Tesoro Refining & Marketing Company LLC
A subsidiary of Marathon Petroleum Corporation

August 25, 2023

Bryce Bird
Utah Division of Air Quality
195 North 1950 West
P.O. Box 144820
Salt Lake City, Utah 84114-4820

Submitted by email to anawilliams@utah.gov and rbares@utah.gov

Subject: Response to Marathon Refinery Moderate Ozone SIP Final RACT Determination

Dear Mr. Bird,

As you know, Marathon has endeavored to provide all requested information relating to UDAQ's evaluation of control technology options for the Moderate Ozone SIP control strategy throughout the rulemaking process and will continue to do so. The State's latest request for information (the estimated total hours for startup and shutdown events per 12-month rolling period and the estimated total hours for minimum power load operations per 12-month rolling period) that we received via email on August 21, 2023 is apparently based on a determination that SCR satisfies the criteria as a viable control strategy for the Moderate ozone SIP. (While your August 21st e-mail request for the information characterizes the SCR control as being RACT, based on our subsequent conversation, I understand that UDAQ is considering the control as potentially qualifying as a "beyond RACT" control.) Although Marathon appreciates UDAQ's consideration of our detailed technical analysis that we provided on July 17, 2023 and is providing the additional requested information, we respectfully request that UDAQ provide responses to our following questions so that we can understand the context and rationale for the requested information and beyond RACT determination:

- What are the criteria that UDAQ is using to make beyond-RACT control determinations? Specifically:
    - By what date must the controls be capable of being installed to satisfy the legal requirements for a viable beyond-RACT control? In view of the fact that the applicable attainment date for the NWF NAA is August 3, 2024, we do not understand how a control that UDAQ recognizes cannot be installed until well after that date (UDAQ is proposing to require the control by October 1, 2028) can be a considered a viable control for the Moderate ozone SIP.
    - How can UDAQ require a control as part of the control strategy that it has acknowledged is not reasonably cost effective? As our comments on the proposal make clear, beyond-RACT controls must satisfy the same reasonable cost-effectiveness threshold as RACT controls.

- What is the basis for UDAQ concluding that the beyond-RACT controls are "necessary" for attainment in view of the staff's presentation to the Board representing that UDAQ has met the statutory requirements for a moderate nonattainment area demonstration without relying on the proposed beyond-RACT control?

For a more complete discussion of the points raised by these questions, please reference Marathon's legal comments submitted on the proposed Moderate ozone SIP control strategy. While Marathon very much appreciates the efforts of UDAQ to address the challenges of putting together a Moderate ozone SIP control strategy, we certainly hope that UDAQ, in turn, recognizes the potentially significant impacts that these decisions will have on Marathon.

As noted above, in continuation of our efforts to expeditiously respond to UDAQ's most recent request for information regarding startup/shutdown and minimum power load operations, we are providing the following responses.

UDAQ Request for Information: Due to increasing the timeline to a typical project schedule of approximately 5 years, the UDAQ changed capital costs back to the original Jacobs Engineering cost estimate provided in Marathon's January 2023 RACT cost analysis.

Marathon Response: Marathon believes UDAQ's revised costs should include adjustments to the capital costs due to additional progress in the engineering project since the January 31, 2023 estimate. The capital costs presented in the July 17, 2023 comment letter reflect both an adjustment for the expedited schedule for installation by May 1, 2026, as well as an adjustment due to additional progress on the project engineering. The capital costs for installation on a typical project schedule of approximately 5 years is $22.5 million. This capital cost is reflected in the revised cost analysis.

Marathon's final cost-effectiveness is $42,740/ton. The revised feasibility analysis confirms that the **costs associated with the installation of SCRs continue to remain beyond reasonable**. The calculations are enclosed as Appendix 1.

Based on this information, we request that UDAQ include the correct cost-effectiveness analysis in its analysis of economic feasibility.

UDAQ Request for Information: The estimated total hours for startup and shutdown events per 12-month rolling period.

Marathon Response: Startup and shutdown hours per turbine are not expected to exceed 614 hours per 12-month rolling period.

UDAQ Request for Information: The estimated total hours for minimum power load operations per 12-month rolling period.

Marathon Response: Minimum power load operation hours per turbine are not expected to exceed 421 hours per 12-month rolling period.

