APPENDICES TO COLUMBIA RIVER GORGE AIR STUDY AND STRATEGY

APPENDIX A

Columbia River Gorge Scenic Area Visibility 2018 CAMx What if Runs

DRAFT REPORT

Introduction

Oregon DEQ and the SW Clean Air Agency (SWCAA) decided to test haze improvements that might result from reducing emissions from various key source sectors. As a result, additional modeling was performed for selected source categories to better understand which categories might have a significant influence on Gorge visibility in 2018, and to identify potential candidates for further investigation of emission reduction strategies.

These modeling test cases are referred to as "what-if" scenarios, and were run by removing selected emission source categories from the emissions inventory used in the model (that is, the source category was zeroed-out") in order to evaluate the resulting affect on haze. Initially, five scenarios were chosen to model, the results of which are available in the *Gorge CAMx Modeling Report* (Emery, 2007)

After the analysis of the initial five scenarios, additional examples of "what-if" scenarios were modeled to gain further insight and information about strategies that might be used to obtain immediate reductions in haze. These additional hypothetical "test-cases" include a suit of Boardman sensitivity runs, scenarios in which all emissions were selectively removed from 1) on-road mobile sources (cars and trucks), 2) trains in the Gorge, 3) residential wood heating, 4) industry, and 5) ammonia from Confined Animal Feed Operations (CAFOs), and an additional ammonia sensitivity run. These scenarios are described in more detail below.

Background

Visibility impairment includes both light scattering and light absorption, and is expressed as an extinction coefficient representing air opacity that is measured in inverse mega-meters (1/Mm). Absolutely clean air at the sea level has an extinction coefficient of 10 Mm^{-1}.

To simplify and illustrate the effects of opacity on a linear scale, the metric referred to as deciview (dv) is used (Pitchford and Malm, 1994). Technically, a deciview is a log function of the extinction coefficient. For example, an extinction coefficient of 10 Mm^{-1} represents an opacity of zero deciviews and a visual range of about 217 miles (350 km). A linear change of 1.0 dv is considered a "just perceptible" visibility change. However, in the EPA Regional Haze program, emissions from a single source that result

in impacts of greater than 0.50 dv but less than 1.0 dv are considered to *contribute* to impairment, and impacts of 1.0 dv or greater are considered to *cause* visibility impairment. For the BART program, which is part of the Regional Haze Rule, an impact of 0.500 or greater is considered significant.

The higher the deciview level the hazier it is. The values of measured daily visibility typically range from about 3 to about 40 dv. A 3.0 dv value represents about 180 miles visibility, and 40.0 dv represent about 4 miles visibility. For comparison purposes, the haziest 80th percentile visibilities in US parks are in the range of 11-33 dv; a typical urban environment ranges from 15 to 20 dv.

Deciview Haze Index = 10 ln (bext/10 Mm^{-1})

Modeling domain

The CAMx modeling domain is centered on the Columbia River Gorge but extends north to the Canadian border, and includes portions of southwestern and central Oregon, as shown in Figure 1. The Wishram monitoring site, which marks the eastern end of the Gorge, is identified.

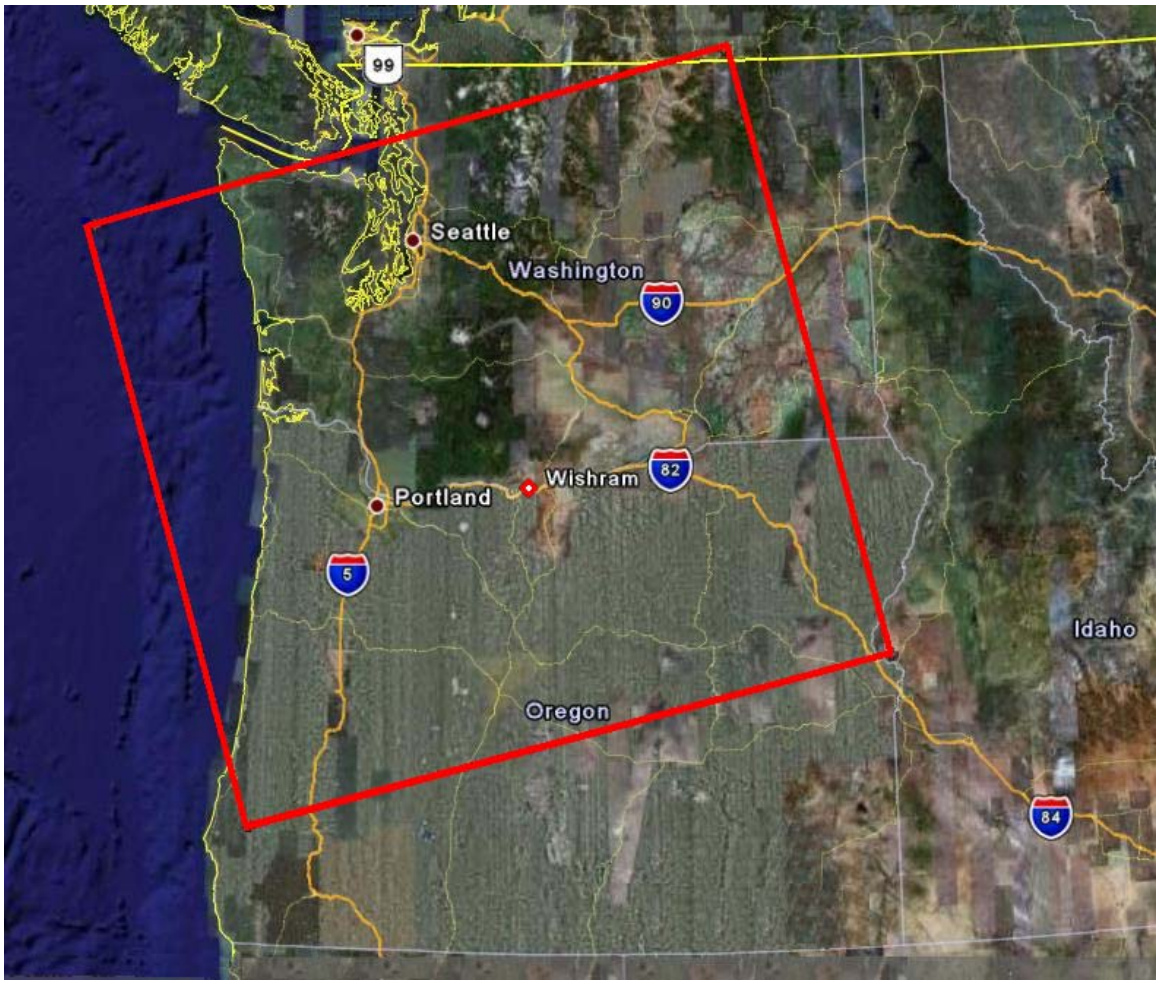

Figure 1. Columbia River Gorge CAMx modeling domain.

1. PGE Boardman at 2004 emission levels

The emissions inventory for Gorge CAMx modeling was prepared in the summer of 2006. PGE provided the "actual" 2004 emissions for Boardman, and a projection of emissions for 2018 based on EPA's presumptive BART (Best Available Retrofit Technology) limits of 0.15 lb/mmBtu for SO2 and 0.23 lbs/mmBtu for NOx (T. Worrell, August 2006 e-mail communication). The EPA BART analysis of older permitted industrial sources, and resulting control strategy evaluation, is part of the Regional Haze program.

Boardman's NOx and SO2 emissions used for 2004 and 2018 modeling are shown in Table 1. The goal of the Boardman at 2004 levels run was to evaluate the potential effect of un-controlled Boardman emissions in 2018.

Table 1 Boardman NOx and SO2 emissions.

	2004	2018
	lbs/hr	lbs/hr
NOx	1,783	1,326
SO2	2,831.5	870

Figure 2 represents a comparison of the light extinction at Wishram in November 2018. The DEQ 2018 base run is compared to the run with Boardman emissions at uncontrolled levels. A similar comparison for Mt. Zion is shown in Figure 3.

During the November episode in the 2018 base DEQ run, the modeled visibility at Mt. Zion ranges from about 22 dv to about 38 dv. At Wishram, the visibility ranges from 19 dv to 36 dv.

The difference between the visibility in the November 2018 base run and the 2018 run without Boardman controls, at both Wishram and Mt. Zion, ranges from about zero on some days to about 1 dv on other days. For the BART program, which is part of the Regional Haze Rule, an impact of 0.500 dv or greater is considered significant.

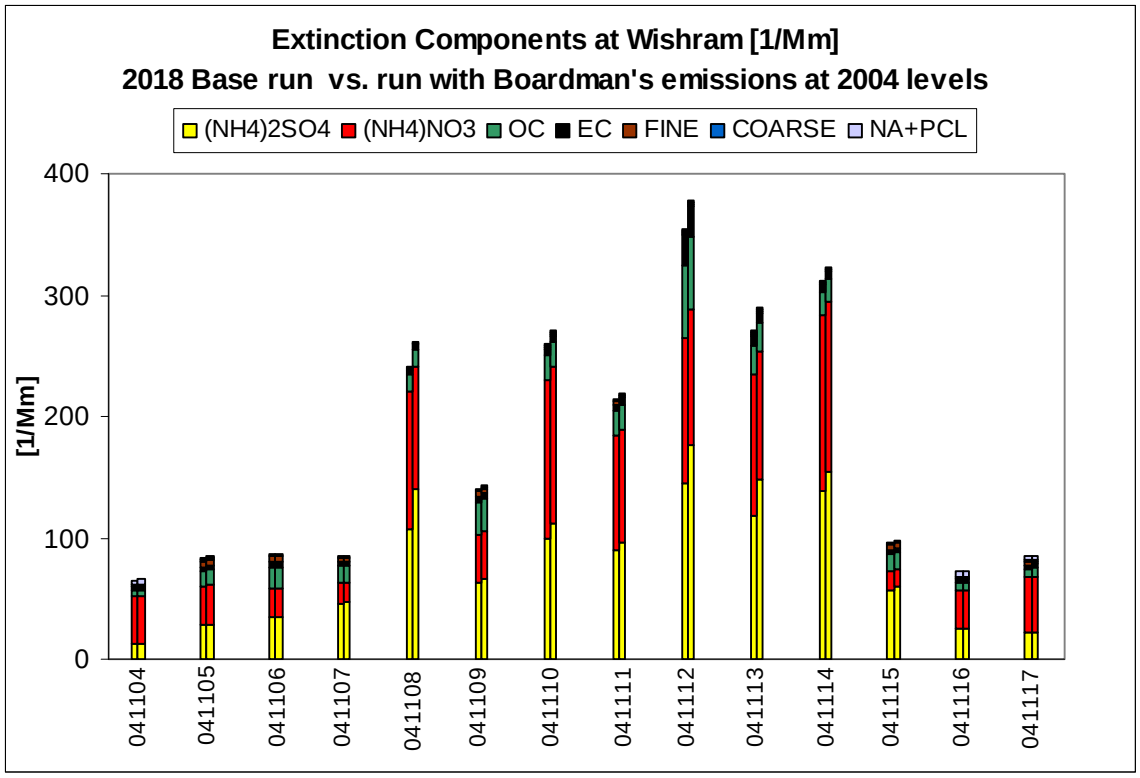

Figure 2. November 2018, Wishram, Boardman at 2004 emissions levels run.

