NPS comments on the Catalyst Paper (Snowflake) Inc. BART Analysis and Determination
December 2, 2010

Process Description

Abitibi Consolidated was purchased by Catalyst Paper Snowflake Inc (CPSI) in April of 2008. CPSI operates a recycled paper mill near Snowflake, Arizona, which produces newsprint and newsprint-like grades at a capacity of approximately 1,460 tons per day. A Powerhouse consisting of 3 boilers provides steam and electricity for use at the mill. Power Boiler #2 is rated at 1,132 million British thermal units (MMBtu) per hour and is the primary boiler.

Description of Emissions Units Subject to Best Available Retrofit Technology (BART)

ADEQ: Power Boiler #2 is a coal-fired boiler installed in 1975. CALPUFF modeling performed by CPSI demonstrated that the boiler has a visibility extinction of 0.739 deciviews on the Sierra Ancha Wilderness Area and 0.523 deciviews on the Superstition Wilderness Area. Therefore, the unit contributes to the impairment of visibility at a Class I area and is subject-to-BART for NO_x and SO_2.

NPS: Agreed.

NO_x BART Analysis and Determination

Step 1: Identify the Existing Control Technologies in Use at the Source

CPSI currently does not operate any NO_x control technology on Power Boiler #2 although there is a permit limit of 0.7 lb/MMBtu. There is an existing over fire air system (OFA) that has never been operated.

Step 2: Identify All Available Retrofit Control Options

CPSI has identified seven control options:

- Operate the existing OFA
- Install Low NO_x Burners (LNB)
- Install LNB with new OFA
- Install LNB, new OFA, and a selective non-catalytic reduction system (SNCR)
- Install a Rotating Over Fire Air (ROFA) system
- Install a ROFA with SNCR
- Install LNB, new OFA, and a selective catalytic reduction system (SCR)

NPS: ADEQ has chosen a reasonable suite of options.

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that all of the control options identified above are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies

According to the analysis performed by Catalyst Paper, the technically feasible control options were identified as being able to achieve the following emissions rates:

Table 4: Control Effectiveness of Control Options

Control Option	Achievable Emissions Rate (lb/MMBtu)
OFA	0.525
LNB	0.370
ROFA	0.348
ROFA with SNCR	0.291
LNB with new OFA	0.265
LNB, OFA, and SNCR	0.194
LNB,OFA, and SCR	0.070

NPS: In its SNCR cost analyses, CPSI has assumed a boiler uncontrolled NO_x emission rate of 0.192 lb/mmBtu and a desired outlet emission rate of 0.148 lb/mmBtu. Because the uncontrolled emission rate is lower than the “Achievable Emission Rates” evaluated by ADEQ, the ADEQ analyses are invalid.

In its SCR cost analyses, CPSI has assumed a boiler outlet NOx emission rate of 0.265 lb/mmBtu. We have shown in our General BART Comments that SCR can reduce emissions by at least 90%, which corresponds to the 0.03 lb/mmBtu, less than half of the rate evaluated by CPSI.

ADEQ must reconcile the wide disparity between the values in its Table 4 and the emission rates used by CPSI to generate its cost data below.

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results

Cost of Compliance

ADEQ: During the course of Catalyst Paper’s review of the technically feasible control options, the company identified the expected amount of emissions reduced by the application of each control option, as well as the annualized cost, and the average cost effectiveness of the controls. That information is summarized in Table 5 below.

Table 5: Cost of Compliance of Control Options

Control Option	Expected emissions reduction (tpy)	Annualized Cost	Average Cost Effectiveness ($/ton NO_x)
OFA	868	$3,221,359[2]	$3,711
LNB	1,636	$3,400,185	$2,078
ROFA	1,745	$4,262,553	$2,443
ROFA with SNCR	2,028	$4,903,534	$2,418
LNB with new OFA	2,157	$3,509,992	$1,627
LNB, OFA, and SNCR	2,509	$3,968,779	$1,582
LNB,OFA, and SCR	3,124	$7,181,536	$2,299

1. This analysis assumes the facility is current emitting NO_x at the permit limit of 0.7 lb/MMBtu. That is the rate at which CPSI modeled visibility impacts and therefore must be held constant for any analysis based on emission rates.
2. There is a large annualized cost to this existing equipment because it has been assumed that its operation would make the fly ash from the boiler unsellable.

