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

July 17, 2023

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Submitted by email to epryor1@utah.gov and rbares@utah.gov.

Subject: Comments on Amendments to R-307-110-13, Incorporation of Utah State Implementation Plan, Section IX.D.11: 2015 Ozone NAAQS Northern Wasatch Front Moderate Nonattainment Area, and Incorporation of Utah State Implementation Plan, Section IX.H.31 and Section IX.H.32: Emission Limitations and Operating Practices, R-307-110-17.

Dear Mr. Bird,

Tesoro Refining & Marketing Company LLC d/b/a Marathon Salt Lake City Refinery (Marathon) is providing these comments in response to the Utah Division of Air Quality (UDAQ)'s draft amendments to the Utah State Implementation Plan (SIP) to add requirements for moderate ozone nonattainment areas (adding Subsections IX.D.11, IX.H.31, and IX.H.32 published on June 1, 2023.[1] Marathon previously submitted comments on draft determinations for Reasonably Available Control Technology (RACT) in its letter to UDAQ dated March 16, 2023, enclosed as Appendix 1. Appendix 1 also incorporates comments submitted on February 2, 2023, and March 10, 2023, by the Utah Petroleum Association (UPA) regarding UDAQ's preliminary RACT determinations for petroleum refineries in the Northern Wasatch Front (NWF) ozone nonattainment area.[2]

As background, at UDAQ's request, Marathon performed a RACT analysis for NO_X and VOCs for the Salt Lake City Refinery for the purpose of determining potential RACT measures to be included in the Moderate Ozone SIP. As noted in the analysis, the installation of selective catalytic reduction (SCR) technology at the cogeneration units is not an economically feasible control option. Further, it is impossible to install and operate prior to EPA's RACT implementation date of January 1, 2023[3], or by the attainment date of August 3, 2024. As detailed in the draft Moderate Ozone SIP, UDAQ intends to require the installation of SCR technology on the Salt Lake City Refinery's cogeneration unit for the reduction of oxides of nitrogen (NO_X) emissions as a "beyond-RACT" requirement. UDAQ has not provided an appropriate legal, technical, or economic basis for its conclusion, as described in these comments.

[1] Utah State Bulletin, June 1, 2023, Vol. 2023, No. 11
[2] Marathon is a member company of UPA.
[3] 87 FR 60897, *Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as Marginal for the 2015 Ozone National Ambient Air Quality Standards* ("DAAD"), p. 60907/1

In addition to the comments in this letter, Marathon endorses and incorporates the comments submitted on July 17, 2023 by the Utah Petroleum Association (UPA) as Appendix 2. UPA's comments highlight several deficiencies in the draft Moderate Ozone SIP, including concerns regarding model performance, failure to meet reasonable further progress in volatile organic compound (VOC) emissions, requirements for contingency measures, in addition to the concerns highlighted in this letter regarding the legality and technical basis of beyond-RACT requirements.

I. SUMMARY OF LEGAL ANALYSIS

UDAQ has misconstrued the Clean Air Act's (or "Act") authority for imposing beyond-RACT control measures in fundamental ways. This has led UDAQ to, by its own admission, disregard the economic feasibility or reasonableness of the control measures it has proposed pursuant to the Act's beyond-RACT authority. In fact, UDAQ has acknowledged that the cost effectiveness of the beyond-RACT control it is proposing for Marathon's cogeneration units (SCR) exceeds what it deems to be reasonable. But as explained below, disregarding the economic feasibility of control measures is contrary to the Clean Air Act. EPA has made clear that beyond-RACT controls must be reasonable; that is, cost effective.

Additionally, UDAQ has acknowledged that SCR controls cannot be installed by the attainment-date deadline of August 3, 2024. Again, EPA has made clear that this is a fundamental criterion for beyond-RACT controls.

Furthermore, even if the beyond-RACT controls proposed for Marathon's cogens were deemed to be economically feasible and could be implemented by the attainment-date deadline, UDAQ has failed to show that such controls are necessary for expeditiously attaining the NAAQS. In fact, while UDAQ acknowledges that such a showing is required, it also acknowledges that it has not evaluated the affect the proposed beyond-RACT controls would have on ambient ozone concentrations, contrary to the requirements of the Act. Additionally, UDAQ has asserted that it has made a strong and compelling attainment demonstration that does not rely on the proposed beyond-RACT controls, belying any claim that such controls are, in fact, necessary.

Finally, UDAQ's Proposed SIP does not comply with the mandatory Reasonable Further Progress (15% VOC reduction) requirement that is a prerequisite to the State being able to impose beyond-RACT controls.

Refer to Appendix 3 for the detailed legal analysis.

II. THE PROPOSED EMISSION LIMIT OF 2 PPMV AT 15% O2 CANNOT BE ACHIEVED

Marathon has completed a technical evaluation of the feasibility and performance level for NOx emissions at the existing East (CG-1) and West (CG-2) cogeneration units if they are retrofitted with an SCR system. Based on a review of previous emissions testing reports, an engineering analysis of the entire cogeneration system, and the technical evaluation of the emissions reduction capability of an SCR by CECO Peerless (Peerless), the 2 ppmvd NOx limit is not achievable as a compliance limit for all of the cogeneration unit's operating conditions. Key technical constraints to meeting this limit at all times include the following:

1. Extreme temperature or low load conditions. 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 low load conditions (less than 50% load). At cold temperature extremes and low loads, the SoLoNOx burner emissions control system must be controlled differently to assure stable operation per the original equipment manufacturer (OEM) design requirements.

2. Available SCR footprint at these cogeneration units. The available physical space at the existing cogeneration units establishes the size of the SCR system, restricting the location of the ammonia injection grid and the catalyst bed volume and spacing.
3. Higher NOx generation and potential ammonium bisulfate generation from refinery fuel gas combustion. Refinery fuel gas supplied to the duct burners associated with the GTG is variable in composition and heat content. Additional NOx is generated at the duct burners when the fuel gas contains higher relative levels of hydrogen concentration or fuel heat content, resulting in greater NOx generation to the SCR than a typical natural gas-fired GTG. Limiting ammonia slip to 5 ppmvd constrains the NOx control efficiency of the SCR during these conditions. Additionally, the refinery fuel gas contains sulfur, some of which oxidizes to sulfur trioxide and will form ammonium bisulfate (ABS) in the presence of ammonia. The ABS will embed onto the SCR catalyst surface, thus deteriorating NOx reduction performance.
4. Catalyst fouling, masking, and age degrade control efficiency over time. Even with proper design, fouling and poisoning will increase over time, and active catalyst sites become inactive.

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 described in this paper, 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.

If UDAQ continues to require installation of an SCR system, the requirements must be revised to reflect what is achievable. Additionally, the requirements must cover time periods outside of normal operation consistent with precedent set in Section IX, Part H, Subsections H.2 and H.12 of the Utah SIP. Marathon proposes the following revisions to language in H.32.j:

b. Cogeneration Turbines with Heat Recovery Steam Generation CG1 & CG2:

i. Emissions to the atmosphere from the cogeneration turbines with heat recovery steam generation CG1 and CG2 shall not exceed the following concentration no later than May 1, 2026:

1. Emissions of NOx from each stack shall not exceed 5 ppmvd (@ 15% O2, dry) based on a 12-month rolling average. This limitation applies to steady state operation, occurring when there is an operating load of at least 50%, an ambient air temperature greater than 0°F and less than 120°F, and not including startup and shutdown.

~~Pollutant ppmdv (15% O2 dry)~~
~~NOx 2~~

2. Compliance with the above emissions limits shall be determined by stack test as outlined in SIP Section IX Part H.31.f.

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

i. Startup begins when the fuel valves open and natural gas or fuel gas is supplied to the combustion turbines.

ii. Startup ends when the following conditions are met: SCR inlet gas temperature is at least 575 F, the ammonia block valve has opened and ammonia is being injected into the SCR, and the unit has reached an output of 50% operating load.
iii. Shutdown begins when the unit load or output is reduced below 50% operating load with the intent of removing the unit from service.
iv. Shutdown ends at the cessation of fuel input to the turbine combustor.
v. Minimum Power Load begins when the turbine generator is less than 50% operating load, the heat recovery steam generation unit is no longer supplemental fired, and the SCR remains operational with the intent to continue operation of the turbine generator at minimum power make.
vi. Minimum Power Load ends when the turbine generator is greater than 50% operating load.
vi. Turbine output (turbine load) shall be monitored and recorded on an hourly basis with an electrical meter.

The detailed technical analysis is enclosed as Appendix 4.

III. SCR Is Not "Reasonable"/Economically Feasible

As detailed in Appendix 3, UDAQ forthrightly acknowledges that the proposed SCR controls for Marathon's cogens are not economically feasible and, for this reason, rejects those controls as qualifying as RACT.[4] Additionally, the assessment of economic feasibility for a control is the same for beyond-RACT as it is for RACT. Marathon's preliminary cost analysis for SCR installation at the cogeneration systems determined a cost-effectiveness of $23,600/ton, **almost four times** what is typically considered RACT.[5] Since the submittal of the preliminary cost analysis, Marathon has performed additional engineering analysis to improve the accuracy of the cost-effectiveness estimate and determined a cost-effectiveness of $50,300/ton. Revisions to the cost-effectiveness analysis included:

- Adjustment of the capital costs to reflect an implementation deadline of May 1, 2026. Based on early project development, the capital cost of this project is expected to be $27.7 million, compared to the original estimate of $18.3 million.[6] This update value is based on a typical cost-driven project parameters. The cost was originally developed assuming a typical project schedule of 59 months to startup. This duration is aligned with industry benchmarking data for similarly sized capital revamp projects for refineries in the Mountain-West region.[7] However, the revised capital cost estimate assumes startup by May 1, 2026. To accelerate the schedule beyond industry standard introduces additional cost and schedule risk. The additional costs include increased overtime required for engineering and construction, expediting fees on major equipment deliveries, increased number of engineering staff supporting the project, increased travel for collaboration and co-location for engineering and vendor support, and a decrease in costs due to reduced escalation.

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[4] *See* Proposed SIP at 73-74.
[5] In fact, this cost would significantly exceed cost effectiveness levels typically used for making BACT determinations, as also shown in the February 2023 letter.
[6] See p. 71 of Utah State Bulletin, June 1, 2023, Vol. 2023, No. 11. However, the fiscal analysis does not include the costs for installing a secondary seal on Tank 321 or for replacing the refinery's wastewater API separator and Dissolved Air Flotation unit with a new system equipped with a closed vent system to an activated carbon adsorption control system.
[7] Marathon obtains industry benchmarking data from Independent Project Analysis (IPA), specifically IPA CEC 2016.

- Inclusion of costs for the use of temporary boiler(s) to replace the steam production of the units during SCR installation. The cogeneration units at the refinery are the primary source of electricity and steam for the refinery. Planned outages of these units for a major project, such as SCR installation on the turbines, require safe, reliable backups for supplying power and steam to the refinery.
- Inclusion of purchased electricity costs during SCR installation to replace the lost on-site production of power.
- Inclusion of operator labor costs consistent with the EPA control cost manual.
- Revised bank prime rate consistent with the current market.
- Revised controlled emission rate of 5 ppmv NO_x at 15% O_2, as described above in the Section II of this letter.

The revised cost-effectiveness analysis confirms that costs are beyond reasonable. The calculations are enclosed as Appendix 5.

IV. SCR Is Not Necessary For Attainment

As detailed in Appendix 2, UPA contracted Ramboll to evaluate the modeling completed by UDAQ and to evaluate the impact of emissions controls required under beyond-RACT. Operation of the emissions controls required under beyond-RACT result in a combined[8] reduction of only 0.03 ppb ozone, which would not have a significant impact on the attainment demonstration even if included in UDAQ's model. Refer to UPA's comment letter enclosed as Appendix 2 for supporting details.

In addition to the analysis performed by Ramboll and UPA, Marathon notes that UDAQ's modeling over-estimated Marathon's impacts from NOx emissions because UDAQ did not appropriately consider emission limits on Marathon's Fluidized Catalytic Cracking Unit. Marathon installed a wet gas scrubber with LoTOx emission controls in late 2017 with startup in January 2018, which reduced NOx emissions by 98 tpy compared to the uncorrected 2017 baseline.[9] Marathon also notes that the baseline appears to include major sources outside of the nonattainment area, apparent by comparing Table 7 with Table 4 of the SIP. Correction of these emission rates will support a more accurate modeling analysis.

V. Marathon is Committed to Reducing Emissions as Demonstrated by its Voluntary Measures

As UDAQ is aware, Marathon is committed to improving air quality. Marathon has demonstrated this commitment through emission reduction projects such as the following:

- Upgraded the refinery to produce U.S. EPA's Tier 3 fuels to the Salt Lake market, which contributed to reducing NO_X, VOCs, $PM_{2.5}$, SO_2 and other air toxics in Utah, setting an example for other refineries to follow.
- Installed a wet gas scrubber and LoTOx air pollution control system on the Fluidized Catalytic Cracking Unit, which reduced NO_X and SO_2 emissions
- Installed Ultra Low NO_X Burners on the F-1 Furnace, which reduced NO_X emissions
- Installed a Tail Gas Treatment Unit on the Sulfur Recovery Unit, which reduced SO_2 emissions

[8] Combining emission reductions from Tesoro/Marathon (NOx and VOC) and Chevron (NOx) with source apportionment results, we find that the total simulated 2023 ozone DV reduction from required refinery controls is 0.03 ppb at Hawthorne.

[9] 2017 baseline emissions were 127.48 tpy NOx, compared to a potential-to-emit after installation of LoTOx of 29.48 tpy NOx.

- Upgraded flare gas recovery with compressor availability limits, combustion efficiency requirements, and flare volume caps, which results in VOC and NO_X emission reductions
- Upgraded multiple storage tanks at the refinery by installing guidepole controls, retrofitting storage tanks with internal floating roofs, replacing cone roofs with geodesic dome tanks, and controlling tank degassing emissions with a portable thermal oxidizer, which significantly reduced VOC emissions.

In addition to these projects, Marathon will be replacing the refinery's wastewater API separator and Dissolved Air Flotation unit with a new system equipped with a closed vent system to an activated carbon adsorption control system. This upgrade project will reduce VOC emissions by approximately 10 tons per year and is projected to be completed in 2025.

VI. RECOMMENDED PATH FORWARD

As detailed above, where UDAQ's proposed requirements for Marathon as detailed in its draft Moderate Ozone SIP will not advance the goal of attainment of the ozone standard and does not meet the legal and regulatory standards for the SIP, UDAQ's preliminary determination of beyond-RACT controls of SCR at the cogeneration turbines, secondary seals at Tank 321, and replacement of the refinery's wastewater API separator and Dissolved Air Flotation unit is not correct and we respectfully request that UDAQ remove these draft SIP requirements.

Sincerely,

Wes Waida

Wesley Waida
Environmental, Safety and Security Manager

Cc:

Bryce Bird, UDAQ
Ana Williams, UDAQ
Jon Black, UDAQ
John Jenks, UDAQ

Appendix 1 – March 16, 2023 letter from Marathon to UDAQ *(Document page number starting 7)*
Appendix 2 – July 17, 2023 UPA letter to UDAQ *(Document page number starting 32)*
Appendix 3 – Detailed Legal Comments on the Draft Ozone SIP *(Document page number starting 109)*
Appendix 4 – Cogeneration Unit SCR Technical Evaluation *(Document page number starting 130)*
Appendix 5 – Revised Cogeneration Unit SCR Control Cost Analysis *(Document page number starting 149)*

Appendix 1 — March 16, 2023 letter from Marathon to UDAQ

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

March 16, 2023

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

Submitted by email to bbird@utah.gov

Subject: Moderate Ozone Nonattainment SIP
UDAQ's Preliminary RACT Determination for Tesoro Refining & Marketing Company LLC d/b/a Marathon Salt Lake City Refinery

Dear Mr. Bird,

Tesoro Refining & Marketing Company LLC d/b/a Marathon Salt Lake City Refinery (Marathon) is providing this submittal in response to UDAQ's preliminary RACT (Reasonably Available Control Technology) determinations, as communicated to Marathon via email dated February 22, 2023, and subsequent verbal discussions. As noted in this submittal, Marathon believes UDAQ's proposed RACT determination does not meet the legal and regulatory standards for RACT. As noted in UDAQ's communication, it is our understanding that UDAQ intends to require the installation of a selective catalytic reduction (SCR) technology on the Salt Lake City Refinery's cogeneration unit for the reduction of oxides of nitrogen (NOx) emissions. Marathon provides the following reasons why including this requirement as RACT within the Moderate Ozone Nonattainment SIP is not appropriate at this time.

As background, at UDAQ's request, Marathon performed a RACT analysis for NOx and VOCs for the Salt Lake City Refinery for the purpose of determining potential RACT measures to be included in the Moderate Ozone State Implementation Plan (SIP). As noted in the analysis, the installation of SCR at the cogeneration units is not an economically feasible control option with a cost-effectiveness of nearly $24,000 / ton. Further, it is impossible to install and operate prior to EPA's implementation date of January 1, 2023[1], or by an alternative proposed date of the summer of 2026. UDAQ has not provided any technical or cost basis for its conclusion, has not established a consistent threshold for economic feasibility across the industrial sectors within the region, and has not provided Marathon with enough time to vet a realistic implementation timeline for the controls.

[1] 87 FR 60897, *Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as Marginal for the 2015 Ozone National Ambient Air Quality Standards* ("DAAD"), p. 60907/1

In other words, UDAQ has established a deadline prior to receiving information on the realities of when the controls could actually be installed. Additionally, UDAQ provided only six days for Marathon to provide this information which, for the reasons discussed below, is not possible.

In addition to the comments in this letter, Marathon endorses and incorporates by reference the comments submitted on February 2, 2023, and March 10, 2023, by the Utah Petroleum Association (UPA) regarding UDAQ's preliminary RACT determinations for petroleum refineries in the Northern Wasatch Front (NWF) ozone nonattainment area.[2]

UDAQ's RACT Determination Proposed for SCR on the Cogeneration Turbines at Marathon SLC Refinery Does Not Comply with the Requirements of the Federal Clean Air Act and Corresponding Regulations

The federal Clean Air Act (CAA) and SIP rules for the ozone National Ambient Air Quality Standards ("NAAQS") call for the Moderate SIP to contain three major elements potentially affecting emissions controls at stationary sources in moderate areas:

1. RACT, as referenced by UDAQ;[3]
2. Attainment demonstration that provides for such specific reductions in emissions as necessary to attain the primary NAAQS by the applicable attainment date;[4] and
3. Reasonable further progress (RFP) for 15 percent reductions of VOC emissions.[5]

The regulations for procedural requirements for SIPs define RACT as follows:

> *Reasonably available control technology (RACT) means devices, systems, process modifications, or other apparatus or techniques* ***that are reasonably available*** *taking into account:*
>
> *(1) The necessity of imposing such controls in order to attain and maintain a national ambient air quality standard;*
>
> *(2) The social, environmental, and economic impact of such controls; and*
>
> *(3) Alternative means of providing for attainment and maintenance of such standard. (This provision defines RACT for the purposes of § 51.341(b) only.)*[6] [emphasis added]

An important aspect of this definition is that the controls be *reasonably available*. Rather than applying the regulatory RACT criteria, UDAQ appears instead to have acted in an arbitrary, ad hoc manner to impose controls under the guise of RACT. One of the hallmarks of administrative rulemaking is that an agency such as UDAQ provides a reasoned explanation for its proposed action. UDAQ has done no such thing; instead, simply announcing its conclusion that Marathon install SCR without providing any supporting rationale.

The NOx Supplement to the General Preamble indicates that "decisions on RACT may be made on a case-by-case basis, considering the technological and economic circumstances of the individual

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[2] Marathon is a member company of UPA.
[3] 40 CFR 51.1312
[4] 40 CFR 51.1308(a)
[5] 40 CFR 51.1310(a)(4)
[6] 40 CFR Part 51 Subpart F Procedural Requirements §51.100(o).

source."[7] UDAQ has not provided any explanation for why SCR is considered RACT for the cogeneration turbines. This is especially concerning in view of the information that Marathon has provided UDAQ, which rebuts such a conclusion.

SCR cannot be considered to constitute RACT because it cannot be installed by the requisite RACT Deadline for the Moderate Ozone SIP

A key consideration for making RACT determinations is the timing for the installation of a candidate control. It is, obviously, not possible to install and operate SCRs at the refinery prior to the regulatory deadline of January 1, 2023. In EPA's recently published "Determination of Attainment by Attainment Date ("DAAD") for the 2015 ozone NAAQS," the Agency established an installation deadline of January 1, 2023, for installation of all VOC and NOx RACT controls under a Moderate SIP. EPA states specifically:

> *SIP revisions required for the newly reclassified Moderate areas must be submitted no later than **January 1, 2023**, and RACM/RACT for these areas must be implemented as expeditiously as practicable, but **no later than the same date**.*[8, 9] [emphasis added]

Therefore, since the regulatory deadline for having RACT controls installed by January 1, 2023, has passed, the installation of SCRs cannot be considered RACT for the Moderate SIP.[10]

Marathon's Cost Per Ton of Emissions Reductions Far Exceeds RACT Cost-Effectiveness Threshold

Cost-effectiveness has long been a key criterion in making determinations of what controls are appropriate under various CAA programs such as Best Available Control Technology (BACT) for Prevention of Significant Deterioration (PSD) review, BACT for SIPs, RACT for SIPs and the Regional

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[7] 3 57 FR 55624/3.

