison to NOx emissions from dry wood-fired boilers. Norbord's proposal compares well with the permitted (final and draft) data from similar facilities illustrated in the table above; however, Norbord's proposal is significantly higher than the emission rate specified by AP-42.

It is relevant that the South Carolina Department of Health and Environmental Control recently promulgated a state rule (Air Pollution Control Standard Regulation 61-62.5 Standard No. 5.2) which limits NOx emissions from wood-fired boilers to 0.20 lb/MMBtu on a 30-day rolling average. Based on a telephone conversation with the South Carolina contact for this rule, the energy system at Norbord might be subject to this rule (if Norbord were to build this plant there), because a portion of the energy system's heat energy is applied indirectly.

Upon careful consideration, the Division has determine that the proposal to use low excess air coupled with proper design/operation meets the requirements of BACT for NOx. The short-term NOx BACT emission limit for the operation of the energy system, in conjunction with the dryers, is set at 78.4 lb/hr (Note: Equivalent to 0.25 lb/MMBtu at 285 MMBtu/hr). This limit also applies during periods of startup and shutdown. The averaging time of this emission limitation is tied to or based on the run time(s) specified by the applicable reference test method(s) or procedures required for demonstrating compliance (i.e., Method 7E – 3 hour averaging period). The Division believes that this determination is consistent with recent BACT determinations.

CO BACT Limit: The applicant's proposed short-term CO BACT emission limit of 78.4 lb/hr (Note: Equivalent to 0.25 lb/MMBtu at 285 MMBtu/hr) is equivalent to the applicant's short-term NOx BACT proposal so it appears to balance NOx and CO emissions from wood-fired combustion. Based on available data, the applicant's proposal appears to be relatively stringent rather than high. Upon careful consideration, the Division has determined that the proposal to use low excess air, coupled with proper design/operation in the energy system along with the use of an RTO, meets the requirements of BACT for CO. The short-term CO BACT emission limit for the operation of the energy system, in conjunction with the dryers, is set at 78.4 lb/hr. This limit also applies during periods of startup and shutdown. The averaging time of this emission limitation is tied to or based on the run time(s) specified by the applicable reference test method(s) or procedures required for demonstrating compliance (i.e., Method 10 – 3 hour averaging period). The Division believes that this determination is consistent with recent BACT determinations.

VOC BACT Limit: The applicant proposes a short-term VOC BACT emissions limit of 59.8 lb/hr. Norbord's proposal compares well with the permitted (final and draft) data from other similar units illustrated in the table above; however, Norbord's proposal is higher than the emission factors in AP-42. Upon careful consideration, the Division has determined that the proposal to use low excess air coupled with proper design/operation in the energy system along with the use of a WESP/RTO, meets the requirements of BACT for VOC. This limit also applies during periods of startup and shutdown. The averaging time of this emission limitation is tied to or based on the run time(s) specified by the applicable reference test method(s) or procedures required for demonstrating compliance (i.e., Method 25 – 3 hour averaging period). The Division believes that this determination is consistent with recent BACT determinations.

PM/PM10 BACT Limit: The applicant proposes a short-term PM/PM10 BACT emissions limit of 28.5 lb/hr. Norbord's proposal compares well with the permitted (final and draft) data illustrated in the table above; however, Norbord's proposal is higher than the emission factors in AP-42. Upon careful consideration, the Division has determined that the proposal to use low excess air coupled with proper design/operation in the energy system along with the use of a WESP/RTO, meets the requirements of BACT for PM/PM10. This limit also applies during periods of startup and shutdown. The averaging time of this emission limitation is tied to or based on the run time(s) specified by the applicable reference test method(s) or procedures required for demonstrating compliance (i.e., Method 5T – 3 hour averaging period). The Division believes that this determination is consistent with recent BACT determinations.

Opacity BACT Selection: Georgia Rule 391-3-1-.02(2)(b) limits the visible emissions to forty (40) percent. The visible emissions from the existing Norbord facility are limited to twenty (20) percent for purposes of PSD. 40 CFR 60 Subpart Db limits the opacity to 20 percent (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity. With that in mind, the visible emissions BACT limit for the energy system/dryers combined stack is set at twenty (20) percent.

5.0 BACT REVIEW – BOARD PRESS AND UNLOADER

The press itself emits very little, if any, NOx and CO emissions. Emissions from board presses/unloaders is dependent on the type and amount of resin used to bind the wood particles together, as well as wood species; wood moisture content; catalyst application rates; and press conditions. When the press opens, vapors that may include resin ingredients (such as formaldehyde, phenol, MDI, etc.) and other VOCs are released. The rate at which the resin ingredients are emitted during pressing and unloading is a function of the amount of excess VOC/HAPs in the resin, board thickness, press temperature, press cycle time, and catalyst application rates [AP-42– Section 10.61-3 Edition March 2002]. Norbord has stated that the press could generate a high percentage of condensable PM/PM10. A BACT review for the board press/unloader is performed for NOx, CO, PM/PM10, VOC, and visible emissions.

Top-Down BACT Alternatives: The applicant considered the following Best Available Control Technology alternatives for NOx, CO, VOCs, and PM/PM10 as specified, in part, in Norbord's February 3, 2005 letter to EPD.

Air Pollutant	BACT Alternatives
NOx	Selective Non-Catalytic Reduction (SNCR) Selective Catalytic Reduction (SCR) Low NOx Burner Water/Steam Injection Flue Gas Recirculation Reduced Air Preheat Low Excess Air/Oxygen Trim Proper Design/Operation
CO	Regenerative Catalytic Oxidation (RCO) Thermal Catalytic Oxidation (TCO) Regenerative Thermal Oxidation (RTO) Proper Design/Operation

Air Pollutant	BACT Alternatives
VOCs	RCO TCO RTO Biofilter Technology Proper Design/Operation
PM/PM10	Baghouse Multiclones/Electrified Filterbed RCO TCO RTO Proper Design/Operation

Technical Feasibility Analysis – Infeasible Options:
NOx and CO Control Alternatives: The press itself emits very little NOx and CO; therefore, the technical feasibility of NOx and CO control alternatives are not investigated.

Technical Feasibility Analysis –Feasible Options:
Regenerative Catalytic Oxidation: Incineration can reduce VOC and PM/PM10 (as condensable VOC) emissions by destroying these constituents at high temperatures. The RCO technology can accelerate the rate of VOC oxidation and allow for their destruction at lower temperatures. Norbord noted that RCO technology is technically feasible for control of these pollutants at the press/unloader exhaust point.

Thermal Catalytic Oxidation: TCO technology can reduce VOC and PM/PM10 (as condensable VOC) emissions by destroying these constituents at high temperatures. The RCO technology may accelerate the rate of VOC oxidation and allow for their destruction at lower temperatures. Norbord noted that TCO technology is technically feasible for control of these pollutants at the press/unloader exhaust point.

Regenerative Thermal Oxidation: RTO technology can reduce VOC and PM/PM10 emissions by destroying these constituents at high temperatures. With that in mind, RTO technology is technically feasible for controlling VOC and PM/PM10 emissions.

Biofilter Technology: According to AP-42 (Section 10.6.1-5 – March 2002), this type of technology uses microorganisms immobilized in a biofilm layer on a porous packing such as bark, wood chips, or synthetic media. As the contaminated vapor stream passes through the biofilter media, pollutants are transferred from the vapor to the biofilm and, through microbiological degradation, are converted to carbon dioxide, water, and salts. According to PPC Industries in Texas (a manufacturer of biofilter systems for the wood products industry), the use of biofilter technology to control VOC emissions from a press/unloader is technically feasible because (1) the exhaust stream has a low PM content which could be cleaned from the exhaust stream using a pretreatment such as a bioscrubber and (2) the temperature of the exhaust stream at saturation is within acceptable temperature ranges (50-105 deg F) for use with such technology. Norbord did not consider the application of a pre-treatment system in order to reduce the temperature of the exhaust stream and believes that a biofilter may not be feasible. However, Norbord included this technology as feasible because the PCWP MACT identified this technology as an acceptable control device. With that in mind, the use of biofilter technology to minimize VOC emissions from the combined stack of the press/unloader is considered technically feasible.

Fabric Filter Technology, ESP, WESP, Multiclones, EFB: Norbord identified these technologies as feasible even though there is the opportunity for these technologies to be blinded easily by the waxes and resins.

Electrified Filterbed (EFB): EFB technology has been implemented at several OSB plants in the US and Canada, based on a literature search. EFB technology consists of ionizing the dust and aerosols in the exhaust stream, causing them to deposit onto the surface of another very small solid media due to electrostatic forces. The solid media is then conveyed to another portion of the EFB to be cleaned (i.e., dust/aerosols are removed from the solid media) and the solid media is recycled back into the EFB. The collected dust is then transferred to a hopper for waste storage. EFB technology is considered technically feasible for the removal of PM/PM10 and condensable VOCs.

Proper Design/Operation of the Press/Unloader: This option is technically feasible.

Note from page 27 of Norbord's February 3, 2005 letter to EPD: Norbord is currently evaluating whether an RTO, RCO, or TCO would be most appropriate for the proposed press operations. Norbord asserts that these control systems would perform at the same level of VOC removed. Norbord bases this conclusion, in part, on operating experience at their Cordele, Georgia and Joanna, South Carolina facilities. An RTO is used to control VOC emissions from the Cordele board press and achieves a 95 percent VOC destruction efficiency. A TCO is used to control VOC emissions from the Joanna board press and achieves a 95 percent VOC destruction efficiency. [Telephone conversation between EPD (Susan Jenkins) and Norbord (Phillip Towles) on April 6, 2005.]

In addition, Norbord asserts they will need to install a pretreatment device for either the use of the RTO, RCO, or TCO but at this time no specific pre-treatment device is mentioned, as it is considered part of the RTO/RCO/TCO option. It should be noted that Norbord did not consider pre-treatment for the biofilter even though several wood products facilities in the nation utilize a pretreatment device prior to the biofilter (which could take care of the applicant's concern that the press exhaust temperature is too hot for use in a biofilter). However, because an RTO, RCO, or TCO would have a higher efficiency than a biofilter, that is a moot point.

