NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF AIR QUALITY

PREVENTION OF SIGNIFICANT DETERIORATION PRECONSTRUCTION REVIEW AND PRELIMINARY DETERMINATION, AND TITLE V REVIEW

FOR

PROJECT INVOLVING
MODIFICATION TO PARTICLEBOARD DRYERS
AT
ATC PANELS, INC.
MONCURE, CHATHAM COUNTY
NORTH CAROLINA

THIS REVIEW WAS PERFORMED BY THE
AIR PERMITS SECTION
IN ACCORDANCE WITH 15A NCAC 2D .0530 AND 2Q .0500 - NCDAQ
REGULATIONS FOR
PREVENTION OF SIGNIFICANT DETERIORATION
AND
TITLE V PROCEDURES

May 22, 2007

Mailing List

NEWSPAPER	The Chatham Record P. O. Box 459 Pittsboro, NC 27312 (919) 542-3013	Public Notice
OFFICIALS	Mr. Charlie Horne County Manager Chatham County 12 East Street Pittsboro, NC 27312 (919) 542-8200	Public Notice
LIBRARY	Ms. Mary Beall Pittsboro Memorial Library P. O. Box 580 Pittsboro, NC 27312 (919) 542-3524	Preliminary Determination & Application
SOURCE	Mr. Ricardo Hillmann Director of Operations - Particleboard ATC Panels, Inc. 985 Corinth Road Moncure, NC 27559 (919) 545-5847	Preliminary Determination & Public Notice
EPA	Mr. James Little Air Permits Section U.S. EPA Region 4 Sam Nunn Atlanta Federal Building 61 Forsyth Street, S.W. Atlanta, Georgia 30303-3104 (404) 562-9118 Preliminary Determination and Public Notice via electronic mail to: little.james@epa.gov with cc to: forney.kathleen@epa.gov worley.gregg@epa.gov	Preliminary Determination & Public Notice
FLM	Mr. Bill Jackson National Forest Service 160A Zillicoa Street Asheville, NC 28801 (828) 257-4815	None

RALEIGH REGIONAL OFFICE	Mr. Ernie Fuller NCDAQ Air Quality Regional Supervisor 3800 Barrett Drive P.O. Box 27687 Raleigh, NC 27609 (919) 791-4200	Preliminary Determination & Public Notice
AFFECTED STATES	State of Virginia & Forsyth County	Preliminary Determination & Public Notice

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Applicant:

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- ATC Panels, Inc., Moncure, NC, submitted a Prevention of Significant Deterioration (PSD) application to the North Carolina Division of Air Quality (NCDAQ) on October 18, 2006.

- The application was deemed complete by NCDAQ for review purposes pursuant to 40 CFR 51.166 (q)(1) and 15A NCAC 2D .0530(o) as of October 20, 2006.

- The facility is an existing PSD major stationary source. The facility emits or has the potential to emit 250 tons per year of at least one PSD regulated pollutant including nitrogen oxides (NO_x) and carbon monoxide (CO).

- The application includes a request to increase the process rates of existing particleboard dryers and to remove the associated regenerative thermal oxidizer.

- The project will result in increases in emissions of PM (85 tons/yr), PM_{10} (58 tons/yr), sulfur dioxide (36 tons/yr), nitrogen oxides (88 tons/yr), carbon monoxide (1,114 tons/yr), and volatile organic compounds (800 tons/yr). The increases in emissions of PM, $PM_{10,}$ nitrogen oxides, carbon monoxide, and volatile organic compounds will exceed their respective PSD significance thresholds: 25 tons/yr for PM, 15 tons/yr for PM10, 40 tons/yr for nitrogen oxides, 100 tons/yr for carbon monoxide, and 40 tons/yr for volatile organic compounds.

- NCDAQ proposes the following Best Available Control Technology (BACT) emission limits and control techniques for this project:

EMISSION SOURCE	POLLUTANT	BACT EMISSION LIMITS*	CONTROL TECHNOLOGY
Particleboard dryers (ID Nos. 1410, 1420, and 1430)	VOC	202 lbs/hr	good combustion control with existing wet ESP
	CO	329.4 lbs/hr	good combustion control
	PM10	28.3 lbs/hr	good combustion control with existing multiclones and wet ESP
	NOx	94.7 lbs/hr	good combustion control

* BACT emission limits are a total for three particleboard dryers (ID Nos. 1410, 1420, and 1430). They shall apply at all times. However, emissions resulting from startup, shutdown or malfunction as defined under 15A NCAC 2D .0535, exceeding the above limits in Table are permitted, provided that the Permittee, to the extent practicable, maintains and operates each emission source including any associated air pollution control equipment listed in this Table, in a manner consistent with good air pollution control practice for minimizing emissions.

SECTION 1.0
INTRODUCTION

ATC Panels, Inc. (“ATC”) has submitted to the North Carolina Division of Air Quality ("NCDAQ") a combined Prevention of Significant Deterioration ("PSD") major modification and a Title V significant modification application (1900015.06D) for its facility located in Moncure, NC. The application includes a request to increase the process rates of existing particleboard dryers and to remove the associated regenerative oxidizer (RO), thus emitting volatile organic compounds uncontrolled from these dryers.

This application will be reviewed using a "one-step" process in 15A NCAC 2Q .0501(d)(1).

ATC currently operates this facility under a consent order[1] with the State of North Carolina, County of Chatham. The order requires that ATC submit a permit application to repair, replace, modify or eliminate the existing regenerative oxidizer (RO) on the particleboard dryers. In brief, one of two chambers of the RO has been permanently damaged and the RO is currently operating with only the remaining chamber. The existing permit requires that the Permittee operate both chambers of the RO if all three particleboard dryers are in operation and one chamber of RO must be in operation if maximum two particleboard dryers are in operation. This application includes a request to eliminate the existing RO by concluding that it would be unreasonable to require installing a new RO for VOC emissions from the modified particleboard dryers based upon economic and environmental standpoints.

Also, it should be stated here that the current best available control technology (BACT) emission limit for VOC (39.5 lbs/hr as C each) for the particleboard dryers as included in the existing air permit was established without considering the VOC control achieved by the use of existing wet electrostatic precipitator (wet ESP) and hence, the Permittee wishes to account for it in this permit application.

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[1] ATC Panels, Inc. Moncure Facility, Special Order by Consent 2006-004.

The facility is an existing major stationary source under the PSD program, which has been classified as per 40 CFR 51.166(b)(1)(i)(b). That is, it emits or has the potential to emit 250 tons per year of at least one PSD regulated pollutant including nitrogen oxides (NO_x) and carbon monoxide (CO).

The project will result in increases in emissions of PM (85 tons/yr), PM_{10} (58 tons/yr), sulfur dioxide (36 tons/yr), NO_x (88 tons/yr), CO (1,114 tons/yr), and VOC (800 tons/yr). The increases in emissions of PM, $PM_{10,}$ NOx, CO, and VOC will exceed their respective PSD significance thresholds: 25 tons/yr for PM, 15 tons/yr for PM10, 40 tons/yr for NOx, 100 tons/yr for CO, and 40 tons/yr for VOC.

Thus, the project is subject to review and processing under the 15A NCAC 2D .0530 "Prevention of Significant Deterioration" for emissions of PM10[2], NOx, CO, and VOC. The facility must also comply with other specific NC DAQ air pollution regulations where applicable.

Pursuant to the Federal Register notice on February 23, 1982, North Carolina (NC) has full authority from the Environmental Protection Agency (EPA) to implement the PSD regulations in the State effective May 25, 1982. Accordingly, the NCDAQ will conduct a full PSD review and process the PSD permit application for the proposed project. NC's State Implementation Plan (SIP) - approved PSD regulations have been codified in 15A NCAC 2D .0530, which implement the requirements of 40 CFR 51.166.

In accordance with the PSD requirements, ATC has conducted a best available control technology (BACT) analysis, source impact analysis, additional impacts (soils, vegetation, visibility) analysis, and Class I area analysis.

After careful review of the company submitted BACT analysis, DAQ proposes to approve the following BACT emission limits and controls for the proposed project:

[2] BACT will be established for PM10 and not for PM, as DAQ does not consider PM a regulated NSR pollutant under 15A NCAC 2D .0530.

EMISSION SOURCE	POLLUTANT	BACT EMISSION LIMITS*	CONTROL TECHNOLOGY
Particleboard dryers (ID Nos. 1410, 1420, and 1430)	VOC	202 lbs/hr	good combustion control with existing wet ESP
	CO	329.4 lbs/hr	good combustion control
	PM10	28.3 lbs/hr	good combustion control with existing multiclones and wet ESP
	NOx	94.7 lbs/hr	good combustion control

* BACT emission limits are a total for three particleboard dryers (ID Nos. 1410, 1420, and 1430). They shall apply at all times. However, emissions resulting from startup, shutdown or malfunction as defined under 15A NCAC 2D .0535, exceeding the above limits in Table are permitted, provided that the Permittee, to the extent practicable, maintains and operates each emission source including any associated air pollution control equipment listed in this Table, in a manner consistent with good air pollution control practice for minimizing emissions.

The source impact and additional impact analysis, and Class I area evaluation concluded that the proposed project will not cause adverse air quality impacts in the surrounding community or the nearest Class I area; James River Face Wilderness Area.

