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April 25, 2008

Doug Jackson, VP US Operations
Centralia Power Plant
TransAlta Corporation
913 Big Hanaford Road
Centralia, WA 98531

RE: Review of Best Available Control Technology Analysis, January, 2008.

Dear Mr. Jackson:

With the assistance of Clint Lamoreaux of SWCAA, I have reviewed the Best Available Control Technology (BART) submittal by your company.

We have a number of questions and comments about the analysis. They are listed in the attachment to this letter. Please respond to these questions and comments by May 25, 2008.

If you have any questions about our comments, please contact myself at 360-4017-6810, (anew461@ecy.wa.gov) or Clint Lamoreaux at 360-357-3058 (clint@swcleanair.org).

Sincerely,

Alan R. Newman, PE
Senior Air Quality Engineer

CC: Bob Elliot, SWCAA
Paul Mairose, SWCAA
Clint Lamoreaux, SWCAA
Richard DeBolt, TransAlta, Centralia
Dan Zandell, TransAlta, Centralia
Richard Griffith, LLC, 216 16th Street, Suite 1300, Denver, CO 80202

Comments on the TransAlta, Centralia Power Plant BART analysis, January 2008

Overall comment:
The baseline emission rate for all analyses (visibility and cost improvement) is the maximum 24 hour emissions level achieved during the 2003-2005 time period utilizing the LNC3 system installed per the SWCAA RACT Order, No. 97-2057. All emission reductions are applied against this baseline emission rate, all on a 24 hour rate basis. The potential annual average emissions from the future flexible fuels project are not suitable for use as baseline emissions. The BART analysis should be revised to reflect the correct baseline emissions rate, which will affect all analyses based on the difference between baseline emissions and potential future conditions.

Specific comments

1. The Table of Contents for Appendix B should include all the tables in that section (Table 3-3 is missing from the Table of Contents).

2. Page ES-2, NOx Emission Control, While the discussion on inapplicability of the ROFA and Rotamix controls technologies are adequate for the executive summary of this document, there needs to be a more detailed discussion later in the report on these control technologies.

3. Page ES-3, BART Modeling Analysis. The listing and discussion of the modeling cases appears to be incomplete. 5 cases are listed, yet the modeling files indicate that modeling was performed for 6 different cases, including for the correct baseline emissions based on actual operations in the 2003-2005 period. The listed Case 1 reflecting the expected emissions of the future Flex Fuel Project is not the baseline case against which the other options should be evaluated. *See* Overall Comment, above.

4. Page ES-4: The report includes the following description of the maximum potential visibility improvement in Mount Rainier National Park attributable to the installation of BART controls at the Centralia Power Plant: "In addition, the modeling results indicate that the greatest potential improvement would be in the Mount Rainier National Park of about 2 dv, a level that might not be perceptible by humans." If you leave this statement in the executive summary, you should add a statement that the deciview scale was designed such that a single deciview represents a change in visibility that would be noticeable to most people. "A one deciview change in haziness is a small but noticeable change in haziness under most circumstances when viewing scenes in mandatory Class I Federal areas." (62 FR 41145, July 31, 1997)

5. Section 2, Present Unit Operation. Page 2.1 The third paragraph on this page indicates that an equipment lifetime of 10 years is used as recommended by Ecology's annotations on EPA's BART Guidance. However, Ecology's guidance actually states that 10 years is the *default* time unless a different control equipment lifetime is listed in the EPA Control Cost Manual or another different lifetime applies to a particular control (i.e. catalyst bed lifetime

for an SCR system)[1]. For an SNCR system, the Control Cost Manual indicates an equipment lifetime of 20 years (6th edition of the Control Cost Manual, EPA/452/B-02-001, January 2002, Section 4, page 1-37). This contrasts with the catalyst portion of an SCR system with a rated bed life of 1 – 4 years and the balance of the equipment with a 20 year lifetime (Control Cost Manual, EPA/452/B-02-001, Section 4, page 2-48). In its 2007 Investor Day presentations, TransAlta lists the 'book lifetime' of this facility extending to 2030 (5 years longer than the BART analysis's statement on this page of "both units operating at least until 2025"). Since TransAlta proposes a life extension project to add another 10 years of plant lifetime beyond that date, the report should focus its analysis on longer equipment lifetimes for NOx control systems.

The 5th paragraph on this page mentions a Flex Fuel Project to modify the coal boilers to accommodate Powder River Basin and similar coals. What is being done at the plant as part of this project? Are the reduced emissions of NOx that are anticipated to occur at the conclusion of the project enforceable?

6. Page, 2-2, Table 2-1. Table 2-1 should clearly indicate that the "Stack Exit ID" and "Exit Area" value is the effective diameter and cumulative area of both stacks (Unit #1 and Unit #2) combined.

