

Appendix V

Public Comments Received on Public Review Draft SIP

Comment Forms - Individual Citizens

Air pollution remains one of the most serious threats facing national parks, threatening the health of park visitors, wildlife, watersheds, and Washington communities.

I am concerned the Department of Ecology has proposed a Regional Haze Plan that does nothing to reduce and control facility emissions that degrade views of Mt. Rainier, drive climate change and harm local communities, especially those disproportionately affected by cumulative environmental exposures from air pollution. The plan proposed by the state does not reduce emissions from paper mills and oil refineries, which together account for nearly half of air impacts in our state.

I'm reaching out today to call on Ecology to fulfill its Regional Haze obligations under the Clean Air Act and ensure our protected public lands and affected communities get the benefit of cleaner air. Please revise the regional haze plan to thoroughly assess air pollution impacts on communities of color and low-income neighborhoods and ensure that these paper mills and oil refining facilities are required to clean up their pollution and do not get a free pass to pollute for the next decade. The health of our national parks, wilderness areas and communities depend on your choices today. Also the military's impact on air quality is not even being factored into climate change or air quality. Western Washington has a disproportionately high amount of air pollution coming from military activity. The amount of Co2 created by one growler jet flying for 1 hour is equivalent to driving a average car 29,000 miles. Growlers fly over and around Olympic National Park everyday

Air pollution remains one of the most serious threats facing national parks, threatening the health of park visitors, wildlife, watersheds, and Washington communities.

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Michael Ruby

Michael Ruby

Comments on the proposed revisions to the Washington State Implementation Plan for Regional Haze 11/23/2021

Ecology has produced a comprehensive and informative document regarding their intention to submit a revision to the Washington State Implementation Plan (SIP). The actual text of their proposed amendments to the SIP do not appear to have been published and made available for public review and comment. Perhaps that is intended to be the next step following the conclusion of this public comment period.

The Clean Air Act rules require Washington to make reasonable progress toward the stated goal of "remediating of any existing, impairment of visibility in mandatory class 1 federal areas which impairment results from manmade air pollution." Where a Federal Land Manager has designated a source of pollutants to be associated with a regulated visibility impairment the State is required to evaluate and implement the Best Available Retrofit Technology. In this case the Federal Land Managers have identified the Washington refinery sector as the source of reasonably attributable impairment of visibility at several National Park wilderness areas, which triggers the evaluation of Best Available Retrofit Technology. However, probably because there are detailed state statutes that govern Reasonable Available Retrofit Technology findings, Ecology consistently refers to the RACT standard throughout the proposed Regional Haze revisions document.

To clarify here are the definitions in the Washington Administrative Code (173-400-030):

(14) "Best available retrofit technology (BART)" means an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by an existing stationary facility. The emission limitation must be established, on a case-by-case basis, taking into consideration the technology available, the costs of compliance, the energy and nonair quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.

(80) "Reasonably available control technology (RACT)" means the lowest emission limit that a particular source or source category is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility. RACT is determined on a case-by-case basis for an individual source or source category taking into account the impact of the source upon air quality, the availability of additional controls, the emission reduction to be achieved by additional controls, the impact of additional controls on air quality, and the capital and operating costs of the additional controls. RACT requirements for any source or source category shall be adopted only after notice and opportunity for comment are afforded.

and the requirement regarding visibility impairment in the Washington Administrative Code (173-400-151(d)(3)):

. . .ecology, in consultation with the permitting authority shall determine BART for each air contaminant of concern and any additional air pollution control technologies that are to be required

to reduce impairment from the existing stationary facility.

(4) Each existing stationary facility shall apply BART as new technology for control of the air contaminant becomes reasonably available if:

(a) The existing stationary facility emits the air contaminant contributing to visibility impairment;

(b) Controls representing BART for that air contaminant have not previously been required under this section; and

(c) The impairment of visibility in any mandatory Class 1 federal area is reasonably attributable to the emissions of the air contaminant.

The two definitions are very similar but have one striking difference. BART begins with determining the technology available to achieve the "best system of continuous emission reduction" while RACT begins with identification of "additional controls", which may or may not be the best technology available. Thus the responsibility rests with Ecology to identify the starting point of analysis and to then conduct the reasonable availability analysis.

The determination that the refinery sector and its individual refineries do emit contaminants that contribute to visibility impairment and that the visibility impairment in Class I federal area can be attributed to those emissions is supported by the analyses presented in this document. Therefore, while using the structure of the statutory RACT process Ecology must apply the standard of BART in developing its recommendations for further controls at the refineries.

These analyses do identify ammonium sulfate as the most important contributor to visibility impairment with ammonium nitrate or organic particulate as the next most and significantly less important, for Most Impaired Days at all sites. Therefore the focus on NO_x control is a little curious for refineries and other stationary sources. Ecology should be more clear why control of sulfur emissions is de-emphasized. Ecology should take note that there is an active proposal to restart the Ferndale Intalco aluminum refinery, which was a major source of sulfur and organic particulate emissions. It is possible that a restart of the facility by a new owner would require a BACT analysis.

Because the Federal Land Managers have specifically identified the refinery sector I assume that will be the first effort out of the gate. I argue that the starting point should be, at a minimum an examination of the technologies identified in relevant NSPS and MACT regulations, such as NSPS Subparts Db, Dc, Ja, Kb, GGGa, QQQ, IIII, JJJJ, KKKK and OOOOa and MACT Subparts CC, OO, UUU, YYYYY, ZZZZ, 5D, 5U and 6J. Many of these rules are for auxiliary equipment found at refineries or are not focused on the particular pollutants that are most associated with visibility impairment but, I suggest, they may identify sources and helpful technologies that should be considered.

Further I argue that an important technology that will meaningfully reduce the emissions of the relevant pollutants, and should be considered, is a reduction in the amount of petroleum crude that is processed by the refinery, as required by E3SHB 1091 Session Law C317 L21, the Clean Fuels Program. If the refinery adheres to the compliance obligation to reduce their regulated emission responsibility by 5.5% in 2028 and 20% by 2038 without resorting to offset payments the visibility impairment due to refinery emissions may be significantly reduced. Thus the rule applied in the SIP would be that the refineries comply with the law without any offset payments.

Ecology proposes to initiate RACT review after the SIP revision is accepted by EPA and, I presume, published in the Federal Register. From past experience that is a very long timeline. I

request that Ecology spell out in its revisions to the current document more detail as to approximately when it expects to be in a position to begin the BART analysis and when it expects to be able to require the refineries to submit additional information. I hope that may get underway long before EPA announces or publishes its acceptance of the SIP revision.

The application of BART to sources is independent of any reference to reasonable progress or the glide path laid out in several figures in this report. The reasonable further progress glide path is only a test by EPA to determine if a state is failing to do its job, not a limit on what a state might achieve. And the requirement in 40 CFR 51.308(f) should not be seen as an upper limit of what is reasonable. As is seen in the graphs, Washington is generally doing much better than the glide path and should continue to aspire to achieving real reductions in visibility impairment at the earliest possible date. Given the number of impacted wilderness areas in the state and the great value that Washington places on amazing views within, out of and into these areas early action should be a high priority. Already meeting or exceeding the glide path is no reason to determine that an application of BART is not necessary.

In an effort to prioritize the sources to work on, Ecology has relied on a Q/d metric using only the distance (d) to the nearest wilderness area. Since visibility impairment is a logarithmic function I propose that the metric should be $Q/\ln(d)$ and that it should be computed by adding the resulting value for all the wilderness areas in Washington in computing the metric for each source. It is possible that this refinement may not result in a significant difference in the priorities - I can't say as I have not made test calculations. I certainly support the conclusion by the Federal Land Managers and Ecology that the refineries complex in the north Puget Sound lowlands should be the first priority.

With respect to several sources Ecology notes that permits to install and operate new control equipment have been languishing at the local control agency for several years. This has become a general scandal for more than just the permits identified in this document. Ecology should require more aggressive action, perhaps by adding some immediate dates for progress in the revised SIP.

I share Ecology's concern for the application of SCR as a preferred control technology to SNCR, due to the excess ammonia often utilized and the generation of unreasonable quantities of ammonium sulfate I have personally witnessed in non-optimized systems. The need for cooling for sulfur control and reheating after for nitrogen control should be met by heat exchangers instead of fossil fuel-fired reheaters wherever possible.

Ecology does face a difficulty in dealing with wildfire smoke, which they have attempted to deal with by defining it away. In this report Ecology has adopted an exclusion of the five percent of worst days from the attainment standard in creating the standard of Most Impaired Days. Ecology reports wildfire smoke has been responsible for impaired visibility on as much as seven percent of yearly days. It is reasonable to assume that without further attention to wildfire prevention and suppression that the number of annual days will increase in the future.

The small portion of section 8.6 in the document describing silvicultural burning and wildlands vegetation management and prescribed fires permits does not adequately address the much larger problem of planning to prevent wildfires or active wildfire management. It is necessary for the Department of Natural Resources to make a much more significant contribution to the development of a section of the proposed revisions to the SIP describing how they will reduce the runaway

nature of the fires we are now experiencing and will experience at a much greater level in coming years. Climate change demands more aggressive forest management to significantly reduce the magnitude of the wildland fires and better fire suppression techniques to end the fires more quickly. This would reduce the number of days when visibility is impaired by the human-induced climate change and forest mismanagement that impairs visibility in wilderness areas and even in urban areas.

Appendix V

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National Park Service



United States Department of the Interior



NATIONAL PARK SERVICE
Interior Regions 8, 9, 10, and 12
333 Bush Street, Suite 500
San Francisco, CA 94104-2828

IN REPLY REFER TO:
I.A.2 (PW-NR)

November 23, 2021

Washington Department of Ecology
Submitted to [Public Comment Form](#)
Attention: Linda Kildahl
Department of Ecology
PO Box 47600, Olympia, WA 98504-7600

Dear Ms. Kildahl:

Thank you for the opportunity to review the proposed Washington Regional Haze State Implementation Plan (SIP) for the Second Implementation Period (2018-2028). The National Park Service (NPS) participated in early engagement and federal land manager (FLM) consultation with the Washington Department of Ecology (Ecology) regarding SIP development from 2018 through July 2021. We appreciate the extensive efforts that Washington invested in early engagement and consultation with the NPS as well as responses to our input in the proposed draft SIP. We take this opportunity to reiterate our initial recommendations and request the state share and respond to our formal consultation input of July 29, 2021 in the draft SIP.

Significant opportunities for emission reductions are available that could improve the draft SIP and advance progress toward natural visibility conditions. Specifically:

- Requiring emission controls for the refinery sector in this planning period rather than deferring potential controls to the Reasonably Available Control Technology (RACT) process would directly benefit Class I areas. The SIP process allows for FLM involvement, has more rigor, and achieves results more quickly in comparison to RACT.
- We maintain our recommendation that reasonable, cost-effective controls to reduce haze causing emissions for pulp and paper facilities in Washington are available and should be implemented in this planning period.
- We recommend that Ecology require the maximum level of nitrogen oxide controls that is technically and economically feasible for the glass and cement facilities evaluated.

As we shared in our earlier feedback, the NPS appreciates that Ecology has developed an organized, detailed SIP, and evaluated a reasonable set of facilities contributing to haze in the region. We also recognize that Ecology has made corrections to many of the cost analyses prepared by facilities, demonstrating a commitment to accurate cost effectiveness considerations.

INTERIOR REGION 8 • LOWER COLORADO BASIN*
INTERIOR REGION 9 • COLUMBIA—PACIFIC NORTHWEST*
INTERIOR REGION 10 • CALIFORNIA—GREAT BASIN
INTERIOR REGION 12 • PACIFIC ISLANDS

AMERICAN SAMOA, ARIZONA*, CALIFORNIA, GUAM, HAWAII, IDAHO, MONTANA*,
NEVADA, NORTHERN MARIANA ISLANDS, OREGON, WASHINGTON
*PARTIAL

The NPS manages 48 of the 156 federally designated Class I areas across the country where visibility is an important attribute. NPS-managed Class I areas affected by haze causing emissions from Washington include Mount Rainier, North Cascades, and Olympic National Parks. Haze can significantly diminish the visitor experience in these iconic parks that offer awe-inspiring vistas of glacier capped mountains, old-growth temperate rainforest, and miles of wild coastline.

We encourage Ecology to take timely opportunities to reduce haze causing emissions. The cumulative benefits of emission reductions from many sources are necessary to achieve the Clean Air Act and Regional Haze Rule goal to prevent future and remedy existing visibility impairment in Class I areas. Ecology analyses have identified emission reductions that would make further progress toward this goal. The state has an opportunity to improve the effectiveness of their Regional Haze SIP by choosing to require cost-effective emission controls identified using the four statutory factors. These incremental steps are needed to advance reasonable progress goals.

We appreciate the opportunity to comment and look forward to continued work with Washington for clean air and clear views. If you have questions contact Jalyn Cummings (jalyn_cummings@nps.gov) or Melanie Peters (melanie_peters@nps.gov).

Sincerely,

Cindy Orlando
Acting Regional Director
National Park Service, Interior Regions 8, 9, 10, and 12

cc: Stephanie Burkhart, stephanie_burkhart@nps.gov, Acting Deputy Regional Director
Denise Louie, denise_louie@nps.gov, Regional Natural Resources & Science Lead
Jalyn Cummings, jalyn_cummings@nps.gov, Regional Air Resources Program Manager
Melanie Peters, melanie_peters@nps.gov, Air Resources Division Regional Haze Lead

From: [Kildahl, Linda J. \(ECY\)](mailto:Kildahl.Linda.J.(ECY)@nps.gov)
To: [Kildahl, Linda J. \(ECY\)](mailto:Kildahl.Linda.J.(ECY)@nps.gov)
Subject: FW: Ecology's November 3, 2020 in consultation with EPA
Date: Tuesday, November 2, 2021 9:09:20 AM

From: Shepherd, Don <Don_Shepherd@nps.gov>
Sent: Monday, November 01, 2021 10:26 AM
To: Hunt, Jeff <Hunt.Jeff@epa.gov>; Hedgpeth, Zach <Hedgpeth.Zach@epa.gov>
Cc: Peters, Melanie <Melanie_Peters@nps.gov>; kirsten_king <kirsten_king@nps.gov>; andrea_stacy <andrea_stacy@nps.gov>; Miller, Debra C <debra_miller@nps.gov>; Cummings, Jalyn C <Jalyn_Cummings@nps.gov>
Subject: Ecology's November 3, 2020 in consultation with EPA

Folks,

I am reviewing WA Ecology's responses to FLM comments and saw this statement:

Based on the current 2019 EPA Guidance, and confirmed on November 3, 2020 in consultation with EPA, Ecology is in full compliance with the regional haze rule by deciding to not pursue controls for pulp mills at this time.

Is EPA going to address this?

Appendix V

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bp Cherry Point Refinery



bp America, Inc.
4519 Grandview RD
Blaine, WA 98230

James Verburg
Sr. Environmental Engineer
bp Cherry Point Refinery

November 23, 2021

Linda Kildahl
Department of Ecology
Air Quality Program
P.O. Box 47600
Submitted via [Electronic Upload](#)

Re: bp Comments on the Regional Haze State Implementation Plan Revision – 2nd 10-Year Plan

Dear Ms. Kildahl:

On behalf of bp America Inc. (“bp”), thank you for the opportunity to provide comments on the Washington State Department of Ecology (“Ecology”) Regional Haze Rule (“RHR”) draft State Implementation Plan for 2018 through 2028 (“draft RHR SIP”). This letter provides comments regarding Ecology’s Emission Inventory (Chapter 4 of the draft RHR SIP) and the Four-Factor Analysis (Chapter 11 of the draft RHR SIP) that was issued for public comment on October 19, 2021.

