all4 Inc.
2393 Kimberton Road • Suite 100 • P.O. Box 299 • Kimberton, PA 19442
610.933.5246 (phone) • 610.933.5127 (fax) • www.all4inc.com

Received
04/27/06

April 25, 2006

James Boylan, Ph.D.
Georgia Department of Natural Resources
Environmental Protection Division - Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, GA 30354

RE: Packaging Corporation of America Valodosta, GA Mill
Best Available Retrofit Technology (BART) Visibility Modeling Protocol

Dear Dr. Boylan:

Enclosed is one copy of a visibility modeling protocol for a Best Available Retrofit Technology (BART) exemption modeling analysis for the Packaging Corporation of America (PCA) pulp and paper mill located in Valdosta, Georgia. This protocol contains information on all BART eligible sources at the Valdosta Mill, as well as a discussion on the procedures that will be used to conduct the visibility modeling analysis for these sources that is required under the Regional Haze regulations codified in 40 CFR Part 51.308.

Please note that the visibility modeling analysis described in this protocol will be conducted by the Visibility Improvement State and Tribal Association of the Southeast (VISTAS). PCA previously submitted all emissions information associated with the BART eligible sources at the Valdosta Mill to the Georgia Environmental Protection Division (GEPD) on February 7, 2006. This emissions information was to be forwarded to VISTAS by GEPD so that VISTAS can begin the visibility modeling analysis. This emissions information is included in the enclosed protocol for completeness purposes.

PCA believes that this submittal, combined with the earlier submission of emissions data on February 7, satisfies GEPD's requests for information from BART eligible sources. If GEPD requires additional information in order to begin the visibility modeling analysis for the Valdosta Mill, please contact me at 610-933-5246 Ext. 30.

Sincerely,

Thomas S. Wickstrom

Thomas S. Wickstrom
Environmental Scientist
All4 Inc.

cc: Virginia Holton (PCA)
Jim Little (USEPA)
Cindy M. Huber (USDA Forest Service)
Catherine Collins (US Fish and Wildlife Service)

PACKAGING CORPORATION OF AMERICA – VALDOSTA GEORGIA MILL

Visibility Modeling Protocol – BART Exemption Modeling

Submitted By:

PACKAGING CORPORATION OF AMERICA

PCA – VALDOSTA MILL
HIGHWAY 31
CLYATTVILLE, GA 31604

Submitted To:

Georgia Department of Natural Resources
Environmental Protection Division
Air Protection Branch
4244 International Parkway
Suite 120
Atlanta, Georgia 30354-3906

April 2006

Prepared by:

all 4 inc.
2393 Kimberton Road, Suite 100
P.O. Box 299
Kimberton, PA 19442
610.933.5246 (phone)
610.933.5127 (fax)

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1. INTRODUCTION

Packaging Corporation of America (PCA) owns and operates a kraft pulp mill (the "Mill") in Valdosta, Georgia. The Mill produces linerboard, which is used in the outer plies of corrugated box stock and in various other packaging. The Mill is a major source as defined by the federal operating permit program (40 CFR Part 70) and the federal new source review (NSR) program (40 CFR Part 52). In addition, the Mill is also subject to the Georgia Title V permit regulations and Prevention of Significant Deterioration (PSD) regulations, Chapter 391-3-1-.03(10) and 391-3-1-.02(7), respectively.

The Mill is subject to the Best Available Retrofit Technology (BART) rule that is part of the Regional Haze Rules listed at 40 CFR Part 51.308. Under the Regional Haze rules, an air quality modeling analysis is required to be performed for facilities that have BART eligible sources to determine if the sources at the facility cause or contribute to visibility impairment at nearby Class I areas. If the source does not cause or contribute to visibility impairment, then the facility with BART eligible sources does not need to conduct any further air quality modeling under the Regional Haze Rules.

