



August 7, 2007

Project No. 173-6

Mr. Paul Mairose
Southwest Clean Air Agency
11815 NE 99th Street
Vancouver, WA 98682

Subject: Comments on the Draft CRGNSA Air Quality Modeling Report

Dear Paul:

Attached are technical comments by Air Sciences Inc., on behalf of Klickitat County, on the Draft Report: "Modeling Analyses Conducted for the Columbia River Gorge National Scenic Area Air Quality Study" prepared by ENVIRON and Alpine Geophysics. We appreciate the amount of work and effort that went into this modeling effort. We also appreciate the challenges in communicating a complicated and detailed application to the public and stakeholders.

Sincerely,

Air Sciences Inc.

Kent Norville

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Associate Scientist

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Comments on the Draft Report: "Modeling Analyses Conducted for the Columbia River Gorge National Scenic Area Air Quality Study" prepared by ENVIRON and Alpine Geophysics, dated July 3, 2007.

General Comments:

The modeling involved in this work is but one piece of a bigger collection of work. Yet, it needs to be explained so that the stakeholders can understand what is being accomplished and why. This report is very technical, full of jargon and acronyms, and very detailed in many ways that it will no doubt be very difficult for the average stakeholder to understand and comprehend what they are reading. There needs to be an overview or schematic of the entire modeling system so that reader can see how the elements of the systems are linked. The EI presentation is lacking as it summarizes the emissions by PSAT region or source type in a clear, meaningful way. The report generally lacks text and figure that put the analysis into context. There is so much information that it is hard to get a handle on what is being reported.

The Executive Summary has too much detail. It should only highlight the important items and summarize the conclusions.

In Tables ES-1 and 2.1 have "Shallow Convection" set to "none". If the same value was used for all runs, why include it in the table?

Emissions Processing: A schematic on the sources of the EI data would be good. Again, does all that detail (Emissions adjustments, Canopy Escape Factors...) need to be in the Executive Summary when it is discussed in the same level of detail in the report?

ES-9: Discussion of BART for the Boardman. Again this should not be in the ES. However, most readers will not have any reference to compare the 0.23 lbs NO_x/MMBTU. This should be referenced to current levels and non-BART future predicted.

ES-10: SOA is used but never defined.

ES-13: Need to define PSO₄, PNO₃ and PHH₃.
How does PSO₂ differ from SO₂?

What defines "Other fires"? Prescribed fires? Wood smoke?

ES-14: Do "East of Gorge" EGU's include Boardman? What other EGU's are there and how do they compare with Boardman?

Some where in the Gorge documentation there needs to be a discussion of what is in each source category.

ES-16: The text states: "large ammonia sources in the area of Wishram may be causing a local formation of particulate ammonium nitrate as aged nitric acid plumes move into the area from the east...". Isn't the modeling suppose to help resolve this?

Table ES-2: What is the "Extinction Annual Rate?" For Wishram, why is it negative when the total extinction is positive?

ES-22: The question is asked: Is it realistic to base area source emissions on population? You are the experts, do you have an answer? Is there a reasonable alternative?

Section 1. A good, clear short overview or schematic of the modeling system is needed for those who do not want to read all of the details.

Section2. On the statistic charts, many of the symbols overlap so it is hard to get a sense of one model runs performance over another. How about a table with the runs comparing parameter and its statistical result as compared to the standard listed on 2-6 for the two episodes.

Figure 2-9 should be presented in the same way as 2-8.

If there is a numerical solver error (Page 2-16) that may be causing erroneous results, how can we trust the model is giving reasonable results?

Page 2-23. The vector plots are hard to read and find the observations. Would lighter arrow and black observations be better?

Figure 3-1: A green area should be added to the legend stating these were not assembled as part of the OR/WA EI.

A schematic of the EI process would be beneficial. If anything, it would indicate how complex the process is.

Page 3-3: The constituents should be identified. What is SULF and PSO4? What are ALD2, ETH, FORM....

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Are emissions from Canada included?

Canada has several large power plants just over the border. The Trail BC plant is a large SO₂ emitter. Are these emissions included in the EI and modeling?
If not, then this really needs to be stated clearly.

Table 3-2a-g show state level pollutant emissions. You should also include OR and WA for comparison. In fact, there is no emissions summary collectively by state or PSAT regions or source group.

Table 3-6 should remove the state FIPS ID as the table already separates the sources by state and put the county name instead of the Country ID.

The report refers to EGU's as a major contributor. Since Boardman has been identified as the "East-Gorge" EGU, the report should list the name and size of all of the EGU's along with their emissions of NO_x and SO_x.

Figure 3-3 to 3-16 are hard to read. A larger plot would be good.

It looks like Washington and Oregon are handling wildfire and prescribed fires differently (e.g. point versus county wide). This should be commented upon. Will this cause a problem in the model?

A bar chart of pollutants by class may be useful since the overall magnitude of the emissions across the region is not obvious. For example, for CO, the red is 2.5×10^2 but covers a large area where as the red in the point source plot is 100 times large, the area is very small.

No where is a complete inventory of sources by region and source group.
It seems much of the graphics from the weekly conference call have been excluded from the report. Some of these better figures should be included. The EI section is very weak.

Figures 3-18 to 3-30: The legend should be clearer (ar = Area Sources, bi = biogenic sources, fi = fires, mb = mobile, pt = point). Also, the y-axis label should be "Fraction of Daily Emissions". It should be noted that all of the hourly emissions for each group sum to 1 and that the scale is relative for each group. The x-axis should be labeled "hour of day in UTC". It looks like the hour is in UTC. If it is local time, then there is a big problem as mobile CO is not low in the morning. It may be better to translate these



to local time. The same color scheme should be used for all plots so that fires have the same color.

Why are the area source PMC emissions high during the morning (UTC) hours?

Table 3-7 and 3-8 need to be summarized for the reader. How do the Oregon and Washington emissions compare. Summaries by pollutant and PSAT region are needed. This current table format provides no real information to inform already overwhelmed readers with important and relevant EI information. Also, there seems to be duplicate entries in the OR table.

3.3.1 Boardman emissions. The current emissions also need to be listed in order to give perspective. Most readers are not going to know what the BART limits are and what this means in terms of emissions reductions.

Table 3-11 should include OR and WA for comparison. The table should include Future in the title as well.

Figure 4-2 did not print well. Perhaps is you did west and east end as well it would be easier to see the sites.

Figure 4-5 to 4-6, the y-axis label are not readable.

Figure 4-6: Should the label "PM25. 04Aug.run10" be "PM2.5 04Aug.run10"?
The 24-hour numbers don't look great here.

Table 4-7: What defines Excellent, good or average? They seem pretty subjective. I would say if you had an r^2 of 0.7 or more, then the performance would be excellent. What are the r^2 values?

Figure 4-7: It looks like we are only comparing on day in these figures. The observational data should be clearly identified, say with an arrow.

Figure 4-14: Again, the observational data should be clearly identified in the plot.

Table 5-1 should include the total mass along with the individual masses.

Section 5: There needs to be a plot indicating the mass contribution by source type for the two episodes.

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Biogenic emissions are a big contributor but not identified in these plots. Is there a way to split out the biogenic/natural contribution?

Figure 6-1: Why does only one day have 2018 impacts exceeding 2004. Why is there a big increase in sulfate? This does not make sense. Where the winds at Wishram from the east, west or transitional on this day? Does the EI support this increased impact?

Figure 6-3: Why are impacts going up when in-gorge sources are turned off?

There has been considerable discussion about the fact that the 2018 inventory overestimated several point source emissions. Will information from those discussions be included when discussing the trends?