Robert Poole
Director, NW Regulatory Affairs

November 23, 2021

Sent via email to: Email: linda.kildahl@ecy.wa.gov

Ms. Linda Kildahl
Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Re: Comments on the Second Regional Haze Implementation Plan for 2018-2028

Dear Ms. Kildahl,

Western States Petroleum Association (WSPA) is a trade association that represents companies which provide diverse sources of transportation energy throughout the west, including Washington. This includes the transport and market petroleum, petroleum products, natural gas, and other energy supplies.

We appreciate the opportunity to provide comments regarding the Washington Department of Ecology (Ecology) rulemaking process on the second draft Regional Haze Implementation Plan (2nd draft SIP) for the 2018-2028 planning period (October 2021 Public Review Draft). WSPA and the various refinery members appreciate Ecology's willingness to incorporate some of WSPA's feedback on the first draft of the SIP and are looking forward to continued collaboration to ensure the final Regional Haze Implementation Plan is centered in technically sound site-specific analysis with meaningful improvements to visibility impairment in the state.

Key WSPA comments are summarized below with more detailed information on specific sections or passages in the 2nd draft SIP provided in Attachment 1. For reference, comments provided below are organized to reflect the structure of the 2nd draft SIP.

Comments on Executive Summary

The Executive Summary states that: "*Emissions from petroleum refineries cause poor visibility. We plan to identify emissions controls, if any, to reduce emissions from refineries. After we have identified and scheduled installation of controls, we will amend this plan.*" However, there is no apparent supporting documentation in the 2nd draft SIP to support the finding that the refineries cause visibility impairment. As example, the Western Regional Air Partnership (WRAP) analyses described in the 2nd draft SIP do not provide source-apportionment specific to refineries or a specific refinery site. WSPA requests that Ecology modify the language in the Executive Summary to reflect fact that there is limited data presented in the SIP with regard to source-specific contributions to regional haze.

The 2nd draft SIP does later reference high quantities of NO_X emissions from the refineries as a reason reductions in those emissions are a focus for Ecology's four-factor review. However, NOx emissions contribute only a small fraction to visibility impairment, and refineries represent a small fraction of the NO_X emissions in the total NO_X inventory for the state. Based on Table 3-8, NO_X emissions (in the form of nitrates) contribute only about 10% (ranging between 8% and 11%) to

visibility impairment at the nearest Class 1 area (North Cascades National Park).[1] This small fraction compares to approximately 50% contribution from sulfates. Similar relationships of lower nitrate contribution compared to sulfate contribution also occur at all other Class 1 IMPROVE sites in the state, as presented in Figure 1 below.