The Visibility Improvement State and Tribal Association of the Southeast (VISTAS) has established modeling procedures (VISTAS Common Modeling Protocol – 2005) that sources should follow to conduct visibility modeling for BART. In addition to establishing the modeling procedures, VISTAS has processed meteorological data for the CALPUFF model that should be used in any BART modeling analysis. The Georgia Environmental Protection Division (GEPD) has offered VISTAS as a technical resource to assist some sources in completion of the necessary CALPUFF modeling analyses. The assistance is available to sources with a ratio of actual annual SO_2 emissions (tpy) to distance to the nearest Class I area (km) (i.e., the Q/D ratio) of 10 or lower. The PCA Valdosta Mill is one of the sources that qualifies for VISTAS assistance.

For sources with Q/D<10, VISTAS has proposed that these sources attempt to show that they do not cause or contribute to visibility impairment through a BART exemption

modeling process. This air quality modeling protocol outlines the procedures that will be used to conduct the BART exemption modeling. It should be noted that PCA is submitting the air quality modeling protocol to GEPD to provide documentation of the visibility modeling procedures that will be used, despite the fact that the actual modeling will be conducted by VISTAS. Since VISTAS will follow procedures outlined in their guidance document, this protocol will serve to (1) identify the BART eligible units at the PCA Valdosta Mill, (2) quantify emission rates and stack parameters, and (3) re-affirm the parameters that VISTAS will use in visibility modeling analyses of the PCA Valdosta Mill.

The air quality modeling protocol includes the following sections:

Section 2	Description of the PCA Valdosta Mill
Section 3	Emissions Inventory
Section 4	Visibility Modeling Approach and Technical Information
Section 5	Presentation of Air Quality Modeling Results
Section 6	References

Appendix A – Emissions Calculations Supporting Information

2. DESCRIPTION OF THE PCA VALDOSTA MILL

This section of the BART exemption modeling protocol contains a description of the PCA Valdosta Mill. The description contains general information on the manufacturing processes, and a description of the geographic and topographic setting of the Mill.

2.1 MANUFACTURING PROCESS DESCRIPTION

The facility produces linerboard, which is used in the outer plies of corrugated box stock and in various other packaging. The Mill process begins as logs are delivered to the Mill by truck. The logs are debarked and processed into wood chips, which are then screened and transferred to storage in chip piles or stored in chip silos. Purchased chips are also delivered by truck and rail and are combined with the processed chips in the chip piles. The chips are reclaimed from the chip piles, and then are screened and processed in the Mill's digesters or are stored in chip silos prior to being processed in the Mill's digesters. The bark and screen rejects are collected and burned in the C.E. and Riley Combination Boilers. Purchased wood refuse, sawdust, and bark (collectively referred to as wood residue fuel) are stored in a wood residue fuel pile for subsequent firing in these two boilers.

Wood chips are transferred by conveyor and charged to one of ten batch digesters where they are cooked in white liquor; a sodium hydroxide/sodium sulfide solution. During the cooking process, steam is added with the white liquor and chips which causes high temperature and pressure in the digester. At this elevated pressure and temperature, the caustic in the white liquor penetrates the chips and dissolves and breaks down the lignin and other organics in the wood.

When the cooking process is completed, the digester blow valve is opened and the contents are "blown" into a blow tank. As the digester is blown, the abrupt pressure change causes the cooked chips to transform into fibers. These fibers make up the pulp that is ultimately made into linerboard.

The pulp is refined, screened and washed to remove the excess spent cooking liquor. The spent cooking liquor (black liquor) contains the lignin and other impurities from the chips

as well as the spent inorganic fraction of the cooking liquor. The black liquor is washed from the pulp in the brown stock washers (No. 3A BSW System), and is then collected and processed in the recovery area of the Mill. The washed pulp, referred to as stock, is removed from the washers and stored in high-density stock tanks. The stock from the tanks is mixed with certain additives and also with internally recycled pulp and is then processed on the paper machine. The paper machine forms the pulp into a continuous web, which is then drained, pressed, dried, and wound into large rolls of finished linerboard.

In the kraft process, the black liquor from the brown stock washers is reprocessed back into white liquor in the chemical recovery cycle and is then reused in the digesters. The black liquor from the brown stock washers, referred to as weak black liquor, is collected and sent to the multiple effect evaporators (MEE). The MEE removes water and concentrates the solids in the black liquor. Additional evaporation occurs in the black liquor oxidation system and in the direct contact evaporator (DCE) sections of the recovery furnaces. The black liquor can be fired in one of three recovery furnaces at the Mill. In the recovery furnaces, the organics in the black liquor are burned off in a reducing atmosphere, producing steam and leaving molten sodium carbonate and sodium sulfides behind. The molten mass of salts, called smelt, flows to a tank in which weak wash from the causticizing area is mixed with the smelt to create an intermediate stream called green liquor.

