Appendix R
Reasonably Available Control Technology

Reasonably Available Control Technology Amendment

to

South Carolina State Implementation Plan

January 22, 2007

Executive Summary

Ground level ozone, one of the principal components of "smog," is a serious air pollutant that harms human health and the environment. Ozone is generally not directly emitted to the atmosphere; rather it is formed in the atmosphere by photochemical reactions between volatile organic compounds (VOC), oxides of nitrogen (NOx), and carbon monoxide (CO) in the presence of sunlight. High levels of ozone can damage the respiratory system and cause breathing problems, throat irritation, coughing, chest pains, and greater susceptibility to respiratory infection. High levels of ozone also cause serious damage to forests and agricultural crops, resulting in economic losses to logging and farming operations.

On April 30, 2004, the United States Environmental Protection Agency (EPA) designated and classified a portion of York County, South Carolina as a moderate nonattainment area for the 8-hour ozone standard as part of the Charlotte-Gastonia-Rock Hill nonattainment area. As a result of this designation, the South Carolina Department of Health and Environmental Control (Department) is required to submit to the EPA a state implementation plan (SIP) that includes the enactment of reasonably available control technology (RACT) in accordance with Subpart 2, §§ 182(b)(2) and 182 (f) of the *Clean Air Act* (CAA).

According to 40 CFR §51.100 - Definitions:

Reasonably Available Control Technology means devices, systems, process modifications, or other apparatus or techniques that are reasonably available taking into account:

(1) The necessity of imposing such controls in order to attain and maintain a national ambient air quality standard;
(2) The social, environmental, and economic impact of such controls; and
(3) Alternative means of providing for attainment and maintenance of such standard. (This provision defines RACT for the purposes of §51.341(b) only.)

The CAA requires that RACT be applied to major stationary sources of NO_x and VOCs located in ozone nonattainment areas. A major source is considered any source with the potential to emit 100 tons per year or more of NO_x or VOCs. RACT requirements are typically prescribed by State and local rules and regulations, but may also be made on a case-by-case basis. In accordance with the CAA and 40 CFR Part 51-Subpart X-§51.912, the Department is required to submit a revision to the South Carolina SIP by September 15, 2006.

This SIP pertains only to the following major non-CTG* (Control Technology Guidance) sources located in the ozone nonattainment portion of York County:

(1) Bowater, Inc. (Title V permit # 2440-0005);
(2) Cytec Carbon Fibers, LLC (Title V permit # 2440-0097); and
(3) Georgia Pacific Wood Products, LLC (Title V permit # 2440-0026).

**There are no CTG or other major non-CTG sources located in York County.*

The above facilities determined their RACT applicability based on the "top down" procedures established for prevention of significant deterioration (PSD) and non-attainment new source review (NSR). A report of each facility's applicability determination was prepared and submitted to the Department for review. Following the Department's review of the above facilities' RACT determination reports, it agreed with the resulting conclusions that "work practices" only and no additional emission control devices would be utilized for RACT. Because compliance for RACT is not until March of 2009, the Department will not be issuing permits prior to that date. The exception to this is that Georgia Pacific Wood Products, LLC will comply with maximum achievable control technology (MACT) requirements in accordance with 40 CFR 63, Subpart DDDD, whereby MACT is at least as stringent as RACT.

Any new sources with the potential to emit 100 tons per year or more of NO_x or VOCs will be covered under the requirements of Regulation 61-62.5, Standard 7.1, *Nonattainment New Source Review (NSR)*.

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1. Attachment 1 – List of RACT Affected Sources
2. Attachment 2 – Inventory of Emissions for RACT Affected Sources
3. Attachment 3 – RACT Analysis Report for Bowater, Inc.
4. Attachment 4 – RACT Analysis Report for Cytec Carbon Fibers, LLC
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Attachment 1

List of RACT Affected Sources

Bowater Coated Paper Division
5300 Cureton Ferry Road
Catawba SC 29704
Permit Number: TV-2440-0005

Cytec Carbon Fibers LLC – Rock Hill
800 Cel River Road
Rock Hill SC 29730
Permit Number: TV-2440-0097

Georgia-Pacific Wood Products, LLC (formerly known as Georgia-Pacific Corporation - Catawba Hardboard Plant)
5260 Cureton Ferry Road
PO Box 66
Catawba SC 29704
Permit Number: TV-2440-0026

Attachment 2

Inventory of Emissions for RACT Affected Sources

Detailed Emissions Inventory Report for BOWATER INC PAPER/PULP

From 05 Database

Permit: 2440-0005 County: 091-YORK EQC District: Catawba Year Of Emissions: 2004

Plant Location:
5300 CURETONFERRY RD
CATAWBA, SC

Latitude: 34°50'44"
Longitude: 80°53'39"
Lat/Long Source: CMPG

Contacts
Emissions: JACQUELYN TAYLOR (803)981-8759-
Billing: JACQUELYN TAYLOR (803)981-8759-

Telephone Numbers

Mailing Address:
BOWATER INC COATED PAPER DIV
PO BOX 7
CATAWBA, SC 29704

UTM Zone: 17
UTM Vertical: 3855.725
UTM Horizontal: 509.674

Principal Product: COATED AND UNCOATED PAPER
Standard Industrial Classification:
2611 Pulp Mills
2621 Paper Mills Exc Building Paper

Facility Class: A
Potential/Actual: A HAP Single/Combo: S

No. Employees: 1000
Property Area: 19200.0

Plant Pollutant	VOC	Non VOC HAP	VOC HAP	VOC TAP	TAP	112r	Class	Detailed Emissions (Tons/Year)	
4-NITROPHENOL (CAS:100027)	X		X	X				0.0003	
ETHYL BENZENE (CAS:100414)	X		X	X				0.0737	
STYRENE (CAS:100425)	X		X	X				5.4886	
P-XYLENE (CAS:106423)	X		X	X				0.2400	
1,4-DICHLOROBENZENE (CAS:106467)	X		X	X				0.0006	
ACROLEIN (CAS:107028)	X		X	X		X		9.6628	
ETHYLENE DICHLORIDE (CAS:107062)	X		X	X				0.1290	
VINYL ACETATE (CAS:108054)	X		X	X		X		0.0200	
METHYL ISOBUTYL KETONE (CAS:108101)	X		X	X				0.6800	
M-XYLENE (CAS:108383)	X		X	X				0.2400	
TOLUENE (CAS:108883)	X		X	X				2.7680	
CHLOROBENZENE (CAS:108907)	X		X	X				0.2585	
PHENOL (CAS:108952)	X		X	X				1.3213	
FURAN (CAS:110009)	X		X			X		0.0000	
HEXANE (CAS:110543)	X		X	X				0.9026	
BIS(2-ETHYLHEXYL)PHTHALATE (CAS:117817)	X		X	X				0.0001	
ANTHRACENE (CAS:120127)	X		X	X				0.0071	
1,2,4-TRICHLOROBENZENE (CAS:120821)	X		X	X				2.8500	
PROPIONALDEHYDE (CAS:123386)	X		X	X				4.4063	
TETRACHLOROETHYLENE (PERCHLOROETHYLENE)		X			X			1.0200	1.0200
PYRENE (CAS:129000)	X		X	X				0.0088	
XYLENE (MIXED ISOMERS) (CAS:1330207)	X		X	X				0.0795	
2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN (CAS:1746016)	X		X	X				0.0000	
CHROMIUM (CR6PT) (CAS:18540299)		X						0.0083	
BENZO(G,H,I)PERYLENE (CAS:191242)	X		X	X				0.0002	

Detailed Emissions Inventory Report for CYTEC CARBON FIBERS ROCK HILL

From 05 Database

Permit: 2440-0097 County: 091-YORK EQC District: Catawba Year Of Emissions: 2001

Plant Location:
800 CELRIVER ROAD
ROCK HILL, SC

Latitude: 34°58'30"
Longitude: 80°58'45"
Lat/Long Source: RPRT

Contacts
Emissions: MEREDITH MANGUM (864)299-9397-
Billing: MEREDITH MANGUM (864)299-9397-

Telephone Numbers

Mailing Address:
CYTEC CARBON FIBERS LLC
P O BOX 849
GREENVILLE, SC 29602

UTM Zone: 17
UTM Vertical: 3870.080
UTM Horizontal: 501.902

Principal Product: CARBON FIBER
Standard Industrial Classification:
2824 Organic Fibers, Noncellulosic

Facility Class: A
Potential/Actual: P HAP Single/Combo: S

No. Employees: 45
Property Area: 0.0

Plant Pollutant	VOC	Non VOC HAP	VOC HAP	VOC TAP	TAP	112r	Class	Detailed Emissions (Tons/Year)	
1,4-DICHLOROBENZENE (CAS:106467)	X		X	X				0.0001	
HEXANE (CAS:110543)	X		X	X				0.0818	
PYRENE (CAS:129000)	X		X	X				0.0000	
FLUORANTHENE (CAS:206440)	X		X	X				0.0000	
FORMALDEHYDE (CAS:50000)	X		X	X		X		0.0034	
BENZENE (CAS:71432)	X		X	X				0.0001	
METHANE (CAS:74828)						X		0.1045	0.1045
ETHANE (CAS:74840)						X		0.1408	0.1408
HYDROGEN CYANIDE (CAS:74908)	X		X	X		X	A	12.5300	
PHENANTHRENE (CAS:85018)	X		X	X				0.0000	
FLUORENE (CAS:86737)	X		X	X				0.0000	
2-METHYLNAPTHALENE (CAS:91576)	X		X	X				0.0000	
ARSENIC & COMPOUNDS (AS)		X			X			0.0000	
CADMIUM & COMPOUNDS (CD)		X			X			0.0001	
CARBON MONOXIDE (CO)							B	3.8161	
CARBON DIOXIDE (CO2)								5451.5380	
MERCURY & COMPOUNDS (HG)		X			X			0.0000	
MANGANESE & COMPOUNDS (MNC)		X			X			0.0000	
NICKEL & COMPOUNDS (NI)		X			X			0.0001	
NITROGEN DIOXIDE (NO2)							B	4.5430	4.5430
LEAD & COMPOUNDS (PB)		X			X			0.0000	
PARTICULATE MATTER (LESS THAN 10 MICRONS (PM10)								0.3453	
PARTICULATE MATTER (LESS THAN 2.5 MICRON (PM2.5)								0.3453	
PARTICULATE MATTER (TOTAL) (PT)							B	0.3453	0.3453
SULFUR DIOXIDE (SO2)						X	B	0.0273	0.0273

Detailed Emissions Inventory Report for GP CATAWBA

From 05 Database

Permit: 2440-0026 County: 091-YORK EQC District: Catawba Year Of Emissions: 2005

Plant Location:
5260 CURETON FERRY ROAD
CATAWBA, SC

Latitude: 34°50'30"
Longitude: 80°53'38"
Lat/Long Source: RPRT

Contacts
Emissions: STEVE M WILSON, P.E. (803)782-5890-13
Billing: TIM MACKINEM (803)981-5901-

Telephone Numbers

Mailing Address:
GEORGIA-PACIFIC CORP
PO BOX 66
CATAWBA, SC 29704

UTM Zone: 17
UTM Vertical: 3855.300
UTM Horizontal: 509.700

Principal Product: HARDBOARD
Standard Industrial Classification:
2493 Reconstituted Wood Products

Facility Class: A
Potential/Actual: P HAP Single/Combo: S

No. Employees: 160
Property Area: 56.0

Plant Pollutant	VOC	Non VOC HAP	VOC HAP	VOC TAP	TAP	112r	Class	Detailed Emissions (Tons/Year)	
ETHYL BENZENE (CAS:100414)	X		X	X				0.0064	
STYRENE (CAS:100425)	X		X	X				0.1105	
1,4-DICHLOROBENZENE (CAS:106467)	X		X	X				0.0000	
ACROLEIN (CAS:107028)	X		X	X		X		0.4691	
TOLUENE (CAS:108883)	X		X	X				0.0487	
PHENOL (CAS:108952)	X		X	X				2.7124	
HEXANE (CAS:110543)	X		X	X				0.0502	
PROPIONALDEHYDE (CAS:123386)	X		X	X				1.9442	
PYRENE (CAS:129000)	X		X	X				0.0000	
CRESOLS (MIXED ISOMERS) (CAS:1319773)	X		X	X				0.0187	
XYLENE (MIXED ISOMERS) (CAS:1330207)	X		X	X				0.3120	
FLUORANTHENE (CAS:206440)	X		X	X				0.0000	
FORMALDEHYDE (CAS:50000)	X		X	X		X		47.6222	
HEXANAL (CAS:66251)	X							1.4184	
METHANOL (CAS:67561)	X		X	X				65.5946	
ACETONE (CAS:67641)								0.2591	
BENZENE (CAS:71432)	X		X	X				0.0039	
METHANE (CAS:74828)						X		0.0715	0.0715
ETHANE (CAS:74840)						X		0.0865	0.0865
METHYL CHLORIDE (CHLOROMETHANE) (CAS:74873)	X		X	X		X		0.0049	
ETHYL CHLORIDE (CHLOROETHANE) (CAS:75003)	X		X	X		X		0.0005	
ACETALDEHYDE (CAS:75070)	X		X	X		X		3.1547	
CFC-11 (FLUOROTRICHLOROMETHANE) (CAS:75694)	X							0.0005	
METHYL ETHYL KETONE (CAS:78933)	X			X				0.0825	
PHENANTHRENE (CAS:85018)	X		X	X				0.0000	

Attachment 3

Report of RACT Analysis for Bowater, Inc.

Reasonably Available Control Technology (RACT) Analysis

Prepared for:

Bowater Coated and Specialty Papers Division
Catawba, South Carolina

September 1, 2006

Prepared by:

URS

URS Corporation
Greenville, South Carolina

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1.0 Introduction

Bowater Coated and Specialty Papers Division (Bowater) operates an integrated pulp and coated paper manufacturing facility (the Catawba Mill) located at 5300 Cureton Ferry Road, in Eastern York County, South Carolina. The location of the Bowater Catawba Mill is within the boundary of the Charlotte-Gastonia-Rock Hill 8-hour Ozone Nonattainment Area. At the request of the South Carolina Department of Health and Environmental Control (DHEC), Bowater has prepared this Reasonably Available Control Technology (RACT) Analysis.

Ground level ozone forms when oxides of nitrogen (NO_X) and volatile organic compounds (VOC) react at high temperatures in the presence of sunlight. High levels of ozone are observed in the area during the growing season, which runs from May 1 through September 30. Studies have shown ground level ozone formation is limited by the amount of NO_X available, due to the abundance of naturally occurring VOC released from vegetation in the Southeastern United States.

This RACT analysis has been prepared for sources of both NO_X and VOC emissions from the Bowater Catawba Mill, even though ozone formation is NO_X limited, at the request of DHEC. The RACT analysis generally follows the EPA "top-down" approach. However, many NO_X and VOC sources at the Bowater Catawba Mill are also subject to Federal Regulations that already require stringent NO_X and VOC controls.

Sources subject to Lowest Achievable Emission Rate (LAER) standards have installed the best controls technically feasible to achieve the lowest emissions possible, and no additional emission reductions are practical. Therefore, sources meeting LAER requirements are presumed by definition to satisfy RACT in this analysis.

Sources subject to Best Available Control Technology (BACT) standards have installed the best technically feasible controls which are considered cost effective. The cost effectiveness threshold for RACT determinations has been set by the Environmental Protection Agency (EPA) between $600-$1,300 per ton of pollutant removed, compared to a cost threshold of several

thousand dollars per ton for most BACT analysis. Therefore, sources meeting BACT are based on a more stringent cost threshold than RACT, and are presumed to satisfy RACT in this analysis.

Sources subject to Maximum Achievable Control Technology (MACT) standards have installed controls which EPA considered cost effective. The cost effectiveness threshold used by EPA for MACT standards is generally the same order of magnitude as the EPA RACT cost threshold. Therefore, sources meeting MACT are considered to be equivalent to RACT in this analysis.

Sources subject to the EPA NO_X SIP Call reduced NO_X emissions to levels required to reduce ozone formation resulting from transport of pre-cursor emissions. Emission reductions required to meet the NO_X SIP Call reduce ozone formation everywhere, not just at long downwind distances, and are presumed to satisfy RACT in this analysis.

2.0 Kraft Pulp Mill (Fiberline) (TV ID 02)

2.1 Nitrogen Oxides (NO_X)

The Kraft Pulp Mill processes are not a source of NO_X emissions. Therefore, a RACT analysis for NO_X is not included in this section.

2.2 Volatile Organic Compounds (VOC)

The Kraft Pulp Mill emits VOCs, including volatile organic Hazardous Air Pollutants (HAP). The Kraft Pulp Mill is regulated by 40 CFR 63 Subpart S, also referred to as the Pulp and Paper cluster rule. The portion of the cluster rule which regulates pulping and bleaching systems is referred to as MACT I. Specifically, vent gases from the Kraft Pulp Mill containing HAP and VOC are collected and incinerated as required by 63.443(d)(4). Therefore, the MACT requirements for kraft pulping systems satisfy RACT for the Kraft Pulp Mill.

3.0 Bleach Plant (TV ID 03 & 04)

3.1 Nitrogen Oxides (NO_X)

The Bleach Plant is not a source of NO_X emissions. Therefore, a RACT analysis for NO_X is not included in this section.

3.2 Volatile Organic Compounds (VOC)

Bleach Plant emissions consist of chlorinated compounds and VOC, including volatile organic HAP. Emissions of organic HAPs in bleach plant operations (bleaching and chlorine dioxide generation) were evaluated for inclusion in the MACT I standard. In the preamble to the cluster rule, EPA discussed the research which was conducted for bleaching systems. Since it was determined that most bleaching systems include a caustic scrubber to control emissions, EPA reviewed data regarding caustic scrubbers and the removal of chlorinated and non-chlorinated hazardous air pollutants. The EPA determined that although the caustic scrubbers were controlling chlorinated hazardous air pollutants, non-chlorinated (organic) hazardous air pollutants were not controlled by the scrubber. However, no other option was determined to be feasible to control non-chlorinated (organic) hazardous air pollutants, and the use of add-on control technologies were determined to be cost prohibitive [63 FR 18526-18527]. Therefore, the MACT requirements for bleaching systems satisfy RACT for the Bleach Plant.

4.0 Thermo-Mechanical Pulp (TMP) Process (TV ID 05)

4.1 Nitrogen Oxides (NO_X)

The TMP process is not a source of NO_X emissions. Therefore, a RACT analysis for NO_X is not included in this section.

4.2 Volatile Organic Compounds (VOC)

TMP emissions are primarily VOCs, including volatile organic HAPs. Organic HAP emissions from TMP operations were evaluated for inclusion in MACT III of the Pulp and Paper cluster rule. In the preamble to the cluster rule, the EPA discusses the research of mechanical pulping processes for inclusion in MACT III. The EPA determined that mechanical pulping operations are not significant sources of organic HAP, and no organic HAP controls are feasible [63 FR 18519]. Therefore, MACT requirements for mechanical pulping systems satisfy RACT for the TMP process.

5.0 Paper Mill (TV ID 06)

5.1 Paper Forming (No. 1, No. 2, and No. 3 Paper Machines and Pulp Dryer)

5.1.1 Nitrogen Oxides (NO_X)

The paper forming process does not include combustion, and therefore NO_X emissions are not expected from this process. Therefore, a RACT analysis for NO_X is not included in this section.

5.1.2 Volatile Organic Compounds (VOC)

The No. 1, No. 2, and No. 3 Paper Machines and the Pulp Dryer meet the definition of papermaking systems in 40 CFR 63.447(a)(3). In this preamble, EPA discusses the review of papermaking systems for regulation under MACT III. Information reviewed by the EPA indicated that there were no existing papermaking systems which were operated with controls for gaseous hazardous air pollutants (HAPs); therefore, EPA established the MACT floor level of control for papermaking systems as "no control". Two possible control options were evaluated for papermaking systems: 1) removal of HAPs from the pulp stock and whitewater prior to entering the papermaking system and 2) control of papermaking system vent streams. It was determined that these two options were not cost effective. EPA does not require HAP control beyond the floor (i.e., no control) [63 FR 18525-18526]. Therefore, MACT requirements for papermaking systems satisfy RACT for Paper Machines No. 1, No. 2, No. 3 and the Pulp Dryer.