Ranking the Technically Feasible Alternatives:

Air Pollutant	Technically Feasible BACT Alternatives
VOCs	(1) RTO or RCO or TCO (2) Biofilter Technology (3) Proper Design/Operation
PM/PM10 Which includes condensable VOCs	(1) Baghouse (2) ESP (3) WESP (4) Multiclones/EFB (5) EFB (6) RTO or RCO or TCO (7) Proper Design/Operation

Emission Standard Analysis: The following table specifies the applicant's proposal for short-term BACT emission rates for NOx, CO, VOC, and PM/PM10 from the board press/unloader, for each technically feasible control strategy. The numerical values representing the proposed scenario are taken from Appendix C of Norbord's November 2004 application and Table 6 of Norbord's February 3, 2005 letter to EPD.

Air Pollutant	Control Technology	AP-42 lb/MSF Various Resins	Existing Operation (lb/hr) – (a)	Proposal lb/MSF (lb/hr)
NOx	Not Applicable	NA	NA	NA
CO	RTO/RCO/TCO Proper Design	0.21-0.22 0.0026-0.21	1.69 -	0.33(24.5) 1.32(98)
VOC	RTO/RCO/TCO Biofilter Technology Proper Design	0.027-0.086 0.061 0.20-0.67	0.45 - -	0.154(11.4) 3.07(228) 3.07(228)
PM PM10	Baghouse ESP WESP MCLO/EFB EFB RTO/RCO/TCO Proper Design	- - - - - 0.142 0.11-0.63	- - - - - 3.02 -	0.004 (0.3) 0.007(0.5) 0.019(1.4) 0.019(1.4) 0.036(2.7) 0.054(4.0) 2.74(27)

(a) Data taken from Initial Title V Permit Application for the facility.

The following table specifies the applicant's determination of what the short-term BACT emission rates would be for VOC and PM/PM10 from the board press/unloader with the technically feasible control strategies in comparison to identical/equivalent operations.

Air Pollutant	Control Technology	Facility Name or Agency Name	Emissions
VOC Proposal is 11.4 lb/hr or 90% control	RTO	SEC August 1994 Newsletter	0.34 lb/hr
	Not Specified	LP Carthage OSB Mill – Panola, Texas	5.7 lb/hr DRAFT
	RTO	J.M. Huber – Commerce, Georgia	6.6 lb/hr
	Not Specified	GP-Hosford OSB Plant – Hosford, Florida	13.7 lb/hr
	Not Specified	GP – Calhoun, Arkansas	27.4 lb/hr
PM/PM10 Proposal is 4.0 lb/hr or 0.07 gr/dscf	RTO	SEC August 1994 Newsletter	2.08 lb/hr or 0.002 gr/dscf
	Not Specified	Langboard OSB – Quitman, Georgia Initial Title V Permit	0.02 gr/dscf
	RTO	J.M. Huber – Commerce, Georgia Initial Title V Permit	3.0 lb/hr

Air Pollutant	Control Technology	Facility Name or Agency Name	Emissions
	Not Specified	GP – Hosford OSB Plant – Hosford, Florida	3.8 lb/hr
	Not Specified	GP – Calhoun, Arkansas	3.8 lb/hr
	Not Specified	LP Carthage OSB Mill – Panola, Texas	10.4 lb/hr - DRAFT

Energy Impacts: The applicant did not identify any energy impacts associated with the technically feasible control options for VOC or PM/PM10.

Environmental Impacts: The applicant did not identify any environmental impacts associated with the technically feasible control options for VOC or PM/PM10.

Economic Impacts: The applicant chose to implement the most stringent control technology option and therefore no economic analysis is discussed in this review.

NOx BACT Limit: Because any NOx emissions will be generated by the control technology itself (i.e., from burning an auxiliary fuel), there will be no short-term NOx BACT limit specified for the press/unloader.

CO BACT Limit: Because any CO emissions will be generated by the control technology itself (i.e., from burning an auxiliary fuel), there will be no short-term CO BACT limit specified for the press/unloader.

VOC BACT Limit: The applicant proposes a short-term VOC BACT emissions limit of 11.4 lb/hr or 90% control. Norbord's proposal compares well with the permitted (final and draft) BACT data illustrated in the table above; however, Norbord's proposal is higher on a mass emission rate basis than the data specified by AP-42. Upon careful consideration, the Division has determined that the BACT limit and the proposal to use an RTO or RCO or TCO (which includes a pretreatment system), coupled with proper design/operation of the press/unloader, meets the requirements of BACT for VOC. This limit also applies during periods of startup and shutdown. The averaging time of this emission limitation is tied to or based on the run time(s) specified by the applicable reference test method(s) or procedures required for demonstrating compliance (i.e., Method 25 – 3 hour averaging period). The Division believes that this determination is consistent with recent BACT determinations.

PM/PM10 BACT Limit: The applicant proposes a short-term PM/PM10 BACT emissions limit of 4.0 lb/hr or 0.07 gr/dscf. Norbord's proposal compares well with the permitted (final and draft) data illustrated in the table above. Upon careful consideration, the Division has determined that the BACT limit and proposal to use an RTO, RCO, or TCO (which includes a pretreatment system), coupled with proper design and operation of the press/unloader, meets the requirements of BACT for PM/PM10. This limit also applies during periods of startup and shutdown. The averaging time of this emission limitation is tied to or based on the run time(s) specified by the applicable reference test method(s) or procedures required for demonstrating compliance (i.e., Method 5T – 3 hour averaging period). The Division believes that this determination is consistent with recent BACT determinations.

Opacity BACT Limit: Georgia Rule 391-3-1-.02(2)(b) limits the visible emissions to forty (40) percent. The visible emissions from the existing Norbord facility are limited to twenty (20) percent for purposes of PSD. With that in mind, the visible emissions BACT limit for the press/unloader system is set at twenty (20) percent.

6.0 BACT REVIEW – BLENDING, FORMING, AND FINISHING

A BACT review for blending, forming, and finishing is performed for NOx, CO, PM/PM10, and VOC. These operations emit very little, if any, NOx and CO emissions. Therefore, the BACT review will only cover VOC and PM/PM10 emissions.

Top-Down BACT Alternatives: The applicant considered the following Best Available Control Technology alternatives for VOC and PM/PM10:

Air Pollutant	BACT Alternatives
VOCs	RCO TCO RTO Proper Design/Operation
PM/PM10	Baghouse Multiclones/Electrified Filterbed RCO TCO RTO Proper Design/Operation

Technical Feasibility Analysis –Feasible Options:
RCO/TCO/RTO: Norbord asserts that the blending, forming, and finishing operations generate very low inlet VOC concentrations and, as such, these control technologies would not be able to achieve a high removal efficiency. Nonetheless, Norbord did consider these options as technically feasible.

Fabric Filter Technology, ESP, WESP, Multiclones, EFB: Norbord identified these technologies as feasible.

Proper Design/Operation of the Press/Unloader: This option is technically feasible.

Ranking the Technically Feasible Alternatives:

Air Pollutant	Technically Feasible BACT Alternatives
VOCs	(1)WESP/RCO/TCO/RTO (2) Proper Design/Operation
PM/PM10 Which includes condensable VOCs	(1) Baghouse (2) ESP (3) WESP (4) Multiclones/EFB (5) EFB (6) Proper Design/Operation

Emission Standard Analysis: The following table specifies the applicant's proposal for short-term BACT emission rates for VOC and PM/PM10 from the blending, forming, and finishing steps for each technically feasible option.

Air Pollutant	Control Technology	Proposal Note a
VOC	WESP/RTO/RCO/ TCO Proper Design	11.9-199 lb/hr 397 lb/hr
PM PM10	Baghouse ESP WESP MCLO/EFB EFB Proper Design	0.005 gr/dscf 0.005 gr/dscf 0.013 gr/dscf 0.013 gr/dscf 0.025 gr/dscf 0.250 gr/dscf

(a) Data taken from February 3, 2005 letter

Energy Impacts: The applicant did not identify any energy impacts associated with the technically feasible control options for VOC or PM/PM10.

Environmental Impacts: The applicant did not identify any environmental impacts associated with the technically feasible control options for VOC or PM/PM10.

Economic Impacts: The applicant stated that the cost effectiveness of utilizing oxidation would be approximately $19,695 per ton of VOC removed assuming an uncontrolled VOC emission rate of 8 lb/hr and a 90% VOC control efficiency.

VOC and PM/PM10 BACT Limit The applicant proposes the following short-term BACT emission limits from blending, forming, and finishing. The numerical values representing the proposed scenario are taken from Table 6 of Norbord's February 3, 2005 letter to EPD.

Process Equipment	BACT Determination	Proposed Emission Rate	Existing Operation – Permit Limits *
<u>Process Name = Resinated Fines</u> FLP2 – Forming Line & Prepress #2 FB05, Flake Blender #5 FB06, Flake Blender #6	PM/PM10 – Baghouse VOC – Proper Design/Operation	0.005 gr/dscf = 1.89 lb/hr 11.9 lb/hr	Forming Line & Prepress PM = 0.04 lb/hr Flake Blenders PM = 0.10 lb/hr

Process Equipment	BACT Determination	Proposed Emission Rate	Existing Operation – Permit Limits *
Process Name = Un-Resinated Fines RS05, Rotary Screen #5 RS06, Rotary Screen #6	PM/PM10 – Baghouse VOC – Proper Design/Operation	0.005 gr/dscf = 1.89 lb/hr 8.9 lb/hr	PM=0.10 lb/hr
Process Name = Finishing Line L2SD, Line #2 Saw System L2SS, Line #2 Saw System	PM/PM10 – Baghouse VOC – Proper Design/Operation	0.005 gr/dscf = 1.89 lb/hr 1.1 lb/hr	PM=0.18 lb/hr to 0.53 lb/hr
Process Name = Wet Strand Fines GB05, Green Bin #5 GB06, Green Bin #6	PM/PM10 – Baghouse VOC – Proper Design/Operation	0.005 gr/dscf = 1.89 lb/hr 8.9 lb/hr	Georgia Rule (e)
Process Name = Dry Fuel Storage DFS2, Dry Fuel Storage Silo #2	PM/PM10 – Baghouse VOC – Proper Design/Operation	0.005 gr/dscf = 2.1 lb/hr 4.5 lb/hr	PM=1.59 lb/hr
Process Name = Blowline DB05, Dry Bin #5 DB06, Dry Bin #6 HPW2, High Pressure Waste System #2	PM/PM10 – Baghouse VOC – Proper Design/Operation	0.005 gr/dscf = 0.26 lb/hr No VOC limit proposed	Dry Bins PM = 0.10 lb/hr High Pressure Waste System PM = 1.14 lb/hr

* No VOC emissions limits.

