Wisconsin Sources - BART Applicability and Requirements

A core federal requirement for addressing visibility impairment in the federal Class I areas is the implementation of a control program known as Best Available Retrofit Technology (BART) for certain older major sources directly impairing visibility. This BART control requirement addresses sources constructed in the decade before New Source Performance Standards (NSPS) first came into effect, and as a result have minimal or less than adequate emission controls. The federal requirements for identifying sources subject to BART, and the methods for determining appropriate emission control requirements, are set forth by the United States Environmental Protection Agency (U.S. EPA) under 40 CFR Part 51, Appendix Y, *Guidelines for BART Determinations Under the Regional Haze Rule*.

In order to meet the federal requirements, Wisconsin implemented rules for BART as provided under NR Ch. 433, Wis. Adm. Code, that address emissions of particulate matter (PM), sulfur dioxide (SO_2), and nitrogen oxide (NOx).

The Wisconsin rules establish that electricity generating units (EGUs) meet BART requirements for SO_2 and NOx by meeting the federal Clean Air Interstate Rule (CAIR) requirements. For all other cases, the Wisconsin rules establish a process for determining those sources subject to BART and applicable BART emission reduction requirements on a case-by-case basis. As part of this process, the source must submit an analysis of potential pollution control technologies and their installation cost and related issues. Sources must implement BART requirements by December 31, 2015.

This document summarizes the determination of Wisconsin sources eligible and subject to BART and the determination of BART requirements for the affected sources. The finalized BART program is based on proposals provided for public comment & hearings in July 2010 and September 2011.

1. Determination of BART Eligible and Affected Sources.

Under the state rule, the CALPUFF air quality model is used to determine a source's visibility impairment on a Class I area for those sources found to be an appropriate age to be eligible under the BART program. The pollutants of concern emitted by boilers at the non-EGU facilities are SO_2, NOx, and PM. If the modeled results show a significant reduction in visibility, the source is subject to BART or "BART-affected". An alternate CALPUFF analysis, which utilizes more specific data, is also allowed under the state rule. The protocols for the CALPUFF modeling and alternative modeling for determining if a source is subject to BART controls, along with additional details for modeling, are found in the Regional Haze SIP.

Table 1 shows the EGUs found subject to BART. Details for modeling are found in “July 2011 Draft BART Technical Support Document (TSD) for EGUs” within Wisconsin’s BART SIP.

Table 1 - Wisconsin EGU Sources Subject to BART

Source Name	Emission Units (B = Boiler)	County
Alliant Energy – Columbia	B-21, B-22	Columbia
Alliant Energy – Edgewater	B-24	Sheboygan
Alliant Energy – Nelson Dewey	B-22	Grant
Wisconsin Energy – Oak Creek	B-27,28	Milwaukee
Wisconsin Energy – Pleasant Prairie	B-21, B-22	Kenosha
Wisconsin Public Service Corporation – JP Pulliam Plant	B-27	Brown
Dairyland Power Coop – Alma	B-25,26	Buffalo
Dairyland Power Coop – Genoa	B-20	Vernon
Wisconsin Energy – Valley	B-21, B-22, B-23, B-24	Milwaukee

The status of non-EGU sources as BART-subject is summarized in Table 2. The Department determined that four non-EGU facilities have sources that are potentially subject to BART based on source category and age criteria. Based on visibility modeling the Department determined that the Green Bay Georgia-Pacific facility is the only non-EGU source subject to BART. The BART determination for Georgia-Pacific is described below. The BART TSD for non-EGUs is located in Wisconsin's BART SIP.

Based on visibility modeling results, the three other BART eligible industrial facilities listed in Table 2 – International Paper Kaukauna facility (a.k.a. Thilmany), Packing Corporation of America-Tomahawk, and Mosinee Paper Corporation – do not exceed the threshold of 7-day visibility impact in any base year to any single Class I area. Therefore, the Department determined these sources are not subject to BART control requirements. The modeling evaluation for these facilities relied on the VISTAS protocol for utilizing more specific model inputs and smaller grid analysis for visibility impacts compared to the default approach. The details for these visibility modeling analyses are presented in Attachment 5 of Wisconsin's BART Implementation SIP Submittal.