[8] 87 FR 60897, *Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as Marginal for the 2015 Ozone National Ambient Air Quality Standards* ("DAAD"), p. 60907/1.

[9] This RACT installation date set in the DAAD comports with the requirements of the SIP implementation rule for the 2015 ozone standard:

> *For RACT required pursuant to reclassification, the state shall provide for implementation of such RACT as expeditiously as practicable, but **no later than the start of the attainment year ozone season associated with the area's new attainment deadline**, or January 1 of the third year after the associated SIP revision submittal deadline, **whichever is earlier; or the deadline established by the Administrator in the final action issuing the area reclassification**.* (40 CFR Part 51 Subpart CC §51.1312(a)(3)(ii)) [emphasis added]

EPA initially designated the NWF as nonattainment in 2018 with an effective date of August 3, 2018 (83 FR 25776). Based on the effective initial designation date, the attainment date for the NWF at Moderate is six years later, in other words August 3, 2024 (See Table 1 of 40 CFR §51.1303). EPA considers the "attainment year" to be the last full calendar year prior to the attainment date, and thus 2023 is the attainment year for the NWF at Moderate. Thus, the installation date for RACT for the NWF, per the 2015 ozone NAAQS implementation rule, must be set no later than the start of the ozone season in 2023. The date set in the DAAD for RACT installation – January 1, 2023 – comports with the SIP implementation requirements.

[10] Furthermore, even assuming that UDAQ had a basis for ignoring the legal deadline for RACT installation, the arbitrary summer of 2026 deadline that it has specified is flawed for several reasons. First, we are unaware of any analysis – certainly not by Marathon – that has been completed to determine if the installation of SCR could, in fact, be accomplished by that deadline. The engineering, design, procurement, contracting, and scheduling associated with such significant projects is extensive and, at present, there is no basis for concluding that UDAQ's summer 2026 deadline is feasible.

Haze Program, Maximum Achievable Control Technology (MACT) under the hazardous air pollutant program, and Lowest Achievable Emission Rate (LAER) under the major nonattainment New Source Review (NSR) program. Generally, states have made decisions on RACT cost-effectiveness thresholds by evaluating the cost (dollars) per ton of emission reduced and comparing that to a threshold value deemed to be economically reasonable.

As explained in UPA's February 2, 2023 letter to UDAQ, the maximum cost-effectiveness threshold indicated for ozone RACT should be no greater than $5,000 to $7,500 per ton of emission reduced (copy of February letter attached).[11] UDAQ itself recently stated, "physical controls are not cost-effective at a $5,750/ton level is in line with the range considered by other states."[12] Controls with cost-effectiveness higher than these levels cannot be considered to be *reasonably available*.

Marathon's preliminary cost analysis for SCR installation at the cogeneration systems determined a cost-effectiveness of $23,600/ton, **almost four times** what is typically considered RACT.[13] Moreover, Marathon's preliminary cost analysis was prepared on an expedited basis to meet UDAQ's rushed process and thus does not include such costs associated with the construction and operation of SCRs.[14]

Additionally, when estimating the cost-effectiveness, the RACT analysis conservatively assumed an annual performance level of 2 ppmv NOx at 15% O_2 based on EPA determinations for BACT for natural gas-fired turbines. As a result, this performance level does not incorporate emission guarantees from a vendor, which are typically provided during the engineering phase. In addition, Marathon's cogeneration turbines are fired on refinery fuel gas, which does not have the same NOx performance as firing on natural gas. Refinery fuel gas has components such as hydrogen, propane, butane, and other heavier hydrocarbons that produce more NOx emissions than natural gas. Finally, any limits established would need to consider the emission impacts from operational scenarios such as turndown, startup, and shutdown.

UDAQ has offered no explanation of how it determined such a high cost-effectiveness level to be an acceptable threshold for RACT. While we understand that UDAQ may be reluctant to offer an exact cost-effectiveness threshold, there must be some reasonable, upper-bound cost-effectiveness that guides its decision-making. We find no other examples of RACT determinations approaching this cost-effectiveness threshold. Moreover, setting the cost-effectiveness level this high – and significantly higher than other similarly-situated states – sets a very bad precedent for Utah. Such a precedent will discourage businesses and industry from relocating to Utah or from investing further within Utah due to the high costs of emission controls.[15] The precedent would carry into future SIPs and even into minor NSR BACT determinations for air permitting and could spread beyond the state of Utah.

In addition to the high costs, the use of SCR inherently results in ammonia slip which causes additional condensable PM emissions to be released to the atmosphere. This increase in particulate matter emissions does not appear to have been considered as part of this decision-making process.

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[11] Letter, Rikki Hrenko-Browning to Bryce Bird, *Criteria for Selection of Reasonably Available Control Technology*, February 2, 2023 ("February 2023 Letter")

[12] *See* Utah Air Quality Board Meeting, July 6, 2022 (https://documents.deq.utah.gov/air-quality/board/2022/DAQ-2022-008950.pdf#page=300).

[13] In fact, this cost would significantly exceed cost effectiveness levels typically used for making BACT determinations, as also shown in the February 2023 letter.

[14] Marathon did not believe that a more complete accounting of such costs were necessary since even the initial estimate was so much higher than the cost effectiveness levels typically understood to constitute RACT.

SCR Installation Will Not Advance the Goal of Attainment of the Ozone Standard

UDAQ has also not shown how SCR installation at the cogeneration turbines at Marathon Salt Lake City Refinery would contribute to emissions reductions needed to bring the area into attainment by August 3, 2024. As noted above, the definition of RACT specifically requires that UDAQ consider "[t]he necessity of imposing such controls in order to attain and maintain a national ambient air quality standard." UDAQ has not shown if or how the controls in the RACT determinations would support the attainment demonstration at Moderate. In fact, UDAQ even identified during its February 15, 2023, industry stakeholder meeting that they can provide a successful attainment demonstration by accounting for the combination of exceptional events and international emissions. Therefore, while not RACT, SCR also is not necessary for the attainment demonstration.

Installation of SCR on the Cogeneration Turbines is not Feasible by Summer 2026

One of our significant concerns during this rulemaking process pertains to UDAQ's unrealistic requirement that SCR Turbine controls be installed by the summer of 2026. If UDAQ were to require installation of SCR at the cogeneration unit's turbines at the Marathon Salt Lake City Refinery despite SCR not being RACT, it is imperative that UDAQ understand a timeline of 3 years to install SCRs at the refinery is infeasible based on industry benchmarking data for similarly sized capital projects. UDAQ has not considered the significant amount of planning and safety considerations and complexity that is involved when designing for the installation of this type of emissions control technology. Additionally, as a result of UDAQ's fast-track schedule for developing its Moderate Ozone SIP, Marathon has not had adequate time to assess and confirm such elements as technical designs, operational costs, emissions performance, and other data/information that typically get confirmed through the company's detailed engineering process.

The cogeneration units at the refinery are the primary source of electricity and steam for the refinery. Planned outages of these units for a major project, such as SCR installation on the turbines, require safe, reliable backups for supplying power and steam to the refinery. Thus, during the installation of controls at the cogeneration turbines, the use of temporary boiler(s) to replace the steam production of the units would be required. Additionally, Marathon must purchase electricity from the grid to replace the lost on-site production of power. There is also no existing infrastructure for ammonia receipt, storage, and usage. Accounting for each of these complexities, as well as other details that still need to be determined during the detailed design, will not only significantly extend the time period for the design and implementation of the project but also increase costs.

To demonstrate why it is not feasible for Marathon to complete a major project like SCR installation within 3 years, we have provided an overview of the company's project development process. To ensure that major projects are developed and implemented in a safe and reliable manner and to ensure safe and optimal long-term operations of a large capital project, Marathon follows a strict project development process. This process follows a set of proven methods and tools for planning and executing projects, and Marathon requires all major engineering projects to adhere to this framework. Projects designed and implemented under this framework go through multiple phases to divide projects into smaller logical units to increase manageability. The six phases include, chronologically, a conceptual, feasibility, definition, detailed design, procurement, construction, and startup phase. Based on the duration of time attributed to each phase established by industry benchmarking data for similarly sized capital projects, a major engineering project can take up to 5 years to complete.[16]

[16] Marathon obtains industry benchmarking data from Independent Project Analysis (IPA).

UDAQ itself has stated that it "believes in its mission of improving air quality through balanced regulation, and is committed to continued work with the EPA through the SIP process. Reasonable controls **require reasonable timelines and cooperation from co-regulators** including timely and co-beneficial actions to reduce emissions under federal jurisdiction."[17] (emphasis added). Therefore, where the engineering, design, procurement, contracting, and scheduling associated with such significant projects is extensive, there is no basis for UDAQ to conclude that installation of SCR on the Turbines at the refinery by summer 2026 deadline is reasonable.

Marathon is Committed to Reducing Emissions as Demonstrated by its Voluntary Measures

As UDAQ is aware, Marathon is committed to improving air quality. Marathon has demonstrated this commitment through emission reduction projects such as the following:

- Upgraded the refinery to produce U.S. EPA's Tier 3 fuels to the Salt Lake market, which contributed to reducing NOx, VOCs, $PM_{2.5}$, SO_2 and other air toxics in Utah, setting an example for other refineries to follow.
- Installed a wet gas scrubber and LoTOx air pollution control system on the Fluidized Catalytic Cracking Unit, which reduced NOx and SO2 emissions
- Installed Ultra Low NOx Burners on the F-1 Furnace, which reduced NOx emissions
- Installed a Tail Gas Treatment Unit on the Sulfur Recovery Unit, which reduced SO_2 emissions
- Upgraded flare gas recovery with compressor availability limits, combustion efficiency requirements, and flare volume caps, which results in VOC and NOx emission reductions
- Upgraded multiple storage tanks at the refinery by installing guidepole controls, retrofitting storage tanks with internal floating roofs, replacing cone roofs with geodesic domes, and controlling tank degassing emissions with a portable thermal oxidizer, which significantly reduced VOC emissions.

In addition to these projects, Marathon will be replacing the refinery's wastewater API separator and Dissolved Air Flotation unit with a new system equipped with a closed vent system to an activated carbon adsorption control system. This upgrade project will reduce VOC emissions by approximately 10 tons per year and is projected to be completed in 2025.

[17] UDEQ Letter to U.S. EPA, Docket ID No. EPA-HQ-OAR-2021-0742, Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as Marginal for the 2015 Ozone National Ambient Air Quality Standards (June 16, 2022).

Conclusion

As detailed above, where UDAQ's proposed RACT determination for Marathon will not advance the goal of attainment of the ozone standard and does not meet the legal and regulatory standards for RACT, UDAQ's preliminary determination that SCR at the cogeneration turbines is RACT is not correct and we respectfully request that UDAQ reconsider this preliminary determination prior to engaging in further rulemaking efforts.

Sincerely,

Wes Waida

Wesley Waida
Environmental, Safety and Security Manager

Cc:
Ana Williams, UDAQ
Jon Black, UDAQ
John Jenks, UDAQ

Attachment 1 – UDEQ February, 22, 2023 email to Marathon
Attachment 2 – February 2, 2023 UPA letter to UDEQ
Attachment 3 – March 10, 2023 UPA letter to UDEQ

Attachment 1 – UDEQ February, 22, 2023 email to Marathon

Bujdoso, Michelle D.

From: Ana Williams <anawilliams@utah.gov>
Sent: Wednesday, February 22, 2023 5:56 PM
To: Bujdoso, Michelle D.
Cc: Jon Black; Sarah Foran
Subject: [EXTERNAL] Moderate Ozone RACT Analysis Submittal

Hi Michelle,

UDAQ has completed the review of Tesoro dba Marathon Refinery's RACT submission. After evaluating, UDAQ has determining the following additional control technologies are considered RACT for the following emission units:

- Cogeneration Turbines: the installation of SCR

UDAQ is moving forward with this RACT determination and will begin writing the technical support documents and Part H Conditions that will require installation of these controls by Summer, 2026. We request the following information no later than Tuesday, February 28th:

1. The implementation timeline to install SCR on the Cogen Turbines.

Please feel free to contact me if you have any questions or need any clarification.

Thank you,

Ana Williams | Environmental Engineer | NSR Major Source

Phone: 385.306.6505

Website | Blog | Twitter | Facebook | LinkedIn

Attachment 2 – February 2, 2023 UPA letter to UDEQ

Utah Petroleum Association

6905 S. 1300 E. #288, Cottonwood Heights, UT 84047-1817

FUELING UTAH'S GROWTH & PROSPERITY

February 2, 2023

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

Submitted by email to bbird@utah.gov

Subject: Criteria for Selection of Reasonably Available Control Technology

Dear Bryce:

In a recent meeting between the Utah Petroleum Association (UPA) and staff members from the Utah Division of Air Quality (UDAQ), we discussed the question of objective criteria for establishing cost-effectiveness thresholds in Reasonably Available Control Technology (RACT) for the ozone Moderate State Implementation Plan (SIP). Staff were not certain how the RACT cost-effectiveness thresholds would be established for the case-by-case facility RACT analyses.

RACT cost-effectiveness thresholds should be selected on objective measures comparable to RACT cost-effectiveness thresholds in other jurisdictions. Towards that end, this memo summarizes some research on RACT decisions in other jurisdictions nationwide. Based on this research, ***we recommend that the RACT cost-effectiveness thresholds for the Moderate ozone SIP be selected in a range no higher than $5,000 to $7,500 per ton of emissions reduced.***

The Clean Air Act (CAA) and SIP rules for various National Ambient Air Quality Standards (NAAQS) call for implementing the RACT level of control.[1] Additionally, states often apply RACT for Regional Haze SIPs. The regulations for procedural requirements for SIPs define RACT as follows:

> *Reasonably available control technology (RACT) means devices, systems, process modifications, or other apparatus or techniques* ***that are reasonably available*** *taking into account:*
>
> *(1) The necessity of imposing such controls in order to attain and maintain a national ambient air quality standard;*

[1] See, for example, CAA §182(b)(2), CAA §182(f), and 40 CFR §51.1312 for ozone nonattainment areas; CAA §189(a)(1)(C) and 40 CFR 51.1009(a)(4) for particulate matter nonattainment areas.

(2) The social, environmental, and economic impact of such controls; and

(3) Alternative means of providing for attainment and maintenance of such standard. (This provision defines RACT for the purposes of § 51.341(b) only.)[2] [emphasis added]

The NOx Supplement to the General Preamble indicates that, "decisions on RACT may be made on a case-by-case basis, considering the technological and economic circumstances of the individual source."[3]

Generally, states have made decisions on RACT cost-effectiveness thresholds by evaluating the cost (dollars) per ton of emission reduced and comparing that to a threshold value deemed to be economically reasonable.

Our research, provided in Table 1, shows that states have recently generally selected the RACT level of control at about $3,000 per ton of emission reduced and no higher than $5,500 per ton for RACT applied outside of Regional Haze SIPs. The highest RACT values that we identified, $10,000 per ton, were selected for Regional Haze by Utah and Oregon.

Based on this research, ***we recommend that Utah select RACT for the Moderate ozone SIP in a range no higher than $5,000 to $7,500 per ton***, which would put Utah at the high end of non-Regional Haze RACT evaluations among the states identified.

For comparison purposes, we also researched Best Available Control Technology (BACT). BACT is defined as follows:

Best Available Control Technology means an emissions limitation (including a visible emission standard) based on the ***maximum degree of reduction*** *for each pollutant subject to regulation under the Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR part 60, 61, or 63. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.*[4] [emphasis added]

BACT provides a higher level of control than RACT, evidenced by the "maximum degree of reduction" for BACT compared to controls that are "reasonably available" for RACT in the regulatory definitions noted above. For example, the $PM_{2.5}$ SIP implementation rule requires

[2] 40 CFR Part 51 Subpart F Procedural Requirements §51.100(o).
[3] 57 FR 55624/3.
[4] 40 CFR §52.21(b)(12).

RACT for Moderate nonattainment areas and BACT for Serious nonattainment areas.[5] Furthermore, RACT for both ozone and $PM_{2.5}$ considers controls that are reasonably available but, on the other hand, EPA considers BACT, a concept included for $PM_{2.5}$ SIPs but not included for ozone SIPs, to be generally independent of achieving attainment.[6] BACT is also considered in New Source Review for major precursors of both ozone and $PM_{2.5}$.

As provided in Table 2, our research shows that, outside of a few outliers, states have generally applied BACT at control levels ranging from $10,000 to $20,000 per ton of emissions reduced. Considering that BACT is a higher level of control than RACT, these values further substantiate our conclusion and recommendation above, that ***RACT should be chosen no higher than the range of $5,000 to $7,500 per ton.***

We hope that you will find our research into objective measures for RACT to be useful. Please do not hesitate to contact me if you have any questions or feedback.

Sincerely,

Rikki Hrenko-Browning
President, Utah Petroleum Association

cc: Becky Close – bclose@utah.gov
Ryan Bares - rbares@utah.gov
Jon Black - jlblack@utah.gov
John Jenks - jjenks@utah.gov

[5] See 40 CFR Part 51 Subpart Z "Provisions for implementation of $PM_{2.5}$ National Ambient Air Quality Standards".
[6] See, for example, 81 FR 58081.

Table 1. Regional Haze and RACT Cost-Effectiveness Determinations

Agency	Year	NO_x Cost-Effectiveness ($/ton)	Regulatory Driver	Type of Determination	Source
Colorado – Department of Public Health and Environment	2021	5,000	Regional Haze	Threshold	1
	2019				2
	2011				3
Illinois – Environmental Protection Agency	2020	2,500 - 3,000	RACT	Threshold	4
	2016				5
	2007	2,500			6
Maryland – Department of Environment	2020	3,500 - 5,000	RACT	Threshold	4
	2016				5
New York – Department of Environmental Conservation	2020	5,000 - 5,500	RACT	Threshold	4
	2016				5
	1994	3,000			7
Ohio – Environmental Protection Agency	2020	5,000	RACT	Threshold	4
	2016				5
	2007				6
Pennsylvania – Department of Environmental Protection	2020	2,800	RACT	Threshold	4
	2016				5
	2016	3,500	Regional Haze		8
Wisconsin – Department of Natural Resources	2020	2,500	RACT	Threshold	9
	2016				5
	2010				10
	2007				6
Texas – Texas Commission on Environmental Quality	2021	5,000	Regional Haze	Threshold	11
Oregon – Department of Environmental Quality	2021	10,000	Regional Haze	Threshold	12
Minnesota – Minnesota Pollution Control Agency	2022	7,600	Regional Haze	Threshold	13
Utah – Department of Environmental Quality	2022	10,000	Regional Haze	Threshold	14
Maine – Department of Environmental Protection	2010	<7,360	Regional Haze	Project Determination	15

[1] [EPA–R08–OAR–2020–0114; FRL–10019–22–Region 8]

[2] 5 CCR 1001-9 XVII.E.3.a.(ii)

[3] Colorado Visibility and Regional Haze State Implementation Plan for the Twelve Mandatory Class I Federal Areas in Colorado

[4] EPA–R03–OAR–2019–0657; FRL–10014–53–Region 3

[5] "Responses to Frequently Asked Questions" Final Rulemaking Additional RACT Requirements for Major Sources of NOx and VOCs 25 Pa. Code Chapters 121 and 129 46 Pa. B. 2036 (April 23, 2016)

[6] Order of the State of Wisconsin Natural Resource Board Amending and Creating Rules. State Implementation Plan

[7] DAR-20:Economic and Technical Analysis for Reasonably Available Control Technology (RACT) Networks (August 8, 2013)

[8] RACT II Overview and Implementation Presentation

[9] [EPA–R05–OAR–2020–0097; EPA–R05–OAR–2020–0199; EPA–R05–OAR–2020–0200; FRL–10011–90–Region 5]

[10] [EPA–R05–OAR–2007–0587; EPA–R05–OAR–2009–0732; FRL–9205–8]

[11] Texas Commission on Environmental Quality Agenda Item Request For Proposed State Implementation Plan Revision

[12] Oregon Regional Haze State Implementation Plan

[13] Minnesota Draft SIP

[14] Technical Support Document for Proposed Action on Area Source Rule Revisions

[15] 2010 Departmental Finding of Fact and Order Regional Haze Best Available Retrofit Technology Determination

Table 2. BACT Cost-Effectiveness Determinations

Agency	Applicability	NAAQS Designation (Applicable NAAQS)	Year	NO_x Cost-Effectiveness ($/ton)	Type of Determination	Source
California - San Diego County Air Pollution Control District	Local	Moderate Nonattainment (1997 Ozone)	2011	12,000	Threshold	1
California - San Joaquin Valley Air Quality District	Local	Extreme Nonattainment (1997 Ozone); Serious (1997, 2006, 2012 $PM_{2.5}$)	2022	18,000	Threshold	2
California - Bay Area Air Quality District	Local	Marginal Nonattainment (2008 Ozone); Moderate (2006 $PM_{2.5}$)	2016	17,500	Threshold	3
California - South Coast Air Quality District	Local	Extreme Nonattainment (all Ozone) and Serious (2006, 20012 $PM_{2.5}$)	2022	38,575	Threshold	4
Massachusetts - Massachusetts Department of Environmental Protection	Federal	Marginal Nonattainment (2008 Ozone); Moderate (1997 Ozone)	2011	11,000-13,000	Threshold	5
Alaska - Alaska Department of Environmental Conservation	Federal	Attainment	2022	7,133 < Threshold < 10,123	Project Determinations	6
	Federal	Attainment	2021			7
	Federal	Attainment	2020			8
Alabama - Alabama Department of Environmental Management	Federal	Attainment	2021	<20,400	Project Determinations	9
Minnesota - Minnesota Pollution Control Agency	Federal	Attainment	2007	3,201 < Threshold < 12,727	Project Determinations	10
	Federal	Attainment	2015			11
Washington - Washington Department of Ecology	Federal	Attainment	2018	10,000	Threshold	12

[1] June 2011 "New Source Review Requirements for Best Available Control Technology BACT"
[2] April 28, 2021, BACT Policy Updates
[3] September 2016 "BAAQMD New Source Review Permitting"
[4] 2022 South Coast Air Quality Management District BACT Maximum Cost Effectiveness Value ($/ton)
[5] June 2011 "Best Available Control Technology (BACT) Guidance"
[6] July 2022 Technical Analysis Report for Construction Permit AQ1539CPT01
[7] March 2021 Technical Analysis Report for Construction Permit AQ0083CPT07
[8] August 2020 Technical Analysis Report for Construction Permit AQ1524CPT01
[9] 2021 Preliminary Determination Tennessee Valley Authority (TVA) – Colbert
[10] October 2007 Minnesota Public Utilities Commission Staff Briefing
[11] May 2015 Air Emission Permit NO. 14100071-001
[12] Pollution Control Hearings Board State of Washington PCHB No. 17-055c

Attachment 3 – March 10, 2023 UPA letter to UDEQ

Utah Petroleum Association

6905 S. 1300 E. #288, Cottonwood Heights, UT 84047-1817

FUELING UTAH'S GROWTH & PROSPERITY

March 10, 2023

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

Submitted by email to bbird@utah.gov

Subject: UDAQ Preliminary RACT Determinations for Petroleum Refineries in the Northern Wasatch Front Ozone Nonattainment Area

Dear Bryce:

The Utah Petroleum Association ("UPA") sends this letter about recent Utah Division of Air Quality ("UDAQ") determinations of Reasonably Available Control Technology ("RACT") provided to some of our member company petroleum refineries operating within the Northern Wasatch Front ozone nonattainment area ("NWF"). In short, we are concerned that the determinations are inconsistent with applicable legal and regulatory requirements, will not assist in advancing the goal of attainment, are based on incomplete and inaccurate information, and are being developed on a fast-track schedule that does not provide adequate time for the normal exchanges of information that typically take place between affected sources and UDAQ. We detail our concerns here for inclusion in the record.