Green liquor is an aqueous solution of sodium carbonate and sodium sulfide that has a greenish tint. The green liquor is processed in the causticizing area, where it is converted back into white liquor by adding lime (calcium oxide) to it. The lime converts the sodium carbonate into sodium hydroxide and calcium carbonate. The sodium hydroxide is soluble, and this caustic solution is recovered as white liquor, stored, and reused in the digesters. The calcium carbonate precipitates out of the white liquor, and is collected, washed, and calcined in the lime kiln, which converts the calcium carbonate back to calcium oxide by adding heat. The "reburned" lime is stored and added again to green liquor.

In addition to the C.E. Combination Boiler and the Riley Combination Boiler, the Mill operates two other power boilers, the C.E. Power Boiler and a Package Boiler. The C.E. Power Boiler can fire natural gas and fuel oil while the standby Package Boiler fires natural

gas. The boilers, as well as the recovery furnaces, produce steam for process and heating use throughout the facility. The steam is also used to drive steam turbines that produce a portion of the Mill's electricity requirements. The remaining electrical power is purchased from the local public utility.

The Mill operates a wastewater treatment plant that treats process wastewater from the Mill prior to discharge to the Withlacoochee River. The wastewater treatment process includes primary clarification, followed by secondary biological treatment in a series of impoundments. Land application of the effluent is the back-up method of treatment for dry weather scenarios.

