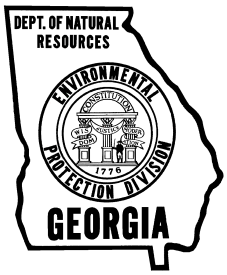
Prevention of Significant Air Quality Deterioration Review of
Koch Cellulose, LLC – Brunswick Cellulose Inc. Pulp and Paper Mill Crystallizer Project
Located in Glynn County, Georgia

PRELIMINARY DETERMINATION
SIP Permit Application No. 16228
December 2005



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

Stationary Source Permitting Program (SSPP)
Prepared by Casie Britton – Chemicals Unit
Modeling Approved by: Peter Courtney Data Modeling Unit
Reviewed and Approved by: David M. Matos – Chemicals Unit Coordinator Heather M. Abrams – SSPP Manager Ron Methier – Chief, Air Protection Branch

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SUMMARY

The Environmental Protection Division (EPD) has reviewed the Air Quality Permit Application submitted by Brunswick Cellulose Inc. Pulp and Paper Mill (Brunswick Mill or BCI) for the construction of a crystallizer at its Kraft pulp mill located in Brunswick, Georgia (Glynn County). The project involves the installation of a chloride crystallizer which will remove chlorides from the ash collected by the chemical recovery furnaces' electrostatic precipitators at the Brunswick Mill. Both the No. 5 and No. 6 recovery furnaces operate electrostatic precipitators (ESPs) to control particulate matter emissions. The ash collected by the ESPs is mixed with black liquor prior to being burned in the furnace. This gives the furnace a second opportunity to recover the chemicals in the collected ash. This ash, however, has a high chloride concentration which results in a build-up of chlorides in the process loop. The amount of chlorides contained in the black liquor is important, because the increased chloride content affects the "stickiness" of the furnace ash and causes the ash to collect on the boiler tubes. When this build-up on the tubes becomes too heavy and cannot be removed with the boilers' soot blowers, the recovery furnaces must be shut down so that the furnace can undergo a washout to remove the chlorides that have built up on the tubes. The proposed crystallizer will remove chlorides from the ash collected in the No. 6 recovery furnace ESP prior to being mixed with the liquor to be burned in the furnaces. Removing chlorides will mean less build-up of material on the steam tubes, thereby requiring fewer washouts of the recovery furnaces will be required. This, in turn, will result in less downtime of the recovery furnaces, which will translate into more uptime for the recovery furnaces and the rest of the mill.

The Brunswick Mill is located in Glynn County, which is classified as "attainment" or "unclassifiable" for all pollutants in accordance with Section 107 of the Clean Air Act, as amended August 1977.

The EPD review of the data submitted by BCI related to the proposed construction project indicates that the project will be in compliance with all applicable state and federal air quality regulations. None of the new operations or modified units that are included in the proposed project are sources of the pollutants triggering a Prevention of Significant Deterioration (PSD) review therefore no Best Available Control Technology (BACT) analysis is required for the proposed project.

It has been determined through approved modeling techniques that the estimated increase in emissions will not result in an impact that exceeds the significant monitoring concentration of any of the pollutants triggering a PSD review (PM_{10}, NO_X, and CO). No further evaluation was therefore required for any of the pollutants. It has further been determined that the proposal will not cause impairment of visibility or detrimental effects on soils, vegetation, or visibility in the local Class 1 or Class II areas. Any air quality impacts produced by project-related growth will be inconsequential.

This Preliminary Determination concludes that an Air Quality Permit should be issued to Brunswick Cellulose Inc. for the requested modifications. Various conditions have been incorporated into the current Title V operating permit to ensure and confirm compliance with all applicable air quality regulations. A copy of the draft permit amendment is included in Appendix A.

