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April 2, 2009

Robert C. Burmark, P.E.
Environmental Engineer
Department of Ecology
Air Quality Program
PO Box 47600
Olympia, WA 98504-7600

Subject: BART Analysis and Determination Report, Addendum 2

Dear Mr. Burmark:

I am submitting as BART Analysis and Determination Report, Addendum 2 the results of our follow up to the questions you posed in the letter dated March 12, 2009. I believe you will find the report to be responsive to your questions. This report when combined with the original BART Analysis and Determination Report and Addendum 1 should be considered PTPC's formal analysis and determination.

I have asked Anna Henolson at Trinity to forward this report electronically with a hard copy to follow. Please feel free to contact me if you have any questions.

Sincerely-

E Muehlethaler

Eveleen Muehlethaler
VP Environmental Affairs
eveleenm@ptpc.com
(360) 385-6484

BEST AVAILABLE RETROFIT TECHNOLOGY APPLICABILITY ANALYSIS AND DETERMINATION REPORT
ADDENDUM 2
PORT TOWNSEND PAPER CORPORATION ▪ PORT TOWNSEND, WA

Prepared for:

PORT TOWNSEND PAPER CORPORATION

PO Box 3170
Port Townsend, WA 98308
(540) 969-5385

Prepared by:

Anna Henolson ▪ Consultant
Aaron M. Day, P.E. ▪ Principal Consultant

TRINITY CONSULTANTS
20819 72nd Ave S.
Suite 610
Kent, Washington 98032
(253) 867-5600

April 2009

Project 094801.0011

1. INTRODUCTION

Port Townsend Paper Corporation (PTPC) submitted a Best Available Retrofit Technology (BART) Applicability and Determination Report (BART Report) to the Washington Department of Ecology (Ecology) on December 19, 2007. In October of 2008, PTPC submitted an addendum to the original BART Report providing additional information as requested by Mr. Robert Burmark, Ecology. On March 12, 2009, PTPC received a second request for information from Mr. Burmark. This second addendum provides the information requested in Ecology's March 12, 2009 letter. A copy of the March 12, 2009 letter is provided in Appendix A.

This addendum addresses each of the items in Ecology's March 12, 2009 letter, as summarized in the following list.

1. An evaluation of the economics of using a lower sulfur containing fuel
2. Further evaluation of the feasibility of the use of a wet scrubber for control of SO_2 from the Recovery Furnace
3. A discussion and evaluation of using an ammonia background concentration of 17 parts per billion (ppb)

2. Economic Analysis for Using Lower Sulfur Fuel

Ecology requested in their March 12, 2009 letter that PTPC provide an evaluation of the economics of using low sulfur diesel (0.05 percent sulfur) and ultra low sulfur diesel (0.0015 percent sulfur) in the No. 10 Power Boiler. This review is in addition to the evaluation that was provided in PTPC's original BART Report for switching from "low spec" (0.76 percent sulfur) recycled fuel oil (RFO) to "high spec" RFO (0.50 percent sulfur). This section summarizes the economic analysis for using lower sulfur fuel for reduction of SO_2 emissions from the No. 10 Power Boiler.

PTPC, in reviewing the cost information for fuel oil, found that the current fuel market does not offer appreciable additional cost savings for using low sulfur diesel (LSD) compared to using ultra low sulfur diesel (ULSD). Therefore, the economics of using ULSD are evaluated below using price information for No. 2 diesel fuel oil sold to the industrial sector in Washington State.[1]

Petroleum fuel prices have been unusually volatile in 2008 and 2009. Using a single price point for the cost analysis from the most recent data available may result in an unrealistically low or high cost of diesel fuel oil. Therefore, the cost evaluation for switching to ULSD fuel oil is based on the average cost of No. 2 diesel fuel oil derived from three years of historical price data. Additionally, fuel prices for both the No. 2 diesel fuel oil and the baseline RFO from year 2008 were not considered, because petroleum prices observed during 2008 hit record highs. Because higher increases occurred for the No. 2 diesel fuel prices during 2008 than for the RFO prices, the exclusion of 2008 fuel cost data from this analysis results in a conservative (i.e., lower) calculated cost of switching to ULSD fuel. PTPC obtained the historical No. 2 diesel fuel oil prices for the years 2005 through 2007 from the Energy Information Administration based on sales to the industrial sector in Washington State.[2]

Table 2-1 presents the cost analysis for the control of SO_2 by switching from "low spec" RFO to ULSD fuel oil. In addition to the conservatism of using 2005 to 2007 prices for No. 2 diesel fuel oil, this analysis adds further conservatism by excluding all costs that the mill would incur from the installation of any new equipment that would be necessary (e.g., a separate ULSD storage tank) to switch the fuel type fired in the No. 10 Power Boiler.

