Appendix H.10

Supporting Data for Four-factor Analyses

Georgia EPD requested four-factor analyses from SO2 point sources for emissions units identified as likely to contribute 0.5% or more to the total visibility impairment caused by sulfate at any Class I area in 2018. Analyses were received for a total of 15 emissions units. The units and the corresponding four-factor analysis submittal dates are presented in Table H.10-1. For some emissions units additional data was submitted at the request of EPD or at the initiative of the facility. The submittals have been saved with Georgia EPD's Regional Haze files. They are available to the public for inspection during normal business hours of 8:00 a.m. to 4:30 p.m. at the Georgia Environmental Protection Division, Air Protection Branch, 4244 International Parkway, Suite 120, Atlanta, Georgia 30354.

Table H.10-1. Submittal Dates and Worksheets for Four-factor Analyses

Facility	Emissions Unit	Submittal Date(s)	Summary Worksheet
GA Pacific Brunswick Cellulose	Power Boiler No. 4	7-2-07 9-7-07 10-20-07 10-10-08 10-15-08	H.10-1
GA Pacific Brunswick Cellulose	Recovery Boiler No. 6 (M24)	7-2-07 9-17-07 1-17-08	H.10-2
GA Pacific Cedar Springs	Power Boiler No. 1 (U500)	7-2-07 9-17-07 1-17-08	H.10-3
GA Pacific Cedar Springs	Power Boiler No. 2 (U501)	7-2-07 9-17-07 1-17-08	H.10-4
GA Pacific Cedar Springs	Recovery Boiler No. 3 (R402)	7-2-07 9-17-07 1-17-08 7-31-08 8-15-08	H.10-5
GA Pacific, Savannah River Mill	Boiler No. 3 (B001)	7-2-07 7-16-07	H.10-6
GA Pacific, Savannah River Mill	Boiler No. 4 (B002)	7-2-07 7-16-07	H.10-7
GA Pacific, Savannah River Mill	Boiler No. 5 (B003)	7-2-07 7-16-07	H.10-8
Georgia Power Plant Kraft	Steam Generator 1	7-12-07 9-7-07	H.10-9
Georgia Power Plant Kraft	Steam Generator 2	7-12-07 9-7-07	H.10-10
Georgia Power Plant Kraft	Steam Generator 3	7-12-07 9-7-07	H.10-11
Georgia Power Plant McIntosh	Steam Generator 1	7-12-07	H.10-12

		9-7-07	
Georgia Power Plant Mitchell	Steam Generator 3	7-12-07 9-7-07	H.10-13
Internat. Paper, Savannah Mill	Power Boiler 13	6-29-07 10-11-07	H.10-14
Temple-Inland Rome Linerboard	Power Boiler No. 4	6-29-07 11-11-08	H.10-15

A summary worksheet (compiled by EPD) of each emissions unit analysis submitted by the facilities is presented below. Following the individual emissions unit worksheets are a summary worksheet for emissions units in south Georgia (which affect Okefenokee and Wolf Island) and a summary worksheet for emissions units (there is only one) in north Georgia (which affect Cohutta). The south and north Georgia worksheets include visibility improvement metrics. Table H.10-2 contains notes of explanation for selected fields and cells in the four-factor analysis spread sheets.

Table H.10-2. Four-Factor Analysis Worksheets: Explanatory Notes

Field	Data Source	Notes
Class I sulfate impact fraction	Georgia EPD	This is the impact of sulfate emissions from the specific emissions unit on visibility in the specified Class I area, expressed as a fraction of the combined sulfate impacts of all of the impacting facilities in the Area of Influence. The impact given is based on the VISTAS SO2 projected 2018 emissions. Threshold for inclusion in 4-factor analysis was impact of 0.005 (0.5 %) or more.
4F baseline SO2	company	The baseline emissions used by the facility in the 4-factor submittal. In the cases of U500 and U501 at GA Pacific Cedar Springs, the number represents emissions after an existing venturi scrubber with water scrubbant (they estimate 30% SO2 control). In the case of GA Pacific Savannah River, all 3 emissions units currently perform limestone injection for SO2 removal.
Baseline basis	company	In many instances the company used a different baseline emissions level than the VISTAS projected value. A blank field means that the company did not provide a full evaluation and that the VISTAS value has been inserted into the baseline field.

Field	Data Source	Notes
Control Technology	company	Control, deemed technically feasible by the facility, evaluated for reduction of SO2 emissions.
Control Effectiveness	company	Percent reduction as presented in the facility's 4-factor analysis. In cases where the facility did not list a control effectiveness, this was back-calculated from the tons of reductions.
Annual cost, company	company	Company cost estimates were typically prepared as study-level estimates, accurate to within +/- 30 percent. The costs are assumed to be in 2007 dollars (some companies stated this explicitly). The annual cost is the sum of the annual operation and maintenance cost and the total installed cost (capital cost), annualized over the life of the project. Project lives ranged from 15 to 20 years, interest rates from 7% to 10%, and capital recovery factors from 0.094 to 0.117.
Cost/ton	calculation	The annual cost divided by the tons reduced from the 4F baseline.
Annual Cost, ACNet	Air Control Net	The estimated annual cost from a query of EPA's Air Control Net database. The costs listed came from queries which found matches for the applicable technology at the specific unit and facility. The queries provide estimates in 2004 dollars. This number was then escalated to 2006 dollars using the Chemical Engineering Plant Cost Index.
Statutory factors	Company	A "0" indicates that the submittal provided no information pertaining to the specific factor. A blue cell indicates that the company has indicated that the option could be implemented prior to Jan. 1, 2012. This would allow the control measure to be in place during all 5 years that visibility data will be collected for the 2018 Regional Haze progress report. The expected useful life of all of the emissions units is 2018 or later.
Visibility Sensitivity: Tons SO_2/Mm^{-1}	Georgia EPD	The tons of SO2 required to effect a reduction of 1 Mm^{-1} (inverse megameter) in the applicable Class I area. This value is independent of the control technology.
Visibility Sensitivity: $\$10^6/Mm^{-1}$	Calculation	The cost, based on the specific technology, to effect a reduction of 1 Mm^{-1} (inverse megameter) in the applicable Class I area. This is the product of $/ton and ton/ Mm^{-1}.

Field	Data Source	Notes
Visibility Sensitivity: Mm^{-1}	Calculation	The extinction reduction (visibility improvement) in Mm^{-1} that would be achieved in the applicable Class I area by implementation of the specific control. An orange cell indicates an extinction reduction of greater than 0.010 and less than 0.100. A light green cell indicates an extinction reduction of greater than 0.100.

Abbreviations Used:

ACNet – Air Control Net
acfm – actual cubic feet per minute
CRF – capital recovery factor
dscfm – dry standard cubic feet per minute
Mm^{-1} (inverse megameter)

Following the summary worksheets of the four-factor analyses are copies of the original facility submittals. Followup submittals (if applicable) from the facilities may be inspected at the offices of Georgia EPD's Air Protection Branch as noted above.