5.2 Paper Coating (No. 1, No. 2, and No. 3 Paper Machines)

5.2.1 Nitrogen Oxides (NO_X)

Natural gas combustion in the coaters for the three paper machines will emit NO_X. The No. 3 Paper Machine was converted to coated paper in 2003, and a BACT analysis for NO_X was included in the July 2001 PSD air permit application. The BACT analysis determined that low NO_X burners (LNB) were BACT (the only technically feasible technology) for the air flotation

dryer, and there are no technically feasible controls for the infrared dryer of the No. 3 Paper Machine on-machine coater. Therefore, BACT requirements for the No. 3 paper machine on-machine coater satisfy RACT for the No. 3 Paper Machine on-machine coater.

The No. 1 and No. 2 Paper Machine off-machine coaters are considerably older than the No. 3 Paper Machine on-machine coater installed in 2003. The No. 1 and No. 2 off-machine coaters are designed with multiple sections of air flotation drying, and no infrared drying. In these off-machine coaters, the coatings are dried by direct contact of the combustion air with the sheet of paper. Retrofitting LNB into the existing off-machine coaters would alter the flame dimensions, potentially impinging on the sheet of paper and creating a fire hazard. Therefore, installation of LNB on the No. 1 and No. 2 Paper Machine off-machine coaters is not technically feasible and RACT is no control for the No. 1 and No. 2 Paper Machine off-machine coaters.

5.2.2 Volatile Organic Compounds (VOC)

The coatings used on the three paper machines include emissions of VOCs as a result of the chemicals used in the coated paper manufacturing process. The No. 1 and No. 2 Paper Machine off-machine coaters meet the definition of web coating lines and are regulated by 40 CFR 63 subpart JJJJ (MACT JJJJ), specifically as defined in 40 CFR 63.3300. As required by the MACT JJJJ, the coating material used for the No. 1 and No. 2 off-machine coaters "as applied" is formulated to be less than the MACT JJJJ limit of 0.04 kg HAP per kg coating. Monthly usage data is maintained onsite to ensure compliance with this limit. Therefore, the control used to comply with MACT JJJJ is the exclusive use of low HAP-coating materials. The No. 3 Paper Machine uses an on-machine coater which is not regulated under MACT JJJJ, although the No. 3 on-machine coater uses the same MACT compliant coating used on the No. 1 and No. 2 off-machine coaters. Therefore, MACT requirements for paper coating satisfy RACT for coaters associated with all three paper machines.

6.0 Paper Mill Air Makeup Units (TV ID 06)

6.1 Nitrogen Oxides (NO_X)

Nitrogen oxides (NO_X) are formed from the reaction of nitrogen (N_2) and oxygen (O_2) within the combustion air thus creating thermal NO_X. Increasing quantities of oxygen in the combustion zone results in greater amounts of NO_X formation. The air make-up units are manufactured by *Eclipse Combustion* and are equipped with Eclipse AH-MA burners. The AH-MA emissions for NO_X and CO surpasses all global standards for indoor air quality, and according to the manufacturer, the Eclipse AH-MA has the lowest NO_X and CO emissions for the class of burner [Eclipse Combustion AH-MA Bulletin 160c/8-00]. According to the bulletin, the burner "... is ETL listed, complying with ANSI Z21.20 design standards, and is used in systems which meet ANSI Z83.4 / CGA 3.7". Since the burners are specifically designed to minimize NO_X emissions using the ANSI design specification for indoor environments, this specification creates much lower NO_X emissions than conventional natural gas burners used in boilers and other fuel burning appliances. Therefore, the ANSI standards for indoor air quality satisfy RACT for the Air Make-Up Units.

6.2 Volatile Organic Compounds (VOC)

In general, combustion results in low VOC emissions. Based on a review of the RBLC clearinghouse, proper operation and/or good combustion practices are the only practical VOC control techniques for natural gas combustion sources. Therefore, RACT for the Air Makeup Units is proper operation using good combustion practices.

7.0 No. 2 & No. 3 Kraft Recovery Furnaces (TV ID 07)

7.1 Nitrogen Oxides (NO_X)

NO_X formation in kraft recovery furnaces is dominated by fuel NO_X, based on the nitrogen content of the spent cooking liquor, which varies from one mill to another. Kraft recovery furnaces typically do not operate at temperatures high enough to generate large amounts of thermal NO_X. Kraft recovery furnaces are designed as staged combustion processes with primary, secondary, and tertiary air ports to properly manage liquor combustion. The staged combustion design of a kraft recovery furnace also results in lower NO_X emissions when compared to an industrial boiler of similar steam generating capacity.

The No. 3 Recovery Furnace was built in 1983, and is currently being modified. A LAER analysis was completed for the modifications as part of the July 2005 PSD air permit application. The LAER analysis determined that adding a fourth level of combustion air (quaternary air) was the only technically feasible NO_X control option. Therefore, LAER requirements for the No. 3 Recovery Furnace (quaternary air) satisfy RACT for the No. 3 Recovery Furnace.

The No. 2 Recovery Furnace is older and smaller than the No. 3 Recovery Furnace. The installation of a fourth level of combustion air is not technically feasible in the No. 2 Recovery Furnace, due to lack of space between the tertiary air ports and the steam drum (see Figure 1). Therefore, quaternary air is not technically feasible for the No. 2 Recovery Furnace and RACT is no control.

7.2 Volatile Organic Compounds (VOC)

In general, combustion results in low VOC emissions. Based on a review of the RBLC clearinghouse, proper operation and/or good combustion practices are the only practical VOC control techniques for kraft pulp mill recovery furnaces. Therefore, RACT for the No. 2 and No. 3 Recovery Furnaces is proper operation using good combustion practices.

8.0 No. 2 and No. 3 Smelt Dissolving Tanks (TV ID 07)

8.1 Nitrogen Oxides (NO_X)

Since no combustion takes place in the smelt dissolving operation, nitrogen oxide emissions from smelt dissolving tanks are not expected. However, NO_X emissions from smelt dissolving tank vents have been reported by the National Council for Air and Stream Improvement (NCASI). NCASI believes this may be the result of ammonia in the vent gases being oxidized in the NO_X analyzer.

Although NO_X emissions have been calculated for the smelt dissolving tanks based on NCASI emission factors, AP-42 does not contain NO_X emission factors for smelt dissolving tanks. A review of the RBLC Clearinghouse also indicated no smelt dissolving tanks operate with NO_X controls. Therefore, RACT for the No. 2 and No. 3 Smelt Dissolving Tanks is no control.

8.2 Volatile Organic Compounds (VOC)

In the proposal for 40 CFR 63 Subpart MM (MACT II), EPA reviewed chemical recovery combustion sources at Kraft Pulp Mills for inclusion in the MACT. No MACT floor for smelt dissolving tanks was established by EPA for total gaseous organic HAP [63 FR 18771]. A review of the RBLC clearinghouse also indicates there are no smelt dissolving tanks operating with VOC controls. Therefore, RACT is no control for VOC emissions from the No. 2 and No. 3 Smelt Dissolving Tanks.

9.0 No. 2 Lime Kiln (TV ID 07)

9.1 Nitrogen Oxides (NO_X)

The No. 2 Lime Kiln was built in 1994, and is currently being modified. A LAER analysis was completed for the modifications as part of the July 2005 PSD air permit application. The LAER analysis determined that the only technically feasible control technology was use of LNB, which was installed in 2003 as part of another previously permitted modification. Therefore, LAER requirements for the No. 2 Lime Kiln (LNB) satisfy RACT for the No. 2 Lime Kiln.

9.2 Volatile Organic Compounds (VOC)

EPA reviewed chemical recovery combustion sources at kraft pulp mills for inclusion in 40 CFR 63 subpart MM (MACT II), and determined that the gaseous organic HAP emissions from lime kilns are primarily attributed to the use of HAP-contaminated process waters in the lime mud washer and lime kiln scrubbers. As a result, EPA established no MACT floor for gaseous HAP from lime kilns [63 FR 18771]. Based on a review of the RBLC database, one facility controls VOCs from a lime kiln. The International Paper facility in Mansfield, Louisiana utilizes a venturi scrubber with fresh water to reduce VOCs. Since the Bowater No. 2 Lime Kiln uses an electro-static precipitator instead of a venturi scrubber, this determination is not applicable. Therefore, RACT for the No. 2 Lime Kiln is no control.

10.0 Causticizing Area (TV ID 07)

10.1 Nitrogen Oxides (NO_X)

The Causticizing Area is not a source of NO_X emissions. Therefore, a RACT analysis for NO_X is not included in this section.

10.2 Volatile Organic Compounds (VOC)

A review of the RBLC database did not identify any causticizing areas operating with VOC controls. Based on the operation temperature, moisture content, and the geographical arrangement of the causticizing equipment, there are no technically feasible control technologies. Therefore, RACT for the Causticizing Area is no control.

11.0 No. 1, No. 2, and No. 3 Evaporator Sets (TV ID 07)

11.1 Nitrogen Oxides (NO_X)

The No. 1, No. 2, and No. 3 Evaporator Sets are not a source of NO_X emissions. Therefore, a RACT analysis for NO_X is not included in this section.

11.2 Volatile Organic Compounds (VOC)

The evaporator sets are regulated by 40 CFR 63 subpart S, also referred to as the Pulp and Paper cluster rule. Specifically, vent gases from the evaporator sets containing HAP and VOC are collected and incinerated as required by 63.443(d)(4). Therefore, the MACT requirements for evaporator systems satisfy RACT for the No. 1, No. 2, and No. 3 Evaporator Sets.

12.0 Precipitator Mix Tanks (TV ID 07)

12.1 Nitrogen Oxides (NO_X)

Precipitator Mix Tanks are not a source of NO_X emissions. Therefore, a RACT analysis for NO_X is not included in this section.

12.2 Volatile Organic Compounds (VOC)

A review of the RBLC database indicates that there are no precipitator mix tanks operating with VOC controls. In addition, the low level of VOC emissions from the precipitator mix tanks would make it cost prohibitive to implement controls at the emission source. Therefore, RACT for the Precipitator Mix Tanks is no control.

13.0 Power Boiler (TV ID 08)

The Power Boiler fires primarily No. 6 fuel oil and some natural gas. The heat input to the power boiler was approximately ninety-seven percent No. 6 fuel and three percent natural gas in 2005. The Power Boiler is used primarily during the winter months when mill steam demand is higher, and when the No. 1 or No. 2 Combination Boilers are down for maintenance.

13.1 Nitrogen Oxides (NO_X)

NO_X formation in the power boiler is dominated by fuel NO_X, based on the nitrogen content of the No. 6 fuel oil. Although small quantities of natural gas are fired in the boiler (3% in 2005), the majority of the fuel is No. 6 fuel oil. Therefore, the Power Boiler does not generate large amounts of thermal NO_X.

The Power Boiler is regulated by the EPA SIP Call (40 CFR Part 96) for NO_X, and complies with the rule using the low mass emission (LME) unit option. The LME compliance option limits NO_X emissions to less than 50 tons per year during the ozone season (May 1 to September 30). Actual NO_X emissions for 2005 were 16% of the potential emissions. Therefore, compliance with the NO_X SIP Call requirements satisfies RACT for the Power Boiler.

13.2 Volatile Organic Compounds (VOC)

In general, combustion results in low VOC emissions. Based on a review of the RBLC clearinghouse, proper operation and/or good combustion practices are the only practical VOC control techniques for No. 6 fuel oil and natural gas combustion sources. The Power Boiler is also subject to the Boiler MACT (40 CFR 63, Subpart DDDDD). The MACT floor for existing gaseous and liquid fuel-fired boilers is no control. Therefore, NO_X SIP Call and Boiler MACT requirements satisfy RACT for the Power Boiler.

14.0 No. 1 & No. 2 Combination Boilers (TV ID 08)

The No. 1 and No. 2 Combination Boilers fire primarily bark and wood-waste (biomass) with some tire derived fuel, with the capability to co-fire No. 6 fuel oil and natural gas. The heat input to the combination boilers is approximately 85%-90% biomass and 10%-15% fossil fuel on an annual basis. Biomass is the preferred fuel because it is generated as a byproduct of the forest products industry, and biomass costs much less than fossil fuels on a dollars per Btu basis.

The fossil fuels are co-fired primarily so the combination boilers can respond quickly to rapidly changing mill steam demand, since the No. 2 and No. 3 Recovery Furnaces generate a relatively constant amount of steam processing spent cooking liquor. Co-firing fossil fuels also allow the combination boilers to maintain steam generating rates when the biomass feed system malfunctions or unusually wet biomass is being fired.

14.1 Nitrogen Oxides (NO_X)

NO_X formation in combination boilers is dominated by fuel NO_X, based on the nitrogen content of the biomass, which varies from one mill to another. Combination boilers typically do not generate large amounts of thermal NO_X. Below includes a discussion of possible NO_X control technologies for the No. 1 and No. 2 Combination Boilers.

14.1.1 Low NO_X Burners (LNB)

LNB reduce NO_X formation through staged combustion, primarily by controlling the mixing of air and fuel to suppress peak flame temperature and the formation of thermal NO_X. Thermal NO_X is not the primary formation mechanism in combination boilers primarily firing biomass.

LNB generally produce a longer flame than conventional burners, and are often larger than conventional burners. This creates multiple issues when retrofitting an existing combination boiler burning primarily biomass with LNB, since only the fuel oil and natural gas are introduced to the firebox through a burner, and the biomass burns on a grate. Therefore, LNB are not an appropriate NO_X control technique for the No. 1 and No. 2 Combination Boilers.

14.1.2 Staged Combustion

Off-stoichiometric or two-stage combustion operates so that air and fuel mixtures are combusted in two separate zones. In one zone, the fuel is fired with less than a stoichiometric amount of air, creating a fuel rich local zone in the region of the primary flame. The second zone is an air rich zone where the remainder of the combustion air is introduced to complete the combustion of the fuel. The heat in the primary flame zone is not as intense as with normal firing because combustion is incomplete.

The No. 1 and No. 2 Combination Boilers are a spreader-stoker design, with primary air and secondary (over-fire) air systems to promote efficient biomass combustion. Therefore, the No. 1 and No. 2 Combination Boilers incorporate staged combustion in their design and operation.

14.1.3 Flue Gas Recirculation (FGR)

FGR reduces NO_X emissions by lowering the flame temperature and diluting the oxygen content of the combustion air. The combination boilers operate at varying temperatures due to the firing of fuel mixtures. Biomass firing requires a lower combustion temperature than No. 6 fuel oil or natural gas, however the exact proportions of each fuel varies based on availability of biomass and mill steam demand. Therefore, FGR is not an appropriate control technology for the No. 1 and No. 2 Combination Boilers.

14.1.4 Selective Non-Catalytic Reduction (SNCR)

SNCR reduces NO_X emissions through chemical reactions of NO_X with ammonia or urea. SNCR requires a narrow temperature range and sufficient residence time for effective chemical conversion of NO_X. Maintaining the optimum temperature and residence time for SNCR in a combination boiler is not practical because rapidly changing steam loads alter the temperature profile and residence time within the boiler. Since the ammonia/urea injection point is fixed, under varying operating boiler conditions either significant amounts of ammonia would remain unreacted and be emitted from the stack, or more NO_X would be generated than was being

reduced. Therefore, SNCR is not an appropriate NO_X control technique for the No. 1 and No. 2 Combination Boilers.

14.1.5 Selective Catalytic Reduction (SCR)

SCR reduces NO_X emissions using a catalyst to react ammonia with NO_X. In biomass combination boilers plugging and fouling of the catalyst can occur due to the large amount of fly ash generated by the biomass. SCR is also not practical for combination boilers burning No. 6 fuel oil because the catalyst tends to oxidize SO_2 in the fuel to SO_3, which can react with ammonia to form ammonium bisulfate. Ammonium bisulfate is a sticky solid that can corrode the SCR catalyst and plug and/or foul the downstream equipment. Once the catalyst became plugged or fouled, the ammonia issues discussed previously would become important. Therefore, SCR is not an appropriate NO_X control technique for the No. 1 and No. 2 Combination Boilers.

14.1.6 Selection of RACT

RACT for the No. 1 and No. 2 Combination Boilers is staged combustion incorporated in to the boilers original design.

14.2 Volatile Organic Compounds (VOC)

In general, combustion results in low VOC emissions. Based on a review of the RBLC clearinghouse, proper operation and/or good combustion practices are the only practical VOC control techniques for biomass combustion sources. The combination boilers are also subject to the Boiler MACT (40 CFR 63, Subpart DDDDD). The MACT floor for existing solid fuel-fired boilers is no control. Therefore, RACT for the No. 1 and No. 2 Combination Boilers is proper operation using good combustion practices.

15.0 Wastewater Treatment System (TV ID 09)

15.1 Nitrogen Oxides (NO_X)

The Wastewater Treatment System is not a direct source of NO_X. However, there is some NO_X emitted as a result of burning the off-gases from the condensate steam stripper in the combination boilers to comply with the cluster rule MACT standards. As discussed above, RACT for the combination boilers is staged combustion incorporated in the boilers original design.

15.2 Volatile Organic Compounds (VOC)

The Wastewater Treatment System is regulated by the cluster rule (MACT I), which requires segregation of clean and dirty process condensates and treatment of the dirty condensates to remove organic HAP prior to entering the wastewater treatment system. Bowater removes organic HAPs from the dirty condensate using a steam stripper prior to the wastewater treatment system. Therefore, the MACT requirements for process condensates satisfy RACT for the Wastewater Treatment System.

16.0 No. 1 and No. 2 Holding Basin Pumps, Tertiary Treatment Plant (TTP) Pump, and Aerated Stabilization Basin (ASB) Pump (TV ID 09)

16.1 Nitrogen Oxides

Nitrogen oxide formation in diesel powered internal combustion engines is directly related to high pressures and temperatures during the combustion process and to the nitrogen content of the fuel. Nitrogen oxide is formed by two mechanisms- 1) thermal NO_X resulting from the reaction of the molecules of nitrogen (N_2) and oxygen (O_2) in combustion air, mostly in the high-temperature region of the flame from dissociated molecular nitrogen in combustion air; and 2) fuel NO_X which is created from the reaction of fuel-bound nitrogen compounds with oxygen. Most distillate oils have no chemically-bound fuel N_2 and essentially all NO_X formed is thermal NO_X.

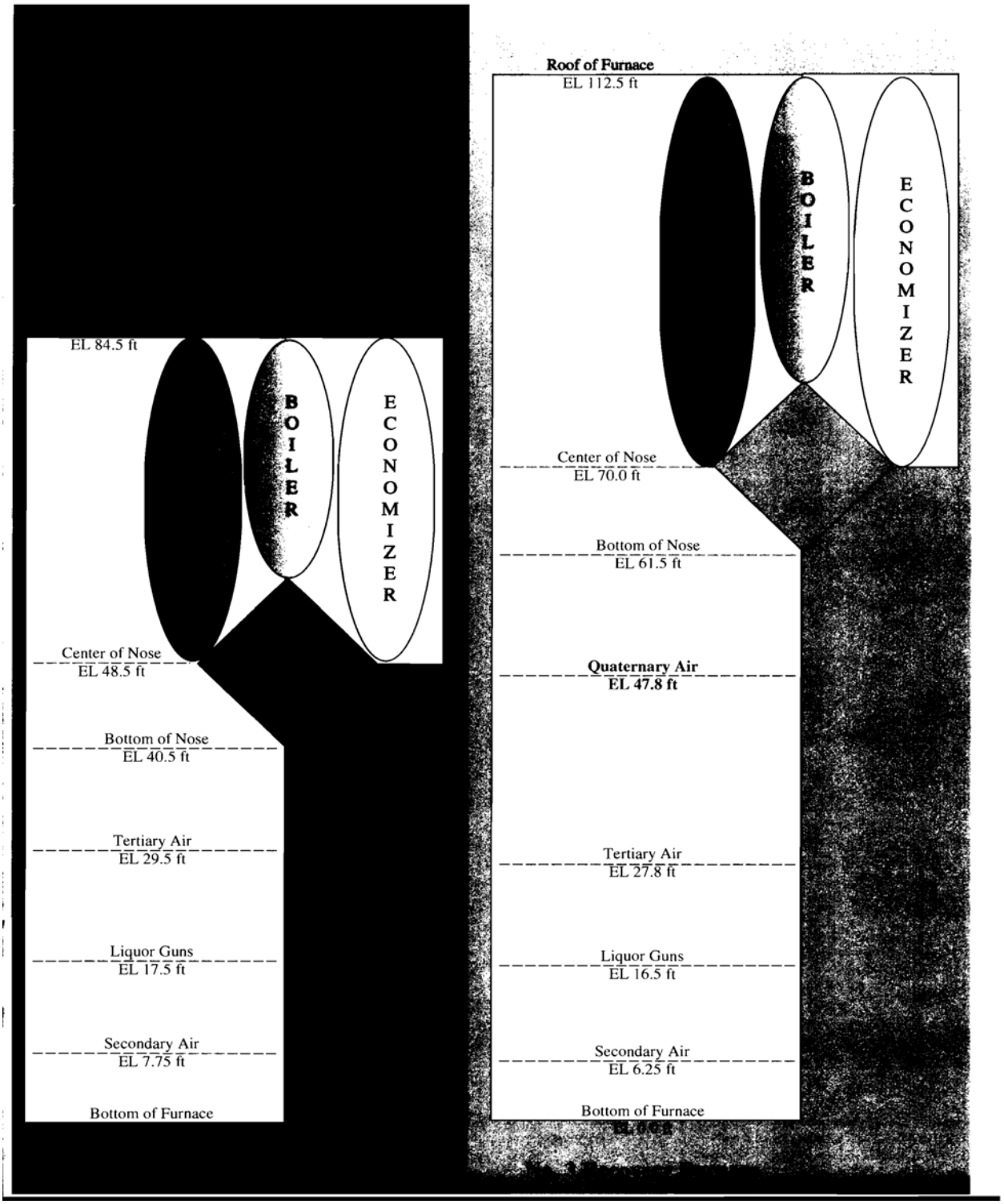
The No. 2 Holding Basin Pump, ASB Pump, and TTP Pump meet EPA Tier I emission limits for NO_X. It should be also noted that these three pumps only operate on an as needed basis, typically during low river flow occurring under drought-like conditions, and have not been used since 2003. Therefore, EPA Tier I emission limits satisfy RACT for the No. 2 Pump, TTP Pump, and ASB Pump.