ADEQ: From Table 5 it can be seen that ROFA and ROFA with SNCR are inferior options because there is an option (LNB with new OFA) that provides greater annual reduction at a lower annualized cost. ADEQ has eliminated those control options from consideration and the incremental cost effectiveness associated with the remaining control options is as follows:

NPS: Despite ADEQ's assertion that the cost analysis must be based upon the 0.7 lb/mmBtu permit limit, the analyses submitted by CPSI and used by ADEQ were actually based upon the lower NO_x emission rates we noted above. Furthermore, the CPSI BART analysis used a 10.5% interest rate instead of the 7% interest rate recommended by the Cost manual. As a result, the ADEQ costs are overestimated and its analyses are invalid.

As explained by ADEQ in footnote #2 to its Table #5, "There is a large annualized cost to this existing equipment because it has been assumed that its operation would make the fly ash from the boiler unsellable." Neither CPSI nor ADEQ have provided any concrete justification to support its speculation. On the contrary, our conversations with SNCR vendors indicate that this claim is probably invalid.

Energy Impacts

ADEQ: According to the analysis provided by CPSI, there are adverse energy impacts that require consideration for several of the technically feasible control options. Specifically, CPSI reported that the OFA would require 224 kW of power, the SNCR would require 10 kW, and the SCR would require 377 kW. ADEQ notes that the LNB would require no additional power.

NPS: These energy costs are included in the overall cost analysis.

Non Air-Quality Environmental Impacts

ADEQ: According to CPSI's analysis, non-air quality impacts may result due to the application of several technically feasible control technologies. Specifically, CPSI stated that due to the potential increase in the amount of unburnt carbon, the installation of LNB and OFA may have the potential of rendering the fly ash unsellable. If the fly ash were rendered unsellable, the fly ash would increase the amount of solid waste generated at the facility, ultimately increasing the amount sent to the landfill.

In addition to the LNB and OFA technologies, SCR and SNCR have the potential to impact the sellability of the fly ash. As noted above, both technologies rely on the injection of ammonia to reduce the formation of NO_x. Most SCR and SNCR vendors recommend that the operator inject more than the stoichiometric amount of ammonia to drive NOx formation to a minimum. This practice results in emissions of ammonia (called ammonia slip). Since the ammonia has an affinity for the fly ash, its presence in the exhaust stream could result the spoiling of the fly ash, leading to increased solid waste from the facility.

NPS: The concerns raised by CPSI and ADEQ are speculative and unsupported.

<u>Remaining Useful Life</u>

ADEQ: None of the documentation submitted by CPSI has indicated that the facility will be shut down in the near future. For the purposes of its analyses, CPSI assumed a typical equipment life of 15 years for calculating the annualized cost of control options. As a result, ADEQ has determined that the remaining useful life of the mill has no effect on this BART analysis.

NPS: CPSI incorrectly assumed a 15-year life for SNCR and SCR. The Cost Manual recommends a 20-year life. As a result, ADEQ has overestimated the annual costs of SNCR and SCR.

<u>Step 6: Evaluate Visibility Impacts</u>

ADEQ: As part of its analysis of potential BART options, CPSI estimated the total visibility improvement that is projected to occur should one of the technically-feasible and cost-effective control options be applied. Based upon that information, ADEQ was also able to calculate the average cost effectiveness in terms of dollars per deciview of visibility improvement. CPSI's results are summarized in Table 7 below.

Table 7: Visibility Impacts of Remaining Control Options

Control Option	Deciview Improvement*	Cost Effectiveness* ($/Deciview)
OFA	0.076	$42.4 million
LNB	0.164	$20.7 million
LNB with new OFA	0.207	$17.0 million
LNB, OFA, and SNCR	0.252	$15.7 million
LNB,OFA, and SCR	0.309	$23.2 million

*Based on visibility effects at most impacted Class I area – Sierra Ancha WA

NPS: ADEQ must also consider the benefits to the other Class I areas.

Step 7: Select BART

ADEQ: Based upon its review of CPSI's analysis, and in particular the marginal visibility impact from the current facility operations and the magnitude of the dollar per deciview costs in Table 7, ADEQ has determined that BART for control of NO_x from Power Boiler #2 is the current emission limit of 0.7 lb/MMBtu.

NPS: ADEQ is proposing that BART be an emission rate more than double that used by CPSI in its analyses. Even though the cost estimates relied upon by ADEQ are inflated, the $/dv values estimated by ADEQ for Sierra Ancha WA for LNB with new OFA and LNB, OFA, and SNCR fall within the range of average $/dv costs proposed or accepted by other sources and states. ADEQ has incorrectly evaluated the effectiveness and cost of the control options, and ignored the visibility benefits to multiple Class I areas. ADEQ's BART analysis for Catalyst Paper is not acceptable.