In good faith, our member companies submitted updated RACT evaluations to UDAQ to ensure that the RACT determinations for the NWF Moderate State Implementation Plan ("SIP") would be based on more accurate, up-to-date information to the extent this could be prepared in the short time available, rather than pulling from five-year-old evaluations of Best Available Control Technology ("BACT") developed for the $PM_{2.5}$ SIP.[1] UDAQ subsequently notified some of the refineries that they must install additional nitrogen oxide ("NOx") controls before the summer ozone season of 2026, stating that the "additional control technologies are considered RACT."

While UDAQ indicated that it has determined these controls to constitute RACT, it offered no basis for that determination. For example, it did not address considerations related to cost

[1] While the updated information was better than the five-year old information, companies were still required to provide it on a relatively expedited basis. This resulted in information and assumptions that, while the best available given the time constraints, was nonetheless itself incomplete and likely conservative in that it tended to underestimate total control cost. Companies nonetheless believed this information to be sufficient for the purpose in that the estimates showed cost effectiveness significantly higher than what has been understood to constitute RACT (and even BACT). Accordingly, companies considered the precision of the estimates to be sufficient for screening out certain controls from further consideration as RACT.

effectiveness[2] or timing for the installation of the controls.[3] Nor did it address the necessity (or even the potential for marginal benefit) of the controls in bringing about attainment, an especially egregious oversight in view of the particular parameters of the airshed such as, for example, the contribution of international transport to nonattainment. We explain below.

UDAQ's Proposed RACT Does Not Comply with the Requirements of the Clean Air Act and the Corresponding Federal Regulations

The Clean Air Act ("CAA") and SIP rules for various National Ambient Air Quality Standards ("NAAQS") call for implementing RACT level of control.[4] Additionally, states often apply RACT for Regional Haze SIPs. The regulations for procedural requirements for SIPs define RACT as follows:

> *Reasonably available control technology (RACT) means devices, systems, process modifications, or other apparatus or techniques* ***that are reasonably available*** *taking into account:*
>
> *(1) The necessity of imposing such controls in order to attain and maintain a national ambient air quality standard;*
>
> *(2) The social, environmental, and economic impact of such controls; and*
>
> *(3) Alternative means of providing for attainment and maintenance of such standard. (This provision defines RACT for the purposes of § 51.341(b) only.)*[5] [emphasis added]

An important aspect of this definition is that the controls be *reasonably available*. Rather than applying the regulatory RACT criteria, UDAQ appears instead to have acted in an arbitrary, ad hoc manner to impose controls under the guise of RACT. One of the hallmarks of administrative rulemaking is that an agency such as UDAQ provide a reasoned explanation for its proposed action. UDAQ has done no such thing, instead, simply announcing its conclusion without providing any supporting rationale.

Cost Criteria

Cost effectiveness has long been a key criterion in making determinations of what controls are appropriate under various Clean Air Act programs. These include BACT for Prevention of Significant Deterioration ("PSD") review, BACT for SIPs, RACT for SIPs and the Regional Haze Program, MACT under the hazardous air pollutant program, and Lowest Achievable Emission Rate ("LAER") under the major nonattainment New Source Review ("NSR") program. As

[2] The UDAQ RACT determinations have cost-effectiveness ranging between $24,000 and $28,000 per ton of NOx emissions reduced. These values fall ***far*** outside of the upper range that has typically been considered to be cost effective for RACT.

[3] UDAQ is requiring that the controls be installed by the summer of 2026. While it is not clear that the controls can even be installed by that deadline – additional analysis would be required to understand when such controls could be installed assuming that they were, in fact, determined to constitute RACT – they certainly cannot be installed by the regulatory deadline for RACT for the NWF nonattainment area which is January 1, 2023.

[4] See, for example, CAA §182(b)(2), CAA §182(f), and 40 CFR §51.1312 for ozone nonattainment areas; CAA §189(a)(1)(C) and 40 CFR 51.1009(a)(4) for particulate matter nonattainment areas.

[5] 40 CFR Part 51 Subpart F Procedural Requirements §51.100(o).

explained in our February 2023 letter, the maximum cost-effectiveness threshold indicated for ozone RACT should be no greater than $5,000 to $7,500 per ton of emission reduced (copy of February letter attached).[6] Any higher level of control would not be *reasonably available*. The controls being suggested as RACT by UDAQ's recent e-mail communications have cost effectiveness of $24,000 per ton and greater and, therefore, cannot be deemed to be "reasonably available." In fact, the UDAQ RACT determinations are ***three to four times more costly than appropriate*** and even exceed levels typically used for the higher level of control for BACT determinations, as shown in the February 2023 letter.

No justification exists to make RACT determinations at such high cost effectiveness levels. While we understand that UDAQ may be reluctant to offer an exact cost effectiveness threshold, there must be some reasonable upper-bound cost effectiveness that guides its decision making. We find no other examples of RACT determinations approaching this cost effectiveness threshold. Moreover, setting the cost effectiveness level this high – and significantly higher than other similarly-situated states – sets a discouraging precedent for those that do, or might seek to do, business in Utah. Such a precedent will discourage business and industry from relocating to Utah or from investing further within Utah due to the high costs of emission controls.[7] The precedent would carry into future SIPs and even into minor NSR BACT determinations for air permitting.

Deadline for Installation of RACT Controls

Furthermore, the installation deadline provided to the refineries (summer 2026) for the new controls fails to consider (i) the regulatory timeline requirement for RACT installation or (ii) whether the work could be done within the existing refinery planned turnaround schedule or even whether the engineering and procurement can be completed on time.

EPA's recently published Determination of Attainment by Attainment Date ("DAAD") for the 2015 ozone NAAQS established an installation date of January 1, 2023, for installation of all VOC and NOx RACT controls:

> *SIP revisions required for the newly reclassified Moderate areas must be submitted no later than January 1, 2023, and RACM/RACT for these areas must be implemented as expeditiously as practicable, but* ***no later than the same date.***[8, 9] [emphasis added]

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[6] Letter, Rikki Hrenko-Browning to Bryce Bird, *Criteria for Selection of Reasonably Available Control Technology*, February 2, 2023 ("February 2023 Letter")

[7] We are assuming that UDAQ is applying its cost effectiveness threshold equally across all industries and not singling out the refineries for disparate treatment. A central purpose of cost effectiveness is to create a level playing field so that all sources and industries are treated equally.

[8] 87 FR 60897, *Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as Marginal for the 2015 Ozone National Ambient Air Quality Standards* ("DAAD"), p. 60907/1.

[9] This RACT installation date set in the DAAD comports with the requirements of the SIP implementation rule for the 2015 ozone standard:

> *For RACT required pursuant to reclassification, the state shall provide for implementation of such RACT as expeditiously as practicable, but* ***no later than the start of the attainment year ozone season associated with the area's new attainment deadline****, or January 1 of the third year after the associated SIP revision submittal deadline,* ***whichever is earlier; or the deadline established by the Administrator in the final action issuing the area reclassification.*** (40 CFR Part 51 Subpart CC §51.1312(a)(3)(ii)) [emphasis added]

UDAQ has not explained how these controls can be justified as RACT if such a clear, unambiguous deadline requirement cannot possibly be satisfied. We are unaware of any authority that would allow UDAQ to ignore the regulatory requirement under which it purports to be acting pursuant to.

Even assuming that UDAQ had a basis for ignoring the legal deadline for RACT installation, the arbitrary summer of 2026 deadline that it would substitute is flawed for several reasons. First, we are unaware of any analysis – by the subject companies or UDAQ – that has been completed to determine if the installation of these control systems could be accomplished that date. The engineering, design, procurement, contracting, and scheduling associated with such significant projects is extensive and, at present, there is no basis for concluding that UDAQ's summer 2026 deadline is feasible.

An additional consideration impacting scheduling relates to refinery "turnaround" schedules. Due to the integrated operating nature of refineries, projects of this magnitude are typically planned for a refinery's scheduled turnaround. Refineries establish their turnaround schedules years in advance to accommodate extensive engineering, maintenance, equipment codes, upgrades, product delivery commitments, and other factors, and typically spend years planning the myriad of details so they can procure the necessity parts and equipment including long-delivery items and execute the turnaround safely, on time, on budget, and without incident. Disruptions to the schedule and inadequately planned turnarounds risk the safety of those involved as well as cost and schedule overruns and can lead to incidents including environmental incidents.

Requiring installation of controls without accounting for the established turnaround schedule could add millions of dollars to the installation cost based on the duration of the required additional turnaround and the lost profit opportunity associated with the additional turnaround. Refineries did ***not*** consider disruptions to the normal planned turnaround schedule or lost profit opportunity in their cost effectiveness calculations in their RACT evaluations, nor did they think it would be necessary to do so because they did not anticipate being told to install controls as RACT with such high cost effectiveness values (even without accounting for these additional costs) and within a short time window.

Thus, the controls in the RACT determinations cannot be installed by the regulatory time frame – which has passed. Nor can they be installed by the (unexplained) summer of 2026 deadline that UDAQ proposed.

Necessity of Controls to Attain/Maintain NAAQS

As noted, the definition of RACT specifically provides for taking into consideration, "[t]he necessity of imposing such controls in order to attain and maintain a national ambient air quality standard." UDAQ has not shown if or how the controls in the RACT determinations would support the

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EPA initially designated the NWF as nonattainment in 2018 with an effective date of August 3, 2018 (83 FR 25776). Based on the effective initial designation date, the attainment date for the NWF at Moderate is six years later, in other words August 3, 2024 (See Table 1 of 40 CFR §51.1303). EPA considers the "attainment year" to be the last full calendar year prior to the attainment date, and thus 2023 is the attainment year for the NWF at Moderate. Thus, the installation date for RACT for the NWF, per the 2015 ozone NAAQS implementation rule, must be set no later than the start of the ozone season in 2023. The date set in the DAAD for RACT installation – January 1, 2023 – comports with the SIP implementation requirements.

attainment demonstration at Moderate. Furthermore, in UDAQ's industry stakeholder meeting held on February 15, 2023, UDAQ explained that they can provide a successful attainment demonstration by accounting for the combination of exceptional events and international emissions.[10] Thus, the controls included in the RACT determinations are not necessary for the attainment demonstration.

UPA Supports Controls Shown to be Cost Effective Towards Lowering Ozone

UPA and its member companies support installing those controls shown to be cost effective towards lowering NWF ozone levels. We demonstrated our support for improving air quality through the voluntary implementation of Tier 3 gasoline in Utah, installation of controls that have been effective towards reducing $PM_{2.5}$ concentrations, and decades of cooperation with UDAQ to improve local air quality under other State Implementation Plans ("SIPs").

As shown in part A of the figure below, UDAQ's source apportionment modeling study shows that only 14% of the ozone during an episode (episode average) results from anthropogenic emissions *throughout Utah* (including point sources located in the NWF).[11] The remaining 86% of NWF ozone arises from additional sources that ***cannot be controlled within Utah*** including the following:

- Anthropogenic sources located outside Utah including other states and international sources
- Various local and non-local natural sources (including biogenic emissions)

Furthermore, the 14% of ozone arising from anthropogenic sources throughout Utah includes onroad and off-road motor vehicle emissions. Utah has no control over the motor vehicle emissions; the federal government controls these sources. Yet they comprise 77% and 46% of NWF NOx and VOC emissions, respectively (61% of total NWF emissions as shown in part B of the figure).[12] In other words, Utah can only control a fraction of the 14% of ozone during an episode that arises from anthropogenic emissions in Utah, that portion which does not come from on or off-road mobile sources.

Point sources generate only a small portion of NWF ozone and the four major source petroleum refineries account for only a small portion of that, as shown in part B of the figure. The modeling study indicates that all point source emissions in the NWF account for approximately only 1 ppb of NWF ozone.[13] Presumably, this includes point source volatile organic compound ("VOC") and NOx emissions. The result is not surprising, for the following reasons:

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[10] In view of UDAQ's findings in this regard, it would seem that UDAQ would be persuaded towards a lower – not higher – cost effectiveness threshold for making RACT determinations; or at least a threshold that is in keeping with norms.

[11] See *Northern Wasatch Front, O3 State Implementation Plan: Modeling Updates*, presented by UDAQ's Technical Analysis Section on February 15, 2023 ("Modeling Update"), slide 11.

[12] Utah Division of Air Quality, *Marginal Ozone Inventory, Northern Wasatch Front, UT*, June 2020, available on UDAQ website at https://documents.deq.utah.gov/air-quality/planning/air-quality-policy/DAQ-2022-012149.pdf ("NWF 2017 Inventory") (accessed on March 6, 2023).

[13] See Modeling Update, slide 13. (The slide does not indicate if the point source contribution shown represents an average modeled day, episode average day, or exceedance day.)

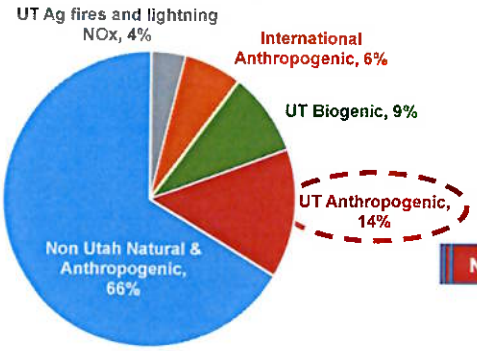
- UDAQ's NWF emission inventory for 2017 indicates that point sources account for only 21% of NWF anthropogenic NOx emissions and only 6% of NWF anthropogenic VOC emissions, or 13% of all NWF anthropogenic emissions.[14]

- The point source inventory for 2017 indicates that the four major source petroleum refineries account for 11% of the NWF point source NOx, corresponding to only 2.4% of the NWF anthropogenic NOx emissions (11% of 21%).

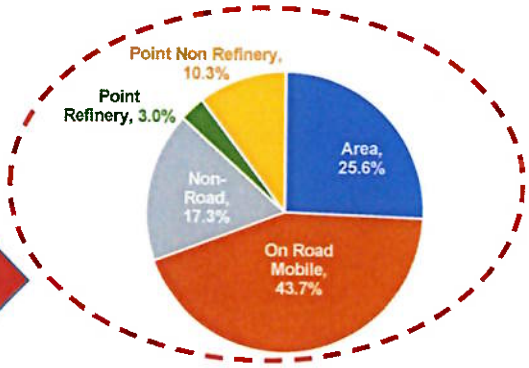
- While the major source petroleum refineries account for 53% of NWF anthropogenic point source VOC emissions, that amount equates to only 3.2% of all NWF anthropogenic VOC emissions (53% of 6%).[15]

In other words, ***the petroleum refineries emit only a very small portion of NWF anthropogenic emissions and therefore account for only a very small fraction of locally formed ozone***.

A. Modeled Source Apportionment, Ozone Episode Average



B. NWF 2017 Emissions Inventory



We are also not surprised that the RACT evaluations submitted by our member companies did not identify very many additional controls that would qualify as RACT or very large emission reductions as RACT. ***Our member company petroleum refineries are already very well controlled.*** The petroleum refineries comply with various federal rules under New Source Performance Standards ("NSPS") and Maximum Achievable Control Technology ("MACT"), including complying with the recent 2015 extensive revisions to petroleum refinery requirements.[16] The petroleum refineries have undergone decades of new source review air permitting. Furthermore, they have also installed controls for prior SIPs including most recently RACT and BACT for the $PM_{2.5}$ Moderate and Serious SIPs, respectively.

Considering the very small effect of the petroleum refineries on local ozone and the already high level of control on their operations, UDAQ has not demonstrated the need for the NOx emission reductions that they have called for.

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[14] NWF 2017 Inventory.
[15] *Base Year Ozone SIP Point Source Inventory*, located on UDAQ website at https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001356.pdf (accessed on March 6, 2023).
[16] 80 FR 75178, *Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards*.

The Controls are Not Needed for Inclusion in the Moderate SIP

The proposed controls do not comport with the RACT determination requirements and will not contribute to the attainment demonstration for the Moderate SIP. The remaining Moderate SIP requirement for adding controls to existing sources is the requirement for Reasonable Further Progress ("RFP").

RFP for the NWF at Moderate requires reducing VOC by 15% from the 2017 baseline emissions inventory amount.[17] The requested controls will not help to fulfill the Moderate RFP requirements for the NWF because they would reduce NOx and would not contribute to the required *VOC reductions*.

Additional Discussion

We understand the difficulties in developing the Moderate SIP for the NWF, especially in light of the large effects of wildfire exceptional events and international emissions on NWF ozone, as shown in the Modeling update presented in February 2023.[18] Although EPA disapproved the retroactive 179B demonstration submitted by UDAQ in May 2021, we encourage UDAQ to prepare a new package with appropriate exceptional events justifications and a new 179B demonstration, a prospective demonstration this time, using UDAQ's much more refined photochemical modeling and other weight-of-evidence technical information such as EPA or peer-reviewed studies showing the effect of international emissions on ozone in the intermountain west. To its credit, UDAQ has shown through its modeling that the combination of exceptional events and international emissions accounts for the NWF not attaining the 2015 ozone NAAQS. These results and information should not be ignored.

Conclusion

As detailed above, the incremental controls deemed to be RACT by UDAQ do not meet the reasonableness or the timing requirements of RACT, and therefore cannot be RACT.[19]

We have further shown that these controls will not contribute to fulfilling any other Moderate SIP requirement and will not contribute to attaining and maintaining the NAAQS. We remind UDAQ of the terms of its rulemaking authority. Any controls that go beyond federal requirements must have written justification meeting certain requirements.[20]

Considering the relatively large effects of exceptional events plus international anthropogenic emissions on the NWF compared to the relatively small portion of NWF ozone produced by NWF anthropogenic emissions, there is no prospect for bringing the area into attainment in the near term. We encourage UDAQ to utilize the tools provided in the CAA, namely exceptional events and 179B for international emissions, to help to fulfill the SIP requirements at this time. When Congress amended the CAA in 1990, they provided these tools for areas like the NWF that are

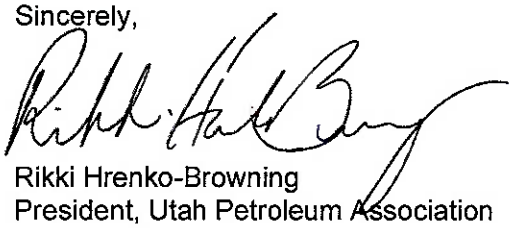
[17] See 40 CFR 51.1310(a)(4)(i). Note that EPA also uses the term "ROP", Rate of Progress, instead of RFP.
[18] See Modeling Update, slides 15 through 17.
[19] Consistent with UDAQ's communications, we understand that the controls are being proposed as satisfying the RACT requirements for Utah's Moderate ozone SIP for the NWF nonattainment area. If UDAQ is assuming some other legal authority for its proposal, we request that UDAQ promptly disclose such authority so that we may evaluate it.
[20] See Utah Code 19-2-106.

impacted by ozone concentrations that are effectively beyond their control. Using these tools would allow UDAQ more time to study appropriate ways to achieve beneficial emission reductions that will improve air quality and to work with sources to implement reductions on appropriate and achievable timelines. Forcing the petroleum refineries to implement unjustified controls under the pretense of RACT will not achieve the goal of attainment and only serves to divert technical and financial resources from the only path that will reasonably satisfy the SIP requirements.