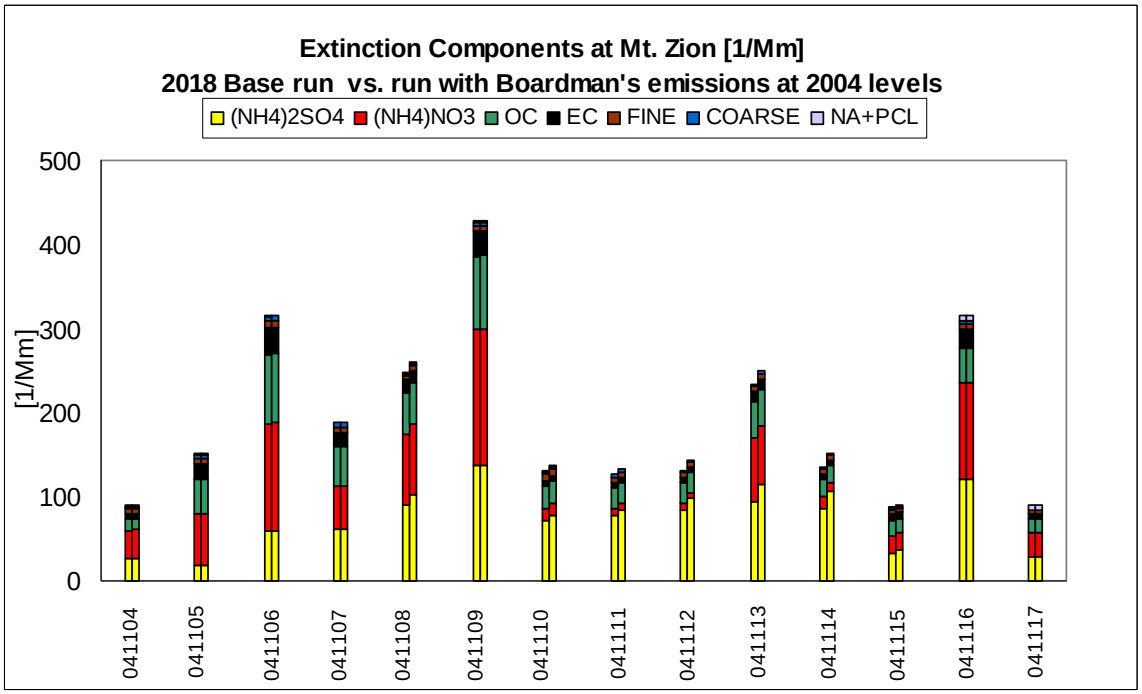

Figure 3. November 2018, Mt. Zion Boardman at 2004 emissions levels run.

2. Zero-ed out PGE Boardman emissions run

This run was designed to further test the significance of PGE Boardman power plant's contribution to the total visibility impairment in the Gorge National Scenic Area. Since Boardman has recently undergone an extensive BART analysis, another goal of this run was to compare the CAMx model results to the results from the CALPUFF dispersion model used in the BART analysis. In the BART analysis, Boardman was modeled as a single source.

The domain for the BART CALPUFF modeling includes Federal Class I areas (specially designated Wilderness areas) within a 300 km radius from the PGE Boardman plant, and covers essentially the same area as the CAMx domain shown in Figure 1. In place of the modeled concentration grids that are produced by CAMx, CALPUFF estimates concentrations at discrete receptor locations. For the comparison of the CAMx to CALPUFF results, the concentrations were extracted from CAMx grid containing Wishram monitoring site and a subset of CALPUFF receptors shown in Figure 4.

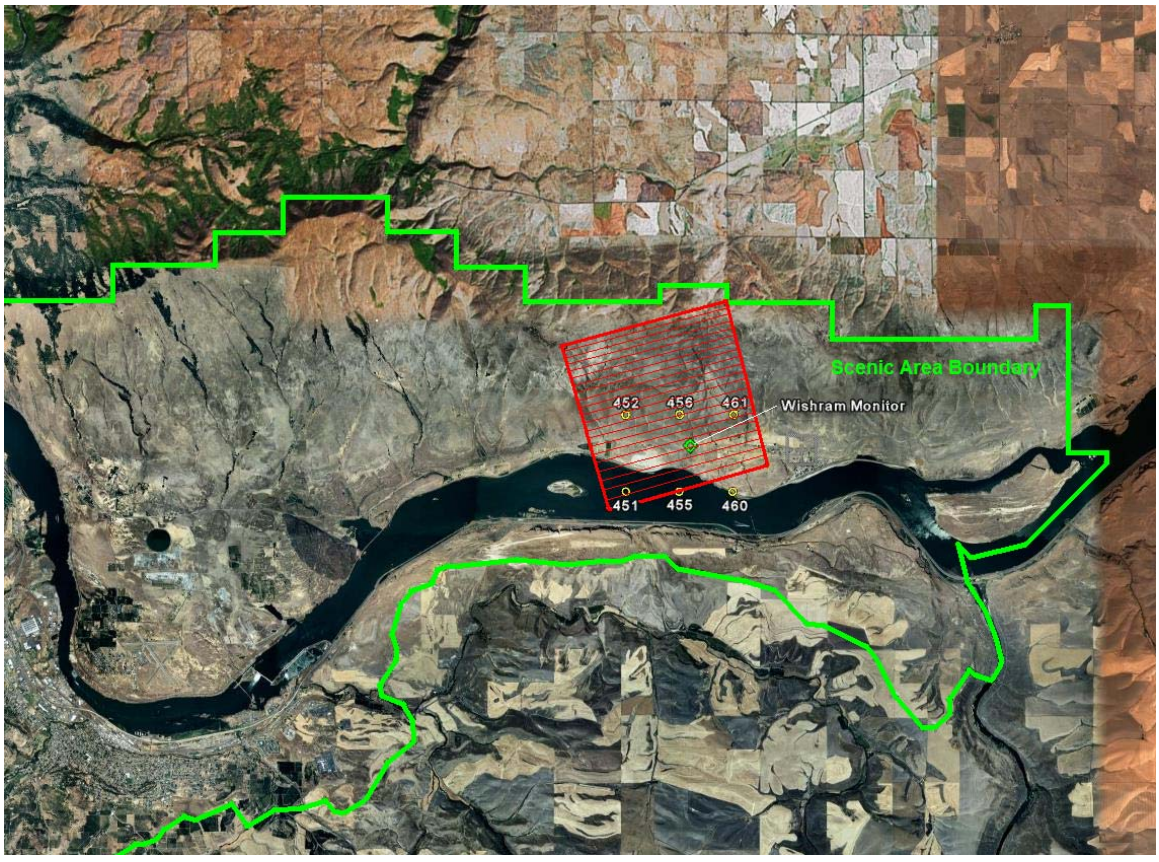

Figure 4. CAMx grid (red) and CALPUFF receptors (numbers) evaluated.

In order to compare the CAMx and CALPUFF results, CALPUFF was run twice, first using uncontrolled 2004 Boardman emissions and then again using the presumptive BART controlled 2018 emissions shown in Table 1. Since Boardman was modeled as a single source in CALPUFF, a CAMx run without Boardman's emissions was necessary for such a comparison. Figures 5 and 6 show a comparison of light extinction for three CAMx scenarios: the zero-ed out Boardman emissions run, the DEQ 2018 base run (presumptive BART controls), and Boardman at 2004 emissions levels run (no controls), at Wishram and Mt. Zion.

To estimate Boardman's contribution to visibility impairment, a change in extinction, expressed as delta deciview, was calculated for two comparisons: between the DEQ 2018 base run (presumptive BART controls) and the zero-ed out Boardman emissions run, and again between a run with Boardman at 2004 emissions levels and the zero-ed out Boardman emissions run. In the first case, we estimated the contribution to visibility impairment from Boardman with presumptive controls, and in the second case the contribution from Boardman with no controls. Contributions from Boardman were then calculated for each day of the November episode using the light extinction from both models. Table 2 shows the visibility impairment attributed to Boardman by CALPUFF and CAMx represented in delta deciviews and sorted in ascending order, not paired in time, for the 14 days of November including the days preceding and following the November 8 – 14 episode.

Figure 7 is a plot of delta deciviews not paired in time attributed to Boardman by CAMx (pink) and CALPUFF (blue). The goal of this comparison is to evaluate whether the two models are predicting a similar range of Boardman impacts. Figure 8 represents a plot of CAMx predicted visibility impairment attributed to Boardman versus the CALPUFF predicted Boardman values. Both plots show a strong agreement between these two modeling evaluations providing additional confidence in the results.

Table 2. CALPUFF and CAMx delta deciview, sorted lowest to highest.

PGE Boardman: comparison of modeling results			
2004 levels		**2018 levels**	
CALPUFF	**CAMx**	**CALPUFF**	**CAMx**
delta dv	delta dv	delta dv	delta dv
0.000	0.000	0.000	0.000
0.006	0.001	0.000	0.000
0.011	0.044	0.000	0.012
0.025	0.160	0.004	0.045
0.026	0.252	0.005	0.058
0.256	0.290	0.197	0.154
0.299	0.298	0.277	0.170
0.360	0.381	0.300	0.185
0.465	0.445	0.387	0.271
0.647	0.559	0.525	0.316
0.726	0.756	0.528	0.432
0.748	1.099	0.554	0.493
0.879	1.181	0.586	0.502
1.407	3.178	1.095	2.258

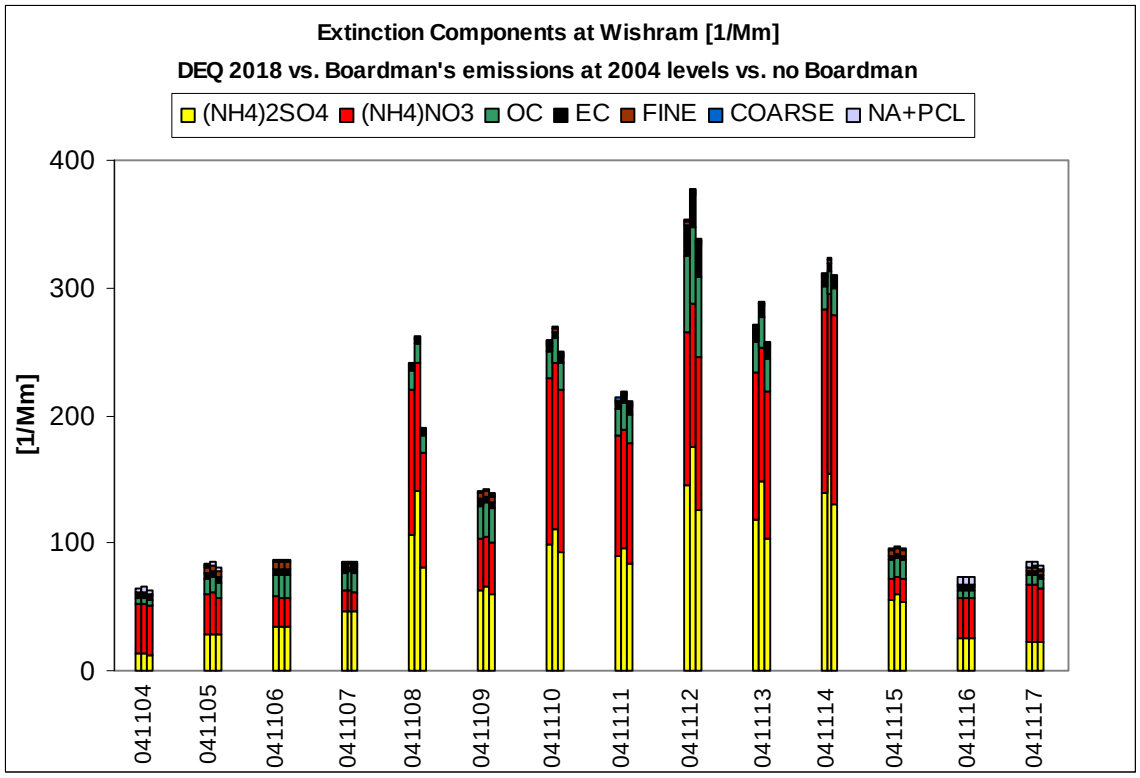

Figure 5. November 2018, Wishram.