1. The Statewide Emission Inventory Fails to Include Certain Emission Reductions from the Cherry Point Refinery (186 tpy NO_x and 270 tpy SO₂):

The Regional Haze Rule requires an accurate statewide emission inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I Federal area. The emission inventory must include emissions for the most recent year for which data are available.¹

For the bp Cherry Point Refinery, Ecology selected 2014 emissions for both the baseline year emissions and the 2028 “On-the-Books” (“OTB”) emissions for visibility modeling scenarios. The 2028 OTB emission inventory should include emissions associated with applicable controls, regulations, and facility changes. Ecology incorporated emission reductions at both Cardinal FG Winlock facility and TransAlta Centralia Generation. Ecology did not incorporate emission reductions from the bp

¹ Requirements for revisions of RHR implementation plans are set forth at 40 CFR 51.308(f)(6)(v).

Cherry Point Refinery (186 tons per year (tpy) NO_x and 270 tpy SO₂) that have occurred since the 2014 baseline year.

Emission reductions include low NO_x burner retrofits, process heat replacement projects, federal New Source Performance Standard (“NSPS”) Subpart Ja compliance projects to reduce flaring, and a 90 percent reduction in marine diesel fuel sulfur content (used to pump feedstock from marine vessels to refinery storage). All of these emission reductions are enforceable either by regulation (i.e., NSPS Subpart Ja and fuel standards) or by enforcement of permit conditions in permits issued by Ecology and Northwest Clean Air Agency (“NWCAA”). These emission reductions at Cherry Point should be incorporated into the 2028 OTB emission inventory used to develop the draft RHR SIP.

2. NO_x Emission Benchmarking in Table 7-6 is Incorrect

Ecology presents an unrefined, incomplete petroleum refinery NO_x emissions benchmarking analysis in Table 7-6 of the draft RHR SIP. As Ecology indicated in its 2013 Refinery GHG RACT analysis, benchmarking refineries is more complex than comparing emissions to refinery crude capacity.² The Nelson Complexity Index (NCI) is an example of accounting for a refinery’s capability to upgrade crude oil and provides a more accurate comparison between refineries with different processing capabilities. Ecology calculated NCI values for each Washington refinery as part of the GHG RACT analysis, and Ecology stated “two facilities with equal crude throughput ratings that have NCIs that are significantly different will likely have significantly different levels of GHG emissions.” The same situation applies in the draft RHR SIP with NO_x emissions from refineries that have different NCI values. Instead of incorporating the complexity index (similar to the GHG RACT analysis), Ecology has excluded complexity index information for their NO_x benchmarking analysis and simply compared NO_x emission rates to reported crude capacity. As a result, this approach has likely overstated bp Cherry Point’s relative NO_x emissions compared to refineries of similar size and complexity. bp requests that Ecology either remove the incomplete NO_x benchmarking analysis from the draft RHR SIP or incorporate refinery-specific complexity index information with NO_x emission information before comparing the Cherry Point Refinery NO_x emissions to other refineries in Washington and across the United States.

3. Ecology Should Not Use bp’s PSD Permitting Discussion from the Four Factor Analysis (“FFA”) Reasonableness Analysis

Page 187 of the draft RHR SIP (Ecology’s FFA reasonableness analysis) includes a summary of a recent Ecology PSD permit issued to bp and comments received during the PSD permit public comment period. bp requests the PSD permit discussion be removed from Ecology’s FFA because it is completely unrelated to the process Ecology

² Section 6.10 (Refinery Complexity) from Washington Oil Refinery RACT Accessed at <https://apps.ecology.wa.gov/publications/documents/1302031.pdf> in November 2021.

used to determine which sources were required to complete a FFA (see the Source Screening Analysis on page 159 of the draft RHR SIP), and the PSD permit discussion is not relevant to any of the four factors evaluated in the analysis (cost of compliance, time necessary for compliance, energy and non-air quality environmental impacts of compliance, and remaining useful life of any potentially affected sources.) Ecology did not request bp include the recently permitted equipment in the FFA; therefore, Ecology should remove the PSD permit discussion from the FFA.

4. Ecology Should Use bp's Detailed Project-Specific Retrofit Cost Estimates for the Selective Catalytic Converter ("SCR") Systems

Guidance provided by the U.S. Environmental Protection Agency ("EPA") for the Second Implementation Period Regional Haze SIPs recommends that caution be exercised before accepting or rejecting controls based on generic cost estimates if adequately documented source-specific cost estimates are available.³ Here, adequately documented source-specific cost estimates are available, but Ecology has declined to use them.

In April 2020, bp provided Ecology with detailed project-specific retrofit cost estimates based on engineering information for selective catalytic reduction ("SCR") systems specific to the Crude Heater, #1 Reformer Heaters, and #1 Hydrogen Plant Heaters. The cost estimates bp provided to Ecology represent the most accurate estimates of the cost of compliance available. Furthermore, we believe that use of the generic Control Cost Manual methods does not provide accurate cost estimates for application of SCR systems to the heaters evaluated, as we detailed in our February 16, 2021 comment letter. In response to comments on the most recent updates to the SCR Control Cost Manual, EPA stated the cost manual provides study-level estimates and recommends detailed design specifications and cost quotes for more accurate cost estimates.⁴

Ecology has instead relied upon generic SCR estimates from an EPA cost model without exercising the caution recommended by EPA and conducting a complete review of bp's source-specific cost estimate.⁵

³ EPA Four Factor Analysis Guidance. Accessed at https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf in January 2021.

⁴ Public Comments on the Proposed Revisions to Section 4.2 (Chapter 2, SCR, of the Control Cost Manual), Accessed at https://www.epa.gov/sites/default/files/2020-07/documents/scr_costmanual_7thed_rtc.pdf in November 2021.

⁵ Ecology's disregard of bp's detailed cost estimates is inconsistent with prior positions adopted by the agency. For example, Ecology accepted and defended bp's detailed cost estimates in a challenge to the Final PSD for bp West Coast Products, LLC's Coker Heater Project. *See, e.g., National Parks Conservation Ass'n v. Dept. of Ecology and bp West Coast Products*, PCBH No. 17-055, Ecology Motion for Summary Judgment at 18 (Jan. 19, 2018).

Ecology previously has accepted bp's detailed SCR retrofit cost estimates in making other decisions, such as the SCR retrofit cost-effectiveness calculations and the original Best Available Retrofit Technology ("BART") Orders for refineries.^{6, 7} Ecology should rely upon bp's refreshed, detailed cost estimates again here.

Finally, in the draft FFA, Ecology indicates that bp did not provide any information on how the SCR retrofit cost estimates were developed, which is inaccurate. Ecology staff and the bp cost estimating team met on February 19, 2021 to discuss the process and information used to develop bp's detailed SCR retrofit cost estimates to be used in the FFA. bp requests Ecology correct the draft FFA to state that bp has provided documentation on how the SCR cost estimates were developed, has discussed that cost estimate methodology with Ecology and answered Ecology's questions.

5. Ecology Should Revise the SCR Cost Model to Include Source-Specific Cost Information, as EPA recommends

The cost estimation methodology EPA presented in the SCR chapter of the Control Cost Manual is based on a Sargent and Lundy study of coal-fired electric utility boilers. Putting an SCR on a coal-fired electric utility boilers differs significantly from retrofitting process heaters found at a petroleum refinery with an SCR.

In the Control Cost Manual, EPA notes the limitations of the simplistic study-level cost equation methodology provided, and states that the cost-effectiveness of SCR control should be based on a detailed engineering study and cost quotes from system vendors.⁸ In response to comments on the SCR cost chapter, EPA again notes the limitations of their SCR cost estimate equations as a simplified approach to obtain a study-level cost estimate, and EPA notes that the cost equations are not intended to reflect site-specific project details.⁹

The South Coast Air Quality Management District ("SCAQMD") also has noted the limitations of EPA's SCR cost equations as part of current NO_x emission rulemaking activities for petroleum refineries, where SCAQMD adjusted the study-level capital cost estimate equations with actual refinery SCR retrofit cost estimate data after review by a third-party engineering firm.¹⁰ However, it must be emphasized that detailed

⁶ 2012 Revised Washington Regional Haze SIP including Appendix L (BART Determinations) Accessed at <https://apps.ecology.wa.gov/publications/SummaryPages/1002041.html> in November 2021.

⁷ BART Determination Support Document for bp Cherry Point Refinery. Washington Ecology, September 2009.

⁸ EPA Control Cost Manual, Section 4, Chapter 2 (Selective Catalytic Reduction), June 2019. Accessed at https://www.epa.gov/sites/production/files/2017-12/documents/scrcostmanualchapter7thedition_2016revisions2017.pdf in January 2021.

⁹ EPA Response to Comments on Chapter 2 (SCR), of the Control Cost Manual. Accessed at https://www.epa.gov/sites/production/files/2020-07/documents/scr_costmanual_7thed_rtc.pdf in January 2021.

¹⁰ SCAQMD adjustments to SCR installation total capital investment presented and discussed in December 12, 2019 and June 30, 2021 working group meetings for Rule 1109.1 (Slides 14 – 19 on presentation accessible here: <http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/pr1109->

engineering cost estimates, like the ones bp provided to Ecology, provide the source-specific cost information that EPA recommends be used to evaluate the cost of compliance.

6. Ecology Should Revise the FFA Analysis to Include the Detailed Engineering Cost Estimates bp Provided to Ecology in April 2020

As discussed with Ecology on February 19, 2021 the EPA Control Cost Manual summarizes examples of source-specific conditions that affect SCR retrofit costs, including space constraints, existing fan limitations, limitations of existing electrical distribution system, etc. These retrofit costs are not included in EPA's SCR cost calculation because they are project-specific.

In late 2019 Ecology requested cost-effectiveness calculations for several units at Cherry Point Refinery. bp responded in April of 2020 with detailed engineering cost estimates to retrofit the Crude Heater, #1 Reformer Heaters, and #1 Hydrogen Plant Heaters with SCR systems. The detailed engineering cost estimates developed by bp for these potential SCR systems were based on process flow diagrams, piping and instrumentation diagrams, vendor-supplied estimates, and process knowledge. bp used Jacobs Engineering to provide the estimated requirements for the equipment, demolition, site work, pilings, buildings, concrete, structural steel, ducting, piping, insulation, instrumentation, electrical, painting, scaffolding and fire protection requirements. The detailed engineering cost estimates submitted by bp in April of 2020 are similar to the actual costs of historic SCR retrofit projects completed by bp and should be used in Ecology's FFA analysis. bp requests Ecology revise the draft FFA analysis to include the detailed engineering cost estimates bp provided in April 2020.

7. Ammonia Reagent Costs

The cost of the ammonia reagent is a substantial portion of the cost to operate an SCR system. Ecology selected an ammonia reagent cost of \$0.04/pound for bp heaters instead of using bp's actual ammonia reagent cost of \$0.33/pound. bp purchases 29 percent aqueous ammonia reagent for existing SCR control equipment at the Cherry Point Refinery, and bp requests that Ecology revise the ammonia reagent costs to incorporate actual ammonia reagent costs.

[1 wgm22 presentation.pdf?sfvrsn=18](#)), and 3rd Party Engineering Review of Cost Estimates accessible here: <http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/norton-report-rev-2-barct-cost-review.pdf?sfvrsn=6>

8. Space Limitations

Ecology concluded that no additional control equipment is required for cement manufacturing. Ecology's basis for this determination was that the cement manufacturing sites have limited space, and the installation of additional control equipment would require the site to be reconfigured. The same space constraint issues exist at refineries, and bp provided Ecology with engineering cost estimates addressing the space limitations near the Crude Heater, #1 Reformer Heaters, and the #1 Hydrogen Plant Heaters; however, Ecology has disregarded these additional retrofit costs for bp. Ecology should take these additional retrofit costs into consideration.

* * *

bp appreciates the opportunity to provide comments on the draft RHR SIP Revision for the 2nd 10-Year Plan. Please feel free to contact me at james.verburg@bp.com or 360-526-3901 if you would like to discuss further.

Sincerely,

A handwritten signature in blue ink, appearing to read "James Verburg". The signature is fluid and cursive, with a long horizontal stroke at the end.

James Verburg
Senior Environmental Engineer

Appendix V

Public Comments Received on Public Review Draft SIP

Holly Frontier Puget Sound Refinery

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: HollyFrontier Puget Sound Refinery Comments on 2nd Draft Regional Haze State Implementation Plan

Dear Mr. Gent:

The HollyFrontier Puget Sound Refinery (HFPSR) appreciates the opportunity to provide comments on the Washington Department of Ecology's (Ecology's) 2nd Draft of the State Implementation Plan for Regional Haze (2nd draft SIP). Please note that on November 1, 2021, ownership of Puget Sound Refinery (PSR) transferred from Equilon Enterprises LLC d/b/a Shell Oil Products US (Shell) to HollyFrontier Puget Sound Refining LLC (HFPSR) and as such all comments now submitted are on behalf of HFPSR.

At the request of Ecology, HFPSR (formerly owned by Shell) submitted a January 30, 2020 letter to Ecology identifying specific emission units at the HFPSR that met Ecology's criteria for a four-factor analysis. HFPSR also submitted the requested four-factor analysis for each subject emission unit in a report submitted on April 30, 2020. Ecology shared a 1st draft of the Regional Haze SIP four factor analysis in January 2021, and HFPSR provided comments on the conclusions made in the 1st draft SIP on February 16, 2021.

HFPSR recognizes and appreciates Ecology's willingness to incorporate comments from both HFPSR and the Western States Petroleum Association (WSPA) as part of the ongoing rulemaking efforts. The changes to the draft SIP based on previous comments and discussion are appreciated as well, and HFPSR looks forward to future collaboration towards reconciling discrepancies between HFPSR's and Ecology's cost calculations. In reviewing the 2nd draft SIP, HFPSR has identified a few important remaining comments, which are provided in detail below.

Comments from WSPA on 2nd Draft SIP

While the intention of this letter is to provide comments that are specifically relevant to HFPSR, the comments on the 2nd draft SIP prepared by WSPA are pertinent, and HFPSR wants to emphasize and reiterate the key takeaways from those comments, which are summarized below.

- ▶ Language in the 2nd draft SIP concluding that "refineries cause poor visibility" should be revised to either clarify that these are only possible conclusions (as Western Regional Air Partnership did not provide site-specific apportionment of visibility impairment) or provide further evidence to substantiate Ecology's claims.
- ▶ The refineries' overall contributions to visibility-impairing pollutant emissions should be more accurately represented. Refinery emissions of NO_x, SO₂, PM₁₀, 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.
- ▶ Further clarification should 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 heuristics and formulae developed specifically for the given emission units.

Characterization of HollyFrontier HFPSR NO_x Emissions

As noted in HFPSR's comments on the 1st draft SIP, the NO_x emissions intensity comparison table in Section 7.6 of this draft is an oversimplification of the NO_x emissions at a given refinery. There are important, fundamental differences between refinery processes and equipment that make this type of comparison inappropriate. The differences in NO_x emissions are not an indicator of poorly-controlled emission units, but are instead indicative of the varying crude slate, equipment, and products at a given refinery. Emissions from HFPSR, as an example, include emissions from a co-located cogeneration (or cogen) plant. The cogen plant is a non-refining process that other refineries in the state do not have. Moreover, refineries vary in complexity based on the types of products produced and operations conducted at the site. Less complex refineries that do not operate certain types of process equipment (e.g., FCCUs) will have lower total NO_x emissions per barrel of throughput. In contrast to the implications in the 2nd draft SIP, HFPSR has well-controlled NO_x emissions compared to most refineries, with controls installed on all but two process heaters, and SCR installed on its cogen units.¹ This table represents an oversimplification of NO_x emissions from refineries and ultimately does not aid in the development of conclusions for the Regional Haze Program. As such, HFPSR requests that Ecology remove the refinery comparison table and possibly replace it with a description of the varying NO_x emissions sources at refineries to provide the adequate context for the NO_x control analyses that follow.