The primary purpose of the No. 1 Holding Basin Pump is to initiate a siphon between the two holding basins, and once the siphon is started the No. 1 Pump is shutdown. The No. 1 Pump is an older model that does not meet any recent EPA NOX emission standards.

The No. 1 Pump is used occasionally, and has operated 60 hours since July 2003. The actual NO_X emissions from the No. 1 Pump have been 0.302 tons since July 2003, or an annual NO_X emission rate of approximately 0.1 ton per year. In order to lower NO_X emissions, the No. 1 Pump would need to be replaced at an estimated cost of approximately $100,000. Due to the limited use and subsequent low actual NO_X emissions from the No. 1 Pump, it is cost prohibitive to replace it with a newer pump. Therefore, RACT for the No. 1 Pump is no control.

16.2 Volatile Organic Compounds

In general, combustion results in low VOC emissions. Based on a review of the RBLC clearinghouse, no appropriate technologies are available as control for VOC emissions on an existing diesel pump engine. Therefore, RACT for the No.1 Pump, No. 2 Pump, TTP Pump, and ASB Pump is no control.


EL 84.5 ft
BOILER
ECONOMIZER
Center of Nose
EL 48.5 ft
Bottom of Nose
EL 40.5 ft
Tertiary Air
EL 29.5 ft
Liquor Guns
EL 17.5 ft
Secondary Air
EL 7.75 ft
Bottom of Furnace
Roof of Furnace
EL 112.5 ft
BOILER
ECONOMIZER
Center of Nose
EL 70.0 ft
Bottom of Nose
EL 61.5 ft
Quaternary Air
EL 47.8 ft
Tertiary Air
EL 27.8 ft
Liquor Guns
EL 16.5 ft
Secondary Air
EL 6.25 ft
Bottom of Furnace

Attachment 4

RACT Analysis Report for Cytec Carbon Fibers, LLC

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Reasonably Available Control Technology (RACT) Analysis for Carbon Fiber Manufacturing Equipment

Cytec Company

Rock Hill, South Carolina

June 2006

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Section 1
Introduction

1.1 Background

Cytec Carbon Fibers LLC (Cytec), located in Rock Hill, South Carolina, operates a carbon fiber manufacturing process. Since the Rock Hill area is part of the Mecklenberg County, ozone non-attainment area, the South Carolina Department of Health and Environmental Control (SC DHEC) is required to apply reasonably available control technology (RACT) to existing facilities with emissions of the ozone precursors, nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that have the potential to exceed 100 tons per year (tpy). The Cytec facility has the potential to emit NO_x in excess of 100 tpy while VOC emissions are limited to less than 100 tpy by a federally enforceable permit condition. SC DHEC has required Cytec to submit a RACT analysis by July 1, 2006.

1.2 Facility Location and Contact Personnel

The Cytec facility is located in York County, South Carolina. The facility location and mailing address are as follows:

Facility Physical Address

Cytec Carbon Fibers, LLC
800 Celriver Road
Rock Hill, South Carolina 29730

Facility Mailing Address

Cytec Carbon Fibers, LLC
PO Box 849
Greenville, South Carolina 29607

The facility contact is as follows:

Meredith Mangum, Cytec
Environmental Engineer
Telephone: 864/299-9397

Information related to this RACT analysis can also be obtained from:

Robert vandenMeiracker, RMT
Project Manager
Telephone: 864/234-9177

1.3 Process Description

The carbon fiber production facility consists of one production line and associated equipment. The production begins with unwinding of acrylic fiber and ends with winding of carbon fiber onto spools. The processing steps are oxidation, carbonization, and sizing application. A detailed process flow diagram is contained in Appendix A

1.3.1 Oxidation

Oxidation consists of four natural gas fired furnaces. The first furnace is identified as the pretreatment oven (PTO). This oven is used to begin the oxidation process, and heat for oxidation in this unit is provided by a 4.0×10^6 British thermal unit per hour (Btu/hr) natural gas burner. This equipment is no longer used and Cytec has indicated in previous correspondence that this equipment will not be operated in the future.

Oxidation now occurs in the three oxidation furnaces that follow the pretreatment oven. These furnaces operate in series to complete the oxidation process. The equipment identification numbers for these units are OX-1, OX-2, and OX-3. These furnaces have 18 burners with a total capacity of 16.8×10^6 Btu/hr and fire natural gas. Emissions from these units are not controlled.

1.3.2 Carbonization

Carbonization is a two-step process. Step one is a pre-carbonization step and step two is final carbonization. Pre-carbonization is performed in the pre-carb furnace (PREC). This furnace is heated with 32 natural gas burners of various sizes and that have a combined maximum capacity of 5.7×10^6 Btu/hr. After passing through the PREC, the fiber enters either one of two carbonization furnaces (ECON or ECOS). These two furnaces are electrically heated. Process emissions from this area are controlled by a thermal oxidizer while pre-carb burner emissions vent directly to the atmosphere. The thermal oxidizer has a natural gas burner rated at 5.0×10^6 Btu/hr.

1.3.3 Sizing Application and Drying

Once the carbon fiber has been manufactured, sizing is applied prior to winding on spools. The sizing is water-based but may contain VOCs, hazardous air pollutants (HAPs), and toxic air pollutants (TAPs). The sizing is stored in one of six tanks prior to application. The sizing is applied to the fiber in a bath and then heated to volatilize the solvents. The heat is provided by two 0.8 X 10^6 Btu/hr burners. Once the fiber is dry, it is wound onto spools and prepared for shipment.

1.3.4 Miscellaneous Equipment

Cytec operates various support equipment to assist with manufacturing. This equipment includes a gas-fired water heater rated at 0.4 X 10^6 Btu/hr, three gas-fired space heaters rated at 2.2 X 10^6 Btu/hr, electric heaters, laboratory equipment, office equipment, maintenance welding equipment, and forklifts. The emissions from these units are not expected to be significant.

1.4 Identification of Equipment Subject to Reasonable Available Control Technology Analysis

In order to determine which sources should be evaluated for RACT, two criteria were identified. First, the sources must emit nitrogen oxides. The sources that have the potential to emit nitrogen oxides are as follows:

- Oxidation ovens
- Pre-carb oven burner
- Carbonization ovens and thermal oxidizer
- Sizing dryer
- Water heater
- Three space heaters

The second criteria relates to the total amount of NO_x emissions. Sources with insignificant emissions need not be evaluated for RACT. For purposes of this report, individual emission sources with potential NO_x emissions of less than or equal to 1 tpy were excluded from the analysis. Table 1 summarizes the emission sources and the potential NO_x emissions:

Table 1
Potential Nitrogen Oxides Emissions

EMISSION SOURCE	POTENTIAL NO_x EMISSIONS (tpy)	BASIS FOR EMISSION ESTIMATE
Oxidation ovens	145.4	AP-42 Factor and Process Information
Pre-carb oven burner	3.2	AP-42 Factor
Carbonization ovens and thermal oxidizer	46.0	AP-42 Factor and Process Information
Sizing dryer	0.9	AP-42 Factor
Water heater	0.2	AP-42 Factor
#1 space heater	1.0	AP-42 Factor
#2 space heater	1.0	AP-42 Factor
#3 space heater	1.0	AP-42 Factor

The sources subject to analysis are the three oxidation ovens, the pre-carb oven burner, and the carbonization ovens with its associated control device, the thermal oxidizer. The other sources have insignificant NO_x emissions. Control of these emissions would not result in significant level of NO_x emissions reduction.

Section 2
Reasonably Available Control Technology Demonstration

Under United States Environmental Protection Agency's (USEPA's) 8-hour ozone plan dated November 29, 2005, and listed in Federal Register Volume 70, No. 228, indicates that facilities in areas designated as non-attainment are required to apply RACT. USEPA also indicates on page 71654 that RACT should achieve 30 percent to 50 percent reduction while the cost should be $160 to $1,300 per ton of pollutant removed.

The RACT analysis for the Cytec facility was performed with the objective of choosing the best emissions control while considering environmental, economic, and energy impacts. The RACT analysis evaluates the emissions from a base case of current technology versus the emissions from other options, including a new generation of emission control equipment resulting in lower emissions. This RACT analysis considers controls used in all industries and does not focus solely on the carbon fiber manufacturing industry. RMT, Inc. (RMT) and Cytec have reviewed applicable emission control technologies and determined that RACT for the facility includes the following work-practice standard:

- Reduction of the thermal oxidizer temperature set-point temperature from 980°C to 700°C during periods when the production line is not operating.

2.1 Reasonably Available Control Technology Definition and Background

RACT is defined in the *Code of Federal Regulations* (40 CFR 51.100) as "devices, systems, process modifications, or other apparatus or techniques that are reasonably available taking into account: (1) The necessity of imposing such controls in order to attain and maintain a national ambient air quality standard; (2) The social, environmental, and economic impact of such controls; and (3) Alternative means of providing for attainment and maintenance of such standard. (This provision defines RACT for the purposes of §51.341(b) only.)" Guidance on well-controlled sources is available through the Reasonable Available Control Technology/Best Available Control Technology/Lowest Achievable Emission Rate (RACT/BACT/LAER) Clearinghouse (RBLC).

The determination of RACT emission limits for a particular source is site-specific. RACT is bounded on one hand by requirements such as New Source Performance Standards (NSPS) and

National Emission Standards for Hazardous Air Pollutants (NESHAPs), if applicable as minimum requirements (the upper bound emission rates). On the other hand, the lower bound or most stringent emission limit can be defined as LAER. Emission limits associated with a given technology usually vary depending upon the site-specific analysis dictated by RACT requirements.

Specific guidance on conducting RACT analyses is not available; therefore, a "top-down" approach similar to approach used in the BACT analysis was selected. A review of USEPA's guidance on determining BACT ("Top-Down" Best Available Control Technology, March 1990) indicates that certain fundamental considerations are applicable. Those considerations include the following:

- The analysis should be held to a minimum with the depth of the analysis being dependent on the difficulty of the decision.
- In justifying a limit for a given pollutant, only those alternatives that have greater control capabilities for that pollutant need be considered in the analysis.
- Unrealistic alternatives need not be presented, such as placing in series control equipment that is normally used alone (*e.g.*, an electrostatic precipitator [ESP] followed by a baghouse).

Additional guidance from USEPA's 1980 Prevention of Significant Deterioration (PSD) Workshop Manual provides other considerations that also appear to be appropriate for this analysis. Those considerations include the following:

- In selecting an alternative control strategy for consideration, the applicant must first determine the technical feasibility. A technically feasible control strategy is one that has been demonstrated to function efficiently on an identical or similar process.

2.2 Reasonably Available Control Technology Analysis Approach

RACT will be determined on a case-by-case basis taking into account energy, environmental, and economic impacts. RACT may be achieved through a variety of means, including production process changes, modifications of emission control equipment, and procedural changes. In addition, if it is determined that technological or economic limitations or the application of measurement methodology to a particular emissions unit would make the imposition of an emission standard infeasible, a design, equipment work practice, operational standard or combination thereof may be employed to satisfy the requirements for the application of RACT.

To assist in the assessment of RACT, USEPA maintains the RBLC. The RBLC is a database of the emission limits included in new construction permits subject to federal new source review regulations. Although only RACT determinations are germane to Cytec's RACT proposal, the

research of control technologies in the RBLC was not just limited to RACT. Determinations in the RBLC are made for individual permit applications and included in the clearinghouse at the time the permit is issued, usually by state or local permitting agencies. Ideally, these listings are updated following successful performance testing after the facility has been constructed. Frequently, however, these latter critical milestones are not recorded so that verification of successful compliance with listed permit limits usually requires additional research. In the development of this analysis, a query of the RBLC Web site was performed for NOx emission reduction technologies.

Section 3
Reasonably Available Control Technology Analysis

3.1 Introduction

Cytec is submitting a RACT analysis to identify the control requirements, if any, for NOx emissions from the facility's processes. The RACT analysis was prepared consistent with the following five-step process:

1. Identification of Control Technologies
2. Elimination of Infeasible Control Options
3. Ranking of Remaining Control Technologies
4. Evaluation of Most Effective Control Technologies
5. Selection of RACT

The evaluation and selection of RACT are based on the economic, environmental, and energy impacts. The following subsections describe the basis for each of these steps and the final recommendation of RACT.

3.2 Identification of Control Technologies

The RBLC database was queried for emission sources and control devices of NOx that are used in the carbon fiber manufacturing industry. The query did not return any results. The following broader categories were researched because they may contain operations similar to Cytec's Rock Hill operations:

- Emissions Control Afterburners & Incinerators (19.200)
- Gaseous Fuel & Gaseous Fuel Mixtures (13.300)

The search of the RBLC returned more than 2,500 pages of results for these searches. The information was reviewed and the control technologies employed are quoted below, directly from the RBLC. The actual search results are contained on a CD included as Appendix B.

- Source Has Option Of Using Direct Water Injection Or The Following Operating Limits: 21,371 Kw (Generator Output) Each When Using Natural Gas Or 7,771 Kw (Generator Output) Each When Using Fuel Oil

- Lean Head End Combustion Technology
- According To BACT-PSD- Use Lean Head End Combustion Technology. According To NSPS- Do Not Operate Turbine On Fuel Oil, Except As Provided For Under Emergency Fuel Provisions Listed In 40 CFR 60.332(K)
- Dry Low NOx Combustion Technology
- Low NOx Burners
- After-Cooling Combined With High Pressure Fuel Injection Pumps And Cylinder Design To Ensure Clean Burn In The Cylinder
- Proper Operation And Maintenance
- Dry Low NOx Combustion Technology (SoLoNOx)
- Variable-Step Fuel Injection Timing Retard As Incorporated By The Manufacturer
- Low NOx Burners / Flue Gas Recirculation
- Conventional Burner Technology
- Dry Low NOx And Selective Catalytic Reduction (SCR)
- Low NOx Burners
- SCR
- Low NOx Burners
- Water Injection W/SCR
- Low NOx Combustion
- Low NOx Burners
- Dry Low NOx + SCR
- Good Combustion Practices
- Good Combustion Practices
- Natural Gas Only; Low NOx Burners
- Low NOx Burners
- SCR – Low NOx Burners
- Low NOx Combustor & Proper Operation, lb/hr Limit For Each Boiler.
- Low NOx Burners. Initial Testing To Verify BACT Rate Required & Every 3 Yrs After.
- SCR And Dry Low- NOx Combustors, 10 ppm Allowable Ammonia Slip.
- Low NOx Option (Low NOx Burner And/Or Flue Gas Recirculation)

- Combustion Control: High Operating Temperatures, High Excess Oxygen Concentrations, And Low Residual Carbon Monoxide Concentrations
- Low-NOx Burners Without Flue Gas Recirculation
- Limitation Of Operating Hours To Less Than 1200 Combined Hours/Yr For Sn-Pbcdf-09 And Sn-Pbcdf-10 And Less Than 500 Hours/Yr For Sn-Pbcdf-12.
- Low NOx Burners And SCR
- Two Banks Of Carsound Exhaust System, Inc., 3-Way Catalytic Converters (Model No. 298035) And An Air/Fuel Ratio Controller (Model Kat2000)
- Alzeta Ultra Low-NOx Burner, Good Combustion
- Ultra Low NOx Burner
- SCONOx Catalytic Absorption System
- Lean Burn Combustion Technology
- Turbine Equipped With SoLoNOx II Combustion Technology (Dry Low NOx)
- Dry Low NOx Burners, Water Injection
- Retarded Ignition Timing (3-4 Degrees)
- Dln (Natural Gas), Water Injection (Fuel Oil)
- Natural Gas Fired Oxy Fuel Burners, Compliance Method: NOx Continuous Emissions Monitor
- Premix Style Burners.
- Ultra Low NOx Burners or Combination Fuel Burners
- Exclusive Use Of Natural Gas, Advanced Dry Low-NOx Burners, SCR, Oxidation Catalyst, Good Combustion Practices
- Side-Well Emissions Pass Through Lime-Injected Baghouse Of 80000 Cfm, Serving Both Furnaces.
- Lean Pre-Mix Combustion & SCR
- SCR And Staged Air
- Direct Evacuation Control And Low NOx Oxy-Fuel Burners
- Selective Non-Catalytic Reduction (SNCR System (Urea Injection)
- Dry Low NOx Burners, Steam Injection, Proper Operation And Maintenance
- SCR For Both Turbine And Duct Burner, Turbines Use Steam Injection In The Combustors And The Duct Burners Will Use Low-NOx Burners.
- Dry Low NOx Combustion And SCR W/Ammonia Injection, Continuous Emission Monitor.

- GE Advanced Dry-Low NOx Combustors Plus SCR
- Non-Selective Catalytic Reduction
- BACT For NOx-An Acid Gas Packed Tower Wet Scrubber Low -NOx Burner, Use Of Natural Gas Emission Limit Primary: 100 ppmvd-Scrubber; Alternate Limit - 48 ppmvd-Unit Heater
- Low NOx Burners For Oxidizer System (Either RTO or Catalytic)

The Clean Air Technology Center (CATC) Technical Bulletins and Air Pollution Technology Fact Sheets were also reviewed to determine if any other control technologies for NOx emissions from combustion are available. The CATC and RBLC reviews indicated that the following technologies are applicable to control of NOx emissions:

- Air Staging
- Burners Out Of Service (BOOS)
- Catalytic Combustion
- Flue Gas Recirculation (FGR)
- Combustion Optimization (good combustion practices)
- Fuel Staging
- Lean Head End Combustion Technology
- Two Banks Of Carsound Exhaust System, Inc., 3-Way Catalytic Converters (Model No. 298035) And An Air/Fuel Ratio Controller (Model Kat2000)
- Low NOx Burners (LNB) / Lean Burn / Pre-Mix Burners
- Low or Less Excess Air (LEA)
- Overfire Air (OFA)
- Water or Steam Injection
- SoLoNOx, SCONOx, Dry Low NOX
- Fuel Injection Timing Retard
- Combustion Control: High Operating Temperatures, High Excess Oxygen Concentrations, And Low Residual Carbon Monoxide Concentrations

Based on a recent stack testing event for NOx, Cytec has determined that reducing the set-point temperature of the thermal oxidizer may result in a reduction of NOx emissions. Initial indications are that the amount of reduction could be as much as 40 percent from initially calculated values. This option is feasible to the extent that Cytec must maintain a minimum temperature in the thermal oxidizer to destroy VOC and HAP emissions from the process. The currently available testing indicates that the unit must be operated in excess of 900°C to effectively destroy organic pollutants and meet permitted emission limits.

A RACT analysis was performed for each of the control equipment options and none were determined to be technically feasible and cost-effective. It must be noted that this RACT analysis examined potential technologies outside of the carbon fiber production industry.