[1] The cost effectiveness of a control option such as fuel switching is quantified by dividing the annual control cost by the annual emissions reduction achieved by that control option. Therefore, because control costs are approximately equivalent for the transition to either LSD or ULSD, a higher emissions reduction results in a lower cost effectiveness determination. As the use of ULSD fuel results in the higher emissions reduction and the more conservative (i.e., lower) cost effectiveness determination for fuel switching, only ULSD is considered in this analysis.

[2] Energy Information Administration No. 2 diesel fuel oil cost data obtained from http://tonto.eia.doe.gov/dnav/pet/pet_pri_dist_dcu_nus_m.htm, downloaded on March 13, 2009.

TABLE 2-1. COST ANALYSIS FOR THE CONTROL OF SO2: ULTRA LOW SULFUR DIESEL

Description	Value	Units
Maximum Sulfur Content in Baseline Fuel	0.76	(weight %) [a]
SO_2 Emitted	5.01	(lb SO_2/barrel) [b]
Cost of Baseline Fuel	43.53	($/barrel) [c]
Maximum Sulfur Content in Ultra Low Sulfur Diesel	0.0015	(weight %) [d]
SO_2 Emitted	0.01	(lb SO_2/barrel) [b]
Cost of ULS Diesel	92.67	($/barrel) [e]
SO_2 Reduction from Switching to ULS Diesel	5.00	(lb/barrel)
Cost of Switching to ULS Diesel	49.14	($/barrel)
Cost Effectiveness of ULS Diesel ($/lb SO_2 removed)	9.83	($/lb SO_2)
Cost Effectiveness of ULS Diesel ($/ton SO_2 removed)	19,651	($/ton SO_2)

[a] Percent weight of sulfur in of low spec RFO is based on maximum sulfur content guaranteed by vendor.
[b] SO_2 emissions are based on AP-42 Table 1.3-1 emission factor (157*S% lb SO2/103 gallons).
[c] The average price PTPC paid for RFO from 2005 through 2007 is $43.53 per barrel.
[d] Ultra low sulfur diesel is defined as having a sulfur content of 15 ppm or 0.0015%.
[e] The cost of ULSD was determined based on the price of No. 2 diesel fuel oil sold in Washington State from 2005 to 2007. Cost information was obtained from the U.S. Energy Information Administration (EIA)'s website (www.eia.doe.gov). Using fuel cost of No. 2 diesel fuel oil conservatively represents ULSD fuel oil costs.

As presented in Table 2-1, the cost of switching from the recycled fuel oil (RFO) currently fired in the No. 10 Power Boiler to ULSD fuel oil with a maximum sulfur content of 15 ppm (0.0015 %) is $19,651 per ton of SO_2 removed. Although the actual sulfur content of the RFO is typically considerably lower than the vendor guarantee, this estimate conservatively calculates the current SO_2 emissions based on the guaranteed maximum sulfur content of 0.76 % in the RFO.[3] The estimate also conservatively assumes that all sulfur in the fuel oil is emitted as SO_2.[4] These same conservative assumptions were also applied when conducting the evaluation for switching from "low spec" RFO to "high spec" RFO that was presented in PTPC's original BART Report. However, as discussed in the original BART Report, the alkaline fly ash created from co-firing the RFO with wood fuel in the No. 10 Power Boiler absorbs much of the sulfur compounds in the exhaust gas. This sulfur-containing ash is then removed from the exhaust stream in the multiclones and wet scrubber. As shown in Table 2-1, even if this natural SO_2 scrubbing effect is ignored, switching to ULSD fuel oil is cost ineffective. Therefore, the option of reducing SO_2 emissions by switching from RFO to ULSD fuel oil in the No. 10 Power Boiler is not considered further.

[3] Fuel sulfur content is recorded based on the specifications of each shipment. The actual sulfur content of the "low spec" RFO is approximately 0.47 percent, based on the average sulfur content of fuel combusted at the PTPC mill from 2003 through 2005, which serves as the basis for BART emissions data. However, by using the guaranteed maximum sulfur content of RFO, a higher emissions reduction for the fuel switching strategy is quantified than would be quantified if the actual RFO sulfur content were used. Because a higher emissions reduction results in a lower (i.e., more conservative) cost effectiveness determination, this strategy conservatively represents the cost effectiveness of this SO_2 emissions control option.