SO_x BART Analysis and Determination

Step 1: Identify the Existing Control Technologies in Use at the Source

ADEQ: Power Boiler #2 has a SO_2 permit limit of 0.8 lb/MMBtu and is controlled with a wet sodium flue gas desulfurization system tray tower scrubber.

Step 2: Identify All Available Retrofit Control Options

ADEQ: CPSI has identified two control options as potentially being BART:

- Upgrade the existing scrubber
- Add a second scrubber

In 2008, CPSI was forced to switch to Lee Ranch Mine coal due to the closure of the McKinley Mine. The coal now available to CPSI has an average sulfur content of 2.3 lb/MMBtu and the facility has been forced to complete much of the upgraded scrubber project in order to maintain compliance with the 0.8 lb/MMBtu emission limit in its operating permit. As it now represents baseline control, it is no longer appropriate to consider upgrading the scrubber to be an additional control option.

Add a second scrubber. A second scrubber could be added in order to capture 100% of the flue gas at an efficiency of 98%. This would increase the overall control efficiency from 63.9% to 98% control.

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that both control options identified above are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies.

According to the analysis performed by CPSI, the technologically feasible controls are capable of achieving the following emissions rates:

Table 8: Control Effectiveness of Control Options

Control Option	Achievable Emissions Rate (lb/MMBtu)
Upgrade Current Scrubber / Baseline Control	0.80
Add Second Scrubber	0.044

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results

Cost of Compliance

During the course of CPSI's review of the technically feasible control options, the company identified the expected amount of emissions reduced by the application of each control option, as well as the annualized cost and the average cost effectiveness. That information is summarized in Table 9 below.

Table 9: Cost of Compliance of Control Options

Control Option	Expected emissions reduction (tpy)	Annualized Cost	Average Cost Effectiveness ($/ton SO_2)
Upgrade Current Scrubber / Baseline Control	0	0	N/A
Add second scrubber	3,743	$4,769,365	$1,274

1. This analysis assumes the facility is current emitting SO_2 at the permit limit of 0.8 lb/MMBtu. That is the rate at which CPSI modeled visibility impacts and therefore must be held constant for any analysis based on emission rates.

NPS: The ADEQ data presented above does not match the data provided by CPSI in its 1/17/08 BART analysis. For example, CPSI Tables 3-4 and in its Appendix A show that addition of a second wet scrubber would reduce SO_2 emissions by 10,764 tpy at $901/ton at the same annual cost that ADEQ assumes to remove 3,743 tpy and $1,274/ton. The Alstom Power 10/21/06 Budgetary Proposal quoted a turnkey price for the new scrubber at $11,500,000. However, the CPSI BART analysis increased this cost to $15 million in its Appendix A. It is therefore not possible to evaluate the ADEQ analysis without any supporting information. It appears that change to higher sulfur coal that occurred after the CPSI BART analysis was conducted has invalidated that analysis.

Non Air-Quality Environmental Impacts

CPSI has stated that the addition of a second scrubber will result in the generation of an additional 8,000 tpy of solid scrubber waste and the additional use of 38 million gallons of water per year.

Step 6: Evaluate Visibility Impacts

As part of its analysis of potential BART option, CPSI estimated the total visibility improvement that is projected to occur should one of the technically-feasible and cost-effective control options be applied. Based upon that information, ADEQ was also able to calculate the average cost effectiveness in terms of dollars per deciview of visibility improvement. CPSI's results are summarized in Table 10 below.

Table 10: Visibility Impacts of Control Options

Control Option	**Deciview Improvement***	**Cost Effectiveness* ($/Deciview)**
Add 2nd Scrubber	0.20	$23.8 million

1. Based on visibility effects at most impacted Class I area – Sierra Ancha WA

NPS: ADEQ must also consider the benefits to the other Class I areas.

Step 7: Select BART

ADEQ: Based upon its review of CPSI's analysis, and the all of the considerations listed above, ADEQ has determined that BART for control of SO_2 from Power Boiler #2 is the current upgraded scrubber, as defined in Step #2, with an emission limit of 0.80 lb/MMBtu.

NPS: ADEQ has incorrectly evaluated the cost of the control options, and ignored the visibility benefits to multiple Class I areas. ADEQ's BART analysis for Catalyst Paper is not acceptable.