1.0 INTRODUCTION

Brunswick Mill submitted an Air Quality Permit Application in May 2005 for a permit to install a chloride crystallizer at its pulp and paper mill located in Brunswick, Glynn County, Georgia. The facility is located at 1400 West Ninth Street, Brunswick (Glynn County), Georgia. The project is for the construction of a chloride crystallizer which will remove chlorides from the ash collected by the chemical recovery furnaces' electrostatic precipitators. Both the No. 5 and No. 6 recovery furnaces operate electrostatic precipitators (ESPs) to control particulate matter emissions. The ash collected by the ESPs is mixed with black liquor prior to being burned in the furnace. This gives the furnace a second opportunity to recover the chemicals in the collected ash. This ash, however, has a high chloride concentration which results in a build-up of chlorides in the process loop. The removal of the chloride and potassium from the ESP ash will decrease the stickiness of the ash thereby decreasing the amount of ash that collects in the boiler tubes. The decrease in the ash collected in the boiler tubes will, therefore, reduce the number of water washes required on the recovery furnaces. With the decrease in downtime required for recovery furnace water washes, the overall mill uptime will increase. This project also allows for increased utilization of the chemical recovery operations resulting from the recovery of filtrate from the mill's oxygen delignification system.

BCI is currently classified as a "major" source under the PSD definition of major source because it has the potential to emit more than 100 tpy of regulated air pollutants and is one of the listed 28 source categories (Kraft pulp and paper mills). Thus, the project is subject to a PSD review for those pollutants whose emissions will increase above the corresponding PSD Significant Levels. The first step in permitting the addition of the crystallizer to the chemical recovery system was to calculate the potential emissions increase from the mill due to the modifications. This increase in emissions was then compared to PSD significance levels. Any project which exceeds these significance levels is required to undergo a PSD review. This project does not include any modifications to existing equipment, and emissions from the crystallizer and two new tanks will vent to the atmosphere.

A PSD review requires emission calculations be determined on an actual-to-potential basis from affected units for all process changes and new or modified equipment. The EPA does, however, allow emission increases to be calculated as "worst case increases" from a unit rather than actual-to-potential when the affected equipment is strictly being utilized more (such as steam demand) and not being modified. For this project, the installation of the crystallizer and associated equipment will not affect existing units except to allow for increased mill uptime and increased liquor firing. Therefore, the emission calculations from the crystallizer and associated equipment (new crystallizer saltcake mix tank and crystallizer filtrate tank) are performed on an actual to potential basis. Incremental calculations based on "worst case increases" were performed for the entire mill with respect to the increased uptime and for the chemical recovery cycle (recovery furnaces, smelt dissolving tanks, lime kiln, slakers and causticizers) with respect to the increased liquor firing from the oxygen delignification washer filtrate. If the sum total of actual to potential and incremental emissions increases from all new and existing affected units exceeds the PSD significance levels (15 tpy for PM_{10}, 40 tpy for VOC, NO_X, and SO_2, and 100 tpy for CO), then PSD is triggered for that pollutant. If PSD is triggered, a Best Available Control Technology (BACT) analysis and an air quality modeling analysis are required for the pollutant or pollutants triggering PSD.

The incremental emissions calculations were performed utilizing permitted emission rate limits, wherever they existed. Where emission limits do not exist, NCASI or EPA AP-42 emission factors were used. This approach was used in order to show worst case potential emissions increases from the increased mill uptime and increased liquor firing.

Table 1 provides the PSD Applicability Table for the proposed project. The emission calculations for Table 1 can be found in detail in the facility's PSD submittal (see Exhibit B of the permit Application).

Table 1: PSD Applicability Table

Pollutant	Potential Emission Increase (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review
PM_{10}	135	15	Yes
PM	135	25	Yes
SO_2	39	40	No
NO_X	152	40	Yes
CO	443	100	Yes
VOC	33	40	No
TRS	-99	10	No
H_2S	7	10	No
Pb	$1.65x10^{-2}$	0.60	No
H_2SO_4 Mist	2	7	No
Be	1.88×10^{-4}	4×10^{-4}	No
Hg	3.22×10^{-4}	0.10	No
Vinyl Chloride	4.92×10^{-3}	1	No
Fluorides	9.74×10^{-3}	3	No

Through the new source review (NSR) procedure, EPD has evaluated the Brunswick Mill's proposal for compliance with State and Federal requirements. The findings of EPD have been assembled in this Preliminary Determination.