We re-emphasize that our member company petroleum refineries are already very well controlled, through a litany of other requirements. Both the model and emission inventory evidence discussed above validate this point, demonstrating that the petroleum refineries contribute only a small fraction of a ppb to local ozone during an episode.

Finally, for all the reasons stated the requested controls are not RACT and so are not appropriate at this time, but nonetheless we remain committed to working with UDAQ on potential solutions that have a demonstrated air quality benefit.

Sincerely,



Rikki Hrenko-Browning
President, Utah Petroleum Association

cc: Gordon Larson - gordonlarsen@utah.gov
Neil Abercrombie - nabercrombie@utah.gov
Marina Thomas – marinathomas@agutah.gov
Kim Shelley - kshelley@utah.gov
Becky Close – bclose@utah.gov
Ryan Bares – rbares@utah.gov
Brian Somers - bsomers@utahmining.org

Attachment: February 2023 letter (Rikki Hrenko-Browning to Bryce Bird, Criteria for Selection of Reasonably Available Control Technology, February 2, 2023)

Appendix 2 – July 17, 2023 UPA letter to UDAQ

Utah Petroleum Association
6905 South 1300 East #288
Cottonwood Heights, UT 84047

Utah Mining Association
4286 South Main Street
Salt Lake City, UT 84107

July 17, 2023

Erica Pryor
Ryan Bares
Utah Division of Air Quality
P.O. Box 144820
Salt Lake City, Utah 84114-4820

Submitted by email to *epryor1@utah.gov* and *rbares@utah.gov*.

Subject: Comments from the Utah Petroleum Association and Utah Mining Association on Amendment to R-307-110-13, Incorporation of Utah State Implementation Plan, Section IX.D.11: *2015 Ozone NAAQS Northern Wasatch Front Moderate Nonattainment Area,* and Incorporation of Utah State Implementation Plan, Section IX.H.31 and Section IX.H.32: *Emission Limitations and Operating Practices*, R-307-110-17.

Dear Ms. Pryor and Mr. Bares:

In 2015, the Environmental Protection Agency ("EPA") lowered the National Ambient Air Quality Standard ("NAAQS" or "standard") for ozone from 75 parts per billion ("ppb") to 70 ppb.[1] On June 4, 2018, EPA designated the Northern Wasatch Front ("NWF") as an ozone nonattainment area ("NAA") under the 2015 NAAQS for ozone, in accordance with the requirements of the federal Clean Air Act ("CAA"), with an effective date of August 3, 2018. The NWF includes all of Salt Lake and Davis County and portions of Toole and Weber Counties. The rulemaking also designated the Southern Wasatch Front ("SWF") including all of Utah County as a separate NAA. Both NAAs had an initial designation of Marginal.[2]

The NWF failed to attain the NAAQS by the attainment date of August 3, 2021, and EPA reclassified it to Moderate status on October 7, 2022, with an effective date of November 7, 2022. The rulemaking established due dates for State Implementation Plan ("SIP") revisions for Moderate areas and implementation of Reasonably Available Control Technology ("RACT") and Reasonably Available Control Measures ("RACM"), setting these dates at no later than January 1, 2023. In the same action, EPA granted the Determination of Attainment by Attainment Date ("DAAD") to the SWF, meaning that the SWF will remain at Marginal status with no SIP or additional controls required.[3]

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[1] 80 FR 69292, *National Ambient Air Quality Standards for Ozone*.
[2] 83 FR 25776, *Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards* ("Initial Designations").
[3] 87 FR 60897, *Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as Marginal for the 2015 Ozone National Ambient Air Quality Standards* ("DAAD"). Discussion of due dates begins on p. 60906.

On April 5, 2023, the Utah Air Quality Board ("AQB") approved for public comment the Moderate SIP for the NWF ("proposed Moderate SIP", "Moderate SIP", or "SIP") and proposed revisions to Part H for formal proposal. This letter provides comments on the proposed Moderate SIP and proposed revisions to Part H, by both the Utah Petroleum Association ("UPA") and the Utah Mining Association ("UMA"), collectively the "Associations". We are pleased to be able to offer these comments. Given the importance of the SIP to our member companies and to the NWF, we sincerely appreciate the extended comment period.

UPA is a statewide oil and gas trade association established in 1958 representing companies involved in all aspects of Utah's oil and gas industry. UPA members range from independent producers to midstream and service providers, to major oil and natural gas companies widely recognized as industry leaders responsible for driving technology advancement resulting in environmental and efficiency gains. Five member companies each operate a petroleum refinery in the NWF. Additionally, UPA member companies operate oil and gas production and midstream facilities within the Uintah Basin ozone NAA. Thus, our member companies have an interest in air quality and air emissions controls throughout Utah.

UMA was founded in 1915 and serves as the voice of Utah's mine operators and service companies which support the mining industry. The member companies operate hardrock, industrial mineral, and coal mines throughout the State of Utah. UMA has an interest in air quality in support of the communities in which our member companies operate and air emissions controls in Utah.

The Associations support regulations that will be cost-effective towards improving air quality. Towards that end, Utah's petroleum refineries are producing Tier 3 gasoline for sale within the NWF, rather than using other methods to comply with EPA Tier 3 requirements such as averaging or purchasing credits. Several refineries have made multi-million dollar investments to produce Tier 3 and to support other significant air quality improvements. The proposed Moderate SIP acknowledges the benefits of Tier 3 gasoline.[4] While we support cost-effective regulations towards improving air quality, we have several concerns about the proposed Moderate SIP.

The CAA requires the Moderate SIP to include several items, as detailed in Table 3 of the proposed Moderate SIP:[5]

- Reasonable Further Progress ("RFP") showing a 15% reduction in volatile organic compound ("VOC") emissions from the baseline inventory to the attainment year
- Base year and projected inventories of VOC and nitrogen oxides ("NOx")
- Attainment demonstration using a photochemical model that shows the NWF will attain the NAAQS
- RACT application (technically and economically feasible) at major sources
- RACM for all other sources of ozone precursors
- Motor Vehicle Inspection and Maintenance ("I/M") program or assessment of whether the current program meets the requirements
- Nonattainment New Source Review ("NNSR") program for major sources and major modifications of NOx and VOC with increased offsets from 1.1 to 1.15

[4] Proposed Moderate SIP, p. 134.
[5] Proposed Moderate SIP, pp. 16-17.

- Contingency measures ("CM") triggered if EPA makes a finding that the area failed to attain by the attainment date or a finding that the SIP fails to meet RFP[6]
- Motor vehicle emission budgets to establish the maximum allowable ozone precursor emissions from the on-road mobile sector used in the transportation conformity analysis

These comments focus on the air quality modeling and related scientific studies, the attainment demonstration, RFP, CM, RACT and RACM, and additional controls required on two of the refineries including proposed revisions to Part H. We also make editorial suggestions for these and other parts of the proposed Moderate SIP.

I. Summary of Comments

We appreciate the extensive work that the Utah Division of Air Quality ("UDAQ") staff have put into the Moderate SIP and some of the difficult decisions that had to be made under tight timing. Nonetheless, the SIP will not be approvable by EPA because it does not fulfill some of the obligations.[7] Upon submittal of the Moderate SIP, UDAQ staff will need to focus on addressing the deficiencies as a top priority.

Statements that the model performs well are questionable at best and unsubstantiated. The modeling discussion omits important issues and fails to address discrepancies between modeling and recent monitoring studies with respect to the ozone formation regime, i.e., whether the NWF is NOx- or VOC-limited or both.

The SIP falls far short of the required 15% VOC RFP reduction and provides an incomplete plan to address the shortfall, lacking a robust discussion of all viable options to close the considerable gap. EPA will not be able to approve the Moderate SIP without the full 15% reduction in VOCs. NOx may not be substituted for VOC until the full 15% VOC RFP has been demonstrated.

Furthermore, the CM do not meet EPA requirements including requirements set forth in a recent court opinion. This aspect of the SIP also cannot be approved by EPA.

Additionally, unless UDAQ resolves the shortcomings in a timely manner, they leave the NWF vulnerable to EPA imposing a Federal Implementation Plan ("FIP") and to highway funding sanctions.[8]

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[6] An EPA finding of these types requires a formal notice in the Federal Register as a final rulemaking.

[7] See statement by Ryan Bares, Utah Air Quality Board Meeting, April 5, 2023 ("AQB 4/5/2023"): "We know this plan does not fully fulfill some of those obligations. These obligations do not go away after the finalization or submission of a SIP." Meeting recording at 0:02:40.

[8] The AQB 4/5/2023 suggests that failure to attain the standard as soon as possible triggers the sanctions and FIP. Meeting recording at 0:22:20. However, the missing or incomplete SIP elements including RFP and CM would trigger clocks for sanctions and a FIP, not failure to attain as soon as possible. Furthermore, the AQB 4/5/2023 narrative goes on to say that UDAQ believes they will avoid a finding of failure to submit. Meeting recording at 0:23:48. However, EPA issued a final finding of failure to submit to Utah for submitting an incomplete SIP for interstate transport for the 2015 ozone NAAQS. See 84 FR 66612, *Findings of Failure to Submit a Clean Air Act Section 110 State Implementation Plan for Interstate Transport for the 2015 Ozone National Ambient Air Quality Standards (NAAQS)*, Final Action. Thus, we can assume that EPA will likely issue a Finding of Failure to Submit for the Moderate SIP, if the shortcomings are not corrected in a timely way.

While we support including the 179B(a) demonstration in the Moderate SIP as an essential element, the demonstration is not approvable without all the other parts required by the CAA being approved, including the RFP and CM. This again emphasizes the need to close the gaps on other SIP elements.

The SIP and Part H revisions impose controls on the Marathon and Chevron refineries, either as RACT or as controls needed for expeditious attainment. However, these controls far exceed the reasonable requirement for RACT and the reasonable requirement for controls that go beyond RACT. Furthermore, UDAQ has failed to show the extent that these controls contribute to attainment, a requirement for controls that go beyond RACT. Ramboll has shown that, based on UDAQ's SIP modeling results, they only contribute approximately 0.03 ppb to attainment, in other words 0.04% of the current design value, a miniscule amount that cannot be considered helping the NWF to attain as quickly as possible. In other words, these controls do not meet the requirements for either justification presented, either RACT or expeditious attainment achieved by beyond RACT. Finally, retaining these controls as part of the SIP requires proper justification under the Utah Code.

We discuss each of these issues in detail below.

II. The SIP fails to address some important scientific considerations.

The proposed SIP acknowledges:

> *Despite years of success in reducing precursor emissions of NOX and VOCs, the region still faces significant and unique challenges in meeting ambient ozone concentration health based standards. These regionally specific challenges include significantly elevated background ozone levels, increasing instances and contributions of emissions from wildfire events, significant biogenic contributions, as well as both interstate and international transport.*[9]

The proposed SIP acknowledges substantial emission reductions in both NOx and VOC over the past six years, with NOx emissions decreasing by 21.3 tons per day ("tpd") and VOC emissions decreasing by 3.7 tpd. These significant decreases came about in part due to past SIP efforts and in part due to improvements to the mobile on-road sector associated with lower emissions from Tier 3 fuels and engines. Beyond the inventoried reductions, these reductions likely underestimate the full extent of emission reductions in this sector since they fail to capture Utah's high adoption rate of zero emission vehicles ("ZEVs"), predominantly in the light duty sector, with growth rates of 940.3% for ZEVs and 101.6% for electric hybrid vehicles in Utah from 2015 to 2021.[10] Concentrations of NO_2 dropped steadily from 2000 to 2019, and yet ozone fourth high values remained constant between 70 and 80 ppb.[11]

[9] Proposed Moderate SIP, p. 22.
[10] Proposed Moderate SIP, p. 133.
[11] CRC (Coordinating Research Council, Inc.) Report No. A-124, *Evaluation of Ozone Patterns and Trends in 8 Major Metropolitan Areas in the U.S.*, Final Report, March 2021, prepared by Daniel A. Jaffe ("Jaffe CRC report", available on CRC website at http://crcao.org/wp-content/uploads/2021/04/CRC-Project-A-124-Final-Report_Mar2021.pdf, accessed on June 22, 2023), Figure S3 for Salt Lake City, Trend in 4th highest O3 and daily max NO2, 1995-2019 for Hawthorne site, p. A67.

Despite the emission reductions, **Figure 1** shows that the ozone design value in the NWF has failed to improve even though the 24-hour $PM_{2.5}$ design value, which includes VOC and NOx as precursor emissions, shows a substantial long term improvement trend:

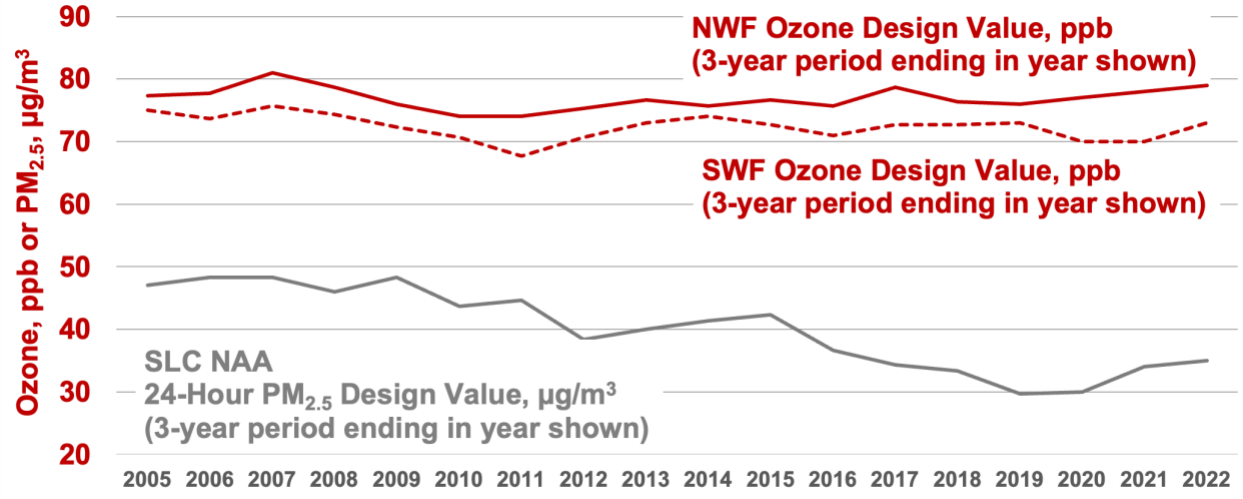

Figure 1. Ozone and 24-Hour $PM_{2.5}$ Long Term Trends

The proposed Moderate SIP makes no attempt to explain why the design value trend over the past twenty years would suddenly be responsive to new and very limited NOx and VOC reductions, significantly smaller than reductions over the past several years, and provides little or no evidence in support of the anticipated response. It is not enough to simply trust the model.

Furthermore, UDAQ must explain these air quality measurements compared to its contention that the model shows equal benefit of NOx and VOC reductions.[12] Past reductions in these emissions provided no ozone air quality benefit. In the absence of a rational scientific explanation, the actual air quality measurements showing little benefit of the emissions reductions should take precedence. Reasons for model non-performance should be identified and corrected. While VOC reductions must be included in this SIP to achieve the 15% VOC RFP, the SIP must include only those NOx reductions needed to achieve RACT and RACM.

Evidence presented at the 2023 Science for Solutions ("S4S") conference from data gathered under the Salt Lake Regional Smoke, Ozone, and Aerosol ("SAMOZA") study shows that at least for the Utah Tech Center monitoring location ("UTC"), small to moderate reductions of NOx such as those proposed in this SIP will have no effect on ozone concentrations, and reductions must be substantial, at least 75%, to make a difference in ozone.[13] Conversely, the SAMOZA study shows direct benefits from small VOC reductions at UTC. Contrary to the 75% NOx reduction

[12] See Proposed Moderate SIP, section 7.4.1 beginning on p. 114.

[13] Presentation at 2023 S4S conference, *Investigation of Ozone Formation Chemistry During the Salt Lake Regional Smoke, Ozone, and Aerosol Study (SAMOZA)* by Matt Ninneman, Marc Mansfield, Seth Lyman, Lu Hu, and Dan Jaffe; presented by Matt Ninneman ("Ninneman S4S presentation" or "SAMOZA study"), available on S4S website at https://byu.app.box.com/s/v2cm42e4i73s0l1fhbn1301zi6dt5gtv/file/1200206266091 (accessed on June 22, 2023).

needed, point sources account for only 13% of NWF anthropogenic emissions with refineries contributing and even smaller portion, only 3%.[14] The reductions from the added NOx controls comprise only a portion of the refinery emissions. Again, UDAQ made no attempt to rationalize this difference from its contention that small reductions in NOx from added NOx controls imposed on Chevron and Marathon will benefit ozone reductions. These scientific measurements must be explained vis-à-vis the conflicting modeling results.

Granted, the SAMOZA study findings represent the UTC location and not the entire nonattainment area, but the Jaffe CRC report also shows consistent results, that very large reductions of NO_2, 59.6%, would be needed to reduce ozone at the Hawthorne monitor.[15] Thus, multiple recent scientific studies call for very large reductions of NOx or NO_2 to make a difference in ambient ozone concentrations and stand in stark contrast to the very small reductions from the added NOx controls.

III. Ramboll's scientific review of the modeling aspects of the SIP calls the modeling conclusions into question, indicating the area may be more likely VOC-limited during peak ozone formation hours, and shows the insignificance of the added NOx controls requested of Marathon and Chevron in the proposed Part H revisions.

The Associations asked Ramboll to conduct a scientific review the CAMx modeling aspects of the SIP and associated Technical Support Documents ("TSDs").[16] We provide Ramboll's report of their review in its entirety as Attachment 1 to this letter, as part of these comments.[17] The report identifies various errors, and missing, overlooked analyses in the modeling.

We summarize some of the highlights of the Ramboll report as follows:

- There is little shown or explained in the main SIP document that supports UDAQ's claim that "the CAMx model performs well at simulating ozone at all sites." Maximum daily average 8-hour ("MDA8") ozone performance over all days is consistently under predicted by a large margin and reported normalized mean bias is at the outer end of referenced performance criteria. Bias and correlation are worse when considering only days when observed MDA8 ozone exceeds 60 ppb.
- The claim that "model performance statistics suggest that the model performs well" is questionable and inaccurate.
- Additional information on precursor performance should be included in the main SIP document to support the argument that the modeled ozone is well simulated, and to present likely root causes for the ozone under prediction tendency.
- ***Poor model performance degrades confidence that it will respond appropriately to modeled emission changes.***

[14] Utah Division of Air Quality, *Marginal Ozone Inventory, Northern Wasatch Front, UT*, June 2020, available on UDAQ website at https://documents.deq.utah.gov/air-quality/planning/air-quality-policy/DAQ-2022-012149.pdf ("NWF 2017 Inventory") (accessed on March 6, 2023).
[15] Jaffe CRC Report, Table 4, Estimated NOx reductions needed to reach an annual fourth highest O3 MDA8 of 70 ppb, p. 13.
[16] See Modeling TSDs at https://deq.utah.gov/air-quality/northern-wasatch-front-moderate-ozone-sip-technical-support-documentation#supporting-tsd.
[17] *Comments on State Implementation Plan for the 2015 Ozone NAAQS Northern Wasatch Front Moderate Nonattainment Area, Section IX Part D.11* ("Ramboll report").

- Ozone source apportionment modeling indicates that 54% of ozone is attributable to NOx while 46% is attributable to VOC at Hawthorne, based on UDAQ's modeling for the SIP. In support of this result, daily measured VOC-to-NOx ratios from a 2021 UDAQ monitoring study indicate that ozone at Hawthorne forms in a transitional regime (NOx and VOC sensitive). However, measured VOC-to-NOx ratios from using reactivity-weighted VOC show a stronger tendency toward VOC sensitive conditions, which should be emphasized given the abundance of reported higher-reactivity alkene, aromatic, and aldehyde compounds. Additionally, a UDAQ weekday-weekend analysis indicates statistically significant ozone **increases** for 2021 summer weekends relative to weekdays due to reduced mobile source NOx emissions. The authors correctly suggest that this "points to a VOC-limited regime" during 2021.
- NOx sensitivity indicated by the CAMx modeling results do not agree with a conceptual model for VOC sensitivity indicated by monitoring studies. UDAQ uses NOx sensitivity suggested by the modeling as justification for NOx controls despite not meeting VOC reduction requirements. ***NOx controls under VOC-limited conditions may result in higher ozone, or a "NOx disbenefit".***
- Furthermore, the recent 2022 SAMOZA monitoring study shows ozone production increasing during the morning hours and peaking around noon, after which ozone destruction processes dominate. Therefore, the VOC-to-NOx ratio is best evaluated during the morning hours (e.g., 6 AM to 12 PM), when results from the 2021 UDAQ study indicate a more VOC-limited regime regardless of reactivity weighting. As stated above, box modeling showed strong responses to VOC and little response to NOx, supporting VOC-limited conditions.
- Both modeling and monitoring techniques are associated with uncertainties, and these are likely at play to various extents. However, ***the documented CAMx performance issues weaken conclusions drawn from the modeling that suggest NOx-sensitive conditions and strengthen conclusions drawn from two monitoring studies that suggest VOC-sensitive conditions.***

In other words, recent studies show the NWF to be more likely VOC-limited during peak ozone formation hours, and NOx reductions may have little or no benefit or may even pose a disbenefit in some areas, resulting in increased ozone formation.