[4] For the cost analysis, SO_2 emissions are based on AP-42 Table 1.3-1 emission factor (157*S% lb $SO_2/10^3$ gallons), which assumes 100 % of the Sulfur in the oil is emitted as SO_2.

3. Evaluation of a Wet Scrubber to Control SO_2 from the Recovery Furnace

In the March 12, 2009 letter, Ecology requested that PTPC further evaluate the option of installing an add-on wet scrubber to control SO_2 emissions from the Recovery Furnace. This section summarizes the technical and economic evaluation of this control technology.

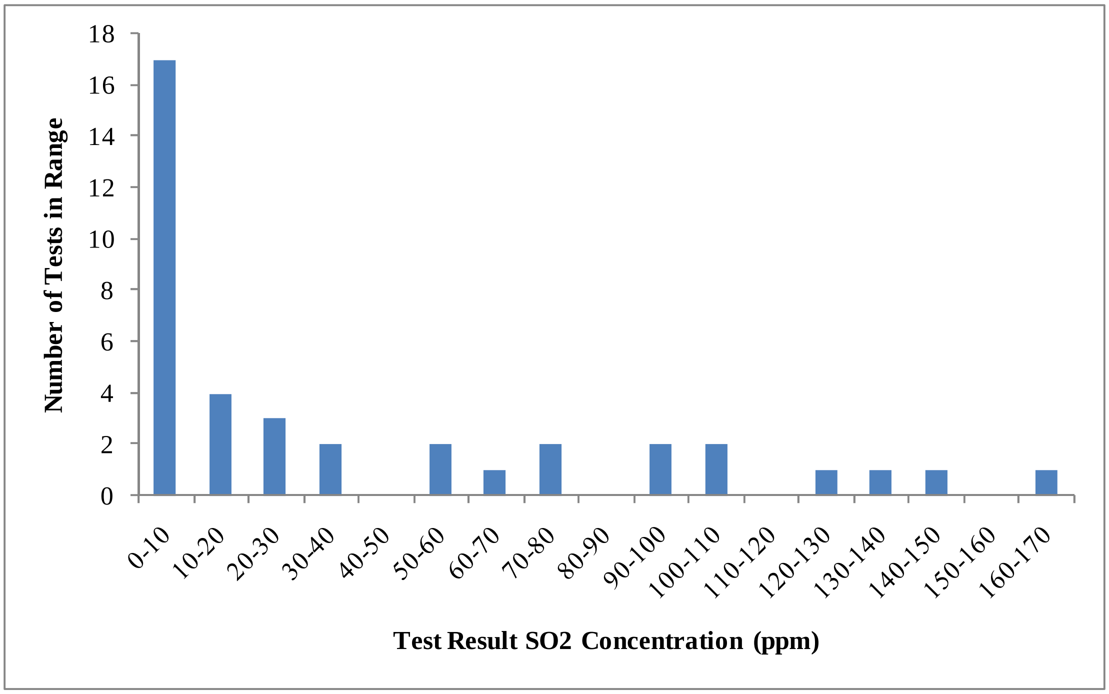
As stated in Ecology's letter, wet scrubbers have been operating on three recovery furnaces in the Northwest. In researching this information, PTPC found that the primary purpose of installing these scrubbers had been for heat recovery purposes or incremental particulate matter control. These scrubbers may provide an ancillary benefit of SO_2 reduction, but it PTPC's belief that the installation of a wet scrubber for the purpose of controlling SO_2 is not cost effective. NCASI notes that the use of dedicated add-on control equipment for the reduction of SO_2 from recovery furnaces has not been demonstrated anywhere in the United States and is considered prohibitive from a cost perspective.[5]

As discussed in the original BART Report, the primary purpose of the Recovery Furnace is to recover chemicals that have been used in the pulping process and to re-use them; well designed and properly operated recovery furnaces emit little SO_2. The typical vendor guarantee for SO_2 is equivalent to an expectation of near zero steady state SO_2 emissions, while still accounting for some highly sporadic, unpredictable, and short duration "spikes" in SO_2 emissions. These spikes can be theoretically traced back to dozens of potential culprits, with variations in black liquor sulfidity and solids content being the best characterized and understood of these factors.

Short-term SO_2 emissions from PTPC's Recovery Furnace are typically less than 20 ppm as demonstrated in Figure 3-1, a histogram representing the source test results for SO_2 from the Recovery Furnace for years 1997 through 2007. Of the forty SO_2 test results reviewed, more than half showed emissions less than 20 ppm, and more than 40 percent of tests showed emissions less than 10 ppm.