3.3 Elimination of Infeasible Control Options

The control options outlined in the previous section were evaluated qualitatively to determine if these options are technically feasible. The control options that were determined to be technically infeasible are as follows:

- BOOS
- Catalytic combustion (oxidation and pre-carb burner)
- SCR (oxidation and pre-carb burner)
- SNCR (oxidation and pre-carb burner)
- Low NOx Burners/FGR/Air-fuel Staging/Steam Injection/LEA/OFA/Lean Burn/Pre-Mix Burners (pre-carb burner)
- Lean Head End Combustion Technology, SoLoNOx, SCONOx, and Dry Low NOx
- Fuel Injection Timing Retard
- Combustion Control: High Operating Temperatures, High Excess Oxygen Concentrations, and Low Residual Carbon Monoxide Concentrations
- Two Banks Of Carsound Exhaust System, Inc., 3-Way Catalytic Converters (Model No. 298035) And An Air/Fuel Ratio Controller (Model Kat2000)
- The rational behind the conclusion of technical infeasibility is discussed below.

BOOS applies to liquid, gaseous, or pulverized solid fuel boilers. The oxidation ovens, PREC burner, and the carb furnace with its associated thermal oxidizer are not boilers. In the case of the oxidation ovens and PREC, the burners are not designed for intermittent operation. The thermal oxidizer only has a pilot burner and off-gas burner. The pilot burner and off-gas burners are designed to operate concurrently to ensure safe and complete combustion of the off-gases. Tampering with these burners relative to the BOOS control option could result in an unsafe operation of the thermal oxidizer or incomplete combustion of the off-gases. Therefore this control option is not technically feasible for the oxidation ovens, PREC burner, and the carb furnace with its associated thermal oxidizer.

Catalytic Combustion was deemed to be infeasible, because catalytic combustion units in the size range needed for the oxidation ovens, PREC burner, and the carb furnace with its associated thermal oxidizer are not commercially available at this time. Furthermore, this catalytic combustion results in a lower combustion temperature. In order to process the carbon fiber, a threshold temperature range must be achieved; the lower combustion temperature would preclude manufacture of carbon fiber. Catalytic combustion could be applicable to the thermal oxidizer; therefore, it is included as a technically feasible control option.

SCR involves passing the boiler exhaust gases across a catalyst bed that selectively converts the NOx emissions to nitrogen and oxygen. These catalyst beds are normally applied in low-sulfur and low-particulate applications because the sulfur and particulate emissions reduce the chemical activity of the catalyst, eventually rendering it ineffective. The ideal application is combustion of natural gas because of the low particulate and sulfur emissions. This technology may be technically feasible for the thermal oxidizer, but is not technically feasible for the oxidation and pre-carb burners because no room is available for installation of the catalyst bed.

SNCR involves the injection of ammonia into the combustion chamber to reduce NOx compounds to nitrogen and water. This technology has been shown to achieve 50 percent reduction of NOx emissions in certain applications. Two critical design factors for an SNCR system are temperature and residence time. As described in the USEPA's *Air Pollution Control Fact Sheet* for SNCR, combustion unit design dictates the effectiveness of SNCR. In general, the ammonia must be injected into the unit in such a manner that the temperature is maintained between 1,550°F and 1,950°F. The flue gases must remain in this temperature range for at least one second. Best results are obtained when the temperature is between 1,600°F and 1,800°F and the residence time exceeds one second. The oxidation and PRECs are not designed to have such a long residence time at these temperatures. However, the incinerator operates with a current set point of 1,800°F and has a 0.5 second residence time. SNCR may be a technically feasible option for this control device.

Low NOx Burners/FGR/Air-fuel Staging/Steam Injection/LEA/OFA/Lean Burn/Pre-Mix Burners are considered combustion control technologies for reduction of NOx emissions employed in low NOx burner design. Although low NOx burners for boilers are commonplace, the technology is somewhat less common in furnaces for a number of reasons. First, boilers can be designed concurrently with burners to optimize NOx reduction. The furnaces used at the Cytec facility were designed for optimal production of carbon fiber.

A review of manufacturer's replacement burners for the equipment did indicate that low NOx burners (LNB) were available for the oxidation oven burners. The pre-carb burners are already low NOx burners; no further reductions for the pre-carb burners are available. The thermal oxidizer burner currently utilizes staged air for reduction of NOx. The manufacturer has indicated that no other burners or burner modifications are available to reduce NOx emissions from the thermal oxidizer. Building on this staged combustion approach, a two-stage combustion system may be an applicable technology for the thermal oxidizer; therefore it is included as an option.

Lean Head End Combustion Technology, SoLoNOx, SCONOx, and Dry Low NOx technologies are listed in the RBLC database for NOx control. These technologies are only applicable to gas turbines; therefore, they are not applicable to this RACT analysis.

Fuel Injection Timing Retard is only applicable to internal combustion engines; therefore it does not apply to this RACT analysis.

Combustion Control: High Operating Temperatures, High Excess Oxygen Concentrations, and Low Residual Carbon Monoxide Concentrations is listed as control technology for NOx emissions from a chemical agent disposal facility. These technologies are not consistent with good operating practices for reduction of NOx, but these practices are appropriate for complete destruction of hazardous constituents as described in the RBLC for chemical agent disposal. This option has been discounted for purposes of this RACT analysis.

Two Banks Of Carsound Exhaust System, Inc., 3-Way Catalytic Converters (Model No. 298035) And An Air/Fuel Ratio Controller (Model Kat2000) is applied to an internal combustion engine; therefore, it is not an applicable technology for this RACT analysis.

A detailed economic analysis of the technically feasible options has been performed and is summarized in later sections.

3.4 Ranking of Remaining Control Technologies

The potential effectiveness of the remaining control options has been evaluated by reviewing manufacturer information and USEPA documents. The remaining control options and their anticipated efficiency are listed in Table 2.

Table 2
Technically Feasible Control Options

CONTROL OPTION	OXIDATION OVENS	PRE-CARB FURNACE BURNER	CARB FURNACE/ THERMAL OXIDIZER	NOx CONTROL EFFICIENCY [1]
Reduce Set-Point Temperature	No	No	Yes	40%
Catalytic Combustion (new incinerator)	Yes	No	Yes	50%
Low NOx Burners	Yes	No	No	50%
Staged Combustion	Yes	No	Yes	50%
SNCR	No	No	Yes	30%-50%
SCR	No	No	Yes	70%-90%

(1) Assumes no degradation of VOC/HAP efficiency.

3.5 Evaluation of Most Effective Control Technologies

The RACT analysis is a three-part investigation that includes economic, energy, and environmental impacts. Each of the remaining control alternatives was reviewed with respect to the impacts to determine if they meet RACT requirements.

3.5.1 Economic Analysis

The economic analysis is composed of a calculation of the control technologies' average cost effectiveness (ACE) based on a comparison of the cost of each feasible control technology in terms of cost per mass of pollutant removed. As described in the final rule to implement the 8-hour ozone National Ambient Air Quality Standard (NAAQS); Final Rule published in the Federal Register on November 29, 2005, page 71654 states that the acceptable cost range for RACT is $160-$1,300 per ton of NOx removed. Costs in excess of $1,300 per ton of pollutant removed are considered economically infeasible and the installation of that technology ***would not*** be deemed appropriate.

The annualized cost was determined by estimating ten percent of the capital cost for an installed system and the resulting annual operating and maintenance costs. Vendor and USEPA cost factors were utilized to estimate the capital investment as well as annual operating and maintenance costs for each of the technically feasible control options. The following formula was used to estimate the ACE:

ACE = (Control Option Annualized Cost)/(Baseline emission rate — Control option emission rate)

The baseline emission rates are taken from Table 1 of this report. The control efficiency for each option provided in Table 2, was used to estimate the control option emission rate for each option [Baseline Emission Rate X (1 – Control Efficiency)]. For control of emissions from the thermal oxidizer using the SNCR option, the Baseline Emission Rate is 46 tpy and the Control Option Emission Rate is 23 tpy.

Table 3 is a summary of the available control options and presents the estimated average cost effectiveness of each option.

Table 3
Average Cost Effectiveness of Control Options

CONTROL OPTION	CAPITAL COST OF CONTROL OPTION ($)	ANNUAL OPERATING COST OF CONTROL OPTION ($)	SUM OF [1] ANNUALIZED CAPITAL AND OPERATING COST ($)	AVERAGE COST EFFECTIVENESS ($/ton)
Reduce Set-Point Temperature	0	300,000	300,000	16,000
Catalytic Combustion (new incinerator)	220,000	40,000	62,000	2,700
Low NOx Burners	90,000	0	9,000	2,000
Staged Combustion (incinerator for oxidation ovens)	1,250,000	250,000	375,000	5,200
Staged Combustion (new incinerator for pre-carb and carb)	1,000,000	40,000	140,000	6,100
SNCR	681,000	34,000	102,100	4,100
SCR	1,000,000	34,000	134,000	3,200

(1) Annualized cost = capital cost X (0.10)

Reduce Set Point Temperature

Aside from testing costs associated with identification of NOx emissions, the reduction of the set-point temperature does not require capital expense. However, the reduction could result in significant increase in operating expenses due to additional equipment downtime.

The thermal oxidizer is currently set to operate at 980°C (1,800°F). In the event of a malfunction of the process of thermal oxidizer, the facility staff have approximately 10 minutes to "re-fire" the thermal oxidizer. After 10 minutes, the thermal oxidizer temperature will drop below the safe operating limit of 760°C. At this point, the operators must stop fiber production. Once the thermal oxidizer is "re-fired" the fiber must be "restrung" through the oxidation and carb furnaces. An event of this nature would result in lost production, raw materials, and additional labor expenses associated with restarting the line. Past experience indicates a cost of $300,000 per event.

A reduction in the set point temperature reduces the facility's response time to a malfunction. A reduction of the set point from 980°C to 920°C results in a reduction in the available response time by 3 minutes. The facility anticipates 20 malfunction events per year with one resulting in a shutdown of the production line. Normally, the facility is able to respond in sufficient time to prevent excess emissions, but the reduction in set point temperature is likely to cause one additional shutdown of the production line per year, resulting in a cost of $300,000.

Since the set point reduction option does not have a capital cost, has an annual operating expense of $300,000 per year (due to malfunction events), and results in a reduction of emissions of 18.8 tpy, the cost per ton of NOx removed is $16,000.

Catalytic Combustion (new incinerator for PREC and carb furnaces)

A new catalytic incinerator could be purchased and installed to replace the existing thermal oxidizer. The cost of a new unit is based on a flow rate of 10,000 cubic feet per minute (cfm). The USEPA's *Air Pollution Control Fact Sheet* for a catalytic incinerator gives a capital cost of $22 to $90 per cfm and an operating cost of $4 to $25 per cfm. Therefore the capital cost for the new unit would be between $220,000 and $900,000 while the operating costs would be between $40,000 and $250,000 per year. Therefore the low-side cost per ton of pollutant removed would be $6,700 per ton of pollutant removed.

Low NOx Burners (Oxidation Ovens)

The oxidation ovens emit NOx from fuel combustion as well as processing emissions. The fuel combustion emissions are estimated as 9.2 tpy, while the bulk of the emissions are generated from the process. The burner manufacturer for this oven indicated that the burners can be replaced with a lower NOx technology that could achieve a 50 percent reduction in emissions. The installed cost is estimated to be at least $90,000 for these burners, which gives a cost per ton of pollutant removed of $2,000.

Staged Combustion (incinerator for oxidation ovens)

A staged combustion incinerator may be able to provide NOx reductions. The off-gases are introduced into a high temperature chamber with low oxygen content. This chamber reduces the nitrogen containing off-gases to molecular nitrogen. The off-gases then enter an oxidation section that completes the

combustion process by converting the carbon compounds to carbon dioxide while leaving the nitrogen unchanged. The flow rate from oxidation is in the range of 50,000 cfm. The USEPA's *Air Pollution Control Fact Sheet* for a incinerator gives a capital cost of $25 to $90 per scfm and an operating cost of $5 to $75 per scfm. The operating costs are expected to be similar to those of the catalytic unit described previously. Therefore the cost per ton of pollutant removed would be $5,200 per ton of pollutant removed.

Staged Combustion (new incinerator for pre-carb and carb areas)

A staged combustion incinerator may be able to provide NO_x reductions. The off-gases are introduced into a high temperature chamber with low oxygen content. This chamber reduces the nitrogen containing off-gases to molecular nitrogen. Then the off-gases enter an oxidation section that completes the combustion process by converting the carbon compounds to carbon dioxide while leaving the nitrogen unchanged. Cytec is in the process of installing a new two-stage thermal oxidizer at the Greenville facility. The installed capital cost is expected to be $1,000,000. The operating costs are expected to be similar to those of the catalytic unit described previously. Therefore the cost per ton of pollutant removed would be $6,100 per ton of pollutant removed.

SNCR Capital and Operating Costs

The capital cost for the SNCR system is $681,000. For this equipment, a factor of 0.1 was used to annualize this cost. Therefore, the annualized capital cost is $68,180 / year. The operating cost is based on reagent usage and unit cost. Reagent usage is directly related to the level of NO_x removal required. For purposes of this estimate a reduction of 50 percent is desired (25 tpy). Since 1 mole of NO_x weighs 30 lb, the number of moles of NO_x that need to be controlled is (25 tons/year) X (2,000 lb/ton) X (1 mole NO_x/ 30 lb NO_x) = 1,667 moles NO_x/ year. The following chemical equation describes the stoichiometry of NO_x conversion by ammonia:

$$4NH_3 + 6NO \rightarrow 5N_2 + 6H_2O$$

Since every 6 moles of NO reduced requires 4 moles of ammonia (NH_3), the annual moles of NO_x is multiplied by 4/6 to estimate the number of moles of NH_3 required, (4/6) X (1,667 moles NO_x/ year) = 1,111 moles NH_3 / year. Equipment vendors indicate that a 10% excess of reagent is needed to assure conversion of the NO_x. So the amount of NH_3 needed is 1,222 moles / year. In

general, an aqueous urea solution is used to manufacture the ammonia; 1 mole of urea makes 2 moles of NH_3. The amount of urea needed is 611 moles. Urea has a molecular weight of 60 lb/mole. The amount of urea needed is 36,674 lb/year. Urea comes in solution with water where 1 lb of the solution contains 0.32 lb of urea; therefore, the amount of solution needed is (36,674 lb/year) X (1/0.32) = 114,606 lb/year. Since the solution density is 10 lb/gallon, 11,461 gallons per year of solution are needed. Each gallon of solution costs approximately $3.00; the annual cost of the solution is $34,381. Therefore the cost per ton of pollutant removed would be $4,100 per ton of pollutant removed.

SCR Capital and Operating Costs

Operating costs are assumed to be the same as SNCR because SCR uses a similar reagent. The capital cost of $1,000,000 is based on information from the thermal oxidizer manufacturer, John Zink Company. Therefore, the cost per ton of pollutant removed would be $3,200 per ton of pollutant removed.

3.5.2 Energy Analysis

An energy impact analysis is used to identify if the technically feasible control options result in any significant or unusual energy penalties or benefits. The feasible control options have been evaluated and it has been determined that no unusual energy penalties exist beyond what was considered in the economic analysis described in the previous section. An analysis of energy benefits was also considered. The option related to reduction of the temperature set point could result in a small energy benefit for the facility, while the other options do not appear to provide any energy benefit.

3.5.3 Environmental Analysis

A review of the control options with respect to the environment was conducted to determine if any of the options created any adverse environmental impacts. The technically feasible control options do not appear to create any wastewaters or solid wastes.

The SNCR and SCR control options require additional electricity, water, and chemical reagent for removal of a relatively small level of emissions. This additional energy requirement only creates more emissions from electricity generating sources and creates more emissions of criteria pollutants such as sulfur dioxide (SO_2), NO_x and particulate matter (PM). Further, "ammonia slip" is always a concern with SNCR and SCR control options. NH_3, the SNCR and SCR reagent, can exit the control equipment without

reacting and enter the atmosphere. Although NH_3 is not a SC DHEC regulated material, NH_3 can contribute to visibility impairment.

3.6 Selection of Reasonably Available Control Technology

Based on the energy, environmental, and economic impacts associated with the technically feasible control options, Cytec has concluded that there are not any appropriate options for NOx emissions reduction. As such, Cytec proposes a work practice standard for reduction of NOx emissions during production outages. Cytec proposes to lower the set point temperature of the thermal oxidizer during non-operational periods of the pre-carb and carb lines. This lower set point temperature and the level of emission reduction cannot be definitively quantified at this time. Furthermore, this option does not result in a reduction in potential emissions from the facility. Cytec estimates that this work practice could lower actual annual NOx emissions.

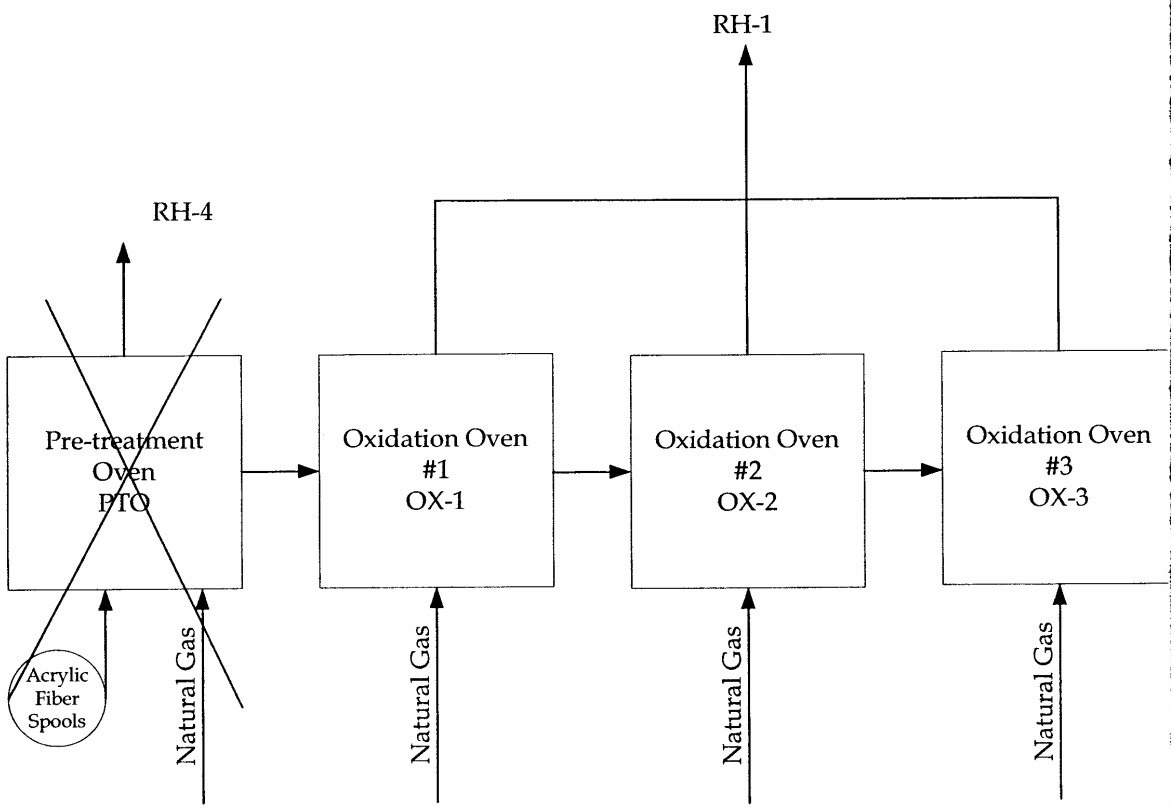
On average, Cytec has 100 product changes during the year. Each product change lasts for approximately 24 hours. If the thermal oxidizer temperature was kept at 700°C during product changes instead of 980°C, a reduction of 60 percent or more of NOx emissions could be achieved during these periods. Cytec proposes the following text be included as RACT in the facility Title V permit:

> *Reasonably Available Control Technology (RACT) for the pre-carb and carb processes as well as the thermal oxidizer was determined to be work practices/monitoring to reduce NOx emissions. While maintaining compliance with the VOC and HAP reduction requirements in other conditions of this permit, the facility shall maintain and operate the thermal oxidizer in a manner that reduces NOx emissions by programming the thermal oxidizer controller with the minimum recommended temperature during periods when production is not run through the pre-carb and carb furnaces. By May 1, 2009, the facility shall submit to the Technical Management Section of the BAQ the proposed set-point operating temperature for the thermal oxidizer during these periods. The facility shall prepare and submit a semiannual report to the Technical Management Section of the BAQ that contains a summary of any events when the production line was down and the set point temperature was not reduced to the level previously submitted.*