Notably, Ramboll used the SIP source apportionment modeling results to estimate the approximate benefit of the added NOx controls requested of Chevron and Marathon Petroleum, and found the benefit to be miniscule, not nearly of the magnitude expected to fulfill the claim in the SIP that the added NOx controls support expeditious attainment. According to source apportionment results, over the top 10 simulated MDA8 ozone days in 2023, the "other point sources" sector (i.e., exclusive of electric generation and Rio Tinto mine haul truck emissions) in Salt Lake County contribute 0.30 ppb and 0.04 ppb from NOx and VOC sensitive chemistry, respectively. That same source sector in Davis County contributes 0.18 ppb from NOx sensitive chemistry. Combining results from above, Ramboll found that ***the total simulated 2023 ozone design value reduction from the NOx and VOC controls required of Marathon and Chevron is a combined 0.03 ppb*** based on the SIP source apportionment modeling results, in other words, not enough to support expeditious attainment. Conceivably this impact would be smaller if the model simulated a VOC-sensitive environment rather than NOx-sensitive, as indicated by monitoring studies.

These are only some of the highlights of the Ramboll report, which we include here in its entirety as part of these comments. In conclusion, we recommend addressing each of the recommendations from the Ramboll report.

IV. The SIP does not meet the required 15% VOC reduction.

The CAA and the SIP implementation rule for the 2015 ozone standard require the Moderate SIP to demonstrate RFP showing a 15% reduction in VOC emissions within the nonattainment area.[18] The proposed Moderate SIP falls far short, demonstrating only 3.7 tons per day ("tpd"), a shortfall of 10.3 tpd.[19]

RFP reductions for this Moderate SIP must come from VOC reductions and cannot come from NOx reductions, considering that this Moderate SIP is the first ozone standard with the 15% RFP applicable.[20] NOx emission reductions may not be substituted for VOC. The AQB 4/5/2023 narrative states, "We've actually worked pretty hard to try and get some NOx substitutions creditable towards [the RFP] because we've seen such impressive reductions in that area, and we have not been able to find a viable way to make that work."[21]

EPA cannot approve the RFP with this shortfall and may make a "finding of failure to submit" a complete SIP.[22]

Furthermore, neither the proposed SIP nor the associated TSDs include a sufficiently robust analysis of additional potential emission reductions that could be used to achieve the 15% VOC reduction or to get closer to the required reduction. The SIP provides some discussion of potential strategies and paths forward to make the gap smaller but no strategy to completely close the gap, even though the SIP states, "UDAQ also posted all documents related to the development of this SIP revision, including all technical supporting documentation, to its public webpage as soon as they became available."[23]

We recommend adding a robust discussion of additional VOC reduction opportunities to Chapter 7 of the Moderate SIP. The discussion should include evaluation of various options to make the I/M programs more restrictive, considering the large role that mobile sources fulfill in the emissions inventory, as well as other possible ways to reduce VOC emissions.

[18] CAA §182(b)(1) and 40 CFR 51.1310(a)(4).
[19] Proposed Moderate SIP, p. 112.
[20] Although Utah submitted a 15% RFP plan in the original 1-hour ozone NAAQS, EPA deemed the plan to be irrelevant during the redesignation process and never approved it. See 62 FR 28396, *Proposed Approval and Promulgation of Air Quality Implementation Plans; State of Utah; Salt Lake and Davis Counties Ozone Redesignation to Attainment, Designation of Areas for Air Quality Planning Purposes, Proposed Approval of Related Elements, Proposed Approval of Partial NOX RACT Exemption, and Proposed Approval of Weber County I/M Program*, p. 28398. For completeness, the SIP should mention this in §1.3.1 *1979 1-Hour Ozone Standard*, p. 11.
[21] 4/5/2003 AQB, meeting recording at 0:28:07.
[22] As an example, see 73 FR 15416, *Finding of Failure To Submit State Implementation Plans Required for the 1997 8-Hour Ozone NAAQS*.
[23] Proposed Moderate SIP, p. 17.

As of this writing, UDAQ recently posted an advance notice of proposed rulemaking for 2-stroke lawn and garden equipment.[24] According to the SIP, this rule will fulfill a significant portion of the RFP gap.[25] However, the draft rule provides no information about enforcement and includes compliance dates far in the future, not within the design value period to determine attainment at the Moderate level. We question both the implementation timing and the effectiveness of the rule and whether EPA will consider emission reductions under the rule as creditable to the SIP RFP requirements.

The absence of robust discussions on achieving the 15% RFP goal provides no confidence to the regulated community and other stakeholders that Utah has a strategy to meet the requirements, thus fostering concerns about pending sanctions and a FIP. Additionally, the lack of a strategy leaves the regulated community in a state of uncertainty about "surprise" demands for additional controls to be installed in short order and, consequently, at unreasonably high cost.

V. The SIP fails to provide an adequate contingency plan.

Although the proposed Moderate SIP identifies NOx controls as CM, NOx may not be used for CM at this stage of the SIP process. The proposed Moderate SIP states, "Unlike the RFP requirements of a Moderate SIP, emission reductions associated with contingency measures can consist entirely, or in part, of NOx emission reduction strategies,"[26] and attributes this to the implementation rule for the 2015 ozone standard.[27] However, the proposed Moderate SIP misquotes the referenced 2015 Implementation Plan, which states,

> *. . . the EPA is continuing to allow contingency measure emissions reductions to be based entirely or in part on NOX controls* ***if the area has completed the initial 15 percent ROP[28] VOC reduction*** *required by CAA section 182(b)(1)(A)(i) and an air agency's analyses have demonstrated that NOX substitution (entirely or in part) would be effective in bringing the area into attainment.[29]* [emphasis added]

In other words, NOx may not be used for CM in this Moderate SIP unless and until the SIP establishes the required 15% VOC reduction for RFP and the required demonstration regarding NOx substitution.[30]

In addition, CM must be measures that are not already required. CM must be triggered by an EPA ***finding*** (i.e., a final Federal Register notice) of failure to meet the 15% VOC reduction or ***finding*** of failure to attain.[31] CM must be implemented within 60 days of the finding with no

[24] See https://deq.utah.gov/air-quality/reducing-2-stroke-lawn-equipment-emissions (accessed July 6, 2023).
[25] Proposed Moderate SIP, p. 102.
[26] Proposed Moderate SIP, p. 154.
[27] 83 Fed. Reg. 62998, *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements* ("2015 Implementation Plan").
[28] "ROP" or "Rate of Progress" is used interchangeably with RFP for the 15% VOC reduction.
[29] 2015 Implementation Plan, p. 64036.
[30] As summarized above, the attached Ramboll report calls into question the effectiveness of NOx reductions discussed in the proposed Moderate SIP, Section 7.4.1, pp. 114-115.
[31] The AQB 4/5/2023 narrative incorrectly states that the attainment date is the triggering date. Meeting recording at 0:31:40.

additional state or EPA action.[32] The 2015 Implementation Plan discusses the circuit split between the Ninth Circuit in Bahr and an earlier Fifth Circuit decision allowing "early triggered" measures and indicates that states outside the Ninth Circuit may rely on the Fifth Circuit decision.[33] However, EPA reversed this position in its March 2023 proposed CM guidance, indicating that EPA will follow the Ninth Circuit decision everywhere:

> *EPA now draws from this case that **the statute prohibits approval as CMs any measures that the state has already implemented**, and that will already be in place and achieving emissions reductions, regardless of whether there is ever a future triggering event for CMs such as a finding of failure to meet RFP or finding of failure to attain.* States must have CMs that are structured and worded so that they are both conditional and prospective*, to take effect only in the event of a future triggering event.*[34] [emphasis added]

Additionally, the language of the CAA indicates that CM must take effect after an EPA finding that the area fails to make reasonable further progress, or to attain the NAAQS by the attainment date:

> *Contingency Measures.— Such plan shall provide for the implementation of specific measures **to be undertaken if the area fails** to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date applicable under this part. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator.*[35] [emphasis added]

The proposed Moderate SIP includes the following CMs:

- NOx reductions from boilers, final rules approved at the May 2023 AQB meeting but not contingent on an EPA finding – these rules would not be approvable as CM because they address NOx prior to meeting the 15% VOC RFP and they will be implemented without a triggering EPA finding.
- VOC reductions from US Magnesium (currently located outside the nonattainment area) – these requirements would not be approvable as CM because they are not contingent on an EPA finding.
- NOx emission reductions due to already-required vehicle fleet turnover and market penetration of Tier 3 gasoline – these reductions would not be approvable because they are NOx reductions rather than VOC and not triggered by an EPA finding.

By way of example, EPA recently published a final disapproval of CM for the Sacramento area because the measures were not contingent on the appropriate EPA finding. Although the disapproval discusses the Ninth Circuit decision in *Bahr*, which is applicable in Sacramento, it makes no mention of the circuit split. The disapproval starts the FIP and sanctions clocks.[36]

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[32] See discussion of Bahr v. EPA, 836 F.3d 1218 (9th Cir. 2016), in *DRAFT: Guidance on the Preparation of State Implementation Plan Provisions that Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter*, 3/17/23 ("Proposed CM Guidance"), pp. 17-18.
[33] 2015 Implementation Plan, p. 63026.
[34] Proposed CM Guidance, p. 18.
[35] CAA §172(c)(9).
[36] 88 FR 39179, *Disapproval of Clean Air Plans; Sacramento metro, California; Contingency Measures for 2008 Ozone Standards.*

Therefore, the CM included in the proposed Moderate SIP will not be approvable by EPA and must be replaced by measures that will be triggered by an appropriate EPA finding. It is not enough to project that the RFP has not been met or that the area will not attain; EPA must make the finding to trigger the CM. Furthermore, all applicable CM must be VOC reductions and not NOx reductions unless the Moderate SIP can first be revised to fulfill the 15% VOC RFP requirement.

VI. The SIP implies the added NOx controls to be required of Chevron and Marathon Petroleum are RACT, but these controls cannot be RACT.

The proposed Moderate SIP and the proposed revisions to Part H of the SIP require added NOx controls of Chevron and Marathon ("added NOx controls"). In places, the SIP implies these controls to be RACT[37] and in other places, it describes the controls as "necessary to demonstrate attainment as expeditiously as practicable."[38] Are the controls RACT or are they necessary to demonstrate attainment? The SIP blurs the distinctions between the two but fails to make either case. These comments address the two separate questions of:

- Why the controls are not RACT
- Why the controls have not been shown to be "necessary to demonstrate attainment as expeditiously as practicable"

The SIP has not shown the controls requested of Chevron and Marathon to be ***necessary*** as required by the definition of RACT:

> ***Reasonably available control technology (RACT)*** *means devices, systems, process modifications, or other apparatus or techniques that are* ***reasonably available*** *taking into account:*
> *(1)* ***The necessity of imposing such controls in order to attain and maintain a national ambient air quality standard****;*
> *(2) The social, environmental, and economic impact of such controls; and*
> *(3) Alternative means of providing for attainment and maintenance of such standard. (This provision defines RACT for the purposes of § 51.341(b) only.)*[39] [emphasis added]

As explained above, the Ramboll report estimates that these controls added together will reduce ozone by a mere 0.03 ppb, based on the source apportionment modeling obtained for the SIP. In other words, the controls reduce ozone only a miniscule amount and *do not contribute appreciably to attainment and maintenance of the standard, as required by the RACT definition*. This is the case considering these controls as they were proposed, in the absence of the very large NOx reductions needed as cited by the Ninneman paper and Jaffe CRC report, discussed above. As explained in the attached Ramboll report, the area is likely VOC sensitive during the morning ozone formation hours. Thus, NOx controls may not help and ***could actually provide a disbenefit,*** resulting in increased ozone.

[37] See Tables 25 and 41 in proposed Moderate SIP, beginning on pp. 39 and 70, respectively, for Chevron and Marathon.
[38] See pp. 44 and 74 for Chevron and Marathon, respectively, in the proposed Moderate SIP.
[39] 40 CFR 51.100(o). (Item 3 only applies to secondary NAAQS.)

UDAQ has not shown these controls to be necessary to attain and maintain the standard. It provided no modeling to show the effect of the controls and no other evidence. In fact, UDAQ has asked for the controls to be installed by May 2026[40] but provided no modeling for any year later than 2023, and stated as much in the proposal AQB meeting.[41]

EPA requires the RACT controls to be installed by December 31, 2022, but these controls cannot be installed by this due date, which occurred in the past.[42]

As explained in our RACT Selection Criteria letter, the cost for these controls far exceeds the range of RACT costs previously applied by other jurisdictions and even by UDAQ, and cannot be considered ***reasonable*** costs.[43] While the cost range for RACT may be subjective, costs must still be ***reasonable***. These costs exceed those typically seen for BACT, which carries a higher $/ton than RACT.[44]

In fact, the proposed Moderate SIP acknowledges that the controls fall outside of RACT cost thresholds. With respect to both Chevron and Marathon, the proposed Moderate SIP states, "While the financial feasibility of the identified controls may be beyond previously established RACT thresholds, the CAA provides states with "discretion to require beyond-RACT reductions from any source" if those reductions are necessary to "demonstrate attainment as expeditiously as practicable".[45] UDAQ should provide detailed written justification for choosing the high cost threshold for RACT, which are four times higher than prior RACT thresholds used nationwide.

UDAQ did not describe a uniformly systematic process to arrive at the added NOx controls and provided no explanation for choosing Chevron and Marathon for installing controls that far exceed RACT. Some major sources provided updated RACT analyses while others did not, leaving UDAQ to rely on previously submitted 2017 BACT analyses. To make RACT determinations in the absence of updated RACT analyses, the SIP and TSDs do not describe a systematic methodology for adapting the older BACT analyses performed for the Serious $PM_{2.5}$ SIP for some sources. For example, the $PM_{2.5}$ BACT and Moderate ozone RACT have different timing requirements. How did UDAQ resolve this for those who did not submit a current RACT analysis?

RACM controls for industrial bakeries present another example of inconsistency. The SIP rejects controls for these sources at $19,000/ton[46] but imposes controls at a much higher cost for

[40] Well after the required RACT installation date.
[41] AQB 4/5/2023: Upon questioning by a Board member about modeling of the additional requirements, "[T]hose have not been modeled because all of them will be implemented after this SIP timeline . . . so we've modeled up through 2023 which is our attainment date, we have not been able to model controls beyond that." Meeting recording at 0:29:34.
[42] See "Deadline for Installation of RACT Controls" in *UDAQ Preliminary RACT Determinations for Petroleum Refineries in the Northern Wasatch Front Ozone Nonattainment Area*, letter, Rikki Hrenko-Browning to Bryce Bird, March 10, 2023 ("Preliminary RACT Determinations letter", copy attached).
[43] *Criteria for Selection of Reasonably Available Control Technology*, letter, Rikki Hrenko-Browning to Bryce Bird, February 2, 2023 ("RACT Selection Criteria letter", copy attached).
[44] See Tables 1 and 2 in RACT Selection Criteria letter.
[45] Proposed Moderate SIP, p. 44 for Chevron and p. 74 for Marathon.
[46] Proposed Moderate SIP, Table 56, p. 96.

Chevron ($26,000/ton and $28,000/ton)[47] and Marathon ($24,000/ton).[48] A similar situation exists for commercial cooking at $20,000/ton[49] and for human and animal cremation at $15,000/ton.[50]

VII. The SIP describes the added NOx controls as "necessary to demonstrate attainment as expeditiously as practicable" but does not adequately demonstrate the necessity for these beyond-RACT controls.

The attached report "Legal comments on UDAQ O3 SIP Including B-RACT" (Attachment III) ("legal comments") provides an analysis of why these controls cannot be considered to be beyond-RACT ("B-RACT") and that the proposed SIP goes beyond what the CAA allows in attempting to adopt these controls as B-RACT. In summary:

- The authority for B-RACT controls stems from the interpretation included in the 2015 ozone NAAQS implementation rule, which requires that controls be ***reasonable***, yet by seeking controls with costs that are not reasonable, the SIP goes beyond this requirement.
- B-RACT controls must be able to be ***implemented by the attainment date***, but the SIP seeks these controls to be implemented in 2026, well beyond the August 3, 2024, attainment date for the NWF at Moderate.
- EPA references the $PM_{2.5}$ rulemaking in explaining B-RACT and the process to assess whether controls qualify as B-RACT. The process requires ***determining whether the control measure is economically reasonable and ensuring that the controls can be installed by the attainment date***.
- The proposed Moderate SIP fails to show that the added NOx control measures are necessary for attainment or if they even provide a marginal benefit or if they will advance attainment by one year or more, as required.
- Requiring the B-RACT controls (which will not be installed until after that date) is inconsistent with the claim that it has a "strong case that [Utah has] met the requirements for the statutory requirements for a moderate nonattainment area demonstration" by the attainment date.
- UDAQ's authority under the CAA to impose B-RACT is contingent on first complying with the mandatory 15% VOC reduction requirement for RFP, which, as discussed above, has not been fulfilled.

We include these legal comments in their entirety as part of these comments. Based on the reasoning in the legal comments, UDAQ should remove the B-RACT requirements from the SIP and the proposed Part H revisions.

Moreover, as discussed above, UDAQ has not explained why large reductions of NOx did not reduce ozone in recent years or why the result of reducing NOx would be different now than in

[47] See Chevron "SLC – UDAQ Ozone RACT Analysis", located on UDAQ website at https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001911.pdf (accessed on July 11, 2023), pp. 16 and 19.
[48] See "Tesoro Logistics Operations LLC Truck Loading Rack – UPDATED RACT 01-31-23", located on UDAQ website at https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001507.pdf (accessed on July 11, 2023), p. 29. Additionally, since the submittal of the preliminary cost analysis, Marathon has performed additional engineering analysis to improve the accuracy of the cost-effectiveness estimate and determined a cost-effectiveness of $42,700/ton.
[49] Proposed Moderate SIP, Table 56, p. 98.
[50] Proposed Moderate SIP, Table 56, p. 99 and Table 57, p. 101.

the recent past. Furthermore, the attached Ramboll report identifies inconsistencies between the modeling and other recent monitoring studies, calling into question SIP modeling results showing benefits of NOx reductions. Thus, we have no evidence that these small reductions will reduce ozone.

Furthermore, as explained above, the Ninneman S4S presentation shows that at least for the Utah Tech Center monitoring location ("UTC"), small to moderate reductions of NOx will have no effect on ozone concentrations, and reductions must be substantial, at least 75%, to make a difference in ozone. This is consistent with the Jaffe CRC study results at the Hawthorne monitor, as explained above. Again, UDAQ made no attempt to rationalize this difference from its contention that small reductions in NOx will benefit ozone reductions and are necessary to attain the NAAQS as soon as possible.

The SIP includes no modeling to demonstrate the effect of the added NOx controls. Nonetheless, we expect the effect to be small considering that anthropogenic emissions from throughout Utah account for only 14.5% of NWF ozone.[51] Point sources account for only 13% of NWF anthropogenic emissions with refineries contributing and even smaller portion, only 3%.[52] In other words, refineries contribute 3% of the NWF emissions that contribute 14.5% of the Utah-made ozone. Moreover, the added NOx controls would only reduce a rather small portion of NOx emissions from two of the refineries. This is consistent with Ramboll's estimate of 0.03 ppb benefit to ozone concentrations, 0.04% of the design value and a miniscule benefit at best.

In fact, the SIP modeling shows the controls as unnecessary for the attainment demonstration, with near attainment shown with the incorporation of wildfire exceptional events coupled with the attainment demonstration being fully achieved with the 179B(a) prospective demonstration.

See the attached legal comments, which are fully incorporated into these comments, for more detail. These legal comments demonstrate that the B-RACT controls should be removed from the SIP and proposed Part H revisions.

VIII. For the added NOx controls, the SIP and supporting technical documentation do not meet the legal bar established to adopt regulations that go beyond Federal Clean Air Act requirements.

As noted, and discussed elsewhere in these comments, the State asserts that it is proposing beyond-RACT controls pursuant to the CAA, in particular, sections 189(b) and 172(c)(6). We have explained that the proposed beyond-RACT controls are, in fact, inconsistent with and contrary to the CAA. While the Board does have the authority to engage in rulemaking that is more stringent than corresponding federal regulations, it has not provided notice of an intent to do so, nor has it made the necessary findings that it would be required to make before proceeding under this authority.

The added NOx controls do not meet the requirements of Utah Code 19-2-106 which addresses rulemaking authority and procedure. This section of the Code requires that the board "may make

[51] See, for example, proposed Moderate SIP, Figure 16, p. 129.
[52] Utah Division of Air Quality, *Marginal Ozone Inventory, Northern Wasatch Front, UT*, June 2020, available on UDAQ website at https://documents.deq.utah.gov/air-quality/planning/air-quality-policy/DAQ-2022-012149.pdf ("NWF 2017 Inventory") (accessed on March 6, 2023).

rules for the purpose of administering a program under the federal Clean Air Act different than the corresponding federal regulations which address the same circumstances if the board holds a public comment period . . . and a public hearing; and the board finds that the different rule will provide reasonable added protections to public health or the environment of the state or a particular regions of the state". *These findings must be in writing and must be based on evidence, studies, or other information contained in the record* that relates to the state of Utah and the type of source involved.