[5] NCASI, *Corporate Correspondence Memo CC-06-14: Information on Retrofit Control Measures for Kraft Pulp Mill Sources and Boilers for NO_X, SO_2, and PM Emissions*, June 4, 2006.

FIGURE 3-1. HISTOGRAM OF SO_2 SOURCE TEST RESULTS FOR PTPC'S RECOVERY FURNACE



Given the relatively low SO_2 emissions that occur under normal recovery furnace operating conditions (i.e., BLS combustion resulting in emissions of 20 ppm SO_2 or less), it is unlikely that a sulfur dioxide scrubber would achieve a substantial reduction in outlet concentrations. The U.S. EPA Clean Air Technology Center (CATC) fact sheet on spray towers used for SO_2 removal cites a typical inlet concentration loading of 250 to 10,000 ppm for the scrubbers, which can achieve control efficiencies of 80 to 99% (the higher efficiencies correspond to high inlet concentration streams), and have typical efficiencies of 90% or greater.[6] Therefore, a scrubber with an inlet stream with a typically SO_2 concentration of 20 ppm or less would not be expected to have an appreciably lower outlet exhaust stream SO_2 concentration. Further, use of a scrubber would have other environmental impacts associated with its operation (e.g., disposal/treatment of the pollutant-laden scrubbing medium, additional power generation by the boilers to support the pumps). Due to the low SO2 exhaust concentration typically for PTPC's Recovery Furnace, PTPC concludes that it is infeasible to install a wet scrubber for control of SO_2 from the Recovery Furnace. The economic evaluation provided in the following paragraph further supports this determination by demonstrating that the installation of a wet scrubber for control of SO_2 would be cost ineffective.

EPA's CATC fact sheet provides an average annualized cost for a wet scrubber of $34/scfm and notes that "smaller units controlling a low concentration waste stream will be more expensive (per unit volumetric flow rate)." [7] The Recovery Furnace flow rate exceeds 249,000 scfm (wet basis), which

[6] U.S. EPA CATC, *Air Pollution Control Technology Fact Sheet – Spray Tower Wet Scrubber*, EPA-452/F-03-016, July 2003. Available at: www.epa.gov/ttn/catc/dir1/fsprytwr.pdf.

[7] The CATC Fact Sheet lists wet scrubber annualized costs ranging from $2.5 to $48/scfm, for an average of $25.25/scfm (2002 $) and notes that units controlling lower concentration waste streams will be more expensive. Therefore,

would correspond to an annual control cost of $20,117 per ton of SO_2 removed (2007 $), assuming 90 percent SO_2 control is even feasible with the low SO_2 concentrations from PTPC's Recovery Furnace. Table 3-1 shows the calculations used to estimate this annual control cost. As this level of control (i.e., 90 percent) is not likely feasible, the cost per ton of SO_2 removed would actually be even greater. Additionally, this cost estimate does not account for site-specific retrofit costs, adding further conservatism to the result. Finally, recent control technology determinations on the RBLC have not considered a scrubber to be a feasible control option. Therefore, the option of reducing SO_2 emissions by installing a wet scrubber for control of SO_2 is not economically feasible and is not considered further.

TABLE 3-1. COST ANALYSIS FOR THE CONTROL OF SO_2: WET FGD TECHNOLOGY

Annual Cost Summary		**Value**
Specific Annualized Cost ($/scfm), 2007 $		$34 [a]
Capacity of Equipment (scfm wet)		249,946 [b]
TOTAL ANNUALIZED COST		$8,381,892
Cost Effectiveness Summary		
Annual Control Cost ($)		$8,381,892
Pollutant to be Removed (tpy SO_2)	90% removal	416.65 [c]
CONTROL COST EFFECTIVENESS ($/ton SO_2)		$20,117

[a] U.S. EPA CATC, Air Pollution Control Technology Fact Sheet – Spray Tower Wet Scrubber, EPA-452/F-03-016, July 2003. Available at: www.epa.gov/ttn/catc/dir1/fsprytwr.pdf. Costs are scaled to 2007 dollars using the Chemical Engineering Plant Cost Index (CEPCI). The values of the CEPCI are 395.6 for 2002 and 525.4 for 2007. Additional retrofit costs are conservatively not included.

[b] The capacity of the scrubber is based on the maximum measured flow from 2003 to 2005 stack test data.

[c] For the purposes of the cost analysis, a 90 % control efficiency is conservatively used. However, the control efficiency that can actually be achieved in practice is likely to be much lower since the inlet concentration of SO_2 from the Recovery Furnace is already at a low value.

using the average cost is expected to be conservative since the inlet SO_2 concentration loading from PTPC's Recovery Furnace is low. Costs are scaled to 2007 dollars using the Chemical Engineering Plant Cost Index (CEPCI). The values of the CEPCI are 395.6 for 2002 and 525.4 for 2007.