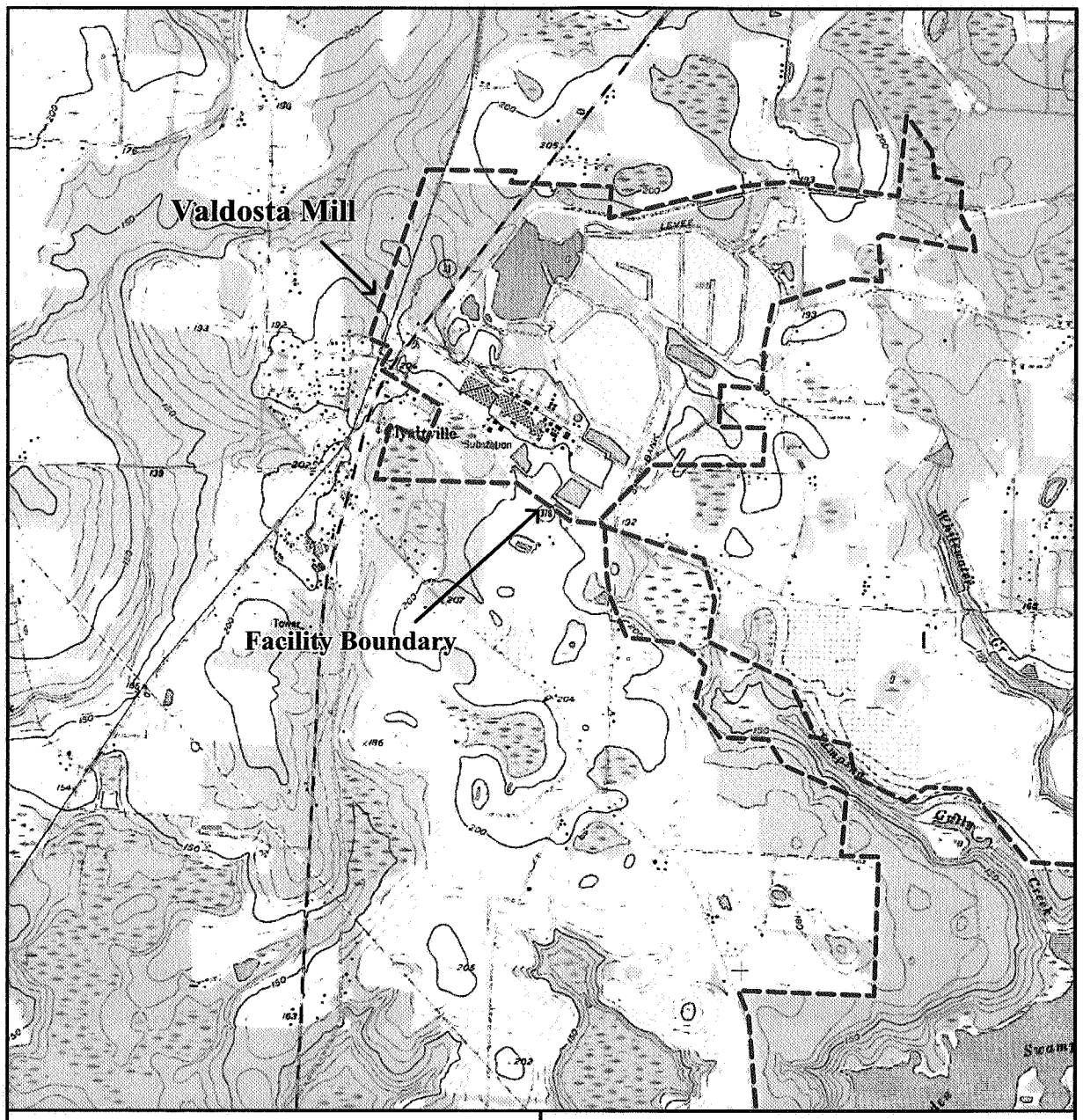
2.2 MILL LOCATION

The Valdosta Mill is located in Clyattville, Georgia which is approximately 16 kilometer (km) south of Valdosta, Georgia. Situated in the southern portion of Lowndes County, the Mill is about 5 km from the Georgia and Florida border. A facility location map is provided in Figure 2-1.

The geographical coordinates for the approximate center of the processing area of the Mill are:

- Universal Transverse Mercator (UTM) Easting: 279,400
- Universal Transverse Mercator (UTM) Northing: 3,397,800
- UTM Zone : 17
- North American Datum (NAD): 1927
- Longitude (degrees, minutes, seconds): 83° 18' 11.2"
- Latitude (degrees, minutes, seconds): 30° 41' 39.3"

The Valdosta Mill is in the Southwest Georgia Intrastate Air Quality Control Region (AQCR). Within this AQCR, Lowndes County is in attainment or unclassifiable/attainment for all criteria pollutants including ozone as designated in the July 2003 Code of Federal Regulations and amended on September 26, 2003. It is also anticipated that the area will be in attainment with $PM_{2.5}$. The area surrounding the



Packaging Corporation of America
Valdosta Mill
Clyattville, Lowndes County, Georgia

FIGURE 2-1
FACILITY LOCATION MAP

Valdosta Mill is generally flat with minor changes in elevation. The Mill elevation is 200 ft above mean sea level (amsl).

2.3 LOCATION OF CLASS I AREAS

The following five Class I areas are located within 300 km of the PCA Valdosta Mill:

- Okefenokee National Wildlife Refuge: 73.1 km
- St. Marks National Wildlife Refuge: 89.1 km
- Bradwell Bay Wilderness: 128.5 km
- Wolf Island National Wildlife Refuge: 201 km
- Chassahowitzka National Wildlife Refuge: 220.8 km

A map showing the locations of these Class I areas and the PCA Valdosta Mill is shown in Figure 2-2.