1.1 Preliminary Determination

ATC's permit application has been reviewed by the NCDAQ, Permits Section staff, to determine compliance with the requirements of all NCDAQ air pollution regulations. The review was performed for the following:

- PSD including determination of BACT with consideration of non-PSD regulated toxic pollutants, source impact analysis, additional impact analysis on soils, vegetation and visibility, and Class I analysis;

- Compliance with the North Carolina Air Quality Rules at 15A NCAC 2D and 2Q.

The NCDAQ, Permits Section staff has conducted a preconstruction review of the application and made a preliminary determination that the proposed project will comply with all applicable

North Carolina air quality regulations including the PSD requirements. Therefore, the NCDAQ proposes to issue an air permit for the modification described in Section 1 above, with specific permit conditions and emission limits. Preliminary preconstruction approval under the PSD requirements was contingent upon the following findings:

- A demonstration that the BACT is applied to each emission unit that will contribute to an increase in emissions of any pollutant above the significance threshold.

- A demonstration that National Ambient Air Quality Standards (NAAQS) and PSD Class II increments will not be violated as a result of emissions from the proposed project.

- A demonstration that emissions from the proposed project will neither cause adverse impacts to soils and vegetation nor cause degradation of visibility, and that economic growth associated with the project will not cause a significant increase in regional air pollutant levels.

- A demonstration that air emissions resulting from the proposed project will not adversely impact any PSD Class I area.

The remainder of this report contains a review by NCDAQ of the demonstration and analyses presented by ATC. Sections 2 and 3 of this report present a general description of the proposed project and a description of the site location. Section 4 presents a regulatory analysis of the North Carolina and Federal air quality regulations that apply to the project construction and operation. Section 5 contains the BACT analysis and Section 6 presents the results of the air quality analysis. The sample emission calculations and summary have been included in Appendix A while the NCDAQ draft air permit is contained in Appendix B.

In addition to the regulatory analysis, the application must undergo adequate public participation. The NCDAQ solicits and encourages participation by the general public, industry, and other affected persons impacted by the proposed project. Specific public notice requirements and a

30-day public comment period are required before the NCDAQ can take final action on this application. Appendix C contains a copy of the public notice.

SECTION 2.0
GENERAL DESCRIPTION

2.1 Process Description

2.1.1 Existing Operations

ATC owns and operates a particleboard and medium-density fiberboard (MDF) manufacturing facility in Moncure, North Carolina. The facility has been classified under the Standard Industrial Classification (SIC) code 2493 “Reconstituted Wood Products”. This facility operates under the current air permit 03449T30. Permitted equipment includes particleboard and MDF operations (screens, dryers and presses), and associated raw materials and finished product handling.

There are three, direct fired (wood suspension dust or natural gas) rotary dryers for the particleboard manufacturing operation: two core layer (50 million Btu/hr each) and one surface layer (60 million Btu/hr) dryers.

There is also one "Wellons" indirect wood suspension dust-fired burner (40 million Btu/hr), which provides heat for the thermal oil, which is then used in particleboard press. The exhaust gases from the "Wellons" burner are currently directed to the inlet to the surface layer dryer as a portion of combustion air. This burner also has a capability to exhaust through two core layer dryers.

As per Permittee, these dryers have previously been defined with a rated capacity of approximately 55,000 lbs/hr (wet) [31,000 lbs/hr dry] for each of the two core layer dryers, and 65,000 lbs/hr (wet) [38,000 lbs/hr dry] for the surface layer dryer. These capacities represent a nominal rate of 15.5 oven dry ton (ODT)/hr for each core layer dryer and 19.0 ODT/hr for surface layer dryer, thus making a current total capacity of all particleboard dryers to 50 ODT/hr.

2.1.2 Proposed Modifications

As included in Section 1, ATC is proposing to redefine or increase the process rates of the core layer particleboard dryers and to remove the associated RO (ID No. CD-1515).

Each core layer dryer shall be defined with a capacity of 60,000 lbs/hr (wet). The surface layer dryers' capacity will remain at 65,000 lbs/hr (wet). With a representative minimum moisture content of 38 percent by weight for core layer and 32 percent by weight for surface layer, these wet capacities can be equated to 37,200 lbs/hr (dry) or 18.6 ODT/hr for each core layer dryer and 44,200 lbs/hr (dry) or 22.1 ODT/hr for the surface layer dryer, thus making the total capacity of all three particleboard dryer 59.3 ODT/hr.

The Permittee stated that the existing BACT emission limits for particleboard dryers as included in the current permit 03491T30, were based on inaccurate data and these dryers were capable of the above processing capacities and were designed as such. The Permittee also argues that the particleboard flakers are capable of producing a smaller flake thus allowing the dryers to be more efficient in drying additional raw (wet) materials. In brief, the Permittee intends to meet these increased process rates for the dryers without any physical modifications.

Also as included in Section 1 above, the proposed modifications include removal of the existing RO, which currently controls emissions from the permitted particleboard dryers.

The "Wellons" burner does not become an affected emission unit due to the increase in process rates of two core layer dryers. Finally, it should be emphasized here that the existing permitted capacity of particleboard mill, which is 180 million ft^2 on a 3/4-inch basis, is unaffected by the increase in process rates of two core layer dryers.

2.2 Emissions

Emissions from the particleboard dryers are composed of wood dust, fuel combustion products, flyash, and organic compounds evaporated from the extractable portion of the wood.

The evaporated extractable compounds are primarily composed of terpenes and wood resins/pitch. The quantity of these compounds present in the exhaust is dependent on the original extractive content of the wood, which varies by wood species (for example, southern pines would have much greater content than the hardwood). Pines have some of the highest extractable organic compound content (longleaf pine with up to 9.2%w and slash pine up to 15.2%w).

A portion of the wood resin contributes to particulate matter and VOC emissions.

NOx emissions are expected due to combustion of fuel (wood dust) in these direct-fired dryers. However, wood combustion is expected to result into less NOx per Btu because of lower nitrogen content of the fuel. Moreover, the lower flame temperature in the dryers is expected to cause less formation of thermal NOx.

Emissions from the ATC facility include PM, $PM_{10,}$ $PM_{2.5,}$ SO_2, NO_x, CO, and VOC. Detailed emission summary for increase in emissions due to proposed project are included in Section 4.

SECTION 3.0
REGIONAL DESCRIPTION

3.1 Area Classification

The facility is located in Chatham County, North Carolina, approximately 2.4 miles southeast of the town of Moncure. The approximate UTM coordinates for the facility are 677.103 km E and 3941.181 km N (UTM Zone 17) with plant grade approximately 180 feet above mean sea level. The site is approximately 433 acres located in four tracts. Corinth Road on the west, Old US Hwy 1 on the north, Shaddox's Creek on the east, and a creek and/or power line right-of-way on the south, bind the property. The topography in the near vicinity of the site consists of flat (simple) terrain with higher terrain (rolling hills) approximately 6-10 kilometers to the northwest and south.

Air quality with respect to the NAAQS in Chatham County is classified as follows:

Pollutant	**Attainment Status**
PM_{10}	Attainment
$PM_{2.5}$	Attainment
Sulfur Dioxide	Attainment
Nitrogen Dioxide	Attainment
Carbon Monoxide	Attainment
Ozone	Partial Attainment (includes Moncure) and Partial Non-attainment

Chatham County is considered a Class II Area with ambient air increments for PM_{10}, SO_2, and NO_2.

The closest Class I Area from this facility is James River Face Wilderness Area, which is located 220 kilometers northeast of the facility.

SECTION 4.0
REGULATORY ANALYSIS

The following discussion pertains to the regulatory requirements that must be met for the proposed modification of the ATC facility. These requirements include both PSD regulations and other State air quality regulations.

4.1 PSD Applicability and Required Analysis

The basic goal of the PSD regulations is to ensure that the air quality in clean (i.e. attainment) areas does not significantly deteriorate while maintaining a margin for future industrial growth. The PSD regulations focus on industrial facilities, both new and modified, that create large increases in the emission of certain pollutants.

US Environmental Protection Agency's (EPA) latest revisions governing the PSD regulation are included in the Federal Register (67 FR 80186, December 31, 2002 and 68 FR 63021, November 7, 2003, except those provisions stayed in 69 FR 40274).

Under PSD requirements, all major new or modified stationary sources of air pollutants as defined in Section 169 of the Federal Clean Air Act (CAA) must be reviewed and permitted prior to construction by EPA or permitting authority, as applicable, in accordance with Section 165 of the CAA. A "major stationary source" is defined as any one of 28 named source categories, which emits or has a potential to emit (PTE) 100 tons per year of any regulated pollutant, or any other stationary source, which emits or has the potential to emit 250 tons per year of any PSD regulated pollutant.

As indicated in Section 1.0 above, ATC facility is an existing PSD major stationary source, classified under 40 CFR 51.166(b)(1)(i)(b). It emits or has the potential to emit 250 tons per year of NOx and CO.

Because the existing facility is considered a major stationary source, modification to an existing major source which results in emission increases for regulated pollutants in amounts equal to or greater than the significance levels, is subject to PSD review and must meet certain review requirements. Thus, the emission increases as a result of this modification must be compared to the "significance levels" as listed in 40 CFR 51.166(b)(23)(i) to determine which pollutants must undergo PSD review.