4. DISCUSSION AND EVALUATION FOR USING AN AMMONIA BACKGROUND CONCENTRATION OF 17 PPB

In the March 12, 2009 letter, Ecology requested that PTPC submit additional information showing its impacts on the nearest Class I area, Olympic National Park, using a higher background ammonia concentration of 17 ppb. However, PTPC believes that using 17 ppb ammonia background concentration would significantly overestimate the effect of background ammonia in the BART modeling for PTPC's potential impacts at Olympic National Park.

In PTPC's original BART Report dated December 19, 2007, a background concentration of 17 ppb ammonia was used for the BART applicability modeling conducted for all Class I areas within 300 kilometers of the PTPC Mill. The BART applicability modeling demonstrated that the 98^{th} percentile visibility impacts did not exceed the 0.5 dv contribution threshold for all modeled areas other than Olympic National Park. Following U.S. EPA's BART guidelines, the modeling results submitted in PTPC's original BART Report support the determination that the BART-eligible emission units at the PTPC Mill do not contribute to visibility impairment at following Class I areas: Alpine Lakes Wilderness Area, Glacier Peak Wilderness Area, Goat Rocks Wilderness Area, Mount Adams Wilderness Area, Mount Rainier National Park, North Cascades National Park, and Pasayten Wilderness Area. In addition, the BART-eligible emission units at the PTPC Mill do not contribute to visibility impairment at the Columbia River Gorge National Scenic Area.

For Olympic National Park, PTPC had also conducted a refined modeling analysis in the original BART Report to assess the visibility impacts. The refined modeling analysis applied the following changes to the modeling methodology.

- Use a background ammonia concentration of 0.5 ppb to more accurately represent the background ammonia concentration for the area including and between PTPC and Olympic National Park
- Applied the ammonia limiting method (ALM)
- Applied the revised equation for calculating light extinction coefficients (the new IMPROVE algorithm)
- Used refined emission calculations for emission rates

PTPC does not believe that modeling its impacts on Olympic National Park using the 17 ppb ammonia background concentration would be appropriate for reasons described in Section 4.1 below. However, PTPC has conducted this analysis at Ecology's request for informational purposes. The visibility impacts of the PTPC Mill at Olympic National Park using the 17 ppb ammonia background are presented in Section 4.2. The analysis presented in Section 4.2 does use the ALM, IMPROVE, and emission rate refinements. Because the analysis presented in Section 4.2 includes these three refinements to the original BART applicability modeling conducted for all the Class I areas, the results of the 17 ppb ammonia background concentration analysis presented below show improved results, and are not directly comparable to the results from the original BART applicability analysis.

The modeling results using a 17 ppb ammonia background concentration do not change the conclusion of the BART determination, as presented in PTPC's original BART Report.

4.1 CHOICE OF AMMONIA BACKGROUND CONCENTRATION

PTPC stands by its use of a 0.5 ppb background ammonia concentration for assessing impacts at Olympic National Park, as modeled in its initial BART Report. PTPC does not believe the 17 ppb ammonia concentration is appropriate for evaluating its impacts at Olympic National Park for the reasons discussed below.

PTPC conducted a refined modeling analysis in the original BART Report to assess impacts on the nearest Class I area, Olympic National Park. The background ammonia concentration used for the refined modeling analysis was 0.5 parts per billion (ppb).[8] This background value was selected because it accurately represents the landuse in the area including and between the PTPC mill and Olympic National Park. The concentration was obtained from the Phase 2 Report issued by IWAQM.[9] The IWAQM Phase 2 Report provides typical background ammonia values of 10 ppb for grasslands, 0.5 ppb for forest, and 1 ppb for arid lands at 20°C. As the area between and including the PTPC mill and Olympic National Park is primarily forest land, the 0.5 ppb background concentration is an appropriate value.