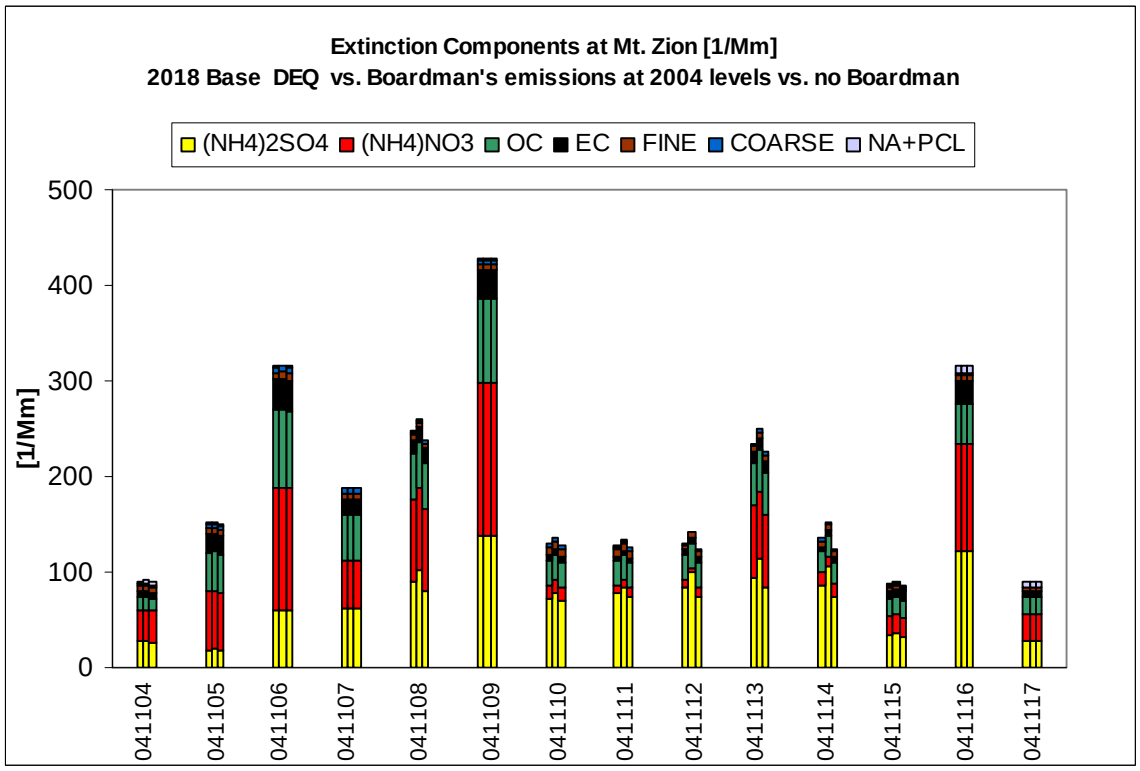

Figure 6. November 2018, Mt. Zion.

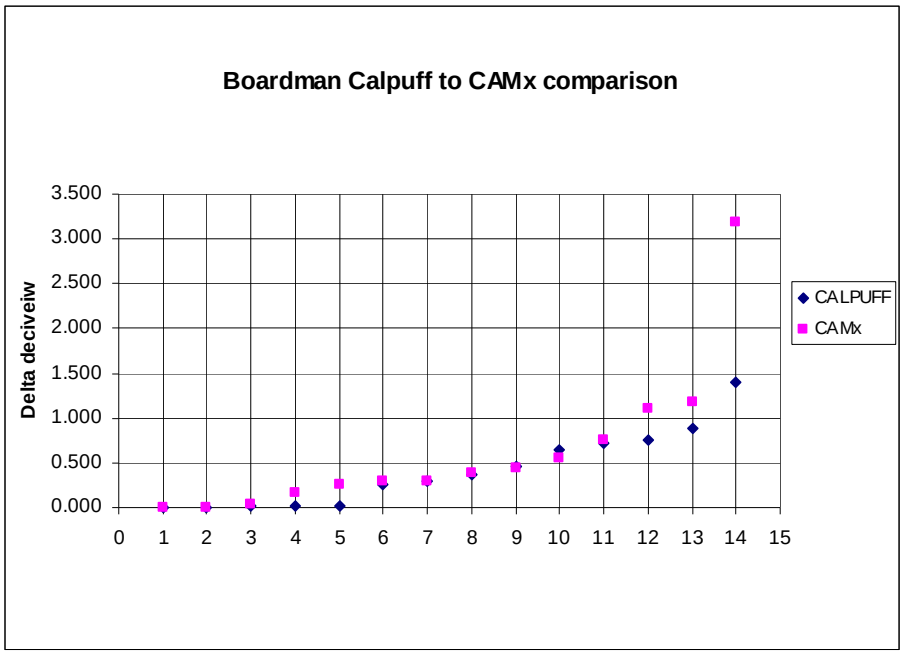

Figure 7. Wishram, November episode

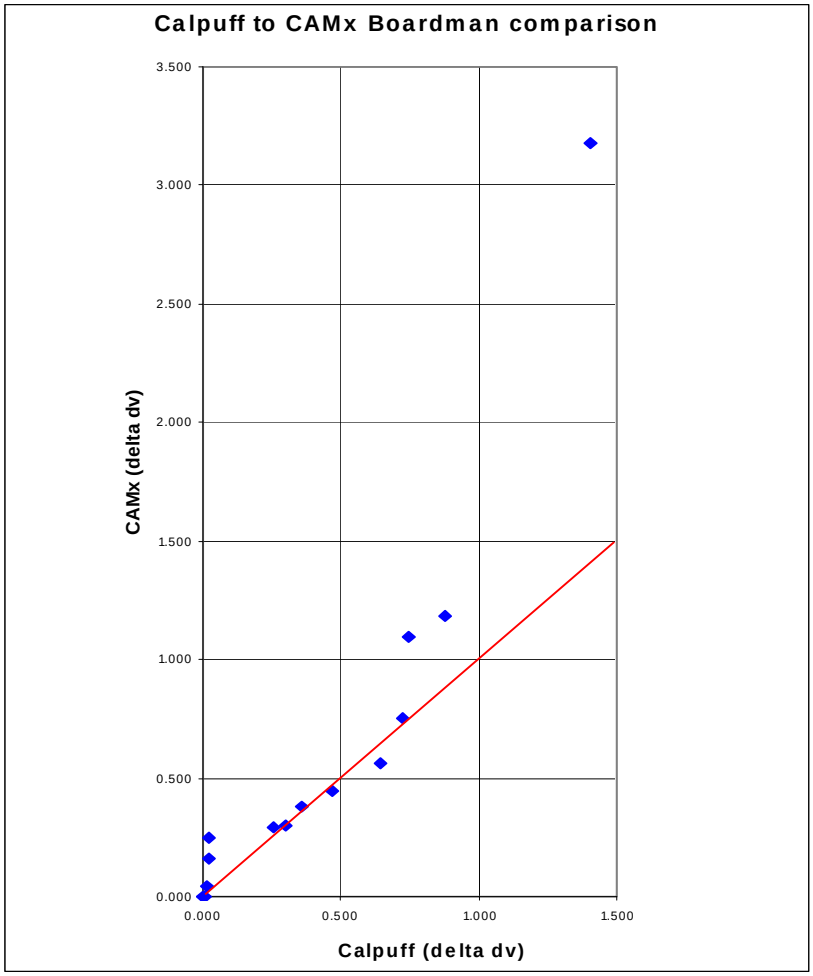

Figure 8. Wishram, November episode

3. Zero-ed out point sources emissions run.

The following run was set up to evaluate the impact of point sources to the total visibility impairment at Wishram and Mt. Zion. The emissions from all point sources in the domain were set to zero. The results of this run are illustrated in Figures 9 and 10. The change in visibility at Wishram between the zero-ed out point sources emissions run and the DEQ 2018 base run ranges from 0.14 to 0.9 dv on five days and from 0.97 to 4.7 dv on nine days of the November episode.

Seven days of the November episode showed a change in visibility of 0.13 to 0.81dv at Mt. Zion; on the other seven days, the visibility change ranges from 0.98 to 3.9 dv.

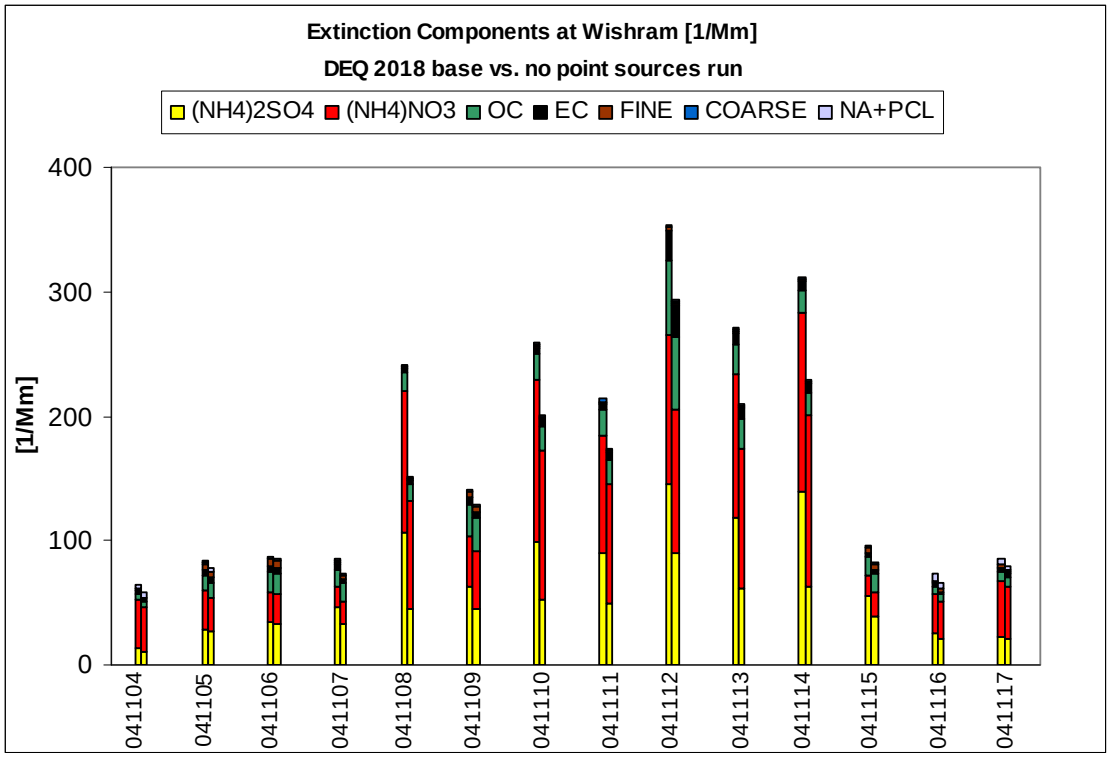

Figure 9. Wishram, November 2018, DEQ 2018 base and zero-ed out point sources emissions runs

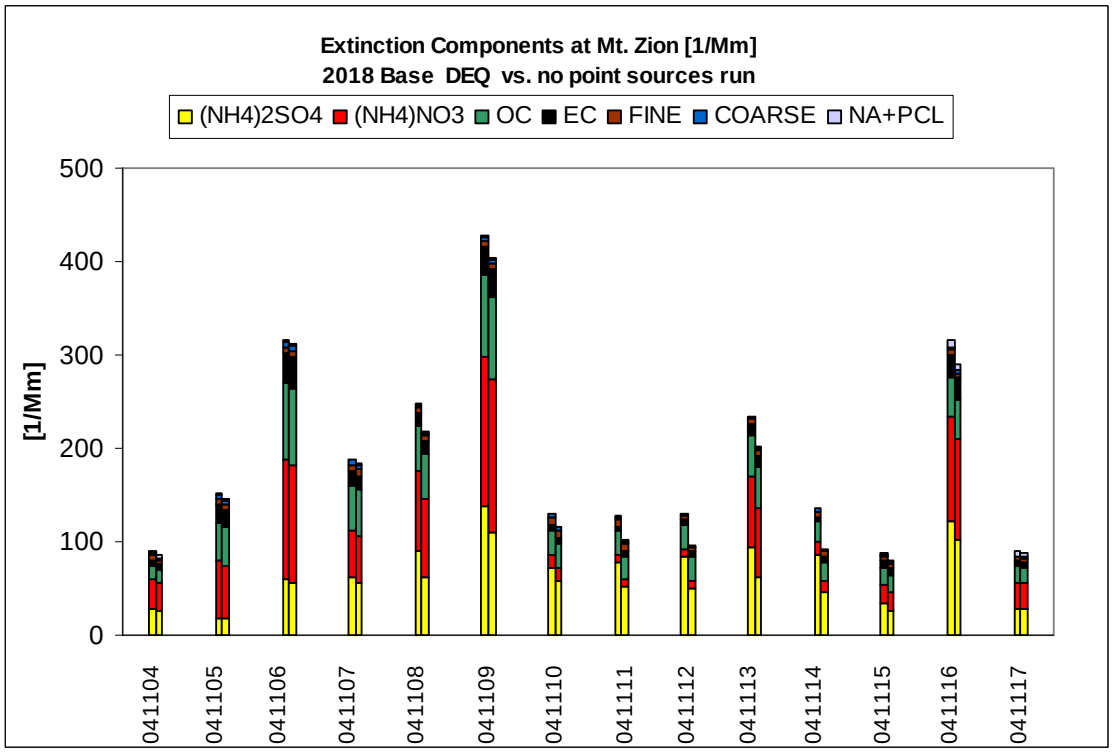

Figure 10. Mt. Zion, November 2018, DEQ 2018 base and zero-ed out point sources emissions runs

4. Zero-ed out Mobile Sources Emissions Run

The goal of this run was to evaluate the contribution of domain-wide mobile sources to visibility impairment at Wishram and Mt. Zion in August and November. In this scenario all emissions from on-road and non-road mobile sources in the domain were set to zero for both August and November episodes. Figure 11 shows a snapshot of zero-ed out NOx emissions. Modeling results for the November episode for Wishram are shown in Figure 12, Figure 13 shows the modeling results for Mt. Zion.