The company has performed a PSD applicability analysis by determining whether the project results in an emission increase of any PSD regulated pollutant above the respective significance thresholds.

The change in emissions due to proposed project has been estimated using the provisions in 40 CFR 51.166(a)(7)(iv)(c) "Actual-to-projected actual applicability test for projects that only involve existing emission units".

Using the "actual-to-projected actual test", the Permittee has performed emission calculations for baseline actual (pre change) and projected actual (post change) emissions for all PSD regulated pollutants for each modified emissions unit. The baseline actual emission rate for a modified emission unit (e.g. particleboard dryer [ID No. 1410]) has been based upon 24-month data [2004 to 2005] of operating hours and production rates, and site-specific emission factors. The projected actual emission rate for a modified emission unit (e.g. particleboard dryer [ID No. 1410]) has been based upon projected utilization (i.e., production rate and operating hours) of the emission unit and the site-specific emission factors. This applicability analysis has been included in the Appendix B of the permit application.

The following Table includes a summary of emission increases due to the proposed project.

Table 4-1 Emission Increases for the Proposed Project

Compounds	PSD Significant Emission Rates Tons Per Year	Net Emissions Increase/Decrease Tons Per Year	PSD Major Modification Review Required?
PM	25	85	No[3]
PM_{10}	15	58	Yes
$PM_{2.5}$	Not Available	58[4]	-
SO_2	40	36	No
NOx	40	88	Yes
CO	100	1,114	Yes
VOC (ozone precursor)	40	800	Yes
Sulfuric Acid Mist	7	0.56	No
Lead	0.6	0	No

Using Table 4-1 data, the following can be concluded:

- The change in emissions due to the project for $PM_{10,}$ NOx, CO, and VOC will exceed their respective significance thresholds, and hence, PSD major modification review is required for these pollutants.

[3] DAQ does not consider PM as a regulated NSR pollutant under 15A NCAC 2D .0530.

[4] In the absence of quantified emissions for $PM_{2.5}$ for the proposed project, DAQ has assumed that $PM_{2.5}$ emissions equal to PM_{10} emissions, which is a conservative assumption. No data is available for PM2.5 emission rates for particleboard dryers in AP-42, Section 10.6.2 "Particleboard Manufacturing", 6/02. It should also be stated here that the National Council of the Paper Industry for Air and Stream Improvement, Inc. (NCSAI) [R&D organization for forest products industry] has not yet developed the PM2.5 emission factors for particleboard dryers (e-mail communication of 3/7/07 from David Word, Program Manager, NCASI, Newberry, FL to Wallace Pitts, NCDAQ, Raleigh, NC)

As per 4/5/05 memorandum "Implementation of New Source Review Requirements in $PM_{2.5}$ Non-attainment Areas" from Steve Page, Director, OAQPS, EPA and 10/23/97 memorandum, "Interim Implementation of New Source Review Requirements for $PM_{2.5}$" from John Seitz, Director, OAQPS, EPA, DAQ will consider PM_{10} as a surrogate pollutant for controlling $PM_{2.5}$ emissions and analyzing impacts on air quality for $PM_{2.5}$. In brief, establishing BACT for PM_{10}, and ensuring compliance with NAAQS and PSD Class I and Class II increments for PM_{10} will be adequate for $PM_{2.5}$ emissions from the proposed project.

Finally, it should also be stated here that EPA has finalized on 3/29/07 "Clean Air Fine Particle Implementation Rule." However, this rule does not include the NSR requirements for PM2.5. EPA has informed DAQ that it intends to separately publish a final rule for NSR requirements for PM2.5 by August/September 2007. Refer to e-mail from Raj Rao of EPA OAQPS dated 4/3/07.

- For SO_2, sulfuric acid mist, and lead, the change in emissions due to the project will be either less than their respective significance thresholds or zero. Thus PSD major modification review is not required for these pollutants.

Thus, ATC has performed the following reviews and analyses related to PSD for the emissions of PM_{10}, NOx, CO, and VOC. The reviews and analyses are required to be performed for each modified emission unit contributing to the emission increase for any regulated air pollutant equal to or exceeding its significance threshold, as per 40 CFR 51.166(j) through (q), implemented through 15A NCAC 2D .0530.

- BACT determination
- source impact analysis
- air quality impact analysis
- additional impacts analyses including effects on soils, vegetation, and visibility.
- Class I analysis.

Under PSD regulations, the determination of the necessary emission control equipment is developed through a BACT review. BACT is defined, in pertinent part, at 40 CFR 51.166 (b)(12) as:

> *An emissions limitation... based on the maximum degree of reduction for each pollutant... which would be emitted from any proposed major stationary source or major modification which the reviewing authority, on a case-by-case basis, taking into account energy, environment, and economic impacts and other costs, determines is achievable... for control of such a pollutant.*

The BACT requirements are intended to ensure that the control systems incorporated in the design of the proposed facility reflect the latest control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the facility. Additionally, the BACT analysis must consider the impacts of noncriteria pollutants and unregulated toxic air pollutants, if any are emitted, when making the BACT decision for regulated pollutants. Under the BACT requirements of the PSD regulations, all BACT emission limits must, at a minimum, comply with any applicable standard of performance under 40 CFR Part 60 (New Source Performance Standards) and Part 61 (National Emission Standards for Hazardous Air Pollutants), and the North Carolina State Implementation Plan (SIP). A discussion of the BACT determination can be found in Section 5 of this document.

The sample emission calculations can be found in Appendix A.

4.2 NCDAQ Air Pollution Regulations

In addition to the PSD requirements, the NCDAQ has promulgated air quality rules under Title 15A NCAC Subchapters 2D and 2Q.

The NCDAQ emission control regulations that affect the proposed modification are summarized below:

Regulation	Affected Sources	Comment
2Q .0101	Particleboard dryers	A permit is required for all sources of air emissions not specifically exempted.
2D .0515	Particleboard dryers	Allowable PM emission rate depends upon process weight rate.
2D .0516	Particleboard dryers	2.3 lb/million Btu heat input SO_2
2D .0521	Particleboard dryers	Visible emissions cannot exceed 20 percent opacity for all affected sources except sources subject to NSPS.
2D .0530	Particleboard dryers	PSD review is required for a major modification.
2D .0535	Particleboard dryers	Emissions in excess of established permit limits that last for more than 4 hours require notification to the Director within 24 hours.
2D .0614	Particleboard dryers	CAM plan is required for any large pollutant specific emission unit (PSEU) permitted using the significant modification provision of Title V program, provided the PSEU cannot be exempted under 40 CFR 64.2(b). Only pollutant for which active control is available is PM10. Three particleboard dryers vent to three dedicated multiclones and then to a single wet electrostatic precipitator. The combined after control total PM10 emissions of the pollutant specific emission unit

		[PSEU] (three dryers deemed as one PSEU) exceed the major source threshold for PM10. Hence, CAM plan is required for three multiclones and a wet ESP.
2D .1100	Facility wide	Demonstrate compliance with applicable ambient levels for each pollutant whose facility wide emissions exceed its toxic pollutant emission rate.
2D .1111	Particleboard dryers	Particleboard dryers are subject to MACT Subpart DDDD. The compliance date is October 1, 2008.

4.2.1 15A NCAC 2Q .0101 - Required Air Quality Permits

This regulation requires the owner or operator of all sources for which there is an ambient air quality or emission control standard, that is not exempted from permit requirements, to apply for an air quality permit. The owner or operator of a source required to have a permit shall not begin construction or operation of the source without first obtaining a permit. All modified equipment, as included in Section 2.1.2 above are not exempt from permitting. Thus, ATC is required to submit an air permit application and obtain a revised permit prior to any construction or change in method of operation of the source. The Permittee has submitted the required application and information sufficient to obtain an air quality permit, including all information required pursuant to 15A NCAC 2D .0530 "Prevention of Significant Deterioration" and 15A NCAC 2Q .0500 "Title V Procedures".

4.2.2 15A NCAC 2D .0515 - Particulates from Miscellaneous Industrial Processes

The allowable emission rates for particulate matter from any stack, vent, or outlet, resulting from any industrial process for which no other emission control standards are applicable, shall not exceed the level calculated with the equation $E = 4.10(P)^{0.67}$, calculated to three significant figures for process rates less than or equal to 30 tons per hour. For process rates greater than 30 tons per hour, the allowable emission rates for particulate matter shall not exceed the level calculated with the equation $E = 55.0(P)^{0.11} - 40$ calculated to three significant figures. For the purpose of these equations "E" equals the maximum allowable emission rate for particulate matter in pounds per hour and "P" equals the process rate in tons per hour.

Based upon the process rates of 18.6 ODT/hr for each core layer dryer and 22.1 ODT/hr for surface layer dryer, the allowable PM emission rates (filterable only) for these dryers can be estimated as 29.06 lbs/hr (each core layer dyer) and 32.62 lbs/hr (surface layer dryer). The Permittee has estimated after control PM emission rates of 10.08 lbs/hr (each core layer dryer) and 11.98 lbs/hr (surface layer dryer) using the site-specific emission factor and observed control device efficiencies for the multiclone and wet ESP. Compliance with this requirement is expected.