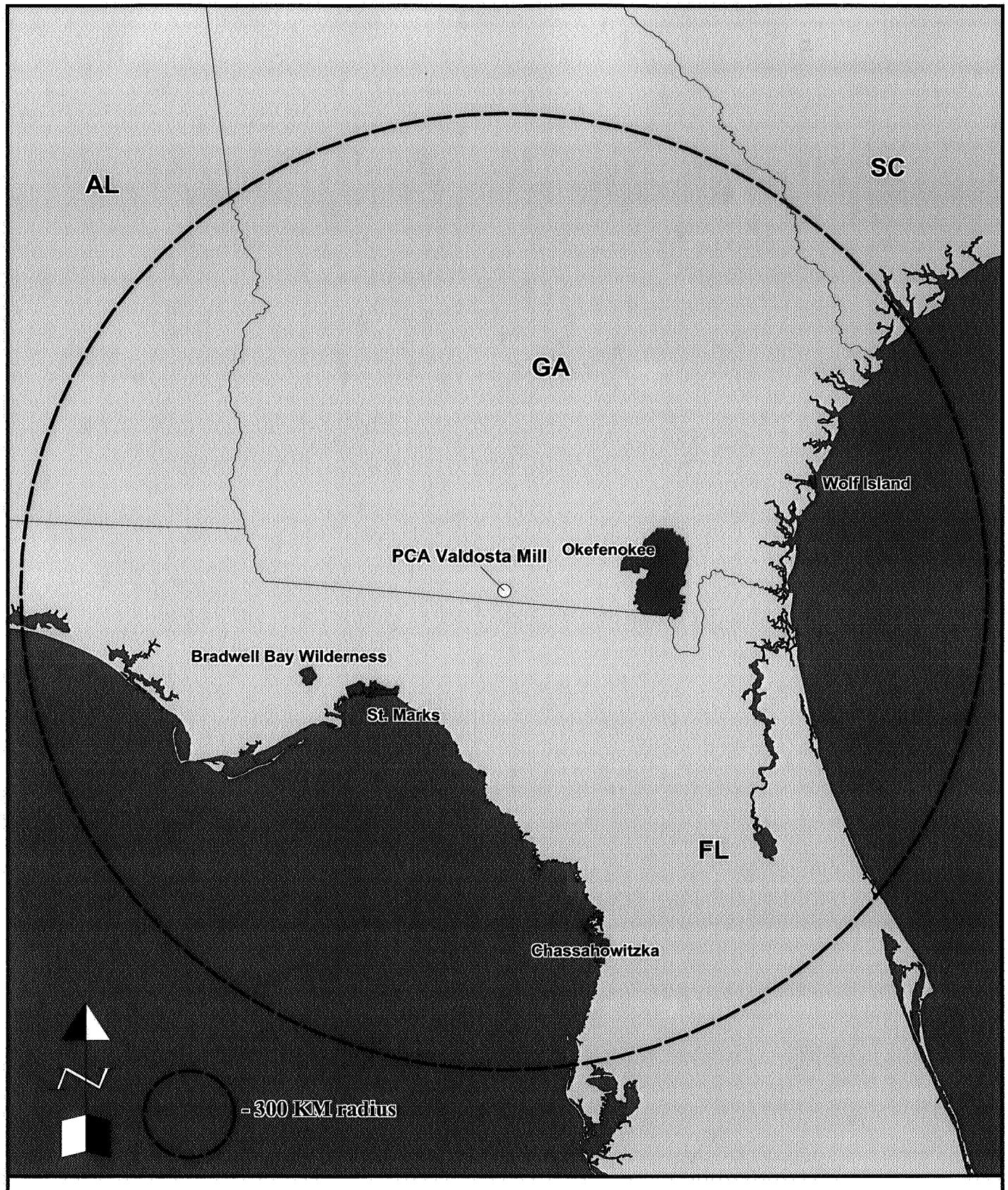


Figure 2-2
Location of Class I Areas
Within 300 km of the PCA Valdosta Mill

3. EMISSIONS INVENTORY

This section identifies the BART eligible units at the PCA Valdosta Mill and provides an overview of the emissions data that were developed and will be relied upon for the BART exemption modeling analysis.

3.1 BART ELIGIBLE SOURCES

The final Regional Haze Regulations and Guidelines for BART Determinations were published on July 6, 2005 in the Federal Register. According to the guidance contained in the Regional Haze Regulations, a source is considered BART eligible if the following three criteria are met:

- If the potential emissions are at least 250 tpy of a visibility impairing pollutant;
- If the source was installed between August 7, 1962 and August 7, 1977; and
- If the source falls within one of the 26 listed source categories summarized in the guidance.

The BART eligible sources at the PCA Valdosta Mill are:

- Riley Bark Boiler
- No. 3 Recovery Furnace
- No. 3 Smelt Dissolving Tank
- Lime Slaker

These sources have been identified by GEPD as meeting the emissions and installation date criteria for BART eligibility. These are the only sources at the Mill that will be included in the BART exemption modeling.