2.0 PROCESS DESCRIPTION

The No. 5 and No. 6 recovery furnaces at the Brunswick Mill burn black liquor to generate steam for the mill and, at the same time, to recover the chemicals used for the pulping process in the form of green liquor, which after causticizing produces white liquor that completes the chemical recovery cycle. Over time a sticky ash builds up on the tubes of the recovery furnaces. An increased amount of chlorides in the ash decreases the melting point of the ash and changes the stickiness characteristic of the ash. Even though soot blowers continuously blow ash off the tubes, this sticky ash tends to adhere to the tubes and can not be easily blown off. This accumulation of ash on the tubes eventually plugs the furnace (restricts air flow) and causes corrosion of the tubes, necessitating the shut down of the furnaces so that the impacted tube section can be water washed. Washing out the furnace requires the unit to be down for roughly 36 hours for cool down, wash out, dry out, and warm-up. The crystallizer will also remove potassium, which also increases the stickiness of the ash. The removal of the chloride and potassium from the ESP ash will decrease the stickiness of the ash thereby decreasing the amount of ash that collects in the boiler tubes. The decrease in the ash collected in the boiler tubes will, therefore, reduce the number of water washes required on the recovery furnaces. With the decrease in downtime required for recovery furnace water washes, the overall mill uptime will increase. This project also allows for increased utilization of the chemical recovery operations resulting from the recovery of filtrate from the mill's oxygen delignification system. In an effort to eliminate water washes on the furnaces and increase their uptime, the Brunswick Mill is proposing to install a crystallizer to remove chlorides from the ash collected in the recovery furnace ESPs.

Under current operation, ash is removed from the No. 5 and No. 6 ESPs, mixed with concentrated black liquor in a saltcake mix tank, and then recycled back to the recovery furnaces for burning. This recovery and reinjection of the ESP ash with liquor allows the mill to recover valuable chemicals in the ash that would otherwise be lost. High concentrations of chlorides are a particular problem at the Brunswick Mill because of the high chloride concentration in the mill's water supply (due to saltwater intrusion into the supply wells), and higher than normal chlorides in the raw wood, which is also due to the coastal water location.

The future operation will dissolve the collected ESP ash in condensate from the evaporators to feed the new crystallizer. The liquid stream is recirculated by a pump through an external heater (reboiler) back to the crystallizer which crystallizes out the sodium sulfate (saltcake) in a solid crystalline form. A centrifuge is used to separate this saltcake from the filtrate. The filtrate stream will be recycled back to the crystallizer via a filtrate tank for further saltcake crystallization, and purged to the wastewater treatment system when the remaining chloride concentration builds up to a high level. The recovered saltcake will then be dissolved in 50% black liquor solids in the new crystallizer saltcake mix tank prior to being reintroduced into the recovery process. The crystallizer will operate only on the No. 6 recovery furnace, however, because the saltcake is recycled back to the main black liquor feed line, both the No. 5 and No. 6 recovery furnaces will benefit from it. The crystallizer, crystallizer saltcake mix tank and the crystallizer filtrate tank will vent to the atmosphere. With the crystallizer installed, the project could potentially eliminate all water washes on the recovery furnaces, other than the one wash per year occurring during the annual shutdown. This is equivalent to a reduction of 4.5 washes per year on the No. 5 recovery furnace and a reduction of 3 washes per year on the No. 6 recovery furnace (the average number of water washes completed on the two furnaces over the last 2 years).

The crystallizer will also allow the mill to process a new filtrate stream. In the future, a new filtrate stream coming from the previously permitted oxygen delignification process will exist, which contains valuable pulping chemicals. The oxygen delignification system consists of a new set of washers installed prior to the bleach plant. The filtrate from these washers will contain chemicals which can be recovered in the recovery furnaces. Unfortunately, this filtrate stream also contains chlorides. It is expected that if the mill were to recover these chemicals without the new crystallizer in place, the number of washouts of the recovery furnaces would increase. This corresponding increase in downtime would potentially result in no net increase in liquor firing. The crystallizer project will, therefore, allow for the recovery of these chemicals from the filtrate rather than sending them to the wastewater treatment plant for treatment and discharge. Recycling this stream to the recovery furnaces will allow for an increased burning of approximately 351,750 lbs black liquor solids per day.

3.0 REVIEW OF APPLICABLE RULES AND REGULATIONS

State Rules

Georgia State Rule 391-3-1.02(2)(gg) regulates TRS emissions from multiple-effect evaporator systems, which are defined as the "multiple-effect evaporators and associated condenser(s) and hotwell(s) used to concentrate the spent cooking liquid that is separated from the pulp (black liquor)". The crystallizer system is not part of the system used to concentrate the liquor but instead is just removing chlorides from the collected ESP ash. None of the new operations (crystallizer, crystallizer salt cake liquor mix tank, and crystallizer filtrate tank) are, therefore, regulated by 391-3-1.02(2)(gg). This rule will not, therefore, apply to any of the new equipment included with the crystallizer project.