VOC BACT Limit: The applicant's proposal to not utilize VOC control from the various blending, forming, and finishing operations has been found to meet the requirements of BACT, in this case, because EPD finds the use of technically feasible control options to be nearly $20,000/ton which is not cost effective. Short-term VOC BACT emissions will be limited from the following processes: (1) Resinated Fines; (2) Un-Resinated Fines; and (3) Wet Strand Fines. The Division believes that this determination is consistent with recent BACT determinations.

PM/PM10 BACT Limit: The applicant's proposal to utilize baghouses to control PM/PM10 emissions from the various blending, forming, and finishing operations noted above, with baghouse PM/PM10 emission limits of 0.005 gr/dscf, meets the requirements of BACT. These limits also apply during periods of startup and shutdown. The averaging time of this emission limitation is tied to or based on the run time(s) specified by the applicable reference test method(s) or procedures required for demonstrating compliance (i.e., Method 5T – 3 hour averaging period). The Division believes that this determination is consistent with recent BACT determinations.

Opacity BACT Limit: Georgia Rule 391-3-1-.02(2)(b) limits the visible emissions to forty (40) percent. The visible emissions from the existing Norbord facility are limited to twenty (20) percent for purposes of PSD. With that in mind, the visible emissions BACT limit for the various new blending, forming, and finishing operations is also set at twenty (20) percent.

7.0 CONTROL TECHNOLOGY REVIEW FOR ANCILLARY EQUIPMENT

Ancillary equipment include the following: (1)750 hp diesel-fired emergency generator; (2) edge coating line; (3) two resin storage tanks; (4) grinding operation.

Diesel Fired IC Engine

Top-Down BACT Alternatives/Technical Feasibility: The applicant considered the use of good combustion practice coupled with an operational limit of 250 hours per year as BACT for NOx, CO, VOC, and PM/PM10. The applicant did not consider post-combustion control equipment.

Technical Feasibility Analysis: Georgia Rule 391-3-1-.02(2)(g) limits the fuel sulfur content to 2.5 weight percent. Georgia Rule 391-3-1-.02(2)(b) limits the visible emissions to forty (40) percent. No state or federal regulation specifies an applicable NOx, CO, VOC, or particulate matter standard.

The use of a catalytic converter is technically feasible; however, it is not considered further in this analysis due to the non-routine nature of the unit's operation. Fuel sulfur limits of 0.05 weight percent have been routinely specified in utility PSD permits issued by EPD for emergency generators fired with diesel fuel. Since the proposed Norbord expansion does not have to undergo a BACT review for SO2 emissions, EPD will not impose a fuel sulfur requirement other than that specified by Georgia Rule (g).

BACT Selection: BACT is determined to be good combustion practice coupled with an operational limit of 250 hours per year per unit for NOx, CO, VOC, PM/PM_{10}, and visible emissions.

Edge Coating Operation

Top-Down BACT Alternatives/Technical Feasibility: Norbord estimated potential VOC emissions from the edge coating operation at approximately 4.5 tons per year. The applicant considered the use of low VOC coatings as BACT for VOC emissions. The applicant indicated that the use of post-control equipment would not be conducive to this operation, as it will occur in a small enclosed area.

Technical Feasibility Analysis: Norbord asserts that typical edge seal paints contain VOCs on the order of 0.1 lb VOC per gallon of coating.

BACT Limit: With such low VOC-content coatings, BACT is determined to be no control and the Division does not believe limiting the VOC content is needed in this case because potential VOC emissions per gallon are small. Norbord will be required to maintain a MSDS for each edge seal paint used in this new operation. Short term PM emissions from the edge coating operation are anticipated to be negligible so the PSD BACT limit for PM will be set to that allowed by Georgia Rule (e).

Resin Storage Tanks and Grinding Operation

Norbord's proposed resin storage tanks and grinding operation will result in negligible emissions. The grinding operation will take place in an enclosed area serviced by a standard air conditioning system. Norbord proposes to utilize grinding equipment with inherent machine filters. No BACT controls or emission limits are imposed for the resin storage tanks and grinding operations.

8.0 HAZARDOUS AIR POLLUTANT/AIR TOXIC REQUIREMENTS

The proposed expansion is a major source of individual and total HAPs. The proposed expansion is subject to 40 CFR Part 63 Subpart DDDD – Plywood and Composite Wood Products. Because the proposed expansion is classified as an *existing source* per that standard, the proposed expansion will have to comply with this standard on October 1, 2007. Since the facility has not chosen how to comply with Subpart DDDD, the proposed PSD/Part 70 permit does not contain specific Subpart DDDD requirements.

There are no applicable NAAQS or specific Georgia ambient air standards for the non-criteria pollutants listed in Table 1. Impacts from each of the pollutants listed in the application were analyzed using the Division Guidance for Ambient Impact Assessment of Toxic Air Pollutant Emissions (referred to as the Georgia Air Toxics Guideline), Version June 21, 1998. The Georgia Air Toxics Guideline is a guide for estimating the environmental impact of sources of toxic air pollutants. A toxic air pollutant is defined as any substance which may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. That includes all HAPs and many other compounds. The ISCST3 computer dispersion model was used to predict the maximum 24-hour and 15-minute average ground level concentration (referred to as MGLC) for each pollutant in question.

Each MGLC is compared to its respective acceptable ambient concentration (referred to as AAC). The basis for calculation of an AAC is the pollutant toxicity rating systems described in the Georgia Air Toxics Guideline. The data was reviewed to determine if predicted emissions complied with the Toxics Guideline. Based on the Division's analysis, the predicted MGLC's for each applicable pollutant are below the AAC. A copy of this assessment is provided in Appendix C of this document.

9.0 TESTING REQUIREMENTS

An initial performance test will be required for the air pollutant and emission unit combinations specified in the table below.

Emission Unit	Air Pollutant
Energy System – See Note	PM, opacity
Energy System/Dryers Combined Stack	NOx, CO, VOC, PM, opacity
Board Press/Unloader	VOC, PM, opacity
Resinated Fines Equipment	VOC, PM, opacity
Un-Resinated Fines Equipment	VOC, PM, opacity
Finishing Line	PM, opacity
Wet Strand Fines	VOC, PM, opacity
Dry Fuel Storage	PM, opacity

Emission Unit	Air Pollutant
Blowline	PM, opacity

Note: The energy system is classified as a "steam generating unit" for purposes of 40 CFR 60 Subpart Db purposes (based on a review of NSPS Db applicability determinations). NSPS Db limits, in this case, emissions of PM and opacity from the energy system. The permit will impose the testing requirements of the NSPS General Provisions (Subpart A – 60.8) using the procedures and reference methods prescribed in 40 CFR 60.44b(d) for particulate matter and opacity for the energy system only (i.e., energy system exhausting through the dryers without operation of the dryers).

The permit requires the applicant to verify that the new board press/unloader are contained in a permanent total enclosure as defined by Method 204.

10.0 PART 52.21, PART 60, AND PART 70 MONITORING REQUIREMENTS

Energy System and Dryers Combined Stack

The energy system and dryers exhaust through a common stack and these emission units are subject to Georgia Rules 391-3-1-.02(2)(e), (b), and (g) for PM emissions and visible emissions and fuel sulfur content; 40 CFR 52.21 for NOx, CO, VOC, PM/PM10, and visible emissions. PM/PM10 and visible emissions are also regulated by 40 CFR 60 Subpart Db. The requirements of 40 CFR 52.21 subsume the requirements of Georgia Rules (e) and (b). NOx emissions from the energy system and dryers combined stack are regulated by PSD BACT, and PSD does not specify monitoring requirements. Part 70 imposes "periodic monitoring" requirements and, in particular, 40 CFR 70.6(a)(3)(i)(B) provides that where the applicable requirement does not require periodic testing or monitoring, the Part 70 permit shall contain "periodic monitoring sufficient to yield reliable data from the relevant time period that are representative of the source's compliance with the permit...." NOx emissions from this stack are uncontrolled and Norbord has indicated it believes that the energy system is a significant source of NOx emissions. Therefore it is important to verify that the NOx emissions rate is not greater than the rate proposed by the applicant.

Parametric monitoring and the use of either a NOx Continuous Emissions Monitoring System (CEMS) or Predictive Emissions Monitoring System (PEMS) was considered in this analysis. A CEMS or PEMS was given strong consideration in this particular case because the stack in question carries a major portion of the NOx emissions from the plant expansion. In addition, the "margin of compliance" between the tested NOx emission rate and the PSD emission limit is unknown. Compliance with the PSD emission limit becomes a concern as the "margin of compliance" is reduced. No surrogate parameter has been established that estimates NOx emissions from a wood-fired energy system such as the one proposed. Upon careful consideration, the Division will require the installation and operation of a NOx CEMS on the energy system and dryers combined stack. The Division believes that the requirement for a NOx CEMS provides a reasonable assurance of compliance with the short term NOx BACT limit for a stack that carries a major portion of the NOx emissions from the plant expansion. An exceedance is defined as any three-hour rolling average NOx emission rate that exceeds 78.4 lb/hr, including periods of startup, shutdown, and malfunction.

Proper operation of the energy system and the RTO are the primary means for maintaining actual CO emissions at or below the permit limits. The considerations behind evaluation of the appropriate NOx monitoring requirements are very similar for CO emissions. The use of a CO CEMS or PEMS was given strong consideration because CO emissions are generated in both the energy system and dryers and the stack in question carries a major portion of the CO emissions from the plant expansion. Other options available for consideration is to require testing at frequencies dependent upon the "margin of compliance" and/or parametric monitoring of the RTO. Upon careful consideration, the Division will require the installation and operation of a CO CEMS on the energy system and dryers combined stack. The Division believes that the requirement for a CO CEMS provides a reasonable assurance of compliance with the short term CO BACT limit for a stack that carries a major portion of the CO emissions from the plant expansion. An exceedance is defined as any three-hour rolling average CO emission rate that exceeds 78.4 lb/hr, including periods of startup, shutdown, and malfunction.