3.2 EMISSION RATES

The Regional Haze Regulations state that the highest 24-hour average actual emission rate of visibility impairing pollutants for the most recent three to five years be used in the visibility modeling analysis. VISTAS defines visibility impairing pollutants as SO_2, NO_X, H_2SO_4, and PM_{10}, and PM_{10} sub-species. The 24-hr actual emission rates of these pollutants from the BART eligible sources at the PCA Valdosta Mill are shown in Table 3-1. These emission rates represent maximum daily production data applied to emission factors for each pollutant. All relevant supporting information for the emissions calculations is included in Appendix A of this protocol. These data were previously provided to GEPD on February 7, 2006, as required.

3.3 STACK CHARACTERISTICS

The stack characteristics for the BART eligible sources are provided in Table 3-2. The gas stream volumetric flow rates and temperatures represent stack data used in previous air quality modeling analyses of the PCA Valdosta Mill.

The VISTAS visibility modeling procedures state that facilities that are not within 50 km of a Class I area do not need to consider building downwash in the BART modeling analysis. As shown in Section 2, the PCA Valdosta Mill is not located within 50 km of any Class I area, and therefore, no building downwash information is included in this protocol.

Table 3-1
BART 24-Hour Emission Rates
PCA Valdosta Mill
Valdosta, GA

Emission Unit	Modeling ID	BART SO_2 24-Hour Emission Rate (g/sec)	BART NO_x 24-Hour Emission Rate (g/sec)	BART PM_{10} Emission Rate (g/sec)	BART $PM_{2.5}$ Emission Rate (g/sec)
Riley Bark Boiler	CSS	6.85	10.69	0.00	4.86
No. 3 Recovery Furnace	#3RFS	12.85	4.77	0.15	0.48
No. 3 Smelt Dissolving Tank	#3SDTS	0.05	0.00	0.00	0.17
Slaker	SLAKER	0.00	0.00	0.019	0.138

Riley Bark Boiler	NCASI Tech Bulletin 98% of TPM is PM2.5 and 98% of TPM is PM10
No. 3 Recovery Furnace	NCASI Tech Bulletin 51% of TPM is PM2.5 and 67.2% is PM10
No. 3 Smelt Dissolving Tank	NCASI Tech Bulletin 89.6% of TPM is PM2.5 and 89.5% is PM10
Slaker	NCASI Tech Bulletin 98% of TPM is PM2.5 and 100% is PM10

Table 3-2
Summary of Physical Stack Characteristics for BART Sources
at the PCA Valdosta Mill
Valdosta, Georgia

Source	Stack ID	Stack Location (UTM Coordinates NAD 27)		Stack Elevation (meters)	Stack Height (meters)	Stack Exit Velocity (meters/sec)	Stack Temperature (degrees K)	Stack Diameter (meters)
Riley Bark Boiler	CSS	279,250	3,397,874	61.0	61.26	14.10	338.0	3.05
#3 Recovery Furnace Stack	#3RFS	279,303	3,397,846	61.0	55.17	20.71	395.0	2.13
#3 Smelt Dissolving Tank Stack	#3SDTS	279,305	3,397,816	61.0	33.53	9.31	328.0	1.22
Slaker Stack	SLAKER	279,400	3,397,776	61.0	27.43	7.34	311.0	0.61

4. VISIBILITY MODELING APPROACH AND TECHNICAL INFORMATION

This section of the air quality modeling protocol contains information on the technical approach that will be followed in the air quality modeling study. The technical approach follows the guidance established in the VISTAS modeling protocol, and outlines the configurations for CALMET and CALPUFF that will be used by VISTAS to model the BART sources at the PCA Valdosta Mill.