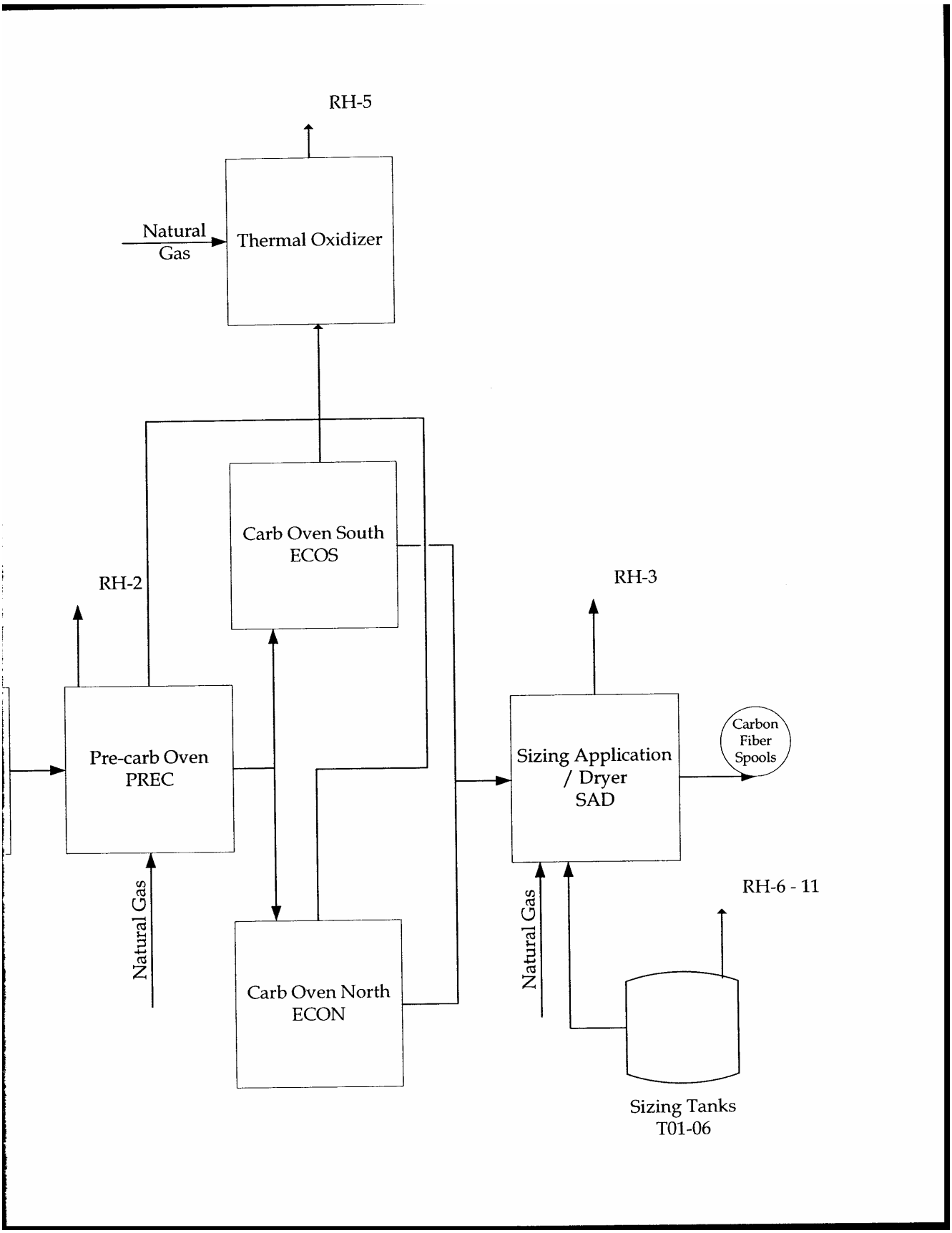
Since no add-on control technologies are technically and economically feasible, Cytec proposes a work-practice standard for reduction of NOx emissions. The work practice standard is expected to reduce NOx emissions from the thermal oxidizer by 60 percent during product changes. Work-practice standards are consistent with RACT requirements and are often employed as emission reduction techniques. Therefore, Cytec proposes this work practice standard as RACT for the Cytec facility.

Appendix A
Process Flow Diagram

Process Flow Diagram
Emission Unit ID 01
Carbon Fiber Production Line



I:\WPGVL\PJT\00-71285\33\007128533-001PFD.VSD


RH-5
Natural Gas
Thermal Oxidizer
Carb Oven South
ECOS
RH-2
RH-3
Pre-carb Oven
PREC
Sizing Application
/ Dryer
SAD
Carbon Fiber Spools
RH-6 - 11
Natural Gas
Natural Gas
Carb Oven North
ECON
Sizing Tanks
T01-06

Attachment 5

Report of RACT Analysis for Georgia Pacific Wood Products, LLC

Georgia-Pacific

Environmental Engineering
Wood Panels
55 Park Place, 17th floor,
Atlanta, GA 30348-5605

Paul J. Vasquez
Senior Manager

(404) 652-3564-Office (404) 232-386-Fax

e-mail PJVASQUE @ GAPAC.COM

Sent Via E-MAIL

September 13, 2006

Mr. Anthony T. Lofton
SCDHEC
Bureau of Air Quality
2600 Bull Street
Columbia, SC 29201

Re: Georgia-Pacific Catawba Hardboard Plant
RACT Analysis

Dear Mr. Lofton:

As requested, attached for your review is Georgia-Pacific Corporation's RACT analysis for our Catawba Hardboard facility.

If there are any questions regarding the analysis, please feel free to call me at (404) 652-3564 or Mark Aguilar at (404) 652-4293. We will also make ourselves available to meet with you and other DHEC staff members, if necessary.

Sincerely,

Paul J. Vasquez
Paul J. Vasquez
Senior Manager, Environmental Compliance
Wood Products

cc: Mssrs. T. Mackinem
S. Wilson
M. Aguilar
L. Wyatt

ATTACHMENT A

REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT) REVIEW

CATAWBA, SC HARDBOARD PLANT

1.0 INTRODUCTION

The control technology review requirements of the federal and State nonattainment regulations require that all applicable federal and State emission-limiting standards be met, and that Reasonably Available Control Technology (RACT) be assessed. The RACT analysis steps applied by GP are equal to the steps used for Best Available Control Technology (BACT). These steps are:

(1) Identify all potential control strategies.
(2) Eliminate technically infeasible options. The demonstration of technical infeasibility should be clearly documented and should show, based on physical, chemical, and engineering principles, that the technical difficulties would preclude the successful use of the control option on the emission unit under review.
(3) Rank the remaining control technologies by control effectiveness. The ranking should include relevant information, including control effectiveness, expected emission rate, expected emission reduction, energy impacts, environmental impacts and economic impacts.
(4) Evaluate the most effective controls and document the results. The evaluation should include case-by-case consideration of energy, environmental and economic impacts. If the "top" option is not selected as BACT, the evaluation should consider the next most effective control option.
(5) Select BACT. BACT is the most effective option not rejected in Step 4.

2. PROCESS DESCRIPTION

The Catawba facility produces hardboard panel sheets for a variety of customers. Wood chips are washed, mixed with wax, cooked, mixed with resin and oil, refined into fiber, and dried to form fiber. Steam for the drying step is provided by the adjacent Bowater Paper Mill. The fiber is then formed into a mat which is pressed into hardboard panel sheets. The hardboard panel sheets are then humidified to prevent warping. Finally, the hardboard is finished in a variety of ways including trimming, sanding, grooving, laminating, and coating.

3. APPLICABILITY

Table 1 below presents the 2003 actual NOx and VOC emissions for the GP operations. As shown, the NOx emissions for the plant are much lower than the major source threshold of 100 tons per year (tpy). The RACT analysis is completed below for VOC emissions. As shown in the table below, the cooker, dryers, and press equipment emit over 88% of the total VOC emissions. As the plant configuration is relatively compact, the RACT analysis considered all of these emissions to be in a combined conveyance system.

Table 1. Summary of Actual VOC Emissions for 2003, GP Catawba

Equipment ID	Equipment Description	Total 2003 VOCs (tons/yr)	Total 2003NOx (tons/yr)
CC	Chip Cooker	17.01	0.0
DC1	Dryer Cyclone No.1	43.21	0.18
DC2	Dryer Cyclone No. 2	43.21	0.18
DC3	Dryer Cyclone No. 3	37.06	0.16
DI	Dryer System No. 1	3.93	2.05
D2	Dryer System No. 2	3.93	2.05
SC17	Forming Conveying System	5.47	0.18
P	Press	40.50	0
F5	Press Exhaust Vent	20.25	0
PU	Press Unloader	35.74	0
F4	Laminator	0.05	0
O1	Oven # 1	5.72	2.6
O2	Oven # 2	11.20	2.6
O3	Oven # 3	0.13	2.6
RSC	Residuals Silo Cyclone	0.29	0
MS	Metering Screws	0.97	0
CCL	Caul Cooler	0.38	0
H2	Humidifier No. 2	0.54	0
H3	Humidifier No. 3	0.54	0
IR	Infrared Oven, Natural Gas	0.13	2.6
Total		270.3	15

The following sections address source characteristics, and the individual RACT steps for the set of emission units.

For this RACT analysis, all significant sources of volatile organic compound (VOC) emissions were reviewed. Insignificant sources, such as liquid resin storage tanks, are not reasonable to control and are not further addressed as a separate source subject to review.

4. RACT ANALYSIS

4.1. Source Characteristics

Drying System:
The drying system is heated with direct-fired natural gas burners. The direct-fired dryer emits wood dust, extracted organics (volatile organic compounds), and minor quantities of combustion products (*e.g.*, carbon monoxide, nitrogen oxides, etc.) due to partial combustion of the wood furnish.

The evaporated, extractable compounds, primarily consisting of terpenes and wood resins or pitch, are unique to wood drying. The quantity of these materials present in the dryer exhaust is dependent on the extractive content of the wood furnish, with softwood containing considerably more extractives than hardwoods. Pines have, by far, the highest extractive content.

Press System:

The board press is the final step in the manufacturing process prior to finishing. A mat of resinated furnish is continuously formed and fed to the press. When the rollers come into contact with the mat it is heated under pressure, to cure the urea-formaldehyde resin to hold the wood fibers together. The press is steam heated with heat supplied by the external Bowater plant.

4.2 Step 1 - Potential Control Options

Selection of air emission control options for the dryer must consider the high moisture content of the exhaust gas stream, the relatively high concentration of fine, organic and inorganic particulate matter and the condensable VOC material that is present. These considerations limit the control options to those systems that have either been demonstrated in practice (at least on a pilot scale) to be able to operate in the previously described conditions or can be reasonably expected to handle the conditions based on applications with similar harsh conditions. The following sections present control options that can be considered to have a practical potential for application to cooking, drying and pressing:

Conversations with state regulatory agencies and a review of the RBLC have indicated that two technologies for control of VOC from wood drying have been most frequently proposed. RTO technology has been approved for numerous facilities. RTOs are operating in a number of industry sectors, including those involved in MDF, oriented strandboard (OSB), particleboard, and plywood manufacturing. The other frequently proposed control technology option is RCO.

One of the major operational issues associated with regenerative oxidation systems is the effect of particulate matter loading on system efficiency and life expectancy. Build-up of particulate matter in the ceramic heat-recovery media increases system pressure drop and operating costs. Highly efficient particulate matter removal systems help assure performance, but add substantially to the capital equipment costs.

Recent BACT determinations for VOCs from flash tube dryers in the industry are available in the RBLC. A summary of the control technologies is as follows:

- RTO
- Biological air filter (biofilter)

Based on conversations with equipment vendors and staff at state agencies, as well as GP's extensive experience operating control equipment, the following options can be considered to have a practical potential for dryer control application:

- RTO with particulate matter pre-cleaning
- RCO with particulate matter pre-cleaning
- Exhaust gas recycle with indirect heat exchange
- Biological air filtration (biofilter) with particulate matter control

All four options are capable of controlling VOC, PM and CO emissions. RTO technology has been available for many years, but has only recently been adapted to meet the needs of the wood products industry. RTOs rely on thermal oxidization to destroy organic PM/PM_{10}, VOC and CO emissions at temperatures over 1,400 °F. To increase the thermal efficiency of the system, ceramic beds are used to preheat the inlet air prior to combustion. This technology is very effective in the destruction of VOCs, CO and organic particulate matter. However, RTOs are ineffective at removing inorganic particulate matter and they generate some NO_x and CO from the combustion of natural gas or propane in order to reach the desired temperature. Inorganic particulate matter and condensable organics may cause fouling of the ceramic beds. The RTO can operate at, or close to the melting point of some of the inorganic particulate matter present in the dryer exhaust gases. Once melted, these by-products can permanently adhere to the ceramic bed, resulting in the occurrence of plugging, with the possibility of premature bed failure. Occasional bed burn-out and/or wash-out are required to clear the bed of inorganic particulate matter and to reduce the pressure drop build-up from the plugging. For this reason, RTO vendors universally recommend a high degree of pre-cleaning, often through the use of high efficiency cyclones, rotary bed protectors, or wet electrostatic precipitators (ESPs).

RCOs are similar in nature to RTOs except that a catalyst is employed to oxidize the VOCs. These units operate at a much lower temperature (generally in the range of 600 to 1,000 °F), thus providing operational savings by burning less fuel (natural gas or propane). Destruction efficiency is similar to that of RTO systems, but they produce less NO_x and CO because of the reduced fuel consumption. As is the case with an RTO, additional inorganic particulate matter control may be required upstream of the RCO to prevent ceramic bed fouling.

Another example of a high temperature oxidation control device is dryer exhaust recycle. A recycle system is not a retrofit technology. Recycle systems return the VOC exhaust as combustion air/drying air for other steps in the manufacturing process. Exhaust recycle represents an example of a process change that eliminates the need for end-of-the-pipe control of organics. The system is based on proven components and has a control efficiency similar to that of an RTO/RCO. However, due to the sensitive pressure and heat balances for the process, a recycle system is not technically feasible for existing sources.

Biofiltration is another option with the potential to reduce VOCs, as well as particulate matter. Biofiltration is a process where the exhaust gases from the dryers are passed through filter beds enriched with micro-organisms that degrade the VOCs and particulate matter. Biofiltration technology does not require natural gas to pyrolize VOCS, therefore offering a substantial savings over both RTOs and RCOs. Exhaust gases from the dryers would be directed to the biofiltration unit after passing through a pre-cleaning device, such as a quench chamber, where water is sprayed into the chamber to cool the gas stream and to remove larger particles. This gas would then be passed through filter beds, which house micro-organisms. The VOCs and additional particulate matter are captured and degraded by the micro-organisms. The degradation process is aerobic. The end products include carbon dioxide, water, mineral salts and biomass. While a number of different filter beds have been tested (*e.g.*, wood, bark shavings, chips, etc.), the filter of choice is activated carbon. Though more expensive, it provides for longer bed life without compaction. Bed temperatures need to be kept fairly constant for greatest efficiency and to prevent harm to the micro-organisms. The system requires a fairly large surface area for the filter beds.

4.3 Step 2- Elimination of Infeasible Options

The next step in the top-down process involves the elimination of control alternatives on the basis of physical differences (*e.g.*, fuel type), location differences (*e.g.*, availability of water), or significant differences that may exist in the environmental, economic, or energy impacts.

Both RTOs and RCOs, and the hybrid TCOs, have been successfully proven in this application.

The strict temperature limitations on biofiltration technology limit its potential to gas streams that can be consistently maintained below approximately 105°F. This is not the case with the dryer exhaust unless very large quantities of dilution air are introduced. It should also be noted that other wood products manufacturing facilities, such as those operated by Weyerhaeuser in Grayling, Michigan and Adel, Georgia, have been unable to maintain high VOC removal efficiencies on a continuing basis. Since this technology has been installed at the Plum Creek facility in Montana, it is considered further in the RACT analysis.

An exhaust gas recycle system requires a high temperature heat exchanger in order to transfer heat from the heat source to the ambient air used to dry the wood. This requires very costly materials of construction and as discussed above, not technically feasible. For this reason, exhaust gas recycle is not considered further.

4.4 Step 3 - Ranking of Control Options

This part of the evaluation is performed by ranking the various control options not eliminated in the previous step. The only feasible options for control of VOCs are Biofilters, RTOs, RCOs and the hybrid TCO.
As discussed above, an exhaust gas recycle system is not considered feasible for this application. Although GP believes that a biofilter is not feasible in this application, it is included in the ranking. The only feasible options remaining include RTOs, RCOs and the hybrid TCO. These controls are ranked as follows:

Table 2. Summary of VOC Control Options

VOC Control Option	Effectiveness (%)
RTO w/pre-cleaning	90+
RCO w/pre-cleaning	90+
TCO w/pre-cleaning	90+
Biofilter	50

4.5 Step 4 – Control Effectiveness Evaluation

This step of the RACT process is necessary when the top control is not selected as RACT. Step 4 determines the economic impact of the feasible control options listed in Step 3 and then selects the most appropriate technology as RACT for dryers. The economic analysis is based on cost data supplied by the equipment suppliers and the use of EPA's Office of Air Quality Planning & Standards (OAQPS) Control Cost Manual, 6th Edition, January 2002 (Chapter 2-Cost Estimating Methodology). Typical values were selected from the OAQPS Manual for the various parameters used to determine the cost effectiveness for reducing pollutant emissions. Various engineering calculations were utilized to complete the data requirements for the spreadsheet(s) are provided at the end of this analysis.

The top three options listed above require very similar equipment. Thus, TCO and RTO technologies were addressed with a common economic estimate. Further, as presented below, the technologies for VOC control are the same for the press source, GP requested a single common quotation to control both press and dryer. As a conservative measure, the economic analysis assumed these two emission sources were directed to the control device in a common duct. No costs for additional collection systems were included in this estimate.

Table 3 presents the estimated equipment cost for installing a common RTO/RCO/TCO for 236,000 actual cubic feet per minute (acfm).

Table 3 presents the estimated equipment cost for installing a common RTO/RCO/TCO for 236,000 actual cubic feet per minute (acfm).

VOC EMISSIONS FROM THE PRESS AND DRYERS

TOTAL ANNUAL COST SPREADSHEET PROGRAM--REGENERATIVE THERMAL OXIDIZERS

COST BASE DATE: December 1988
[1]

VAPCCI(Second Quarter 2005-FINAL):[2]	131.6	

INPUT PARAMETERS

-- Gas flowrate (scfm):	218611	
-- Reference temperature (oF):	77	
-- Inlet gas temperature (oF):	155	
-- Inlet gas density (lb/scf):	0.0739	
-- Primary heat recovery (fraction):	0.95	
-- Waste gas heat content (BTU/scf):	3.06	
-- Waste gas heat content (BTU/lb):	41.41	(ASSUME MOSTLY AIR)
-- Gas heat capacity (BTU/lb-oF):	0.255	
-- Combustion temperature (oF):	2000	
-- Heat loss (fraction):	0.01	
-- Exit temperature (oF):	247	
-- Fuel heat of combustion (BTU/lb):	21502	(natural gas)
-- Fuel density (lb/ft3):	0.0408	(natural gas)

DESIGN PARAMETERS

Auxiliary Fuel Requirement (lb/min):		18.422	
	(scfm):	451.5	
Total Gas Flowrate (scfm):		219062	

TOTAL CAPITAL INVESTMENT ($) [3]
(Cost correlations range: 5000 to 500,000 scfm)

@ 95 % heat recovery--base: 4,600,000
--escalated:$8,027,911
-- Other -install ventilation capture hood
0

Total 8,027,911

ANNUAL COST INPUTS

Operating factor (hr/yr):	8760	
Operating labor rate ($/hr):	19.11	
Maintenance labor rate ($/hr):	21.98	(15% > Operating labor)

Table 3 presents the estimated equipment cost for installing a common RTO/RCO/TCO for 236,000 actual cubic feet per minute (acfm).

Operating labor factor (hr/sh):	0.50
Maintenance labor factor (hr/wk):	1.00
Electricity price ($/kwh):	0.048
Natural gas price ($/mscf):	9.00
Annual interest rate (fraction):	0.07
Control system life (years):	20
Capital recovery factor:	0.0944
Taxes, insurance, admin. factor:	0.04
Pressure drop (in. w.c.):	17.0

ANNUAL COSTS

Item	Cost ($/yr)	Wt. Factor
Operating labor	10,463	0.003
Supervisory labor	1,569	0.000
Maintenance labor	1,143	0.000
Maintenance materials	1,143	0.000
Natural gas	2,135,850	0.603
Electricity	305,985	0.086
Overhead	8,591	0.002
Taxes, insurance, administrative	321,116	0.091
Capital recovery	757,778	0.214
Total Annual Cost	3,543,637	1.000

[1] Base total capital investment reflects this date.
[2] VAPCCI = Vatavuk Air Pollution Control Cost Index (for regenerative thermal oxidizers) corresponding to year and quarter shown. Base total capital investment has been escalated to this date via VAPCCI and control equipment vendor data.
[3] Source: Vatavuk, William M. ESTIMATING COSTS OF AIR POLLUTION CONTROL. Boca Raton, FL: Lewis Publishers, 1990.