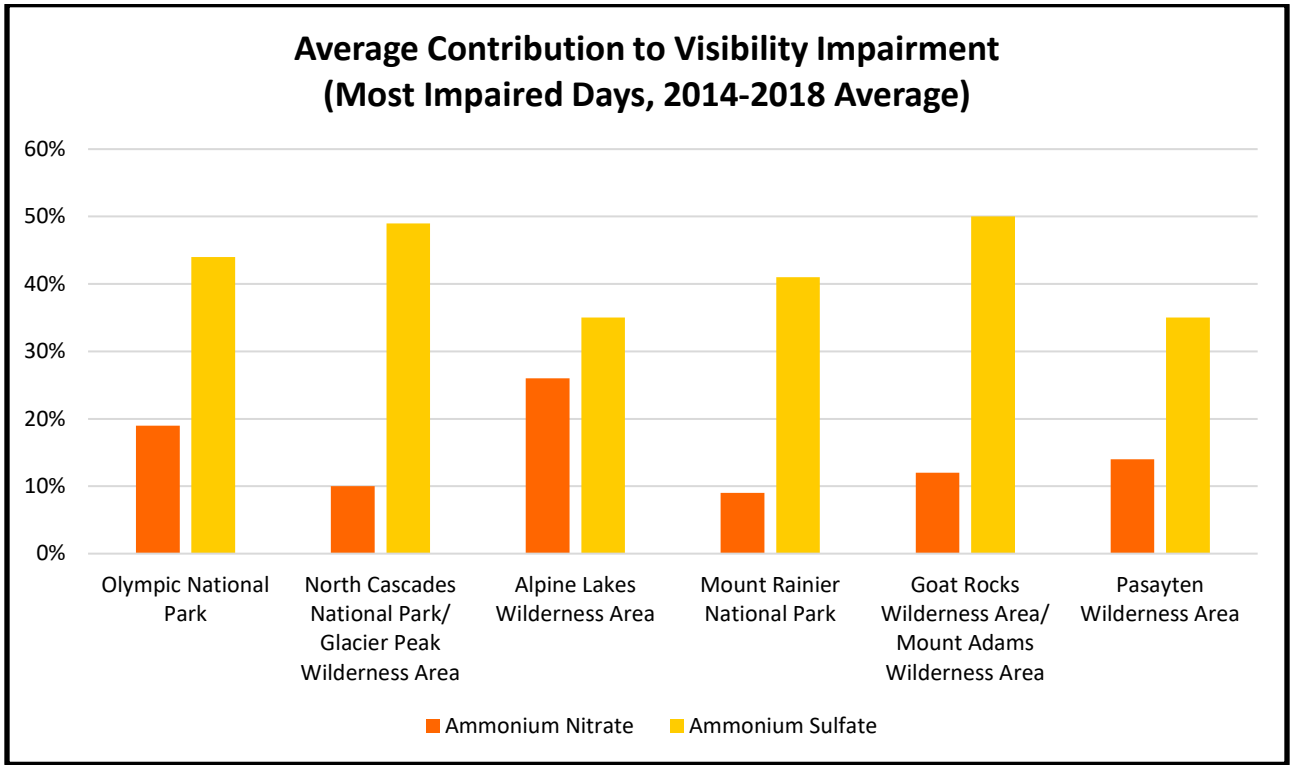

Figure 1. Average contribution to visibility impairment at Washington Class 1 areas (Most Impaired Days, 2014-2018)

Furthermore, based on the total NO_X inventory for the state, refinery NO_X emissions represent only a small fraction of the total NO_X emissions generated in the state. At greater than 55% of total anthropogenic NO_X emissions, the mobile source NO_X emissions represent the overwhelming majority of NO_X emissions. Refinery NO_X emissions, in contrast, represent only 2.5% of the total NO_X emissions in Washington. WSPA recognizes that most refineries, as with other sources included in the 2nd draft SIP, are included on based on the Q/d screening method. A Q/d ratio greater than the screening threshold does not, however, directly indicate the reductions in emissions for a given source will correspond with substantive improvements to visibility impairment. When considering both the relatively low contributions to NO_X emissions statewide and the low contributions of nitrates to visibility impairment, NO_X emissions from refineries are not an appropriate priority for regional haze improvements. WSPA requests that the Executive Summary recognize the relatively small total contributions of refineries to the state NO_X emissions inventory and include the necessary context that NO_X emissions (in the form of nitrates) are a relatively small contributor to visibility impairment.

References are made throughout the 2nd draft SIP regarding the WRAP modeling. WSPA recommends that more of the analysis conducted by WRAP be incorporated into the Executive Summary. Specifically, 2nd draft SIP sections following the Executive Summary make references to analysis conducted by WRAP that can lend key insights into the causes of visibility impairment at

[1] Contribution on most impaired days, annual average from 2014 – 2018.

Class 1 areas in Washington. Based on the data provided in Tables 6-1 and 6-2 of the 2nd draft SIP, Washington non-electricity generating unit (non-EGU) point sources account for an average of only 6% of sulfate and 7% of nitrate contributions to regional haze on most-impaired days. These numbers are even lower on clearest days, where the source category accounts for only 6% and 4% of average visibility contributions from sulfates and nitrates, respectively. Emissions from non-EGU point sources contribute only a small fraction of the visibility impairment in Washington Class 1 areas, and refineries represent only a fraction of this non-EGU point source category.

Given that the WRAP model did not account for individual source or industry group contribution in its analysis, specific assessments of the refineries' potential contributions to visibility impairment at Washington's Class 1 areas cannot be determined using only WRAP model results. However, considering individual pollutant contributions from IMPROVE data combined with WRAP model results for non-EGU point source contributions can lend valuable insights into anticipated refinery NO_X emissions contributions to regional haze.

- Ammonium nitrate accounts for an average of 15% of total contribution to visibility impairment in Washington Class 1 areas (see Figure 1 above).
- WRAP model results indicate that non-EGU point sources contribute only 7% of total ammonium nitrate contributions to visibility impairment.
- This 7% non-EGU point source fraction of the 15% nitrate contribution means that NO_X emissions from non-EGU point sources (including refineries and all other stationary sources in all of Washington) contribute only 1.1% to visibility impairment in Class 1 areas.

Figure 2 below, non-EGU point source NO_X emissions are responsible for only 1.1% of total visibility impairment in Washington Class 1 areas.