4.2.3 15A NCAC 2D .0516 - Sulfur Dioxide Emissions from Combustion Sources

This regulation establishes emission standard of 2.3 lb/million Btu for SO_2 emissions. The modified particleboard dryers will be burning either wood dust or natural gas. These fuels are inherently low sulfur fuels. The Permittee has estimated SO_2 emission rates of 6.02 lbs/hr (each core layer dryer) and 7.16 lbs/hr (surface layer dryer), using the site-specific emission factor. These emission rates can be converted to 0.14 lb/million Btu (each core layer dryer based on 50 million Btu/hr) and 0.12 lb/million Btu (surface layer dryer based on 60 million Btu/hr). Compliance with this requirement is expected.

4.2.4 15A NCAC 2D .0521 - Control of Visible Emissions

The intent of this Rule is to prevent, abate and control emissions generated from fuel burning operations and industrial processes where an emission can be reasonably expected to occur, except during startup, shutdowns, and malfunctions approved as such according to procedures approved under 15A NCAC 2D .0535. This rule applies to any stationary source, which has visible emissions except the sources subject to any applicable limits in NSPS.

For sources manufactured after July 1, 1971, visible emissions shall not be more than 20 percent opacity when averaged over a six-minute period. Compliance with the 20 percent opacity limit shall be determined as follows:

i. No six-minute period exceeds 87 percent opacity;

ii. No more than one six-minute period exceeds 20 percent opacity in any hour; and

iii. No more than four six-minute periods exceed 20 percent opacity in any 24-hour period.

Excess emissions during startup and shutdown shall be excluded from the determination of compliance with this limit, if the excess emissions are exempted according to the procedures set out in 2D .0535(g). Excess emissions during malfunctions shall be excluded from the determination of compliance with this limit, if the excess emissions are exempted according to the procedures set out in 2D .0535(c).

This visible emission limit applies to all sources in Section 2.1.2 above, as there are not any applicable NSPS standards for opacity for particleboard dryers. Compliance with this requirement will be verified after the modified dryers resume their operation.

4.2.5 15A NCAC 2D .0530 - Prevention of Significant Deterioration

Facilities classified as major for PSD and applying for a significant modification are subject to all the requirements as defined in 40 CFR 51.166. These requirements include:

- A demonstration that the BACT is applied to each emission unit that will emit any PSD regulated pollutant above the significant threshold, including a demonstration that emissions of air toxics will not exceed the acceptable ambient levels (AAL's) as regulated by the NCDAQ.

- A demonstration that neither allowable PSD ambient air increments nor NAAQS will be violated as a result of emissions from the proposed project.

- A demonstration that emissions from the proposed project will neither cause adverse impacts to soils and vegetation nor cause degradation of visibility, and that economic growth associated with the project will not cause a significant increase in regional air pollutant levels.

- A demonstration that air emissions resulting from the proposed facility will not adversely impact any PSD Class I area.

For additional details on PSD regulatory analysis, please refer to Section 4.1 above.

4.2.6 15A NCAC 2D .0535 - Excess Emissions Reporting and Malfunctions

This regulation applies to all permitted facilities and outlines the procedures of reporting excess emissions as a result of malfunctions or operational upsets. The facility owner/operator must notify the appropriate regional office of any excess emissions that last for greater than four hours. This report must be made within 24 hours of becoming aware of the occurrence.

4.2.7 15A NCAC 2D .0614 - Compliance Assurance Monitoring

This regulation implements the requirements of 40 CFR 64 "Compliance Assurance Monitoring". The requirements of this regulation are applicable to any pollutant-specific emission unit (PSEU), if the following three conditions are satisfied:

- the unit is subject to any non-exempt emission limitation or standard for the applicable regulated pollutant.

- the unit uses any control device to achieve compliance with any such emission limitation or standard.

- unit's precontrol potential emission rate exceeds either 100 tons/yr (for criteria pollutants) or 10/25 tons/yr (for HAPs).

Also per Section 64.5, the Permittee must analyze whether any emission unit undergoing a "significant permit revision", be deemed as a large PSEU and therefore a CAM plan needs to be submitted. Large PSEUs are those emission units, which have after control PTE equal to or greater than either 100 tons (for criteria pollutants) or 10/25 tons (for HAPs).

In brief, this permit modification request is processed using the procedures in 15A NCAC 2Q .0516 “Significant Permit Modification” and the one-step process as allowed in 15A NCAC 2D .0501(d)(1). Hence, applicability to Part 64 must be analyzed.

The particleboard dryers (PSEUs) have (active) control devices (three multiclones and one wet ESP) for assuring compliance with PM10 BACT limits under 15A NCAC 2D .0530. Each dryer has a dedicated multiclone and all three dryers have a single wet ESP for further removal of PM10 emissions. The potential after control PM10 emissions from the wet ESP for three dryers are approximately 123 tons exceeding the major source threshold for PM10. Hence for this large pollutant specific emissions unit [PSEU] (three dryers deemed as one PSEU), a CAM plan is required for both three multiclones and one wet ESP.

The current permit includes monitoring consisting of weekly external inspection of system ductwork and material collection unit, annual inspection of multiclones for structural integrity, and record keeping for each action/inspection and maintenance performed on multiclones. DAQ believes that the above existing monitoring requirement, which is written to satisfy the Part 70 requirement, does meet the part 64 (CAM) requirements.

The current permit also includes daily monitoring requirement for primary voltage and primary current of the wet ESP, and record keeping for these parameters if any observations fall below the set minimum values for these parameters in the permit. DAQ believes that although this existing monitoring requirement does satisfy the Part 70 requirements, it does not meet the requirements of Part 64. The revised permit will include a requirement to establish a relationship between the PM10 emissions, and the primary voltage and primary current for the wet ESP. The Permittee will be required to establish this relationship through a performance of stack test for PM10 emissions and amend the permit within 90 days from submittal of stack test results for modified particleboard dryers.

4.2.8 15A NCAC 2D .1100 - Control of Toxic Air Pollutants

Pursuant to the State Air Toxic program, any source that emits air toxics in quantities greater than the toxics permitting exemption rates (listed in 15A NCAC 2Q .0711) must demonstrate compliance with the acceptable ambient level (AALs) listed in 15A NCAC 2D .1104(a). For a modification, only those toxic air pollutants emitted with a net increase need to be assessed for compliance.

As per the current permit, the facility has not been triggered for air toxics review.

The proposed modification to particleboard dryers will result in a net increase in emissions of formaldehyde, acrolein, methylene chloride, benzene, phenol, arsenic, beryllium, cadmium, soluble chromate compounds, chromium (as Cr^{+6}), manganese, and nickel. In addition, the emissions of acetaldehyde and di(2-ethylhexyl) phthalate will be near the respective toxics permitting exemption rates. Hence, the Permittee has performed a modeling analysis on a facility-wide basis for these pollutants including emissions from permitted and exempt emissions sources and demonstrated compliance with the respective AALs. Although the Permittee has modeled air toxic emissions from the exempt sources in 2Q .0702(a)(1) through (a)(24), the air permit will not include the modeled emission rates for the exempt sources.

This analysis predicted the impacts of the above pollutants between less than 1 percent to maximum 68 percent on a source-by-source basis at its premise boundary, thus demonstrating compliance with their respective AALs.

The modeled emission rates for the above pollutants are based upon design capacity of the particleboard mill (21,048 ft^2/hr) and 8,760 hrs/yr of operation. Because the modeled emission rates for these pollutants represent the potential emissions, no monitoring including record keeping is justified.

It should be emphasized here that the Permittee evaluated all of the toxic air pollutants regulated in Section 2Q .0700 for a facility-wide evaluation and thus met the requirements of 2Q .0705.

Finally, it should be noted here that this requirement is a "state-only" requirement for Part 70 purpose.

4.2.9 15A NCAC 2D .1111 - Maximum Achievable Control Technology

The ATC facility is a major source of HAP emissions. The particleboard dryers and some of the other sources at this facility are deemed as "existing sources" under 40 CFR 63 "National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products (PCWP)". The compliance date for the "existing sources" for this MACT standard is October 1, 2008.

The Permittee has indicated that it plans to submit a permit application in the future to classify the facility as "low risk subcategory" under this MACT and wishes to exempt the facility from the requirements of §63.2240 "Compliance Options, Operating Requirements, and Work Practice Requirements."

SECTION 5.0
BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

5.1 Introduction

Each pollutant subject to PSD review must meet the criteria of BACT, which refers to the maximum amount of emission reduction currently possible with respect to technical application and economic, energy, and environmental considerations. Given the variation between emission sources, facility configuration, local airsheds, and other case-by case considerations, Congress determined that it was impossible to establish a single BACT determination for a particular pollutant or source. Economics, energy, and environmental impact are mandated in the CAA to be considered in the determination of case-by-case BACT for specific emission sources. In most instances, BACT may be defined through an emission limitation. In cases where this is impossible, BACT can be defined by the use of a particular type of control device and its achievable emission reduction efficiency.

In no event can a technology be recommended which would not comply with any applicable standards established under 40 CFR Parts 60 and 61.