Zero-ing out mobile sources emissions resulted in predicted visibility improvement at Wishram monitoring site in 0.75 – 2.9 dv range with thirteen days exceeding 1 dv. The predicted visibility improvement at Mt. Zion ranges from 0.75- to 3.9 dv, with twelve out of fourteen days exceeding 1.0 dv. The range of predicted visibility improvement in August episode is similar to November.

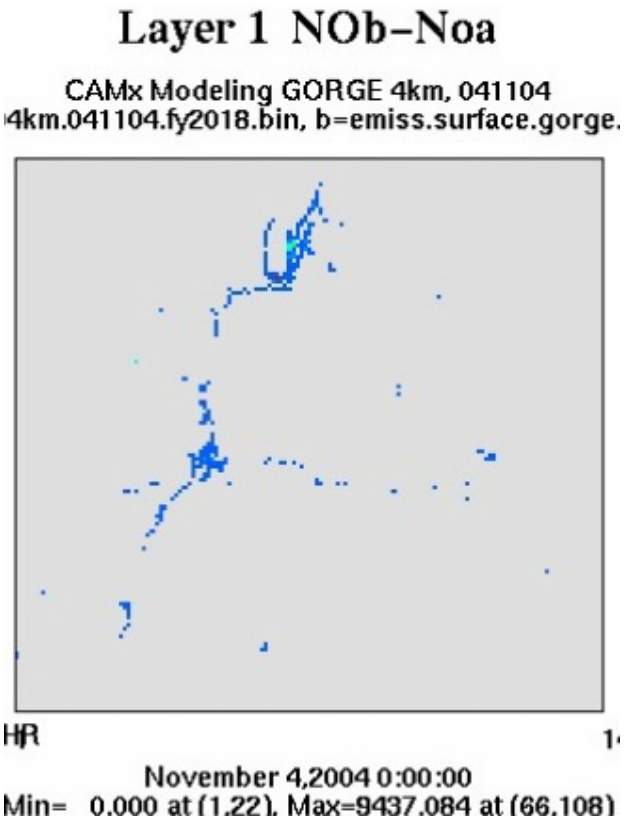

Figure 11. Zero-ed out mobile sources NOx emissions.

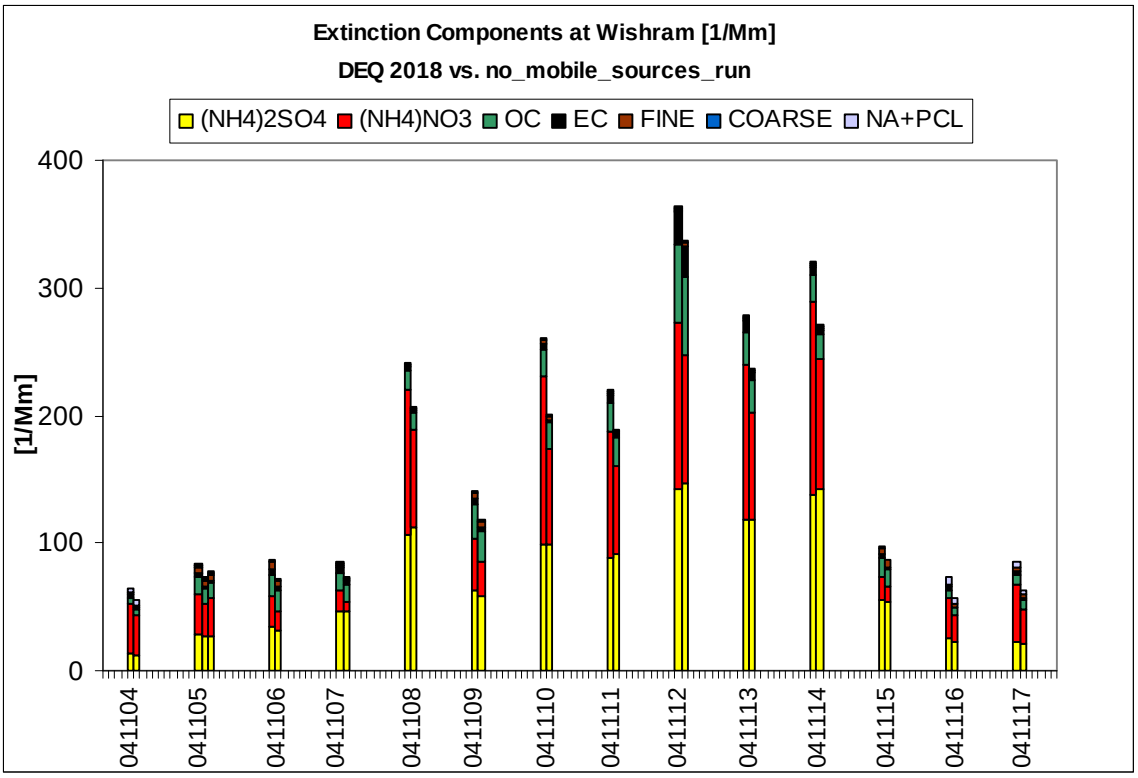

Figure 12. Wishram, November episode, zero-ed out mobile sources emissions.

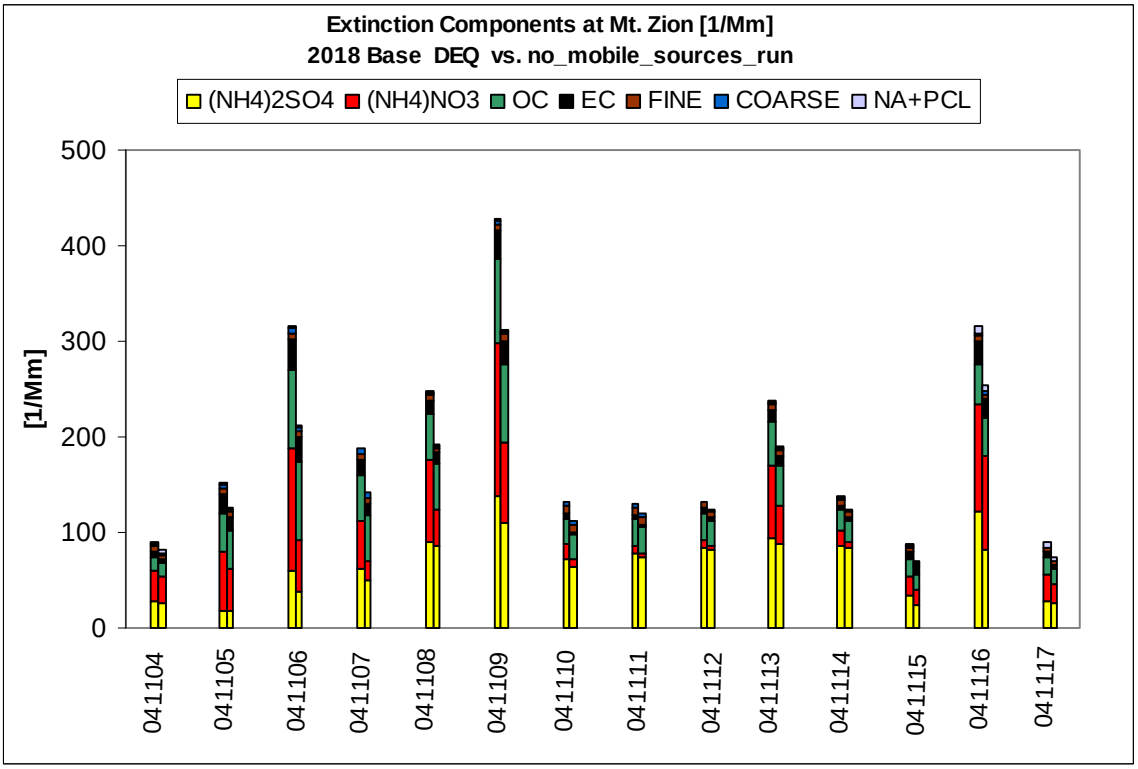

Figure 13. Mt. Zion, November episode, zero-ed out mobile sources emissions.

5. Zero-ed out Railroad Emissions Run

The goal of this run was to evaluate the potential effect of diesel emissions on visibility degradation. In this run all railroad emissions were zero-ed out. The results for the November episode at Wishram are presented in Figure 14, the results for the November episode at Mt. Zion are in Figure 15.

Zero-ing out railroad emissions showed visibility improvement in a range of 0.06 - 0.54 dv at Mt. Zion. At Wishram, the visibility improvement ranges from 0.3 to 1.2 dv with three out of fourteen days showing visibility improvement over 1.0 dv.