4.1 CALMET CONFIGURATION

CALMET will be configured as outlined in the VISTAS modeling protocol for BART exemption modeling. VISTAS identified the following basic features for the 12-km CALMET runs:

- Modeling period: 3 years (2001-2003).
- Meteorological inputs: MM5 data provide initial guess fields in CALMET
- CALMET grid resolution: 12-km.
- CALMET vertical layers: 10 layers. Cell face heights (meters): 0, 20, 40, 80, 160, 320, 640, 1200, 2000, 3000, 4000.
- CALMET mode: No-Observations mode including option to read overwater data directly from MM5 data.
- Diagnostic options: IWAQM default values, except as follows: diagnostic terrain blocking and slope flow algorithms used for 2003 simulations (using 36-km MM5 data), but no diagnostic terrain adjustments in 2001 and 2002 simulation (using 12-km MM5 data).
- Land use defining water: JWAT1 = 55, JWAT2 = 55 (large bodies of water).
- Geophysical data for regional runs: SRTM-GTOPO30 30-arcsec terrain data, Composite Theme Grid (CTG) USGS 200m land use dataset.

4.2 CALPUFF CONFIGURATION

CALPUFF will be configured by VISTAS to model emissions from the PCA Valdosta Mill. The following configurations will be used by the VISTAS contractor, as outlined in the VISTAS common modeling protocol:

- No building downwash considered.
- CALPUFF domains will be set to an area that provides an adequate buffer around all modeled Class I areas. The domains will be sized so to ensure at least a 50 km buffer surrounding the Class I area.
- VISTAS will use background concentrations of sulfate and total nitrate from their CMAQ runs using 2001-2003 meteorological data.
- VISTAS will model SO_2, H_2SO_4, NO_X, and PM_{10} (including sub-PM_{10} speciations) from the BART eligible sources at the PCA Valdosta mill.
- VISTAS will use the receptor grids developed by the National Park Service for the Okefenokee, Wolf Island Bradwell Bay, St. Marks, and Chassahowitzka Class I areas.
- The Pasquill-Gifford (P-G) dispersion option will be used.
- Observed non-urban ozone data for the 2001-2003 CASTnet and AIRS monitoring networks will be used.
- A background ammonia concentration of 0.5 ppb will be used.
- The integrated puff sampling methodology will be used.

4.3 CALPOST AND POSTUTIL CONFIGURATION

CALPOST and POSTUTIL will be configured by VISTAS to estimate visibility impacts at both Class I areas. The following configurations, as outlined in the VISTAS common modeling protocol, will be used:

- Visibility Method 6 with Class I area specific monthly relative humidity values will be used.

- Ammonia concentrations from CMAQ will be used to define NH_3 for each Class I area.

- Natural background light extinction values will be calculated using the USEPA's "Guidance for Estimating Visibility for Regional Haze Estimates" guidance document. A Raleigh scattering efficiency of Mm^{-1} will be used for all Class I areas.

As stated previously in this protocol, PCA will not be responsible for the CALPUFF modeling runs. The modeling effort will be conducted by VISTAS. The CALPUFF/CALMET/CALPOST settings presented here are consistent with the VISTAS common modeling protocol. PCA assumes that the VISTAS contractor will not deviate from the methodology presented in the VISTAS common modeling protocol.

5. PRESENTATION OF VISIBILITY MODELING RESULTS

This section of the protocol discusses how the results from the visibility modeling analyses will be evaluated. PCA will be responsible for the submittal of the visibility modeling results for GEPD upon receiving the results of the visibility modeling from VISTAS.

5.1 SUBMITTAL OF AIR QUALITY MODELING RESULTS

A brief report will be submitted to GEPD that presents the results of the BART exemption modeling analysis. For the purposes of this analysis, the PCA Valdosta facility will be considered "exempt" from further modeling requirements under the BART rule if the results show that no impacts greater than a 0.5 deciview change in visibility occur on a 24-hr basis occur over the entire modeling period. The modeling submittal will essentially consist of a summary of emission rates, stack characteristics, and a results table. The results table will include impacts for all Class I areas within 300 km of the Mill. PCA anticipates submitting results to GEPD soon after receiving the visibility outputs from VISTAS.

6. REFERENCES

VISTAS 2005 – "Protocol for the Application of the CALPUFF Model for Analyses of Best Available Retrofit Technology (BART)" - Visibility Improvement State and Tribal Association of the Southeast (VISTAS)

APPENDIX A – EMISSIONS CALCULATIONS SUPPORTING INFORMATION