Ecology is now requesting that PTPC provide visibility impacts for its BART determination using a background ammonia concentration of 17 ppb. This higher concentration was recommended in the BART modeling protocol for Washington, Oregon, and Idaho (BART Modeling Protocol for WA, OR, and ID) for all months. According to BART Modeling Protocol for WA, OR, and ID, Section 3.6.3: "*This value is supported by measurements made in 1996 – 1997 at Abbotsford in the Frazier River Valley of British Columbia… It is recognized that ammonia values may be lower in Class I areas; however, the BART analysis must account for transport through ammonia-rich areas.*"

The Abbotsford, British Columbia monitoring site that served as the basis for the 17 ppb value is located in the middle of the Fraser Valley of British Columbia, Canada in an area with intensive pig and chicken production.[10] Ammonia concentrations measured at Abbotsford ranged from 1.9 to 31.1 micrograms per cubic meter (ug/m^3), with an average of approximately 16.4 ug/m^3. The values ranged from 2.7 to 44.0 ppb. The IWAQM Phase 2 report states that areas in the vicinity of strong point sources of ammonia, such as feed lots or other agricultural areas, may experience locally high

[8] The refined analysis, including the use of the 0.5 ppb ammonia background, was discussed and agreed upon with Ecology during a June 4, 2007 meeting at Ecology Headquarters, attended by Clint Bowman and Alan Newman, Ecology; Alice McConaughy, PTPC; and Aaron Day and Kirsten Rollay, Trinity Consultants.

[9] U.S. EPA, Air Quality Modeling Group (MD-14), Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long-Range Transport Impacts, December 1998.

10 Belzer W. , Evans C., Poon A. 1997. Atmospheric Nitrogen Concentrations in the Lower Fraser Valley. Aquatic and Atmospheric Sciences Division, Environmental Conservation Branch, Environment Canada, 201 - 401 Burrard Street, Vancouver, BC, V6C 3S5. DOE-FRAP 97-23.

levels of background ammonia.[11] There are no known strong point sources of ammonia in the area between and including the PTPC mill and Olympic National Park.[12]

It would not be appropriate to apply background ammonia concentrations measured at the agricultural monitoring station in Abbotsford, British Columbia to the area between and including the PTPC mill and Olympic National Park, because this area experiences minimal impacts from agriculture. The Abbotsford monitoring station is located approximately 70 miles to the northeast of the PTPC Mill, while the Olympic National Park is located in the opposite direction to the southwest of the mill. As the emissions from the PTPC mill are not expected to travel near the Abbotsford area nor through other significant agricultural areas before reaching Olympic National Park, the high ammonia background levels measured in Abbotsford will significantly overestimate the effect of background ammonia in the BART modeling for PTPC's potential impacts at Olympic National Park.

Based on the information presented above, PTPC concludes that using an ammonia background concentration of 0.5 ppb is more appropriate than using the ammonia background concentration of 17 ppb requested by Ecology.

4.2 VISIBILITY IMPACT MODELING RESULTS USING 17 PPB BACKGROUND AMMONIA CONCENTRATION

As stated in Section 4.1, PTPC believes that an ammonia background concentration of 17 ppb is not appropriate for estimating the mill's visibility impacts on Olympic National Park. However, to satisfy Ecology's request for additional information, PTPC has prepared modeling results for visibility impacts using an ammonia background of 17 ppb, as presented below. This modeling analysis is conducted using the same methodology as used for PTPC's refined BART determination modeling analyses except for the change to the background ammonia concentration. Electronic copies of the visibility impact results files (CALPOST output "LST" files) for the re-evaluation are provided in Appendix B.

It should be noted that the modeling results presented in this section are provided for informational purposes in order to determine if any changes to the BART determination conclusions would be necessary for the case of using the 17 ppb ammonia background concentration. PTPC believes that using 17 ppb ammonia background concentration significantly overestimates the effect of background ammonia in the BART modeling for PTPC's potential impacts at Olympic National Park. Therefore, the total visibility impacts presented below should not be used as a basis for predicting PTPC's contribution to visibility impairment at Olympic National Park.

[11] U.S. EPA, Air Quality Modeling Group (MD-14), Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long-Range Transport Impacts, December 1998, pg. 15.

[12] No known strong point sources of ammonia emissions located in the area between and including the PTPC mill and Olympic National Park were identified based on a review of the Washington State Emissions inventory, downloaded from http://www.ecy.wa.gov/programs/air/EmissionInventory/AirEmissionInventory.htm, March 2009; including a review of the WRAP ammonia inventory: Mansell, Gerard E. *Final Report, Volume I, An Improved Ammonia Inventory for the WRAP Domain*, March 7, 2005; and considering agricultural activity in Jefferson County and Clallam County from the USDA Agricultural Census data available at www.agcensus.usda.gov.

This section summarizes the visibility impact estimates at Olympic National Park due to emissions from the PTPC Mill for three emissions scenarios. The modeling is conducted using the CALPUFF modeling system with an ammonia background concentration of 17 ppb, as requested by Ecology. The three emissions scenarios that are re-evaluated using the ammonia background concentration of 17 ppb are described in Table 4-1 below, and correspond to the same scenarios evaluated using the more appropriate 0.5 ppb ammonia background concentration that were presented in PTPC's original BART Report.