Proper operation and maintenance of the WESP and RTO are the primary means for maintaining actual VOC emissions at or below the VOC emissions limit. VOC emissions are generated in both the energy system and the dryers. Periodic monitoring options available include parametric monitoring of the WESP and RTO and testing at frequencies depending upon the "margin of compliance." Another parametric option is to track the likelihood of an excursion of the VOC emissions limit by using the CO CEMS. Parametric monitoring options available for the WESP include secondary voltage, water flow rate at the mist pump, secondary current, and temperature of the gas stream at the outlet of the quench chamber. Parametric monitoring options available for the RTO include combustion zone temperature and pressure drop across the RTO. EPD believes that, with improper operation of the WESP and/or RTO, there is a likelihood that the short term VOC BACT emissions limit would be exceeded. Upon careful consideration, the Division has determined that in order to provide for a reasonable assurance of compliance with the VOC BACT emissions limit, periodic monitoring will consist of the following: (1) monitoring the combustion zone temperature of the RTO; (2) monitoring of the secondary voltage in each field of the WESP; (3) monitoring of the temperature of the gas stream at the outlet of the quench chamber; (4) monitoring the water flow rate at the mist flow pump; and (5) establishing a CO emissions rate in lbs/hr during initial testing which correlates with the permitted VOC emissions rate. The numerical values of the parametric monitoring ranges for each control device will be established during initial performance testing and operation of the applicable control device in a manner which does not comply with the numerical values of the derived parametric monitoring ranges will constitute an excursion. In addition, a CO CEMS measurement in pounds per hour identified in item 5 above, which is exceeded, shall constitute an excursion of the VOC BACT limit as well.

Proper operation and maintenance of the WESP and RTO are the primary means for maintaining actual PM/PM10 at or below the applicable requirements. Periodic monitoring options available include parametric monitoring of the WESP and RTO and testing at frequencies depending upon the "margin of compliance." Applicable parametric monitoring options for the WESP and RTO are listed in the preceding paragraph. EPD believes that, with improper operation of the WESP and/or RTO, there is a likelihood that the short term PM/PM10 BACT emissions limit would be exceeded. Upon careful consideration, the Division has determined that in order to provide for a reasonable assurance of compliance with the PM/PM10 BACT emissions limit, periodic monitoring will consist of the following: (1) monitoring the combustion zone temperature of the RTO; (2) monitoring of the secondary voltage in each field of the WESP; (3) monitoring of the temperature of the gas stream at the outlet of the quench chamber; and (4) monitoring the water flow rate at the mist flow pump. The numerical values of the parametric monitoring ranges for each control device will be established during initial performance testing and operation of the applicable control device in a manner which does not comply with the numerical values of the derived parametric monitoring ranges will constitute an excursion.

Proper operation and maintenance of the WESP and RTO are the primary means for maintaining actual visible emissions at or below the applicable requirements. NSPS Subpart Db [Subpart 60.48b(a)] is applicable to the energy system and this regulation requires the installation, calibration, maintenance, and operation of a Continuous Monitoring System (COMS) for measuring the opacity of emissions. EPD believes that the installation and operation of a COMS provides for a reasonable assurance of compliance with the PSD and NSPS Subpart Db visible emissions limit. An excursion is defined as any six-minute average opacity measurement by the COMS that is greater than 20 percent, including periods of startup, shutdown, and malfunction.

Sulfur dioxide emissions from the energy system and dryers combined stack are not regulated, by PSD, in this case, but sulfur dioxide emissions from this stack are regulated by Georgia Rule (g). Georgia Rule (g), in this case, limits the fuel sulfur content for fuel burned in the energy system to 3.0 weight percent and, in the auxiliary burners in the flake dryers, to no more than 2.5 weight percent. Since the energy system only burns wood (primary fuel) and natural gas (secondary burner), the likelihood of violating the requirements of Georgia Rule (g) is minimal. Thus no additional monitoring is required.

Board Press/Unloader

The board press/unloader (Source Code PRS2) is subject to Georgia Rules 391-3-1-.02(2)(e) and (b) for PM emissions and for visible emissions; 40 CFR 52.21 (PSD) for VOC, PM/PM10, and visible emissions; and 40 CFR Part 63 Subpart . The most stringent emissions limits are established by PSD. The PSD BACT limit for VOC, PM/PM10, and visible emissions applies to captured and controlled emissions. Emissions from the board press/unloader are dependent on the type and amount of resin used to bind the wood particles together, as well as wood species, wood moisture content, wax and catalyst application rates, and press conditions. When the press opens, vapors that may include resin ingredients (i.e., HAPs and VOCs) are released. The rate at which resin ingredients are emitted during board pressing and board cooler operations is a function of the amount of excess organics in the resin, board thickness, press temperature, and press cycle time.

Proper operation and maintenance of the permanent total enclosure and oxidizer system are the primary means for maintaining actual PM, VOC, and visible emissions below the permitted levels. With this in mind, verification of compliance with the short term VOC and PM/PM10 emission limits and the visible emissions limit will be tracked by parametric monitoring of the oxidizer system and total enclosure.

Verification of proper operation of the capture system consists of monitoring the gas stream velocity pressure in the total enclosure duct before the inlet of the oxidizer system. The velocity pressure shall be measured in inches of water column using a pitot tube. Data shall be recorded once per shift. An excursion is defined as operating the total enclosure, during operation of the board press/unloader, with a gas stream velocity pressure outside of the range established during the initial performance test.

Verification of proper operation of the oxidizer system is accomplished by parametric monitoring of certain operating parameters, depending on the type of oxidizer system, as well as testing at frequencies based on the magnitude of the margin of compliance with the applicable limit.

Testing Requirements	Monitoring Requirements
The Permittee shall conduct annual VOC and PM/PM10 performance tests. Where the results are greater than 85 percent of the allowable limit, the Permittee shall begin testing on a semiannual basis with the next performance test due approximately six months following that test. If any subsequent test is less than or equal to 85 percent of the allowable limit, the Permittee may resume annual testing. If the results are less than or equal to 50 percent of the allowable on two consecutive tests, the Permittee may skip the next scheduled performance test.	Oxidizer System Option 1: RTO Monitoring – Continuous Monitoring and Recording of: The combustion zone temperature. Option 2: RCO Monitoring – Continuous Monitoring and Recording of: The inlet and outlet gas temperatures. Option 3: TCO Monitoring – Continuous Monitoring and Recording of: (a) The inlet and outlet gas temperatures if in catalytic mode; or (b) the outlet gas temperature if in thermal mode.

Blending, Forming, Finishing

VOC, PM/PM10, and visible emissions are regulated and limited from the un-resinated fines, resinated fines, and wet strand fines operations. PM/PM10 and visible emissions are regulated and limited from the finishing line, dry fuel storage, and blowline. VOC emissions are uncontrolled. PM/PM10 and visible emissions are controlled by baghouses. The proposed permit requires that Norbord install, calibrate, operate, and maintain pressure drop indicators on each baghouse and record the pressure drop for each baghouse at least once weekly. In addition, the permit also requires that the existence of visible emissions from each baghouse shall be determined daily. For each baghouse determined to be emitting visible emissions, the Permittee shall determine the cause of the excursion and correct the problem in the most expedient manner possible. The Permittee will be given 60 days following the initial startup of any operation that exhausts through a baghouse with Source Code C203, C204, C205, C206, C207, or C208 to determine the pressure drop range for each baghouse that indicates proper operation. These periodic monitoring requirements will be used to provide for a reasonable assurance of compliance with Title V Permit Condition Nos. 3.3.26 through 3.3.35.

Ancillary Equipment

Ancillary equipment includes the emergency generator, edge coating line, storage tanks, and grinding operation. The diesel-fired emergency generator is subject to a PSD work practice standard for NOx, CO, VOC, and PM/PM_{10} emissions and for visible emissions. The work practice standard is an operational limit, and verification of compliance with the operational limit will be done by monitoring and recording the operational time. In addition, the diesel-fired emergency generator is subject to an Equipment SIP Rule for fuel sulfur content, namely Georgia Rule (g). Georgia Rule (g), in this case, limits the fuel sulfur content to no more than 2.5 weight percent. Verification of compliance with this standard will be accomplished through fuel supplier certifications.

The edge coating operation is subject to a PM standard, namely Georgia Rule (e) which, in this case, equates to the PSD BACT limit for PM emissions. The edge coating operation inherently produces negligible PM emissions and thus the likelihood of violating the applicable PM standard is minimal. Thus no additional periodic monitoring is prescribed.

The storage tanks and grinding operation are not subject to a specified PSD requirement; therefore, no monitoring is prescribed.

10.0 PART 64 - COMPLIANCE ASSURANCE MONITORING REQUIREMENTS

The plant expansion is being processed as both a PSD Major Modification and a Part 70 Significant Modification. Compliance assurance monitoring requirements (Part 64) apply to a *large pollutant-specific emissions unit* (LPSEU) which comprise the proposed Part 70 Significant Modification. A *large pollutant-specific emissions unit* (LPSEU) is a *pollutant-specific emission unit* with the potential to emit (taking into account control devices to the extent appropriate under the definition of the term *control device* in 40 CFR 64.1) the applicable regulated air pollutant in an amount equal to or greater than 100 percent of the amount, in tpy, required for a source to be classified as a major source. The following table specifies information needed to assess Part 64 applicability.

PSEUs	Air Pollutant	Control Device	PTE* (tpy)	Applicable Threshold	Subject to Part 64?
Energy System plus Dryer #5 plus Dryer #6	NOx	Not Applicable	NA	NA	NO
	CO	RTO	343	100	YES
	VOC	WESP & RTO	262	100	YES
	PM/PM10	WESP & RTO	153	100	YES
	Individual HAP	WESP & RTO	>10	10	NO**
	Total HAPs	WESP & RTO	>25	25	NO**
Press/Unloader	NOx	Not Applicable	NA	NA	NO
	CO	Not Applicable	NA	NA	NO
	VOC	RTO/RCO/TCO	50	100	NO
	PM/PM10	RTO/RCO/TCO	17.4	100	NO
	Individual HAP	RTO/RCO/TCO	>10	10	NO**
	Total HAPs	RTO/RCO/TCO	>25	25	NO**
Forming Line & Prepress #2, Flake Blender #5, and Flake Blender #6	PM/PM10	Baghouse	52.1	100	NO
Rotary Screens #5 and 6	PM/PM10	Baghouse	8.3	100	NO
Line #2 Saw Systems	PM/PM10	Baghouse	8.3	100	NO
Green Bins #5 & 6	PM/PM10	Baghouse	8.3	100	NO
Dry Fuel Storage Silo	PM/PM10	Baghouse	9.2	100	NO
Dry Bins #5 & 6 and High Pressure Waste System #2	PM/PM10	Baghouse	1.13	100	NO

*PTE Values are taken/derived from Norbord Letter – Page 5 – February 3, 2005

** Not subject to Part 64 requirements because the equipment/air pollutant combination is subject to a Part 63 standard promulgated after November 15, 1990.