HFPSR Analysis of SCR as a Control Technology

In HFPSR's initial four-factor analysis, the report notes that SCR is a well-established technology in the industry. The only basis for determining these emissions controls were not appropriate for installation at HFPSR were the site-specific costs developed by HFPSR as part of the four-factor analysis. HFPSR and Ecology agree that SCR has been demonstrated as a technically feasible control technology for heaters and boilers in the refining industry. HFPSR is encouraged by Ecology's willingness to ensure that analyses of SCR as a retrofit technology are as accurate as possible, and refining assessments of both the technical feasibility and the cost of retrofitting individual units with SCR on a unit-specific basis will be critical to that effort.

¹ All emission units in the Vacuum Pipe Still, Delayed Coking Unit, FCCU, and all three Hydrotreater Unit process areas are equipped with low-NO_x burners, and the Cogen units are equipped with SCR.

As part of the ongoing efforts by both Ecology and HFPSR to reconcile differences in cost calculations, it is important that conclusions made about the costs of retrofitting existing boilers and heaters with SCR are centered on unit-specific assessments. This includes both the recognition of the specific operating conditions that distinguish heaters and boilers located at refineries from those in other industries (such as the utility industry that served as the basis for the EPA Control Cost Manual) and using cost calculation heuristics that are appropriate for refineries as well. Extensive research prepared by WSPA in conjunction with rulemaking efforts for the South Coast Air Quality Management District (SCAQMD) in Southern California indicates that the underlying cost curves in the EPA Control Cost Manual – while appropriate for the utility industry – result in substantial underestimation of retrofit costs for the refinery industry. This research, which is described in detail in WSPA's comments on the 2nd draft SIP, was accepted by the SCAQMD and played a central role in the rulemaking efforts in Southern California.

HFPSR appreciates Ecology's recognition and incorporation of comments on the 1st draft of the SIP that recognized Ecology's initial cost calculations did not incorporate site-specific analysis and that future refinement is necessary. Conclusions made in the 2nd draft SIP regarding likely cost effectiveness are premature because the cost calculations lacked site-specific data and were also developed using EPA Control Cost Manual cost estimate tools that were not developed with the refinery industry in mind. The EPA Control Cost Manual and Regional Haze Guidance recommend using site-specific costs wherever possible. HFPSR is optimistic that the continued research and collaboration on the part of both HFPSR and Ecology will result in a complete and accurate site-specific analysis of appropriate emissions reductions solutions for the Regional Haze Program.

Boiler #1 (Erie City Boiler)

For Boiler #1 (Erie City Boiler), the 2nd draft SIP maintains the previous draft's conclusion that a regulatory order would be needed to shut the unit down by January 2028. HFPSR's analysis included a conservative assumption that the boiler had a remaining useful life of eight years. The remaining useful life is a consideration in a four-factor analysis for determining whether to require controls. The specific timeframe, however, is an estimate used solely for the preparation of the best available cost-effectiveness calculations for implementing additional emission controls. At no point in time has HFPSR agreed to a shutdown of the boiler by January of 2028.

The regional haze program should not mandate a shutdown of the equipment, but instead provide HFPSR with the flexibility to evaluate its options for compliance. As such, the 2nd draft SIP should be revised to include the possibility of substantial upgrades to Boiler #1, rather than exclusively mandating the shutdown of the boiler altogether. Should HFPSR elect these substantial upgrades to the boiler rather than shut down the boiler entirely, this would result in different NO_x emissions and a different remaining useful life, warranting a reevaluation of the anticipated retrofit costs. HFPSR looks forward to ongoing discussions with Ecology to reach agreement on an appropriate remaining useful life for the Boiler #1 to develop cost calculations that lead to an accurate retrofit cost for the four-factor analysis in the SIP.

FCCU / CO Boiler

As noted in previous comments submitted by HFPSR, the FCCU is outside the scope of review for the four-factor analysis. HFPSR recognizes and appreciates Ecology's updates to provide clarification regarding the specifics of the request made by Ecology initially for unit selection. In the 2nd draft SIP, however, Ecology notes the following:

It was Shell's understanding that the addition of particulate matter and SO2 controls on the FCCU in 2014 meant that they were not required to submit a NOx FFA.

Ecology's November 27, 2019 letter to HFPSR requested "Information for a 4-Factor analysis for each operational fluid catalytic cracking unit (FCCU), boiler greater than 40 MMBtu/hr, and heater greater than 40 MMBtu/hr located at your facility that has not been retrofitted since 2005." At no point does Ecology indicate that the applicability of units should be considered on an individual pollutant basis, and HFPSR fulfilled Ecology's requests exactly as written. HFPSR provided background information about these FCCU retrofits in its January 30, 2020 initial response to Ecology's information request. At no point between the January 2020 response and the January 2021 1st draft SIP, did Ecology indicate a need for additional information about the FCCU, or question the FCCU's exclusion from the four-factor analysis. In lieu of the passage identified above, HFPSR proposes the following update:

The Puget Sound Refinery's FCCU did not meet the criteria for unit selection as part of Ecology's Regional Haze request; therefore, cost information was not provided by the Puget Sound Refinery in their FFA.

The suggested language above accurately reflects that HFPSR was not required to submit a four-factor analysis for this unit.

Cogen Units

The cogen units at the HFPSR fall outside the scope of review identified by Ecology for the four-factor analysis. Ecology's November 27, 2019 letter to HFPSR requested a four-factor analysis for boilers and process heaters greater than 40 MMBtu/hr. The cogen units are combustion turbines and do not fall under these specific source types. However, HFPSR did include the cogen units in its initial four-factor analysis to show an example of implemented SCR for NO_x control. In addition to continuing to operate the cogen units with SCR, over the last five years HFPSR has discontinued firing of liquid fuel in the units, which has resulted in NO_x reductions. Liquid fuel firing was discontinued in Cogen #2 in June 2015, in Cogen #3 in June 2016, and in Cogen #1 in June 2017. HFPSR has obtained federally enforceable permit limitations to make these changes permanent.

The 2nd draft SIP, as with the previous draft, identifies the three cogen units at the refinery as requiring further study. However, further study is not needed because the cogen units already have BACT limits. Ecology cites the fact that similar new units are permitted at levels below 2 ppm NO_x. However, those low emission limits for new turbines represent a much more stringent level of control (i.e., Lowest Achievable Emission Rate, or LAER) that may be appropriate for nonattainment areas, but this level does not represent a RACT level of control. Per the EPA's regional haze guidance,² it is appropriate for states to preclude new, reconstructed, or modified units subject to best available control technology (BACT) or LAER analyses from regional haze analyses entirely, as "The statutory considerations for selection of BACT and LAER are also similar to, if not more stringent than, the four statutory factors for reasonable progress." HFPSR's cogens already operate with SCR, the best retrofit technology proposed by Ecology in the 2nd draft SIP for all other emission units. The SCR systems were installed as a BACT control option and were designed to meet a particular outlet concentration. The refinery currently operates the cogens and SCR system to minimize emissions of NO_x while also maintaining low levels of ammonia slip. Attempting to lower NO_x emissions

² U.S. Environmental Protection Agency, "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period." 20 August 2019. Retrieved from: <https://www.epa.gov/sites/default/files/2019-08/documents/8-20-2019 - regional haze guidance final guidance.pdf>

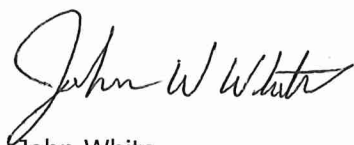
further would raise the possibility of emitting substantially more ammonia, a regulated toxic air pollutant in Washington, and risk violation of the ammonia emission limits on the cogens.

Comparing the emission rates of HFPSR's turbines to those of new turbines is not a relevant comparison for assessing the performance of an SCR system. New turbines will have a lower NO_x inlet emission rate to the SCR than existing turbines can achieve.

To summarize, further reducing the NO_x emission limit for the Cogen units would have negligible benefit to air quality and visibility and represents a level of control far more stringent than those the EPA indicated should be considered under the regional haze program. The Cogen units BACT limits are similar to or more stringent than RACT. HFPSR therefore recommends that the analyses and conclusions regarding the cogens be removed from the 2nd draft SIP entirely.

Thank you for considering our comments. HFPSR looks forward to future collaboration with Ecology to develop comprehensive and accurate analysis for the individual units at the refinery. We appreciate the opportunity to review Ecology's draft report and are available to respond to any questions that Ecology may have about our four-factor analysis or these comments.

Sincerely,

A handwritten signature in black ink that reads "John White". The signature is written in a cursive style with a large initial "J".

John White
VP of Refining and Plant Manager
HollyFrontier Puget Sound Refinery

Appendix V

Public Comments Received on Public Review Draft SIP

Olympic Park Advocates

Olympic Park Advocates

Comments on Washington Regional Haze State Implementation Plan
Olympic Park Advocates

To Whom It May Concern:

Thank you for the opportunity to comment on Washington's Regional Haze State Implementation Plan.

I am on the Board of Trustees for Olympic Park Advocates (OPA) and am submitting these comments on behalf of OPA.

OPA would like to express our concerns that the State of Washington's Department of Ecology has proposed a regional haze plan that does not require enough pollution reductions to make reasonable progress toward clean air goals for our parks and to support healthy air for directly affected communities close to haze-polluting facilities such as paper mills, refineries, cement production and other source emitters. In addition to protecting people, haze reductions are necessary under our nation's clean air laws to benefit Washington's three national parks and adjoining Wilderness areas. The federal Clean Air Act established the goal of naturally clean air – free of human-caused visibility impairment -- by 2064 in all large national parks and wilderness areas existing in 1977 – this means Olympic, Mount Rainier, North Cascades national parks; and other wilderness areas in Washington state. The National Park Service has calculated that on average about 50 miles of visibility is lost due to visibility impairing haze. It is more than just aesthetics. If we clear the air at parks and wilderness from polluting sources, then we are cleaning up harmful human health pollutants, too.

Ecology should be requiring all related industries to implement the best pollution controls available without waiting another ten years.

Thank you for your time and attention on this important topic.

Sincerely,

Olympic Park Advocates

Appendix V

Public Comments Received on Public Review Draft SIP

U.S. Oil and Refinery Co.

U.S. OIL & REFINING CO.

November 18, 2021

CERTIFIED MAIL

7020 1810 0000 6133 4303

Linda Kildahl
Department of Ecology
Air Quality Program
PO Box 47600
Olympia, WA 98504-7600

Subject: U.S. Oil & Refining Co. Comments on Draft Second Regional Haze Plan State Implementation Plan Revision

Reference: (a) Letter Dated February 15, 2021 from Ty Gaub (U.S. Oil) to Colleen Stinson (Ecology) Providing Comments on Ecology's Proposed Regional Haze Revisions to the State Implementation Plan

Dear Ms. Kildahl:

U.S. Oil & Refining Co. (USOR) provides the following comments on the Department of Ecology's State Implementation Plan (SIP) revision for Washington's Regional Haze plan for the second planning period for the years 2018-2028.

I. Regional Haze Emission Reductions at USOR Are Not Cost Effective

In the draft Regional Haze SIP Ecology concluded that "...additional controls are likely not cost effective..." at USOR, since the calculated cost effectiveness exceeded \$15,000/ton for nitrogen oxides (NOx) emissions. USOR concurs with this conclusion.

Ecology goes on to state that it will do a reasonability analysis "...to develop more robust and defensible cost data" for its economic feasibility assessment in the final SIP. USOR believes that this additional work is not necessary. As Ecology pointed out in the draft SIP, the cost effectiveness calculations prepared by Ecology and USOR are very similar, and both estimates are based on the U.S. Environmental Protection Agency's Cost Control Manual (which Ecology accepts as a credible methodology). As shown in Table 7-22 of the draft SIP, the only material difference between Ecology's cost calculations and those developed by USOR are in the annualized cost category -- USOR calculated the annual cost of installing selective catalytic reduction (SCR) controls on Heater H-11 at \$522,175 while Ecology's calculation for that element is \$437,150. Both calculations assumed a 20-year service life for the control device.

While not shown in the draft SIP, USOR suspects that this difference in calculated cost stems from the interest rate that Ecology used for calculating financing costs associated with the control's capital investment. In Appendix J to the draft SIP, Ecology's cost calculation sheet shows that an interest rate of 3.25% was used for the paper mill source category when calculating annualized costs. We infer that same interest rate was used to calculate the annualized control cost for USOR.

Per reference (a), USOR commented to Ecology on February 15, 2021 during the "informal" comment period offered to stakeholders for the Regional Haze SIP that using a 3.25% interest rate is not consistent with either the federal Regional Haze guidance or the EPA Cost Control Manual. The 3.25% interest rate also does not reflect realistic borrowing rates for a

small company like USOR. Please refer to Comment III in USOR's February 15, 2021 letter for a full explanation of why we believe the correct interest rate for making the cost effectiveness calculation should be 7%. We reiterate that comment here and urge Ecology to consult the references cited in our February 15th letter, along with the information provided in USOR's 4-Factor Analysis document describing our company's historical borrowing rates. If the 7% interest rate had been used in Ecology's cost effectiveness calculation the agency's calculation would have exceeded \$19,000/ton, making this control cost even more unreasonable than the estimate Ecology presented in the draft SIP.

In summary, we do not believe that it is necessary for Ecology to develop additional cost data for controlling NOx emissions from USOR's small emission source. The estimates that have already been developed by both Ecology and USOR adequately demonstrate that installing NOx emission controls on Heater H-11 would be dramatically higher than any reasonable Regional Haze control cost threshold. There is no reason for Ecology to devote more of its limited resources to additional cost analysis for USOR.

II. USOR is an Insignificant Contributor to Regional Haze Impacts

Even though the best available information already indicates that additional emission controls at USOR do not meet the cost-effectiveness test established for the Regional Haze regulation, USOR's Tacoma refinery should have been deferred from Ecology's Regional Haze analysis due to its insignificant impact on Class I Area visibility.

As shown in Table 7-5 of the draft SIP, USOR's crude oil processing capacity is less than 30% of the average capacity of the other four Washington petroleum refineries. In terms of the metric that is the predominant factor for determining a source's potential impact on Regional Haze (Q/d , where "Q" is the annual pollutant emission rate and "d" is the distance to the nearest Class I area) USOR's visibility impact value is less than 9% of the average Q/d from the other four Washington refineries. *In fact, at a value of 3.2, USOR's Q/d metric is nearly 70% lower than the screening threshold of 10 that Ecology applied to select the facilities that were evaluated for Regional Haze emission reductions in this planning period.* By all objective measures, USOR's impact on Class I Area visibility is not comparable to the other sources that Ecology evaluated for potential emission reductions in the draft SIP. We therefore reiterate our objection to being included in the draft SIP analysis for the second planning period.

The draft SIP recognizes three viable methods for implementing necessary Regional Haze emission controls for sources that materially affect Class I Area visibility:

- Permit modifications
- Agreed Orders
- Reasonably Available Control Technology (RACT) regulations promulgated under RCW 70A.15.2230

The draft SIP states that due to "limited resources" Ecology has chosen to apply the RACT rulemaking process to the petroleum refining sector. USOR reiterates its comment provided in the February 15, 2021 correspondence on this matter. Specifically, when the RACT process is triggered, controls deemed to be reasonably available are applied to all sources within that industry category after accounting for the impact of the control on air quality, the availability of controls, the emission reduction to be achieved, and the costs of those controls. In light of USOR's immaterial impact on visibility in Class I Areas, the draft SIP makes it clear that the only reason the USOR Tacoma refinery is evaluated for potential emission reductions is its existence within an industry source category for which a RACT regulation is planned. Thus, using the RACT process for driving Regional Haze emission reductions inappropriately captures the USOR facility. Any emission control applied at USOR's refinery would provide a negligible improvement to air quality. Were it not for the uniform application of RACT requirements across the entire petroleum

refining source category, USOR would not have been considered for Regional Haze controls for this planning period, just like dozens of other Washington sources that have a Q/d value less than the screening threshold of 10.

USOR therefore requests that Ecology revise its plan to use the RACT process as the enforcement mechanism for Regional Haze emission reductions from Washington petroleum refineries. Ecology's draft SIP acknowledges that other regulatory mechanisms are available to achieve the agency's objective for reasonable progress toward the Regional Haze goal. Using permit modifications or Agreed Orders would allow Ecology to appropriately tailor its enforcement approach to meet that objective without incorrectly capturing sources that would produce insignificant visibility benefit.