Table 2 - Status of Wisconsin Non-EGU Sources Potentially Subject to BART

Source Name	Eligible Emission Units (B = Boiler)	BART-subject Status	County
Georgia-Pacific – Green Bay	B-26, B-27	Subject	Brown
International Paper Kaukauna facility (a.k.a. Thilmany)	B-11	Not subject *	Outagamie
Packing Corporation of America – Tomahawk	B-24	Not subject *	Lincoln
Mosinee Paper Corporation	B-20, B-21, B-24	Not subject *	Marathon

* Determination based on CALPUFF modeling using VISTAS modeling protocol.

2. Georgia-Pacific BART Determination

The Georgia-Pacific facility in Green Bay, Wisconsin operates two coal-fired power boilers subject to BART under the Clean Air Act. In July of 2011, the Department provided for external review a draft finding of BART requirements applicable to the affected Georgia-Pacific boilers. This document amends the draft BART finding and provides response to public comment (Attachment 3 of Wisconsin's BART SIP). This BART requirement for Georgia-Pacific will comprise a component of Wisconsin's State Implementation Plan (SIP) addressing Regional Haze and will contribute to Reasonable Progress Goals (RPG) by the beginning of 2016 and after. Further requirements and contribution by industrial boilers to RPG, at Georgia-Pacific and sector-wide, will be evaluated for the next RPG evaluation in 2018 as described in the Regional Haze SIP document.

The Georgia-Pacific BART requirements address emissions of PM, SO_2, and NOx from two power boilers B26 and B27. The two affected boilers exhaust through common stack S10 along with the coal-fired boilers B25 and B28. The BART control requirement for each pollutant is summarized below.

Particulate Matter (PM)

The July 2011 draft BART finding proposed PM requirements based on the existing control equipment and permit limitations. This finding was based on the following: insignificant visibility improvement for a zero-out of PM emissions from the maximum actual baseline PM_{10} emissions; a very high level of PM control achieving 0.025 lbs/mmBtu emission rates; and current compliance with malfunction and abatement plans. In responding to comments, the finalized PM BART determination has not been amended and consists of a PM emission limitation requirement of 0.30 Lb/mmBtu on BART boilers B26 and B27. Additional details regarding the Department's BART determination for PM at Georgia-Pacific are found in the July 2011 Draft BART TSD for Non-EGUs (Attachment 3 of Wisconsin's BART Implementation SIP Submittal) and the Response to Comments for BART (Attachment 10 of Wisconsin's BART Implementation SIP Submittal).

Sulfur Dioxide (SO_2)

The Department compared wet flue gas desulfurization (FGD) and dry circulating fluidized bed (CFB) FGD in the July 2011 draft BART finding. The Department developed costs and control levels based on a commercially available CFB unit called Turbosorp. The wet FGD – dry CFB FGD comparison showed that the capital cost of wet FGD is over 30% higher than that of the dry CFB FGD, with both technologies achieving comparable control efficiencies (93% - 98%). The Department concluded in the draft BART finding that the incremental costs do not substantiate the application of wet FGD, and that SO_2 BART should be based on the application of dry CFB FGD technology. The Department further concluded that long-term operation and compliance with dry CFB FGD is represented by 93% control efficiency. The draft finding also established "Base SO_2 emissions" reflecting a presumptive fuel at a specified sulfur content. The BART compliance requirement was then established by applying 93% control to the "Base SO_2 emissions."

The finalized BART determination for SO_2 is amended from the draft BART finding to reflect the use of actual BART baseline emissions (i.e. no adjustment for presumptive fuel) in assessing visibility improvement, control evaluations, and BART requirements. The fuel switched emissions are calculated for fuel switching petroleum coke to the bituminous coal as burned during the BART baseline years. The fuel switch alters the concentration of SO_2 in the flue gas from ~ 3.6 lbs/mmbtu to 3.0 lbs/mmbtu. A dry scrubber control efficiency of 93% is then applied to the fuel switched emissions for BART boilers B26 and B27. The combination of fuel switching and dry scrubber control results in a 95.8% control efficiency for Boiler B26 and 93.8% control efficiency for Boiler B27.