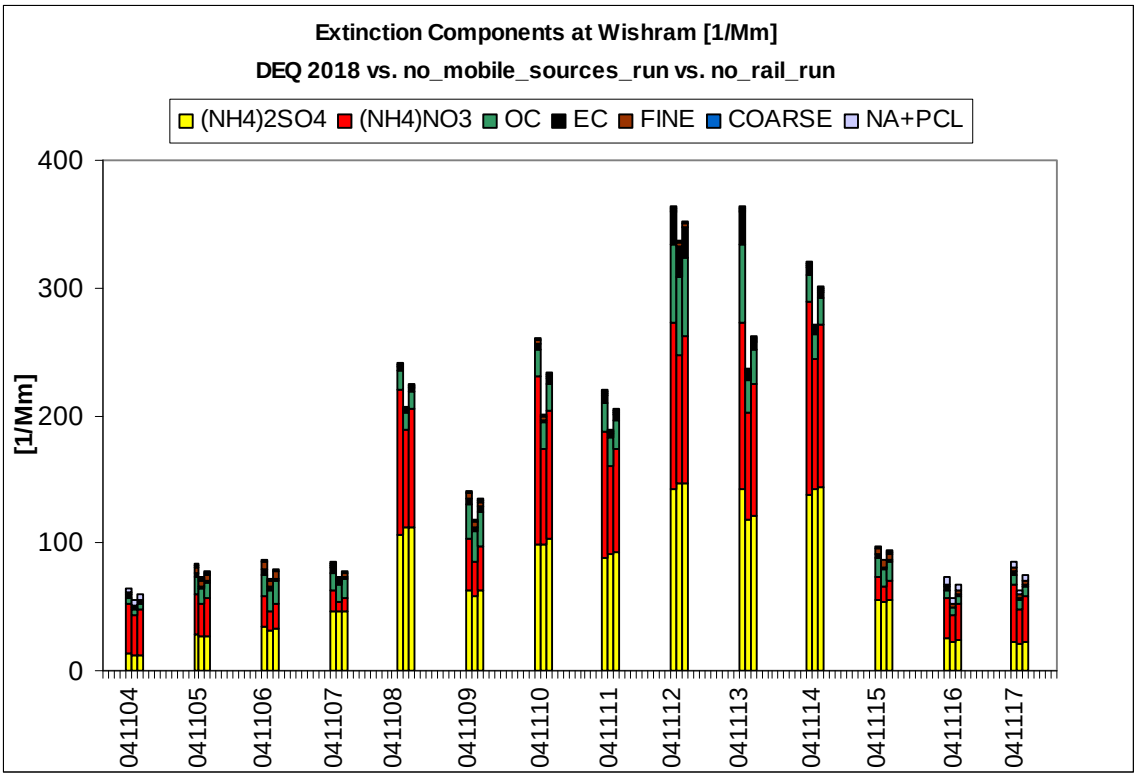

Figure 14. Wishram, November episode, zero-ed out railroad emissions

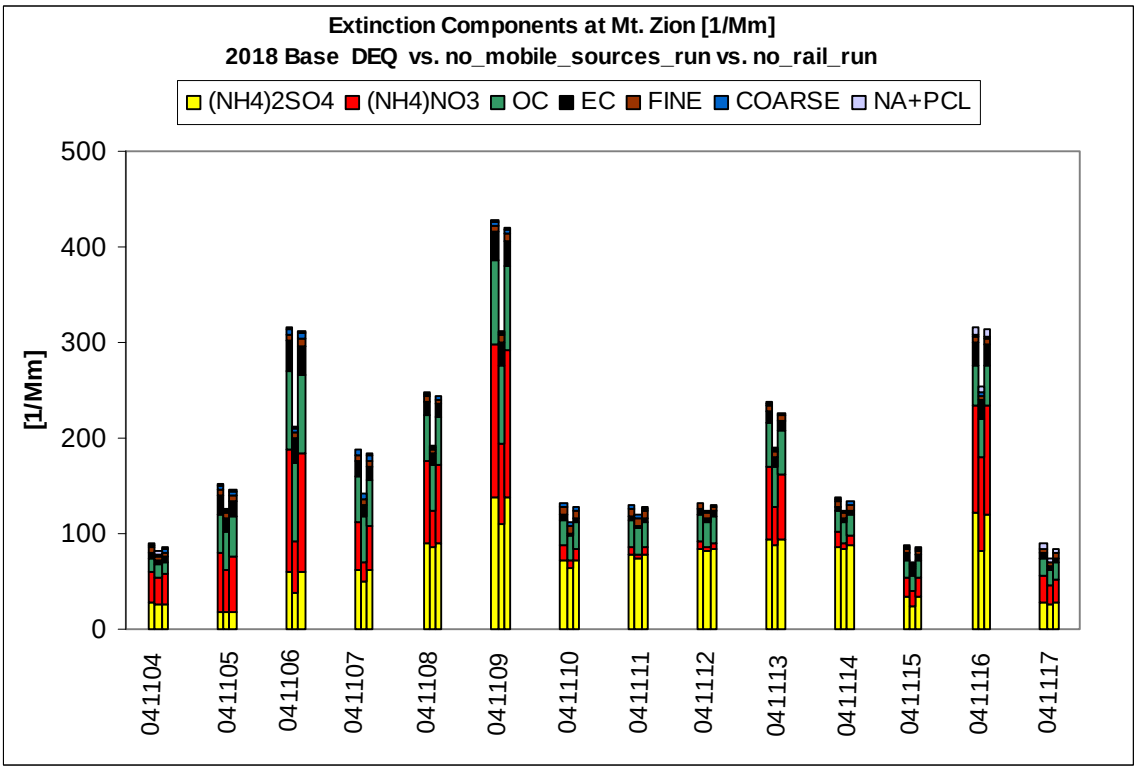

Figure 15. Mt. Zion, November episode, zero-ed out railroad emissions

6. Zero-ed out Residential Wood Combustion Emissions

This run was designed to evaluate the contribution of Residential Wood Combustion (RWC) to the total visibility impairment in the Gorge. Figure 16 is a snapshot of RWC Carbon Monoxide (CO) emissions set to zero during November episode.

The results of this run are presented in Figures 17 and 18. At Wishram, visibility change ranges from 0.03 to 0.4 dv throughout the episode. At Mt. Zion, visibility improvement ranges 0.2 – 3.0 dv with 8 days showing over 1.0 dv change.

Figure 16. Zeroed out RWC CO emissions snapshot

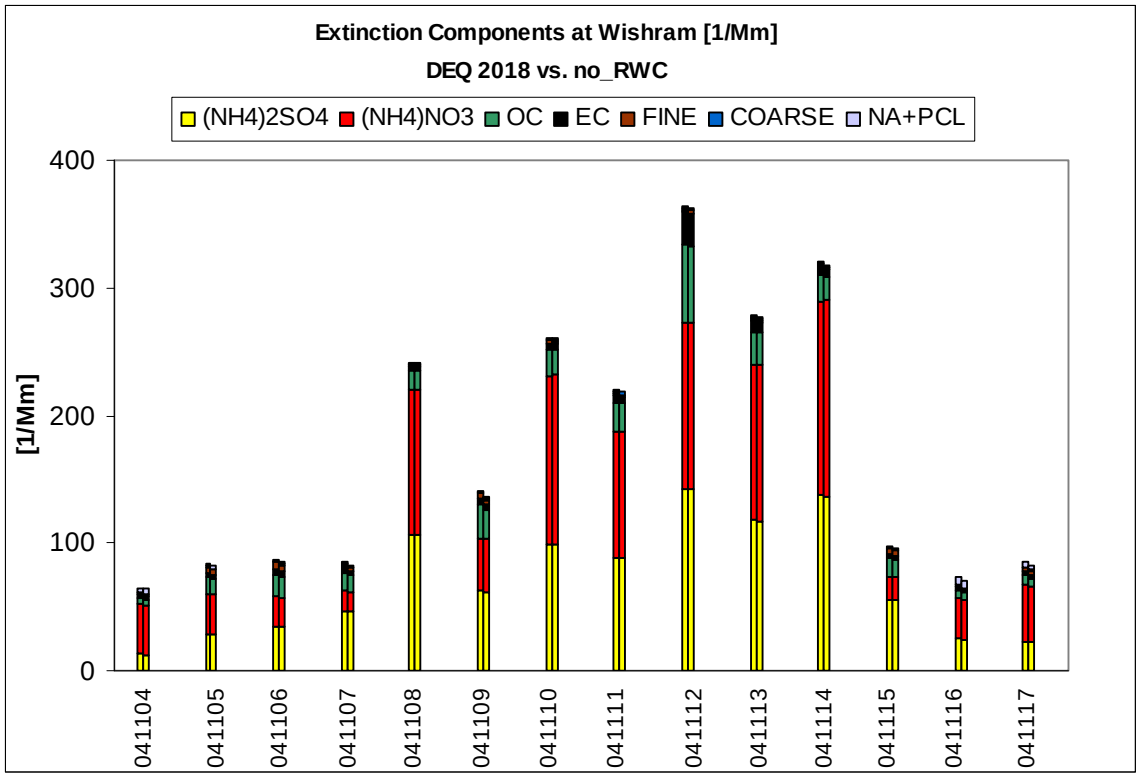

Figure 17 Wishram, zero-ed out RWC emissions run.

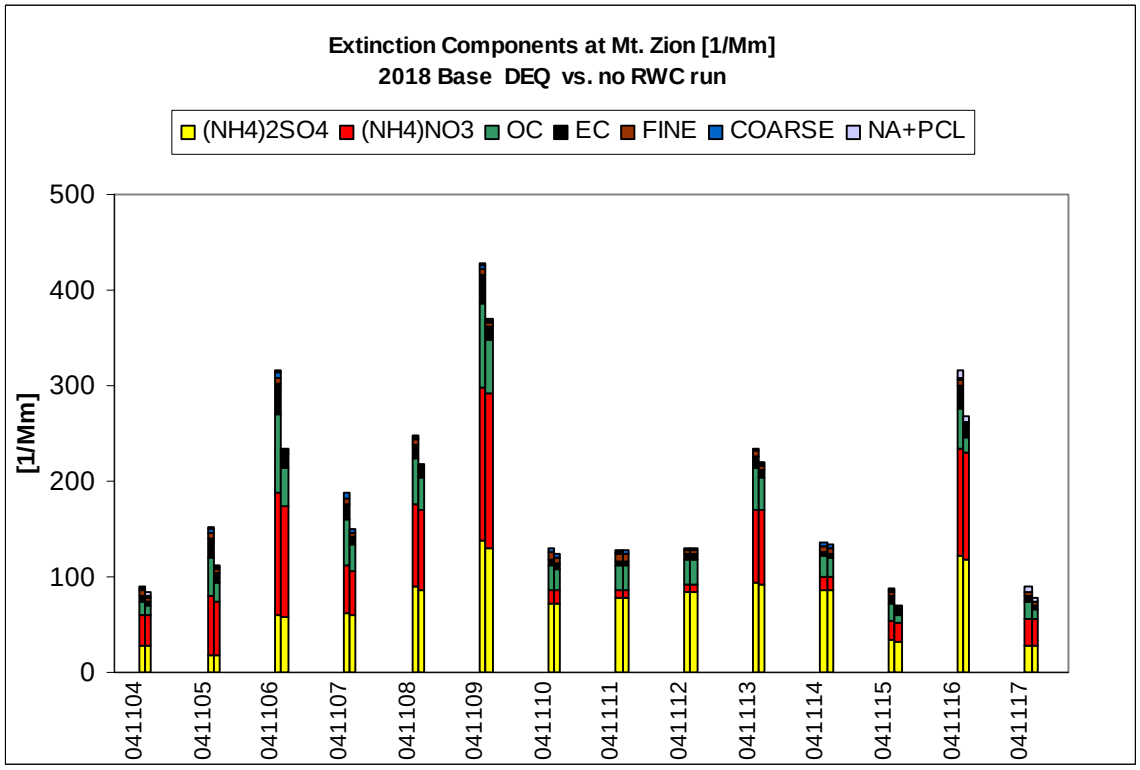

Figure 18 Mt. Zion, Zero-ed out RWC emissions run.

7. Zero-ed out Confined Animal Feed Operations Emissions

The goal of this run was to test the impacts of ammonia from dairies and other confined animal feed operations (CAFOs) facilities. Table 3 shows the Source Classification Codes (SCCs) zeroed out for this run. Figure 19 shows a snapshot of zeroed out emissions. This figure illustrates the location of CAFOs across the modeling domain.

Table 3. Dairy NH3 SCCs

2805002000	Miscellaneous Area Sources-Agriculture Production - Livestock-Beef cattle production composite-Not Elsewhere Classified
2805009100	Miscellaneous Area Sources-Agriculture Production - Livestock-Poultry production – broilers-Confinement
2805018000	Miscellaneous Area Sources-Agriculture Production - Livestock-Dairy cattle composite-Not Elsewhere Classified
2805045001	Miscellaneous Area Sources-Agriculture Production - Livestock-Goats-Total

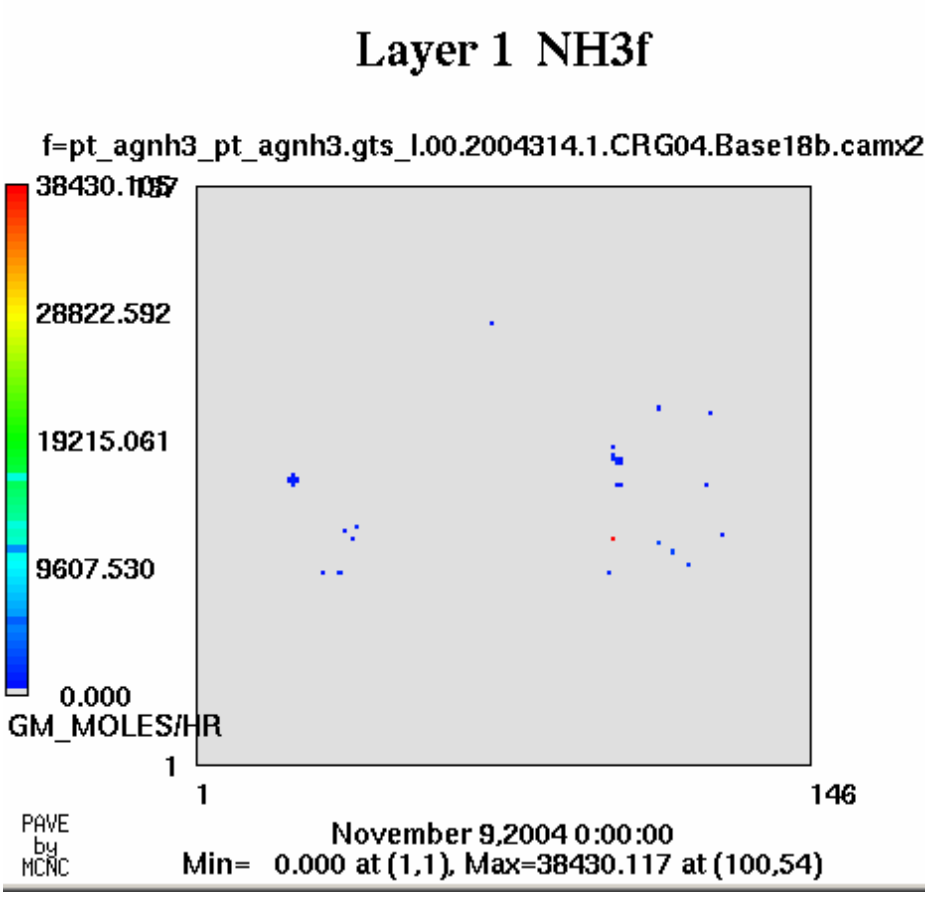

Figure 19. A snapshot of zeroed out CAFO ammonia emissions in the November episode.