Additionally, as a result of the EPA remand involving the North County Resource Recovery project in Region IX, the effects of non-regulated PSD pollutants such as toxic air pollutants, are to be accounted for in determining if the BACT otherwise being prescribed for a regulated pollutant still represents an appropriate level and type of control. There is no specific formula for making PSD decisions for unregulated pollutants; this is a case-by-case process involving the judgment of the reviewing authority. If the reviewing authority judges the potential environmental effects of such unregulated pollutants to be of possible concern to the public, then the final BACT decision for a regulated pollutant should address these efforts and reflect, as appropriate, the control technology beyond what might otherwise be chosen as BACT.

To assist in bringing consistency to the BACT process, the EPA has issued guidance encouraging all PSD applicants to use the "top-down" approach to BACT. In this case, the applicant's BACT analysis is consistent with the EPA based "top-down" approach. However, NC DAQ does not strictly adhere to EPA's top-down guidance. Rather DAQ implements BACT in strict accordance with the statutory and regulatory language. As such, DAQ's BACT conclusions may differ from those of the applicant or EPA.

In general, the top-down approach consists of five basic steps. These are:

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

The first step in this approach is a comprehensive listing of control technologies for each applicable pollutant. Step Two is a demonstration of technical feasibility to ensure the technology evaluated was appropriate for the characteristic gas stream to be treated. Step Three ranks the remaining control technologies by control effectiveness, including the control efficiencies (percent of pollutant removed), expected emission rate (tons per year), expected emission reduction (tons per year), economic impacts (total cost effectiveness, incremental cost effectiveness), environmental impacts (including emissions of toxic or hazardous air contaminants), and energy impacts (benefits or disadvantages). Step Four is a case-by-case evaluation of energy, environmental, and economic impacts. Step Five requires the selection of the most effective option not rejected as BACT for the emission source.

As indicated in Section 4.1 above, the change in emissions due to the project for PM_{10}, NOx, CO, and VOC will exceed their respective significance thresholds. The BACT analysis will focus on applicable control techniques for the modified particleboard dryers for the above pollutants.

5.2 Previous BACT/LAER Determinations

DAQ searched the RACT/BACT/LAER Clearinghouse (RBLC) to identify the recent BACT determinations for emissions of VOC, CO, PM_{10}, and NOx from the particleboard dryers.

DAQ's search of this database (time period 2001-present) revealed that there were a total of 11 BACT determinations on particleboard (PB) / oriented strandboard (OSB) / medium density fiberboard (MDF) dryers for emissions of VOC, CO, $PM_{10,}$ and NOx. Out of 11 determinations, five determinations are for PB dryers and the remaining six are for either OSB or MDF dryers.

Out of five BACT determinations on PB dryers, three include "no control" while the remaining two include RTO as BACT for VOC emissions. Remaining six BACT determinations for OSB/ MDF dryers include RTO, low-NOx burners and multiclone as BACT for VOC emissions.

The following is a summary of types of controls and/or emission limits established for the above 11 BACT determinations for VOC, CO, NOx, and PM_{10}. The summary has been prepared from the RBLC data (print-outs included in Appendix D).

VOC

- Regenerative thermal oxidizer (RTO)
- RTO and low NOx burners (LNB)
- Good combustion control (GCC) and RTO
- RTO and multiclone
- No control

CO

- RTO
- GCC and RTO

- RTO and multiclone
- No control

PM10

- Wet ESP
- RTO and LNB
- Venturi Scrubber and wet ESP
- Cyclone, wet ESP, and RTO
- RTO and multiclones
- Wet ESP and RTO
- Wet scrubber and RTO
- Cyclone and baghouse
- No control

NOx

- LNB
- LNB and water injection
- GCC and LNB
- GCC, LNB, and flue gas recirculation (FGR)
- No control

It should be noted here that although there are some similarities in manufacturing of PB, OSB, and MDF, all three of them are distinctly different products. For example, PB is manufactured using primarily wood particles or otherwise wood particles other than flakes and wafers. The OSB is made from wood wafers specially produced from logs at the plant. The MDF is manufactured from lignocellulosic fibers. In contrast to PB, MDF has more uniform density throughout the board and has smooth, tight edges that can be machined.

5.3 Applicable New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS)

As included in Section 5.1 above, BACT for the modified particleboard dryers cannot be less stringent than any applicable NSPS or NESHAPS. There are no applicable NSPS or NESHAPS for particleboard dryers.

5.4 Company Submitted BACT Analysis

The particleboard dryers are already well controlled for filterable particulates by the existing multiclones and a wet electrostatic precipitator [WESP]. The existing RO operation contributes minimally to the control of condensable particulates, however the facility has never assumed credit for the control of condensable particulates via RO and is currently permitted at a rate that represents no additional control beyond the multiclones and WESP.

As for CO, the particleboard dryers are currently permitted at an uncontrolled rate of 350 lb/hr, however the RO operation does provide some CO emissions control. Therefore, the control of condensable particulate (assumed to be all PM-10) and CO shall be included in the review of possible control technology alternatives.

Based on the review of possible control options for each of these pollutants, the use of a control technology that reduces predominantly VOC but also reduces the other two pollutants would be most cost effective as compared to controls for each pollutant individually. In fact, a review of the most recent BACT determinations for new wood product (particleboard) dryers required the installation of regenerative thermal oxidizers (RTOs) for VOC control, while BACT for PM-10 have been controls comparable to the existing multiclones and wet ESP. CO and NOx BACT has been determined to be “no additional control” (See RBLC report in Appendix C of the permit application).

As such, the identified control options as well as their technical feasibility are summarized in the following Table. The control options and feasibility were identified based on review of the similar emission sources and general knowledge of the industry. Each of the control options is further discussed below.

Summary of Possible Control Technologies for Particleboard Dryers
ATC Panels, Inc. - Moncure

Pollutant	Control	Technically Feasible?
PM/PM10	Electrostatic Precipitator (ESP) – wet	Already installed
	Thermal Oxidation (condensibles only)	YES
	Centrifugal Collectors (multiclones)	Already installed
	Fabric Filter (moisture content of exhaust too high)	NO
	Wet Scrubbers (incompatible with WESP already installed)	NO
	Combustion Technology & Process Control	YES
CO	Catalytic Oxidation	NO
	Thermal Oxidation	YES
	Combustion Technology	YES
NOx	Selective Catalytic Reduction (SCR)	NO
	Combustion Technology	YES
VOC	Regenerative Catalytic Oxidation (RCO)	NO
	Regenerative Thermal Oxidation (RTO)	YES
	Biofilter	NO
	Wet Scrubber	NO
	Concentrator	NO
	Combustion Technology & Process Control	YES

5.4.1 Volatile Organic Compounds (VOCs)

Of the control technologies listed, regenerative thermal oxidation and combustion technology/process control are the only feasible options. For any regenerative oxidation system, the major operational concern is the effect of particulate matter loading on the system efficiency and life-expectancy. Build-up of particulate matter increases system pressure drop and operating costs. High efficient particulate matter removal help assure incineration performance, but add substantially to capital equipment costs. For this project, ATC shall maintain the existing particulate controls (multiclones and wet ESP), and shall not include the cost of these controls for possible VOC control options. A source without proper particulate control would realize the additional capital cost and affect on the overall cost effectiveness as defined by the BACT analysis.

5.4.1.1 Technical Feasibility Discussion

RTO

Thermal oxidation is a process whereby most of the VOCs are broken down and recombined with oxygen to produce water vapor and carbon dioxide. Thermal oxidation occurs by heating the polluted air to an elevated temperature (typically 1,200°F to 1,800°F). At such temperatures, the pollutant molecules spontaneously disassociate and recombine with available oxygen to create the carbon dioxide and water vapor. The efficiency of oxidation and the design of most oxidizers are governed by the residence time, the combustion chamber temperature and the amount of turbulence the air stream sees.

RTO's are technically feasible for the particleboard dryers at this facility. In fact, a review of the most recent BACT determinations for wood product (particleboard) dryers required the installation of regenerative thermal oxidizers (RTOs) for VOC control. Also the MACT emission limits for particleboard dryers would generally require the installation of RTOs (unless a facility qualifies for the low-risk subcategory designation).

RCO

Regenerative catalytic oxidation has been previously proposed and approved as wood-drying BACT for the particleboard dryers at the Moncure facility, when Weyerhaeuser (1997) owned the facility. However substantial issues were experienced at other similar Weyerhaeuser facilities due to severe catalytic fouling and plugging and early catalyst degradation. The Moncure facility entered into a Special Order of Consent (SOC) in July 1998 outlining the conversion of the regenerative catalytic oxidation system to a regenerative thermal oxidizer (RTO). Performance testing confirming operations and emissions for the RTO was conducted in November 1998. Subsequent testing and permit modification allowed the operation of the unit as a regenerative oxidizer (RO with lower operating temperature). As such, RCO's are deemed infeasible for the particleboard wood dryers in this project.

Biofiltration

Biofilters generally operate under induced draft, pulling a contaminated air stream into a humidification/scrubber vessel and over or through a water sump. The sump drops out water-soluble compounds, assists with humidification of the air stream, and harbors bacteria for additional treatment. The contaminants captured in the water-phase are circulated over an inorganic media for additional humidification and treatment. The second stage contains media for digestion and final breakdown of contaminants. The contaminants are converted to carbon dioxide and water vapor and released into the atmosphere (Source: Bio-Reaction Industries website).