The estimated total installed cost is $8.0 million and an annual operating cost of $3.5 million. Note that over two-thirds of the operating cost is the natural gas usage. GP estimated the unit cost of natural gas at $9/mscf. However, this unit cost is variable and has reached up to $12/mscf in recent years. Therefore, GP believes that the operating costs are conservatively low.

Separate from the RTO/RCO/TCO, GP also prepared cost estimates for the Biofilter technology. GP again estimated the cost of controls by using a single control device for both dryer and press. Table 4 presents the estimated equipment cost and annual operating cost.

TABLE 4. Cost Effectiveness for Using Biological Air Filter to Reduce VOC Emissions from Press and Dryer

Cost Items	Cost Factors	2006 data
DIRECT CAPITAL COSTS (DCC):		
(1) Purchased Equipment Cost	Vendor quote for 236,000 acfm	
(a) Basic Equipment		$4,687,000
(b) Press Capture Hood	not included	$0
(b) Freight	Assume = 5% of PEC	$234,350
(c) Subtotal		$4,921,350
(2) Direct Installation	Included with PEC	
Total DCC:		$4,921,350
BAFB		
(3) Indirect Installation Costs		
(a) Engineering & Supervision	Included with above under (2)	
(b) Construction & Field Expenses	Included with above under (2)	
(c) Construction Contractor Fee	Included with above under (2)	
(d) Contingencies	Included with above under (2)	
(4) Other Indirect Costs		
(a) Startup & Testing		$25,000
(b) Working Capital		
(c) Spare parts		
Total ICC:		
TOTAL CAPITAL INVESTMENT (TCI):	DCC + ICC	$4,946,350
DIRECT OPERATING COSTS (DOC):		
(1) Operating Labor	$19.11/hr x 1 hr/shift x 3 shifts/day x 365 day/yr =	$20,925
Operator	15% of operator cost	$3,139
Supervisor		
(2) Maintenance	Equivalent to Operating labor	$20,925
Labor & Materials	Equivalent to Maintenance labor	$3,139
Total DOC:		$48,129
INDIRECT OPERATING COSTS (IOC):		
(3) Overhead	60% of oper. labor & maintenance	$28,877
(4) Property Taxes	1% of total capital investment	$49,464
(5) Insurance	1% of total capital investment	$49,464
(6) Administration	2% of total capital investment	$98,927
Total IOC:		$226,731
CAPITAL RECOVERY FACTOR (CRF)*:	n=yrs; i = %	0.0944

TABLE 4. Cost Effectiveness for Using Biological Air Filter to Reduce VOC Emissions from Press and Dryer

CAPITAL RECOVERY COSTS (CRC):	CRF of 0.094 times TCI (20 yrs@ 7%)	$466,900
ANNUALIZED COSTS (AC):	DOC + IOC + CRC	$741,760

Notes:
Factors and cost estimates reflect vendor quotations, engineering estimates, and EPA's Cost Control Manual procedures

The estimated total installed cost is $5.0 million and an annual operating cost of $0.7 million. Note that no additional contingency costs are included. GP believes that the operating costs are conservatively low.

Combining the equipment costs and removal efficiencies, GP estimated a cost effectiveness for each option. Table 5 presents the cost effectiveness values.

Table 5. Cost Effectiveness for VOC Control Options, GP Catawba

	Technology	
Parameter	RTO/TCO/RCO	Bioairfilter
Uncontrolled 2003 Actual Emissions (tpy)	271	271
Control Efficiency (%)	90%	50%
Annual Emissions Removed (tpy)	243	135
Total Annual Cost ($/yr)	3,543,637	741,760
Cost Effectiveness ($/ton)	14,553	5,483

4.6 Selection of RACT

The cost of compliance for both options greatly exceeds $1,600/ton, and we believe are both economically infeasible. Therefore, GP proposes no additional control for VOC emissions from the plant.

Attachment 6

Department Review of Bowater, Inc. RACT Analysis

South Carolina

Department of Health and Environmental Control

Bureau of Air Quality

Reasonably Available Control Technology (RACT) Determination

for

Bowater Coated Paper Division
York County, South Carolina

December 5, 2006

RACT Determination

Bowater Coated Paper Division
York County, South Carolina

This review was performed by the Bureau of Air Quality of the South Carolina Department of Health and Environmental Control in accordance with South Carolina Regulations for Reasonable Available Control Technology (RACT).

Reviewed by: _____

J. Robert Brown
Environmental Engineer Associate III
Permit Section-Clean Air Act
Bureau of Air Quality

Approved by: _____

Rhonda B. Thompson, P. E.
Director of Engineering Services Division
Bureau of Air Quality

Bowater Coated Paper Division
York County, South Carolina

Introduction

Bowater Coated Paper Division (Bowater) is a Title V facility located in York County, South Carolina, which is part of the Charlotte/Gastonia/Rock Hill, North Carolina-South Carolina area designated under 40 CFR 81.341 as a non-attainment area for the eight-hour (8) ozone standard. The area is classified as moderate. As a result of this designation, South Carolina Department of Heath and Environmental Control (DHEC) is required to submit to the EPA a State Implementation Plan (SIP) that includes the implementation of reasonably available control technology (RACT) in accordance with section 182(b)(2) of the Clean Air Act (CAA). The CAA requires that RACT be applied to major stationary sources of nitrogen oxides (NO_x) and volatile organic compounds (VOC) located in a non-attainment area. NO_x and VOC are surrogates for evaluating emissions reductions for ozone reduction. A major source is considered any source with the potential to emit 100 tons per year or more of NO_x or VOC. Bowater produces bleached pulp and paper products and is a major source for both NO_x land VOC.

At the request of DHEC, Bowater submitted a reasonably available control technology (RACT) analysis for sources of both nitrogen oxides (NOx) and volatile organic compounds (VOC). This RACT determination is based on the analysis submitted by Bowater. The following affected sources were reviewed.

Table 1 Affected Sources for Bowater RACT Determination

Title V ID	Equip. No.	Description	Affected Pollutants
02	5210-5250	Kraft Process-Pulp Mill	VOC
03	5300	Kraft Process-Bleach Plant	VOC
04	1790	Kraft Process ClO2 Generator	VOC
05	4400	TMP Process	VOC
06	2000; 2100; 4100-4130; 4600	Paper Mill-Process	VOC
06	2000; 2100; 4100-4130; 4600	Paper Mill-Coating	NO_x and VOC
06	9900	Paper Air Makeup Units	NO_x and VOC
07	2505; 5105	Recovery Furnaces	NO_x and VOC
07	2510; 2510	Smelt Dissolving Tanks	NO_x and VOC
07	2723	No. 2 Lime Kiln	NO_x and VOC
07	2700	Causticizing	VOC
07	2405	Evaporator Sets	VOC
07	2400	Precipitator Mix Tanks	VOC
08	2550; 2605; 3705	Power and Combination Boilers	NO_x and VOC
09	2902-2905; 9800, 9801	Wastewater Treatment	NO_x and VOC

Reasonably Available Control Technology (RACT) Determination

The RACT determinations were based on the "top down" procedures established for prevention of significant deterioration (PSD) and non-attainment new source review (NSR). This is a five step process:

Step 1	Identify Control Technologies
Step 2	Eliminate Technically Infeasible Options
Step 3	Rank Remaining Technologies By Control Effectiveness
Step 4	Evaluate Most Effective Controls
Step 5	Select RACT

This review is required for each NOx and VOC source. RACT establishes an emission limitation (determined on a case-by-case basis by the Department) taking into consideration the energy, environmental, and economic impacts. RACT can include visible emission limitations or work practice standards. The EPA RACT/BACT/LAER Clearinghouse (RBLC) is used as one source of potential RACT for affected emission units. Many sources at the facility already require stringent NO_x and VOC/(HAP) controls. Sources subject to lowest achievable emission rate (LAER), best achievable control technology (BACT), and 40 CFR Part 63 maximum achievable control technology (MACT) standards are presumed to satisfy RACT in this determination. A summary for the RACT determination is as follows:

Table 2 Summary for Bowater RACT Determination

Title V ID	Equip. No.	Description	Affected Pollutants	Existing Requirement	Proposed RACT
02	5210-5250	Kraft Process-Pulp Mill	VOC	MACT (incineration)	MACT satisfies RACT
03	5300 1790	Kraft Process-Bleach Plant Kraft Process ClO_2 Generator	VOC	MACT (caustic scrubbing)	MACT satisfies RACT
05	4400	TMP Process	VOC	MACT (no control)	MACT (no control) satisfies RACT
06	2000; 2100; 4100-4130; 4600	Paper Mill-Process	VOC	MACT (no control)	MACT (no control) satisfies RACT
06	4110	Paper Mill-Coating	NO_x	BACT (LNB [1])	MACT satisfies RACT
06	2000; 4120 4600	Paper Mill-Coating	NO_x	No Control	No Control (not technically feasible)
06	2000; 4600	Paper Mill-Coating	VOC	MACT (low HAP coatings)	MACT satisfies RACT
06	4110; 4120	Paper Mill-Coating	VOC	MACT (no control)	MACT (no control) satisfies RACT
06	9900	Paper Air Makeup Units	NO_x	No Control	No Control (most feasible burner design in use for application)
06	9900	Paper Air Makeup Units	VOC	No Control	GO/GCP [2]
07	2505	No. 1 Recovery Furnace	NO_x	No Control	No Control (not technically feasible)
07	5105	No. 1 Recovery Furnace	NO_x	LAER	LAER satisfies RACT

Table 2 Summary for Bowater RACT Determination					
Title V ID	**Equip. No.**	**Description**	**Affected Pollutants**	**Existing Requirement**	**Proposed RACT**
				(quaternary air)	
07	2505; 5105	Recovery Furnaces	VOC	NDCE Design	No Control (not technically feasible)
07	2510; 2510	Smelt Dissolving Tanks	NO_x	No Control	No Control (not in RBLC and not technically feasible)
07	2510; 2510	Smelt Dissolving Tanks	VOC	No Control	No Control (not in RBLC and not in MACT floor)
07	2723	No. 2 Lime Kiln	NO_x	LAER (LNB)	LAER satisfies RACT
07	2723	No. 2 Lime Kiln	VOC	No Control	No Control (not in RBLC)
07	2700	Causticizing	VOC	No Control	No Control (not in RBLC and not technically feasible)
07	2405	Evaporator Sets	VOC	MACT (incineration)	MACT satisfies RACT
07	2400	Precipitator Mix Tanks	VOC	No Control	No Control (not in RBLC)
08	2550	Power Boiler	NO_x	No Control	No Control (Meets SIP Call LME option)
08	2550	Power Boiler	VOC	No Control	No Control (not in RBLC and not MACT floor for MACT DDDDD)
08	2605; 3705	Combination Boilers	NO_x	No Control	No Control (boiler uses staged combustion; no other control technology found technically feasible)
08	2605; 3705	Combination Boilers	VOC	No Control	No Control (not in RBLC and not MACT floor for MACT DDDDD)
09	9800, 9801	Wastewater Treatment	VOC	MACT (incineration)	MACT satisfies RACT
09	2903-2905	Wastewater Treatment Pumps	VOC	No Control	No Control (pumps meet EPA Tier 1 limits)
09	2902	Wastewater Treatment Pump	VOC	No Control	No Control (not feasible)

Notes: 1. LNB = Low NO_x Burner; 2. PO/GCP = Proper operation/good combustion practice

VOC RACT Determinations

VOC RACT Determination for Kraft Process-Pulp Mill

[Affected Sources: ID 02, Equipment Nos. 5210 (Continuous Digester), 5220 (Turpentine Recovery System), 5230 (Pulp Washing System), 5240 (Oxygen Delignification System), 5250 (Knotting and Screening System)]

The Kraft Pulp mill process emits VOC, including hazardous air pollutants (HAP). This source is regulated by 40 CFR 63, Subpart S, which requires MACT. Specifically, vent gases from the pulp mill containing VOC and HAP are collected and incinerated in combination boilers as required by §63.443(d). These MACT requirements for the Kraft pulping systems are presumed to satisfy RACT for the Kraft Pulp Mill.

VOC RACT Determination for Kraft Process-Bleach Plant/Kraft Process-ClO_2 Generator

[Affected Sources: ID 03, Equipment No. 5300 (Four-Stage $D_OE_{OP}D_1D_2$ Bleaching System); ID 04, Equipment No. 1790 (ClO_2 Generator System)]

Bleach plant emissions consist of chlorinated compounds and VOC, including organic HAP. Emissions of organic HAP in bleach plant operations (bleaching and chlorine dioxide generation) were evaluated for inclusion in the MACT for 40 CFR 63, Subpart S. The MACT required use of caustic scrubbing. The EPA determined that although caustic scrubbers were controlling chlorinated HAP, non-chlorinated (organic) HAP were not controlled by caustic scrubbing. However, no other option was determined to be feasible to control non-chlorinated HAP, and the use of add-on control technologies were determined to be cost prohibitive [63 FR 18526-18527]. The MACT requirements for bleach plants are presumed to satisfy RACT for the Kraft Process-Bleach Plant and the Kraft Process-ClO_2 Generator.

VOC RACT Determination for Thermo-Mechanical Pulp (TMP) Process

[Affected Sources: ID 05, Equipment No. 4400 (Six TMP Lines)]

TMP emissions are primarily VOC, include HAP. Organic HAP emissions from TMP operations were evaluated by the EPA for inclusion in 40 CFR 63, Subpart S. The EPA determined that mechanical pulping operations are not significant sources of organic HAP, and no organic HAP controls are feasible [63 FR 18519]. The EPA MACT conclusions for TMP process are presumed to satisfy RACT for the TMP process.

VOC RACT Determination for Paper Forming

[Affected Sources: ID 06, Equipment Nos. 2000 (No. 1 Paper Machine); 4600 (No. 2 Paper Machine); 4100 (No. 3 Paper Machine); 2100 (Pulp Dryer/Booster Oven)]

The No. 1, No. 2, and No. 3 Paper Machines and the Pulp Dryer meet the definition of papermaking systems in 40 CFR 63.447(a)(3). In the review for paper machines for 40 CFR 63, Subpart S, and the EPA established a floor level of control for papermaking systems as "no control." Two possible control options were evaluated: 1) removal of HAP from whitewater prior to entering the papermaking system, and 2) control of paper making vent systems. Neither option was found to be cost effective. Therefore, EPA does not require HAP control beyond the MACT floor, (i.e., no control [63 FR 18525-18526]). The EPA MACT conclusions for TMP process are presumed to satisfy RACT for the TMP process.

VOC RACT Determination for Paper Coating
[Affected Sources: ID 06, Equipment Nos. 2000 (No. 1 Paper Machine), 4600 (No. 2 Paper Machine), 4110 (No. 3 Paper Machine Air flotation Dryer), 4120 (Infrared Dryer)]

The coatings used on the three paper machines include emissions of VOC as a result of the chemicals used in the coated paper manufacturing process. The No. 1 and No. 2 Paper Machine off-machine coaters meet the definition of web coating lines regulated by 40 CFR 63, Subpart JJJJ, specifically defined in 40 CFR 63.3300. As required by this MACT, the coating material used for the coaters "as applied" is formulated to be less than the MACT limit of 0.04 kg HAP/kg of coating. Therefore, the control used to comply with the MACT is the exclusive use of low HAP. The No. 3 Paper Machine uses an off-machine coater that is not regulated under 40 CFR 63, Subpart JJJJ. This coater was included in the paper making evaluation where no control was determined as MACT for papermaking processes. The EPA MACT conclusions for the off-machine coaters and the MACT control for on-machine coaters (low HAP coating materials) will be presumed to satisfy RACT.

VOC RACT Determination for Paper Mill Air Makeup Units
[Affected Sources: ID 06, Equipment No. 9900 (Air Makeup Units)]

Based on review of the RBLC, proper operation and good combustion practice are the only practical VOC control techniques for this type of burner. Therefore, RACT for the Air Makeup Units is proper operation and good combustion practice.

VOC RACT Determination for Recovery Furnaces
[Affected Sources: ID 07, Equipment Nos. 2505 (No. 2 Recovery Furnace), 5105 (No. 3 Recovery Furnace)]

Recovery furnaces using the non-direct contact evaporator (NDCE) design are considered to have lower VOC emissions than units that use the direct contact evaporator (DCE) design. The Bowater units both use the NDCE design. Based on a review of the RBLC, proper operation and/or good combustion practice are the only practical VOC control techniques other than design. Therefore, RACT for No. 2 and No. 3 Recovery Furnaces is proper operation using good combustion practice.

VOC RACT Determination for Smelt Dissolving Tanks
[Affected Sources: ID 07, Equipment Nos. 2510 (No. 2 Smelt Dissolving Tank), 5110 (No. 3 Smelt Dissolving Tank)]

The EPA reviewed chemical recovery combustion sources for inclusion in 40 CFR 63, Subpart MM. No MACT floor was established for smelt dissolving tanks for total gaseous HAP [63 FR 18771]. A review of the RBLC indicates no smelt dissolving tanks operating with VOC controls. Therefore, RACT is no control for VOC emissions for No. 2 and No. 3 Smelt Dissolving Tanks.

VOC RACT Determination for No. 2 Lime Kiln
[Affected Source: ID 07, Equipment No. 2723 (No. 2 Lime Kiln)]

The EPA reviewed chemical recovery combustion sources at Kraft mills for inclusion in 40 CFR 63, Subpart MM, and determined that gaseous organic HAP emissions from lime kilns are primarily attributed to the use of HAP-contaminated process waters in the lime mud washer and lime kiln scrubbers. As a result, the EPA established no MACT floor for gaseous HAP emissions from lime kilns [63 FR 18771]. Based on a review of the RBLC, one facility controls VOC from a lime kiln using the scrubber installed for particulate matter control. Since the Bowater No. 2 Lime Kiln uses an

electro-static precipitator (ESP) instead of a venture scrubber, this determination is not applicable. No control devices installed after ESPs are listed in the RBLC. RACT for the No. 2 Lime Kiln is no control.

VOC RACT Determination for Causticizing Area
[Affected Sources: ID 07, Equipment No. 2700 (Causticizing Area)]

A review of the RBLC did not identify any causticizing areas operating with VOC controls. Based on the operating temperature, moisture content, and geographical arrangement of the causticizing equipment, there are no technically feasible control technologies. Therefore, RACT for the Causticizing Area is no control.

VOC RACT Determination for Evaporator Sets
[Affected Sources: ID 07, Equipment No. 2405 (Three Multi-Effect Evaporator Sets)]

The Kraft Pulp mill process emits VOC, including hazardous air pollutants (HAP). This source is regulated by 40 CFR 63 Subpart S, which requires MACT. Specifically, vent gases from the pulp mill containing VOC and HAP are collected and incinerated in combination boilers as required by §63.443(d). These MACT requirements for the Kraft pulping systems are presumed to satisfy RACT for the Multi-Effect Evaporator Sets.

VOC RACT Determination for Precipitator Mix Tanks
[Affected Sources: ID 07, Equipment No. 2400 (No. 2 and No. 3 Precipitator Mix Tanks]

A review of the RBLC did not identify any causticizing areas operating with VOC controls. In addition, the low level of VOC emissions from these sources would make it cost prohibitive to implement controls. RACT for the Causticizing Area is no control.

VOC RACT Determination for No. 1 Power Boiler
[Affected Source: ID 08, Equipment No. 2550 (No.1 Power Boiler)]

Based on a review of the RBLC, proper operation and/or good combustion practices are the only practical VOC control techniques for No. 6 fuel oil and natural gas combustion sources. The No. 1 Power Boiler will also be subject to 40 CFR 63, Subpart DDDDD, and the MACT floor for existing gaseous and liquid fired fuel-fired boilers is no control. Therefore, RACT for the No. 1 Power Boiler is no control.

VOC RACT Determination for Combination Boilers
[Affected Source: ID 08, Equipment Nos. 2605 (No.1 Combination Power), 3705 (No. 2 Combination Boiler)]

Based on a review of the RBLC, proper operation and/or good combustion practices are the only practical VOC control techniques for No. 6 fuel oil and natural gas combustion sources. The combination boilers will also be subject to 40 CFR 63, Subpart DDDDD, and the MACT floor for existing gaseous and liquid-fired boilers is no control. Therefore, RACT for the No. 1 Power Boiler is no control.

