



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.

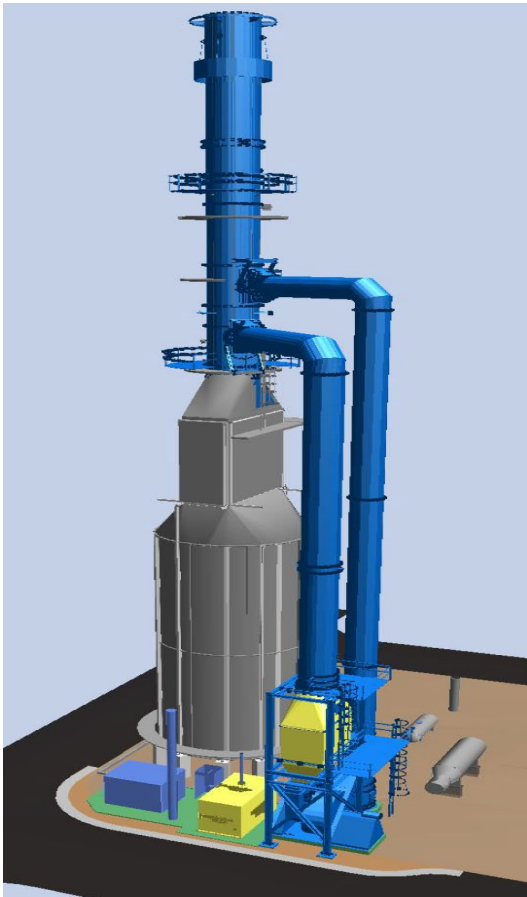


Figure 1 Components included in the EPA Cost Model Shown in Yellow. Components not included in the EPA Cost Model shown in Blue

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.

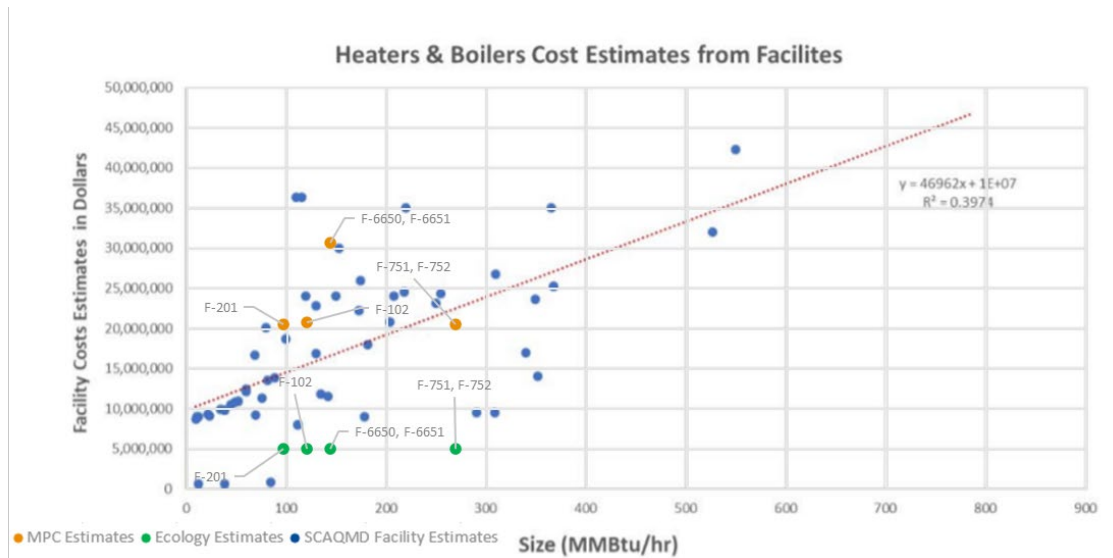


Figure 2 MPC's and Ecology's SCR Total Capital Costs Overlaid with Figure B-4 of the SCAQMD Rule 1109.1 Staff Report

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.