While this technology has been applied on wood products presses (OSB, Particleboard, etc.), the biofiltration technology is not feasible for particleboard dryer VOC emission control due to the high temperature and saturation of the exhaust stream from the dryers and existing wet ESP. The bacteria that metabolize VOC do not perform effectively at high (above 110 ^{0}F) temperatures. The equipment and energy needed to regulate the temperature and moisture would be cost prohibitive. In addition, biofilers have difficultly in obtaining high efficiencies for pinenes and other hydrophobic compounds.

Although this technology has been applied in some small-scale pilot projects (mainly on press vents which have much lower VOC loading, lower air flows, and shorter gas retention times), there are no known installations of this technology on softwood particleboard dryers. Also, the high air flow rates at the ATC particleboard dryers would require the bio-filter to be enormously large.

As such, biofilters are deemed infeasible for the particleboard wood dryers in this project.

Wet Scrubber

This type of technology is commonly called packed-bed/packed-tower wet scrubbers. Absorption is widely used as a raw material and/or product recovery technique in separation and purification of gaseous streams containing high concentrations of VOC, especially water-soluble compounds such as methanol, ethanol, isopropanol, butanol, acetone, and formaldehyde. Hydrophobic VOC can be absorbed using an amphiphilic block copolymer dissolved in water. However, as an emission control technique, it is much more commonly employed for controlling inorganic gases than for VOC. When using absorption as the primary control technique for organic vapors, the spent solvent must be easily regenerated or disposed of in an environmentally acceptable manner. VOC removal efficiencies for gas absorbers vary for each pollutant-solvent system and with the type of absorber used, however most absorbers have removal efficiencies in excess of 90 percent.

The suitability of gas absorption as a pollution control method is generally dependent on the following factors: 1) availability of suitable solvent; 2) required removal efficiency; 3) pollutant concentration in the inlet vapor; 4) capacity required for handling waste gas; and, 5) recovery value of the pollutant(s) or the disposal cost of the unrecoverable solvent. For VOC control, packed towers are usually more cost effective than impingement plate towers. However, in certain cases, the impingement plate design is preferred over packed-tower columns when either internal cooling is desired, or where low liquid flow rates would inadequately wet the packing.

Water is used to absorb VOC having relatively high water solubility. Amphiphilic block copolymers added to water can make hydrophobic VOC dissolve in water. Other solvents such as hydrocarbon oils are used for VOC that have low water solubility, though only in industries where large volumes of these oils are available (e.g., petroleum refineries and petrochemical plants). Another consideration in the application of absorption as a control technique is the treatment or disposal of the material removed from the absorber. In most cases, the scrubbing liquid containing the VOC is regenerated in an operation known as stripping, in which the VOC is desorbed from the absorbent liquid, typically at elevated temperatures and/or under vacuum. The VOC is then recovered as a liquid by a condenser.

The high exhaust flow rates from the existing particleboard dryers will result in high capital costs and water usage for wet scrubber technology. In addition, the Moncure facility has limited waste water treatment and disposal capabilities along with no access to the public sewer system. As such, a wet scrubber following the existing wet ESP would not be feasible. Thus, a wet scrubber is deemed infeasible for this project.

Concentrator

Rotary concentrators are an adsorption technology commonly applied to very dilute airstreams with relatively low hydrocarbon concentrations. Rotary adsorbers can be used to concentrate the emissions into smaller airstreams with much higher concentrations (typically by a factor of 10 or higher) that can be handled by an oxidation or destruction device much more economically.

The hydrocarbon-laden air passes through the rotary adsorption unit where the hydrocarbons are adsorbed onto an adsorbent media such as activated carbon or hydrophobic zeolite. The large volume of incoming air, now purified by the adsorption process, is exhausted to atmosphere. The hydrocarbons which were adsorbed are then continuously removed from the media by desorption with a higher-temperature, low-volume air stream. This high concentration desorption air is delivered to an oxidation device for destruction.

Concentration of hydrocarbons into a smaller air stream is a significant benefit to operating costs to a destruction device. By decreasing the airflow, the device is inherently smaller and less costly to purchase. By increasing the concentration, the auxiliary fuel benefit of the hydrocarbons is increased, in many cases, almost to the level of self-sustaining operation, where the customer's natural gas requirements are virtually eliminated. Traditionally, concentrators were applied and justified on very large air stream volumes, but recent commercial applications have been on airstreams of 30,000 SCFM and smaller. (Source: Durr Environmental website)

Although this technology is highly used in the chemical industry where VOCs are in very high concentrations, the VOCs (terpenes) in the wood products industry are generally low in concentration. If recovered turpentine cannot be sold, it must be disposed of as a hazardous waste requiring additional cost because of special storage and handling, and registration with agencies such as Department of Transportation (DOT).

Thus based on the relatively low concentrations of VOCs in the exhaust stream (in comparison to those found in other industries like chemical plants) and the high volume of exhaust air (upwards of 125,000 SCFM), this technology is deemed non-feasible.

Combustion Technology/Design and Process Control

During the combustion of fuels, the primary mechanism by which VOC are generated, are incomplete combustion. VOC emissions are a result from the drying operation as well due to the release of terpenes during the drying process. No changes in raw material are proposed as part of this project, therefore existing combustion technologies and process controls will be maintained.

5.4.1.2 Energy and Environmental Impacts

The following control technologies have been identified as technically feasible and are ranked according to their control effectiveness:

1) RTO/RO
2) Combustion Technology/Design and Operations

Energy Impacts

RTO operation will cause an increase in backpressure on the particleboard dryers due to the pressure drop across the oxidizer. Thus, larger or higher output fans would be required leading to increased energy usage.

The most significant energy impact is the combustion of natural gas to maintain the combustion chamber temperatures necessary for proper operation and sufficient emissions control. This energy penalty is based on the use of 16 million Btu/hr (4 burners rated at 4 million Btu/hr each) of natural gas for 8,500 hours per year. Thus, the energy cost (penalty) based on $1.62/therm is $2,203,200 per year.

Environmental Impacts

While there are no significant adverse environmental impacts due to the use of an RTO or RO, the application of RTO or RO technology would result in the following adverse impacts:

- Additional hourly NOx emissions due to natural gas combustion and thermal NOx generation
- Combustion of additional fossil fuels (depletion of natural resources)
- High O&M costs and use of cleaning materials

5.4.1.3 Economic Impacts

An assessment of the economic impacts was performed by comparing control costs between a baseline case of uncontrolled emissions for VOC (after control emissions from the existing WESP – proposed scenario) with the controlled emissions of particleboard dryers (after control emissions from the RTO outlet – existing scenario).

The cost impact analysis was conducted using the EPA factors given in Table 4-2[5] and project-specific economic factors as provided in Table 4-3 to the permit application. Emission reductions were calculated assuming baseline case operation of 8,500 hours per year. Tables 4-4 and 4-5 to the application summarize specific capital and annual operating costs, respectively, for the RTO control system.

Incremental cost effectiveness for the application of RTO technology to this project was determined to be $6,885 per ton of VOC removed. If looking at all controlled pollutants, the cost effectiveness when considering VOC, CO, and PM-10 (condensibles) is approximately $2,840 per ton of emissions removed. Based on recent BACT control cost determinations (*e.g.*, $2,400 was deemed cost prohibitive in a recent BACT determination in North Carolina for the Progress Energy Lee Plant in Wayne County), this calculated control costs are considered economically prohibitive and infeasible for VOC and when combining pollutants. Table 4-6 of the application summarizes the results of the VOC BACT cost analysis.

5.4.1.4 Proposed BACT for VOC

The RTO (RO) system was evaluated and is not proposed as a candidate for BACT for economic and environmental reasons. Uncontrolled dryer emissions (i.e., emissions from the existing multiclones and wet ESP) are proposed as BACT for VOC. That is, combustion control and process control are proposed as BACT. Appendix B to the application provides additional information supporting the BACT evaluation, including vendor data and table of recent BACT determinations.

[5] EPA Air Pollution Control Cost Manual, 6th ed., EPA OAQPS, RTP, NC, EPA/452/B-02-001, January 2002.

5.4.2 CO

Carbon monoxide emissions result from the incomplete combustion of fuels. Therefore, the most direct method for reducing CO emissions is to improve combustion. Factors affecting CO emissions include fuel characteristics (including moisture content), firing temperatures, combustion zone residence time, and combustion chamber mixing characteristics. Since higher combustion temperatures will increase oxidation rates, emissions of CO will generally increase during partial load conditions when combustion temperatures are lower. In addition, decreased combustion zone temperature due to combustion modifications targeting reduced NOx may result in increases in CO (and VOC) emissions. As such, emissions of NOx and CO/VOC are inversely related.

There are two available technologies for controlling CO: RTO and combustion design/process controls. Oxidation catalyst for control of CO emissions is not feasible for the same reasons that the RCO was found to be infeasible for VOC emissions.