VOC RACT Determination for Wastewater Treatment
[Affected Source: ID 09, Equipment No. 9801 (Steam Stripper)]

The Wastewater Treatment System is regulated indirectly by 40 CFR 63, Subpart S, which requires segregation of clean and dirty process condensates and treatment of the dirty condensates to remove organic HAP prior to entering the wastewater treatment system. Bowater removes the organic HAP from dirty condensate using a steam stripper prior to the wastewater treatment system. The MACT requirements for process condensates are presumed to satisfy RACT for the Wastewater Treatment System.

NO_x RACT Determinations

NOx RACT Determination for Paper Coating

[Affected Sources: ID 06, Equipment Nos. 2000 (No. 1 Paper Machine), 4600 (No. 2 Paper Machine), 4110 (No. 3 Paper Machine Air flotation Dryer), 4120 (Infrared Dryer)]

Fuel burning (natural gas/kerosene) in the coaters for the three paper machines will result in NO_x emissions. The No. 3 Paper Machine was converted to coated paper in 2003, and the BACT analysis for this PSD modification established low NO_x burners (LNB) as BACT (only technically feasible option) for the air flotation dryer. LNB were installed on the unit and a BACT limit established. There were no technically feasible controls for the infrared dryer for the No. 3 Paper Machine Coater. The BACT determination for these two units is presumed to satisfy RACT for No. 3 Paper Machine on-machine coating.

The No. 1 and No. 2 off-machine coaters are older than the on-machine technology installed on No. 3 Paper Machine in 2003. The coating is dried by direct contact of combustion air with the sheet of paper. Retrofitting LNB into these existing off-machine coaters would alter the flame dimensions, potentially impinging on the sheet of paper and creating a fire hazard. Therefore, the use of retrofitted LNB is not considered technically feasible for these units.

NOx RACT Determination for Paper Mill Air Makeup Units

[Affected Sources: ID 06, Equipment No. 9900 (Air Makeup Units)]

Fuel burning (natural gas/kerosene) in the Paper Mill Air Makeup units will result in NO_x emissions. The air makeup units are manufactured by Eclipse Combustion and are equipped to comply with ANSI Z21.20 design standards for indoor air environments. The design creates lower NOx emission than conventional burners used in boilers and other fuel applications. The ANSI standards are presumed to satisfy RACT for the Paper Machine Air Makeup Units.

NOx RACT Determination for Recovery Furnaces

[Affected Sources: ID 07, Equipment Nos. 2505 (No. 2 Recovery Furnace), 5105 (No. 3 Recovery Furnace)]

NO_x formation in Kraft recovery furnaces is dominated by fuel NOx, based on nitrogen content of spent cooking liquor, which varies day to day and from mill to mill. Most modern Kraft recovery furnaces are designed as staged combustion processes with primary, secondary, and tertiary air ports to properly manage liquor combustion. This staged combustion usually results in reduced NO_x emissions.

No. 3 Recovery Furnace was built in 1983, and is currently being modified. A LAER analysis for the modification resulted in the addition of a quaternary air as the only technically feasible NO_x control option. The LAER requirements are presumed to satisfy RACT for No. 3 Recovery Furnace.

The No. 2 Recovery Furnace is older and smaller than No. 3 Recovery Furnace. The installation of a quaternary level of air is not technically feasible due to the lack of space between the tertiary air ports and the steam drum. Therefore, quaternary air is not technically feasible for No. 2 Recovery Furnace and RACT is no control.

NO_x RACT Determination for Smelt Dissolving Tanks
[Affected Sources: ID 07, Equipment No. 2510 (No. 2 Smelt Dissolving Tank), 5110 (No. 3 Smelt Dissolving Tank)]

Since no combustion takes place in the smelt dissolving operation, NOx emissions from smelt dissolving tanks are not expected. However, NO_x emissions have been reported from by the National Council for Air and Stream Improvement (NCASI). The source on potential NO_x emissions is not known; however, the latest theories suggest the possibility that ammonia in the vent gas is converted to NOx in the NO_x analyzer. Smelt tank NO_x emissions are generally reported at small levels in emission inventories. EPA AP-42 does not contain NO_x emission factors for smelt dissolving tanks. A review of the RBLC indicated no smelt dissolving tanks operating with NO_x controls. Therefore, RACT for the No. 2 and No. 3 Smelt Dissolving Tanks is no control.

NO_x RACT Determination for No. 2 Lime Kiln
[Affected Source: ID 07, Equipment No. 2523 (No. 2 Lime Kiln)]

The No. 2 Lime Kiln was built in 1994, and is currently being modified. A LAER analysis for the modification determined that the only technically feasible control technology was the use of a low NOx burner (LNB). A LNB was installed in 2003 as part of a previously permitted modification. The LAER requirements are presumed to satisfy RACT for No. 2 Lime Kiln.

NO_x RACT Determination for No. 1 Power Boiler
[Affected Source: ID 08, Equipment No. 2550 (No.1 Power Boiler)]

NO_x formation in the power boiler is dominated by fuel NOx, based on the nitrogen content of the No. 6 fuel oil. Although a small quantities of natural gas are fired (3% in 2005), the majority of the fuel used in No. 6 fuel oil. The No. 1 Power Boiler is regulated by EPA SIP Call (40 CFR Part 96) for NO_x, and the unit complies with the rule using the low mass emission (LME) unit option. The LME compliance option limits NO_x emission to less than 50 tons per year during the ozone season (May 1 to September 30). Compliance with the SIP Call requirements satisfies RACT for the No. 1 Power Boiler.

NO_x RACT Determination for Wastewater Treatment Diesel Pumps
[Affected Source: ID 09, Equipment Nos. 2902 (No. 1 Holding Basin Pump No. 2), 2903 (No. 1 Holding Basin Pulp No. 1), 2904 (Aerated Stabilization Basin Pump), 2905 (Tertiary Treatment Plant Pump)]

NO_x formation in diesel powered internal combustion engines is directly related to high pressures and temperatures during the combustion process and to the nitrogen content of the fuel. The No. 1 Holding Basin Pump No. 2, the Aerated Stabilization Basin Pump, and the Tertiary Treatment Plant Pump meet EPA Tier I emission limits for NO_x. The EPA Tier I emission limitation are presumed to satisfy RACT for these pumps. The No. 1 Holding Basin Pump No. 1 an older model and does not meet the EPA Tier I emission limitations. The purpose of this pump is to initiate a siphon between the two holding basins, and once the siphon is started the pump is shut down. In this service, the pump has operated 60 hours since 2003. The actual NO_x emissions have been 0.302 tons since 2003, or an annual

emission rate of approximately 0.1 tons per year. In order to lower emissions, the pump would need to be replaced at an estimated cost of approximately $100,000. Due to the limited use and subsequent low NO_x emissions, replacement of the pump is not practical or cost effective.

NOx RACT Determination for Combination Boilers
[Affected Source: ID 08, Equipment No. 2605 (No.1 Combination Power), 3705 (No. 2 Combination Boiler)]

Available Control Technology

RACT analysis describes the available controls used to reduce NO_x emissions. These controls were determined to be add-on controls.

Low NOx Burners (LNB)
Staged Combustion
Flue Gas Recirculation (FGR)
Selective Non-Catalytic Reduction (SNCR)
Selective Catalytic Reduction (SCR)

Technical Feasibility of Options

LNB: LBN reduce NO_x formation through stated combustion, primarily by controlling the mixing of air and fuel to suppress peak flame temperature and the formation of thermal NO_x. Thermal NO_x is not the primary formation mechanism in the combination boilers firing biomass. LBN generally produce a longer flame than conventional burners, and are often larger than conventional burners. This creates multiple issues when retrofitting in an existing combination boiler burning primarily biomass with LBN, since only the fuel oil and natural gas are introduced to the firebox through the burner. The biomass burns on the grate. LBN are not an appropriate NO_x control technique for No. 1 and No. 2 Combination Boilers.

Staged Combustion: Off-stoichiometric or two-stage combustion operates so that air and fuel mixtures are combusted in two separate zones. In one zone, the fuel is fired with less than a stoichiometric amount of air, creating a fuel rich local zone in the region of the primary flame. The second zone is an air rich zone where the remainder of the combustion air is introduced to complete the combustion of the fuel. The heat in the primary flame zone is not as intense as with normal firing because combustion is not complete. These conditions promote less thermal NO_x formation. The No. 1 and No. 2 Combination Boilers are spreader-stoker design; with primary and secondary (over-fire) air systems to promote effective biomass combustion. Therefore, the No. 1 and No. 2 Power Boilers incorporate stage combustion in their design and operation.

FGR: FGR reduces NO_x emissions by lowering the flame temperature and diluting the oxygen content of the combustion air. The combination boilers operate at varying temperatures due to the firing of fuel mixtures. Biomass firing requires a lower combustion temperature than No. 6 fuel oil or natural gas, however the exact proportions of each fuel varies base on the availability of biomass and mill steam demand. Therefore, FGR is no an appropriate control technology for the No. 1 and No. 2 Combination Boilers.

SNCR: SNCR reduces NO_x emissions through chemical reactions of NO_x with ammonia or urea. This technology requires a narrow temperature range and sufficient residence time for effective chemical conversion of NOx. Maintaining the optimum temperature and residence time for SNCR in No. 1 and

No. 2 Combination Boilers is not practical because rapidly changing steam loads alter the temperature profile and residence time within the boilers. Since the ammonia/urea injection point is fixed, under varying operating conditions either significant amounts of ammonia would remain unreacted and emitted from the stack, or more NO_x would be generated than was being reduced. Therefore, SNCR is not an appropriate NO_x control technique for the combination boilers.

SCR: SCR reduces NO_x using a catalyst to react ammonia with NO_x. In biomass combination boilers plugging and fouling of the catalyst can occur due to large amounts of fly ash generated by the biomass. SCR is also not practical for combination boilers burning No. 6 fuel oil because the catalyst tends to oxidize SO_2 to SO_3, which can react with ammonia to form ammonium bisulfate. Ammonium bisulfate is a sticky solid that can corrode the SCR catalyst and plug and/or foul the downstream equipment. Once the catalyst becomes plugged or fouled, ammonia slip or NO_x production can occur as discussed for the SCNR.

RACT Control Analysis/Emission Limitations

No control technologies were found be feasible, therefore no cost analysis is required.

Conclusion of RACT for NO_x

RACT for the combination boilers is considered no control beyond the existing staged combustion design.

Attachment 7

Department Review of Cytec Carbon Fibers, LLC RACT Analysis

South Carolina

Department of Health and Environmental Control

Bureau of Air Quality

Reasonably Available Control Technology (RACT)
Determination

for

Cytec Carbon Fibers LLC
York County, South Carolina

December 5, 2006

RACT Determination

Cytec Carbon Fibers LLC
York County, South Carolina

This review was performed by the Bureau of Air Quality of the South Carolina Department of Health and Environmental Control in accordance with South Carolina Regulations for Reasonable Available Control Technology (RACT).

Reviewed by: _____

Katharine K. Buckner
Sandhills and Forestry Products Permitting Section
Bureau of Air Quality

Approved by: _____

Rhonda B. Thompson, P. E.
Director of Engineering Services Division
Bureau of Air Quality

Cytec Carbon Fibers LLC
York County, South Carolina

Introduction

Cytec Carbon Fibers LLC (Cytec) is a Title V facility located in York County, South Carolina, which is part of the Charlotte/Gastonia/Rock Hill, North Carolina-South Carolina area designated under 40 CFR 81.341 as a non-attainment area for the eight-hour (8) ozone standard. The area is classified as moderate. As a result of this designation, South Carolina Department of Heath and Environmental Control (DHEC) is required to submit to the EPA a State Implementation Plan (SIP) that includes the implementation of reasonably available control technology (RACT) in accordance with section 182(b)(2) of the Clean Air Act (CAA). The CAA requires that RACT be applied to major stationary sources of nitrogen oxides (NO_x) and volatile organic compounds (VOC) located in a non-attainment area. NO_x and VOC are surrogates for evaluating emissions reductions for ozone reduction. A major source is considered any source with the potential to emit 100 tons per year or more of NO_x or VOC. Cytec operates a carbon fiber manufacturing process and is a major source for NO_x. Cytec has an emission limitation of less than 95.73 tons VOC per year. A RACT determination for VOC was not performed for this facility.

At the request of DHEC, Cytec submitted a reasonably available control technology (RACT) analysis for sources of nitrogen oxides (NO_x). NO_x emissions, from fuel combustion, account for less than 10% of the NO_x emissions at Cytec. The bulk of the NO_x emissions come from the conversion of the raw material into carbon fibers. This RACT determination is based on the analysis submitted by Cytec. The following affected sources were reviewed.

Table 1. Potential Sources for Cytec RACT Determination

Title V ID	Equip. No.	Description	Affected Pollutants
01	OX-1, OX-2, OX-3	Oxidation Ovens 1, 2, and 3	NO_x
01	PreC	Pre-Carb Oven	NO_x
01	ECOS, ECON, C-1	Carbonization ovens and thermal oxidizer	NO_x
01	SAD	Sizing Dryer	NO_x
Insignificant	4	Water Heater	NO_x
Insignificant	1	#1 Space Heater	NO_x
Insignificant	2	#2 Space Heater	NO_x
Insignificant	3	#3 Space Heater	NO_x

Sources subject to analysis are the three oxidation ovens, the pre-carb oven burner, and the carbonization ovens with the associated thermal oxidizer. The other sources have insignificant NO_x emissions. Control of these emissions would not result in a significant level of NO_x emissions reduction.

Reasonably Available Control Technology (RACT) Determination

The RACT determinations were based on the "top down" procedures established for prevention of significant deterioration (PSD) and non-attainment new source review (NSR). This is a five-step process:

Step 1	Identify Control Technologies
Step 2	Eliminate Technically Infeasible Options
Step 3	Rank Remaining Technologies By Control Effectiveness
Step 4	Evaluate Most Effective Controls
Step 5	Select RACT

This review is required for each NO_x source. RACT establishes an emission limitation (determined on a case-by-case basis by the Department) that achieves the maximum degree of pollution reductions while taking into consideration the energy, environmental, and economic impacts. RACT may be achieved through a variety of means, including production process changes, modifications of emission control equipment, and procedural changes. In addition, if it is determined that technological or economic limitations or the application of measurement methodology to a particular emissions unit would make the imposition of an emission standard infeasible, a design, equipment work practice, operational standard, or combination thereof may be employed to satisfy the requirements for the application of RACT. The EPA RACT/BACT/LAER Clearinghouse (RBLC) is used as one source of potential RACT for affected emission units.

Reasonably Available Control Technology (RACT) for Oxidation Ovens, Pre-Carb Oven, and Carbonization Oven equipped with Thermal Oxidizer

The Oxidation process consists of four natural gas fired furnaces. The first furnace is identified as the pretreatment oven (PTO). This oven is used to begin the oxidation process and is equipped with a 4.0 million BTU/hr natural gas burner. Cytec had indicated that this equipment is no longer in use and will not be operated in the future.

Oxidation now occurs in the three oxidation furnaces (OX-1, OX-2, and OX-3) that follow the pretreatment oven. These furnaces operate in series to complete the oxidation process. These furnaces have 18 burners with a total capacity of 16.8 million BTU/hr and fire natural gas. Emissions from these units are not controlled.

Carbonization is a two-step process. Step one is a pre-carbonization step and is performed in the pre-carb furnace (PREC). This furnace is equipped with 32 natural gas burners of various sizes that have a combined maximum capacity of 5.7 million BTU/hr. Emissions from the PREC are uncontrolled. Step two is final carbonization. After passing through the PREC, the fiber enters either one of two carbonization furnaces (ECON and ECOS). These two furnaces are electrically heated. A thermal oxidizer controls process emissions from this part of the process. The thermal oxidizer is equipped with a 5.0 million BTU/hr natural gas burner.

Identify All Control Technology

A review of the RBLC, Clean Air Technology Center (CATC) Technical Bulletins, and Air Pollution Technology Fact Sheets indicated the following technologies are applicable to control of NO_x emissions.

- Air Staging
- Burners Out of Service (BOOS)
- Catalytic Combustion
- Flue Gas Recirculation (FGR)
- Combustion Optimization (good combustion practices)
- Fuel Staging
- Lean Head End Combustion Technology
- Two Banks of Carsound Exhaust System, Inc. 3-way catalytic converters (model No. 298035) and an Air/Fuel Ratio Control (Model Kat2000)
- Low NOx Burners (LNB) / Lean Burn / Pre-Mix Burners
- Low or Less Excess Air (LEA)
- Overfire Air (OFA)
- Water or Steam Injection
- $SoLoNO_x$, $SCONO_x$, Dry Low NO_x
- Fuel Injection Timing Retard
- Combustion Control: High Operating Temperatures, High Excess Oxygen Concentrations, and Low Residual Carbon Monoxide Concentrations

Elimination of Infeasible Control Options

BOOS applies to liquid, gaseous, or pulverized solid fuel boilers. The oxidation ovens, PREC burner, and the carb furnace with associated thermal oxidizer are not boilers. The oxidation ovens and PREC burners are not designed for intermittent operation. The thermal oxidizer only has a pilot burner and off-gas burner that are designed to operate concurrently to ensure safe and complete combustion of the off-gases. Tampering with these burners relative to the BOOS control option could result in an unsafe operation of the thermal oxidizer or incomplete combustion of the off-gases. Therefore this control option is not technically feasible for the oxidation ovens, PREC burner, and the carb furnace with associated thermal oxidizer.

Catalytic Combustion was deemed to be infeasible because catalytic combustion units in the size range needed for the oxidation ovens, PREC burner, and the carb furnace with associated thermal oxidizer are not commercially available at this time. Furthermore, catalytic combustion results in a lower combustion temperature. A threshold temperature range must be achieved to process carbon fiber and the lower combustion temperature would preclude the manufacture of carbon fiber. Catalytic combustion could be applicable to the thermal oxidizer and is included as a technically feasible control option.

SCR involves passing the boiler exhaust gases across a catalyst bed that selectively converts the NO_x emissions to nitrogen and oxygen. These catalyst beds are normally applied in low-sulfur and low-particulate applications because the sulfur and particulate emissions reduce the chemical activity of the catalyst, eventually rendering it ineffective. Natural gas combustion is an ideal application for SCR. This technology may be feasible for the thermal oxidizer, but is not technically feasible for the oxidation and pre-carb burners because no room is available for installation of the catalyst bed.

SNCR involves ammonia injection into the combustion chamber to reduce NO_x compounds to nitrogen and water. Two critical design factors for an SNCR system are temperature and residence time. Ammonia must be injected into the unit to maintain temperature between 1550 F and 1950 F. The flue gases must remain in this temperature range for at least one second. The oxidation and PRECs are not designed to have such a long residence time at these temperatures. However, the incinerator operates with a current set point of 1800 F and has a 0.5 second residence time. SNCR may be technically feasible option for this control device.

Low NO_x burners/FGR/Air-fuel Staging/Steam Injection/LEA/OFA/Lean Burn/Pre-Mix Burners are employed in the low NO_x burner design for NO_x emissions reduction. Although low NO_x burners for boilers are commonplace, the technology is somewhat less common in furnaces for a number of reasons. First, boilers can be designed concurrently with burners to optimize NO_x reduction. The furnaces used at the Cytec facility were designed for optimal production of carbon fiber. Low NO_x burners are available for the oxidation oven burners. The pre-carb burners are already low NO_x burners; no further reductions for the pre-carb burners are available. The thermal oxidizer burner currently utilizes staged air for reduction of NO_x. The manufacturer has indicated that no other burners or burner modifications are available to reduce NO_x emissions from the thermal oxidizer. However, a two-stage combustion system may be an applicable technology for the thermal oxidizer; therefore it is included as an option.

Lean Head End Combustion Technology, $SoLoNO_x$, $SCONO_x$, and Dry Low NO_x technologies are only applicable to gas turbines and are not applicable to this RACT analysis.

Fuel Injection Timing Retard is only applicable to internal combustion engines; therefore it does not apply to this RACT analysis.

Combustion Control: High Operating Temperatures, High Excess Oxygen Concentrations, and Low Residual Carbon Monoxide Concentrations are listed as control technology for NO_x emissions from a chemical agent disposal facility. These technologies are not consistent with good operating practices for reduction of NO_x, but these practices are appropriate for complete destruction of hazardous constituents as described in the RBLC for chemical agent disposal. This option has been discounted for purposes of this RACT analysis.