   Stack parameters listed in Table 2-1 do not match the stack parameters listed in Table 3-3 of Appendix B. For example, the stack velocity is listed as 57 feet per second in Table 2-1 and 15 meters per second (~50 feet per second) in Table 3-3 of Appendix B. Temperatures listed in each table also differ slightly. These differences should be reconciled. Please describe the methodology used to establish the velocity and provide the data used in your analysis

   Please supply the calculations and other supporting information for the boiler heat input rate, and the electric generation heat rate. The heat input rate and heat rate are different than can be calculated from the actual plant operating information in your plant's federal acid rain program submittals. See also our similar comment regarding Appendix B, Tables 2-1 and 2-2.

7. Maximum 24 hour NOx emission rate (lb/MMBtu) during the 2003 – 2005 baseline period is given for each unit. Please include the other operating parameters that went along with those rates such as power output, heat input rate (24 hour averages), basis of emissions (e.g., CEM, stack test, calculated potential). Please provide the spreadsheets or detailed calculation methodology to show how the values for "NO_X Removed per year" was obtained in Table 3-2.

[1] "Unless there is a characteristic of the control technology that requires a different lifetime or the Control Cost Manual lists a different equipment lifetime, utilize a control equipment lifetime of at least 10 years. If a different lifetime is used, document your rationale for the use of the different lifetime.", Page 20 of 40 of the Ecology Annotated EPA BART guidance.

8. Page 3-2, 6th paragraph on the page. We are uncertain about the meaning of the last sentence in paragraph 6, related to LNBs, sub-bituminous coal, and NO_x formation kinetics. Can you please clarify in the report?

9. Page 3-3, Section 3.2.2, In the last paragraph of this page is a discussion of the Mobotec ROFA and Rotamix technologies. The report concludes that the technologies are technically infeasible because they have not been applied to this exact type of boiler. This statement does not demonstrate that the ROFA technology is technically infeasible. Based on research into the technology by SWCAA and Ecology, we consider it to be technically feasible absent an expanded review and demonstration by TransAlta that it is technically infeasible. As such, the cost analysis section of the report should include the ROFA technology or the report should provide an expanded analysis of why the technology is infeasible.

10. Page 3-4, Table 3-1. The correct baseline emissions rate line is missing, please insert it. Please remove the reference that the flex Fuel Project is baseline. *See* Overall Comment.

11. Page, 3-4, in Section 3.2.3. In the listing at the bottom of the page, item 3. notes that the variability in uncontrolled NOx is a consideration to apply to the ability of a given emission control to be successfully implemented. Please describe the variability in NOx emissions over the past year since Centralia coal has no longer been available for use.

12. Page 3-6 The control effectiveness of SNCR is listed as a range (20 – 40% as realistic, up to 60% having been achieved in practice), then a value of 25%, near the low end of the range, is selected for the remaining evaluations. The cost-effectiveness of the SNCR option in Appendix A is calculated using a control efficiency of 24.9%. You must justify the selection of the 24.9% (25%) control efficiency chosen for the BART analysis. In addition, your analysis needs to include an estimate of the rate of ammonia slip.

13. Page 3-6.At the end of the discussion on the ability to implement SNCR and the costs associated with retrofitting the boilers with SNCR equipment, the report mentions an "extremely tight boiler outlet ductwork configuration". Please explain what you mean by extremely tight. In addition to this information, please provide analysis of where ammonia or urea injection would occur in the boiler along with an estimate of reaction time within the proper temperature window. Would a single level of injection be required or would multiple levels be necessary to minimize NOx and ammonia slip? Scale drawings (plan and profile) of the location where SCR system might be inserted may be useful here to demonstrate the 'tightness" issues. Would injection occur in the heat transfer section of the boiler after the superheater or are the appropriate temperatures only available between the boiler and the first ESP?

14. Page 3-6. Again at the end of the discussion on SCR, to the report mentions the "extremely tight boiler outlet ductwork configuration". Please explain the problem, if any, with the boiler outlet configuration related to the addition of a SCR catalyst section. Would it be possible to use a separate large reactor to contain the SCR catalyst (as mentioned in the first paragraph of the SCR discussion)? If not, why not? Scale drawings (plan and profile) of the

location where SCR system might be inserted may be useful here to demonstrate the 'tightness" issues.

As an alternate to achieving the maximum reduction possible by use of the SCR process, how much SCR catalyst could be inserted in the boiler exhaust after the economizer and before the air preheater? How much NOx reduction (% reduction) could be implemented with this much catalyst and an ammonia slip of less than 10 ppm? What would be the cost of such a less than "full deal' installation of SCR?