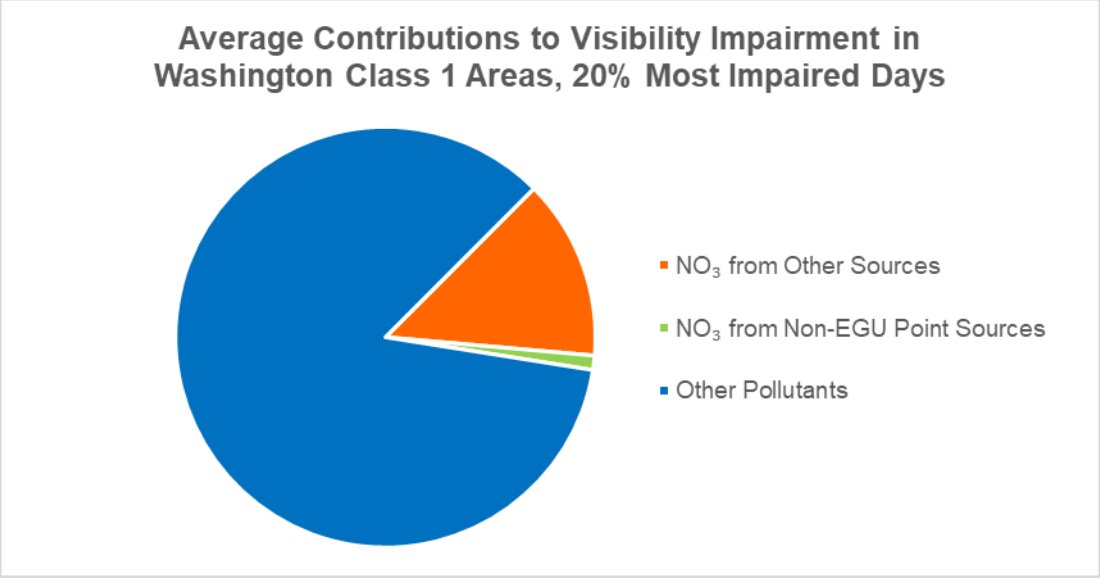

Figure 2. Average Contribution to Visibility Impairment in Washington Class 1 Areas, 20% Most Impaired Days

The contributions of refinery NO_X emissions to visibility impairment represent even less than this 1.1% contribution from total non-EGU point sources. Even in the most extreme case of Ecology's SIP eliminating 100% of NO_X emissions from refineries, at less than 1.1% contribution, the change would not noticeably improve visibility in Washington's Class 1 areas. WSPA requests that the Executive Summary provide this context for the non-EGU point sources by summarizing this important insight from the WRAP model results.

Comments on Chapter 7 - Source Selection and Four-Factor Analysis

In general, WSPA recognizes and appreciates that some of the comments provided for the 1st draft SIP have been incorporated into the 2nd draft SIP and are encouraged by Ecology's plans to resolve any discrepancies between the analyses conducted by the refineries and Ecology's analysis. We would like to provide some additional insights regarding Chapter 7.

Section 7.3 - Reasonable Progress Evaluation

In this section (page 166), it is stated "A number of factors supports the selection of refineries as the first priority." WSPA respectfully disagrees with this statement as the information provided in the 2nd draft SIP suggests differently. As noted above, the refinery contributions to NO_X emissions represent a very small fraction of the total anthropogenic NO_X emissions in Washington. The same can be said for SO_X and PM emissions from the industry. The percent of total anthropogenic emissions in Washington attributed to refineries is summarized in Table 1 below.

Table 1. Summary of NO_X, SO_2, and PM_{10} Emissions from Refineries

Pollutant [a]	Refinery Representative Baseline Emissions [b] (tpy)	Total Anthropogenic Representative Baseline Emissions [b] (tpy)	Percent of Total Anthropogenic Emissions	Total non-EGU Point Source Representative Baseline Emissions [b] (tpy)	Percent of Total non-EGU Point Source Emissions
NO_X	5,897	235,376	2.5%	21,948	26.9%
SO_2	1,510	19,070	7.9%	12,503	12.1%
PM_{10}	499	307,396	0.2%	4,594	10.9%
Overall	7,906	561,482	1.4%	39,045	20.2%

a. This table does not include $PM_{2.5}$, VOC, and NH_3 because it only includes the pollutants for which a source-by-source breakdown is provided in Tables 4-8, 4-9, and 4-10 of the 2nd draft SIP.
b. Refinery representative baseline emissions and total anthropogenic representative baseline emissions are taken from Chapter 4 of the 2nd draft SIP and reflect the representative baseline emissions defined in the chapter.

The 2nd draft SIP notes that "potential emission reductions of 4,200 tons per year" from refineries account for the "vast amount" of potential emissions reductions. However as shown in the table, emissions of visibility-impairing pollutants from refineries (specifically NO_X, SO_2, and PM_{10}) represent only 1.4% of total anthropogenic emissions in the state of Washington. When compared to total non-EGU point source emissions (last column of Table 1), refineries represent only 20.2% of NO_X, SO_2, and PM_{10} emissions, far below the majority.[2] While WSPA recognizes that reductions of all anthropogenic emissions are not equally feasible targets for emissions reductions under the Regional Haze Program, the assertion that refinery emissions represent the vast majority of potential emissions reductions is misleading, given the very small fraction of total emissions in Washington attributed to the refineries. WSPA requests that Ecology either remove the proposed emissions reductions total or provide explicit clarification of the basis and justification for the number – including any necessary caveats regarding the lack of site-specific information considered in determining the total expected reductions.