Conclusion

Applying established regulatory criteria should exclude USOR's Tacoma refinery from mandated emission reductions in the current Regional Haze planning period for two primary reasons:

- The cost of the identified potential emission control is not reasonable, and
- The USOR facility was inappropriately captured within the group of facilities evaluated in the draft Regional Haze SIP despite having an insignificant impact on Class I Area visibility.

Thank you for considering these comments. Please contact Mike Brygger or myself at 253-383-1651 or via email. Mike's email is mbrygger@parpacific.com and mine is tgaub@parpacific.com if questions arise following your review of this material.

Sincerely,

U.S. OIL & REFINING CO.



Ty J. Gaub
Environmental Manager

Cc: AJT, RLG, DKN, MHB, AAJ, DEB, BDM

F:/grp/eh&s/documents/MHB21028

Appendix V

Public Comments Received on Public Review Draft SIP

Western States Petroleum Association



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, NO_x 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.

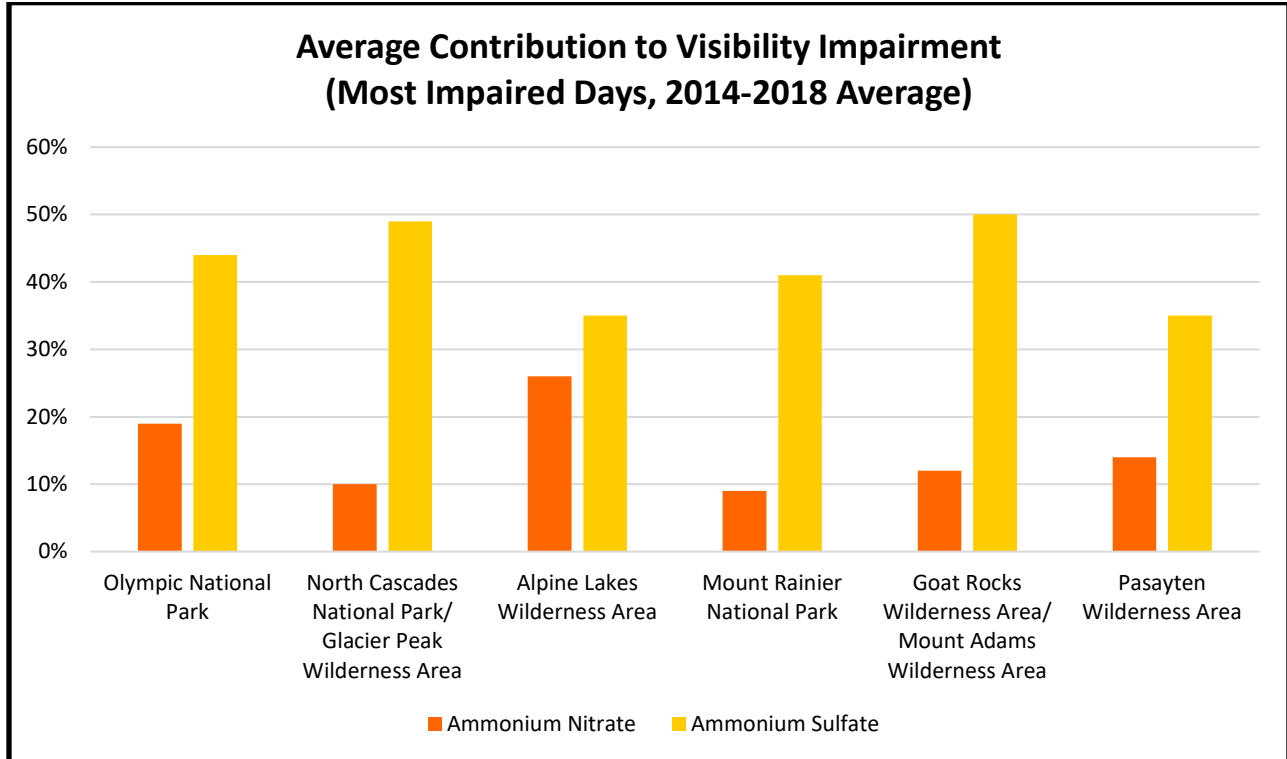


Figure 1. Average contribution to visibility impairment at Washington Class 1 areas (Most Impaired Days, 2014-2018)

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.

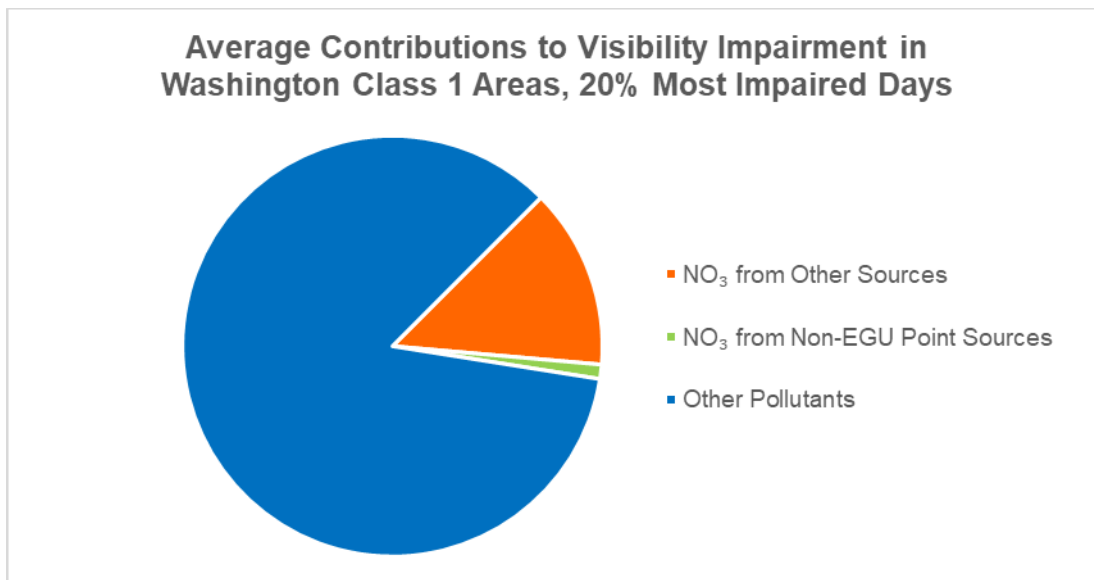


Figure 2. Average Contribution to Visibility Impairment in Washington Class 1 Areas, 20% Most Impaired Days

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, SO₂, and PM₁₀ 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 NH₃ 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, SO₂, and PM₁₀) 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, SO₂, and PM₁₀ 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, SO₂, and PM₁₀ 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.

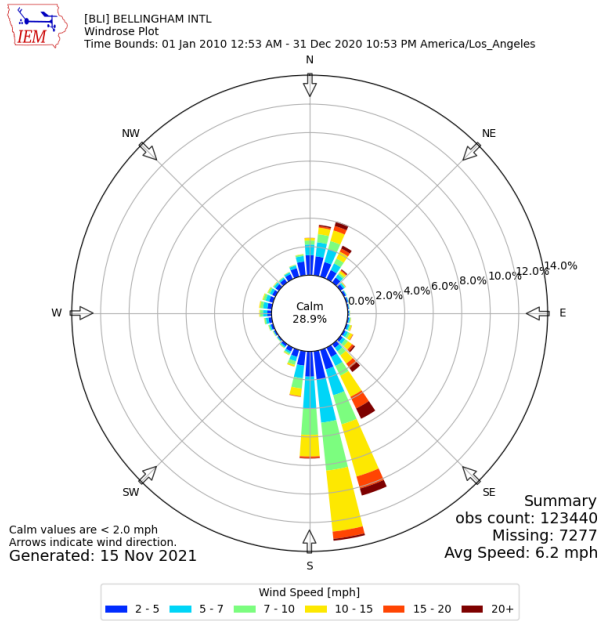


Figure 3. Wind Rose for Bellingham International Airport

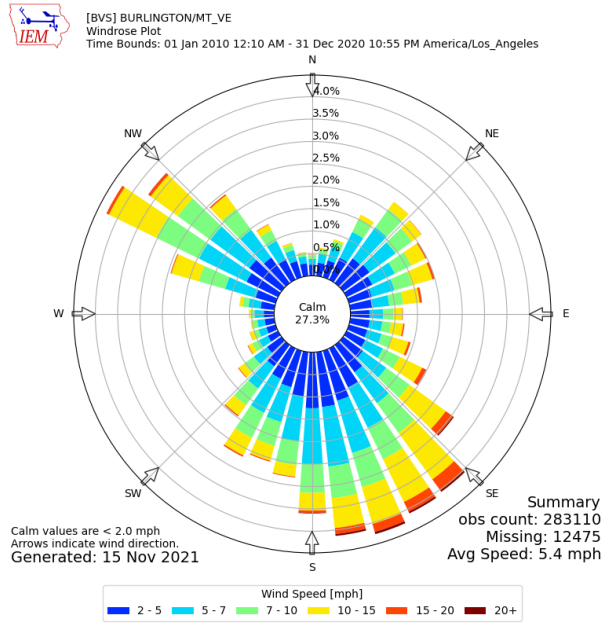


Figure 4. Wind Rose for Skagit Regional Airport

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.

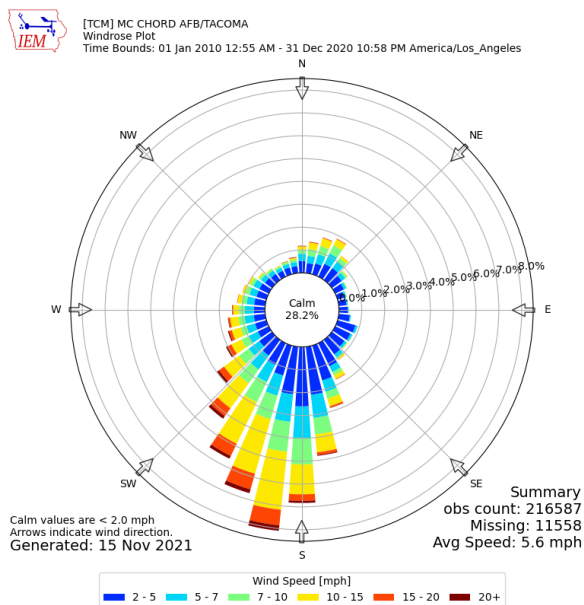


Figure 5. Wind Rose for McChord Airforce Base

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 SO₂ 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 NO_x 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=sheetml&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.

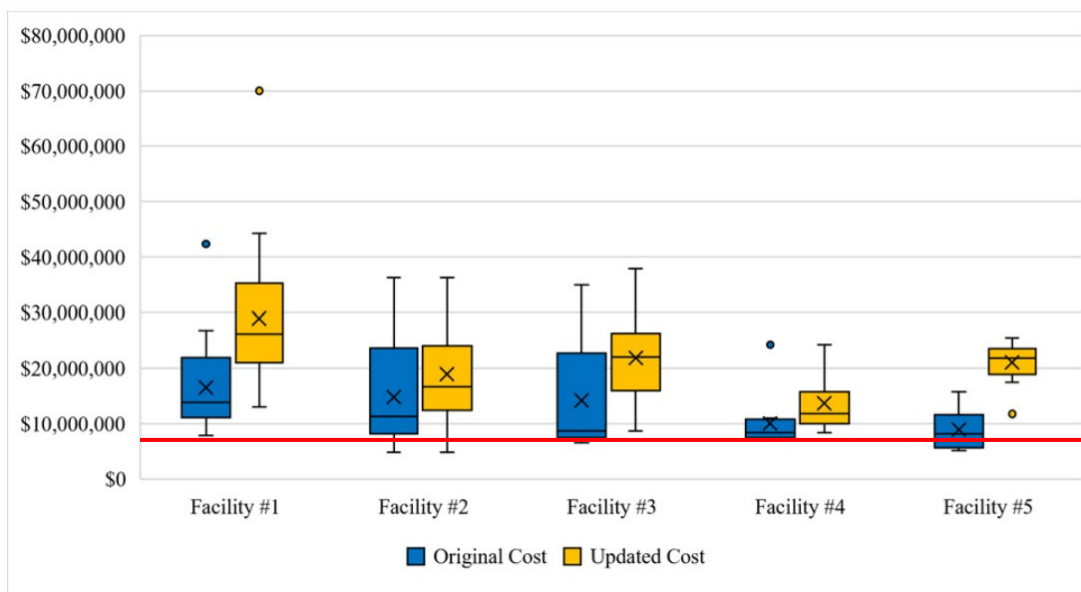


Figure 6. Capital Cost Comparison Between EPA Control Cost Manual and Revised SCAQMD Model (SCAQMD, 2021, red line annotation added)

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, SO₂, PM₁₀, 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.

bpoole@wspa.org or by phone at (805) 833-9760.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert W. Poole". The signature is written in a cursive style with a large initial "R".

Attachment

Appendix V

Public Comments Received on Public Review Draft SIP

Tesoro Refining & Marketing Co. LLC



Tesoro Refining & Marketing Company LLC

P.O. Box 700
Anacortes, WA 98221

November 23, 2021

Linda Kildahl
Department of Ecology
Air Quality Program
P.O. Box 47600
Olympia, WA 98504-7600

RE: Tesoro Refining & Marketing Company LLC's Comments on Washington's Regional Haze State Implementation Plan Revision: Second Regional Haze Plan (2018 – 2028)

Dear Ms. Kildahl:

On behalf of Tesoro Refining & Marketing Company LLC, a wholly-owned subsidiary of Marathon Petroleum Corporation (collectively, "MPC"), MPC appreciates this opportunity to provide the Washington State Department of Ecology (Ecology) with comments on the Public Review Draft of Washington's Regional Haze (RH) State Implementation Plan (SIP) Revision: Second Regional Haze Plan (2018 – 2028) (dated October 2021), including providing comments on Ecology's preliminary review and conclusion regarding Tesoro's Four Factor Analysis (FFA) submitted on April 28, 2020 (FFA Report). This set of comments supplements MPC's two previous letters submitted to Ecology during the informal comment period. These letters are dated January 4, 2021, and February 16, 2021 and are incorporated by reference into this letter. Please refer to these referenced letters, which are included in Attachment A, for additional discussions of MPC's concerns with the draft RH SIP. MPC also endorses and incorporates by this reference the comments submitted by the Western States Petroleum Association (WSPA) dated February 16, 2021, and November 23, 2021.

This set of comments focuses on the following five areas:

1. Potentially Available Emission Controls Other than Selection Catalytic Reduction (SCR) Should be Considered
2. Ecology Significantly Underestimates Project Costs for SCR
3. Ecology Overestimated the Emission Reductions Associated with SCR
4. Ecology Overstates the Visibility Improvements Associated with SCR Controls
5. MPC Preliminary Comments on the RACT Process

1. Potentially Available Emission Controls Other than SCR Should be Considered

To support the FFA, Ecology originally asked MPC for an expansive evaluation of all control technologies on November 27, 2019. Ecology then reduced the scope of the request and instructed refineries on March 9, 2020 to focus on control costs related only to low-NO_x burners (LNB) and selective catalytic reduction (SCR).¹

MPC provided information on SCRs and ultra-low-NO_x burners (ULNB) (instead of LNB) in the 2020 FFA Report based on the recommendations from design firms and vendors stating that ULNBs have superior performance at a similar cost to LNBs. MPC submitted information and data supporting its conclusion in the FFA that ULNB/LNB is a viable NO_x control technology that can be installed on certain refinery emission units that we identified in Table 3-1 of our FFA Report. Despite not asking MPC any follow-up questions or for more information during the FFA process, Ecology has excluded ULNB/LNB as potentially feasible and only includes SCR in the draft RH SIP as potential control technology. ULNB/LNB for NO_x control is potentially technically feasible and could potentially reduce NO_x emissions, and should therefore be included in the RH SIP. This technology should also be included in Ecology's future detailed reasonability analysis it will perform in order to determine what controls are reasonable.