Federal Rule – Prevention of Significant Deterioration Applicability

The Brunswick Mill is in a named source category (a stationary source described by one of 28 source categories listed in 40 CFR 52.21 (b)(1)) and emits several PSD pollutants (PM_{10}, VOC, NO_X, CO, and SO_2) in excess of 100 ton/yr; therefore, the facility is considered a major source under the PSD program. The Brunswick Mill is located in an attainment area for all criteria pollutants. Any proposed project at the mill is therefore required to under go a Prevention of Significant Deterioration (PSD) applicability analysis in order to determine if the project triggers a PSD review for any pollutant. As indicated in the introduction, the crystallizer project will require a PSD review for PM/PM_{10}, NO_X, and CO.

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

- Application of BACT for each regulated pollutant that would be emitted in significant amounts;
- Analysis of the ambient air impact;
- Analysis of the impact on soils, vegetation, and visibility;
- Analysis of the impact on Class 1 areas; and
- Public notification of the proposed modifications in a newspaper of general circulation.

A BACT analysis and ambient air quality review is required for any new or physically modified unit that has an increase in emission rate of a pollutant that has triggered a PSD review. The pollutants triggering a PSD review are PM/PM_{10}, NO_X, and CO. The only new emission source included in the project is the crystallizer saltcake mix tank, which is a source of both Total Reduced Sulfur (TRS) and Volatile Organic Compound (VOC) emissions. Neither of these pollutants triggered a PSD review; therefore, a BACT analysis is not required for this source.

The next step is to review the remaining applicable federal requirements. This step will aid in citing the appropriate legal authority for each requirement in the Title V permit.

Federal Rule – Applicability of 40 CFR 60 Subpart BB, "Standards of Performance for Kraft Pulp Mills"

New Source Performance Standard (NSPS) Subpart BB regulates Total Reduced Sulfur (TRS) emissions from multiple-effect evaporator systems. The evaporator system is defined as the "multiple-effect evaporators and associated condenser(s) and hotwell(s) used to concentrate the spent cooking liquid that is separated from the pulp (black liquor)". The crystallizer system is not part of the system used to concentrate the liquor but instead is just removing chlorides from the collected ESP ash. None of the new operations (crystallizer, crystallizer salt cake liquor mix tank, and crystallizer filtrate tank) are, therefore, regulated by Subpart BB.

Federal Rule – Applicability of 40 CFR 63 Subpart S, "National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry"

The Subpart S MACT standard also regulates multiple-effect evaporators, but as the proposed system does not meet this definition, this portion of the rule doesn't apply to the crystallizer equipment. Evaporators are defined as all equipment associated with increasing the solids content and/or concentrating spent cooking liquor from the pulp washing system including pre-evaporators, multiple-effect evaporators, concentrators, and vacuum systems, as well as associated condensers, hotwells, and condensate streams, as well as any other equipment serving the same function as those previously listed.

The rule does apply to new weak black liquor storage tanks. The project will include a new salt cake mix tank, where the salt cake with the chloride having been removed is mixed with black liquor solids. The liquor entering the tank will be 50% solids and will have gone through the black liquor evaporating system. After leaving the crystallizer salt cake mix tank the black liquor will enter the mill's concentrator. On March 31st, 2000 EPA released a Question and Answer support document to Subpart S. In question 5 on page 3 of this document, the EPA concluded that intermediate liquor tanks used to store liquor once the evaporation process has begun are not subject to any requirements under the NESHAP. A copy of this document is included in Exhibit F of the permit application. No elements of the new equipment will, therefore, be impacted by the Subpart S MACT standard.

4.0 TESTING AND MONITORING REQUIREMENTS

The only new source of emissions from the project is the crystallizer saltcake mix tank which is a source of a small amount of VOCs and TRS. Because there are no applicable emission standards, no additional testing or monitoring requirements are considered warranted.