In addition, the 2nd draft SIP justification for refineries representing the number one priority for the Regional Haze Program in Washington includes the statement that *"Predominant winds direct the emissions from the refineries toward several Class 1 Areas."* The 2nd draft SIP does not document

[2] This trend holds true even when accounting for on-the-books reductions included in the 2nd draft SIP. When compared to the "2028 OTB" emissions inventory, refinery emissions of NO_X, SO_2, and PM_{10} total just 1.8% of total statewide emissions, even when subtracting the emissions from the aluminum smelters. When comparing emissions of those pollutants to non-EGU point sources (and subtracting the emissions from the aluminum smelters) the refinery emissions still represent only 26.8% of total non-EGU on-the-books point source emissions.

any data for the predominant wind directions observed near refineries or nearby Class 1 areas. In reviewing available wind roses in the region, the two stations in the area (Skagit Airport and Bellingham International Airport) recorded predominant winds from the south-southeast and south, respectively. The nearest Class 1 areas are generally to the east of the refineries. These 10 years of meteorological data indicate the predominant wind is ***not*** in the direction from the refineries towards the Class 1 Areas. Wind roses for nearby meteorological stations are provided below.

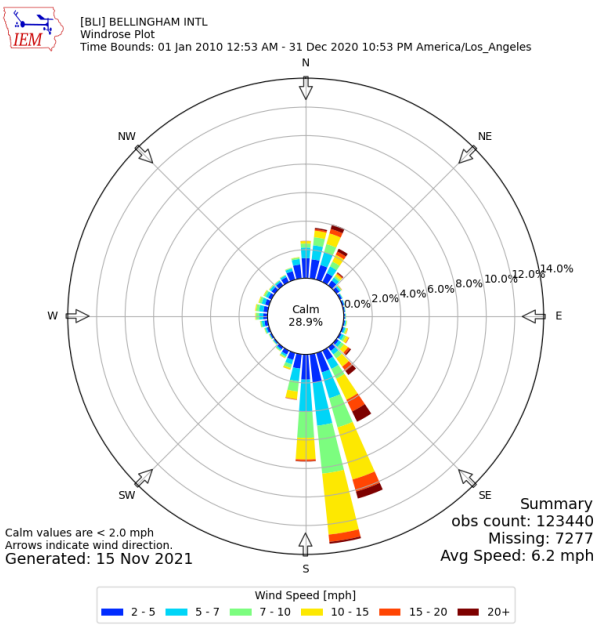

Figure 3. Wind Rose for Bellingham International Airport

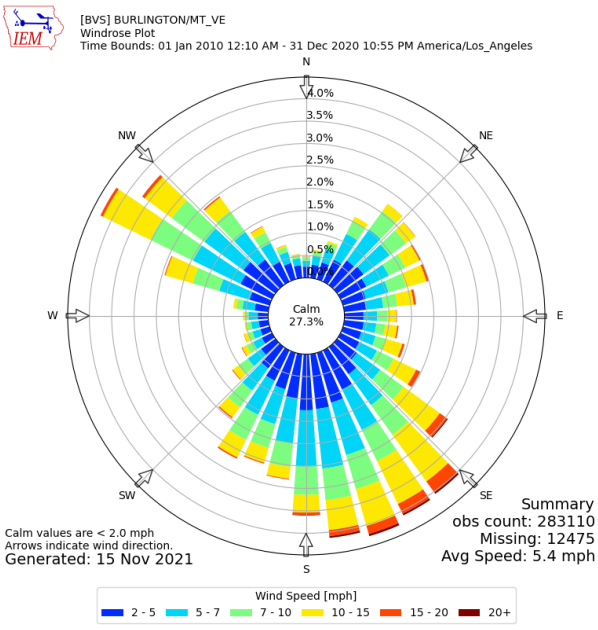

Figure 4. Wind Rose for Skagit Regional Airport

The wind roses in Figures 3 and 4 are for the Washington Automated Surface Observing Systems (ASOS) stations located nearest to the four refineries located on the north side of the state. As seen in both figures, the predominant winds in Bellingham are from the south to the north and the predominant winds at the Skagit Regional Airport are from the southeast to the northwest. In neither example do the wind roses indicate that winds would primarily travel from the refineries towards Washington's Class 1 areas, which are generally located to the east and southeast, with Olympic National Park farther to the southwest. A map of western Washington illustrating the locations of the refineries, wind roses, and Class 1 areas is provided in Attachment 2.

In the case of the final wind rose provided in Figure 5 below, the McChord Airforce Base ASOS station is the closest station to the U.S. Oil refinery located in Tacoma. As with the other wind roses, the predominant winds are not in the direction from the refinery towards the Class 1 areas, but rather from the south to the north. The predominant winds in all cases indicate emissions from refineries are infrequently travelling toward Class 1 areas. The limited expected impact of the U.S. Oil refinery in particular is further supported by the site's Q/d screening ratio of 3.21. The U.S. Oil refinery has a Q/d ratio of less than one third of the threshold used by Ecology for source selection. The screening results alone indicate that U.S. Oil does not have an expected impact on visibility impairment at Class 1 areas that warrants inclusion in the draft SIP.