The annualized cost for dry CFB FGD applied to boilers B26 and B27 was updated from the draft BART finding to reflect fuel switching petroleum coke to bituminous coal. The visibility improvements are estimated using the visibility improvement factors for SO_2 reduction as developed in the Visibility Improvement section below. Table 3 shows a summary of the amended SO_2 BART control and visibility improvement. Additional details regarding the Department's BART determination for SO_2 at Georgia-Pacific are found in the July 2011 Draft BART TSD for Non-EGUs (Attachment 3 of Wisconsin's BART Implementation SIP Submittal) and the Response to Comments for BART (Attachment 10 of Wisconsin's BART Implementation SIP Submittal).

Table 3 - Summary of Final SO_2 BART Control and Visibility Improvement at Northern Class I Areas[1,2]

SO2 BART Boilers B26 & B27 - CFB FGD				
Control Efficiency B26 = 95.8% B27 = 93.8%				
M$/year 18.1				
Controlled grams/sec 416.9				
	Seney		Northern Class I Areas	
	maximum	average	maximum	average
dv per gram/sec =	0.005	0.004	0.011	0.010
dv improvement =	2.19	1.81	4.51	4.10
M$/dv =	8.2	10.0	4.0	4.4

[1] Control efficiency based on combination of fuel switching and dry scrubber control at 93% at B26 and B27.

[2] Northern Class I Areas = Isle Royale National Park, Seney Wilderness Area, Boundary Water Canoe Area, and Voyageurs National Park.

Nitrogen Oxides (NOx)

The July 2011 draft BART finding proposed NOx requirements based on the application of combustion modifications, followed by either selective non-catalytic reduction technology (SNCR) or a type of tail-end selective catalytic reduction technology (RSCR). The requirement for B26, a stoker boiler, reflected combustion modifications followed by SNCR to achieve an overall 68% long-term reduction. For B27, a cyclone boiler, the requirement reflects overfire air (OFA) combustion modifications followed by one of several different available control options: RSCR, Rich Reagent Injection (RRI)/SNCR, and SNCR. These equipment configurations yield an 84% to 85% long-term control requirement for Boiler B27.

After addressing comments, the finalized BART determination for NOx is 68% control for boiler B26 and 85% control for boiler B27. The 68% control efficiency on B26 is based on the use of OFA/Flue Gas Recirculation (FGR)/SNCR. The application of RSCR at 70% control yields no discernable improvement in visibility while requiring significant additional cost. The 85% control efficiency on B27 is based on RSCR or in-duct SCR based control approaches.

Table 4 shows a summary of the amended NOx BART control and visibility improvement. Additional details regarding the Department's BART determination for NOx at Georgia-Pacific are found in the July 2011 Draft BART TSD for Non-EGUs (Attachment 3 of Wisconsin's BART SIP) and the Response to Comments for BART (Attachment 10 of Wisconsin's BART SIP).

Table 4 - Summary of Final NOx BART Control and Visibility Improvement at Northern Class I Areas

NOx BART Combined Boilers B26 & B27				
M$/year 3.5				
Controlled grams/sec 99.9				
	Seney		Northern Class I Areas	
	maximum	average	maximum	average
dv per gram/sec =	0.009	0.005	0.012	0.008
dv improvement =	0.88	0.49	1.18	0.82
M$/dv =	3.95	7.10	2.93	4.21