TABLE 4-1. NET VISIBILITY IMPROVEMENT ANALYSIS CONTROL SCENARIOS

Modeling Scenario	**Scenario Description**
BART100	Baseline Scenario as the refined applicability analysis presented in Section 6 of the original BART Report
BART101	Power Boiler No. 10 PM_{10} reductions associated with the addition of a wet ESP (reduction of PM_{10} emissions to 0.01 gr/dscf vendor guarantee)
BART102	Lime Kiln SO_2 emissions control for addition of alkaline solution to the existing wet scrubber (assumed 90% emissions reduction of SO_2)

Table 4-2 summarizes the visibility impacts at Olympic National Park, using a background concentration of 17 ppb ammonia, and compares the results to the visibility results submitted in PTPC's original BART Report using a 0.5 ppb ammonia background concentration. The impacts are expressed in terms of the maximum 98th percentile (8th-highest), 24-hour average visibility impact among three years of meteorological data modeled, and in terms of the number of days for which the PTPC Mill contributes to or causes visibility impairment. It should be noted that PTPC believes the visibility impacts presented for using 0.5 ppb ammonia background concentration appropriately represent the potential impacts from the PTPC mill at Olympic National Park, and that the total impacts from the PTPC mill using the 17 ppb ammonia background concentration are overestimated.

The baseline scenario (BART 100) impacts are used to assess the net visibility improvement of the emissions reductions and control technologies evaluated for BART.

TABLE 4-2. BART DETERMINATION VISIBILITY IMPACTS

Modeling Scenario	98th Percentile Δdv		Total Days > 0.5 dv		Total Days > 1.0 dv	
	0.5 ppb NH_3 Background	17 ppb NH_3 Background	0.5 ppb NH_3 Background	17 ppb NH_3 Background	0.5 ppb NH_3 Background	17 ppb NH_3 Background
BART100	1.181	1.408	68	89	20	31
BART101	0.987	1.136	46	68	12	23
BART102	1.179	1.404	68	89	20	31

[a] The absolute improvement in the 98th percentile visibility impact is determined based on applying ammonia limiting method (ALM) and the new IMPROVE algorithm both to the baseline scenario and to the two control scenarios.
[b] The absolute improvement in the number of days during which a 24-hour average visibility impact attributable to the BART-subject source exceeds the 0.5 dv visibility impairment contribution threshold and the 1.0 dv visibility impairment causation threshold is based on applying ALM only, because the new IMPROVE algorithm is applied to only the highest 22 days from the CALPOST output file using the VISTAS IMPROVE spreadsheet.

Table 4-3 summarizes the net visibility improvement of scenarios BART101 (control of PM_{10} from the No. 10 Power Boiler) and BART102 (control of SO_2 from the Lime Kiln) compared to baseline scenario BART100.

TABLE 4-3. NET VISIBILITY IMPROVEMENT

Modeling Scenario	Δ98th Percentile Δdv		Δ Total Days > 0.5 dv		Δ Total Days > 1.0 dv	
	0.5 ppb NH_3 Background	17 ppb NH_3 Background	0.5 ppb NH_3 Background	17 ppb NH_3 Background	0.5 ppb NH_3 Background	17 ppb NH_3 Background
BART101	0.203	0.272	22	21	8	8
BART102	0.002	0.004	0	0	0	0

As shown in Table 4-3, the visibility improvement resulting from the two control scenarios is not visually discernable (i.e., the visibility improvement is less than 1 dv) even when using the conservatively high 17 ppb ammonia background concentration in the CALPUFF modeling. Further, when modeling with the 17 ppb ammonia background concentration, the improvement in the total number of days that the PTPC Mill would contribute to or cause visibility impairment is virtually unchanged (and in fact, shows fewer days of improvement) compared to the modeling results using 0.5 ppb ammonia background concentration.

As described in the original BART Report, the implementation of BART101 (control of PM_{10} from the No. 10 Power Boiler) or BART102 (control of SO_2 from the Lime Kiln) is not warranted, because neither technology results in visually discernable visibility improvement. The visibility impact results using a background of 17 ppb ammonia continue to support this determination. It should also be noted that the analyses presented in the original BART Report demonstrate that the addition of a wet ESP to control PM_{10} from the No. 10 Power Boiler is not economically feasible. Therefore, the additional modeling results provided in this addendum do not warrant any change to the conclusion of the BART determination in PTPC's original BART Report.