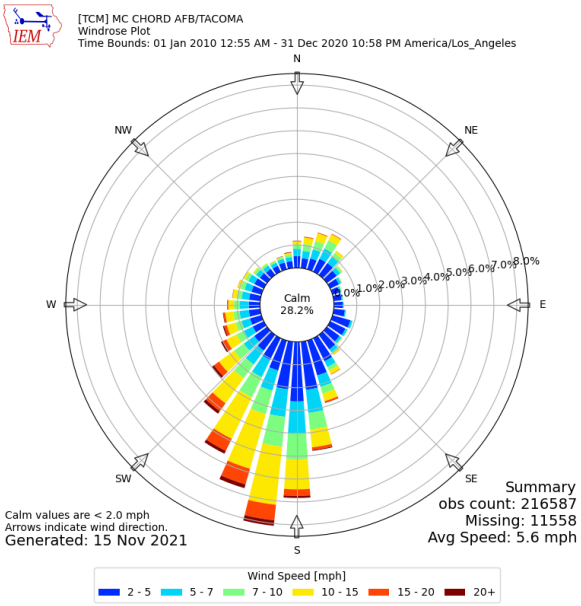

Figure 5. Wind Rose for McChord Airforce Base

WSPA therefore requests that Ecology remove the statement indicating that predominant winds direct refinery emissions towards Washington's Class 1 areas (to the east or northwest). A suggested revision to this passage in the 2nd draft is provided in Attachment 1.

In summary, WSPA requests that the 2nd draft SIP be updated to remove references to refineries as a first priority since the document's own data and analyses do not support this conclusion. We believe that this will help ensure that the available data for the Regional Haze program is appropriately contextualized for the SIP.

Section 7.6 – Refineries

Section 7.6 covers the details of the Regional Haze Implementation Plan that specifically pertain to the refineries in Washington.

Refinery Compliance with Federal Standards

On page 184, it is stated that *"The refineries in Washington are over 40 years old and the facilities have maintained the majority of the equipment in a manner that has not required updating emission controls to current standards."* This current language implies the refineries are deliberately circumventing "current standards". The refining industry is subject to various federal, state, and local air quality rules which have required significant investments to achieve compliance and reduce emissions (particularly in the case of SO_2 emissions reduction projects). For example, refineries are subject to multiple "Maximum Achievable Control Technology (MACT)" regulations, which include limits on visibility-impairing pollutants. All refineries comply with a variety of current standards, even though *some* of the equipment at the refineries in Washington have not undergone modification projects that would result in the equipment becoming subject to the most recent federal refinery standards (specifically, NSPS Subpart Ja as an example). In addition, modifications to existing equipment and installations of new equipment have been permitted in alignment with the appropriate, up-to-date standards including NSPS Subpart Ja, as applicable. WSPA requests that this language be revised to accurately reflect state of compliance with various federal standards.

In addition to maintaining consistent compliance with local, state, and federal environmental standards, the refineries in Washington have also implemented several projects to make continued improvements to the environmental impact of each facility. All emission units at the Washington refineries have undergone preconstruction permitting as necessary. In all cases over the last many years, this permitting includes a Best Available Control Technology (BACT) review. These environmental improvement projects include (but are not limited to):

- NO_X reduction projects, including the retrofitting of burners and the installation of add-on NO_X controls.
- Installation of vapor control units for loading and unloading operations at refineries.
- Optimization of flares to ensure proper emissions control at each facility.

To accurately reflect state of compliance with various standards, a suggested revision to the passage is included in Attachment 1.

Refinery NO_X Emissions Comparison Table

In Table 7-6, a summary of the Washington refineries and the NO_X emissions intensity of each facility on a tons per year per 1,000 barrels per day basis. WSPA has identified a few key concerns about the presentation of this information and its relevance to the Regional Haze Program.

The information presented in the table represents a broad generalization of refineries that does not allow for sufficient context for the origins of the NO_X emissions at each facility. As noted by the paragraphs immediately preceding the table in the 2nd draft SIP, the refineries in Washington and around the country are dependent on specific processes and materials that are fundamentally different from refinery to refinery. In this table, NO_X emissions between refineries are represented as an apples-to-apples comparison when the reality is there are numerous site-specific influences for NO_X emissions. For example, the complexity of a specific refinery, including variations in different types of process units at a facility, is an important factor when comparing NO_X emissions. Furthermore, it is important to consider the scale of operations when identifying opportunities for NO_X emissions reductions. The size and age of various pieces of equipment play a direct role in the feasibility of reducing NO_X emissions, and those details are not accounted for in this table. In several cases, refineries included in this table are located in areas of nonattainment for various pollutants, including ozone. As such, they are subject to far more stringent NOX emissions requirements, and they are required to install emissions controls that exceed the level of control intended for the Regional Haze Program.