Summary of BART Control Levels and Visibility Improvement

The Department performed CALPUFF modeling in the July 2011 draft BART finding to assess visibility improvement achieved under the BART requirements. The emission cases modeled were based on the day of maximum actual emissions from the combined stack S10 during the baseline years. The base uncontrolled emission rates identified for each pollutant, in grams per second, used for this modeling are provided in Appendix A. To assess the BART requirements, controlled emission rates were calculated and modeled. To do this the Department determined the percent reduction that would occur from the maximum day emission rate after applying BART. The Department calculated a reduction using the annual Stack S10 BART mass cap compliance requirement, compared to the base year average emissions before SO_2 base fuel

adjustments. The stack S10 percent reduction applied to the uncontrolled grams per second emission rates in the July 2011 draft BART finding was 70% for NOx and 57% for SO_2. The resulting maximum day controlled emission rates were then modeled for every day in 2002 to 2004. Additional details of this modeling are found in the July 2011 Draft BART TSD for Non-EGUs (Attachment 3 of Wisconsin's BART SIP).

Since the amended BART reflects *actual* instead of *adjusted* BART baseline emissions, along with slightly higher control levels for SO_2 and NOx, the visibility modeling provided in the July 2011 draft BART finding is updated accordingly. The Department first determined the percent reduction that would occur from the maximum day emission rate after applying the finalized BART controls. The Department then calculated a reduction using the annual Stack S10 BART mass cap compliance requirement (Tables 8 and 10 below) compared to the base year average emissions. The new stack S10 percent reduction applied to the uncontrolled grams per second emission rates is 71% for NOx and 81% for SO_2.

Table 5 shows the reduced number of days above the 0.1 and 0.5 dv thresholds due to BART (Reduced Days of Impact with BART). These values were calculated by applying the "Days reduced / gram per sec reduced" factor from the July 2011 draft BART modeling to the new controlled grams per second emission rates. Seney realizes the largest reduction of days for each case. Table 6 shows the maximum daily impact (dv) modeled in each year due to BART. These values were calculated by applying the "Days reduced / gram per sec reduced" factor from the July 2011 draft BART modeling to the new controlled grams per second emission rates. The results for the Seney Class I area are segregated as this area receives the highest impact. Also presented in Table 6 are visibility improvements under BART related to the individual pollutants, shown for SO_2 and NOx. The draft BART control levels for BART boilers in the Stack S10 system and the resulting improvement to the average visibility impact are summarized in Table 7.

Table 5 - Days of Visibility Impact after BART for the Northern Class I Areas.

Number of days with delta-deciview => 0.1

Uncontrolled Emissions

	2002	2003	2004
bowa	25	28	44
isle	34	51	52
sene	107	118	113
voya	10	13	20

BART

	2002	2003	2004
bowa	15	12	18
isle	23	31	25
sene	67	73	71
voya	2	1	1

Reduced Days of Impact with BART

	2002	2003	2004
bowa	10	16	26
isle	11	20	27
sene	40	45	42
voya	8	12	19

Days reduced / grams per sec reduced

	2002	2003	2004
bowa	0.018	0.032	0.050
isle	0.021	0.040	0.053
sene	0.077	0.087	0.082
voya	0.016	0.024	0.037

Number of days with delta-deciview => 0.5

Uncontrolled Emissions

	2002	2003	2004
bowa	7	7	13
isle	14	19	17
sene	41	53	48
voya	2	0	2

BART

	2002	2003	2004
bowa	0	0	0
isle	3	1	0
sene	1	11	2
voya	0.00	0	0

Reduced Days of Impact with BART

	2002	2003	2004
bowa	7	7	13
isle	11	18	17
sene	40	42	46
voya	2	0	2

	2002	2003	2004
bowa	0.013	0.013	0.029
isle	0.021	0.034	0.037
sene	0.077	0.082	0.090
voya	0.005	0.000	0.005

Table 6 - Modeled Maximum Daily Impact (dv) for 2002, 2003, and 2004

Visibility Case / Paramenter		Seney		Northern Class I Areas	
		Maximum	Average	Maximum	Average
Uncontrolled Emissions (max day)		5.38	4.14	9.67	8.12
Residual Visibility Impact (RVI)	BART	1.72	1.38	2.81	2.41
	SO2	3.19	2.32	5.16	4.02
	NOx	4.50	3.65	8.49	7.30
Visibility Improvement (VI) Result of "Uncontrolled" - "RVI"	BART	3.66	2.76	6.86	5.72
	SO2	2.19	1.81	4.51	4.10
	NOx	0.88	0.49	1.18	0.82
	sum of SO2 & NOx	3.07	2.30	5.69	4.93
Visibility Improvement / Gram Pollutant; Result of RVI / grams per sec reduced	BART	0.007	0.005	0.013	0.011
	SO2	0.005	0.004	0.011	0.010
	NOx	0.009	0.005	0.012	0.008

Maximum = Maximum Daily Impact modeled for the base years (2002 – 2004)
Average = Average of each base year maximum daily impact.