Beyond the fact that the notice of proposed rulemaking does not purport to be a rulemaking undertaken pursuant to 19-2-106, the rulemaking record includes no findings that the beyond-RACT controls would "provide reasonable added protections to public health or the environment." To the contrary, the State has forthrightly admitted that it does not know what affect the beyond-RACT controls would have:

> *Those have not been modeled because all of them will be implemented after this SIP timeline, if that makes sense. So, we've modeled up through 2023, which is our attainment date. We have not been able to model controls beyond that.*[53]

IX. Specific question #1: The appropriateness of cost thresholds for Reasonably Available Control Measures (RACM) and Reasonably Available Control Technology (RACT): Cost thresholds must be used.

As discussed in our attached letter on RACT, cost thresholds must be used.

First and foremost, the definition of RACT and the terms for B-RACT both call for ***reasonable*** costs. In the absence of cost thresholds, there is no transparency or validation that costs are held to reasonable levels.

Secondly, UDAQ has chosen $/ton levels that exceed typical RACT by a factor of four, without any explanation for such a high level. We expect that setting this high bar for doing business in Utah falls far outside the expectations of Utah elected officials as it discourages business growth, an undesirable situation. This high bar sets a standard for other states to follow Utah, equally undesirable.

Proceeding with the controls as proposed would position the state of Utah to set a new national threshold for RACT cost effectiveness four times higher than any existing threshold. The precedent being set in this SIP provides a disincentive for new manufacturing to locate in Utah and a direct threat to the state's economic growth.

Finally, the lack of systematic documentation on developing RACT for all sources leaves the regulated community and other stakeholders without an understanding of how these levels were systematically developed and applied uniformly.[54]

[53] AQB 4/5/2023, minute mark at 0:29:34.
[54] AQB 4/5/2023, Ryan Bares, "Lastly, the Division has made significant efforts to make any and all related technical supporting documentation associated with the development of the SIP available to view by the public at the earliest possible date through our website." Meeting recording at 0:03:56. However, the documentation mentioned has not been provided.

As explained in the attached RACT letters, the added NOx controls fall outside of appropriate and reasonable cost thresholds. The upper end of the range should be no more than $7,500 per ton and must certainly not exceed $10,000/ton, while the added NOx controls proposed in the SIP range from $24,000/ton to $28,000/ton.

X. Specific question #2: Whether NOX controls should be required in the absence of the demonstration of meeting the 15% Volatile Organic Compounds (VOC) reduction required by Reasonable Further Progress (RFP): <u>While NOx controls may be required as RACT and RACM, the added NOx controls may not be required prior to meeting the 15% VOC reduction required for RFP and, in light of other issues, is a moot question.</u>

The SIP may require NOx controls as part of the RACT and RACM analyses provided that the analysis meets the regulatory definitions and requirements. On the other hand, the SIP cannot require the added NOx controls until it meets the statutory burden of the required 15% VOC reduction for RFP, and then it may only require NOx controls shown to be needed for attainment. Thus, the added NOx controls may not be required at this time. The 15% VOC reduction for RFP has not yet been met, and the added NOx controls have not been shown to be needed for attainment.

Overriding this question, however, are the demonstrations above and detailed in the legal comments that the added NOx controls do not meet the definition of RACT, nor do they meet the terms of the CAA required for B-RACT controls. Because of these overriding issues, the question of requiring the added NOx controls in the absence of meeting the 15% VOC reduction required by RFP becomes moot.

XI. Specific question #3: Appropriateness of timelines requiring controls in the State Implementation Plan (SIP): <u>Timelines to install controls by May 2026 are not appropriate for the Moderate SIP.</u>

As explained in the Preliminary RACT Determination letter attached, and in the attached legal comments, there is no basis to require controls in the Moderate SIP past the January 1, 2023, RACT installation date or past the August 3, 2024, attainment date when B-RACT must be implemented. Moreover, even if not considered to be RACT, no basis has been established for the May 2026 installation date for the Moderate SIP, long after the Moderate attainment date by which B-RACT must be installed. Furthermore, as explained previously, controls of the extent requested may not be installed on this schedule, the schedule may not match refinery turnaround schedules, and thus could incur substantial lost profit opportunity and substantial costs and risks to install on an expedited schedule. Refineries did not consider disruptions to the normal planned turnaround schedule or lost profit opportunity in their cost effectiveness calculations in their RACT evaluations, nor did they think it would be necessary to do so because they did not anticipate being told to install controls with such high cost effectiveness values (even without accounting for these additional costs) and within a short time window.

XII. Specific question #4: Whether optional components should be included in the State Implementation Plan (SIP) submission: Yes, the 179B(a) demonstration should be included as a necessary part of the SIP.

This question speaks specifically to including the 179B(a) prospective demonstration. This 179B(a) prospective demonstration ***must*** be included in the SIP. The Ramboll review identifies deficiencies in the CAMx photochemical modeling and draws uncertainties to the results. The wildfire analysis shows that the area can come close to attainment but not that it can reach attainment. The 179B(a) demonstration provides important weight of evidence ("WOE") and is consistent with scientific studies cited in the proposed Moderate SIP.[55]

The demonstration provides important context to the difficulties in achieving attainment for the NWF. As shown on the right side of Figure 20 in the proposed Moderate SIP, the SIP modeling indicates that international anthropogenic sources contribute 6.5% of the ozone to the NWF, episode average. This is a substantial contribution in any event and especially so when compared to the 14.5% ozone contributed by Utah anthropogenic sources.[56] In other words, international anthropogenic sources contribute an amount of ozone equivalent to 45% of the entire Utah anthropogenic contribution.

Congress included §179B in the CAA for situations like the NWF, for areas that would attain but for the influence of international emissions. A nonattainment area cannot be responsible for emissions that did not come from within the area. In the case of international emissions, the EPA cannot be responsible for these emissions either. Thus, §179B provides a reasonable alternative for areas suffering from large international contributions.

Failure to use all the tools of the CAA including both §179B and exceptional events, as applicable, would unnecessarily and inappropriately hamstring the NWF compared to Congress' intent and compared to the use of these tools in other NAAs nationwide, by making Utah responsible for ozone from emissions over which neither Utah nor the EPA has control.

Furthermore, while 179B is "optional" in the CAA, it is ***not optional for Utah***, where rulemaking may only go beyond CAA requirements if the rulemaking meets all the criteria in the Utah Code as discussed above for rules that go beyond the CAA. In other words, the analysis for adding rules beyond those required by the CAA may not ignore the benefits of tools such as CAA §179B provided by Congress. Congress provided CAA §179B because states cannot be responsible for pollution caused by other countries. Utah must employ this tool to ensure that it is not requiring controls that go beyond what would otherwise be required. This must be done to comply with the Utah Code 19-2-106.

XIII. UDAQ must focus on a 179B(b) retrospective analysis as its next step, after the 2023 summer ozone season.

Under the requirements of Utah Code 19-2-106, UDAQ must focus on demonstrating attainment after the 2023 ozone season based on appropriate exceptional events demonstrations and a showing that the area would have attained but for the influence of international emissions. In other words, UDAQ should prepare a 179B(b) retrospective analysis after the completion of the

[55] See proposed Moderate SIP, pp. 13, 22, and 131.
[56] Proposed Moderate SIP, p. 146.

2023 ozone season, which is the last ozone season during the three-year period for determining attainment at Moderate. Unless and until UDAQ conducts this analysis, it cannot claim that additional controls are needed. UDAQ should undertake this endeavor prior to seeking any new emission control requirements other than those VOC reductions needed to meet the 15% VOC RFP obligation.

If the area can be shown to have attained at the end of 2023 based on exceptional events and but for international emissions, UDAQ is obligated to submit a 179B(b) retrospective demonstration.

Significant scientific and technical evidence exists to support this direction:

- In the 2021 Jaffe CRC report, Dr. Dan Jaffe showed that Salt Lake incurs up to 4 ppb of wildfire smoke impact on its ozone design value.[57]
- The SAMOZA study, funded with S4S grants, shows modest wildfire influence in 2022 with about a third of the exceedance days exhibiting the influence.[58]
- The Ramboll modeling included in the May 2021 179B demonstration showed 9.9 ppb of international influence on local ozone.
- The more specific modeling results provided in this proposed Moderate SIP show reductions of up to 4.5 ppb due to international influence.[59]
- The international influence shown in the Ramboll and SIP modeling are consistent with other prior studies by EPA.

For these reasons, we urge UDAQ to pursue another 179B(b) retrospective demonstration at Moderate, before embarking heavily on Serious SIP requirements. Pursuing the 179B(b) demonstration will also require resolving the RFP and CM shortcomings of the Moderate SIP.[60]

XIV. The SIP needs a number of editorial corrections.

Attachment IV lists several recommended editorial corrections for the Moderate SIP.

[57] Table 9, CRC Report Number A-124, Evaluation of Ozone Patterns and Trends In 8 Major Metropolitan Areas In The U.S., March 2021, prepared by Danial A Jaffe, available on the CRC website at: https://crcao.org/wp-content/uploads/2021/04/CRC-Project-A-124-Final-Report_Mar2021.pdf (accessed on May 18, 2023).

[58] Presentation by Dan Jaffe at 2023 S4S conference, "The Challenge of O3 and PM in the Western US: How Low Can We Go?", https://byu.app.box.com/s/v2cm42e4i73s0l1fhbn1301zi6dt5gtv/file/1200205944830 (accessed July 11, 2023).

[59] Table 74, p. 148, Proposed NWF Ozone Moderate SIP.

[60] See CAA §179B(a) and (a)(1): "Notwithstanding any other provision of law, an implementation plan or plan revision required under this Act shall be approved by the Administrator ***if (1) such plan or revision meets all the requirements applicable to it under the Act other than a requirement that such plan or revision demonstrate attainment and maintenance*** of the relevant national ambient air quality standards by the attainment date specified under the applicable provision of this Act, or in a regulation promulgated under such provision . . ." [emphasis added]

XV. Conclusions

In conclusion, UDAQ should remove the added NOx controls because they do not constitute RACT – as UDAQ readily acknowledges – nor do they qualify as B-RACT as explained in the attached legal comments.
UDAQ must focus its energies on addressing the gaps in the Moderate SIP needed to make it approvable, namely the 15% VOC RFP obligation and approvable CMs. Under the CAA, these gaps need to be closed for approvability of the 179B(a) prospective demonstration.

Additionally, improvements to the modeling are needed to ensure that the modeling provides a good basis for identifying those controls that will move the needle to reduce ozone concentrations in the NWF. Specifically, the modeling should more closely match the monitoring studies showing the area to be VOC-limited during critical morning ozone formation hours.

Finally, we urge UDAQ to evaluate a 179B(b) retrospective demonstration coupled with wildfire exceptional event analyses after the conclusion of the 2023 ozone season in light of all the evidence that the area would attain with wildfire exceptional events removed and but for the influence of international emissions. According to Utah Code, this demonstration must be evaluated before proceeding to a Serious SIP because an approved demonstration would prevent the NWF from ever being reclassified to Serious and thus would preclude the need for a Serious SIP.

Without the necessary changes to shore up the SIP to meet statutory and regulatory requirements, the NWF remains at risk of EPA imposing a FIP and highway sanctions.

Sincerely,

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Attachments:

- Attachment I, Comments on State Implementation Plan for the 2015 Ozone NAAQS Northern Wasatch Front Moderate Nonattainment Area, Section IX Part D.11 prepared by Ramboll
- Attachment II, Letters to UDAQ from UPA Regarding RACT: Preliminary RACT Determinations Letter (March 10, 2023) and RACT Selection Criteria Letter (February 2, 2023)

- Attachment III, Utah Petroleum Association Legal Comments on Proposed Rulemaking for Northern Wasatch Front Moderate Nonattainment Area: Proposed Amendment to R-307-110-13, Section IX, Control Measures for Area and Point Sources, Part D, Ozone; Proposed Amendment to R-307-110-17, Section IX, Control Measures for Area and Point Sources, Part H, Emission Limits. Published in Utah State Bulletin, June 01, 2023, Vol. 2023, No. 11 at 68- 72
- Attachment IV, Editorial Suggestions

Attachment I

Comments on State Implementation Plan for the 2015 Ozone NAAQS Northern Wasatch Front Moderate Nonattainment Area, Section IX Part D.11, prepared by Ramboll

Comments on

State Implementation Plan for the 2015 Ozone NAAQS Northern Wasatch Front Moderate Nonattainment Area, Section IX Part D.11

Ramboll reviewed the Utah Division of Air Quality (UDAQ) State Implementation Plan (SIP) with particular focus on chapters and technical support documents (TSD) related to the air quality modeling components of the analysis. Our comments stemming from the review are provided below.

Summary of Key Points

Model Performance Evaluation

- There is little shown or explained in the main SIP document that supports UDAQ's claim that "the CAMx model performs well at simulating ozone at all sites." Maximum daily 8-hour average (MDA8) ozone performance over all days is consistently under predicted by a large margin and reported normalized mean bias is at the outer end of referenced performance criteria. Bias and correlation are worse when considering only days when observed MDA8 ozone exceeds 60 ppb.

- The claim that "model performance statistics suggest that the model performs well" is questionable and inaccurate. Reported statistics just within benchmark criteria indicate that the model performs somewhat better than the worst third of US photochemical modeling applications over past 15-20 years. Important contextual information about the purpose of benchmarks should be stated in Section 8.2.1. The statistical performance criteria are neither derived nor recommended by EPA; we suggest deleting any such references alluding to EPA acceptance criteria.

- The contention that regional background is well characterized by better ozone performance at the Gothic, Colorado monitoring site could be bolstered (or weakened) by showing results at other rural sites throughout the Great Basin.

- Additional information on precursor performance should be included in the main SIP document to support UDAQ's argument that the modeled ozone is well simulated, and to present likely root causes for the ozone under prediction tendency.

  - The TSD shows large NOx overestimates during morning commute hours. UDAQ's sensitivity test altering vertical diffusion rates may be too subtle. Perhaps the issue is more related to temporal allocation of mobile source emissions, that more NOx should be allocated away from morning commute hours and into midday hours when ozone chemistry is more efficient.

  - Key reactive VOCs such as formaldehyde and benzene are under predicted, suggesting a lack of secondary photochemical production of formaldehyde and a shortage of radicals (oxidants) as fuel for ozone production.

  - Morning isoprene concentrations are largely over predicted. UDAQ's reference to mobile source isoprene emissions is confusing and suggests that they contribute most to ambient isoprene concentrations. Rather, most isoprene is biogenic, yet biogenic emission models remain inadequate in characterizing western US environments.

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- Poor model performance degrades confidence that it will respond appropriately to emission changes. Under prediction of local ozone production leads to a less responsive model and thins the margin for effectiveness of emission controls.

Analysis of PBL heights

- UDAQ should include their rationale for selecting different planetary boundary layer (PBL) techniques to define vertical mixing in the WRF meteorological model and CAMx. It would be helpful to conduct sensitivity tests with WRF and/or CAMx using different PBL schemes, or at least describe why the specific options for each model were selected.

- UDAQ references data from ceilometer instruments in comparing PBL heights between WRF and CAMx. Caution and context should be included when comparing PBL heights among WRF, CAMx, and ceilometers.

- There are some key uncertainties that should be addressed: (1) ceilometers do not specifically measure PBL heights; (2) PBL differences between WRF and CAMx are most likely related to the use of different PBL approaches in each model.

Subgrid Convection

- UDAQ mentions that excessive simulated cloudiness may be a cause for large ozone under predictions on certain days. It would be helpful to show a sensitivity test that entirely removes sub-grid (or all) clouds to confirm this hypothesis.

Evaluation of NOx and VOC Sensitive Ozone Production from Source Apportionment Results

- NOx sensitivity indicated by the CAMx modeling results do not agree with a conceptual model for VOC sensitivity indicated by monitoring studies. UDAQ uses NOx sensitivity suggested by the modeling as justification for NOx controls despite not meeting VOC reduction requirements. NOx controls under VOC-limited conditions may result in higher ozone, or a "NOx disbenefit".

- Ozone source apportionment modeling indicates that 54% of ozone is attributable to NOx while 46% is attributable to VOC at Hawthorne. Model sensitivity to NOx and VOC changes (and by extension source apportionment) are dependent on the model's ability to correctly replicate conditions that actually occurred.

- Daily VOC:NOx ratios from a 2021 UDAQ monitoring study (Sghiatti and Daher, 2022) indicate that ozone at Hawthorne forms in a transitional regime (NOx and VOC sensitive). However, results from using reactivity-weighted VOC show a stronger tendency toward VOC sensitive conditions, which should be emphasized given the abundance of reported higher-reactivity alkene, aromatic and aldehyde compounds.

- The Sghiatti and Daher (2022) study also presents a weekday-weekend analysis that indicates statistically significant ozone increases during 2021 summer weekends relative to weekdays as a result of reduced mobile source NOx emissions. The authors correctly suggest that this "points to a VOC-limited regime" during 2021.

- A recent 2022 Science for Solutions monitoring study (Ninneman et al., 2023) shows ozone production increasing during the morning hours and peaking around noon, after which ozone destruction processes dominate. Therefore, VOC:NOx ratio is best evaluated during the morning hours (e.g., 6 AM to 12 PM), when results from the 2021 UDAQ study indicate a more VOC-limited regime regardless of reactivity weighting. Box modeling showed strong responses to VOC and little response to NOx, supporting a VOC-limited conditions.

- Both modeling and monitoring techniques are associated with uncertainties, and these are likely at play to various extents. However, the documented CAMx performance issues weaken conclusions drawn from the modeling that suggest NOx-sensitive conditions and strengthen conclusions drawn from two monitoring studies that suggest VOC-sensitive conditions.

<u>Estimated Impacts from Required Refinery Emission Reduction Measures</u>

- We applied UDAQ's ozone source apportionment results to estimate the impact from specific required control measures at two refineries (Chevron in Davis County and Tesoro/Marathon in Salt Lake County) on the 2023 ozone design value (DV) at Hawthorne.

  - Tesoro/Marathon NOx reduction of 87.5 TPY is 7.0% of 2017 Salt Lake County "other point source" emission sector (with Rio Tinto Kennecott off-highway mine trucks removed), while VOC reduction of 12.3 TPY is 0.9%.

  - Chevron NOx reduction of 8.9 TPY is 1.3% of 2017 Davis County "other point source" emission sector.

  - According to source apportionment results at Hawthorne, over the top 10 simulated MDA8 ozone days in 2023, "other point sources" in Salt Lake County contribute 0.30 ppb and 0.04 ppb from NOx and VOC sensitive chemistry, respectively. "Other point sources" in Davis County contribute 0.18 ppb from NOx sensitive chemistry, respectively.

  - Combining emission reductions from Tesoro/Marathon (NOx and VOC) and Chevron (NOx) with source apportionment results, we find that the total simulated 2023 ozone DV reduction from required refinery controls is 0.03 ppb at Hawthorne.

  - Conceivably this impact would be smaller if the model simulated a VOC-sensitive environment rather than NOx-sensitive, as indicated by monitoring studies.

1. Model Performance Evaluation

In Section 8.2.1, page 121 of the main SIP document, UDAQ states, "… the CAMx model performs well at simulating ozone at all sites." There is little shown or explained in the main SIP document that supports this claim. From the stated statistical results and associated tables and figures in this section, MDA8 ozone performance over all days is consistently under predicted by a large margin and reported normalized mean bias is at the outer end of the referenced performance criteria. Bias and correlation are worse when considering only days when observed MDA8 ozone exceeds 60 ppb. UDAQ appropriately acknowledge deficiencies in local emission estimates and simulated meteorology as likely causes for the performance issues.

In the same paragraph, UDAQ states, "These performance statistics suggest that the model performs well at simulating MDA8 ozone concentrations." This claim is questionable and in fact the specific statement about the statistics is inaccurate. Rather, statistics that are just within benchmark criteria indicate that agreement between modeled and observed ozone is somewhat better than the worst third of US photochemical modeling applications over past 15-20 years (Emery et al., 2016). The benchmark criteria do not define a pass/fail test, but rather provide context relative to a large population of past ozone modeling. This important contextual information about the purpose of benchmarks should be stated in Section 8.2.1. Later, in Section 8.3.2, page 127 of the main SIP document, UDAQ incorrectly states that the photochemical modeling results "… meet EPA performance metrics…"[1] The statistical performance criteria are neither derived nor recommended by EPA. Quite oppositely, it is important to stress that EPA (2018) modeling guidance warns against the use of statistical performance benchmarks to define a good or acceptable model[2]. We suggest deleting any such references alluding to EPA acceptance criteria. We note, however, that the photochemical modeling TSD properly does not mention meeting "EPA performance metrics".

UDAQ mentions better ozone performance at the high altitude CASTNET site at Gothic, Colorado, which arguably represents regional background ozone over the intermountain west. The contention that regional background is well characterized could be bolstered (or weakened) by showing additional results at other rural CASTNet sites[3] throughout the Great Basin (e.g., at National Parks and Wilderness area in Utah and Nevada).