The results of the analysis illustrated in the table above show that the requirements of Part 64 – Compliance Assurance Monitoring apply to CO, VOC and PM/PM10 emissions from the energy system/dryers. In addition, the requirements of Part 64.3(b)(4)(ii) [i.e., potential to emit after controls is equal to or greater than 100 tpy] apply and this provision requires the Permittee to collect four or more data values equally spaced over each hour and average the values, as applicable, over the applicable averaging period as determined in accordance with Part 64.3(b)(4)(i).

10.0 OTHER RECORD KEEPING AND REPORTING REQUIREMENTS

The Permit contains general requirements for the maintenance of all records for a period of five years following the date of entry and requires the prompt reporting of all information related to deviations from the applicable requirement. Records, including identification of any excess emissions, exceedances, or excursions from the applicable monitoring triggers, the cause of such occurrence, and the corrective action taken, are required to be kept by the Permittee and reporting is required on a semiannual basis.

NSPS Db Record keeping Requirements – Energy System

In accordance with 40 CFR 60.49b(d), Norbord must record and maintain records of the amounts of wood combusted in the energy system during each day and calculate the annual capacity factor for wood combustion for the reporting period. The annual capacity factor is determined on a 12-month rolling average basis, with a new annual capacity factor calculated at the end of each calendar month.

In accordance with 40 CFR 60.49b(f), Norbord shall maintain records of the opacity.

NSPS Db Reporting Requirements – Energy System

Norbord must submit notification of the date of initial startup of the energy system as provided by 40 CFR 60.7. The notification must include the requirements of 40 CFR 60.49b(a)(1)-(4). In addition the Permittee must submit to EPA the performance test data from the initial PM performance test.

In accordance with 40 CFR 60.49b(h), Norbord is required to submit excess emission reports for opacity which occurred during the reporting period. For purposes of 40 CFR 60.43b, excess emissions are defined as all 6-minute periods during which the average opacity from the energy system (without the dryers in operation) exceeds the opacity standards under 40 CFR 60.43b(f).

Verification of Compliance with the NOx Mass Emission Rate

Compliance with the PSD BACT short-term NOx mass emission rate for the energy system and dryers combined stack is tracked using the NOx CEMS data to compute the hourly-average NOx mass emission rate in pounds per hour. An exceedance is defined as any three-hour average NOx emission rate that exceeds 78.4 pounds per hour including periods of startup, shutdown, and malfunction.

Verification of Compliance with the CO Mass Emission Rate

Compliance with the PSD BACT short-term CO mass emission rate for the energy system and dryers combined stack is tracked using the CO CEMS data to compute the hourly average CO mass emission rate in pounds per hour. An exceedance is defined as any three-hour average CO emission rate that exceeds 78.4 pounds per hour including periods of startup, shutdown, and malfunction.

Verification of Compliance with the Fuel Sulfur Content Limits for the Emergency Generator

The Permittee must verify that each shipment of fuel oil received for combustion in the emergency generator (Source Code GEN1) complies with the specifications for Low Sulfur No. 1-D or Low Sulfur No. 2-D as defined by the American Society for Testing and Materials (ASTM) in ASTM D975-01 – "Standard Specifications for Diesel Fuel Oils." Supplier certifications must contain the name of the supplier and a statement from the supplier that the fuel oil is Low Sulfur No. 1-D or Low Sulfur No. 2-D as defined in ASTM D975-01.

11.0 AMBIENT AIR QUALITY REVIEW

An air quality analysis is required of the ambient impacts associated with the construction and operation of the proposed Norbord expansion. The main purpose of the air quality analysis is to demonstrate that emissions from the proposed Norbord expansion, 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 II or Class I area. NAAQS exist for NO_2, CO, PM_{10}, SO_2, Ozone (O_3), and lead (P_b). PSD increments exist for SO_2, NO_2, and PM_{10}.

Generally, the source impact analysis will involve (1) an assessment of existing air quality, which may include ambient monitoring data and air quality dispersion modeling results; and (2) predictions, using dispersion modeling, of ambient concentrations that will result from the proposed plant and future growth associated with the project.

The following three Class I areas are located within 200 km of the proposed project: (1) Okefenokee National Wildlife Refuge at 170 km; (2) Bradwell Bay Wilderness at 205 km; and (3) Saint Marks National Wildlife Refuge at 205 km. The U.S. Fish & Wildlife Service (USFW) is the FLM responsible for oversight of Okefenokee and Saint Marks; the USDA Forest Service oversees Bradwell Bay.

A separate air quality analysis is required for each of these pollutants to be emitted in an amount over the PSD significant threshold. As shown in Table 1, CO, NOx, PM/PM_{10}, VOC are to be emitted in amounts over their respective PSD significant thresholds.

The following tables illustrate the Class II modeling results:

Class II Modeling Results Source: Memo from Richard Monteith to Susan Jenkins dated April 4, 2005				
Pollutant	Averaging Period	Significant Monitoring Concentrations (ug/m^3)	Class II PSD Modeling Significant Impact Level (ug/m^3)	Projected Concentration (ug/m^3)
CO	8 hour 1 hour	575 No 1 hour	500 2,000	55.33 110.95
NO_2	Annual	14	1	8.79
PM_{10}	Annual 24 hour	No annual 10	1 5	4.96 14.81

Class II Modeling Results Source: Memo from Richard Monteith to Susan Jenkins dated April 4, 2005				
Pollutant	Averaging Period	Significant Monitoring Concentrations (ug/m^3)	Class II PSD Modeling Significant Impact Level (ug/m^3)	Projected Concentration (ug/m^3)
VOC	No significant air quality concentration for ozone monitoring has been established. Instead, applicants with a net emissions increase of 100 tons per year or more of VOCs subject to PSD would be required to perform an ambient impact analysis, including pre-application monitoring data			

In cases where the existing ambient concentration or the modeled impact from an emissions increase is less than the Significant Monitoring Concentrations, EPD has the discretionary authority to exempt Norbord from performing pre-construction ambient monitoring [See 40 CFR Part 52.21(i)(5)]. For NO_2 and CO the highest ambient impact due to the Norbord expansion project does not exceed the Significant Monitoring Concentrations. However, the modeled concentration of PM_{10} does not exceed the Significant Monitoring Concentrations and potential VOC emissions will increase in an amount greater than 100 tons per year.

Norbord requests that EPD waive the pre-construction monitoring requirements of 40 CFR Part 52.21(m) for this project for PM_{10} and ozone (VOC). Ambient monitoring data are already available from EPD run monitoring stations (PM_{10} and ozone) located in Georgia. The data from these monitors provide reasonable (or in some cases conservative) estimates of the background pollutant concentrations of PM_{10} and ozone (VOC) considered in this analysis. EPD recommends state-wide average values of PM_{10} of 38 ug/m^3 and 20 ug/m^3 for 24-hour and annual averaging periods, respectively.

The modeling significant impact level was exceeded for annual NOx and annual and 24-hour PM_{10}, so the applicant conducted National Ambient Air Quality Standard (NAAQS) and PSD increment analyses. EPD conducted a NAAQS and PSD increment modeling evaluation for NO_2 (annual) and PM_{10} (annual and 24-hour). The results of EPD's modeling evaluation are summarized in the following table and in Attachment C of this document.

Class II Modeling Results-NAAQS and PSD Increment Analyses Source: Memo from Richard Monteith to Susan Jenkins dated April 4, 2005					
Pollutant	Averaging Period	NAAQS Standard (ug/m^3)	Total Concentration (ug/m^3)	Class II PSD Increment (ug/m^3)	Maximum Predicted Impact from All Increment Consuming Sources (ug/m^3)
NOx	Annual	100	41.28	25	13.96

Class II Modeling Results-NAAQS and PSD Increment Analyses Source: Memo from Richard Monteith to Susan Jenkins dated April 4, 2005					
Pollutant	Averaging Period	NAAQS Standard (ug/m^3)	Total Concentration (ug/m^3)	Class II PSD Increment (ug/m^3)	Maximum Predicted Impact from All Increment Consuming Sources (ug/m^3)
PM10	24-hour	150	400.10 with a source impact of 14.28.	30	26.0
	Annual	50	67.59 with a source impact of 2.36.	17	8.56

The modeling results indicate that ambient air concentrations of pollutants emitted by the proposed project will comply with applicable state and federal regulations, except the NAAQS annual and 24-hour PM_{10} concentrations. However, the results show that Norbord does not make a significant contribution to the violations. Therefore, the modeling demonstrates that an air permit for the proposed modification can be issued. Note that Crisp County, where the proposed expansion would be located, is currently in compliance with all NAAQS including the 1-hour and 8-hour ozone standard and the 8-hour fine particulate matter standard. However, the Division will have to do further investigations to assure that the county is in compliance.

The applicant submitted an initial Class I impact analysis on February 11, 2005. The Class I impact analysis covered PSD Class I increments, visibility, and total sulfur and total nitrogen deposition. This analysis showed that the proposed project would comply with all requirements including increments, visibility, total sulfur, and total nitrogen deposition at the three Class I areas.

The following table illustrates the Class I Modeling analyses results. It should be noted that the tables specify the allowable Class I Increment and the proposed EPA modeling Class I significant level. The projected concentrations were only compared to the allowable increments in order to verify compliance with the Class I Increments.