5.4.2.1 Technical Feasibility Discussion

RTO

For similar reasons as for VOC, RTO technology is technically feasible for the particleboard wood dryers in this project. A review of the most recent BACT determinations for wood product (particleboard) dryers that required the installation of regenerative thermal oxidizers (RTOs) for VOC control also accounted for the control of CO emissions.

Combustion Techniques and Process Controls

Combustion techniques involve combustion chamber designs and operation practices intended to improve oxidation and minimize incomplete combustion.

Both RTO and combustion techniques and process controls are considered to be technically feasible for this project. Therefore, further evaluation of the energy, environmental, and economic impacts follow.

5.4.2.2 Energy and Environmental Impacts

Energy and environmental impacts for an RTO and resulting CO emissions are the same as for VOC and were presented in Section 5.4.1.2 above.

5.4.2.3 Economic Impacts

The economic impacts of an RTO are the same as for VOC and were presented in Section 5.4.1.3 above. Since the control cost is considered economically prohibitive and infeasible, combustion techniques and process controls represents the most efficient and feasible control option for CO and no further cost evaluation is necessary.

5.4.2.4 Proposed BACT for CO

The control of CO (and VOC) is typically required only for facilities located in CO and/or ozone nonattainment areas. For this reason and the environmental, energy, and economic impacts provided above, the use of an RTO for this project is dismissed as BACT for CO.

The use of combustor design, good operating practices, and process controls to minimize incomplete combustion are proposed as BACT for CO.

5.4.3 PM-10

The regulated pollutant for particulates under the Clean Air Act (as well as New Source Review) include particulate matter with an aerodynamic diameter equal to or less than 10 micrometer. Particulate emissions from particleboard dryers can be a result of:

- oxidation of ash contained in these fuels,
- incomplete combustion,
- emissions of sulfur and nitrogen oxides which are subsequently oxidized to condensible aerosols, and
- particulate present in the combustion air.

Particulate matter consists of both solid and condensable components. The solid particulate can be measured using USEPA Reference Method 5 (“front half”). The condensable particulate can be measured using USPEA Reference Method 202 (“back half”). For this review, both components of particulate are included in the evaluations and are expected to consist of PM-10 exclusively.

The available technologies for controlling particulate emissions were identified in Table 4-1 of the permit application and are discussed briefly below.

5.4.3.1 Technical Feasibility Discussion

Electrostatic precipitators (ESP) remove particulate from a gas stream through the use of electrical forces. Discharge electrodes apply a negative charge to particle as they pass through a strong electrical field. These charge particles migrate to a collecting electrode having an opposite or positive charge. Collected particles are removed from the collecting electrodes by periodic mechanical rapping for a dry ESPs and washing for wet ESPs. Collection efficiencies are high at 90+%.

A fabric filter (baghouse) consists of a number of filter media elements, bag cleaning system, shell structure, dust removal system, and fan. Particulate is captured from the gas stream by various processes (inertial impaction, impingement, accumulated dust cake sieving) as the gas passes through the fabric filter. Accumulated dust is removed using mechanical or pneumatic means. For example, a pulse jet pneumatic cleaner injects a sudden pulse of compressed air into the top of a filter bag, dislodging the cake from the fabric surface. Typical air-to-cloth ratios range 2 to 8 cubic feet per minute-square foot (cfm-ft^2). Collection efficiencies are on the order of 95 to 99 percent. Fabric filters are limited to applications involving generally dry and cooler exhaust gases.

Centrifugal (cyclone) collectors are primarily used to recover material from an exhaust stream before it is ducted to the principal control device since cyclones are effective in removing only the larger sized (greater than 10 microns) particles. As noted earlier, particulate emissions generated from combustion turbines firing natural gas and low-sulfur distillate oil are predominantly less than 10 microns in size.

Wet scrubbers remove particulate from exhaust streams principally by inertial impaction with water droplets. Particles can be captured by impingement, diffusion, or condensation mechanisms. In a venturi scrubber, the gas stream is constricted in a throat section giving the large volume of gas a high gas velocity and high pressure drop across the system. As water is introduced into the throat, the gas is forced to move at an even higher velocity causing the water to shear into droplets. Particles in the gas then impact the water droplets and are subsequently removed for a cyclone separator. Venturi scrubber collection efficiency increases with increasing pressure drops for a given particle size. Collection efficiency will also increase with increasing liquid-to-gas ratios up to the point where flooding of the system occurs. Packed-bed and venturi scrubber collection efficiencies are typically near 90 percent.

The addition of each of the above controls, beyond the currently installed controls consisting of multiclones and wet ESP, is not considered technically feasible for the following reasons:

1) PM10 is already well controlled. The installation of additional controls will create an unacceptable backpressure condition.

2) The control on condensable PM-10 is accounted for in the VOC BACT analysis and analyzed for cost effectiveness.

5.4.3.2 Energy and Environmental Impacts

The only technically feasible control alternatives are combustion techniques and process control. No adverse environmental or energy impacts are expected with these alternatives.

5.4.3.3 Economic Impacts

Since combustion techniques and process control represents the most efficient and feasible control option for the existing source configuration (including existing emissions controls), no cost evaluation is necessary.

5.4.3.4 Proposed BACT for PM-10

Based on the above analysis, combustion technology and process controls are proposed as BACT for emissions of PM-10 resulting from this project.

5.4.4 NOx

Nitrogen oxides result from the combustion of fuels (fuel NOx) and from thermal conversion of ambient nitrogen at high temperatures (thermal NOx). Therefore, the most direct method for reducing NOx emissions is to improve combustion with lower flame temperatures. Since higher combustion temperatures will increase oxidation rates, emissions of NOx will generally increase during high load conditions (high firing rates or temperatures) and decrease during partial load conditions when combustion temperatures are lower. Decreased combustion zone temperature due to combustion modifications targeting reduced NOx may result in increases in CO (and VOC) emissions. As such, emissions of NOx and CO/VOC are inversely related.

There are two available technologies for controlling NOx emissions from particleboard dryers: selective catalytic reduction (SCR) and combustion technology. These available technologies are identified in Table 4-1 to the permit application and are discussed briefly below.

5.4.4.1 Technical Feasibility Discussion

While selective catalytic reduction (SCR) technology has demonstrated NOx control levels up to 90+%, the use of this technology on particleboard dryers (especially those burning wood and wood residues) is undemonstrated in the wood products industry. An SCR unit would have prohibitively high energy requirements due to the strict temperature requirements for proper SCR operation (*i.e.*, reheating of the exhaust stream would likely be required). Also, the potential for catalytic fouling and plugging as seen with RCO's would introduce a severe operational issue. The moisture in the dryer exhaust would potentially need to be further regulated (altered) prior to entering the SCR since the SCR catalyst is zeolite-based, which is water sensitive.

It is important to note that SCR technology was previously analyzed for BACT at this facility's particleboard dryers and was eliminated as a BACT option [see *Revised PSD Air Permit Application for Weyerhaeuser Company (former owner of ATC facility), September 1, 1998*]. Thus, only combustion technology is considered to be technically feasible for this project. Therefore, further evaluation of the energy, environmental, and economic impacts follow.

5.4.4.2 Energy and Environmental Impacts

The only technically feasible control alternatives are combustion techniques (*i.e.*, no additional add-on control). No adverse environmental or energy impacts are expected with these alternatives.

5.4.4.3 Economic Impacts

Since combustion techniques and process control represent the most efficient and feasible control option for the existing source configuration (including existing emissions controls), no cost evaluation is necessary.

5.4.4.4 Proposed BACT for Nitrogen Oxides (NOx)

Based on the above analysis, combustion technology is proposed as BACT for NOx emission increases resulting from this project.

5.5 DAQ Proposed BACT for Approval

After careful consideration of the company submitted BACT analysis for the modified particleboard dryers and previous BACT determinations, DAQ proposes to approve the following as BACT:

VOC

DAQ believes that the cost effectiveness of approximately $6,885 is very high for removal of VOCs using RTO on the particleboard dryers. This annual cost accounts for approximately 40% for natural gas usage, which is based upon $1.62 per therm. Assuming that natural gas prices fall 50% from the current cost of $1.62 per therm, the cost effectiveness for VOC will be reduced to approximately $5,540, which is still considered to be very high. Media replacement and its cleanup are also a major factor for considering economic impacts with the RTO.

In addition to the economic impact of associated with RTO, DAQ believes that environmental impacts resulting from the use of natural gas cannot be ignored. For example, burning of natural gas will increase NOx emissions from the particleboard dryers.

It should be emphasized here that North Carolina is a NOx-limited area for ozone pollution. So, in general, any increase in VOC emissions from the particleboard dryers (i.e., not installing RTO for VOC control) is expected to have minimal impact on ozone formation in the nearby areas while increasing NOx emissions (i.e., installing RTO to control VOC) can have a major impact.

Although a couple of recent BACT determinations do include RTO (as above noted) as BACT for particleboard dryers, DAQ believes that a steep cost for VOC removal ($6,885/ton) is not justified for this project. Thus, DAQ proposes "good combustion control" with existing wet ESP as BACT for particleboard dryers with an emission limit of 202.0 lbs/hr.

CO

There is only one recent BACT determination for particleboard dryer, which includes RTO as BACT.