5.0 AMBIENT AIR QUALITY REVIEW

An air quality analysis is required by the PSD rules to determine the ambient impacts associated with the proposed crystallizer project. The purpose of the air quality analysis is to demonstrate that emission increases or decreases from the proposed project, in conjunction with other applicable emissions from existing sources (including secondary emissions from growth associated with the new project) will not cause or contribute to a violation of any applicable National Ambient Air Quality Standard (NAAQS) or PSD increment in a Class II or Class I area. NAAQS exists for NO_X, CO, PM/PM_{10}, SO_2, ozone, and Pb. PSD increments exist for NO_X, PM/PM_{10}, and SO_2.

This analysis is required for each pollutant emitted in an amount over the PSD significant emission rate threshold. As shown in Table 1, PM/PM_{10}, NO_X, and CO exceed their corresponding PSD significant thresholds. Thus an air quality analysis was performed for these pollutants.

Modeling

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

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

For the air quality analysis, National Weather Service (NWS) meteorological data from the years 1970-1974 for Jacksonville, Florida were used as surface data, and the same years for Waycross, Georgia were used as upper air data. EPA's Building Profile Input Program (BPIP) was used to calculate flow vectors based on 36 possible wind directions in order to allow for building downwash. The modeling included all stacks with applicable emission changes resulting from the production increase, and the individual stack parameters were used in calculating building downwash using BPIP.

A Cartesian receptor grid was used for the modeling runs, including receptors spaced at 100 meter intervals along the fence line/patrolled property line and out to a distance of 2 km, 500 meter intervals from 2 km to 6 km, and 1,000 meter intervals from 6 km to 10 km.

PSD Screening Results

The PSD regulations establish specific maximum allowable increases in ambient concentrations (or increments) for PM_{10}, NO_X, and CO for all areas in compliance with the NAAQS. All areas of the country are categorized as a function of overall use. The regulations were designed to prevent significant air quality deterioration by specifying allowable incremental changes in PM_{10}, NO_X, and CO concentrations within each area category. The area categories are defined below:

> **Class I –** Those areas where almost any deterioration of current air quality is undesirable, and little or no industrial development would be allowed (e.g., national parks, wilderness areas).
>
> **Class II –** Those areas where moderate, well-controlled energy or industrial growth is desired without air quality deterioration up to the national standards (all attainment areas not categorized as Class I were initially designated Class II).
>
> **Class III –** Those areas where substantial energy or industrial development is intended, and where modest increases in ambient concentrations above Class II increments, but below national standards, would be allowed (designation to Class III must follow strict redesignation procedures).

The Glynn County area and all other attainment areas in Georgia, not designated as Class I areas, are Class II areas. The Class I areas nearby the facility are Wolf Island (26 km), Okefenokee Swamp (64 km), and Cape Romain (288 km).

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

The results of the significance analysis conducted for the Brunswick Mill project are summarized in Table 2. The impacts due to the total project emissions of $PM/PM_{10,}$ NO_X, and CO were calculated in this analysis using the ISCST3 dispersion model. Table 2 shows the highest concentration model result from each pollutant. The complete modeling analysis results are located in Section 5 of the Permit Application.

Table 2: Results of the Modeling Significance Analysis

Pollutant	Averaging Period	PSD Significant Impact Level ($\mu g/m^3$)	Monitoring Concentration Level ($\mu g/m^3$)	Modeled Concentration ($\mu g/m^3$)	Notes
PM	24-Hour	5	10	2.28	No further modeling needed
	Annual	1	-----	0.24	No further modeling needed
CO	1-Hour	2,000	-----	35.1	No further modeling needed
	8-Hour	500	575	16.2	No further modeling needed
NO_X	Annual	1	14	0.25	No further modeling needed

As shown in Table 2, the project's impact is below the significant impact level (SIL) for all three pollutants evaluated therefore no further modeling is required.

Preconstruction Monitoring

The PSD regulations require that continuous preconstruction monitoring of regulated pollutants emitted in significant amounts be conducted to establish existing air quality concentrations in the vicinity of the proposed source or modification. However, no preconstruction monitoring data are required if the impact on the ambient air quality is below *de minimis* concentrations. In performing this analysis, the maximum impact for the proposed scenario was determined to be less than the corresponding *de minimis* concentrations, as shown in Table 2. Therefore PM/PM_{10}, NO_X, and CO did not exceed their pre-construction monitoring levels.

Georgia Air Toxics

Impacts from each of the pollutants listed in Table 6-1 of the permit application were analyzed using the EPD Guidance for Ambient Impact Assessment of Toxic Air Pollutant Emissions (referred to as the Georgia Air Toxics Guideline; Version June 21, 1998). The Georgia Air Toxics Guideline is a guide for estimating the environmental impact of sources of toxic air pollutants.