Zeroing out CAFO emissions resulted in predicted significant improvement in visibility at Wishram monitoring site on seven days of the November episode, the visibility improvement on these days ranges from 1.2 to 9.3 dv. On the other seven days of the November episode, the visibility improvement range is from 0.007 to 0.9 dv.

Figure 20 shows the comparison of light extinction coefficients of the base 2018 run and the run without CAFO emissions at Wishram during November episode. Figure 21 shows the comparison of light extinction coefficients of the base 2018 run and the run without CAFO emissions at Mt. Zion during November episode. Visibility improvement at Mt. Zion is predicted to range from 0.01 – 0.9 dv on 10 days of the episode and from 1.3 to 2.0 dv on the remaining four days of the episode.

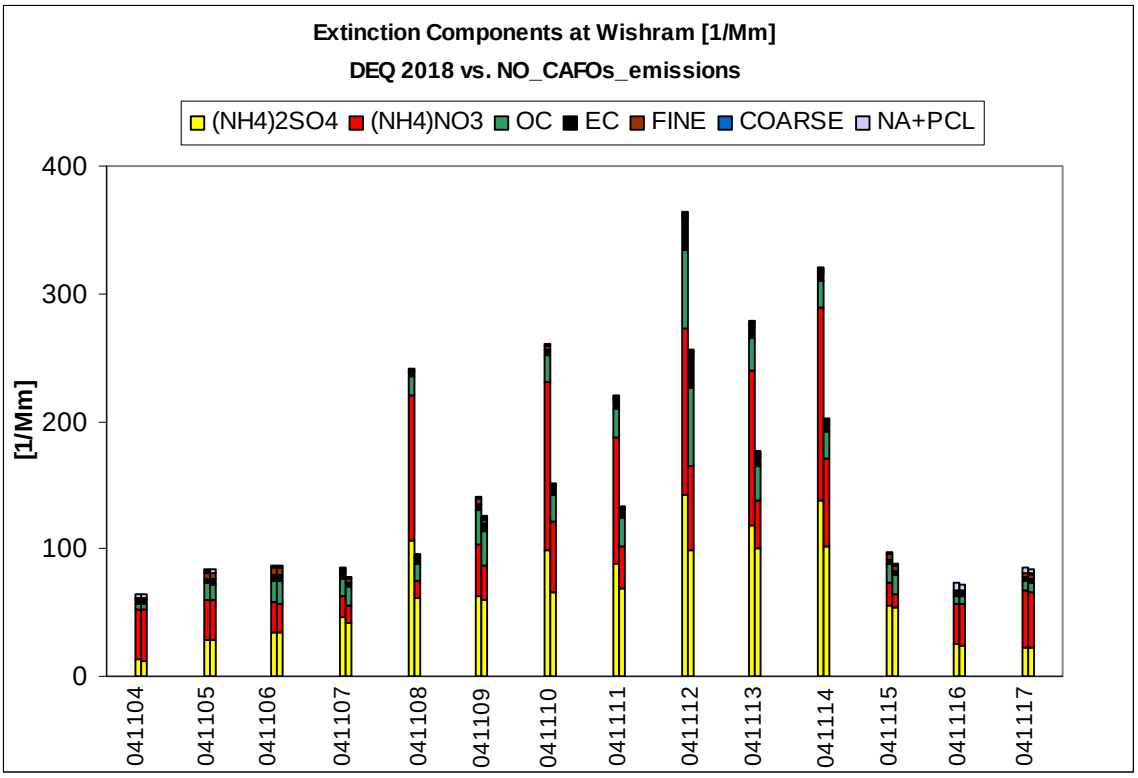

Figure 20. Wishram, November episode, no CAFO NH3 emissions.

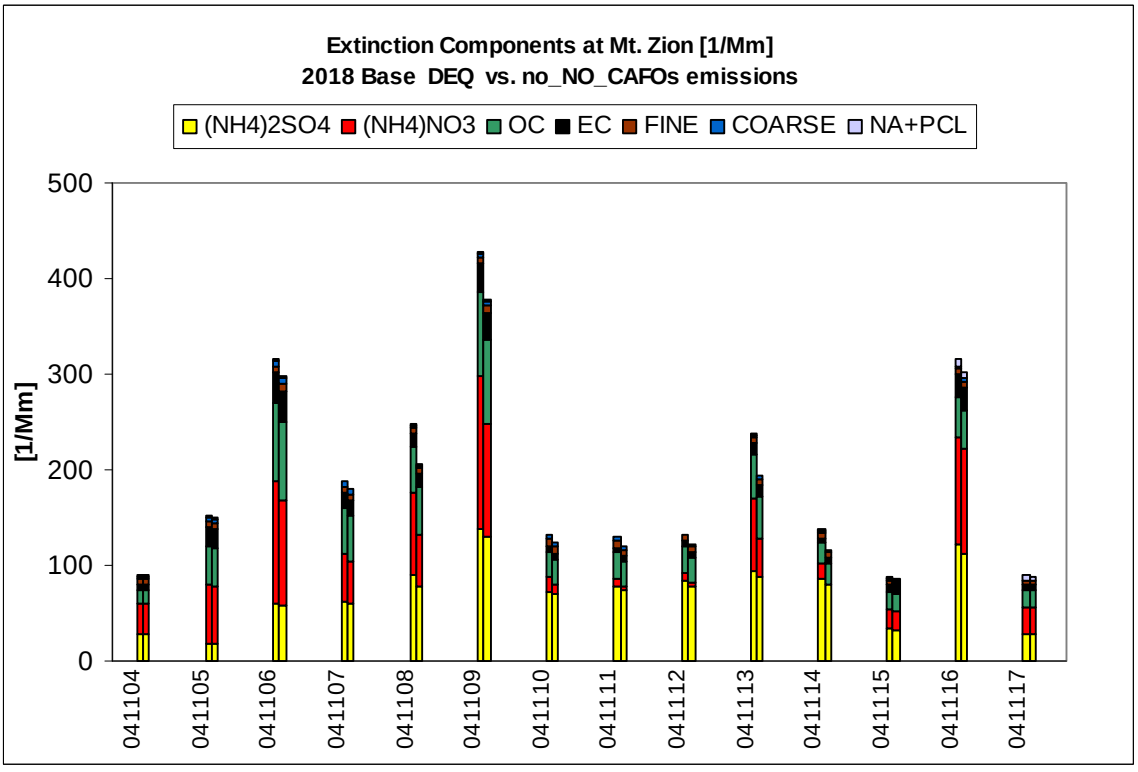

Figure 21. Mt. Zion , November episode, no CAFO NH3 emissions.

8. Tripled CAFO Ammonia emissions.

The goal of this run was to further investigate if the conditions of ammonium nitrate formation in the region were ammonia -limited or nitric-acid limited. For this run, domain-wide CAFO emissions were tripled. Ammonia limited conditions exist when the concentration of nitric acid available to react with ammonia to form ammonium nitrates are greater than the concentration of available ammonia. In such conditions, reducing ammonia emissions would have a greater effect on visibility than reducing oxides of nitrogen emissions. The run with zero-ed out CAFO emissions suggested the existence of such conditions. The run with tripled CAFO ammonia emissions suggests that additional ammonia in the region could turn the ammonia limited conditions into NOx limited. In that case controlling NOx would have a greater effect on visibility.

The results of this analysis for Wishram and Mt. Zion are in Figures 22 and 23. The visibility change ranges from about zero to 2.4 dv at Wishram and from zero to 1.8 at Mt. Zion.