In addition, selective *non-catalytic* reduction (SNCR) control is another technically feasible NO_x emissions control for Fluid Catalytic Cracking Units (FCCUs) and should similarly be included in Ecology's RH SIP and forthcoming more detailed reasonableness analysis.

2. Ecology Significantly Underestimates Project Costs of SCR

When developing the costs estimates included in the RH SIP, Ecology used the EPA SCR Control Cost Model approach, which significantly underestimates the costs of installing and operating SCR systems. MPC has provided much more accurate cost projections for installing SCR, which are included in our FFA Report. Table 1 below shows the appreciable differences between Ecology's and MPC's costs. For a variety of different reasons as outlined below, a strict use of the EPA SCR Control Cost Model approach is not appropriate.

¹ See E-mail from Christopher Hanlon-Meyer of Ecology to Bob Poole of WSPA.

Table 1 Cost Comparison of Draft RH SIP and MPC's 2020 FFA

Unit ^A	Capital Cost (\$)		Direct Annual Cost (\$)		Annualized Cost (\$)		Cost-Effectiveness (\$/ton)	
	Ecology	MPC ^B	Ecology	MPC	Ecology	MPC	Ecology ^C	MPC
CCU	10,286,436	114,030,975 ^D	51,432	2,237,587	977,202	10,747,992	1,159 or 1,346	14,381
F-102	5,084,927	20,876,000	134,206	462,549	437,150	2,021,692	2,962	16,086
F-201	5,084,927	20,629,000	134,206	272,979	437,150	1,813,706	7,589 or 7,623	35,276
F-6650	5,084,927	30,806,000	134,206	607,349	437,150	2,906,872	3,736 or 3,753	21,196 ^A
F-6651	5,084,927		134,206		437,150		3,520 or 3,535	
F-751	5,084,927	20,613,000	134,206	259,272	437,150	1,798,805	2,159 or 2,168	10,060
F-752	5,084,927	20,613,000	134,206	259,206	437,150	1,798,740	2,570 or 2,581	10,513

^A Ecology did not perform a Four-Factor analysis on all heaters/boilers included in the MPC Four-Factor analysis submitted in April 2020.

^B MPC has evaluated NO_x controls for the entire combined unit denoted as F-6650/1/2/3. Crude Inter-Reactor Heater 3, F-6653, is only rated at 38 MMBtu per hour.

^C Ecology's cost efficiency in the draft RH SIP differed from supplemental spreadsheets. First value is from Table 7-19, "Tesoro equipment identified for RACT rule development" in the draft RH SIP. Second value is from the supplemental spreadsheet, "Refinery control cost comparison."

^D Costs based on the planned MPC Martinez FCCU SCR installation – the project has been canceled since the refinery is idled.

2.1. Site-Specific Data are Necessary to Consider

Each existing emission unit has unique design characteristics that must be addressed individually to determine a realistic and representative SCR installation cost estimate. For example, process heaters are one of the most uniquely designed pieces of equipment at a refinery because each process heater is designed for a specific purpose associated with the process unit. MPC took these unique factors into account in its 2020 FFA and included considerations such as plot space, equipment infrastructure, fuel composition, and fuel gas temperature. Ecology's use of the EPA SCR Control Cost Model does not address these highly variable retrofit costs.

Below is a summary of the unit-specific SCR considerations based on the flue gas temperatures for the MPC process heaters evaluated.

Table 2 MPC Unit-Specific SCR Considerations

Unit	MPC Unit Specific SCR Considerations
F-102	Flue gas temperature is too low for catalyst <ul style="list-style-type: none"> - Hot oil reheat coil needed to increase flue gas temperature - ID fan requires upgrade with a plenum downstream of hot oil reheat coil
F-201	Flue gas temperature is too low for catalyst <ul style="list-style-type: none"> - Hot oil reheat coil needed to increase flue gas temperature

Unit	MPC Unit Specific SCR Considerations
	- ID fan requires upgrade with a plenum downstream of hot oil reheat coil
F-301	Flue gas temperature is too low for catalyst and would not be cost-effective to move convection heat transfer downstream of catalyst bed
F-6650/1/2/3	Flue gas temperature is too low for catalyst - Boiler feedwater coils may need to be moved downstream of SCR to ensure higher flue gas temperature
F-6600	Flue gas temperature requires a high-temperature catalyst
F-6601	Flue gas temperature requires a high-temperature catalyst

In addition to these technical considerations at both the site and unit level, MPC also included in its analysis site-specific direct annual costs such as current labor and utility costs.

EPA has guided agencies to “... exercise caution before accepting or rejecting controls based on generic cost estimates if adequately documented source-specific estimates are available or can be prepared.”² As such, Ecology should not use the EPA SCR Control Cost Model to replace MPC’s site-specific defensible cost estimates.

Furthermore, because the EPA SCR Control Cost Model is not appropriate to be used for FCCUs, MPC scaled project costs from an SCR installation project at the MPC’s Martinez, California Refinery’s FCCU. Although the project was ultimately canceled due to the unit being idled, the project costs provide accurate representations of the total cost of an SCR installation at an FCCU.

Therefore, Ecology’s cost-effectiveness determinations in the RH SIP and in any future reasonableness assessment need to include the real expected costs for retrofitting heaters and boilers with SCRs and should be considered on a unit-by-unit basis due to the wide variability of emissions unit design characteristics.

2.2. Ancillary Equipment is Inappropriately Excluded from Cost Analysis

Cost-effectiveness determinations must also include all the costs to install and operate the SCR, not just the costs of the SCR itself. Additional scope items not included in the EPA SCR Control Cost Model that need to be included are ancillary costs such as electrical infrastructure modifications, stack modifications, installation of new fans, installation of new convection sections required to operate the SCR at the required temperature, ammonia piping, and other costs associated with operating the control equipment.

Figure 1 shows in yellow the equipment included in the EPA SCR Control Cost Model and shows in blue the ancillary equipment necessary for operation that is not included in EPA’s SCR Control Cost Model.

² See EPA’s Guidance Memo on RH SIPs (dated August 20, 2019), p. 32.

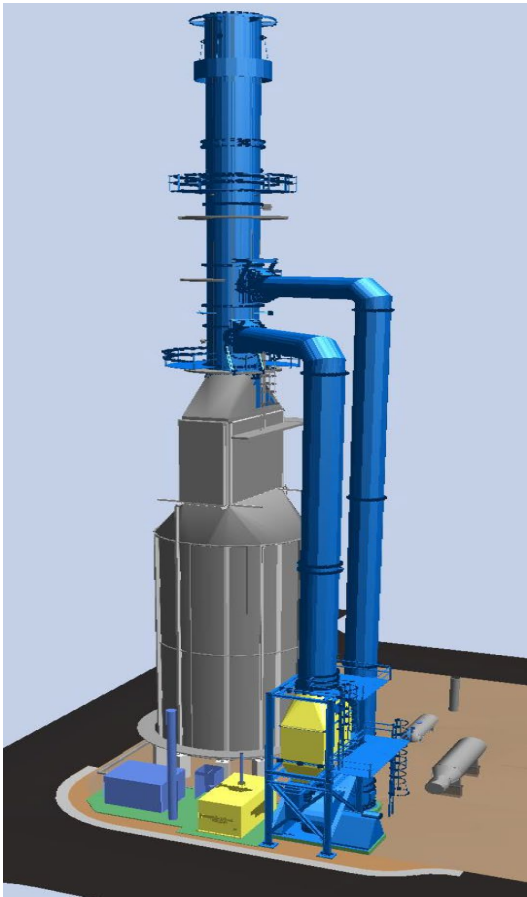


Figure 1 Components included in the EPA Cost Model Shown in Yellow. Components not included in the EPA Cost Model shown in Blue

The EPA SCR Cost Model inappropriately excludes the following ancillary equipment that are required to be installed for proper SCR operation at a typical heater or boiler:

- induced draft fan;
- exhaust stack;
- electrical infrastructure;
- convection section;
- ductwork;
- foundations;
- instrumentation;
- ammonia supply piping; and
- civil and structural steel supports.

For Ecology's reference, MPC's Los Angeles Refinery (LAR) retrofitted the Hydrocracker Fractionator Reboiler Heater (173 MMBtu/hr) with an SCR in the Fall of 2020. The initial South Coast Air Quality

Management District's use of the EPA SCR Cost Model provided only a cost estimate for the SCR equipment alone and failed to account for the other required capital costs associated with the retrofit installation such as new ductwork, new fan, ammonia feed lines, power from substation, etc. As a result, MPC's total actual capital costs for the SCR retrofit were 49 percent higher than what the SCAQMD calculated using the EPA SCR Cost Model. SCAQMD later made adjustments to the EPA SCR Cost Model based on data provided by refineries, as discussed in Section 2.4.

Therefore, Ecology should revise its draft RH SIP and consider in any future reasonableness assessment the real expected costs for retrofitting equipment, including the ancillary equipment costs required to operate SCR.

2.3. The EPA SCR Cost Model Does Not Apply to Refinery Equipment

The EPA (SCR) Cost Model was intended for electric utility boilers of a much larger scale and was not intended for refinery equipment such as gas-fueled boilers or refinery heaters or equipment with heat input capacities less than 250 MMBtu/hr. The EPA Cost Model actually identifies its inapplicability to sources other than utility and industrial boilers.³ Only two of MPC's affected units are industrial boilers that have a design capacity greater than 250 MMBtu/hr (i.e., F-751, F-752). Furthermore, as addressed in Section 2.1, it is even more inappropriate to apply the EPA Cost Model for an SCR to be installed on an FCCU.

2.4. Ecology Should Consider the SCAQMD's Use of the EPA Control Cost Model

When conducting its cost calculations for the RH SIP and any future reasonableness assessments, Ecology should refer to SCAQMD's equipment cost estimating method and cost-effective calculations it performed when developing the recently adopted Rule 1109.1 - *Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations*.⁴ While Rule 1109.1 was driven by the severe ozone nonattainment status in the South Coast air basin in California, which is a more significant regulatory driver, the supporting control cost evaluation is nevertheless informative. In summary, to reflect the actual total installation costs (TIC) for an SCR installation in the refinery sector, SCAQMD staff modified the EPA SCR cost spreadsheet using actual TIC estimates provided by the facilities. EPA approved and endorsed the revised methodology to reflect the change for the refinery sector.⁵ For Ecology's reference, in Figure 2 below, we have overlaid

³ The EPA SCR Cost Manual states: "[t]he procedures to estimate capital costs are not directly applicable to sources other than utility and industrial boilers." p. 2-2.

⁴ See SCAQMD Draft Staff Report for 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 (<http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1109-1>)

⁵ Draft Staff Report states: "To reflect the actual TIC of SCR installations in the refinery sector, staff modified the U.S. EPA SCR cost spreadsheet using actual TIC estimates provided by the facilities. Staff consulted with U.S. EPA Air Economics Group regarding staff's proposed methodology for revision of the SCR cost spreadsheet. Staff's revised methodology was approved and endorsed to reflect the change for the refinery sector." p.190.

MPC's estimates (shown as orange dots) and Ecology's estimates (shown as green dots) on top of SCAQMD's distribution of estimated costs based on equipment size.⁶ As Figure 2 demonstrates, MPC's costs are consistent with SCAQMD's cost estimates, while Ecology's estimates fall well below the linear regression line of the data used by SCAQMD.

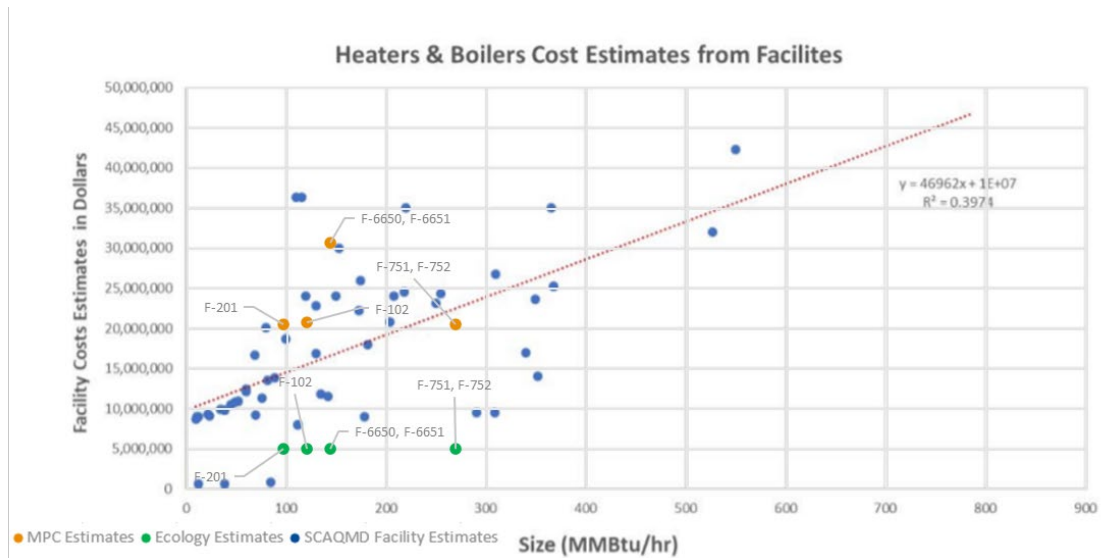


Figure 2 MPC's and Ecology's SCR Total Capital Costs Overlaid with Figure B-4 of the SCAQMD Rule 1109.1 Staff Report

Importantly, SCAQMD ultimately acknowledged the limitations of the EPA Cost Model and developed their estimates of total capital costs for installation of SCR by considering actual facility costs of installation that were submitted by refineries, which were reviewed by third-party engineering firms (i.e., FERCo and Norton Engineering). SCAQMD even stated in its rulemaking Draft Staff Report that the “Total Installation Cost (TIC) for SCR installations in the refining sector can be up to 10 times more expensive due to the limited space within processing units; some facilities have performed elaborate SCR engineering designs to install their SCRs. As a result of space and engineering requirements, TIC cost that a refinery incurs increases significantly compared to the electric power generating sector.”⁷ To support its cost-effectiveness calculations for the RH SIP, Ecology should consider the approach used by SCAQMD for its Rule 1109.1. In doing so, Ecology should also incorporate the costs MPC provided in its 2020 FFA Report into the cost-effectiveness calculations in the RH SIP and any future reasonableness assessment.

⁶ See http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/dsr_pr_1109-1_30_day_package.pdf?sfvrsn=4

⁷ See SCAQMD Draft Staff Report for 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(<http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1109-1>) p. B-10.

2.5. Inconclusive findings

Ecology claims in the draft RH SIP that its preliminary review of the industry-supplied data was inconclusive for determining reasonable controls and will be “performing a detailed cost-analysis to ensure the most effective reasonable controls are identified.”⁸ Since installing emissions control technology on equipment at refineries is a complex process with unique challenges for each refinery and each piece of equipment, MPC requests that Ecology include the real expected costs that we submitted in our 2020 FFA Report. Although Ecology did not ask any questions or for clarification during the FFA process, MPC believes it would still be beneficial for Ecology to understand what these costs are and why they need to be included in Ecology’s future evaluation process.

2.6. Correction to References to MPC’s 2008 Best Available Retrofit Technology (BART) Report

Ecology included reference to the outdated 2008 BART analysis as support for Ecology’s current cost estimates for this RH SIP planning period. The BART analysis was developed 13 years ago and does not reflect current costs for implementing projects at the MPC’s Anacortes Refinery. Additionally, MPC has identified inaccuracies in Ecology’s use of the referenced information as further described below.