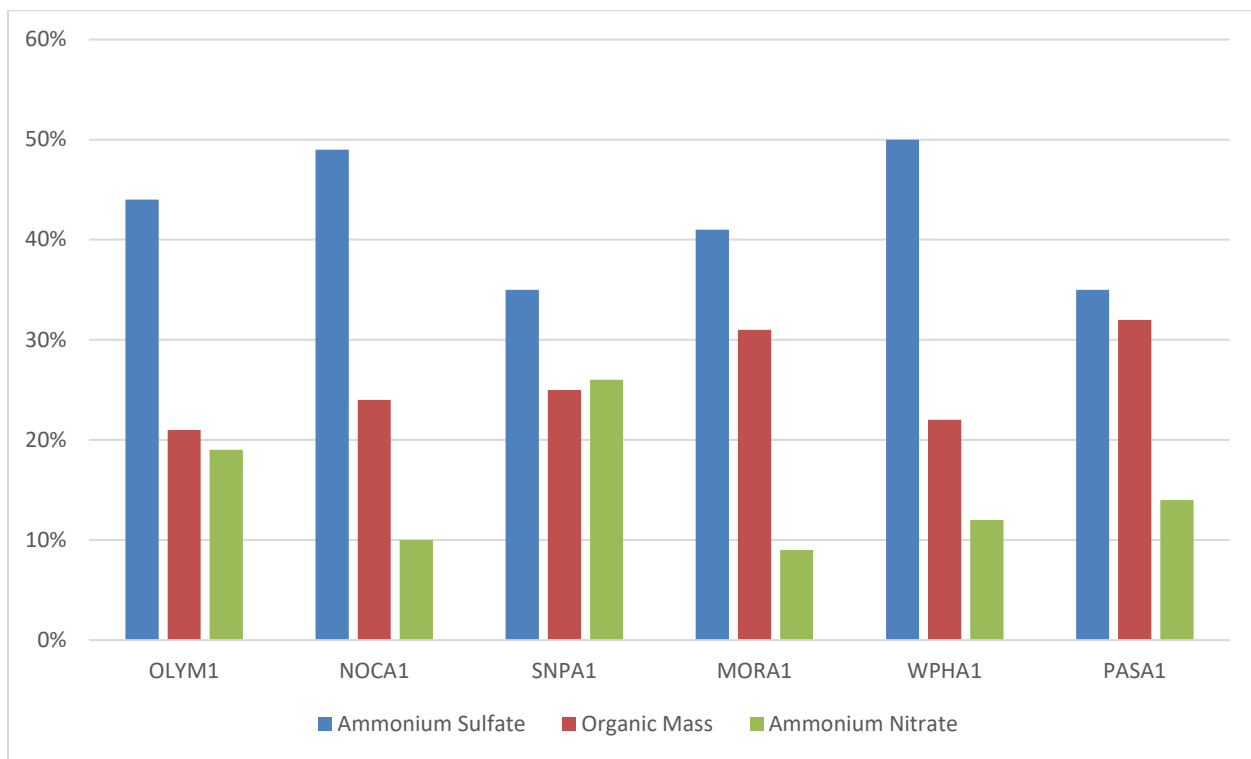


Figure 3 Contributions to Light Extinction Between 2014 and 2018 on the most impacted days¹⁴

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.

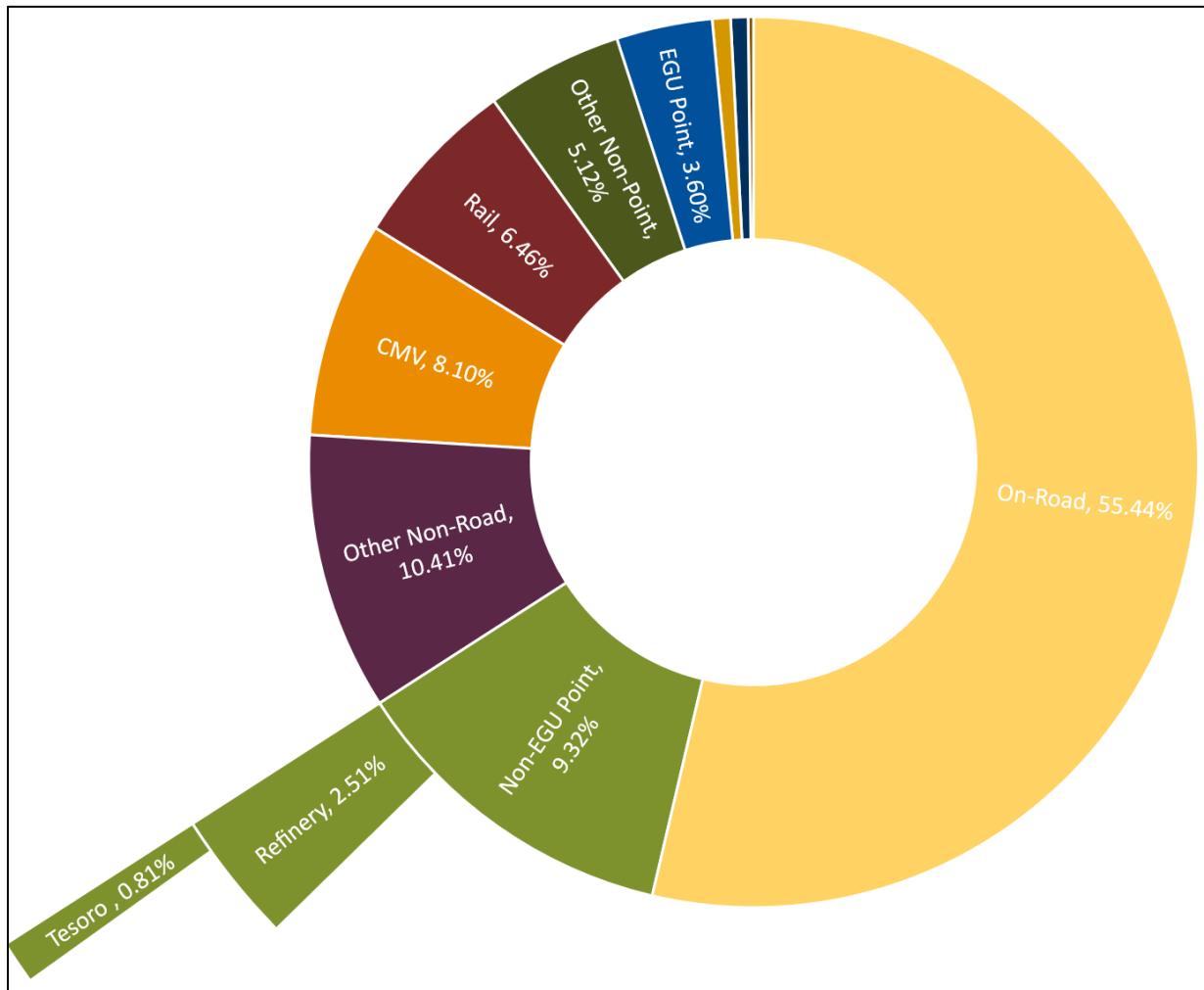


Figure 4 Summary of Draft RH SIP's Representation of NO_x Emissions in Representative Baseline Year

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."

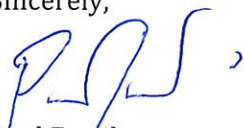
³*Id* at 36-37.

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:

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- 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

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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.