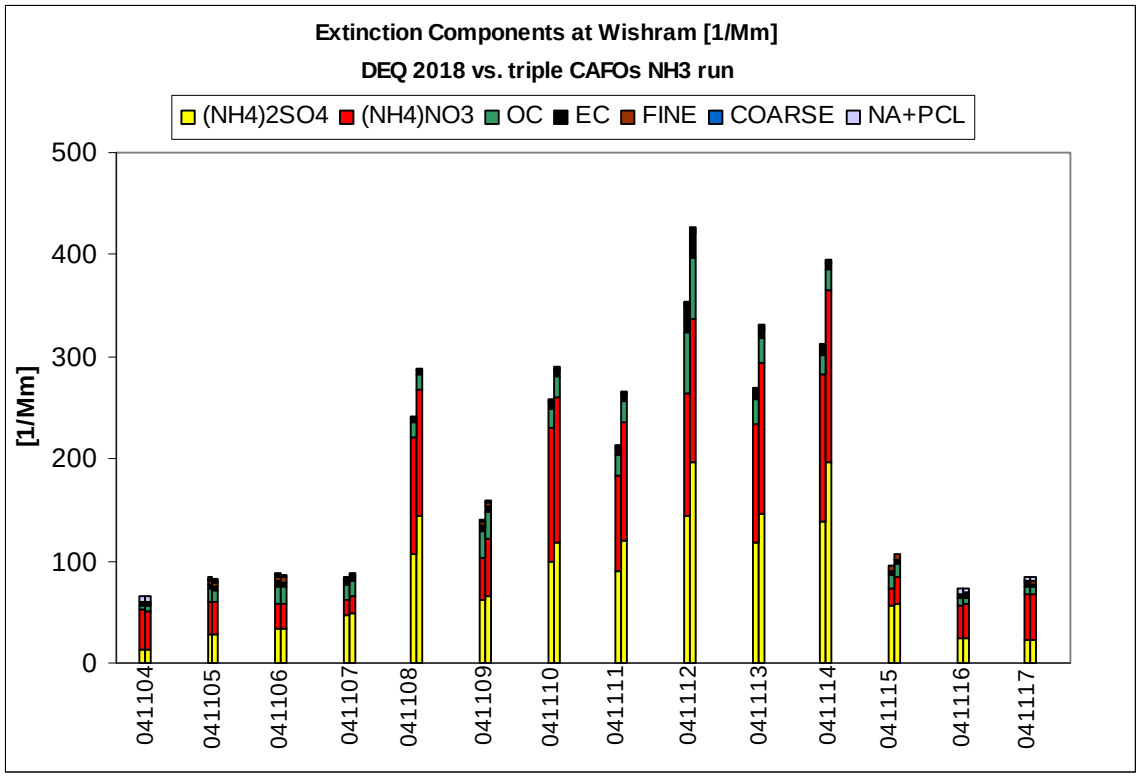

Figure 22. Wishram, November 2018

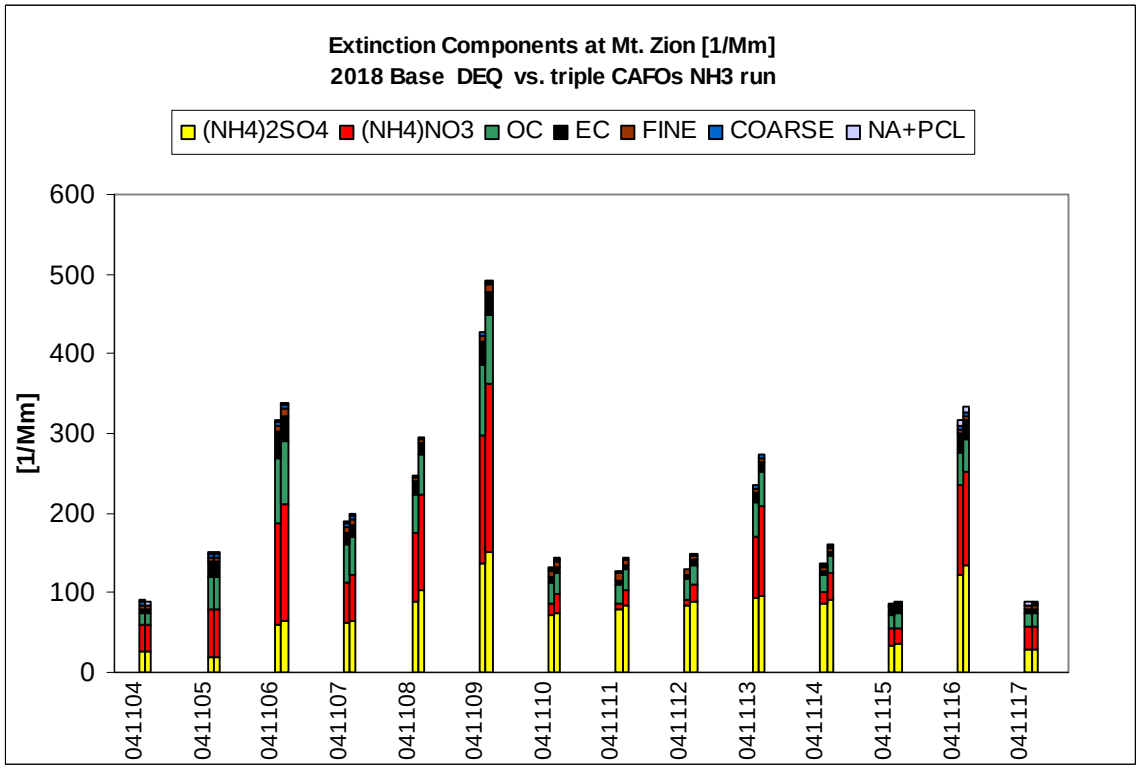

Figure 23. Mt. Zion, November 2018

Conclusions

This additional modeling was performed for selected source categories as a follow up to the Gorge study that produced the *Gorge CAMx Modeling Report* (Emery, 2007). These hypothetical scenarios where the emissions from key source categories were completely removed from the model in order to evaluate the resulting effect on haze are not feasible. However, they provide valuable information about what it would take to obtain an immediate and dramatic reduction in haze.

References

Pitchford, M.L. and Malm, W.C.(1994) Development and Applications of a Standard Visual Index. Atmospheric Environment.

Emery C., et al (2007) Modeling Analysis Conducted for the Columbia River Gorge National Scenic Area Air Quality Study.

APPENDIX B – Air Toxics Source Standards

Source Category	In Effect	**Source Category**	In Effect
Commercial Sterilization Facility	2005	Stainless and Non-stainless Steel Manufacturing	2007
Decorative Chromium Electroplating	2005	Iron Foundries	2007
Dry Cleaning Facility	2005	Plastic Parts and Products	2007
Halogenated Solvent Cleaner	2005	Pressed and Blown Glass Manufacturing	2007
Hard Chromium Electroplating	2005	Steel Foundries	2007
Municipal Waste Combustor	2005	Fabricated Metal Products	2008
Hazardous Waste Incineration	2005	Agricultural Chemicals	2008
Portland Cement Manufacturing	2005	Plating and Polishing	2008
Secondary Aluminum Production	2005	Asphalt Processing and Asphalt Roofing Manufacturing	2008
Municipal Landfills	2005	Synthetic Rubber	2008
Stage I Gasoline Distribution	2007	Plastic Materials and Resins Manufacturing	2008
Flexible Polyurethane Foam Production	2007	Brick and Structural Clay Products	2009
Lead Acid Battery Manufacturing	2007	Industrial Boilers	2009
Wood Preserving	2007	Paint and Allied Products	2009
Paint Stripping Operation	2007	Prepared Feeds Materials	2009
Auto Body Refinishing	2007	Chemical Preparation	2009
Stainless and Non-stainless Steel Manufacturing	2007		

APPENDIX C – National Policy Consensus Center (NPCC) Stakeholder Interview Report

Interview Summary: Gorge Solutions Project Assessment

Prepared by the National Policy Consensus Center
April, 2007

I. Interview Process

Between January 15th and March 12th, 2007, the National Policy Consensus Center (NPCC) interviewed a total of 49 individuals from 36 agencies and organizations to learn about their perspectives on a 'Gorge Solutions' proposal. NPCC contacted an additional six entities/individuals in an effort to interview them, but scheduling problems did not allow these interviews to move forward. The interview process was part of an assessment being conducted by NPCC for the Oregon Department of Environmental Quality and the Southwest Washington Clean Air Agency to determine if a collaborative bi-state group could be an effective component of a regional air quality strategy for the Columbia River Gorge.

The agencies and organizations interviewed are listed below:

- 3 Federal agencies/entities (U.S. Forest Service, U.S. Environmental Protection Agency, and U.S. Institute for Environmental Conflict Resolution)
- 3 Regional (Columbia River Gorge Commission , METRO and Southwest Clean Air Agency-SWCAA)
- 2 State of Washington (Governor's office and Department of Ecology)
- 1 State of Oregon (Department of Environmental Quality)
- 5 Counties (Washington: Clark and Klickitat; Oregon: Wasco, Hood River and Multnomah)
- 4 Cities (Washington: Stevenson and Vancouver; Oregon: The Dalles and Portland)
- 3 Tribes (Umatilla, Nez Perce, Yakama)
- 3 Environmental Groups (Friends of Gorge, Columbia Riverkeepers, Oregon Center for Environmental Health)
- 4 Ports (Portland, The Dalles, Hood River, Skamania)
- 4 Business and Industry Associations (Skamania County Economic Development Council, NW Pulp and Paper Association, Columbia Gorge Economic Development Association, Columbia River Towboat Association)
- 4 Businesses and Utilities (Tidewater, Threemile Canyon Farm, Portland General Electric, BNSF Railroad)

A list of the individuals interviewed is attached to this summary.

II. Interview Findings

A. Willingness to Participate

Most of the federal, state, and local government representatives that we interviewed expressed a willingness to participate in a Gorge Solutions Group and process. For some, the willingness to participate was conditioned on the time commitment and receiving more details about the focus of the group and its agenda. Others felt that it was critical to have a clear and specific charge and objectives for the group. Without that, they would be hesitant to participate. Some of the cities did not feel that it was critical for them to be at the table.

The staff of the three tribal nations we interviewed (Yakama Nation, the Nez Perce Tribe and Confederated Tribes of the Umatilla Indian Reservation), said that participation in a Gorge Solutions group would likely be contingent on a clearly defined role for the tribes, with one seat at the table for each of the four tribal nations (even if only 2 or 3 tribal nations choose to participate at the start of the process) and a holistic, meaningful focus for the group. Each staff member made it clear that their tribal governments (i.e., tribal councils or boards) would need to make decisions about whether their nation would be willing to participate; staff could not do that on their behalf.

The individuals we spoke with in the environmental community indicated that they would be reluctant to participate in a Gorge Solutions process unless regulatory matters were addressed either in another forum, or as a key part of the discussion for the Gorge Solutions group. The key regulatory issues from their perspective are related to PGE Boardman and Threemile Canyon Farms. Some noted that the time commitment required for participation in a Gorge Solutions effort could also be an obstacle.

All of the business and industry representatives that we interviewed indicated a willingness to participate in a Gorge Solutions group. Most saw benefits to their participation; however, several were very wary of too much focus being placed on regulation.

B. Key Themes and Comments

1. Potential Benefits of a Gorge Solutions Approach

Numerous benefits of a Gorge Solutions approach were identified through the interview process. The benefits mentioned in the interviews are described briefly below.

Public Education and Awareness: Many of those interviewed noted that education of the public and exchange of information among key stakeholders would be valuable because a number of people do not understand the full nature and extent of Gorge air quality issues. A Gorge Solutions effort could raise the visibility of air quality issues, while building ownership and a sense of shared responsibility for reducing air emissions. It could provide individuals and organizations with information about how they could contribute to the solution.

Trust Building: Across all sectors, interviewees said that there is a need to find common ground and build trust among the stakeholders through dialogue. Several business representatives noted that the Gorge Solutions group could provide an

opportunity for businesses to interact with a range of stakeholders in a positive way and help them in developing networks and relationships, including partnerships with other businesses. Others hoped that the group process could help improve the culture of finger-pointing that currently exists.

Bi-state Collaboration and Governors' Leadership Role: All of the interviews showed strong support for having the two Governors act as conveners for a Gorge Solutions effort. This was identified as a key benefit and many thought it would play a critical role in the success of the process. It could raise the visibility of the effort, encourage participation, and help ensure that agreements are implemented. There was also support expressed by some of the interviewees for having the Governors co-convene the group with the tribal governments and federal agencies.

Value of Voluntary Collaborative Projects: Most of the interviewees felt that voluntary collaborative efforts have an important role to play. Several noted that some air emission reduction targets do not lend themselves to a regulatory approach. It could be a good opportunity to focus on constructive solutions and demonstrate positive results in the near term. Many saw it as a valuable way of making incremental progress while regulatory measures focused on longer-term improvement. Early project successes could build good will and cooperation among government, business and environmental interests. This might, in turn, increase trust and facilitate dialogue on more contentious issues.

Opportunity to Obtain Resources & Provide Incentives: Many expressed the view that a Gorge Solutions group could be helpful in obtaining government funding. For example, it was felt that the group could be a powerful voice in advocating for federal funds. It could also lead to contributions from the private sector from those businesses that wished to mitigate the impact of their emissions by contributing funds for projects. The Gorge Solutions group might also be able to develop or recommend programs that would provide financial incentives for positive voluntary efforts on the part of individuals or small business.

2. Concerns and Potential Obstacles

Throughout the interview process, we heard a variety of concerns expressed about the Gorge Solutions concept as presented in the material that was circulated prior to the interviews. These concerns are summarized below.

Scope and Focus: A number of the stakeholders believe that the group would need to have a comprehensive scope, looking at both voluntary and regulatory options, as well as broader ecosystem and health issues. Others made it clear that a focused charge with clear expectations and achievable outcomes is critical for success. One interviewee said that a clear air quality goal and specific air quality standards were needed as a first step. Some said that it is important not to set expectations that are too high and therefore not achievable. Both sets of stakeholders indicate that their willingness to participate depends on how the scope of the group is framed. Clear

definition of the roles and responsibilities of the larger group and project teams was also noted as important.

Comprehensive and Regional Approach: Many pointed out that air quality issues go beyond the boundaries of the Gorge and need to be addressed regionally, focusing on both west-side and east-side influences. Others noted that it has become more than just a "visibility" issue and that it would be important to make connections to ecological impacts and health issues. The staff of the tribal governments indicated support for the proposal if it is comprehensive in scope and provides a clear role for tribal nations that honors their sovereignty and acknowledges the value of traditional tribal wisdom and oral history knowledge. They expressed the view that a Gorge Solutions group and process should focus on the impacts of air deposition on the entire ecosystem of the Columbia River Basin, including fish, water quality, lichens, plants, cultural resources and people's health.