Accounting for operating conditions that affect the control effectiveness, such as minimum power load ***and extreme ambient temperatures*** is important. As detailed in Marathon's July 17, 2023 (Section II and Appendix 4) comment letter a NOx emissions limit for the cogeneration unit should correspond with the technical capability of the retrofitted SCR system. In consideration of these factors and additional technical considerations as described in our prior comments, the achievable NOx emissions at the cogeneration units after an SCR retrofit is 5 ppmvd at 15% dry mole percent of excess oxygen **on a 12-**

month rolling average basis. This performance level applies to an operating load of at least 50% and an ambient air temperature greater than 0°F and less than 120°F.

The NOx levels from the gas turbine generator (GTG) increase substantially at extreme ambient temperature conditions (less than 0 degrees or greater than 120 degrees Fahrenheit, °F) and at minimum load conditions (less than 50% load). At temperature extremes and minimum loads, the SoLoNOx burner emissions control system must be controlled differently to assure stable operation per the original equipment manufacturer (OEM) design requirements.

Again, while we do not believe that SCR controls for the cogens satisfies the legal criteria for a viable control strategy under the Moderate ozone SIP (whether as RACT or beyond-RACT), any imposition of such controls in the future must account for startup, shutdown, temperature extremes and minimum load conditions. For example, the markup below shows how the proposed SIP condition would need to be revised to account for these considerations:

Part H.32.j.b.i

1. Pollutant NOx — ppmdv (15% O_2 dry), based on a 12-month rolling average — 5

...

4. The above emission limits apply to steady state operations when ambient temperature is between 0 °F and 120 °F, not including startup, shutdown, and minimum power load operations.

i. Startup / Shutdown / Minimum Power Load Emission Minimization Plan

1. Startup and shutdown events shall not exceed 614 hours per 12-month rolling period per turbine.

2. Cumulative minimum power load operations shall not exceed 421 hours per 12-month rolling period per turbine.

Cogeneration Unit NOx emission limits adopted in the SIP must correspond with the technical capability of the retrofitted SCR system as presented above.

Marathon stands ready to meet its obligations but must, of course, understand the basis and correctness of those obligations. We look forward to your response to our questions posed above.

Sincerely,

for Wesley Waida
Environmental, Safety and Security Manager

Cc:

Ana Williams, UDAQ
Jon Black, UDAQ
Becky Close, UDAQ
Ryan Bares, UDAQ
Joe Thomas, UDAQ

Appendix 1 — August 25, 2023 Revised Cogeneration Unit SCR Control Cost Analysis

Marathon Revised Cogeneration Unit SCR Control Cost Analysis - Updated by UDAQ (8/21/23), Marathon (8/25/23)

Control Equipment Costs	Value	Notes
Total Capital Investment	**$25,364,000**	Sum of total capital investment
Capital Costs	$22,500,000	Changed back to original Jacobs quote from 1/31/23 RACT analysis MPC note: revised to $22.5 million based on C&I engineering estimate used for 7/17/23 public comment, which does not include escalation for 5/1/26 installation schedule.
Temporary Boiler	$2,000,000	From 7/17/23 public comment
Electricity Costs (Installation)	$864,000	From 7/17/23 public comment
Total Direct Annual Costs	**$508,238**	Sum of direct annual costs
Maintenance	$126,820	Updated based on changed capital costs
Operator	$87,600	From 7/17/23 public comment
Reagent	$8,933	From 7/17/23 public comment
Utilities	$62,776	From 7/17/23 public comment
Catalyst Replacement	$222,109	From 7/17/23 public comment
Indirect Annual Costs	**$4,460**	Sum of indirect annual costs
Administration Costs	$4,460	From 7/17/23 public comment
Total Annual Costs	**$512,698**	Sum of direct and indirect annual costs

Equation 1: $$A = \frac{B + C}{D}$$

Equation 2: $$B = PV\left\{\frac{i}{1 - (1 + i)^{-n}}\right\}$$

Annualized Costs Parameters	Value	Notes
Interest Rate {i}	8.25%	From 7/1/23 public comment
Lifespan in Years {n}	25	From 7/1/23 public comment
Total NOx Reduction, tons {D}	68.78	From 7/1/23 public comment

Cogeneration Unit SCR Control Costs	
Capital Cost, $ {PV}	$25,364,000
Annualized Equipment Cost, $ {B}	$2,427,013.38
Annual Operation and Maintenance Cost, $ {C}	$512,698
Total NOx Reduction, tons {D}	68.78
Annualized Cost, $/ton {A}	**$42,740.79**