WSPA requests that the 2nd draft SIP provide substantiation for the relevance of Table 7-6, as currently presented, to the Regional Haze Program and the role this data has in the determinations made as part of the 2nd draft SIP. The NO_X intensity values presented in the table provide no relevant insights as to how control technologies are selected for the program, the anticipated benefits to visibility in the region resulting from the conclusions of the 2nd draft SIP, or rationale for source selection under the regional haze program. WSPA recognizes the intention to provide a broader context for the NO_X emissions generated by Washington refineries, but a simple metric like the NO_X emissions intensity on a per-barrel of production basis fails to capture not only nuances between different refineries but entire processes that can substantially impact NO_X emissions. Without this important context, the table does not provide any information that is relevant for the SIP, and WSPA requests that the table be removed.

Ecology's Cost Estimates

WSPA has previously commented and still contends that the cost estimates Ecology has presented in the 2nd draft SIP are significantly too low and does not reflect the actual expected costs of implementing SCR at the refineries as provided by WSPA members. WSPA recognizes that Ecology plans to reconcile the cost differences between Ecology's preliminary estimates and the site-specific analyses conducted by WSPA members during a future RACT process. The following concerns to address in the meantime are related to the presentation of the cost calculations in the 2nd draft SIP specifically, as well as the interest rates used in Ecology's preliminary cost estimates.

Concern 1 - Characterization of Ecology's Use of the Control Cost Manual and Ecology's Cost Calculation Methods

WSPA requests that references to "EPA Control Cost Manual" costs should be revised to be represented as Ecology's cost calculations. WSPA's primary concern with cost calculations prepared by Ecology is how they are represented in the 2nd draft SIP. In the individual refinery subsections of Chapter 7, costs prepared by Ecology are presented as "EPA Control Cost Manual $/ton." The current language implies that the costs developed by refineries did not use methods consistent with EPA guidance. Costs submitted by the refineries were developed either using the EPA Control Cost Manual (with different inputs than those selected by Ecology) or with other methods consistent with EPA guidance.

WSPA suggests that these costs be referenced as "Ecology Preliminary Cost Estimates" or some similar language to accurately distinguish Ecology's initial cost calculations from those submitted by the refineries. When referencing Ecology's use of the EPA Control Cost Manual, WSPA recommends including specific context for the limitations of using the model when representing costs associated with refinery operations. In addition, the EPA Control Cost Manual calculation workbook for SCR was developed for use with electric generating units and under-estimates the cost of implementing SCR on refinery emission units. As detailed in the following section, WSPA is optimistic that the cost refinement efforts by South Coast Air Quality Management District (SCAQMD)can help inform future discourse on refining the cost calculations for the Washington refineries.

Concern 2 - Statements that "X Refinery supplied a table with limited supporting data"

In both the initial draft and this 2nd draft SIP, Ecology has listed cost values which would benefit from additional input and analysis beyond the presented preliminary cost estimates. WSPA appreciates Ecology's willingness to conduct further site-specific analysis and collaborate to reconcile differences in input values and cost calculations. WSPA requests that these statements regarding limited supporting information for the cost calculations be removed or revised to accurately reflect the ongoing efforts by both the individual refineries and Ecology to reconcile differences in input values and cost calculations.

Concern 3 – Use of Interest Rates in Preliminary Cost Estimates

In Ecology's preliminary cost estimates a 3.25% interest rate was used. While the 3.25% interest rate is the current bank prime loan rate, this is not an appropriate interest rate for cost calculations and results in severely underrepresented retrofit costs for the refineries and other industrial sources included in the 2nd draft SIP. The EPA Control Cost Manual states that "when performing cost analysis, it is important to ensure that the correct interest rate is being used. Because the Control Cost Manual is concerned with estimating private costs, the correct interest rate to use is the nominal

interest rate, which is the rate firms actually face."[3] Over the past 20 years, the annual average prime rate has varied from 3.25% to 9.23%, with an overall average of 4.86% over the 20-year period.[4] The EPA Control Cost Manual also adds the caution that the "base rates used by banks do not reflect entity and project specific characteristics and risks including the length of the project, and credit risks of the borrowers."[5] For this reason, the prime rate should be considered the low end of the range for estimating capital cost recovery. WSPA requests that this EPA guidance on interest rates be taken into consideration for future shared efforts between WSPA, member refineries, and Ecology to reconcile differences in preliminary cost estimates.

WSPA Experience with SCAQMD Rulemaking

In collaboration with the South Coast Air Quality Management District (SCAQMD) in the Los Angeles Basin, WSPA supported a rulemaking effort in SCAQMD's jurisdiction by conducting an in-depth review of the EPA Control Cost Manual and its relevance to the refining industry. As part of this effort, the Fossil Energy Research Corporation (FERCo) and Norton Engineering were hired by the SCAQMD to aid in an in-depth review of the cost models used for SCR retrofits in the EPA Control Cost Manual. FERCo conducted site visits at 5 major refineries in California and documented extensive reviews of SCR installations at each facility, along with assessments of how vendor costs compared to those generated in the EPA Control Cost Manual. FERCo identified, among many conclusions, that limited space and ability to install post-combustion control and substantial differences in estimations of required catalyst volume contributed to underestimated costs when using the EPA Control Cost Manual to estimate SCR retrofit costs at refineries. Based on these complexities for installation, "FERCo confirmed that the installation cost can significantly exceed that of the NO_X [control] equipment and can exceed the equipment cost by a factor of at least 2.5."[6] Norton Engineering also agreed the updated costs were appropriate.