Two Banks of Carsound Exhaust System, Inc. 3-way catalytic converters (model No. 298035) and an Air/Fuel Ratio Control (Model Kat2000) are applied to an internal combustion engine; therefore, it is not an applicable technology for this RACT analysis.

Ranking of Remaining Control Technologies

The potential effectiveness of the remaining control options has been evaluated by reviewing manufacturer information and USEPA documents. The remaining control options and anticipated efficiency are listed in Table 2.

Table 2. Technically Feasible Control Options				
Control Option	**Oxidation Ovens**	**Pre-Carb Furnace Burner**	**Carb Furnace / Thermal Oxidizer**	**NO_x Control (1) Efficiency**
Reduce Set-Point Temperature	No	No	Yes	40%
Catalytic Combustion (new incinerator)	Yes	No	Yes	50%
Low NO_x Burners	Yes	No	No	50%
Staged Combustion	Yes	No	Yes	50%
SNCR	No	No	Yes	30% - 50%
SCR	No	No	Yes	70% - 90%

(1) Assumes no degradation of VOC/HAP efficiency.

Evaluation of Most Effective Control Technologies

The RACT analysis is a three-part investigation that includes economic, energy, and environmental impacts. Each of the remaining control alternatives was reviewed with respect to the impacts to determine if it met RACT requirements.

The economic analysis is composed of a calculation of the control technologies' average cost effectiveness (ACE) based on a comparison of the cost of each feasible control technology in terms of cost per mass of pollutant removed. As described in the final rule to implement the 8-hour ozone National Ambient Air Quality Standard (NAAQS), the Final Rule published in the Federal Register on November 29, 2005, page 71654 states that the acceptable cost range for RACT is $160 - $1,300 per ton of NO_x removed. Costs in excess of $1,300 per ton of pollutant removed are considered economically infeasible, and the installation of that technology would not be deemed appropriate.

The annualized cost was determined by estimating ten percent of the capital cost for an installed system and the resulting annual operating and maintenance costs. Vendor and USEPA cost factors were utilized to estimate the capital investment, as well as annual operating and maintenance costs, for each of the technically feasible control options. The following formula was used to estimate the ACE:

ACE = (Control Option Annualized Cost/(Baseline emission rate – Control option emission rate)

The baseline emission rates are taken from Table 1 of this document. The control efficiency for each option provided in Table 2 was used to estimate the control option emission rate for each option [Baseline Emission Rate X (1 – Control Efficiency)]. For control of emissions from the thermal oxidizer using the SCNR option, the Baseline Emission Rate is 46 tpy, and the Control Option Emission Rate is 23 tpy.

Table 3 is a summary of the available control options and presents the estimated average cost effectiveness of each option.

Table 3. Average Cost Effectiveness of Control Options				
Control Option	**Capital Cost of Control Option ($)**	**Annual Operating Cost of Control Option ($)**	**Sum of [(1)] Annualized Capital and Operating Cost ($)**	**Average Cost Effectiveness ($/ton)**
Reduce Set-Point Temperature	0	300,000	300,000	16,000
Catalytic Combustion (new incinerator)	220,000	40,000	62,000	2,700
Low NO_x Burners	90,000	0	9,000	2,000
Staged Combustion (incinerator for oxidation ovens)	1,250,000	250,000	375,000	5,200
Staged Combustion (new incinerator for pre-carb and carb)	1,000,000	40,000	140,000	6,100
SNCR	681,000	34,000	102,100	4,100
SCR	1,000,000	34,000	134,000	3,200

(1) Annualized cost = capital cost X (0.10).

Selection of RACT

Cytec has concluded there are no technically and economically feasible add-on control options for NO_x emissions reduction. However, Cytec proposes, to include in its operating permit, a work practice standard for reduction of NO_x emissions during product changes. Cytec proposes to lower the set point temperature of the thermal oxidizer during non-operational periods of the pre-carb and carb lines. Non-operational periods occur during product changes. Cytec averages 100 product changes during the year, which last approximately 24 hours. Lowering the thermal oxidizer temperature could result in a reduction in actual NOx emissions of 60 percent or more during these periods. This lower set point temperature and the level of emission reduction cannot be definitively quantified at this time. Furthermore, this option does not result in a reduction in potential emissions from the facility. Cytec estimates that this work practice could lower actual annual NO_x emissions.

Attachment 8

Department Review of Georgia Pacific Wood Products, LLC RACT Analysis

South Carolina

Department of Health and Environmental Control

Bureau of Air Quality

Preliminary Determination

for

Georgia Pacific Catawba Hardboard Plant
York County, South Carolina

December 5, 2006

Preliminary Determination

Georgia Pacific Catawba Hardboard Plant
York County, South Carolina

This review was performed by the Bureau of Air Quality of the South Carolina Department of Health and Environmental Control in accordance with South Carolina Regulations for Reasonable Available Control Technology (RACT).

Reviewed by: _____

Hetal Patel
Environmental Engineer Associate III
Permit Section-Clean Air Act
Bureau of Air Quality

Approved by: _____

Rhonda B. Thompson, P. E.
Director of Engineering Services Division
Bureau of Air Quality

Introduction and Preliminary Determination

Georgia Pacific – Catawba Hardboard Plant (GP) is a major source located in York County, South Carolina, which is part of the Charlotte/Gastonia/Rock Hill, North Carolina-South Carolina area designated under 40 CFR 81.341 as a non-attainment area for the eight-hour (8) ozone standard. The area is classified as moderate. As a result of this designation, South Carolina Department of Heath and Environmental Control (DHEC) is required to submit to the EPA a State Implementation Plan (SIP) that includes the implementation of reasonably available control technology (RACT) in accordance with section 182(b)(2) of the Clean Air Act (CAA). The CAA requires that RACT be applied to major stationary sources of nitrogen oxides (NO_x) and volatile organic compounds (VOC) located in a non-attainment area. NO_x and VOC are surrogates for evaluating emissions reductions for ozone reduction. A major source is considered any source with the potential to emit 100 tons per year or more of NO_x or VOC.

GP's actual NO_x and VOC emissions show that NO_x emissions are below the 100 tpy threshold but VOC emissions are above 100 tpy. RACT analysis was completed for VOC emissions based on the analysis submitted by GP. The cooker, dryers, and press equipment emit over 88% of the total VOC emissions from this facility. The following affected sources were reviewed.

Table 1 Sources that Emit NO_x and VOC for GP RACT Determination

Equipment ID	Equipment Description	Total 2003 VOCs (tons/yr)	Total 2003NOx (tons/yr)
CC	Chip Cooker	17.01	0.0
DC1	Dryer Cyclone No. 1	43.21	0.18
DC2	Dryer Cyclone No. 2	43.21	0.18
DC3	Dryer Cyclone No. 3	37.06	0.16
D1	Dryer System No. 1	3.93	2.05
D2	Dryer System No. 2	3.93	2.05
SC17	Forming Conveying System	5.47	0.18
P	Press	40.50	0
F5	Press Exhaust Vent	20.25	0
PU	Press Unloader	35.74	0
F4	Laminator	0.05	0
O1	Oven # 1	5.72	2.6
O2	Oven # 2	11.20	2.6
O3	Oven # 3	0.13	2.6
RSC	Residuals Silo Cyclone	0.29	0
MS	Metering Screws	0.97	0
CCL	Caul Cooler	0.38	0
H2	Humidifier No. 2	0.54	0
H3	Humidifier No. 3	0.54	0
IR	Infrared Oven, Natural Gas	0.13	2.6
Total		**270.3**	**15**

Reasonably Available Control Technology (RACT) Determination

The RACT analysis steps applied by GP are equal to the steps used for BACT. Chapter B of *The New Source Review Manual* describes the BACT determination process. This is a five step process:

Step 1	Identify All Control Technologies
Step 2	Eliminate Technically Infeasible Options
Step 3	Rank Remaining Technologies by Control Effectiveness
Step 4	Evaluate Most Effective Controls
Step 5	Select BACT

BACT establishes an emission limitation (determined on a case-by-case basis by the Department) that achieves the maximum degree of pollutant reductions while taking into consideration the energy, environmental, and economic impacts. BACT can include visible emission limitations or work practice standards. BACT cannot be less stringent than an applicable NSPS or NESHAP as outlined in 40CFR60, 40CFR61 or 40CFR63.

Best Available Control Technology for Drying System

The drying system is heated with a direct-fired natural gas burner. The dryer emits wood dust, extracted organics (VOCs), and small quantities of combustion products due to partial combustion of the wood furnish.

Identify All Control Technology

Selection of an air emission control option for the dryer must consider the high moisture content of the exhaust gas stream, the relatively high concentration of fine organic and inorganic particulate matter (PM), and the condensable VOC material that is present. Review of the RBLC has indicated the following technologies for control of VOC from wood drying:

Regenerative thermal oxidizer (RTO) with PM pre-cleaning
Regenerative catalytic oxidizer (RCO) with PM pre-cleaning
Exhaust gas recycle with indirect heat exchange
Biological air filter (biofilter) with PM control

All four options are capable of controlling VOC, PM, and CO emissions. These controls were determined to be add-on controls.

Eliminate Technical Infeasible Options

RTOs and RCOs and the hybrid TCOs have been successfully proven in this type of application at other manufacturing facilities and will be considered further for RACT analysis. For biofiltration technology, the gas streams must be maintained at a temperature below approximately 105°. Biofiltration technology has been unable to maintain high VOC efficiencies on a continuing basis at some facilities. Since this technology has been installed, it will be considered further for RACT analysis.

Ranking of Remaining Control Technologies by Effectiveness

The only feasible options for control of VOCs are Biofilters, RTOs, RCOs and the hybrid TCO. These controls are ranked as follows:

Table 2. Summary of VOC Control Options	
VOC Control Option	**Effectiveness (%)**
RTO w/pre-cleaning	90+
RCO w/pre-cleaning	90+
TCO w/pre-cleaning	90+
Biofilter	50

Evaluate Most Effective Controls

This step is used to determine the economic impact of the feasible control options listed in Table 2 above and then the most appropriate technology is selected as RACT for dryers. The technologies for VOC control are the same for the press source.

The economic analysis is based on cost data supplied by the equipment suppliers and the use of EPA's Office of Air Quality Planning & Standards (OAQPS) Control Cost Manual, 6th Edition, January 2002 (Chapter 2-Cost Estimating Methodology). Typical values were selected from the OAQPS Manual for the various parameters used to determine the cost effectiveness for reducing pollutant emissions.

The top three options listed above (RTO, TCO, and RCO) require very similar equipment and were addressed with a common economic estimate. Table 3 has the estimated cost effectiveness values:

Table 3. Cost Effectiveness for VOC Control Options, GP Catawba		
Parameter	**Technology**	
	RTO/TCO/RCO	**Bioairfilter**
Uncontrolled 2003 Actual Emissions (tpy)	271	271
Control Efficiency (%)	90%	50%
Annual Emissions Removed (tpy)	243	135
Total Annual Cost ($/yr)	3,543,637	741,760
Cost Effectiveness ($/ton)	14,553	5,483

Selection of RACT

The cost of compliance for these options greatly exceeds $1,600/ton, and these units are subject to MACT. MACT will be considered as RACT for VOCs for this facility.

Attachment 9

South Carolina's Legal Authority to Adopt and Implement This Plan

LEGAL AUTHORITY

No plan for attaining a goal, the attainment of which is dependent upon regulatory action, can be used with any degree of effectiveness unless the legal framework is strong. Consequently, the Requirements for Preparation, Adoption, and Submittal of Implementation Plans, 40 CFR 51, as amended, define the necessary statutory powers which must be immediately available to states to carry out the responsibility to the Clean Air Act.

40 CFR 51.230 sets forth six specific requirements for state authority. The South Carolina Pollution Control Act, Act 1157 of 1970, as amended, S. C. Code Sections 48-1-10 thru -350 (1976), provides the State's authority to respond to these requirements. The Attorney General of the State of South Carolina has given an opinion as to the adequacy of South Carolina laws, as follows:

Legal Authority Required 40 CFR 51	Adequacy of S. C. Law	S. C. Statutes Involved
(a) "Adopt emission standards and limitations and any other measures necessary for attainment and maintenance of national standards."	Adequate	S. C. Code Secs. 48-1-20, 48-1-50(23)
(b) "Enforce applicable laws, regulations, & standards, and seek injunctive relief."	Adequate	S. C. Code Sec. 48-1-50(1), (3), (4), (5), (11); Secs. 48-1-120, 48-1-130, 48-1-210, 48-1-320, 48-1-330.
(c) "Abate pollutant emissions on an emergency basis to prevent substantial endangerment to the health of persons, i.e., authority comparable to that available to the Administrator under section 305 of the Act."	Adequate	S. C. Code Sec. 48-1-290.
(d) "Prevent construction, modification, or operation of a facility, building, structure, or installation, or combination thereof, which directly or indirectly results or may result in emissions of any air pollutant at any location which will prevent the attainment or maintenance of a national standard."	Adequate	S. C. Code Sec. 48-1-50(5), (10); Secs. 48-1-100, 48-1-110.
(e) "Obtain Information necessary to determine whether air pollution sources are in compliance with applicable laws, regulations, and standards, Including authority to require recordkeeping and to make inspections and conduct tests of air pollution sources."	Adequate	S. C. Code Sec. 48-1-50(10), (20), (22), (24).
(f) "Require owners or operators of stationary sources to install, maintain, and use emission monitoring devices and to make periodic reports to the State on the nature and amounts of emissions from such stationary sources; also authority for the State to make such data available to the public as reported and as correlated with any applicable emission standards or limitations."	Adequate	S. C. Code Secs. 48-1-50(22), 48-1-270.

Public Hearings

The South Carolina Pollution Control Act provides for notice and public hearings prior to action by the Board of Health and Environmental Control concerning adoption of regulations and standards, adoption or modification of final compliance dates, and other specified legal actions.

Additionally, Act 176 of 1977 enacted by the South Carolina General Assembly requires, among other things, that at least thirty days public notice be given before adoption, amendment or repeal of any rule. It also requires that the substance of the intended action or a description of the subjects and issues involved be made known. While this act escapes the actual requirement for a public hearing in each case, the two Acts taken together do impose the requirement of a thirty days notice of public hearing, assuring compliance with the requirements of 40 CFR 51.102 as amended.

Public Availability of Information

The South Carolina Pollution Control Act provides for the public availability of any records, report or information obtained under the provisions of the Act. However, upon a showing satisfactory to the Department that records, reports or information, other than effluent or emission data, if made public would divulge methods or processes entitled to protection as trade secrets of the source, the Department shall consider such data confidential.

All source data are kept on file at the offices of the Bureau of Air Quality Control, Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina, and are available to the public at this location, Monday through Friday, between the hours of 8:30 a.m. and 5:00 p.m. Such data are retained in the Permit, Source Test, and Emission Inventory Files.

The files contain information as to the source emissions, and these emissions are depicted in comparison to the applicable emission standards or limitations as stated in the Air Pollution Control Regulations and Standards for the State of South Carolina.

Attachment 10

Transcript of Public Hearing

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
PUBLIC HEARING

Proposal to Amend the *South Carolina Air Quality Implementation Plan*
Rock Hill & Fort Mill, South Carolina, 8-Hour Ozone Attainment Plan

June 25, 2007, Room 2380
Sims/Aycock Building, 2600 Bull Street
Columbia, SC

Synopsis: The Department proposes to meet the requirements of the Clean Air Act, as amended (42 U.S.C. 7401, *et seq.*) by amending the SC *Air Quality Implementation Plan* to include an Attainment Plan for the Rock Hill & Fort Mill, South Carolina, 8-hour ozone nonattainment area.

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Official Record of Public Hearing
Amendment to the *South Carolina Air Quality Implementation Plan*
Rock Hill & Fort Mill, South Carolina, 8-Hour Ozone Attainment Plan
June 25, 2007

Good morning, I am Stacey Gardner from the Bureau of Air Quality of the South Carolina Department of Health and Environmental Control (the Department), and I will be the facilitator for this public hearing. Let the record show that this forum was convened at the Department's offices at 10:00 a.m. on Monday, June 25, 2007. Public notice of this forum was published in the Notices section of the *State Register* on May 25, 2007. Unless I hear an objection, a copy of this notice will be entered into the record as though it were read.

Is there any objection?

(No objections offered.)

The purpose of this forum is to answer questions, clarify issues, and receive input from interested persons on the methods by which South Carolina intends to revise its *Air Quality Implementation Plan* (also known as a State Implementation Plan, or SIP) in order to meet the requirements of the Clean Air Act, as amended (42 U.S.C. 7401, *et seq.*). Department staff shall consider any comments received today in formulating the final SIP document to be submitted to the United States Environmental Protection Agency (or the EPA) for approval and subsequently published as final in the Notices section of an upcoming edition of the *State Register.*

The Department welcomes your input and assistance in perfecting the proposed SIP amendment. A copy of the proposed SIP amendment text, minus the supporting appendices, is available on the Department's website. Interested parties can also obtain a paper copy of any or all portions of the document upon request.

Please submit any written comments to me for the record.

(No comments submitted.)

I will now present a brief summary and explanation of the proposed SIP amendment. Following this presentation, any member of the audience desiring to make comments will be given an opportunity to do so. If there are any questions after a presentation given either by me or another participant in this meeting, please direct those questions to me, and I will either respond or ask the appropriate person to respond. If no one is able to answer the question today, an answer will be provided at a later date.

On February 8, 1979, the EPA promulgated the 0.12 parts per million (ppm) 1-hour ozone standard (as cited in Vol. 44 of the FR, starting on page 8202). On July 18, 1997, the EPA promulgated a revised ozone standard of 0.08 ppm, as measured over an 8-hour period (i.e., the "8-hour standard") (as cited in Vol. 62 of the FR, starting on page 38856). Upon promulgation of a new or revised National Ambient Air Quality Standard (or NAAQS), the Clean Air Act requires the EPA to designate areas as attaining or not attaining that NAAQS. On April 30, 2004, the EPA announced and promulgated designations, classifications, and boundaries for every area in the United States with respect to the 8-hour ozone NAAQS (as cited in Vol. 69 of the FR, starting on page 23857).

On April 30, 2004, the EPA designated and classified--as a moderate nonattainment area for the 8-hour ozone NAAQS--that portion of York County, South Carolina, within the Rock Hill-Fort Mill Area Transportation Study Metropolitan Planning Organization. This area serves as part of the Charlotte-Gastonia-Rock Hill, NC-SC (or "Metrolina") nonattainment area. As a result of this designation, the Department is required to amend the South Carolina SIP. States involved in a multi-State ozone nonattainment area must work together to perform the appropriate modeling analyses to identify control measures that will enable the area to achieve attainment as expeditiously as practicable. Each State is responsible for its portion of the control program and will be held accountable for controls identified for implementation within its State boundaries.

The EPA established June 15, 2007, as the date by which States must submit their attainment plans (through SIP amendments) for moderate ozone nonattainment areas. South Carolina submitted its proposed attainment plan to the EPA on June 8, 2007, for parallel processing. The Department has since, however, been advised that our original submission must be processed as a prehearing package as opposed to a parallel processing package. On June 15, 2007, the Department sent a request to the EPA to change the mechanism for processing and to, per the EPA's request, extend the public comment period until July 8, 2007. The Department also placed notice of the public comment period extension on its website and in three widely-circulated South Carolina newspapers.

In formulating the proposed SIP amendment, the Department worked diligently with representatives of York County, the Rock Hill-Fort Mill Area Transportation Study Metropolitan Planning Organization, the South Carolina Department of Transportation, EPA Region 4, the South Carolina Division of the Office of Federal Highways, the Federal Transit Authority, the City of Rock Hill, VISTAS Regional Planning Organization, the North Carolina Division of Air Quality, and several other external stakeholders who provided comments on the Department's proposal to amend the SIP.

At this time, I would like to provide an opportunity for other hearing attendants to comment on the proposed SIP amendment.

(No comments offered.)

Thank you. I would like to inform you that all comments provided today will be entered into the official record of this public hearing. Additionally, comments deemed significant by the Department may be used to modify the SIP. The SIP, including any modifications made as a result of the stakeholder process, will be published in an upcoming edition of the South Carolina *State Register*, after which the Department will submit the amendment to the EPA for final approval.

There being no further comments, this forum is adjourned. Thank you for your attendance and participation here today.

I hereby attest that this document is an accurate record of the proceedings at this venue.

Stacey Gardner 7/1/07

Stacey R. Gardner, Manager
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Bureau of Air Quality
SC Dept. of Health & Environmental Control