Conflict and Lack of Trust**:** Some mistrust and conflict currently exists among potential members of a Gorge Solutions group. The existence of conflict is not necessarily a problem if handled in appropriate ways. It can be a source of creativity and a springboard for building lasting approaches and solutions. However, the extent of mistrust among some of the parties could undermine group process and create negative experiences that will cause some stakeholders to leave the table. Some of the interviewees said that contentious debate in the initial stages of the group's work could be a real obstacle to progress, noting that name calling and finger pointing could doom the group to early failure.

Need for Adequate Resources: Many of those interviewed pointed out that there must be adequate funding to support a group process and project teams. All tribal staff representatives agreed that funding must be provided to support tribal participation in the process, including transportation and lodging costs associated with two or three representatives from each of the four tribes to attend meetings. In addition, some tribal nations may require compensation for staff time spent preparing for and participating in meetings. Other government entities, especially at the local level, have significant staffing and resource constraints that interfere with their ability to participate in another group. Some asked if this was the best use of limited resources and whether more could be accomplished with a lower investment if a large group is not formed, but specific voluntary projects are still pursued.

Balance/Fairness: All the interviewees said that appointments to a Gorge Solutions group would need to reflect a balance of interests. Some also noted that it is important that group members have a commitment to the process and civil dialogue. Business and industry interests said that they hoped for frank discussion of how things work for industry and would want to ensure that there was adequate industry representation. Some interviewees felt that an unbalanced group could do more harm than good. NPCC was cautioned by some that the group should not focus too much inside the Gorge because a lot of the air problems are caused by sources to the east and west. Many said that any approaches to air quality improvement must include

considerations of geographic fairness and place no undue burdens on any one sector. Staff from the tribal nations pointed out that their sovereign nations have rights and resources in the Gorge by federal law; and those treaty-reserved rights and resources are directly impacted by air quality.

Voluntary vs. Regulatory Approaches: Some interviewees were concerned that a Gorge Solutions process might be used as a way of delaying action on regulatory approaches. They thought that some regulatory sideboards could be helpful and that voluntary measures must fit into a comprehensive strategy that also addresses regulation. Several said that it is important to focus on the large pollution sources—scrubbers on Boardman and controls on ammonia at Threemile Canyon Farm—because by addressing these sources, the interviewees feel a large part of the problem would be addressed. Others said that too much of a focus on regulatory measures could cause them to leave the table. Several individuals made the point that it is acceptable to have the group discuss regulatory measures if it does not take over the group agenda; they also felt it could be beneficial to work towards consistent regulatory approaches for the two states. A few said that *any* consideration of regulation could be a problem. Others said that it could be helpful to start with a positive announcement about some voluntary actions that will be taken by key players.

Scientific/Technical Issues: Continuing debate about the scientific and technical work could be an obstacle to success, especially if that debate were to dominate group discussions. A number of the people interviewed for this assessment were curious or uncertain about the status and results of the scientific/technical work. Others were very familiar with the studies and what they were showing, but felt that it was taking too long to get results or that it was time to stop studying and take action. Several people expressed the opinion that any voluntary projects should flow logically from what the studies were revealing about the sources of air emissions. Some were concerned that voluntary collaborative projects would make little difference and that, at a minimum, it was important to be able to estimate or measure the impact of those projects

Process Issues/Requirements: There were a variety of comments and concerns about organizational and process issues. Suggestions were made that the group have a fixed time frame and that an effort be made to avoid redundancy with other efforts. Several people said that too large a group could be unwieldy and that it might be preferable to have representatives of government bodies and not representatives of all the different interests, at least in a core group. Another concern was that this might create more bureaucracy; some may see it as another layer of government without a clear relationship to the Gorge Commission. Along those same lines, one interviewee said that it may not be worth setting up a whole group mechanism just to do projects; an existing group might be able to include this in its work plan. Another person noted that collaborative processes can take a lot of time and resources; to be worth the effort, the group should achieve greater results than would be possible without the group.

A number of the interviewees noted that good staffing and chairs with credibility and stature would be important for success. It was suggested that the two Governors could co-convene the process with the tribal nations, with seats at the table reserved for federal agencies as well. The Western Regional Air Partnership was cited as a positive model for what can be accomplished through collaboration in a government-to-government group with stakeholder involvement. Another suggestion was that this Gorge Solutions proposal takes into account other efforts to explore opportunities for bi-state cooperation, such as one underway by Portland State University's (PSU) Institute for Portland Metropolitan Studies.

Several of those interviewed remembered the previous Advisory Committee proposal. One interviewee argued that this was the approach that should be used since it was well thought out, balanced and supported. This interviewee also thought that voluntary on-the-ground projects would be a positive addition to the previous Advisory Committee concept.

Finally, the name of the group was problematic for some. We heard that the name "Gorge Solutions Group" implies that it covers more than just air quality; a different name was suggested, such as "Gorge Air Quality Solutions. Even with that name, there was concern that it might imply that the group was taking on all aspects of air quality. Staff of the tribal nations said that a broad focus was appropriate and suggested "Gorge Holistic Solutions" or "Columbia Basin Air Solutions". Another person said we should consider substituting "Opportunities" for "Solutions."

C. Project Ideas

Considerable enthusiasm was expressed about the value and potential for collaborative voluntary projects that could result in incremental air quality improvement. Work is already being undertaken in some areas but there are opportunities to expand those efforts.

Some argued that any projects should logically flow from the science summary report and the strategy. In addition, a number of individuals said that they felt it would be important to estimate and report on anticipated and actual air emission reductions that would result from these efforts. Some expressed the view that many of these projects would only make a small difference toward improving air quality and emphasized that it was important to choose cost-effective projects that could make the most significant difference. One interviewee argued for a Solutions project focused on Boardman emission reduction and noted that if progress could be made on Boardman, then there would be a clear benefit to taking on other efforts.

Listed below are the project ideas identified in the interview process:

- Forest practices: for example, reduction/elimination of pile burning and long-term maintenance under burning

- Open-burning reductions, including composting operations as alternatives
- A variety of diesel reduction projects, including
  --Retrofitting the truck diesel 'legacy fleet'
  --Engine change-out for trains and switching equipment
  --Tug boat engine replacement and retrofit
  --Increased use of alternative fuels –biodiesel stations, ultra-low sulfur diesel, etc.
  --Truck stop electrification—idling reduction for I-84
  -- Retrofit of heavy-duty diesel engines owned by local government
- Woodstove reduction and conversion, including education about wood stove use
- Making biomass more viable as a sustainable renewable energy resource that would also contribute to economic development
- Incentives for more alternative energy projects (such as wind & biomass) and the promotion of energy efficiency measures, such as weatherization of homes and businesses in the Gorge
- Best management practices for agricultural operations, including composting of cattle waste, alternatives to agricultural burning, including stump burning, and smudge pot replacement with propane
- Threemile Canyon Farm and Boardman voluntary measures
- Per capita VMT reductions: look at increased use of public transportation, including passenger trains, bus, ride-sharing, etc. for recreational traffic
- Metro waste-hauling alternatives, including sending garbage by barge

III. Next Steps

Based on the interviews conducted, NPCC is formulating options for DEQ and SWCAA, the Governors of Oregon and Washington, and the Washington Department of Ecology to consider regarding concepts for a "Gorge Solutions" approach. This will include a general assessment of the practical and fiscal feasibility of various approaches that could be responsive to stakeholder and tribal concerns. Among other things, the interviews suggest there is considerable support for moving forward with voluntary collaborative projects to reduce air emissions. NPCC's continued assessment will include options for how to support and fund development of collaborative emission reduction projects using a "Solutions" approach as part of the air agencies' overall strategy.

After NPCC provides its assessment to the air agencies and the Governors, the agencies will sponsor a public involvement opportunity this summer to explore these concepts and other aspects of their proposed strategy before they present their final report to the Gorge Commission this fall.

Attachment A: List of Interviews Conducted by NPCC

GOVERNMENT: Federal, State, Local	
Organization	**Name**
US EPA Region 10	Mr. Paul Koprowski, EPA Project Officer
USDA Forest Service, Region 6	Mr. Rick Graw, Air Resource Specialist
USDA Forest Service, Columbia River Gorge NSA	Mr. Dan Harkenrider, Area Manager
US Institute for Environmental Conflict Resolution	Mr. Mike Eng, Senior Program Manager
Columbia River Gorge Commission	Ms. Jill Arens, Executive Director; Judy Davis, Chair; Brian Litt, Planning Manager
Columbia River Gorge Commission	Mr. Walt Loehrke, Gorge Commissioner (also a member of the Skamania County Board of Commissioners)
Washington Governor's office	Mr. Keith Phillips, Environmental Policy Advisor
Southwest Washington Public Liaison Officer (Office of the Governor)	Mr. Jim Jacks, Southwest Washington Representative
Southwest Clean Air Agency (SWCAA)	Mr. Bob Elliot,, Executive Director
Washington Dept of Ecology	Mr. Stu Clark, Air Quality Program Manager
Oregon Department of Environmental Quality	Mr. David Collier, Planning Manager; Ms. Rachel Sakata, Air Quality Planner
Oregon Department of Environmental Quality	Mr. Andy Ginsburg, Air Quality Division Administrator
Oregon Department of Environmental Quality	Mr. Kevin Downing, Air Quality Planner
Metro	Mr. Andy Cotugno, Metro Planning Director; Mr. Mark Turpel, Principal Transportation Planner
Clark County	Mr. Kelly Sills, Economic Development Manager, Clark County Board of Commissioners
Klickitat County	Mr. Mike Canon, Director Resource Development Department; Mr. Dana Peck, Project Manager, Horizon Wind Energy (previously Director Resource Development Department)
Hood River County Board of Commissioners	Mr. Chuck Thomsen, Commissioner
Multnomah County	Mr. Derrick Tokos, Principal Planner
Wasco County	Mr. Dan Ericksen, Judge
Vancouver, WA	Mr. Pat McDonnell, City Manager; Mr. Steve Burdick, Economic Development Manager
Stevenson, WA	Ms. Mary Ann Duncan-Cole, City Administrator
Portland, OR	Mr. Jim Middaugh, Chief of Staff to Portland City Commissioner Erik Sten (also a member of the Gorge Commission)
The Dalles, OR	Mr. Nolan Young, City Manager

GOVERNMENT: Tribal Nations

Organization	Name
Nez Perce Tribal Nation	Ms. Julie Simpson, ERWM Program, Air Quality
Umatilla Tribal Nation	Dr. John Cox, Program Manager, Earth & Atmospheric Sciences; Dr. Barbara Harper, Risk Assessor/Toxicology; Mr. Tom Bailor, Projects Coordinator, Department of Science and Engineering
Yakama Tribal Nation	Ms. Rebecca Elwood, Project Coordinator, Sacred Breath of the Columbia River Gorge

ENVIRONMENTAL INTERESTS

Organization	Name
Columbia Riverkeeper	Mr. Brent Foster, Executive Director
Friends of the Gorge	Mr. Michael Lang, Conservation Director
Oregon Center for Environmental Health	Dr. Linda George, Member, Board of Directors

PORTS, BUSINESS & INDUSTRY

Organization	Name
Port of Hood River	Ms. Linda Shames, Financial Manager (for Mr. Michael McElwee, Executive Director)
Port of The Dalles	Ms. Andrea Klaas, Executive Director
Port of Portland	Mr. David Breen, Environmental Project Manager
Port of Skamania	Mr. John McSherry, Manager, Port of Skamania County
Threemile Canyon Farm	Mr. Len Bergstein, Northwest Strategies, Inc.
PGE Boardman	Mr. Dennis Norton, Manager of Environmental Services Mr. David Robertson, Director of Federal, Regional, and State Government Policy
Columbia River Towboat Association	Mr. John Pigott, Chairman
Tidewater	Mr. John Pigott, General Manager; Mr. Paul Jewell, Safety, Environmental and Quality Manager
Mid-Columbia Economic Development District	Ms. Lee Curtis, Executive Director
Skamania County Economic Development Council	Ms. Peggy Bryan, Executive Director
Northwest Pulp and Paper Association	Ms. Kathryn VanNatta, Government Affairs Manager
BNSF Railway Company	Mr. Michael Stanfill, Environmental Program Development Manager

APPENDIX D – Public Comments on Gorge Strategy Document and Air Agencies' Response (To be Included after Gorge Policy Day)