As a result of these reviews and exercises, SCAQMD has now adopted a modified version of the EPA Control Cost Manual model for SCR cost calculations for boilers and heaters at refineries. This modified cost model was developed using a survey of installation costs at several refineries, and the refined cost model results in significantly higher installation costs. Figure 6 shows a box plot prepared by SCAQMD that illustrates the differences in total capital cost resulting from the new model.[7] The data included in the SCAQMD chart below is inclusive of heaters and boilers, but catalytic cracking units are not included in this evaluation. Catalytic cracking units, given the substantial variation from unit to unit, should be evaluated using site-specific cost estimates rather than using a generic cost model. For comparison to the SCAQMD cost models, a red line is added to the chart below. This line represents the average capital costs for an SCR retrofit developed by

[3] Sorrels, J. and Walton, T. "Cost Estimation: Concepts and Methodology," *EPA Air Pollution Control Cost Manual*, Section 1, Chapter 2, p. 15. U.S. EPA Air Economics Group, November 2017. https://www.epa.gov/sites/production/files/2017-12/documents/epaccmcostestimationmethodchapter_7thedition_2017.pdf

[4] Board of Governors of the Federal Reserve System Data Download Program, "H.15 Selected Interest Rates," accessed April 16, 2020. https://www.federalreserve.gov/datadownload/Download.aspx?rel=H15&series=8193c94824192497563a23e3787878ec&filetype=spreadsheetml&label=include&layout=seriescolumn&from=01/01/2000&to=12/31/2020

[5] Sorrels, J. and Walton, T. "Cost Estimation: Concepts and Methodology," *EPA Air Pollution Control Cost Manual*, Section 1, Chapter 2, p. 16. U.S. EPA Air Economics Group, November 2017. https://www.epa.gov/sites/production/files/2017-12/documents/epaccmcostestimationmethodchapter_7thedition_2017.pdf

[6] South Coast Air Quality Management District, Draft Staff Report, "Proposed Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations and Proposed Rescinded Rule 1109 – Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries," October 2021. Page 2-47. http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/dsr_pr_1109-1_30_day_package.pdf?sfvrsn=4

[7] Ibid, "Figure 12. Original and updated cost provided by facilities," Page 4-2.

Ecology for each of the heaters and boilers considered in the 2nd draft SIP ($6,750,635). As illustrated in the figure, Ecology's preliminary cost estimates are below even the SCAQMD initial estimates that used the existing EPA Control Cost Manual When compared to the refined costs using the revised model that was accepted by SCAQMD for the final rulemaking, the comparison shows that Ecology's preliminary cost estimates vastly under-estimated the actual costs of SCR implementation on refinery boilers and heaters.

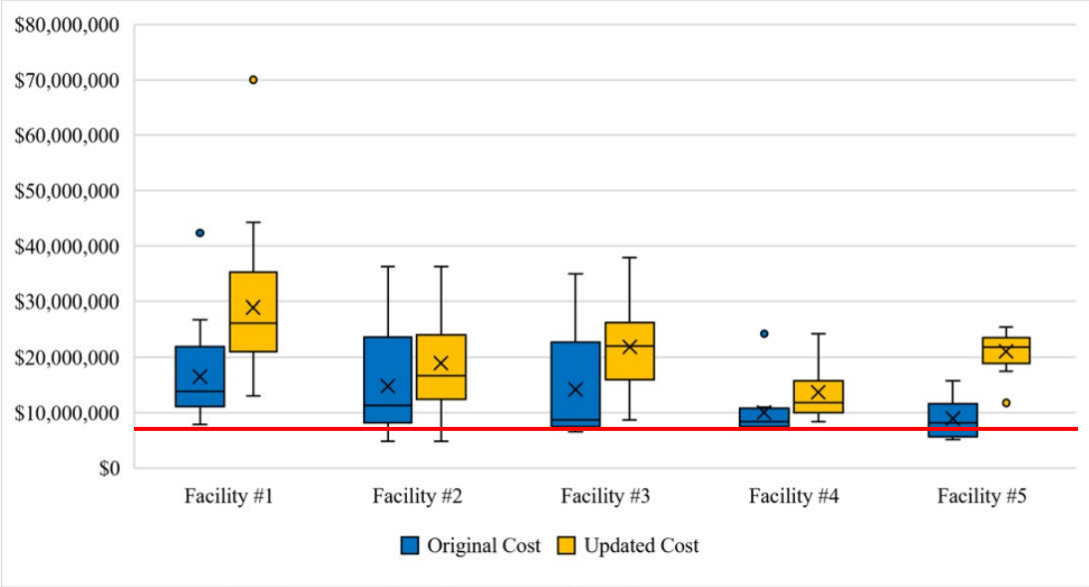

Figure 6. Capital Cost Comparison Between EPA Control Cost Manual and Revised SCAQMD Model (SCAQMD, 2021, red line annotation added)