Table 7 - Draft BART Control Levels and Visibility Improvement for Boilers B26 and B27

Emission Unit	BART Technology and Control Efficiency			Visibility Improvement (dv)[2,3]					
				Seney			Northern Class I Areas		
	SO_2[1]	NOx	PM_{10}	SO_2	NOx	PM	SO_2	NOx	PM
B26	Dry FGD – 93%	OFA/FGR/SNCR – 68%	Existing Baghouse - > 99%	1.81	0.49	N/A	4.10	0.82	N/A
B27	Dry FGD – 93%	OFA + RSCR – 85%	Existing Baghouse - > 99%						
Total BART				2.76			5.72		

Notes:
[1] Overall SO_2 control efficiency, based on combination of fuel switching and dry scrubber control at 93%, is 95.8% for B26 and 93.8% for B27.
[2] Visibility improvement values are the average of the maximum daily impact identified for each BART base year 2002 to 2004
[3] Pollutants when reduced together yield a greater visibility improvement than visibility improvement modeled for each pollutant individually.

BART Baseline Emissions and Calculation of Requirements

The following amended BART requirements are proposed for SO_2 and NOx as 30-day mass caps and 12-month mass caps individually for each boiler B26 and B27. Furthermore, the emission limitations applicable to the common stack S10 are based on averaged emission requirements across boilers B25 through B28. The emission baseline and mass cap calculations exclude the operation of boiler B24 because it has been permanently shut down. Boiler B25 is included – even though it has not operated in recent years – because Georgia-Pacific was actively working with the U.S. EPA during that inoperative period to exempt B25 from the CAIR.

The annual emission baseline used to calculate the 12-month mass caps is the BART baseline 3 year average emission rate and heat input for 2002 to 2004. The 30-day emission baseline is calculated from the BART baseline 3-year average emission rate, multiplied by the actual 30-day maximum heat input which occurred during the BART baseline years. The NOx baseline emission rates for B26 and B27 are adjusted from the baseline data to reflect test data for actual emissions since 2007. The adjusted NOx emission rates are 0.68 lbs/mmBtu for B26 and 1.10 lbs/mmBtu for B27.

The 30-day and 12-month rolling BART mass caps for each boiler are calculated by applying the BART control efficiencies to the 30-day and annual emission baselines, respectively. A 10% additional reduction is then applied to the BART boiler controlled emissions to address the

environmental benefit. This is consistent with EPA's economic incentive program (EIP) policy guidance in reducing emissions 10% below that which would occur through the BART requirement on the individual boilers. The mass cap over all boilers creates an additional environmental benefit (as outlined in the EIP) by limiting the amount of overall emissions, addressing any switch of capacity from one boiler to another, and precluding any future growth in emissions from the non-BART boilers. The resulting emissions for each boiler are summed to yield the 30-day and 12-month rolling emission caps for stack S10.

Tables 8 through 11 show the baseline emissions and requirements for SO_2 and NOx on a 30-day and 12-month basis.

Table 8 - SO_2 BART Annual Baseline Emissions and Requirements

Emission Unit	Baseline Heat Input (mmBtu)	Baseline Emission Rate (Lb/mmBtu)	Baseline Emissions (Tons)	BART Control Efficiency[1]	BART Mass Emissions (Tons)	BART Mass Cap (Tons)[2]
B24	0	0	0	0	0	0
B25	555,606	1.26	349	0	349	349
B26	1,882,890	2.29	2,160	95.8%	90	81
B27	4,366,721	3.99	8,715	93.8%	544	489
B28	1,563,784	1.82	1,421	0	1421	1421
S10	8,369,001	3.02	12,644	81.0%	2,404	2,340

[1] Based on combination of fuel switching and dry scrubber control at 93% at B26 and B27.
[2] Includes 10% additional reduction applied to B26 and B27 controlled emissions.