1b) NOx Evaluation

Additional information on precursor performance should be included from the photochemical modeling TSD to help shed additional light on UDAQ's argument that the modeled ozone is well simulated, and additionally to present likely root causes for the ozone under prediction tendency. The TSD shows large NOx overestimates during morning commute hours. Such high NOx likely squelches early ozone production, making it difficult for ozone to "catch up" later in the day. Based on the "box plots" in Figures 22 and 23 in the TSD, this is a common feature that may be influencing ozone performance.

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[1] A similar statement is repeated in Section 9.5, page 148.

[2] EPA (2018) photochemical modelling guidance, page 69: "…it is not appropriate to assign 'bright line' criteria that distinguish between adequate and inadequate model performance. In this regard, the EPA recommends that a "weight of evidence" approach be used to determine whether a particular modeling application is valid for assessing the future attainment status of an area."

[3] https://www.epa.gov/castnet

While the TSD mentions sensitivity testing with KVPATCH that alters NOx but has no impact on MDA8 ozone, that testing may be too subtle. Perhaps the issue is more related to temporal allocation of mobile source emissions, that more NOx should be allocated away from morning commute hours, when chemistry is NOx-rich and VOC-sensitive, and into midday hours when chemistry is efficient and more NOx-sensitive.

1c) VOC Evaluation

Key reactive VOCs such as formaldehyde and benzene are under predicted (TSD Figures 29 and 31), suggesting a lack of secondary photochemical production of formaldehyde and a shortage of radicals (oxidants) as fuel for ozone production. This could be related to the heavy NOx burden.

In TSD Section 4.7.3, page 27, UDAQ states, "Modeled isoprene displayed high values during early morning-midday hours (8 am - 12 pm)." The average morning peak isoprene in Figure 27 of the TSD shows modeled concentrations reaching almost 2 ppb. UDAQ goes on to say in the same paragraph, "Measured isoprene, on the other hand, peaked much earlier in the morning (between 6 and 9 am), potentially consistent with primary mobile source emissions." The average morning peak isoprene in Figure 28 of the TSD shows measured concentrations reaching only 0.5 ppb. The reference to mobile emissions is confusing and suggests that mobile source emissions contribute most to isoprene emissions. Rather, the majority of isoprene is biogenic, with only minor contributions from mobile sources. Therefore, it is most likely that the over predicted morning isoprene stems from a poor characterization of the BEIS biogenic emissions model.

As described in UDAQ's photochemical modeling TSD, the different versions of BEIS produce very different characterizations of biogenic VOC as depicted by the sensitivity for isoprene concentrations (Figure 3, page 10 of the TSD). We have also noted significant variability in rural and urban biogenic VOC emissions among the last 3 versions of BEIS (v3.6 through 4.0) applied in Denver and Las Vegas. We have seen that BEIS3.6 generates too little urban biogenic emissions but large over estimates of rural emissions; BEIS3.7 generates too much urban emissions but adequate amounts of rural emissions, and BEIS4 generates much less urban and rural emissions than either predecessor. All of this indicates that models for this source sector remain inadequate in characterizing western environments.

1d) UDAQ's conclusions

UDAQ concludes at the end of Section 8.2.1 of the main SIP document, "These results provide confidence in the ability of the modeling platform to provide a reasonable projection of future year ozone concentrations and source contributions in the NWF NAA." This is a strong statement given the lack of evidence in this section and the precursor assessment in the TSD. The concern about ozone performance, and the reason why it is a key part of SIP modeling, is that relatively poor performance degrades confidence that the model will respond appropriately to emission changes. In other words, the model may look mostly right but for the wrong reasons. It is possible that under prediction of local ozone production thins the margin for ozone reductions from controls and leads to a less responsive model in the relative response factor (RRF) calculation used in the design value projection. For example, under predictions of ozone might be caused by excessive NOx that inhibits ozone formation, and NOx controls may lift that inhibition and lead to higher ozone (a "NOx disbenefit" condition). Ozone underpredictions may also be associated with insufficient VOC, which may reduce effectiveness of VOC emission controls. UDAQ acknowledges this at the top of the weight of evidence section (8.3.2, page

127 of the main SIP document), by stating that model uncertainties "… may result in an overestimation in future predicted ozone concentrations."

2. Meteorological Inputs and Analysis

2a) Pressure Units

Pressure units are labelled as millibars (mb) in the photochemical and meteorological modeling TSDs, but the pressure values tabulated in both documents indicate units are Pascals (Pa = 100 x mb).

2b) Analysis of PBL heights

The treatment of the planetary boundary layer (PBL) and associated vertical mixing (or diffusion) is a critically sensitive component in both WRF and CAMx. In Section 4.2, page 6 of the photochemical modeling TSD, UDAQ states that vertical diffusivities (Kv) were calculated for CAMx using the "YSU" planetary boundary layer (PBL) method. The meteorological modeling TSD states that WRF was run using the "MYNN Level 2.5" PBL method (Section 1.2.2, Table 1.3, page 14). WRF includes the YSU algorithm, and the WRFCAMx interface program allows Kv fields to be calculated using turbulent kinetic energy data generated by the MYNN Level 2.5 algorithm. So a consistent PBL approach could have been used in both models (both MYNN or both YSU). UDAQ should include their rationale for selecting the MYJNN approach in WRF relative to the many other options available (including YSU), and why a different approach was used in CAMx. It would be helpful to conduct sensitivity tests with WRF and/or CAMx using different PBL schemes, or at least describe why these specific options for each model were selected.

In Section 4.7.2, page 24 of the photochemical modeling TSD, UDAQ states that the NOx over prediction bias "… is potentially related to an underestimation in the planetary boundary layer (PBL) depth during these overnight hours, as indicated by a comparison between modeled PBL height from wrfcamx and observed PBL height …" (referencing Figure 24 of the TSD). There are some key points that should be addressed in the TSD. First, the referenced ceilometer-derived PBL heights are not necessarily indicative of the actual PBL depth because they do not measure actual turbulent energy but rather backscatter from often unrelated features such as cloud base and aerosol layers. Second, PBL differences between WRF and CAMx (the latter is also incorrectly referred to as "wrfcamx" in the TSD) are most likely related to the use of different PBL approaches in each model, as noted above.

It is important that the TSD explain which PBL information is actually used within CAMx. The rate of vertical mixing in CAMx is quantified using Kv diffusivity fields. PBL heights are not used directly in CAMx but are simply reported for informational purposes (e.g., quality assurance). Reported CAMx PBL heights may vary from the PBL reported by WRF, but this has no effect on model results. Therefore, caution and context should be included when comparing PBL heights among WRF, CAMx, and ceilometers.

2c) Subgrid Convection

In Section 4.2, page 6 of the photochemical modeling TSD, UDAQ states, "Kain-Fritsch subgrid convection and subgrid stratiform cloud options were also invoked." This is one of two options in WRFCAMx that diagnose the amount of sub-grid cloudiness in each grid column. If none of the options are selected, no sub-grid cloudiness is calculated. There is no indication in the TSD about whether this

option was applied for all grids or for just the larger grids. It is likely that this option generates excessive cloudiness at the 1.333 km grid scale as clouds should be well-resolved by WRF at such resolution. UDAQ mentions in the model performance evaluation that excessive simulated cloudiness may be a cause for large ozone under predictions on certain days. It would be helpful to show a sensitivity test that entirely removes sub-grid (or all) clouds to see if they are primarily responsible for the consistent ozone under prediction tendency.

3. Evaluation of NOx and VOC Sensitive Ozone Production from Source Apportionment Results

In section 7.4.1, pages 114-115 of the main SIP document, UDAQ discusses the rationale for the effectiveness of NOx controls within the NWF NAA. Figure 6 on page 115 of the SIP shows results from ozone source apportionment modeling, which tracks ozone formed separately under NOx and VOC limited (or sensitive) conditions, which indicates that 54% of ozone is attributable to NOx limited chemistry while 46% is attributable to VOC limited at Hawthorne when averaged over all days of the modeling episode. A similar breakdown is shown at Bountiful. As stated above, model sensitivity to NOx and VOC changes (and by extension source apportionment) are dependent on the model's ability to correctly replicate conditions that actually occurred. As we discuss below, NOx sensitivity indicated by the CAMx modeling results do not agree with a conceptual model for VOC sensitivity indicated by monitoring studies. UDAQ uses NOx sensitivity suggested by the modeling as justification for NOx controls despite not meeting VOC reduction requirements.

On page 114, UDAQ states that "the findings are consistent with those from a VOC/NOx ratio analysis conducted by the UDAQ which utilized NOx and VOC measurements collected at the Hawthorne monitoring site during the summer of 2021" (Sghiatti and Daher, 2022). The reference includes plots of VOC:NOx ratio calculated with and without consideration of VOC reactivity (reproduced in Figure 1 below). VOC:NOx < 5 indicates VOC-limited (sensitive) chemistry, VOC:NOx > 15 indicates NOx-limited chemistry, and values between 5 and 15 indicate transitional chemistry that responds to changes in both. Based on results shown in Figure 1, presumably by visually averaging hourly results over all daytime hours, Sghiatti and Daher conclude that ozone at Hawthorne forms in a transitional regime. The reactivity-weighted figure shows a tendency toward more VOC-limited conditions, and perhaps more emphasis should be given to that figure given the abundance of higher-reactivity alkene, aromatic and aldehyde compounds according to measurements shown by Sghiatti and Daher, as well as Ninneman et al. (2023).

Sghiatti and Daher (2022) also present a weekday-weekend analysis of monitored ozone that indicates statistically significant ozone increases during 2021 summer weekends as a result of reduced mobile source NOx emissions. The authors correctly suggest that this "points to a VOC-limited regime" during 2021. In previous years spanning 2017-2020, weekday-weekend ozone differences were not statistically significant. The authors offer no potential reasons for the unique conditions analyzed in 2021, but the results suggest recently lower VOC relative to NOx in the Hawthorne area (i.e., a lower VOC:NOx ratio).

Under a Science for Solutions grant, Ninneman et al (2023) conducted photochemical box model simulations constrained by 2022 precursor and meteorological measurements at the Utah Technical Center during days influenced by wildfire smoke and on smoke-free days. The box model showed ozone production increasing during the morning hours and peaking around noon, after which ozone destruction processes dominated (Figure 2 below).

Therefore, VOC:NOx ratio is best evaluated during the morning hours (e.g., 6 AM to 12 PM), when Figure 1 indicates a more VOC-limited regime regardless of reactivity weighting. Box model sensitivity tests in which VOC and NOx precursor concentrations were systematically reduced separately and together showed strong responses to VOC and little response to NOx until very deep NOx reductions were applied (Figure 3 below) or reductions were applied collectively. Thus, results clearly show VOC-sensitive conditions at the Utah Technology Center, although that site measures some of the highest NOx in the area and so results in Figure 3 are not surprising.

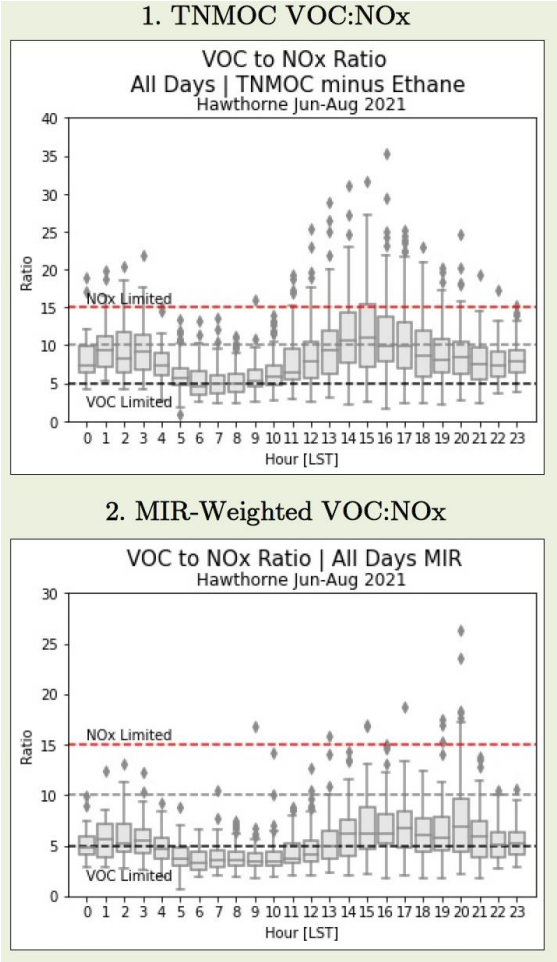

Figure 1. Monitored VOC:NOx ratios at Hawthorne using two different techniques using total non-methane hydrocarbons (TNMOC; top) and maximum incremental reactivity (MIR) weighted VOCs (bottom). Figure from Sghiatti and Daher (2022).

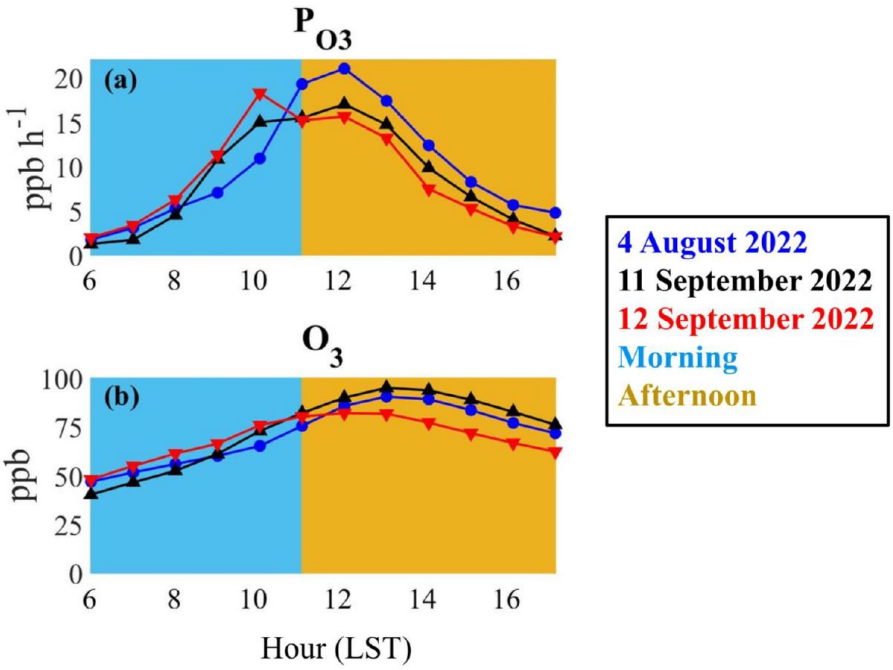

Figure 2. Diurnal profiles of ozone production rate (top) and total ozone concentration (bottom) simulated by a box model run using data from the Utah Technology Center on 3 days in 2022: smoke-influenced days (11 and 12 September) and a smoke-free day (4 August). Figure from Nenniman et al. (2022).

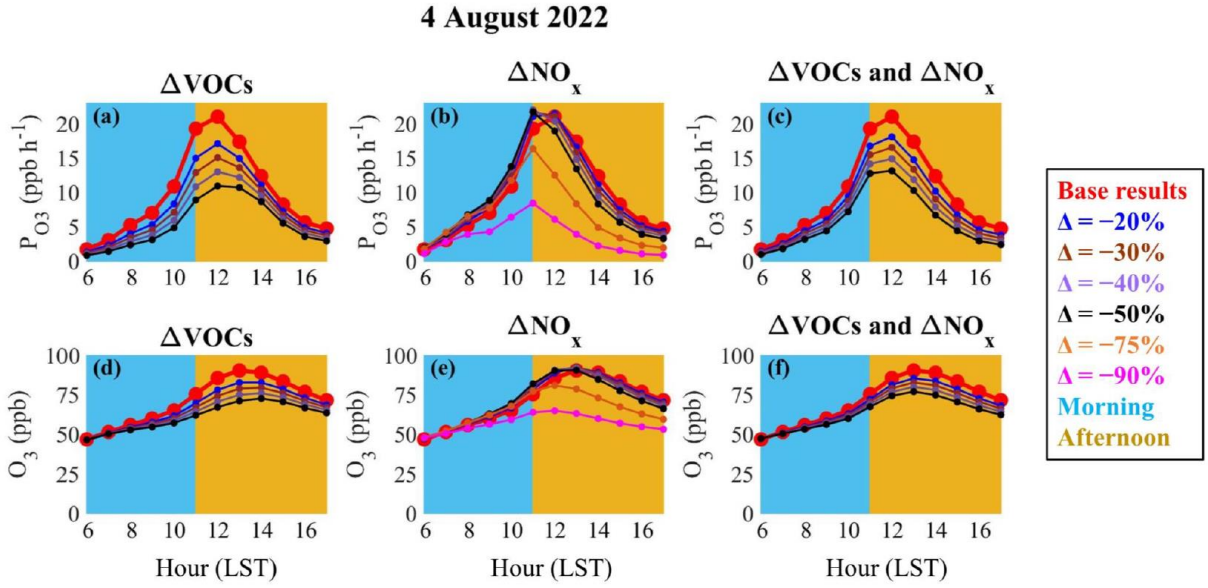

Figure 3. Diurnal profiles of ozone production rate (top) and total ozone concentration (bottom) simulated by a box model on the smoke-free day of August 4. Results from 6 NOx and VOC emission reduction scenarios are also plotted, indicating strong VOC sensitivity and little NOx sensitivity. Figure from Nenniman et al. (2022).

In summary, recent ozone and precursor analyses at two different monitoring sites indicate a stronger tendency toward VOC-limited photochemistry during hours of increasing and maximum ozone production, while CAMx shows a stronger tendency toward NOx-limited photochemistry. There are several possible reasons for this, as both techniques are associated with uncertainties: (1) since the model is not constrained by measured values (as box modeling is), error propagation stemming from uncertainties in emissions (values, time/space allocation) or meteorological inputs (chemical kinetics, vertical mixing, transport patterns) may cause an improper characterization of chemical sensitivity; (2) point measurements at monitoring sites sense local conditions but cannot provide information on how ozone is formed in other areas of the NWF NAA that are transported into the local monitored area. Both issues are likely at play to various extents, however, the documented CAMx performance issues throughout the modeling period weaken conclusions drawn from the modeling about NOx-sensitive conditions and strengthen conclusions about VOC-sensitive conditions drawn from the monitoring studies.

4. Estimated Impacts from Required Refinery Emission Reduction Measures

The SIP lists a number of control measures, mostly to address the Moderate Area requirement for Reasonably Available Control Technology (RACT) applied to stationary permitted sources. We applied UDAQ's ozone source apportionment technology (OSAT) results to estimate the impact on the 2023 ozone design value (DV) at the Hawthorne monitoring site from specific refinery emission control measures at two refineries:

1. Chevron (Davis County): ultra-low NOx burners on 2 crude heaters (8.9 TPY total NOx reduction)[4]
2. Tesoro/Marathon (Salt Lake County):
   a. Selective Catalytic Reduction (SCR) on co-generation turbines (87.5 TPY total NOx reduction);
   b. Second seal on Tank 321 and closed vent with carbon absorption on wastewater system (12.3 TPY total VOC reduction)

Strictly speaking, OSAT is not equivalent to a "sensitivity analysis" with which to estimate effects of emission reductions on ozone concentrations. This is because ozone chemistry responds non-linearly to emission changes. OSAT reports an estimate of attribution under the specific environmental and emission conditions that are given to the model. When those conditions change (e.g., to simulate impacts from a control measure), attribution can change non-linearly, either positively or negatively. However, the ozone response approaches linearity as emission changes or ozone attribution decrease. In this case, both the emission reductions relative to county-level totals and their ozone contributions at Hawthorne are rather small, affording us to use OSAT results to estimate first-order (linear) ozone impacts from the emission reductions above.

[4] Section 4.4.5, Page 44 of the main SIP document states this is a 62% NOx reduction for process heaters, but according to the 2017 Emission Inventory (https://deq.utah.gov/air-quality/2017-statewide-emissions-inventories) process heaters emit 122 TPY (8.9 TPY reduction is 7%). We could not find an equivalent 2023 process-level inventory among UDAQ's SIP material or the referenced website. We have assumed that the stated NOx TPY reduction is correct.

UDAQ tracked many different source categories with OSAT for the 2023 future year base case (i.e., 2023 projected emission inventory reflecting measures currently "on-the-books" and implemented by 2023). Refinery emissions were contained along with many other miscellaneous source types within a sector referred to as "other point sources". OSAT tracked emissions from this sector for each county within the NWF NAA. For our calculations, we needed a county- and process-specific emission inventory for 2023 but could only find such information for the 2017 base year.[5] We used the 2017 inventory for our purposes assuming that permitted point source emission rates have not changed significantly from 2017 to 2023.

Table 1 lists 2017 annual NOx and VOC emissions in Salt Lake and Davis Counties for sources comprising the "other point source" category, according to UDAQ's definition of those sources within the SIP and associated TSDs. Since the 2023 OSAT modeling tracked point sources associated with electric generating units, oil and gas sources, and off-highway mining trucks operating at the Rio Tinto Kennecott facility separately from the "other point source" category, those NOx and VOC emissions were removed from the Salt Lake and Davis County inventories. Additionally, the Rio Tinto Kennecott power plant did not operate in 2023, nor did the Davis County Landfill & Energy Recovery Facility (DCERF), so those emissions were also removed. Table 1 also shows the total absolute and percent emissions contributed by Tesoro/Marathon and Chevron facilities, respectively. Finally, the table shows the respective NOx and VOC reductions from the control measures listed above relative to the county totals. We assumed that annual emission rates are representative of emissions on any given summer day.