WSPA recognizes that there are notable differences in circumstances between Southern California and Washington that will necessitate a deeper review of the revised cost model. The cost effectiveness values for the SCAQMD rulemaking are not directly comparable to the cost effectiveness values under regional haze because the two programs have different goals and also because the two programs use difference cost bases. The SCAQMD cost effectiveness values are determined using the discounted cash flow (DCF) method.[8] The EPA Control Cost Manual, in contrast, uses the equivalent uniform annual cash flow (EUAC) approach.[9] While the regulatory context for these costs is different and means the final cost effectiveness values are not directly comparable to those calculated for the Washington's Regional Haze program, the refined SCAQMD model's capital costs are appropriate to compare. The SCAQMD model and associated capital costs can serve as a helpful reference point for reasonable capital costs and a strong starting point for future cost calculation discussions.[10]

[8] According to SCAQMD's website, "the discounted cash flow method (DCF) is used in the MSBACT Guidelines. This is also the method used in South Coast AQMD's Air Quality Management Plan. The DCF method calculates the present value of the control costs over the life of the equipment by adding the capital cost to the present value of all annual costs and other periodic costs over the life of the equipment."

[9] Also referred to as amortization, EUAC involves annualizing the costs to estimate the expected annual cost of implementing the retrofit over the total life of the equipment. In contrast with simple annualization, however, EUAC is not limited to constant cash flows. The result is a single annual cost that incorporates the net present value of the equipment and a capital recovery factor to account for interest.

[10] The refined cost model developed by SCAQMD takes into account refinery-specific operations and costs. The result is a refined cost model with underlying capital cost curves that are developed using facility cost data and more accurately represents actual retrofit costs for refinery units.

WSPA believes that focusing future collaboration with Ecology on models such as the one developed for SCAQMD can ensure that more accurate cost estimates for SCR are developed that appropriately account for refinery operations.

Summary of WSPA Requests and Recommendations

WSPA appreciates and recognizes Ecology's willingness to listen to and incorporate feedback from both WSPA and the individual refineries for the draft SIP. While the 2nd draft SIP represents some progress from the 1st draft, there are still several areas where WSPA believes the analysis of the refineries in the Regional Haze Program can be improved. Specific suggestions for individual passages in the 2nd draft SIP are included in Attachment 1, and WSPA's key comments on the draft are summarized below:

- WSPA requests that language in the 2nd draft SIP concluding that "refineries cause poor visibility" be revised to either clarify that these are only possible conclusions (as WRAP did not provide site-specific apportionment of visibility impairment) or further evidence be provided to substantiate Ecology's claims.

- Modeling analyses conducted by WRAP indicate that non-EGU point sources (and by extension refineries) contribute minimally to visibility impairment in Washington's Class 1 areas. Highly conservative estimates using available data indicate that reductions in refinery NO_X emissions will not noticeably improve visibility impairment at Class 1 areas in Washington - only improving by less than 1% under the most extreme case of eliminating *all* refinery NO_X emissions.

- WSPA requests that the refineries' overall contributions to visibility-impairing pollutant emissions be more accurately represented. Refinery emissions of NO_X, SO_2, PM_{10}, and other visibility-impairing pollutants represent a very small fraction of the total anthropogenic emissions in Washington, yet the current language in the 2nd draft SIP suggests that refinery emissions represent a vast majority of emissions and of available emissions reductions.

- The current SIP language indicates that the predominant winds in the region would result in the refineries directly causing visibility impairment in local Class 1 areas, but no evidence is provided to substantiate these conclusions. Available wind rose data indicates that the predominant wind direction in the region would not coincide with winds traveling from the refineries to Class 1 areas.

- Table 7-6, as currently presented, has no relevance to the conclusions drawn in the SIP or to the Regional Haze Program as a whole. The data presented in the table is provided without the necessary context for understanding the nature of NO_X emissions from the Washington refineries, comparisons made to refineries in other states are not adequately substantiated, and the data does not inform any conclusions made for source selection under the Regional Haze Program or the anticipated emissions reductions resulting from the four-factor analysis.

- WSPA requests that further clarification be provided for the source of Ecology's preliminary cost estimates. As currently presented, the cost calculation descriptions imply that the refineries did not develop cost estimates consistent with EPA guidance.

- Cost calculations prepared for control technology analyses should be developed using site- and unit-specific data wherever possible, including the use of cost calculations and underlying cost curves developed specifically for the given emission units. Cost estimates should also use interest rates that are representative of the actual interest rates available to the refineries. WSPA

looks forward to future collaboration with Ecology to reconcile the discrepancies between submitted cost calculations and Ecology's preliminary analyses.

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Sincerely,

Attachment