APPENDIX A

MARCH 12, 2009 LETTER FROM ECOLOGY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

March 12, 2008

Ms. Eveleen Muehlethaler
Port Townsend Paper Corporation
P.O. Box 3170
Port Townsend, WA 98368

Dear Ms. Muehlethaler:

As you know, Ecology prepared a draft BART Regulatory Order and a draft Technical Support Document (TSD), which we have shared with you. Ecology held an informal consultation on these documents with Federal Land Managers (FLMs) as part of addressing consultation requirements of the Clean Air Act and the Regional Haze Rule. As a result of the consultation, Ecology has decided to revise some aspects of the draft BART TSD to facilitate eventual approval of BART by EPA.

We need your assistance to address the items discussed below. If not addressed now, we anticipate them coming up again during public review and comment for the BART determination and the overall Regional Haze Plan.

1. Ecology wants to add an evaluation of the economics of using a lower sulfur containing fuel in the TSD. Would you supply costs for available lower sulfur fuels, including low sulfur (0.05%) and ultra low sulfur (15 ppm) diesel? All we need is your expected cost per barrel or per gallon, and we can do a new cost analysis similar to the Low Sulfur Fuel Cost Effectiveness Summary in Appendix D of PTPC's BART Analysis and Determination report.

2. The argument given for technical infeasibility for use of a wet scrubber for control of SO_2 from the Recovery Furnace in Section 10.3.2.1 of your BART analysis needs to be revised. Ecology found that wet scrubbers have been operating on at least three recovery furnaces in the northwest since the mid 1980s (two at Camas, one at Longview Fibre). There are indications in the available information that there are other SO_2 scrubber installations at other mills around the country. Please revise PTPC's Recovery Furnace BART analysis to include evaluation of a wet scrubber control option installation.

   Here is additional information on the two Camas scrubbers: Cross flow scrubbers with a 3-section design were installed on the two Fort James (also named James River, now Georgia Pacific) recovery furnaces for heat recovery before the mid 1980s. The flue gas coming from the recovery furnace contains considerable heat that can be used to generate hot water. The cross flow scrubber removes some of the sulfur dioxide (enough to meet an SO_2 limit of 10 ppm), hydrogen chloride, TRS, and about half of the particulate remaining after the ESP. This makes the scrubbers both a heat recovery device and an air pollution control device.

Fort James decided to expand its pulping capacity in the late 1980s. This required both scrubber systems to go through PSD/NOC permitting (PSD 88-3 and Order No. DE-88-360 issued in 1989). In 1991, a new ESP replaced the old one on the #3 Recovery Furnace (RF #3), and a packed bed AirPol scrubber replaced the old venturi and Teller scrubbers. RF #4 kept its Teller scrubber.

3. Ecology had indicated earlier that PTPC could use a 0.5 ppm ammonia background concentration for the modeling of the impacts of PTPC's emissions on Class I areas to see if it helped to model out of BART. Since this did not occur, we would like to present the visibility impacts modeled with an ammonia background concentration of 17 ppb as recommended in the 3-state/EPA modeling protocol. This will make the PTCP modeling consistent with other BART modeling in Washington. We do not believe the change in the visibility impacts will affect the draft BART determination.

   Ecology is not requesting PTPC write a new report or produce new tables with visibility metrics. We do request that PTPC supply revised Calpost output (*.lst) files for 2003-2005 to us. We will extract the necessary information from the .lst files to determine the visibility output.

   The reanalysis can be done with a partial rerun of the original modeling. We request that PTPC:

   - Follow the procedures below for the "Refined baseline (BART100)," "Controls on Power Boiler #10 (BART101)," and "Controls on Lime Kiln (BART102)" cases.
   - Rerun POSTUTIL with an ammonia background of 17ppb. This does not require CALPUFF to be rerun and only needs to be done for the Olympic National Park Class I area. The only change to the original POSTUTIL input file would be setting the BCKNH3 value to 17.
   - Rerun Calpost after rerunning POSTUTIL. The previously used input file can be used with no modifications.

If there are any questions about these three requests, feel free to contact:

Bob Burmark	(360) 407-6812	rbur461@ecy.wa.gov	
Al Newman	(360) 407-6810	anew461@ecy.wa.gov	
Ranil Dhammapala	(360) 407-6807	rdha461@ecy.wa.gov	(for modeling questions)

Sincerely,

Robert C. Burmark

Robert C. Burmark, P.E.
Environmental Engineer

rcb/te

cc: Aaron Day, Trinity Consultants
Jeff Johnston, Ecology

APPENDIX B

ELECTRONIC VISIBILITY IMPACT RESULTS FILES (CALPOST OUTPUT "LST" FILES)