A toxic air pollutant is defined as any substance that may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. In a separate permit application recently completed by Brunswick Cellulose a complete mill-wide toxics analysis was completed. In this modeling the EPA SCREEN3 computer screening dispersion model was used to predict the maximum 15-minute, 24- hour, and annual average ground level concentration (referred to as Maximum Ground Level Concentration (MGLC)) for each pollutant. Each MGLC was compared to its respective Acceptable Ambient Concentration (AAC). The basis for calculation of AAC comes from the pollutant toxicity rating systems described in the Georgia Air Toxics Guideline (dated June 1998). If the screening analysis did not demonstrate acceptable MGLC, the ISCST3 refined dispersion model was used to predict a more accurate MGLC.

This permit application demonstrated mill-wide compliance at maximum capacities on all equipment. The only new source of air toxics from the plant is the crystallizer saltcake mix tank. An evaluation was completed in Table 6-1 of the permit application which shows that the increase in those toxics emitted from the saltcake mix tank would not result in any increase above the AAC for all toxics evaluated.

Class I Visibility Analysis

The impacts for the proposed project on the Class I area within 100 km of the Brunswick Cellulose mill were also evaluated. The mill is located roughly 26 km from the Wolf Island Class I area and 64 km from the Okefenokee Swamp Class 1 Area in South Georgia. This analysis was completed per discussions with the PSD coordinator with the US National Park Service and as outlined in the Federal Land Managers Air Quality Related Values Workgroup (FLAG) Phase I document dated December 2000. The PSD coordinator indicated that a visibility analysis should be completed for both Wolf Island and Okefenokee.

Emissions from certain sources can create visible, defined plumes that are noticeable to the casual observer. Therefore an exhaust plume visibility analysis was performed for this project to assure that the emissions from the project do not create a noticeably visible plume in either the Class I or Class II area.

The visibility analysis outlined in the guidance breaks up the evaluation approach into two groups for evaluation: Sources that are within 50 km of the Class 1 area and sources which are greater than 50 km from the Class 1 area. The FLAG document states that for distances under 50 km, the EPA VISCREEN model should be used visibility modeling. The VISCREEN analysis was completed for the PM_{10}, NO_X, and SO_2 emissions from the project for Wolf Island per the PSD coordinator. If the results of this modeling are below the acceptable screening criteria, then no additional modeling would be required.

The primary variables that affect whether a plume is visible or not at a certain location are (1) quantity of emissions, (2) type of emissions, (3) relative location of source and observer, and (4) the background visibility range. For this project, visibility modeling was performed using the latest version of the EPA VISCREEN model according to the guidelines published in the *Workbook for Plume Visual Impact Screening and Analysis* (EPA-450/4-88-015). The VISCREEN model is designed to specifically determine whether a plume from a facility may be visible from a given vantage point.

VISCREEN performs visibility calculations for two assumed plume viewing backgrounds (horizon sky and a dark terrain object). The model assumes that the terrain object is perfectly black and located adjacent to the plume on the side of the centerline opposite the observer.

The default particulate size and density for the VISCREEN model were used for the analysis. The project's increase in PM_{10}, NO_X, and SO_2 was put into the model. The Level 1 VISCREEN analysis uses the default worst-case modeling parameters for stability class and wind speed. When the PM_{10}, NO_X, and SO_2 emissions are modeled using this default value, the modeled impacts are below the screening criteria therefore no additional evaluation is required.

The Okefenokee Swamp is 64 km from the mill; therefore, the greater than 50 km method was utilized in order to determine the project's impact on Okefenokee. The goal of this approach is to utilize the Calpuff model to determine the change from the specified reference levels for the Class I Area and compare the change with the prescribed threshold values. The Calpuff model uses thresholds of visibility degradation measured in light extinction to evaluate source impacts to haze and plume impacts.

Under the FLAG guidance, if the proposed project results in a percent change in ß-extinction which is always less than 5 %, the project can proceed without further analysis. Per the FLAG document 5 years of meteorological data were evaluated and the analysis found a maximum $ß_{ext}$ for the 5 years of modeled data of 0.20 % which is below the 5% level. Based on this modeling it was concluded that the proposed project would have an insignificant impact on visibility at Okefenokee and that no further analysis was required.