Class I Modeling Results-Okefenokee Source: February 11, 2005 Letter Table 22				
Pollutant	Averaging Period	Proposed EPA Modeling Class I Significant Level (ug/m^3)	Allowable Increment (ug/m^3)	Projected Concentration (ug/m^3)
NO_2	Annual	0.1	2.5	0.0018
PM_{10}	Annual 24 hour	0.16 0.32	5 10	0.012 0.30

Class I Modeling Results-Saint Marks Source: February 11, 2005 Letter Table 22				
Pollutant	Averaging Period	Proposed EPA Modeling Class I Significant Level (ug/m^3)	Allowable Increment (ug/m^3)	Projected Concentration (ug/m^3)
NO_2	Annual	0.1	2.5	0.000567
PM_{10}	Annual 24 hour	0.16 0.32	5 10	0.0050 0.17

Class I Modeling Results-Bradwell Bay February 11, 2005 Letter Table 22				
Pollutant	Averaging Period	Proposed EPA Modeling Class I Significant Level (ug/m^3)	Allowable Increment (ug/m^3)	Projected Concentration (ug/m^3)
NO_2	Annual	0.1	2.5	0.000432
PM_{10}	Annual 24 hour	0.16 0.32	5 10	0.0048 0.15

Class II Visibility Analysis: In the visibility analysis, the PM_{10} and NOx emission increases associated with the expansion project were used as inputs to the VISCREEN model. The Level-1 input screening parameters were not adequate for the analysis; therefore a Level-2 analysis was conducted for certain parameters, as described in the VISCREEN user's manual. For the Level-2 analysis the worst case meteorological conditions were determined by creating a joint frequency distribution of atmospheric stability and wind speed during daylight hours for the five year data period 1984 through 1988 from observations at Macon, Georgia. As an additional refinement to the Level-2 screening analysis, the NO_2 emission rate was scaled by 75%, following the Ambient Ratio Method to account for the conversion of NO_3 to NO_2 in the atmosphere, since the latter is the visibility impairing species. A summary of the applicant's Class II visibility analysis can be found on pages 6-25 through 6-28 of the application.

Norbord conducted a Class II analysis for the Georgia Veterans State Park. The results of the VISCREEN analysis show that the screening criteria are not exceeded inside this park.

Class I AQRV Analysis: The applicant conducted an air quality related value (AQRV) analysis to assess the potential risk to AQRVs at the Okefenokee National Wildlife Refuge, Bradwell Bay Wilderness, and Saint Marks National Wildlife Refuge. The applicant analyzed the project effects on visibility and sulfur and nitrogen deposition. Regarding the visibility analysis, the FLM recommends that a 5% change in light extinction by an individual source be considered significant. The applicant's Class I visibility analysis is found in their February 11, 2005 letter to EPD. The following table illustrates the applicant's findings:

Class I Area	Maximum Visibility Impact (%) (RH=98%)	Number Days > 5% (RH=98%)
Okefenokee	4.35	0
Saint Marks	2.52	0
Bradwell Bay	Not an AQRV at Bradwell Bay	NA

where RH = Relative Humidity

The applicant conducted the deposition analysis using the worst-case long-term emission rates from the proposed expansion. Based on the applicant's February 11, 2005 letter, the project is not expected to contribute significantly to deposition at the applicable Class I areas (i.e., the predicted impact is less than 0.01 kg/hectare/yr).

The project also is subject to an additional impacts analysis that assesses the impacts of air pollution on soils and vegetation caused by emissions of regulated pollutants from the project, and from associated growth in the project vicinity.

12.0 ADDITIONAL IMPACT ANALYSES

General

PSD requires an analysis of impairment to visibility, soils, and vegetation that will occur as a result of the facility and an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with the facility. Other impact analysis requirements may also be imposed on a permit applicant under local, State or Federal laws which are outside the PSD permitting process.

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 into 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.

Class I and Class II visibility analyses showing insignificant affects were presented earlier in this document.

Soils and Vegetation

The ambient impacts modeling analysis demonstrated that the projected impacts are below the applicable NAAQS. The applicant does not anticipate any significant impacts on soils and vegetation as a result of this proposed project.

Growth

The applicant indicates that there will be no significant growth-related air pollution impacts associated with construction and operation of the proposed expansion.

13.0 EXPLANATION OF DRAFT PERMIT CONDITIONS

Section 1.3 defines the facility modification. Table 3.1.1 defines the emission units that are part of the PSD analysis. The facility's obligations, as to timelines for the commencement of construction and completion of construction, in accordance with 40 CFR 52.21(r), are specified in Condition Nos. 3.3.38 and 3.3.39. The best available control technology (BACT) requirements are specified in Condition Nos. 3.3.13, 3.3.15 and 3.3.18 through 3.3.37. NSPS Subpart Db requirements are specified in Condition Nos. 3.3.16 through 3.3.17. The requirements of the "Plywood MACT" are specified in Condition 3.3.14. Equipment SIP rules for sulfur dioxide are specified in Condition Nos. 3.4.3 through 3.4.5.

An update to the General Testing requirements are specified in Condition 4.1.3. The specific testing requirements are specified in Condition Nos. 4.2.2 through 4.2.21. Monitoring requirements are specified in Condition Nos. 5.2.10 through 5.2.21. General record keeping and reporting requirements are specified, in part, in modified Condition 6.1.7. The specific record keeping requirements are specified in Condition Nos. 6.2.3 through 6.2.5. The specific reporting requirements are specified in Condition Nos. 6.2.6 through 6.2.8.

APPENDIX A - Draft PSD Permit

APPENDIX B - PSD Permit Application No. 15812 and Supporting Data

November 5, 2004	Date of PSD/Title V Application (Assigned No. 15812)
December 20, 2004	Representatives from Norbord, Trinity Consultants, and EPD met to discuss questions pertaining to the air quality application number 15812
January 6, 2005	Letter from EPD to Norbord requesting additional information
February 3, 2005	Norbord's written response to EPD's January 6, 2005 letter
February 11, 2005	Air Dispersion Modeling Update from Norbord (Received Feb. 16, 2005)
February 11, 2005	Class I Modeling Analysis submitted by Norbord (Received Feb. 16, 2005)
February 16, 2005	Record of Telephone Conversation between EPD (Susan Jenkins) and Bob Vanwassen (Wellons) regarding the use of SNCR to control NOx emissions from a wood fired Wellons.
February 16, 2005	Record of Telephone Conversation between EPD (Susan Jenkins) and Scott Standefer (PPC Industries) regarding the use of biofiltration at an OSB Plant.
March 8, 2005	Norbord submitted an alternative dispersion modeling request.
March 25, 2005	Electronic Mail from EPD (John Yntema) to Norbord (Phillip Towles) regarding the technical feasibility of using SNCR on the proposed wood-fired energy system to be used at the Norbord Expansion in Cordele
March 28, 2005	Record of Telephone Conversation between EPD (John Yntema) and Phillip Towles (Norbord) and Jim Teaford (Teaford Company) regarding the use of SNCR on the proposed wood-fired energy system to be used at the Norbord Expansion in Cordele

APPENDIX C- Supporting Data for Dispersion Modeling

April 4, 2005

MEMORANDUM

To: John Yntema and Susan Jenkins
Thru: Dale Kemmerick
From: Richard Monteith
Subject: PSD Dispersion Modeling Review
Norbord Georgia, Inc.

A PSD modeling evaluation was conducted for the proposed modification at the Norbord facility located in Cordele, Georgia. The results of this modeling evaluation are summarized in attached Tables I-1 through I-8 and indicate that air emissions associated with the proposed project will comply with applicable state and federal regulations *except the NAAQS annual and 24-Hour PM_{10} concentration; however, Norbord Georgia, Inc. does not make a significant contribution to this violation.* All modeling input and output files generated in conducting these analyses are available on disk. A discussion of the PSD modeling analysis follows.

INPUT DATA

1. Meteorological Data - Surface data from Macon, Georgia, and upper air data from Centreville, Alabama, for the 5-year period from 1974-1978 were used in this evaluation.
2. Source Data - Source parameters and emission rates provided by Trinity Consultants were used in this evaluation.
3. Receptor Locations - Receptor grids provided by Trinity Consultants consisted of a site boundary grid with a spacing of 100 meters, a Cartesian grid with a spacing of 100 meters to 10 km downwind of the facility, a spacing of 500 meters out to approximately 25 km.
4. Terrain Elevation - The terrain data provided by Trinity Consultants were used in this evaluation. Since no significant impacts were predicted at downwind receptors in complex terrain, complex terrain is not an issue for this site.
5. Building Downwash - Building dimensions for uses in building downwash calculations by ISCST3 PRIME were developed using the latest version of the BPIP program (Version 95086).

PRECONSTRUCTION MONITORING EVALUATION

The pollutants with projected emissions from the proposed project have PSD significant emission rates are PM_{10} and NO_x. The predicted maximum 24-hour PM_{10} and annual NO_x concentration from the proposed project is above the *de minimus* level for PM_{10} and NO_x . Representative monitoring data is being collected by EPD. Norbord requested an exclusion from preconstruction monitoring from EPD.

SIGNIFICANT IMPACT AREA ANALYSIS (SIA)

The SIA is 12.3km and 3.5km for analysis conducted for PM_{10} and NO_x, respectively. These criteria pollutants were emitted in significant amounts. Thus, PSD increment and NAAQS modeling are required for PM_{10} and NO_x.

PSD ANALYSIS

This PSD permit application has a minor source baseline date for PM_{10} / NO_x of 8/5/88 in Crisp County. The other PSD increment consuming source included in the PSD increment analysis are attached. The PSD Class II increment consumption results are summarized in Table II-1 for the proposed project and in Table II-2 for all increment consuming sources.

NAAQS ANALYSIS

NAAQS modeling were conducted for all PM_{10} and NO_x point sources within the Norbord facility that were determined to be significant based on the "20D" rule. Modeling results are summarized in Table II-8.

AIR TOXICS ANALYSIS

An air toxics analysis was performed with ISCST3 PRIME using the 1974-1978 Macon, GA (surface) and Centreville, GA (upper air) meteorological data with downwash excluded. Maximum concentrations for the air toxic pollutants were evaluated and are shown in the attached table. All modeling results were below applicable Acceptable Ambient Concentrations (AAC).

CLASS I AREA ANALYSIS

Norbord facility is located within 200 km of three Class I areas: Okefenokee National Wildlife Refuge, Bradwell Bay Wilderness, and Saint Marks National Wildlife Service. Calpuff modeling was performed for each area stated. The Calpuff modeling results showed no impacts above Class I standards for each area.

VISIBILITY

A Calpuff analysis was conducted to evaluate visibility impacts from the project on a nearby sensitive area. Results were below applicable visibility extinction thresholds for the Class I areas.