“Table 7-19: Tesoro equipment identified for RACT rule development” incorrectly incorporates the cost per ton reduction for SCR control submitted to Ecology in the 2008 BART Report:

- The values Ecology included for F-6650, and F-6651 CAT Reformer Heaters are for LNB and ULNB and not SCR as referenced in the table.
- The value Ecology included for the FCCU was for F-302, not F-304, and was for SNCR rather than SCR. Therefore, the BART Report values for the FCCU should not be directly compared to the submitted values to Ecology as a part of MPC’s 2020 FFA Report.
- Ecology states that the 2008 BART report found that it was cost-effective to add NO_x controls to F-103, F-304, F-6650, and F-6651; however, it was not found to be cost-effective to install SCR.⁹

MPC requests Ecology remove references to the 2008 BART report in the RH SIP. If Ecology proceeds to reference the 2008 BART report, Ecology should update the language to reflect the 2008 BART report conclusions accurately.

⁸ See Public Review Draft Second RH Plan p. 200.

⁹ p.198 of draft RH SIP

2.7. Correction to References to MPC's 2020 FFA Report

Ecology incorrectly states that "The MPC [FCCU] data is based on SNCR controls at about 60 percent controls, which account for the higher \$/ton cost."¹⁰ MPC evaluated SCR controls and not SNCR controls. Additionally, MPC estimated a control efficiency of 89.7% based on 20 ppmv outlet concentration at 0% O₂ compared to the average 2014 inlet concentration of 194 ppmv at 0% O₂, which is comparable to Ecology's use of 90% control. MPC requests Ecology update the language regarding comparing effective costs of SCR at the FCCU to be accurate.

Ecology noted a discrepancy in the ft³/min-MBtu/hr factor included in the MPC SCR evaluation documentation for the subject units.¹¹ However, the factor was ultimately not used by MPC because capital and operating costs were developed from engineering analysis, as explained in MPC's 2020 FFA Report and MPC's February 16, 2021 comment letter.

3. **Ecology Overestimated the Emission Reductions Associated with SCR**

Ecology indicated in a letter to refineries dated May 31, 2019, that sites should consider the baseline year of 2014 in their FFAs. MPC followed Ecology's guidance and used 2014 actual emissions as the representative baseline year in our 2020 FFA Report. However, rather than using 2014 baseline emissions, Ecology used maximum potential emissions as the baseline in the draft RH SIP.¹² As a result, Ecology overestimated emission reductions from SCRs by using maximum capacity emission factors and firing rates. As shown in Table 3 below, the draft RH SIP representations overestimate both the emissions reductions associated with SCR installation and projected 2028 emissions with SCR installation.

¹⁰ p. 200 of draft RH SIP

¹¹ p. 200 of draft RH SIP

¹² See SCAQMD's use of baseline emissions as basis for adopted rule 1109.1 in SCAQMD Draft Staff Report for 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 (<http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1109-1>)

Table 3 Emission Comparison of Ecology's Draft RH SIP and MPC's 2020 FFA

Unit	Baseline NO _x (tpy)		Total NO _x Reduction (tpy)	
	Ecology ^A	MPC ^B	Ecology ^C	MPC
CCU	937	833	843.3	747.37
F-102	164	133	147.6	125.68
F-201	64	55	57.6 or 51.4	51.41
F-6650	130	148 ^D	117 or 137.1	137.14 ^D
F-6651	138		124.2 or 137.1	
F-751	225	187	202.5 or 178.8	178.81
F-752	189	179	170.1	171.10
Total	1,847	1,535	1,662.3 or 1,665.4	1,411.51

^A Ecology used an inlet NO_x concentration of 0.20 lb/MMBtu factor for all units.

^B MPC used unit-specific inlet NO_x concentrations for each unit.

^C Ecology's total NO_x reduction in the draft SIP differed from supplemental spreadsheets. First value is from Table 7-19, "Tesoro equipment identified for RACT rule development" in the draft SIP. Second value is from the supplemental spreadsheet, "Refinery control cost comparison."

^D MPC has evaluated NO_x controls for the entire combined unit denoted as F-6650/1/2/3. CR Inter-Reactor Heater 3, F-6653, is only rated at 38 MMBtu per hour

Ecology's approach of relying on potential emissions rather than a projection of 2028 actual emissions informed by the 2014 baseline overestimated the total NO_x reductions in "Table 7-19: Tesoro equipment identified for RACT rule development" by more than 250 tons per year (tpy), which significantly changes the control cost evaluation.¹³

Furthermore, Ecology's analysis for determining how to make reasonable progress on RH by 2028 is inconsistent with EPA's Guidance Memo on RH SIPs. On page 29 of EPA's Guidance Memo on RH SIPs, it states, "Generally, the estimate of a sources' 2028 emissions is based at least in part on information on the source's operation and emissions during a representative historical period."

Maximum heat input capacities are an unrealistic estimation of 2028 operations and do not consider equipment utilization. Therefore, evaluation of 2028 operations should be informed more by the 2014 baseline year than by design capacities. Such data provides more accurate estimates of how reasonable progress can be made on RH by 2028. As such, MPC requests Ecology follow EPA's guidance and utilize MPC's 2014 actual emissions as the baseline scenario.

¹³ At page 199, Ecology estimates 1,662 tpy of NO_x removal in "Table 7-19: Tesoro equipment identified for RACT rule development" of the draft RH SIP through the use of potential firing capacities and a standard inlet NO_x concentration of 0.20 MMBtu/hr. MPC's estimates 1,412 tpy of NO_x removal for the same units based on actual emissions during the baseline year of 2014.

4. Ecology Overstates the Visibility Improvements Associated with SCR Controls

MPC agrees with the statements made by WSPA in their November 23, 2021 comment letter on Section 7.3 - Reasonable Progress Evaluation. As such, MPC also requests Ecology re-evaluate how Ecology frames refinery NO_x emissions contributions to visibility impacts in the RH SIP.

The draft RH SIP language overstates the impact of refinery emissions on RH. The data presented in the draft RH SIP demonstrates that nitrates are not the primary contributor to light extinction in Washington's Class I areas. Both ammonium sulfates and organic mass contribute more to light extinction overall than ammonium nitrates. As such, required NO_x reductions at refineries would have minimal impact on visibility improvements. Figure 5 summarizes the average contributions to light extinction for ammonium sulfates, organic mass, and ammonium nitrates between 2014 and 2018 based on the tables in the draft RH SIP.

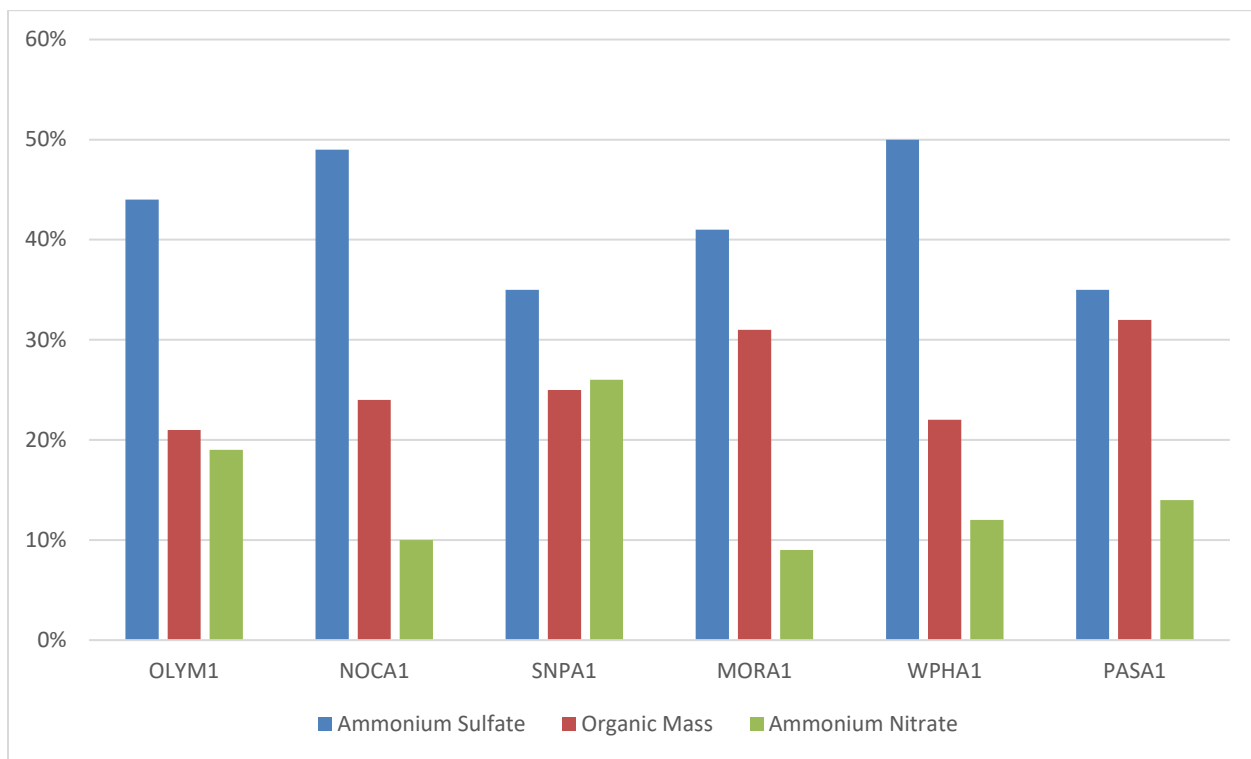


Figure 3 Contributions to Light Extinction Between 2014 and 2018 on the most impacted days¹⁴

Additionally, refinery impacts on NO_x emissions are overstated in the draft RH SIP. Figure 6 summarizes Ecology's representations of NO_x emissions for the representative baseline year in the draft RH SIP.

¹⁴ The remaining species, (i.e., fine soil, coarse mass, and elemental carbon) contributed minimally to the light extinction between 2017 and 2018.

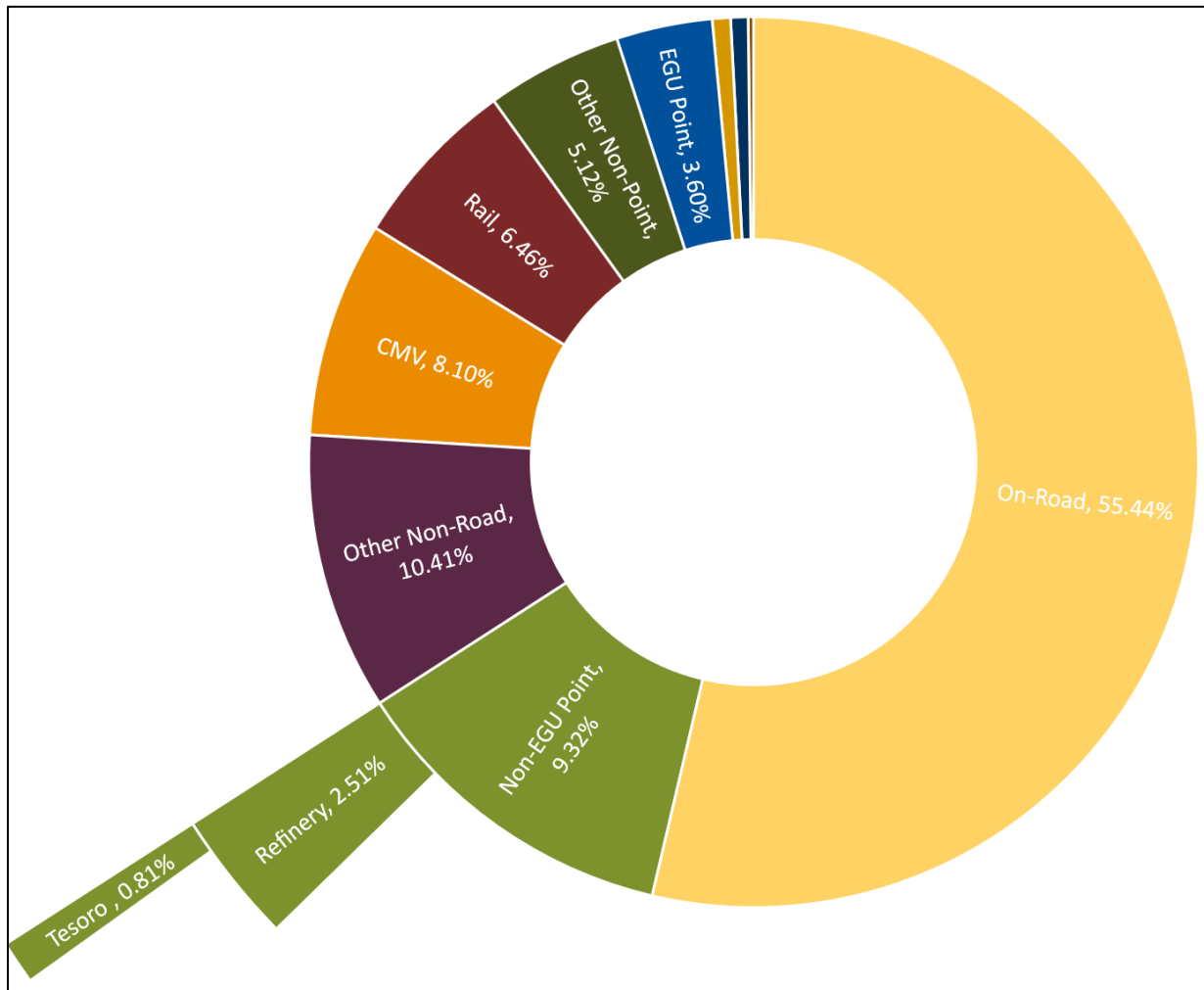


Figure 4 Summary of Draft RH SIP's Representation of NO_x Emissions in Representative Baseline Year

Non-electrical generating unit (non-EGU) point sources, refineries, and MPC's Anacortes Refinery account for only 9.3%, 2.5%, and 0.8% of the NO_x emissions in the representative baseline year, respectively. Refinery NO_x emissions represent a small portion of the state emission inventory and are a minor contributor to light extinction. Focusing mainly on NO_x controls at refineries is not reasonable based on the minimum impact it would have on visibility, and modeling future cases already indicates results below the adjusted glide path.

Where reducing visibility impairments is the overarching goal for the RH SIP, MPC is concerned that Ecology has not addressed secondary air quality impacts associated with SCR operation. When unreacted NH₃ (PM_{2.5} precursor) from SCR operation is emitted, ammonium combines with NO_x and SO₂ to form ammonium salts (PM_{2.5}) that diminish the benefits of the NO_x reductions. Furthermore, SCR oxidizes SO₂ to SO₃ which forms H₂SO₄ when contacted with water vapor. The associated increase in PM_{2.5} and H₂SO₄ emissions will also make it more difficult for MPC to obtain an Order of Approval to Construct or potentially a Prevention of Significant Deterioration (PSD) Permit for the installation. MPC requests Ecology consider

the increased emissions of PM_{2.5}, H₂SO₄, and NH₃ in any visibility impact analysis associated with SCR installation.

5. MPC Preliminary Comments on the RACT Process

MPC understands the Reasonably Achievable Control Technology (RACT) process will be separate from the draft RH SIP and occur subsequent to adoption of the Plan. However, as the draft RH SIP discusses the upcoming RACT process, MPC will take this opportunity to comment on a few concerns.

5.1. Confusion on Outcome of Draft RH SIP

MPC requests that Ecology more directly and clearly explain that the NO_x emission controls addressed in the draft RH SIP are not required at refineries as part of the current RH SIP Plan. During the Public Hearing for Washington's RH Implementation Plan for 2018-2028 on November 18, 2021, Ecology confirmed they would be doing a more robust analysis as part of the RACT process, that depending on the determination may be submitted as a supplement to the Plan at a later date. This approach has been discussed during other previous Ecology public meetings but should be clearly outlined in the RH SIP language.¹⁵

5.2. SCR Does Not Represent RACT

The vast majority of, perhaps all, SCR installations at refineries across the United States have been done for the purpose of meeting Best Available Control Technology (BACT), Lowest Actual Emission Rate (LAER), or specially mandated levels of control through a Consent Decree or other compliance order. MPC requests Ecology explain how the selection of SCR as potentially RACT is logically harmonious with Ecology's position that RACT cost by definition is less stringent than BACT.