DAQ believes that the cost effectiveness, associated with the RTO on the particleboard dryers, of approximately $5,060 is very high for CO. Hence, DAQ proposes "good combustion control" as BACT with an emission limit of 329.4 lbs/hr.

PM-10

DAQ believes that the existing controls (multiclones and wet ESP) are adequate for reducing particulate emissions from the particleboard dryers and hence, no additional controls are warranted. The recent BACT determinations on particleboard dryers include controls similar to particleboard dryers at the ATC facility: cyclones, baghouses, wet scrubber, and RTO. Thus, DAQ proposes to approve "good combustion control" with existing multiclones and wet ESP, and emission limit of 28.3 lbs/hr, as PM10 BACT for the modified particleboard dryers.

NOx

DAQ agrees with the company that SCR is not a technically feasible option for control of NOx emissions from the particleboard dryers. Hence, DAQ proposes to approve "good combustion control" with an emission limit of 94.7 lbs/hr as BACT.

Summary of DAQ Proposed BACT for Approval

EMISSION SOURCE	POLLUTANT	BACT EMISSION LIMITS*	CONTROL TECHNOLOGY
Particleboard dryers (ID Nos. 1410, 1420, and 1430)	VOC	202 lbs/hr	good combustion control with existing wet ESP
	CO	329.4 lbs/hr	good combustion control
	PM10	28.3 lbs/hr	good combustion control good combustion control with existing wet ESP
	NOx	94.7 lbs/hr	good combustion control

* BACT emission limits are a total for three particleboard dryers (ID Nos. 1410, 1420, and 1430). They shall apply at all times. However, emissions resulting from startup, shutdown or malfunction as defined under 15A NCAC 2D .0535, exceeding the above limits in Table are permitted, provided that the Permittee, to the extent practicable, maintains and operates each emission source including any associated air pollution control equipment listed in this Table, in a manner consistent with good air pollution control practice for minimizing emissions.

SECTION 6.0
AIR QUALITY IMPACT ANALYSIS

6.0 Introduction

The air dispersion modeling analysis has been submitted for the PSD project consisting of increase in production rates of particleboard dryers and removal of existing RTO.

PSD regulations (40 CFR 51.166 (k)) require an applicant to perform an ambient air quality impact analysis. This analysis will determine if the National Ambient Air Quality Standards (NAAQS), PSD Class I and Class II increments, and North Carolina toxic standards will be exceeded at any location and during any time period where the modified particleboard dryers will have significant impact.

This modeling analysis shows that this facility **will not cause or contribute** to an exceedence of the NAAQS, PSD Class II Increment, North Carolina Ambient Air Quality Standard (NCAAQS), PSD Class I Increment, and any NC toxic air pollutants Acceptable Ambient Levels (AALs). Furthermore, per discussion with the Federal Land Manager (FLM), this facility will have no impact on Air Quality Related Values (AQRVs) at James River Face National Wilderness Area.

6.1 Air Quality Impact Analysis

Location and Topography

The ATC Panels facility is located in central North Carolina near the town of Moncure in Chatham County. The area near the proposed facility is dominated by agricultural and forestland use types coupled with residential and light industrial areas. The topography around the facility is characterized by gently rolling terrain with elevations changing few feet within several kilometers of the site; therefore, terrain elevations were included in the modeling.

The netting analysis (Table 6.1-1) shows that NOx, PM, PM_{10}, CO, and VOC will exceed their Significant Emission Rates (SERs) and will require a full NAAQS and PSD Class II Increment analysis.

Table 6.1-1
Pollutant Netting Analysis

Pollutant	**Annual Emission Rate Increase (tons/year)**	**Significant Emission Rate**	**Review required**
NOx	87.5	40	Yes
PM	85.2	25	No[+]
PM_{10}	57.9	15	Yes
SO_2	36.4	40	No
CO	1,114.2	100	Yes
VOC*	799.9	40	Yes

[+] DAQ does not consider PM as a regulated NSR pollutant under 15A NCAC 2D .0530.
* Ozone formation is evaluated on a regional basis; therefore VOC's were not modeled.

6.1.1 Preliminary NAAQS/PSD Increment Air Dispersion Modeling Analysis

ATC Panels evaluated all pollutants using the latest EPA approved AERMOD model to evaluate impacts outside the facility's fence line. Phase I modeling consisted of a preliminary impact analysis to determine if any pollutant(s) would exceed the Class I & II Significant Impact Levels (SILs). If any pollutant exceeded its respective SILs, a second, more detailed, NAAQS and PSD Increment modeling analysis would be conducted, to include offsite sources and background values.

To find the maximum impact, the AERMOD model was run using five years (1987-1991) of Raleigh surface and Greensboro upper-air meteorological data. All source heights were determined to be less than their respective GEP stack height and thus structural wake effects where considered using the latest version of the EPA approved BPIP GEP program. The program is used to develop the appropriate 36 direction-specific building dimensions for each point source modeled.

The receptor grid began at the fence line at 50-meter intervals and extended outward to approximately 10 kilometers using a nested grid.

The preliminary modeling analysis showed that none of the pollutants exceeded either the Class I or Class II significant levels; therefore, no further analysis was warranted.

Table 6.1.1-1
Comparison of Impacts from
Preliminary Impact Analysis to Class II SILs

Pollutant	Averaging Period	Modeled Concentration (ug/m^3)	PSD Class II SIL (ug/m^3)
PM_{10}	24-hour	3.62	5
	annual	0.33	1
TSP	24-hour	4.86	5
	annual	0.45	1
CO	1-hour	133.7	500
	8-hour	96.3	2,000
NO_2	annual	0.32	1

Table 6.1.1-2
Comparison of Impacts from
Preliminary Impact Analysis to Class I SIL (James River Face)

Pollutant	Averaging Period	Modeled Concentration (ug/m^3)	PSD Class II SIL (ug/m^3)
PM_{10}	24-hour	0.0040	0.32
	annual	0.0002	0.16

6.2 Non Regulated Pollutant Impact Analysis (North Carolina Toxics)

Several N.C. regulated toxics were evaluated for comparison against the N.C. AALs using the same modeling procedures followed for the Class I and Class II significance analysis. The results are provided in the following Table.

Table 6.2-1
Maximum Toxic Impacts

Pollutant	Averaging Period	% of AAL
Arsenic	annual	35 %
Benzene	annual	33 %
Cadmium	annual	<1 %
Methylene Chloride	24-hour	<1 %
Nickel	24-hour	<1 %
Formaldehyde	1-hour	68 %
Acetaldehyde	1-hour	<1 %
Acrolein	1-hour	16 %
Bis (2-ethylhexyl) phthalate	24-hour	<1 %
Beryllium	24-hour	<1 %
Soluble chromate compounds	24-hour	<1 %
Chromium (as Cr^{+6})	annual	35 %
Manganese	24-hour	2 %
Phenol	1-hour	4 %

6.3 Additional Impact Analysis

6.3.1 Growth Impacts

The growth analysis includes the projection of the associated industrial, commercial, and residential source emissions that will occur in the area due to the source. Evaluating the increase in local work force and assessing secondary emission sources that potentially will build in the area to support the ATC Panels operations are part of this analysis.

The proposed project will not require any additional plant personnel nor will it result in any increases in traffic in the area; therefore, the expected economic growth and associated emissions is expected to be negligible.

6.3.2 Soils and Vegetation

The ATC site is located in the Piedmont physiographic province of central North Carolina. The Piedmont province is characterized by gently rolling hills to strongly sloping uplands with the exception of the level floodplains associated with the Haw and Cape Fear Rivers. The soils vary greatly in chemical composition and physical structure within the area.

The vegetation around the facility has been characterized as agricultural crops, timberland and mixed forest types.

Effects of airborne emissions on soils are considered important due to the relationships that exist between the soil, ground and surface waters, and vegetation. However, because the predicted ambient concentrations of pollutants that will increase from the projects are well below the NAAQS (and modeled as insignificant), no measurable impact is expected on the local soils.

6.3.3 Class II Visibility Impairment Analysis

Since the impacts from the ATC are considered insignificant and there are no scenic vistas or other areas near the ATC site that would likely be affected by any reductions in visibility, a visibility impairment analysis was not conducted.

6.4 Class I Increment/Air Quality Related Values (AQRV) Impact Analysis

6.4.1 Class I Increment Impact Analysis

Since the modeled impacts were less than the Class I SIL's, a Class I increment analysis was not required.

6.4.2 Class I AQRV Regional Haze and deposition Impact Analysis

According to the Federal Land Manager (FLM) for James River Face Wilderness Area (the closest Class I area to the ATC Panels facility), an analysis evaluating air quality related values (AQRVs) is not required. A Class I regional haze analysis is also not required according to the FLM.

6.5 Non-attainment Analysis

There are no designated non-attainment areas impacted by this project.

6.6 Source Impact Analysis Conclusion

Based on the analysis, ATC Panels' proposed PSD modification project will not cause or contribute to any violation of the NAAQS, PSD Class I and Class II increments, Federal Land Manager AQRVs, NCAAQS, and NC toxic air pollutants AALs.

APPENDIX A

Sample Emission Calculations

APPENDIX B

Draft Permit

APPENDIX C

Public Notice

APPENDIX D

RBLC NCDAQ Search Results

APPENDIX E

Application