PSD DISPERSION MODELING ANALYSIS

I. REQUEST FOR MODELING

- Requested By: John Yntema Date: 2/17/05
- Reviewed By: Richard Monteith Date: 2/28/05

A. Source Information

- Name: Norbord Georgia, Inc. Cordele, GA
- Location: ________
- UTM Coordinates - Primary Emission Point: 235069.11 3539934.73
- Pollutants emitted in significant amounts PM_{10}, NO_x

- Is emission point data entered in Table I-1? ________
- Are any point coordinates significantly different from primary emission point coordinates? ____ If yes, submit point source code and coordinates: Source Code ________ UTM ________ ________
- Attach plot plan of the facility that shows property lines, building locations and emission points, location primary emission point, distance to nearest property line _____ meters.

B. Modeling Basis

- PSD (Minor) baseline dates: SO_2 ________ PM10 8/5/88, NO_x 8/5/88
- Modeling to be conducted for: Class I increment________, Class II increment _______, NAAQS ______, Preconstruction monitoring _______
- If there are Class I areas within 100 km of the source, distance to NA area(s) is ______ ______ km.
- Is modeling to include fugitive emissions: _____ If yes, complete fugitive emission data sheet Table I-2.
- If any actual stack height is less than <u>its</u> GEP stack height, submit data for downwash modeling. Include stack(s) affected by downwash and dimensions (length, width, height) of nearby buildings. Is data attached?___
- Distance and direction to closest terrain feature within 50 km of source which is above the stack height elevation to be used in model. Elevation of stack base 91.6 feet, terrain elevation 387 feet, direction 45 °, distance 6000 meters.
- Maximum increase in elevation above base of stack within 10 km of the source is _____ feet.
- Remarks or additional information: ________

TABLE I-1 POLLUTANT EMISSION DATA
SOURCE: Norbord Georgia, Inc.

POINT	EMISSION DATA	STACK DATA

TABLE 1. SUMMARY OF STACK PARAMETERS FOR MODELING ANALYSES

Source ID	Source Description	Stack Height (ft)	Stack Height (m)	Stack Diameter (ft)	Stack Diameter (m)	Exhaust Velocity (ft/s)	Exhaust Velocity (m/s)	Exhaust Temperature (F)	Exhaust Temperature (K)
S01	WESP/Wellons	120.73	36.80	7.97	2.43	51.84	15.80	142	334.11
S03	System 1 Baghouse	20.00	6.10	4.66	1.42	59.68	18.19	Ambient	0
S04	System 2 Baghouse	20.00	6.10	4.33	1.32	59.81	18.23	Ambient	0
S10	HP Waste Baghouse	17.39	5.30	1.25	0.38	57.84	17.63	Ambient	0
S11	T&G Sander	21.33	6.50	3.84	1.17	57.32	17.47	Ambient	0
S12	T&G Saw Line	19.36	5.90	2.56	0.78	68.04	20.74	Ambient	0
S13	Globe Line	21.33	6.50	3.51	1.07	68.86	20.99	Ambient	0
S63	Press RTO	89.90	27.40	8.99	2.74	29.89	9.11	232	384.11
S201	Dryer Exhaust (WESP/TO)	50.00	15.240	8.00	2.4384	82.94	25.2787	275	408.15
S202	Press Exhaust (TO)	50.00	15.240	6.00	1.8288	80.63	24.5749	245	391.48
S203	Resinated Fines	50.00	15.240	3.50	1.0668	77.99	23.7723	Ambient	0
S204	Non-resinated Fines	50.00	15.240	3.50	1.0668	77.99	23.7723	Ambient	0
S205	Finishing Line	50.00	15.240	3.50	1.0668	77.99	23.7723	Ambient	0
S206	Wet Strand Line	50.00	15.240	3.50	1.0668	77.99	23.7723	Ambient	0
S207	Dry Fuel Bin	50.00	15.240	2.34	0.7138	193.53	58.9877	Ambient	0
S208	Blowline	50.00	15.240	1.30	0.3962	81.66	24.8898	93	307.04

GEP = Good Engineering Practice

Input GEP stack height only if greater than 65 meters and less than actual stack height.

Emission rates in Table I-1 are allowable limits.
Hours of operation if other than 24 hours/day:
S.C. ____ Hours per day ____Days per week ____
USE LESSER OF ACTUAL STACK HEIGHT OR GEP STACK HEIGHT IN THE MODEL
Additional Table I-1 Pollutant Emission Data attached ____
Remarks or additional information: ____________________

II. MODELING RESULTS

- Date completed 3/28/05 By Richard Monteith Jr.
- Date reviewed ____________ By ____________

A. PSD Increment Consumption - Class II Area
Source Norbord Georgia Inc.

TABLE II-I SOURCE ONLY

Pollutant	Averaging Period	Allowable Increment ug/m³	Maximum* Increments Consumed ug/m³	Receptor UTM	
				X (m)	Y (m)
SO_2	Annual	20			
	24 Hour	91			
	3 Hour	512			
PM_{10}	Annual	17	7.96	235330.56	3539978.75
	24 Hour	30	24.89	235590.72	3539562.00
NO_x	Annual	25	13.92	235330.56	3539978.75

*Off property concentrations
Highest concentration - annual averaging periods
Highest, second highest concentration - 24 hour and 3 hour averaging periods

- Models used: ISCST3 - PRIME
  Meteorological data: Year(s) 1994-98 Surface data from Macon, GA
  Upper air data from Centreville, AL
- Fugitive emissions included in model? YES
- Remarks or additional information: ____________

TABLE II-2 ALL INCREMENT CONSUMING SOURCES

Pollutant	Averaging Period	Allowable Increment ug/m^3	Maximum* Increments Consumed ug/m^3	Receptor UTM	
				X (m)	Y (m)
SO_2	Annual	20			
	24 Hour	91			
	3 Hour	512			
PM_{10}	Annual	17	8.56	235330.56	3539978.75
	24 Hour	30	26.0	235330.56	3539978.75
NO_X	Annual	25	13.96	235330.56	3539978.75

*Off property concentrations
Highest concentration - annual averaging periods
Highest, second highest concentration - 24 hour and 3 hour averaging periods

- Models used: ISCST3 - PRIME
- Meteorological data: Year(s) 1974-78 Surface data from Macon, GA
  Upper air data from Centreville, AL
- Other increment consuming sources used in model: See Attachment
- Actual ___ Allowable ✓ Emission rates used in model.
- Remarks or additional information: ___

D. National Ambient Air Quality Standards/NAAQS

Source Norbord Georgia, Inc.

TABLE II-6 PROJECTED IMPACTS VS. SIGNIFICANCE LEVELS

Pollutant	Averaging Period	Significance Level ug/m³	Maximum* Projected Concentration ug/m³	Receptor UTM	
				X (m)	Y (m)
SO_2	Annual	1			
	24 Hour	5			
	3 Hour	25			
PM_{10}	Annual	1	4.96	235330.56	3539978.75
	24 Hour	5	14.81	235330.56	3539978.75
NO_x	Annual	1	8.79	235330.56	3539978.75
CO	8 Hour	500	55.33	235282.77	3539993.50
	1 Hour	2000	110.95	235485.03	3539455.25

*Highest concentration off property

- IF MAXIMUM PROJECTED CONCENTRATION IS GREATER THAN THE SIGNIFICANCE LEVEL FOR ANY AVERAGING PERIOD, NAAQS ANALYSIS IS REQUIRED FOR THAT POLLUTANT.
- Projected concentration based on PSD increment consumption modeling - Source only.

TABLE II-7 OTHER SOURCES CONTRIBUTING EMISSIONS TO IMPACT AREA

UTM - meters	Pollutant	Source

See Attachment

- ON CD List of additional sources attached

TABLE II-8 PROJECTED IMPACT - NAAQS

Pollutant	Averaging Period	Source Impact ug/m^3	Total* Impact ug/m^3	NAAQS ug/m^3
SO_2	Annual 24 Hour 3 Hour			80 365 1300
PM_{10}	Annual 24 Hour	.167 2.36**	67.59 400.10	50 150
NO_2	Annual	14.28	41.28	100
CO	8 Hour 1 Hour			10,000 40,000
Pb	3 Month			1.5

*Total impact equals source impact (increment) plus impact from See attachment sources plus background

** Highest value

Background Concentrations (ug/m^3)

Averaging Period	SO_2	PM_{10}	NO_x	CO
Annual		20	27	-
24 Hour		38	-	-
8 Hour	-	-	-	
3		-	-	-
1	-	-	-	

- Origin of other sources' emission data:
Actual emissions ✓ Allowable emissions _____ AIRS _____, if yes has AIRS data been verified _____

No ____. Was actual ✓ or GEP ____ height used in the model?

- Models used: ISCST-PRIME
- Meteorological data: Year(s) 1974-78 Surface data from Macon, GA
  Upper air data from Centreville, GA
- Computer summary of contributing sources attached ✓
- Remarks or additional information ______________________________

TOXIC MODELING RESULTS

FACILITY: **Norbord, Georgia, Inc.** **LOCATION:** **Cordele (Crisp County)**

DATE: **April 4, 2005** **SURFACE/UPPER AIR MET STATION:** **Macon/Centreville**

YEARS OF MET DATA: **1974-1978** **MODELS USED:** **SCREEN3/ISCST3**

POLLUTANT	Chronic Averaging Period	Max Conc. (µg/m^3)	AAC (µg/m^3)	Max 15-min Concen. (µg/m^3)	AAC (µg/m^3)
Acetaldehyde	Annual	5	0.17	6.7	4500
Acrolein	Annual	0.02	3.9E-03	0.16	23
Arsenic	Annual	2.0E-04	2.0E-04	0.009	0.20
Benzene	Annual	3.9-02	0.13	1.6	1600
Beryllium	Annual	1.0E-05	4.0E-03	4.4E-04	0.50
Cadmium	Annual	4.0E-05	6.0E-03	1.6E-03	60
Chromium III	24-Hour	1.4E-03	1.2	NA	NA
Formaldehyde	Annual	0.57	0.77	35.0	245
Hydrogen Chloride	Annual	0.5	0.015	22.4	700
Lead	24-Hour	3.3E-03	0.12	NA	NA
Manganese	Annual	1.5E-02	0.05	0.63	500
Mercury	Annual	3.0E-04	0.30	1.2E-03	10
Methanol	24-Hour	62.3	619	445	32800
Nickel	24-Hour	0.002	0.004	NA	NA
Phenol	24-Hour	1.00	45.2	4.3	6000

Concentrations were calculated using refined model ISCST3.