5.3. Other NO_x Control Technologies

As stated above in Section 1, MPC requests that Ecology consider all technically feasible control technology as part of the RACT process. LNB/ULNB information provided in the refineries' FFA Reports should be used to inform the RACT rulemaking process. Furthermore, additional control technologies that Ecology and refineries have not addressed in the FFA or draft RH SIP, such as SNCR, should be evaluated.

¹⁵ Ecology stated during the January 25, 2021 and November 18, 2021 stakeholder meetings that the RACT process has not yet started, and they acknowledged that more information would be considered for RACT process. Ecology acknowledged that the RACT process would take longer than the time available to complete the RH SIP and as such, the final RH SIP will indicate that due to the longer time required for the RACT process, compliance may be achieved later than 2028.

5.4. Compliance Flexibility

MPC requests Ecology allow refineries to have the flexibility for determining how to achieve NO_x reductions in the RACT process if NO_x reductions are deemed reasonable. One example would be for Ecology to allow for an alternative compliance option similar to the emission cap approach SCAQMD provided for under Rule 1109.1 known as the "B-Cap." An emission cap approach supports both the objectives of achieving equivalent emissions while minimizing implementation costs.

Thank you for the opportunity to provide comments. Please note that in submitting this letter, MPC reserves the right to supplement its comments as it deems necessary, especially if additional or different information is made available to the public regarding the Regional Haze rulemaking process. Due to the potential significant impacts this RACT process will have on our refinery, MPC is looking forward to meeting with Ecology to discuss further our significant concerns and discrepancies discussed above prior to Ecology proceeding with the RACT process.

Please contact me at (360) 293-9141 should you have any questions regarding these comments and to schedule meetings to work through the issues identified in this letter.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Zawila" followed by a horizontal line and the word "for".

Paul Zawila

EH&S Manager, MPC Anacortes Refinery

CC: Gregg Stiglic, MPC
Lester Keel, MPC

Enclosure:
Attachment A

Attachment A:



Tesoro Refining & Marketing Company LLC

P.O. Box 700
Anacortes, WA 98221

January 4, 2021

Chris Hanlon-Meyer
Air Quality Program
Washington State Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

RE: Tesoro Refining & Marketing Company LLC's Comments on Regional Haze State Implementation Plan (SIP) Revision – 2nd 10-Year Plan

Dear Mr. Hanlon-Meyer:

As Washington State Department of Ecology (Ecology) develops its draft Regional Haze (RH) State Implementation Plan (SIP), Tesoro Refining & Marketing Company LLC, a wholly owned subsidiary of Marathon Petroleum Corporation (collectively, "MPC"), requests Ecology consider the following comments regarding Ecology's current development activities for the RH second implementation period. MPC's comments are based on the limited information provided by Ecology during its December 3, 2020 public workshop and previous informal discussions between the agency and MPC.

The U.S. Environmental Protection Agency (EPA) gives states broad discretion to determine the appropriate emissions limits and requirements under their RH plan including what control measures are necessary to make reasonable progress. Provided below is an overview of MPC's most significant initial concerns and comments for Ecology to consider as it develops its draft RH State Implementation Plan (SIP). MPC reserves the right to provide additional comments as it deems necessary, and as more information is made available regarding Ecology's RH SIP.

1. Agreed Order vs Reasonably Available Control Technology (RACT)

Determination/Rulemaking

During its December 3, 2020 RH SIP Public Information Session, Ecology identified the following five potential options for implementing any specific requirement imposed upon the refining industry:

- Taking no action
- Agreed Orders
- Compliance Orders
- Permit modifications
- RACT determinations and rulemaking

As of December 3, 2020, Ecology has not determined a compliance pathway for refineries. Where Agreed Orders are authorized for use under Chapter 70A.15 RCW, MPC believes issuance of an Agreed Order is the best mechanism to implement any required RH emission reduction rather than developing a categorical Reasonably Available Control Technology (RACT) rule as Ecology has suggested in the past. First, Agreed Orders allow more flexibility to account for site specific differences and technological diversity among units within the petroleum refinery source category (e.g., technical infeasibility to retrofit certain heaters). Source-specific determinations included in an Agreed Order would allow each refinery to identify the best source of reductions (if required) and make commitments to achieve those reductions on the most practical timeframe possible (e.g., account for refinery turnarounds). Second, the timeline and process for developing Agreed Orders is significantly shorter and more efficient than the RACT rulemaking process. Ecology has already noted that RACT rulemaking for RH purposes will take a significant amount of time. Third, Ecology has the authority to issue an Agreed Order or source specific orders instead of a categorical rule under RCW 70A.15.2230. For example, RCW 70A.15.2230(3)(d) permits a source specific determination when "An air quality problem, for which the source is a contributor, justifies a source-specific RACT determination prior to development of a categorical RACT rule." Importantly, the public will still have an opportunity to comment on any Agreed Order. Lastly, it should be noted that the Agreed Order path was used effectively during the first 10-year RH SIP process when Ecology required MPC Anacortes Refinery to implement the Best Available Retrofit Technology (BART) requirement at certain sources at the refinery.

While our preferred pathway is an Agreed Order, MPC is open to using other compliance pathways identified by Ecology such as compliance orders or permit modifications but would need more details from Ecology to understand how these alternative compliance mechanisms would be implemented.

2. Flexibility for any required emission limitations

A defining characteristic of the RH law is that states, not EPA, are the lead decision makers. The mandate that states have primacy over visibility improvement policy is also established in the Code of Federal Regulations and in EPA's own implementation guidance for RH.¹ Thus, regardless of the RH mechanism, Ecology has the legal and regulatory ability to allow flexibility to meet an equivalent emission reduction. The Washington State RACT rule (RCW 70A.15.2230) does not limit Ecology's flexibility in how to implement identified emission reductions nor prevent use of an alternate, equivalent emission reduction. Using the flexibility allowed in the law ensures the efficient use of capital and the likely greater and quicker overall emissions reductions. Additionally, EPA's guidance indicates that EPA gives states broad discretion to determine the appropriate emission limits and requirements under their Regional Haze plan.² Other states and local agency RACT rules

¹ See 40 CFR 51.308(f)(2)(i) & (iii), which establishes the process by which states-and not EPA-make both attribution and determination decisions for identifying the enforceable emissions reductions that will provide for meeting the reasonable progress goal for Class I areas within the State and for Class I areas outside the State which may be affected by emissions from the State; see also U.S. EPA's Guidance on Regional Haze SIP for the Second Implementation Period (August 20, 2019), which states "States retain the discretion to develop regional haze SIP revisions that differ from the recommendations in this guidance; however, states must ensure the regional haze SIPs are consistent with applicable requirements of the CAA and EPA regulations, and are the product of reasoned decision-making." (p. 1) "Section 51.308(f)(2)(iii) of the Regional Haze Rule requires a state to document, among other things, the emissions information on which the state is relying to determine the emission reduction measures that are necessary to make reasonable progress..." (p. 17-18)

² See U.S. EPA's Guidance on Regional Haze SIP for the Second Implementation Period (August 20, 2019), p. 40, which states "However, if it is feasible to establish and enforce different requirements for specific sources or subgroups of sources, and if relevant factors can be quantified for specific sources or subgroups of sources, *making a separate decision for each source*

recognize the benefits of this approach and provide flexibility through allowing enforceable caps, bubbles, or emissions averaging to be used to require equivalent emission reductions.

3. Visibility Improvement

Ecology is required to show visibility improvement on the Most Impaired Days (the twenty percent of monitored days in a calendar year with the highest amounts of anthropogenic visibility impairment) and protection of existing visibility on the Least Impaired Days (the clearest or best 20% of days) in the state's 8 mandatory Class I Areas. In addition, the RH rules allow for the degree of visibility improvement to be considered when evaluating control measures. 40 CFR 51.308(f)(2)(iv)(E) indicates that states should consider "[t]he anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the long-term strategy." The guidance provided by EPA also assumes Ecology will consider visibility benefits as part of the analysis and states that "[b]ecause the goal of the regional haze program is to improve visibility, it is reasonable for a state to consider whether and by how much an emission control measure would help achieve that goal."³

If Ecology decides to pursue a RACT determination/rulemaking, the definition of RACT within RCW 70A.15.1030(20) clearly states that the "impact of additional controls on air quality" is a factor that is required to be included in the determination. In fact, the RACT evaluation performed by Ecology for the pulp & paper industry⁴ as part of the initial RH SIP process determined the following when evaluating the need for RACT controls:

Ecology concluded that the actual emission reductions from the individual pulp mills and the industry as a whole would be relatively costly to implement and visibility improvements in the federal Class I areas would not be observable.

We do not recommend further work to evaluate or require additional air pollution controls for pulp mills in Washington.

Therefore, in compliance with federal RH rules and guidance and Washington State RACT requirements, Ecology must weigh the visibility benefits associated with any emission controls imposed upon refineries, and not require investment in control technology that offers little to no discernible visibility benefit.

4. Four-Factor Analysis

MPC submitted its Four-Factor analysis to Ecology in April 2020, but has not received any questions, feedback or comments from Ecology since our submission. Due to the potential significant investments and demands on refinery operations as a result of Ecology's RH SIP planning, MPC requests a response and discussion with Ecology on our four-factor analysis prior to Ecology making any formal four-factor determinations or conclusions.

or subgroup will help states make well-reasoned decisions. . . . At a single source, we recommend that states separately assess units that can be controlled with separate equipment."

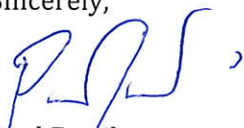
³*Id* at 36-37.

⁴ See Washington Regional Haze Reasonably Available Control Technology Analysis for Pulp and Paper Mills, dated November 2016 (Publication no, 16-02-023).

C. Hanlon-Meyer
January 4, 2021

Please contact me at (360) 293-9141 should you have any questions regarding these comments.

Sincerely,

A handwritten signature in blue ink, appearing to read 'P. Zawila', with a comma at the end.

Paul Zawila
ES&S Manager, Marathon Anacortes Refinery

CC: Gregg Stiglic, MPC
Lester Keel, MPC



Tesoro Refining & Marketing Company LLC

P.O. Box 700
Anacortes, WA 98221

February 16, 2021

Chris Hanlon-Meyer
Air Quality Program
Washington State Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

RE: Tesoro Refining & Marketing Company LLC's Comments on Regional Haze State Implementation Plan (SIP) Revision 2nd 10-Year Plan Chapter 11

Dear Mr. Hanlon-Meyer:

On behalf of Tesoro Refining & Marketing Company LLC, a wholly-owned subsidiary of Marathon Petroleum Corporation (collectively, "MPC"), MPC appreciates this opportunity to provide the Washington State Department of Ecology (Ecology) with comments on the proposed amendments to the Regional Haze State Implementation Plan (SIP) Revision – Second 10-Year Plan, Draft Chapter 11– Four-Factor Analysis (dated January 11, 2021) and regarding Ecology's review of the Four Factor Analysis supplied by Tesoro dated April 28, 2020. As owner and operator of the MPC Anacortes Refinery, MPC is subject to the proposed emission limitations and other requirements proposed in this draft SIP. These comments supplements MPC's letter submitted to Ecology on January 4, 2021, concerning the limited information provided by Ecology during its December 3, 2020 public workshop and previous informal discussions between Ecology and MPC. In addition to the comments in this letter, Tesoro endorses and incorporates by this reference the comments submitted by the Western States Petroleum Association (WSPA) to the same rulemaking action.

MPC's comments address Ecology's preliminary recommendation regarding additional emission controls for the MPC Anacortes Refinery, where we provide several detailed comments on Ecology's initial evaluation of our Four-Factor Analysis (FFA) and unreasonable characterizations it made when selecting the potential control measure as its recommendation for its Reasonably Available Control Technology (RACT) rule development.

General Comments:

Limited Communication & Inconsistent Process

Ecology has used an inconsistent approach when evaluating industries' FFA and appears to have rushed through its SIP development process and consequently propose recommendations based on insufficient information and limited communication with impacted refineries. As part of the second Regional Haze (RH) Rule planning period, states, including Washington, are required to develop and submit their updated state SIPs to U.S. Environmental Protection Agency (EPA) by July 31, 2021. MPC submitted its FFA to Ecology in April 2020 (MPC's 2020 FFA Report) but received no follow-up questions, feedback, or comments from Ecology since its submission. Rather than ask follow up questions like Ecology did with the Chemical Pulp and Paper Mill industries when there were gaps in their data, Ecology took it upon itself to skip to its conclusions and ask no questions on its site-specific estimates and identify no issues for MPC to address before making its recommendations. For example, with respect to MPC's FFA, Ecology simply concluded that "BARR's data is inflated and Ecology cannot reconcile the values presented by Tesoro." (p. 60) without any follow up or request for clarification or additional information. Ecology has also disregarded all of the information and data provided in MPC's 2020 FFA Report. As we describe further below, installing emissions control technology on equipment at refineries is a complex process with unique challenges for each refinery, given the operations' age and complexity. MPC accounted for these complexities in the costs that were submitted in the 2020 FFA Report.

Low-NOx Burners Inappropriately Excluded

Ecology has inappropriately used the lack of information and "uncertainty" to make its determination that installation of low-NOx burners (LNB) should not be a potential control. Even though refineries' FFA concluded that LNB on heaters/boilers "was potentially cost-effective" but "more extensive and in-depth engineering evaluation would be required to establish costs," Ecology jumped to a baseless conclusion that "SCR controls were cost-effective." (p. 47,43) Moreover, Ecology even "agree[d] with the refineries that installation of low-NOx burners requires more extensive analysis to determine feasibility," but simply decided not to ask for more information as it did with other industries when assessing their FFAs. (p. 46-47).

Ecology originally asked for evaluation of all control technologies on November 27, 2019. Ecology requested that refineries focus on control costs related to LNB and SCR on March 9, 2020.¹ MPC provided information on ULNB in the 2020 FFA Report based on the

¹ E-mail from Christopher Hanlon-Meyer of Ecology to Bob Poole of WSPA.

C. Hanlon-Meyer
February 16, 2021

recommendations from design firms and vendors that ULNBs have superior performance at a similar cost to LNBs.

The installation of LNB/ULNBs is a viable NO_x control technology that can be installed on certain refinery emission units, as indicated in Table 3-1 of MPC's 2020 FFA Report. While installing LNB/ULNBs can require more detailed engineering analysis to determine feasibility, this additional analysis should not be a reason to remove this technology from an FFA. Any technically feasible control option is required to be considered and the average and incremental cost-effectiveness evaluated in Four-Factor and RACT analyses. MPC included an initial assessment of feasibility and cost on LNB/ULNB and concluded that LNB/ULNB were technical feasible but not cost-effective.² Therefore, Ecology should not skip the LNB/ULNB evaluation for MPC.

Draft Chapter 11 - Refineries:

SCR Analysis by Ecology

Ecology Must Use Specific Refinery Equipment Data

Installing emissions control technology on equipment at refineries is a complex process with unique challenges for each refinery, given the operations' age and complexity. MPC accounted for these complexities in the costs that were submitted in MPC's 2020 FFA Report. In contrast, Ecology did not consider our data/information and the estimates are based solely upon the generic EPA's Control Cost Manual. MPC considers the EPA Control Cost Manual approach a screening tool and should not be used to replace site-specific defensible cost estimates as outlined on page 21 of the 2019 RH SIP Guidance. Further, the EPA's Control Cost Manual was not intended for refinery equipment and smaller sized boilers and process heaters as described further below.