Table 9 - SO_2 BART 30 Day Baseline Emissions and Requirements

Emission Unit	Baseline Heat Input (mmBtu)	Baseline Emission Rate (Lb/mmBtu)	Baseline Emissions (Tons)	BART Control Efficiency[1]	BART Mass Emissions (Tons)	BART Mass Cap (Tons)[2]
B24	0	0	0	0	0	0
B25	107,015	1.26	67	0	67	67
B26	219,325	2.29	252	95.8%	11	9
B27	411,492	3.99	821	93.8%	51	46
B28	159,515	1.82	145	0	145	145
S10	897,347	2.86	1,285	78.7%	284	268

[1] Based on combination of fuel switching and dry scrubber control at 93% at B26 and B27.
[2] Includes 10% additional reduction applied to B26 and B27 controlled emissions.

Table 10 - NOx BART Annual Baseline Emissions and Requirements

Emission Unit	Baseline Heat Input (mmBtu)	Baseline Emission Rate (Lb/mmBtu)	Baseline Emissions (Tons)	BART Control Efficiency[1]	BART Mass Emissions (Tons)	BART Mass Cap (Tons)[2]
B24	0	0	0	0	0	0
B25	555,606	0.39	108	0	108	108
B26	1,882,890	0.68	640	68%	205	184
B27	4,366,721	1.1	2,402	85%	360	324
B28	1,563,784	0.46	360	0	360	360
S10	8,369,001	2.63	3,510	70.6%	1,033	977

[1] Based on combination of fuel switching and dry scrubber control at 93% at B26 and B27.
[2] Includes 10% additional reduction applied to B26 and B27 controlled emissions.

Table 11 - NOx BART 30 Day Baseline Emissions and Requirements

Emission Unit	Baseline Heat Input (mmBtu)	Baseline Emission Rate (Lb/mmBtu)	Baseline Emissions (Tons)	BART Control Efficiency[1]	BART Mass Emissions (Tons)	BART Mass Cap (Tons)[2]
B24	0	0	0	0	0	0
B25	107,015	0.39	21	0	21	21
B26	219,325	0.68	75	68%	24	21
B27	411,492	1.1	226	85%	34	31
B28	159,515	0.46	37	0	37	37
S10	897,347	2.63	358	67.8%	115	110

[1] Based on combination of fuel switching and dry scrubber control at 93% at B26 and B27.
[2] Includes 10% additional reduction applied to B26 and B27 controlled emissions.

BART Compliance Requirements

The July 2011 draft BART finding provided several compliance alternatives for meeting the SO_2 and NOx BART requirements. These requirements were structured as either emission rate limitations or mass emission caps on either 30-day or 12-month rolling averages. Georgia-Pacific could comply with either the set of emission rate or mass cap limitations applicable to the individual BART boilers or to stack S10. In responding to comments, the BART compliance alternatives for meeting the BART requirements are amended to include only stack S10 mass emission caps on both a 30-day and 12-month basis (Table 12). The PM BART requirements for BART boilers B26 and B27 remain at the existing emission limitation of 0.30 Lb/mmBtu. These compliance requirements become effective January 1, 2016.

Table 12 - Summary of SO_2 and NOx BART Compliance Requirements

Pollutant	Tons Emitted in any 30 Day Period at Stack S10	Tons Emitted in any 12 Month Period at Stack S10
SO_2	268	2,340
NOx	110	977

SO_2 and NOx Alternative Compliance Option

As previously described, the primary SO_2 and NOx BART compliance requirement is to show total emissions are lower than both a 12-month rolling and 30-day rolling mass cap for emissions of each pollutant from stack S10. Since the target of reducing both SO_2 and NOx is to reduce visibility impact in the Class I areas, an alternative compliance option is provided where SO_2 can be traded for NOx reductions while still yielding the same visibility improvement as the primary BART requirement. Simply stated, this approach is a form of inter-pollutant trading for precursor emissions affecting visibility.

