



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.

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:

- 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.