MPC's independent third-party consultants developed cost estimates based on these site-specific challenges. These cost estimates ranged from obtaining unit-specific cost estimates from vendors, scaling costs from actual retrofit costs at different refinery or a different emission unit at the same refinery, and using EPA's Control Cost Manual with a retrofit multiplier and site-specific costs for labor and utilities. As indicated in Appendix A, "Unit Specific Screening Level Cost Summary for Control Measures" of the 2020 FFA report, MPC relied upon the MPC's Martinez Refinery's FCCU SCR project cost data for the CCU evaluation. While the SCR was not ultimately installed at the Martinez Refinery due to the idling of the facility, the project had advanced far enough in the project development process that the costs are considered the best

² Retrofit of Heater F-201 with ULNB is considered technically infeasible because of the risk of flame impingement and change in heat transfer characteristics due to the heater design.

indication of the true cost for installing an SCR at the CCU at the MPC Anacortes Refinery. By Ecology using the EPA's Control Cost Manual without site-specific information, Ecology underestimated the cost effectiveness of SCR at the FCCU by an order of magnitude (MPC estimated \$14,381/ton while Ecology estimated \$1,346/ton).³ Site-specific cost estimates must be used to the extent they better reflect the true cost of installing this equipment.

EPA Control Cost Manual Does Not Represent Actual Costs and Must Be Used in Conjunction with Refineries' Real Data

Ecology did not follow the August 20, 2019 memorandum from EPA, "Guidance on Regional Haze State Implementation Plans for Second Implementation Period," guidance to "... exercise caution before accepting or rejecting controls based on generic cost estimates if adequately documented source-specific estimates are available or can be prepared."

On page 48 of Ecology's FFA, it states the following, "In 2020, Ecology worked with two companies that are in the process of installing SCR equipment on existing equipment. One was a relatively simple installation and a second one was much more complex with the addition of a temporary stack to facilitate maintaining continuous operation of the equipment. When compared to the Cost Control Manual, both facilities' costs were within a factor of two. Therefore, Ecology will use EPA's Cost Control Manual to estimate costs."

A sample size of two facilities in the process of installing Selective Catalytic Reduction (SCR) on existing equipment is too small to make industry generalizations, especially if these examples were from non-refining facilities. Each affected unit's unique operating scenarios need to be considered when conducting technical feasibility evaluations and cost-effectiveness. MPC's 2020 FFA Report includes each emission unit's challenges when conducting the technical feasibility assessment and each of the four statutory factors: cost of compliance; time necessary for compliance; the energy and non-air quality environmental impacts of compliance; and the remaining useful life on existing source subject to such requirements.

Additionally, Ecology indicates the costs of both facilities were within a factor of two of the EPA Cost Manual's calculated value. A factor of two is significant when considering the cost-effectiveness of any control technology and can differentiate between technologies considered infeasible and feasible. Additionally, Ecology has framed an accuracy of a factor of two as supportive of the EPA Cost Manual. However, a factor of two is outside the range of accuracy that EPA represents for cost estimates prepared using the EPA Cost Manual, and instead is demonstration that the EPA Cost Manual underestimates costs. The EPA Cost Manual in Section

³ Ecology noted a discrepancy in the ft³/min-MMBtu/hr factor included in the MPC SCR evaluation documentation for the subject units. However, the factor was ultimately not used because capital and operating costs were developed from an engineering analysis, as explained in MPC's 2020 FFA Report.

1, Chapter 2, states, "This Manual retains the conclusion that the cost methodology laid out in this chapter and information in each control measure chapter with 30% probable error is relevant to be used in air pollution control cost estimation for permitting actions." As a factor of two exceeds the 30% probable error threshold, Ecology should not rely on the EPA Cost Manual alone to determine cost-effectiveness.

EPA Control Cost Manual Does Not Apply to Refinery Heaters and Boilers

The EPA (SCR) Cost Model was intended for electric utility boilers of a much larger scale than most refinery heaters/boilers. The EPA Cost Model was not intended for refinery equipment and was not intended for refinery gas-fueled boilers or refinery heaters or equipment with heat input capacities less than 250 MMBtu/hour. This is clarified in the EPA Cost Manual in Section 4, Chapter 2, as it states, "[t]he procedures to estimate capital costs are not directly applicable to sources other than utility and industrial boilers." Only two of MPC's subjected units are industrial boilers which have a design capacity greater than 250 MMBtu/hr (F-751, F-752).

The EPA SCR Cost Model focuses on the cost of the SCR equipment alone and does not account for additional ancillary costs. These additional cost items typically include electrical infrastructure modifications, stack modifications, installation of new fans, installation of new convection sections, modification of piping, and additional costs associated with actually operating the control equipment.

Ecology's review of SCR also does not account for technical issues and additional costs associated with the flue gas temperature for certain emission units not being in the appropriate temperature range for good SCR performance. Below is a summary of the unit-specific SCR considerations based on the flue gas temperatures for the MPC units.

Unit	MPC Unit Specific SCR Considerations
F-102	Flue gas temperature is too low for catalyst <ul style="list-style-type: none"> - Hot oil reheat coil needed to increase flue gas temperature - ID fan requires upgrade with a plenum downstream of hot oil reheat coil
F-201	Flue gas temperature is too low for catalyst <ul style="list-style-type: none"> - Hot oil reheat coil needed to increase flue gas temperature - ID fan requires upgrade with a plenum downstream of hot oil reheat coil
F-301	Flue gas temperature is too low for catalyst and would not be cost-effective to move convection heat transfer downstream of catalyst bed
F-6650/1/2/3	Flue gas temperature is too low for catalyst <ul style="list-style-type: none"> - Boiler feedwater coils may need to be moved downstream of SCR to ensure higher flue gas temperature
F-6600	Flue gas temperature requires a high-temperature catalyst
F-6601	Flue gas temperature requires a high-temperature catalyst

If Ecology is going to rely on EPA SCR Cost Models rather than site-specific vendor information, then significant changes to assumptions and factors are required in order to represent accurate cost estimates. Even then, the EPA SCR Cost Model should not be used instead of site-specific vendor cost estimates or scaled estimates based upon real cost data from other installations.

Ecology Significantly Over-Represented Emission Reductions for Units

Ecology's approach of relying on potential emissions rather than a projection of 2028 actual emissions overestimated the total NO_x reductions in "Table 20: Tesoro equipment identified for RACT rule development" by more than 250 tpy, which significantly changes the control cost evaluation.⁴

Ecology used a firing rate consistent with the potential-to-emit of the affected units rather than actual emissions. Ecology's analysis for determining how to make reasonable progress on RH by 2028 is inconsistent with EPA's 2019 RH SIP Guidance. On page 29 of EPA's 2019 RH SIP Guidance, it states, "Generally, the estimate of a sources' 2028 emissions is based at least in part on information on the source's operation and emissions during a representative historical period." Ecology indicated that the baseline year considered was 2014 in a letter dated May 31, 2019. MPC's 2020 FFA Report represented 2014 actual emissions as its baseline emissions. As Ecology already has actual emission data from MPC from annual emissions reporting and such data provides more accurate estimates of how reasonable progress can be made on RH by 2028, Ecology should utilize MPC's 2014 actual emissions as the baseline scenario.

Maximum heat input capacities are an unrealistic estimation of 2028 operations and does not consider equipment utilization. Further, any physical changes or changes in the mode of operation for the affected units which increase emissions must be considered in air permitting evaluations. Therefore, evaluation of 2028 operations should be informed more by the 2014 baseline year than by design capacities.

In addition to the use of maximum heat input capacities, Ecology assumed a standard inlet NO_x concentration of 0.20 lb/MMBtu for each of the subject units. Seven of MPC's subject units have known inlet concentrations lower than the standard inlet concentration. MPC relied on known inlet concentrations and achievable outlet concentrations unique for each unit to calculate NO_x removal efficiencies.

⁴ Ecology estimates 1,662 tpy of NO_x removal in Table 20 of the FFA Report through the use of potential firing capacities and a standard inlet NO_x concentration of 0.20 MMBtu/hr. MPC's estimates 1,412 tpy of NO_x removal for the same units based on actual emissions during the baseline year of 2014.

In the case of F-201 and F-6650/1/2/3, Ecology's estimated NOx removal rates that exceed the 2014 actual emissions.

Unit	2014 Baseline NOx Emissions (tpy)	Ecology Estimated NOx Removal (tpy)	MPC Estimated NOx Removal (tpy)
F-201	55	58	51
F-6650/1/2/3	148 ⁵	241	137

Ecology has Incorrectly Used the EPA Control Cost Manual

Ecology provided its inputs to the EPA Cost Tool for review, but not the actual EPA Cost Tool(s) which show the calculated control cost effectiveness. The "Refinery control cost comparison" spreadsheet provided by Ecology is the "Refinery control cost comparison" spreadsheet provided by Ecology is not transparent, and relies upon various assumptions and scaling of values between units and operating scenarios which are not well-documented. As a result, MPC could not fully recreate Ecology's calculations or verify that the input assumptions are accurate. MPC requests that Ecology issue more detailed documentation on their use and assumptions of the EPA Cost Tool for SCR.

Based upon our review of Ecology's inputs to the EPA Cost Tool, it further appears that Ecology developed a cost estimate for a 250 MMBtu/hr industrial boiler and then scaled that result based on the unit's baseline emissions. This approach is an improper use of the EPA Cost Tool since heat input rates and baseline emissions may be directly inputted into the EPA Cost Tool and that some aspects of the design and operating costs are correlated to equipment size and others are correlated to baseline emissions.

Further, in the base calculation for a 250 MMBtu/hr boiler, it appears that the "Maximum Annual Heat Input Rate" on the SCR Design Parameter tab (e.g., 200 MMBtu/hr for F-102) is not the same as the "Maximum Annual Heat Input Rate" on the Data Input tab (e.g., 250 MMBtu/hr for F-102). These values should be the same.

Further, using Ecology's approach means that control costs for individual heaters are scaled directly rather than considering economies of scale. The combination of these improper applications of the EPA Cost Tool with the over-representation of baseline emissions (as described above) results in a lower control cost than would be otherwise calculated if Ecology was correctly using the EPA Cost Tool directly for each emission unit.

⁵ As indicated in Table 2-3 of MPC's 2020 FFA Report, Based on a review of 2014 emission calculations as part of this analysis, Tesoro determined that revisions to the NOx emission factors used for these heaters were appropriate based on the heater design parameters.

Ecology Failed to Consider Consequential Air Quality Impacts from SCRs

Ecology failed to address the environmental impacts (e.g., waste and secondary air impacts) included in Section 4.2.3 of MPC's 2020 FFA Report. Under Ecology's proposed Summary and Recommendations, Ecology concludes the only additional environmental impact for SCR is that "[t]he power needed to drive the exhaust fans ...". The air quality impacts for regional haze pollutants are directly applicable to the goals of the FFA and the SIP. Ecology should consider all energy, secondary air quality and non-air quality environmental impacts.

The secondary air quality impacts associated with SCR operation, such as unreacted ammonia (PM_{2.5} precursor) being emitted and ammonium combining with NO_x and SO₂ to form ammonium salts (PM_{2.5}), diminish the benefits of the NO_x reductions. The associated increase in PM_{2.5} emissions will also increase the difficulty of obtaining an Order of Approval to Construct (or potentially a Prevention of Significant Deterioration) Permit for the installation. Ecology should consider the increased emission of PM_{2.5}, H₂SO₄, and NH₃ in any visibility impact analyses associated with SCR installation.

SCR Does Not Represent RACT

Ecology notes at page 32 of Ecology's FFA, Ecology references the October 1990 EPA Draft New Source Review Workshop Manual and states that to inform the process of selecting RACT the engineer should consider the: "*cost previously borne by other sources of the same type.*" And, *'the range normally incurred by other sources in that category.'*" Furthermore, on page 34 of Ecology's FFA, it notes that RACT is generally considered to be less stringent than BACT or other costs incurred to address specific circumstances. The vast majority of, perhaps all, SCR installations at US Refineries have been done for the purpose of meeting BACT, LAER, or specially mandated levels of control through a Consent Decree or other compliance order. Accordingly, Ecology should explain how selection of SCR as potentially RACT is logically harmonious with Ecology's position that RACT cost by definition is less stringent than BACT.

Correction to references to MPC's 2008 Best Available Retrofit Technology (BART) Report

It is not appropriate to use the 2008 BART analysis as the basis to support Ecology's current cost estimates. The 2008 BART analysis was developed 13 years ago and does not reflect current day costs for implementing projects at the refinery. Additionally, Ecology has inappropriately used data/conclusions from the 2008 BART analysis as further described below.

On page 58 of Ecology's FFA, it states, "The BART cost data was similar to Ecology's 2020 cost." However, "Table 20: Tesoro equipment identified for RACT rule development" incorrectly incorporates the cost per ton reduction for SCR control submitted to Ecology in the 2008 BART Report:

C. Hanlon-Meyer
February 16, 2021

- The values Ecology included for F-6650, and F-6651 CAT Reformer Heaters are for LNB and ULNB and not SCR.
- The value Ecology included for the FCCU was not inclusive of F-302 and was for Selective Non-Catalytic Control (SNCR) and not SCR for F-304. Therefore, the BART Report values for the FCCU should not be directly compared to the submitted values to Ecology as a part of the 2020 FFA Report.

Furthermore, the costs reported in the 2008 BART report did not reflect all true installation costs. To ensure more accurate estimates in the 2020 FFA Report, MPC hired multiple engineering firms to provide realistic cost estimates for ULNB and SCR technology on the units where the technology was deemed technically feasible.

RACT Process

MPC does Not Agree with the Cost Estimates

MPC does not concur with Ecology's current cost estimates in Ecology's FFA; therefore, the currently drafted FFA does not warrant enforceable or binding conclusions.

On page 43 of Ecology's FFA, it states, "Ecology plans to use the submitted FFA's and the EPA Control Cost manual as the basis of a RACT determination. This determination allows for the start of rule development for the installation of SCR controls that is separate from this RH SIP revision. Ecology has identified 19 pieces of equipment to consider during the RACT rule development. The expected NO_x emission reductions would be over 3,800 tpy." During the January 25, 2021 stakeholder meeting, Ecology confirmed that the RF FFA for refineries would be part of the RH SIP. However, it acknowledged the analysis included in the January 11, 2021, is not final.

MPC Understands that the RACT Process will be separate from RH SIP rulemaking

MPC would like to reserve the right to suggest alternatives to controls as part of the RACT process. Additionally, MPC would like Ecology to clarify that the conclusions of the FFA in the RH SIP will not be enforceable requirements on refineries, but just a general thinking on what

C. Hanlon-Meyer
February 16, 2021

controls may be required as an outcome of the RACT rulemaking.⁶ Given the timing of the RH SIP and the issues noted above, we believe it is appropriate for Ecology to remove specific representations and conclusions from the RH FFA chapter and address the topic more generally.

Refinery Ownership Corrections

MPC requests that Ecology correct its descriptions of the MPC Anacortes Refinery and the Ferndale Refinery as they are currently identified on page 40 of Ecology's FFA. The descriptions need to be updated to reflect Tesoro Refining & Marketing Company LLC (Tesoro) as the correct owner and operator of the "Marathon Anacortes Refinery." Neither Tesoro nor its parent company Marathon Petroleum Corporation own the Ferndale refinery.

Due to the significant impacts this rulemaking will have on our refinery, MPC requests that Ecology consider these comments and set up a meeting with MPC to review these significant concerns and discrepancies prior to Ecology proceeding with the next draft of the FFA.

Please note that in submitting this letter, MPC reserves the right to supplement its comments as it deems necessary, especially if additional or different information is made available to the public regarding the Regional Haze rulemaking process. We incorporate by reference into this letter the relevant comments submitted by Western States Petroleum Association on February 16, 2021.

Thank you for the opportunity to provide comments. We are glad to discuss this further and look forward to continued dialogue. Please contact me at (360) 293-9141 should you have any questions regarding these comments and to schedule a meeting.

Sincerely,



Paul Zawila
ES&S Manager, MPC Anacortes Refinery

CC: Gregg Stiglic, MPC
Lester Keel, MPC

⁶ Ecology stated during the January 25, 2021, stakeholder meeting that the RACT process has not yet started, and they acknowledged that more information would be considered for RACT rulemaking. Ecology acknowledged that the RACT rulemaking process would take longer than the time available to complete the RH SIP and as such, the final RH SIP will indicate that due to the longer time required for RACT rulemaking, compliance may be achieved later than 2028. Ecology further stated that when they pursue emission controls, it will be done outside of the RH SIP process.