The alternative compliance option sets forth several set combinations of SO_2 and NOx emission mass caps for stack S10 as identified in the draft Georgia-Pacific BART Administrative Order (Attachment 6 of Wisconsin's BART SIP). Georgia-Pacific can then elect one of these default mass cap combinations by July 15, 2013 through notification to the Department and the U.S. EPA. If Georgia-Pacific elects to choose a non-specified mass cap or choose any alternative mass cap later than July 15, 2013 then the election is subject to Department review with public comment and pursuant U.S. EPA approval of the SIP. The default combinations of SO_2 and NOx emissions for election are provided in Table 13.

Under all of the identified mass cap options, SO_2 emissions are reduced below the primary BART mass cap in order to allow NOx emissions above its BART mass cap. A provision is also included which ensures that in no case, whether under an elected default or alternatively identified mass cap, that in no case NOx emissions can exceed a set cap of 1,522 tons on a 12-month rolling basis and 172 tons on a 30-day rolling basis.

Table 13 - Default SO_2 and NOx Mass Caps Under the Alternative Compliance Option

	30-day rolling		12-month rolling	
	SO_2	**NOx**	**SO_2**	**NOx**
BART	268	110	2,340	977
Mass Cap 1	246	121	2,150	1,072
Mass Cap 2	195	147	1,700	1,297
Mass Cap 3	143	172	1,250	1,522

The mass cap options are identified by establishing potential NOx emission levels consistent with various control equipment applications. The NOx mass cap levels under the alternative compliance option are calculated placing these control assumptions against the BART baseline year average heat input for each boiler. Details of control equipment options and visibility improvement for boilers B26 and B27 are those identified and evaluated under the July 2011 BART proposal.

To ensure equivalent or greater visibility improvement, NOx is offset by two tons of SO_2 (2:1 trading ratio). As a result, at each NOx emission level the SO_2 BART requirement is reduced by two tons for every ton of NOx over the primary BART mass cap. This 2:1 ratio is based on the analysis of SO_2 and NOx trading included in the July 2011 draft BART finding, section 7. The analysis tested various combinations of SO_2 and NOx trading for visibility improvement during the 20% best and worst days and on a 30-day rolling basis relative to the Seney Class I area. The results of the analysis show that a 2:1 trading ratio ensures equivalent or greater visibility. Further, the analysis establishes visibility improvement increases and the magnitude of individual day visibility impact decreases as more SO_2 is removed in lieu of NOx control. The NOx control is evaluated for control levels from 70% down to 21%. However, to address individual days when the impact of NOx emissions can be larger than normal due to atmospheric chemistry, the minimum NOx reduction of approximately 50% overall control is reflected in the maximum NOx emission cap.

Under the Wisconsin BART rule, s. NR 433.06, Wis. Adm. Code, and U.S. EPA's EIP policy, traded emissions must be in excess or surplus of other applicable emission requirements. Currently, the boilers in the stack S10 system are not subject to emission requirements which reduce SO_2 emissions below the primary BART required emission cap. Therefore reductions of SO_2 below the emission cap are excess and can be traded in lieu of the NOx BART requirement. Accordingly, the choice of an alternative mass cap at a future date is based on the assessment of current applicable requirements and as such those mass caps also reflect trading of excess SO_2 emission reductions.

i) Simplified Approach to an Alternative Compliance Option

A simplified approach to implementing an alternative control option is to allow inter-pollutant trading by applying the established 2:1 trading ratio along with the "not to exceed" NOx mass cap. In this case, Georgia-Pacific does not need to elect one set of SO_2 and NOx mass caps. In essence SO_2 can be traded for NOx versus the primary BART mass caps. This approach allows the control levels to be varied over time based on the most effective option at that time. Further, this approach does not require an election of one set of mass caps by June 15, 2013 and or SIP approval for mass caps identified at a later date.