15. Page 3-7, Presumptive BART discussion. 40 CFR 50, Appendix Y, Section V requires that the averaging time in a BART permit for Electrical Generating Units be a 30-day rolling average. The same section directs reviewing agencies to "consider allowing sources to "average" emissions across any set of BART-eligible emission units within a fenceline..." Your report analyzed the cost-effectiveness of "Presumptive BART" on the basis of averaging emissions across one unit equipped with SCR, and one unit without any new controls. Compliance with the 30-day rolling average emissions limit could be difficult if the SCR-equipped unit operates fewer days than the unit without any new controls. Your report should indicate how this would be addressed and include the potential effect on the cost-effectiveness of this control option.

16. Page 3-8, Table 3-2. Please adjust all calculations for the correct emissions baseline. The Flex Fuel project is not the correct emission baseline. As noted above, the baseline emissions are based on the highest 24 hour emissions that occurred in the 2003-2005 baseline period. *See* Overall Comment.

17. Page 3-11, Section 3.2.3 Step 4, Other air quality Impacts. Please describe how ammonia slip could generate a visible plume. Does this potential exist if the SCR/SNCR system is followed by an ESP and a <u>wet</u> FGD system?

    If the possibility of ammonia emissions exceeding an ASIL exists then please calculate how much slip would have to occur for the ASIL to be exceeded. Your calculation should include the effects of the wet FGD system, stack height, and dispersion.

18. Page 3-11, Non-Air quality Impacts. You note that the use of SCR or SNCR may affect wastewater at the plant due to ammonia in the ash. Please describe with specificity how this would occur at this plant.

19. Page 3-11, Economic impacts. The cost analysis is based on tracked CH2M Hill project costs and vender project/performance quotations. The EPA has developed a similar cost estimating tool for general use called CUECost. Please explain why the 2 cost estimating methods result in significantly different capital cost estimates.

20. Page 4-2, Table 4-2, in addition to the average number of days per year with modeled impacts of greater than 0.5dV, it would be beneficial to include the total days in the 3 year modeled period that are above the 0.5 dV value from Appendix B, Table 4-1. Similarly, a review of the seasonality of the days with impacts would be useful – do most of the impacted

days at a given Class I area occur on the same days/months of each of the 3 years modeled? This seasonality information could be provided by replicating the baseline modeled case (as depicted in Appendix B, figure 4-1) for each Class I area impacted. Related to this, please include a brief discussion concerning what weather patterns contribute to visibility impairment due to the Centralia Power Plant in each of the Class I areas evaluated.

21. Page 4-4, Tables 4-4 through 4-9. Please double check your math here, as it appears that the report incorrectly calculates the $/dV of improvement values. Also, please explain how a dV improvement of greater than 8 can result in a $/dV value higher than the annual cost.

22. Page, 5-1, First paragraph. Please note that the emissions from the Flex Fuel project are not the baseline emissions for evaluations of cost or visibility improvements. *See* Overall Comment.

23. Appendix A, Economic analysis, please provide an electronic copy of all spreadsheets involved in the analysis, with formulas intact and functional. Vender quotes and other information utilized to estimate capital costs of control options should be provided. If you believe this information constitutes confidential business information, you may state this belief and submit the information separately from the rest of the report, with such a declaration attached to the information.
    Also, this appendix would be an excellent location to describe the physical constraints of these boilers and their existing emission controls that may tend to limit the effectiveness or ability to implement a particular NOx control.

24. Appendix A, Page 3 of 7. Please note the title of this page seems to have been retained from a prior usage of the spreadsheet.

25. Appendix B, Modeling report. Tables 2-1 and 2-2. In these 2 tables, 8 different heat input rates are given for the plant, with different values for each unit except in the modeling for cost of controls in appendix A. Other Centralia reports and design references provide yet different heat input rates. As part of the BART analysis report (not necessarily part of the modeling report), please explain the origin of the different heat input rates and why the 7049 MMBtu/hr rate used in the capital cost analysis is the appropriate one to utilize.

26. Appendix B Modeling Report. The report states that SO2 emissions were reduced to account for the condensable SO_4 (included in PM). However, SO_2 emissions are measured by CEM. This reduction of SO_2 would be acceptable only if the SO_2 emission rates were calculated on a mass balance basis, not if they were derived using CEM data. Therefore, please clarify whether the baseline 2003- - 2005 base case emission came from CEM monitoring or from estimates. If the SO_2 emissions are from the CEM results, and there is a reason to remodel a proposed control scenario or model another control scenario based on the above comments and questions, then the treatment of the SO_2 should be addressed correctly in revised baseline modeling and control scenario modeling.