TABLE 8. 20D ANALYSIS FOR PM_{10} INCREMENT AFFECTING SOURCES

Facility	PM-10 (lb/hr)	PM-10 (tpy)	UTM E (km)	UTM N (km)	Distance to Norbord (km)	20D (km)	Need to include?
Cargrill., INC.*	0.00	0.00	205.99	3582.38	51.67	787.40	No
Cermex	0.00	0.00	252.96	3589.42	52.67	807.40	No
Coats & Clark, INC. *	2.64	11.56	202.37	3498.01	53.19	817.80	No
Cooper Tire & Rubber Co. *	88.09	385.81	209.71	3496.60	50.20	758.00	No
Crisp County Solid Waste	29.50	129.21	237.00	3529.00	10.94	27.20	Yes
Davidson Exterior Trim*	8.90	38.98	197.10	3550.35	39.60	546.00	No
Duke Energy Tift, LLC	69.73	305.42	257.17	3485.71	58.36	921.20	No
Farmers Peanut and Cotton Ex.*	35.00	153.30	193.91	3545.70	41.78	589.60	No
Frito-Lay, INC.	14.78	64.75	254.78	3596.61	60.07	955.40	No
Georgia Ductile Foundries, LLC	19.53	85.55	242.09	3539.38	6.83	109.40	Yes
Georgia Power Co.	30.00	131.40	257.58	3607.40	71.18	1177.60	No
Georgia-Pacific Corporation*	0.00	0.00	200.37	3500.30	52.71	808.20	No
M&M-Mars*	0.10	0.44	197.99	3494.70	58.52	924.40	No
Marine Corps Logistics Base*	8.20	35.92	207.83	3494.42	53.04	814.80	No
Mid-Georgia Cogen, L.P.	77.82	340.85	255.30	3597.00	60.60	966.00	No
Miller Brewing Company*	95.30	417.41	207.23	3498.54	49.89	751.80	No
Mullite Company of America *	200.23	877.01	205.85	3564.81	38.62	526.40	Yes
P & G Paper Products Co. *	46.60	204.11	204.96	3494.62	54.41	842.20	No
Reeves Construction Company 1*	14.50	63.51	197.80	3502.63	52.78	809.60	No
Reeves Construction Company 2*	11.50	50.37	194.07	3552.76	43.19	617.80	No
Robbins Air Force Base	2.60	11.39	256.20	3611.83	75.00	1254.00	No
Royster-Clark Agribusiness*	21.00	91.98	194.32	3551.39	42.56	605.20	No
Shepherd Construction Co., INC.	9.90	43.36	253.83	3585.75	49.55	745.00	No
Signature Finishers, LLC	0.00	0.00	241.30	3539.77	6.03	125.40	Yes
Tolleson Lumber Company	17.00	74.46	242.95	3593.85	54.59	845.80	No
Weyerhaeuser Company *	126.91	555.87	210.76	3572.42	40.79	569.80	No

* - Coordinates converted from zone 16 to zone 17

TABLE 9. 20D ANALYSIS FOR NO_X INCREMENT AFFECTING SOURCES

Facility	NO_X (lb/hr)	NO_X (tpy)	UTM E (km)	UTM N (km)	Distance to Norbord (km)	20D (km)	Need to include?
Cargrill., INC.*	0.00	0.00	205.99	3582.38	51.67	963.40	No
Cermex	0.00	0.00	252.96	3589.42	52.67	983.40	No
Coats & Clark, INC. *	0.00	0.00	202.37	3498.01	53.19	993.80	No
Cooper Tire & Rubber Co. *	0.00	0.00	209.71	3496.60	50.20	934.00	No
Crisp County Solid Waste	0.00	0.00	237.00	3529.00	10.94	148.80	No
Davidson Exterior Trim*	0.70	3.07	197.10	3550.35	39.60	722.00	No
Duke Energy Tift, LLC	87.99	385.40	257.17	3485.71	58.36	1097.20	No
Farmers Peanut and Cotton Ex.*	0.00	0.00	193.91	3545.70	41.78	765.60	No
Frito-Lay, INC.	13.29	58.19	254.78	3596.61	60.07	1131.40	No
Georgia Ductile Foundries, LLC	0.00	0.00	242.09	3539.38	6.83	66.60	No
Georgia Power Co.	660.00	2,890.80	257.58	3607.40	71.18	1353.60	Yes
Georgia-Pacific Corporation*	0.00	0.00	200.37	3500.30	52.71	984.20	No
M&M-Mars*	0.00	0.00	197.99	3494.70	58.52	1100.40	No
Marine Corps Logistics Base*	0.00	0.00	207.83	3494.42	53.04	990.80	No
Mid-Georgia Cogen, L.P.	241.39	1,057.29	255.30	3597.00	60.60	1142.00	No
Miller Brewing Company*	0.00	0.00	207.23	3498.54	49.89	927.80	No
Mullite Company of America *	0.00	0.00	205.85	3564.81	38.62	702.40	No
P & G Paper Products Co. *	116.80	511.58	204.96	3494.62	54.41	1018.20	No
Reeves Construction Company 1*	0.00	0.00	197.80	3502.63	52.78	985.60	No
Reeves Construction Company 2*	0.00	0.00	194.07	3552.76	43.19	793.80	No
Robbins Air Force Base	155.10	679.34	256.20	3611.83	75.00	1430.00	No
Royster-Clark Agribusiness*	0.00	0.00	194.32	3551.39	42.56	781.20	No
Shepherd Construction Co., INC.	28.50	124.83	253.83	3585.75	49.55	921.00	No
Signature Finishers, LLC	1.37	6.00	241.30	3539.77	6.03	50.60	No
Tolleson Lumber Company	6.30	27.59	242.95	3593.85	54.59	1021.80	No
Weyerhaeuser Company *	40.19	176.01	210.76	3572.42	40.79	745.80	No

* - Coordinates converted from zone 16 to zone 17

TABLE 10. 20D ANALYSIS FOR PM_{10} NAAQS SOURCES

Facility	PM_{10} (tpy)	UTM E (km)	UTM N (km)	Distance to Norbord (km)	20D (km)	Need to include?
Anchor Glass Co.	297.17	256.87	3607.50	71.07	1175.40	No
C-E Minerals PLT1	930.91	204.86	3564.50	38.89	531.80	Yes
C-E Minerals PLT2	1133.10	206.75	3564.44	37.41	502.20	Yes
C-E Minerals PLT5	323.74	212.00	3583.16	48.99	733.80	No
Coats & Clark Inc.	36.10	194.27	3493.76	61.52	984.40	No
Cooper Tire & Rubber Co.	580.75	210.48	3495.52	50.69	767.80	No
Crisp	4.70	231.42	3497.17	42.86	611.20	No
Davidson Exterior Trim	2.89	197.83	3550.27	38.57	525.40	No
Georgia DOT	4.99	213.42	3599.77	63.64	1026.80	No
Georgia-Pacific Corp.	386.14	233.07	3560.38	20.58	165.60	Yes
ITT Rayonier INC.	114.00	341.16	3532.61	106.44	1882.80	No
Langdale Forest Prod Co.	14.18	305.63	3554.30	72.11	1196.20	No
Medusa Cement Co.	290.34	252.65	3588.74	51.95	793.00	No
Merck & Co.	30.21	203.61	3487.94	60.68	967.60	No
Miller Brewing Co.	161.28	207.69	3497.81	50.15	757.00	No
Mitchell	36.96	202.50	3482.42	66.01	1074.20	No
Oxford Const Co.	20.98	165.78	3553.49	70.52	1164.40	No
P & G Paper Products Co.	205.76	205.70	3494.54	53.98	833.60	No
Reeves Construction Company 5	30.35	257.67	3482.10	62.08	995.60	No
Tolleson Lumber Company	209.65	170.36	3548.90	65.24	1058.80	No
Unimin Corporation	24.09	173.25	3608.77	92.50	1604.00	No
Weyerhaeuser Company	590.24	210.76	3572.42	40.55	565.00	Yes

All Coordinates converted from lat/long to UTM zone 17

TABLE 11. 20D ANALYSIS FOR NO_X NAAQS SOURCES

Facility	NO_X (tpy)	UTM East (km)	UTM North (km)	Distance to Norbord (km)	20D (km)	Need to include?
Anchor Glass Co.	83.61	256.87	3607.50	71.07	1351.40	No
C-E Minerals PLT1	0.00	204.86	3564.50	38.89	707.80	No
C-E Minerals PLT2	0.00	206.75	3564.44	37.41	678.20	No
C-E Minerals PLT5	0.00	212.00	3583.16	48.99	909.80	No
Coats & Clark Inc.	182.33	194.27	3493.76	61.52	1160.40	No
Cooper Tire & Rubber Co.	245.17	210.48	3495.52	50.69	943.80	No
Crisp	306.20	231.42	3497.17	42.86	787.20	No
Davidson Exterior Trim	115.98	197.83	3550.27	38.57	701.40	No
Georgia DOT	9.83	213.42	3599.77	63.64	1202.80	No
Georgia-Pacific Corp.	218.72	233.07	3560.38	20.58	341.60	No
ITT Rayonier INC.	294.07	341.16	3532.61	106.44	2058.80	No
Langdale Forest Prod Co.	28.59	305.63	3554.30	72.11	1372.20	No
Medusa Cement Co.	2991.84	252.65	3588.74	51.95	969.00	Yes
Merck & Co.	650.33	203.61	3487.94	60.68	1143.60	No
Miller Brewing Co.	0.00	207.69	3497.81	50.15	933.00	No
Mitchell	3400.96	202.50	3482.42	66.01	1250.20	Yes
Oxford Const Co.	293.46	165.78	3553.49	70.52	1340.40	No
P & G Paper Products Co.	806.88	205.70	3494.54	53.98	1009.60	No
Reeves Construction Company 5	25.34	257.67	3482.10	62.08	1171.60	No
Tolleson Lumber Company	161.04	170.36	3548.90	65.24	1234.80	No
Unimin Corporation	55.43	173.25	3608.77	92.50	1780.00	No
Weyerhaeuser Company	1302.56	210.76	3572.42	40.55	741.00	Yes

All Coordinates converted from lat/long to UTM zone 17