The Department feels this simplified approach is justified in that it ensures equivalent visibility by employing the same criteria used in establishing the previously describe sets of mass caps. Further, even as other future NOx or SO_2 requirements become applicable, the visibility improvement determined as BART cannot be lost. This is supported by the modeling of visibility improvement for the different SO_2 : NOx trading cases at a 2:1 ratio where greater improvement is garnered from deeper SO_2 reductions. On this premise, if a SO_2 reduction level

is chosen for trading under BART and then a future regulation requires the same amount of SO_2 reduction there is no loss of visibility improvement under inter-pollutant trading. Further, if the future regulation requires SO_2 reduction beyond the chosen trading level, then applying these reductions to offset NOx reductions at the same 2:1 ratio will result in even greater visibility improvement. In all of these cases the visibility improvement realized under the primary BART requirement is kept whole at any time into the future. The Department also maintains that this trading, although variable over time, is based on the requirements when the BART is established and therefore excess to other emission requirements. If the U.S. EPA remains concerned that NOx emission levels may increase as future SO_2 regulations come into place, a simple solution is to prohibit a change of "noticed" NOx mass caps to a lower level after that time.

To note is that under any alternative compliance plan or even the primary BART mass cap requirements that any future evaluation of haze reasonable progress or NAAQS attainment demonstrations are based on the maximum emissions allowed under the BART compliance options.

3. Electric Utility Generating Units

The July 2011 draft BART finding proposed PM requirements based on the existing control equipment and permit limitations. In responding to comments, the BART determination for PM has not been amended. A template ("EGU BART Permit Revisions for Implementation of BART") is included as a separate attachment to the BART SIP submittal. Table 14 provides a summary of PM BART determinations for Wisconsin EGU sources. Additional details regarding the Department's BART determination for PM at EGU's are found in the July 2011 Draft BART TSD for EGUs (Attachment 2 of Wisconsin's BART SIP) and the Response to Comments for BART (Attachment 10 of Wisconsin's BART SIP).

Table 14 - PM BART Determination for Wisconsin EGU Sources

Source Name	Emission Units (B = Boiler)	PM Permit Emission Limit (Lbs/mmBtu)	County
Electrostatic Precipitator Control			
Alliant Energy – Columbia	B-21, B-22	0.60 (B-21) 0.10 (B-22)	Columbia
Alliant Energy – Edgewater	B-24	0.13	Sheboygan
Alliant Energy – Nelson Dewey	B-22	0.10	Grant
Wisconsin Energy – Oak Creek	B-27,28	0.03	Milwaukee
Wisconsin Energy – Pleasant Prairie	B-21, B-22	0.10	Kenosha
Wisconsin Public Service Corporation – JP Pulliam Plant	B-27	0.30	Brown
Baghouse Control			
Dairyland Power Coop – Alma	B-25,26	0.10	Buffalo
Dairyland Power Coop – Genoa	B-20	0.034	Vernon
Wisconsin Energy – Valley	B-21, B-22, B-23, B-24	0.15	Milwaukee

Appendix A. Additional information for modeling of visibility impact for BART at Georgia-Pacific

Table A1 - Individual Unit Baseline Emission Rates used for Modeling Results

Unit and Pollutant	Emissions (grams/sec) [a]		
	SO_2	NOx	PM_{10}
B24	19.8	7.0	1.7
B25	0	0	0
B26	116.0	17.8	4.7
B27	314.7	103.2	7.8
B28	64.3	13.4	3.0

[a] Emission rates are "max actual" data (Lbs/day) provided by GP.

Table A2 - Source Parameters at GP, Stack S10

Parameter	Unit	Value
Location		
Latitude	deg.	44.49 N
Longitude	deg.	88.03 W
Datum	-	NAR-C
Stack Height	meters	121.9
Base Elevation	meters	179.5
Diameter	meters	3.81
Gas Exit Velocity	meters/sec	17
Stack Gas Exit Temperature	F	439