Class II Visibility Analysis

A Class II visibility analysis was completed for the nearest sensitive Class II area to the facility utilizing the VISCREEN model. The nearest sensitive Class II area is the Glynco Jetport, which is approximately 10 km from the Brunswick Mill (at the closest point). This VISCREEN modeling followed the same procedures outlined in the Class I modeling evaluation. The Jetport is located roughly in the same wind direction as Wolf Island, so the same meteorological data set was used. Because of its proximity to the Brunswick Mill and VISCREEN's inability to predict accurate projections at close receptors, the analysis proceeded to a Level 3 Screening, which involves the use of the Pluvue model. The Pluvue model accounts for the dispersion of the pollutants due to stack height and plume rise due to stack temperature and velocity. The model was run at worst-case wind conditions previously determined for this wind direction and therefore represents the maximum impact of these emissions on the Jetport.

The analysis is generally considered satisfactory if the ?E and plume contrast are less than the critical values of 2.0 and 0.05 respectively. Both of the critical values are Class I, not Class II, area thresholds. The Division has reviewed the Pluvue II results presented in the Permit Application and has determined that the project has no significant impact on visibility at the Glynco Jetport. The ?E and plume contrast have been determined to be 0.009 and 0.000, respectively, at 10 km.

6.0 ADDITIONAL IMPACT ANALYSES

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

Visibility

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

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

The Brunswick Mill presented visibility impact analyses as discussed in the Section 5.0 of this document. The results of these analyses showed that the proposed project should have no perceptible impact on visibility within the Class I Area of interest – Wolf Island or Okefenokee Swamp – or in any of the Class II Areas of interest.

Soils and Vegetation

Since ground level concentrations of PM/PM_{10}, NO_X and CO are not expected to increase by a significant degree as a result of this project, the impacts on soil and vegetation are predicted to be insignificant. There are currently no known adverse impacts on the local environment from the Brunswick Mill's emissions, and no discernible changes are expected to result from the proposed installation of the crystallizer.

Growth

An increase in employment at the Brunswick Mill is not expected as a result of these proposed changes; therefore, there will be no permanent impacts on the surrounding community with regards to demographics. No grading will be required for the new installation. The construction phase will not adversely impact air quality in the area.

7.0 EXPLANATION OF DRAFT PERMIT CODITIONS

The permit requirements for this proposed modification are included in draft Permit Amendment No. 2631-127-0003-V-04-5.

Part 1.0 Facility Description

The EPD has provided a description of the modifications to the facility in section 1.3 of the amendment.

Part 2.0 Requirement Pertaining to the Entire Facility

There are no modifications or additions to Section 2.0 of the permit.

Part 3.0 Requirements for Emission Units

Condition 3.2.17 was modified to reduce the SO_2 emission limit for the power boiler #4 in order to ensure that the proposed project would not exceed PSD significance levels.

Part 4.0 Requirements for Testing

There are no modifications or additions to Section 4.0 of the permit.

Part 5.0 Requirements for Monitoring

There are no modifications or additions to Section 5.0 of the permit.

Part 6.0 Other Recordkeeping and Reporting Requirements

Condition No. 6.1.7.a.iii.(F) was has been modified to update the SO_2 excess emissions threshold for Power Boiler #4 (Source Code: U700) to match the emission limit set forth in Condition No. 3.2.17.

Condition No. 6.2.28 has been modified to update the reportable SO_2 rolling total threshold for Power Boiler #4 (Source Code: U700) to match the emission limit set forth in Condition No. 3.2.17.

Part 7.0 Other Specific Requirements

There are no modifications or additions to Section 7.0 of the permit.

Part 8.0 General Provisions

There are no modifications or additions to Section 8.0 of the permit.

APPENDIX A

Draft Title V Operating Permit Amendment
Permit Amendment No. 2631-127-0003-V-04-4
Koch Cellulose, LLC – Brunswick Cellulose, Inc. Pulp & Paper Mill
Brunswick (Glynn County), Georgia

APPENDIX B

Koch Cellulose, LLC – Brunswick Cellulose, Inc.
PSD Permit Application and Supporting Data

Contents Include:

1. Chemical Recovery Crystallizer PSD Permit Application, dated May 2005

APPENDIX C

EPD'S PSD Dispersion Modeling and Air Toxics Assessment Review