Table 1. County-level 2017 emissions reported by UDAQ for the "other point source" OSAT category containing the two refineries subject to required control measures as shown.

Salt Lake	**NOx (TPY)**	**VOC (TPY)**
Total "other point sources"	1256	1302
Tesoro/Marathon	313 (25%)	231 (18%)
Required Controls	87.5 (7.0%)	12.3 (0.9%)
Davis		
Total "other point sources"	665	1670
Chevron	254 (38%)	377 (23%)
Required Controls	8.9 (1.3%)	0 (0%)

We received UDAQ's model output files via disk transfer and processed raw hourly OSAT tracer concentrations to MDA8 ozone in local time. Figure 4(a) shows resulting time series of attribution for five aggregate source categories at Hawthorne, while Figure 4(b) shows the average over the top 10 highest simulated ozone days. Figure 5 is a copy of Figure 17, page 132 from the main SIP document. We extracted data from CAMx "receptor files", which report source apportionment results at pre-defined receptor coordinates defined by UDAQ. However, we could not replicate UDAQ's source apportionment results; while exhibiting similar patterns, our results tend to be higher during peak periods and the distribution of high days differ.

[5] 2017 EI website: https://deq.utah.gov/air-quality/2017-statewide-emissions-inventories

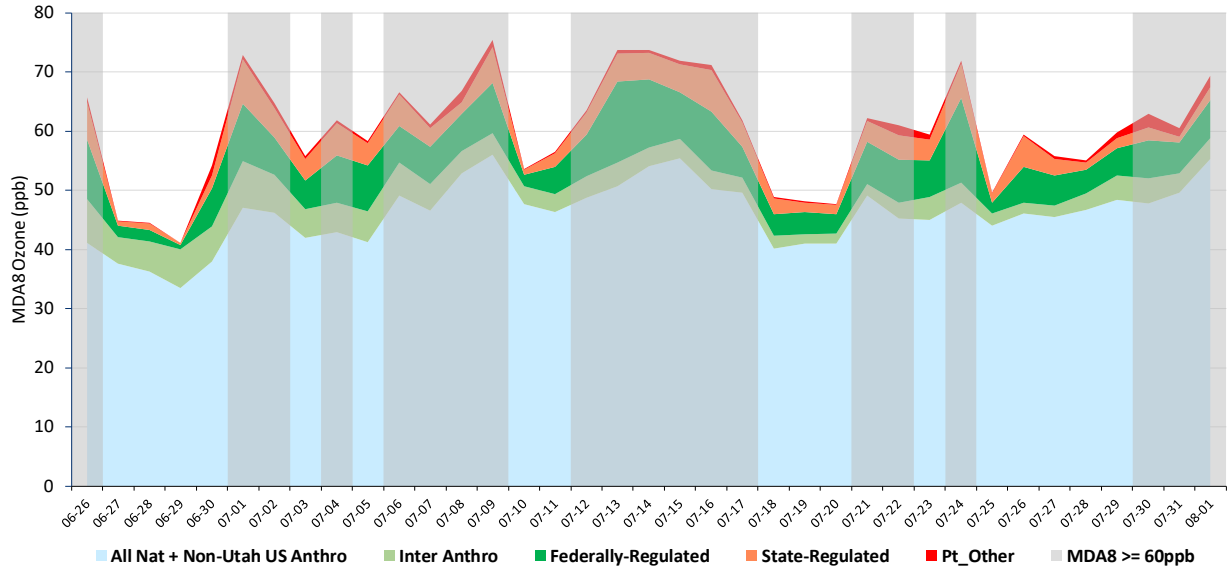

Figure 4(a). Time series of Ramboll's processing of MDA8 ozone contribution at Hawthorne from 5 aggregated sources/regions: all global natural and non-Utah US anthropogenic (blue); all international anthropogenic (light green); all Utah federally regulated (dark green); Utah state-regulated "other point sources" (red); all remaining Utah state-regulated (orange).

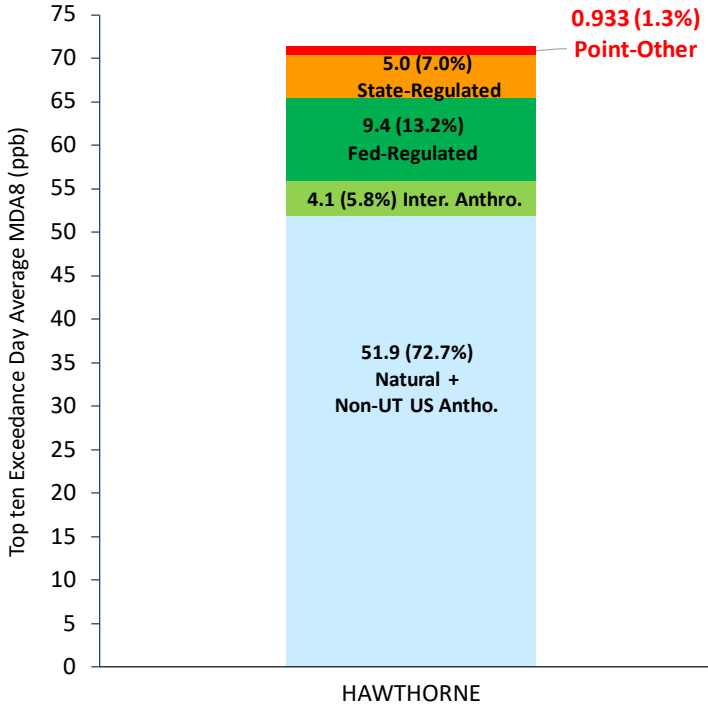

Figure 4(b). Average of Ramboll's processing of MDA8 ozone contribution at Hawthorne over the top 10 days shown in Figure 4(a) from 5 aggregated sources/regions: all global natural and non-Utah US anthropogenic (blue); all international anthropogenic (light green); all Utah federally regulated (dark green); Utah state-regulated "other point sources" (red); all remaining Utah state-regulated (orange).

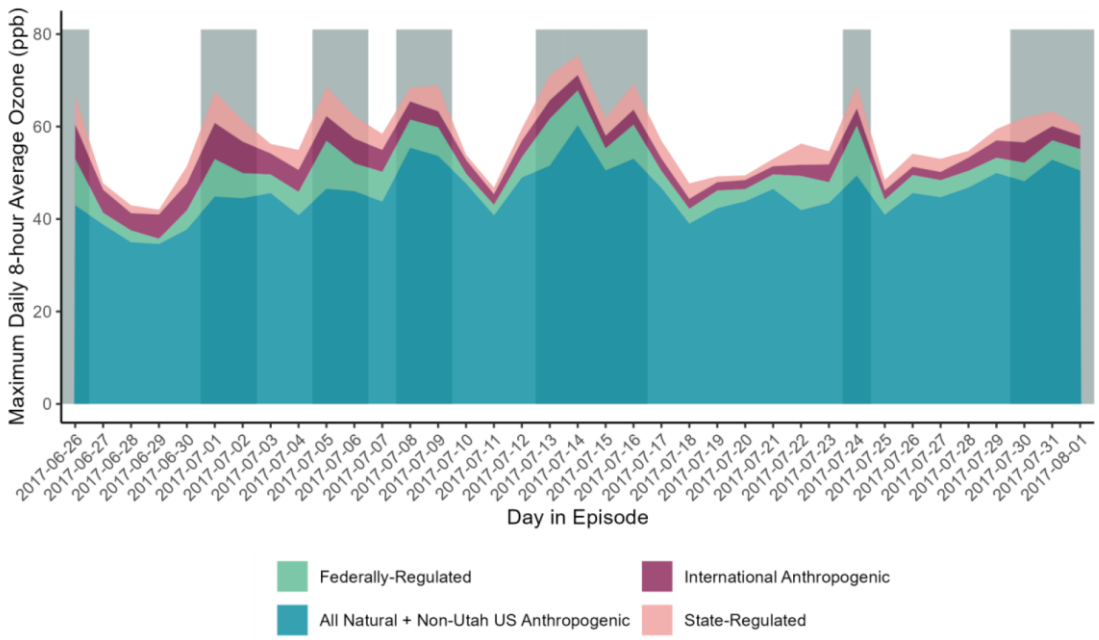

Figure 5(a). Time series of UDAQ's MDA8 ozone contribution at Hawthorne from 4 aggregated sources/regions:[6] all global natural and non-Utah US anthropogenic (blue); all international anthropogenic (red); all Utah federally regulated (green); all Utah state-regulated (pink).

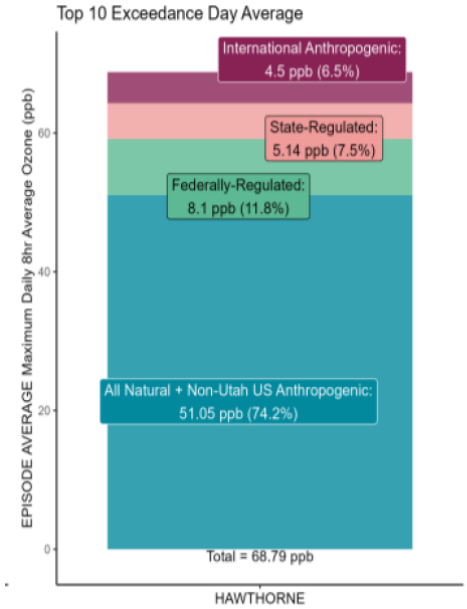

Figure 5(b). Average of UDAQ's MDA8 ozone contribution at Hawthorne over the top 10 days shown in Figure 5(a) from 4 aggregated sources/regions[6]: all global natural and non-Utah US anthropogenic (blue); all international anthropogenic (red); all Utah federally regulated (green); all Utah state-regulated (pink).

[6] From Figure 17, page 132 of main SIP document.

We conducted substantial quality assurance checks of our approach at each processing step and tested numerous possible causes. This included confirming that we could achieve identical results by extracting data from raw gridded data (rather than receptor files) and confirming that total ozone simulated by the core model at Hawthorn matched the sum of all tracers shown in Figure 4. We also extensively interacted with UDAQ staff to find possible reasons of discrepancies at each step of processing but could not identify a specific cause. Based on our substantial checks, we are certain that our results are correct.

According to our results, the "other point source" category that contains refineries contributes a total of 0.9 ppb over the top 10 simulated MDA8 ozone days. Figure 6 shows a breakout of the 0.9 ppb contribution from "other point sources" by NOx (O3N) and VOC (O3V) sensitive ozone production, and from Salt Lake County, Davis County, and other areas outside the two counties. Point sources in Salt Lake County contribute 0.30 ppb (32%) and 0.04 ppb (4%) from NOx and VOC sensitive chemistry, respectively. Point sources in Davis County contribute 0.18 ppb (19%) and 0.10 ppb (11%) from NOx and VOC sensitive chemistry, respectively. For both counties, results indicate more NOx-sensitive ozone formation from point sources. All other point sources located throughout the remainder of the 4/1.33 km modeling domains contribute 0.32 ppb (34%) and <0.01 ppb (0.4%) from NOx and VOC sensitive chemistry, respectively. The stronger NOx-sensitive response from the outside point sources makes sense as they are mostly removed from the central urbanized area of the NAA, and thus ozone formation occurs in more NOx-lean and relatively biogenic VOC-rich suburban and rural areas.

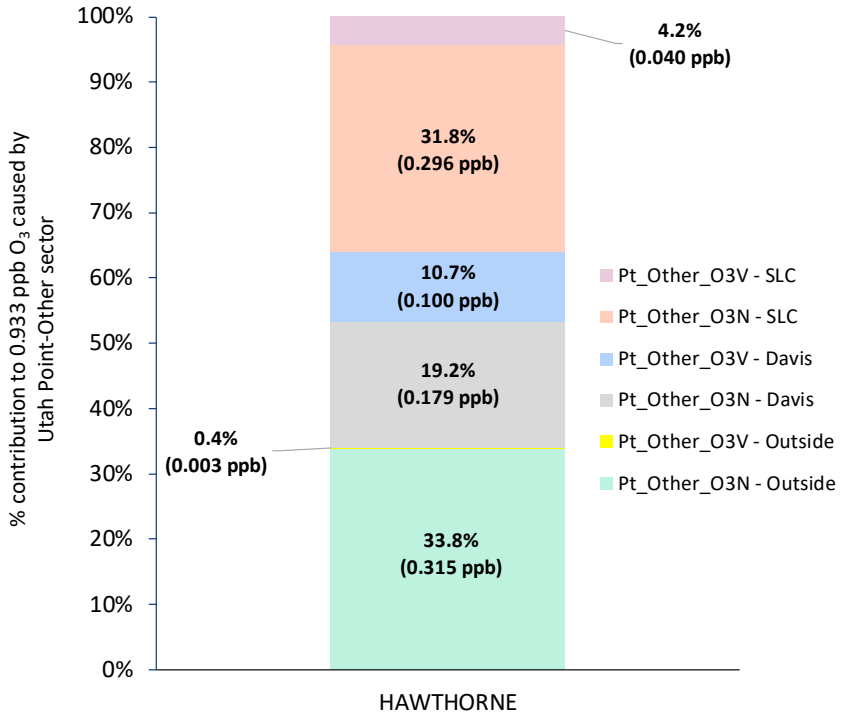

Figure 6. Average of Ramboll's processing of MDA8 ozone contribution at Hawthorne over the top 10 days shown in Figure 4(a) from 6 aggregated "other point source" tracers. Contributions are split by whether ozone was generated by NOx (O3N) or VOC (O3V) sensitivity photochemistry.

We estimated the ozone impacts from simulated refinery control measures in 2023 at Hawthorne by multiplying contributions from Figure 6 by the relative emission reductions shown in Table 1. Results are shown in Table 2. The total simulated MDA8 ozone reduction from refinery measures averaged over the highest modeled ozone days is 0.02 ppb. Conceivably this impact would be smaller if the model simulated a VOC-sensitive environment rather than NOx-sensitive, as indicated by monitoring studies.

Table 2. County-level refinery emission reductions (Table 1) applied to modeled MDA8 O3N and O3V from "other point sources" averaged over the top 10 modeled ozone days (Figure 6), resulting in total MDA8 ozone impact at Hawthorne. Estimated average ozone reductions by individual control measure at each refinery are highlighted in yellow.

Salt Lake	**NOx Reduction**	**Total O3N**	**O3N Reduction**	**VOC Reduction**	**Total O3V**	**O3V Reduction**
Tesoro	7.0%	0.30	0.021	0.9%	0.04	0.00036
Davis						
Chevron	1.3%	0.18	0.0023	0 (0%)	0.10	0
Subtotal		0.48	0.0233		0.14	0.0036
Total Ozone Reduction	0.0269 ppb (O3N reduction + O3V reduction)					

We then projected the total refinery ozone reduction estimate to the 2023 base ozone DV by scaling by the ratio of the 2023 projected DV to the mean modeled ozone over the top 10 modeled days (71.4 ppb, Figure 4(b)), in parallel to the procedure employed by the Software for Modeled Attainment Test (SMAT; EPA, 2018). We did this calculation twice with different 2023 base projected DVs: once with wildfire-flagged days not excluded by UDAQ (74 .3 ppb[7]) and once with wildfire days excluded by UDAQ (72.7 ppb[7]). Table 3 shows the projected 2023 ozone DV reductions from combining control measures from Tesoro/Marathon (NOx and VOC) and Chevron (NOx). Since the modeled highest 10-day average ozone is just slightly lower than the projected 2023 DVs in both cases, the projected total refinery ozone DV impacts from required controls are consistently 0.03 ppb.

Table 3. Projected 2023 ozone DV impact at Hawthorne from all combined refinery control measures (Table 2) on Tesoro/Marathon (NOx and VOC) and Chevron (NOx).

	All Days in DV Calculation	**Wildfire-flagged Days Removed in DV Calculation**
2023 Projected DV[5]	74.3 ppb	72.7 ppb
Relative Response Factor	1.041 (74.3/71.4)	1.018 (72.7/71.4)
2023 Projected DV RACT Impact	0.0280 ppb	0.0273 ppb

[7] Table 68, page 126, main SIP document.

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Attachment II

Letters to UDAQ from UPA Regarding RACT: Preliminary RACT Determinations Letter (March 10, 2023) and RACT Selection Criteria Letter (February 2, 2023)

Utah Petroleum Association

6905 S. 1300 E. #288, Cottonwood Heights, UT 84047-1817

FUELING UTAH'S GROWTH & PROSPERITY

March 10, 2023

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

Submitted by email to bbird@utah.gov

Subject: UDAQ Preliminary RACT Determinations for Petroleum Refineries in the Northern Wasatch Front Ozone Nonattainment Area

Dear Bryce:

The Utah Petroleum Association ("UPA") sends this letter about recent Utah Division of Air Quality ("UDAQ") determinations of Reasonably Available Control Technology ("RACT") provided to some of our member company petroleum refineries operating within the Northern Wasatch Front ozone nonattainment area ("NWF"). In short, we are concerned that the determinations are inconsistent with applicable legal and regulatory requirements, will not assist in advancing the goal of attainment, are based on incomplete and inaccurate information, and are being developed on a fast-track schedule that does not provide adequate time for the normal exchanges of information that typically take place between affected sources and UDAQ. We detail our concerns here for inclusion in the record.

In good faith, our member companies submitted updated RACT evaluations to UDAQ to ensure that the RACT determinations for the NWF Moderate State Implementation Plan ("SIP") would be based on more accurate, up-to-date information to the extent this could be prepared in the short time available, rather than pulling from five-year-old evaluations of Best Available Control Technology ("BACT") developed for the $PM_{2.5}$ SIP.[1] UDAQ subsequently notified some of the refineries that they must install additional nitrogen oxide ("NOx") controls before the summer ozone season of 2026, stating that the "additional control technologies are considered RACT."

While UDAQ indicated that it has determined these controls to constitute RACT, it offered no basis for that determination. For example, it did not address considerations related to cost

[1] While the updated information was better than the five-year old information, companies were still required to provide it on a relatively expedited basis. This resulted in information and assumptions that, while the best available given the time constraints, was nonetheless itself incomplete and likely conservative in that it tended to underestimate total control cost. Companies nonetheless believed this information to be sufficient for the purpose in that the estimates showed cost effectiveness significantly higher than what has been understood to constitute RACT (and even BACT). Accordingly, companies considered the precision of the estimates to be sufficient for screening out certain controls from further consideration as RACT.

effectiveness[2] or timing for the installation of the controls.[3] Nor did it address the necessity (or even the potential for marginal benefit) of the controls in bringing about attainment, an especially egregious oversight in view of the particular parameters of the airshed such as, for example, the contribution of international transport to nonattainment. We explain below.

UDAQ's Proposed RACT Does Not Comply with the Requirements of the Clean Air Act and the Corresponding Federal Regulations

The Clean Air Act ("CAA") and SIP rules for various National Ambient Air Quality Standards ("NAAQS") call for implementing RACT level of control.[4] Additionally, states often apply RACT for Regional Haze SIPs. The regulations for procedural requirements for SIPs define RACT as follows:

> *Reasonably available control technology (RACT) means devices, systems, process modifications, or other apparatus or techniques* ***that are reasonably available*** *taking into account:*
>
> *(1) The necessity of imposing such controls in order to attain and maintain a national ambient air quality standard;*
>
> *(2) The social, environmental, and economic impact of such controls; and*
>
> *(3) Alternative means of providing for attainment and maintenance of such standard. (This provision defines RACT for the purposes of § 51.341(b) only.)*[5] [emphasis added]

An important aspect of this definition is that the controls be *reasonably available*. Rather than applying the regulatory RACT criteria, UDAQ appears instead to have acted in an arbitrary, ad hoc manner to impose controls under the guise of RACT. One of the hallmarks of administrative rulemaking is that an agency such as UDAQ provide a reasoned explanation for its proposed action. UDAQ has done no such thing, instead, simply announcing its conclusion without providing any supporting rationale.

Cost Criteria

Cost effectiveness has long been a key criterion in making determinations of what controls are appropriate under various Clean Air Act programs. These include BACT for Prevention of Significant Deterioration ("PSD") review, BACT for SIPs, RACT for SIPs and the Regional Haze Program, MACT under the hazardous air pollutant program, and Lowest Achievable Emission Rate ("LAER") under the major nonattainment New Source Review ("NSR") program. As

[2] The UDAQ RACT determinations have cost-effectiveness ranging between $24,000 and $28,000 per ton of NOx emissions reduced. These values fall ***far*** outside of the upper range that has typically been considered to be cost effective for RACT.

[3] UDAQ is requiring that the controls be installed by the summer of 2026. While it is not clear that the controls can even be installed by that deadline – additional analysis would be required to understand when such controls could be installed assuming that they were, in fact, determined to constitute RACT – they certainly cannot be installed by the regulatory deadline for RACT for the NWF nonattainment area which is January 1, 2023.

[4] See, for example, CAA §182(b)(2), CAA §182(f), and 40 CFR §51.1312 for ozone nonattainment areas; CAA §189(a)(1)(C) and 40 CFR 51.1009(a)(4) for particulate matter nonattainment areas.

[5] 40 CFR Part 51 Subpart F Procedural Requirements §51.100(o).

explained in our February 2023 letter, the maximum cost-effectiveness threshold indicated for ozone RACT should be no greater than $5,000 to $7,500 per ton of emission reduced (copy of February letter attached).[6] Any higher level of control would not be *reasonably available*. The controls being suggested as RACT by UDAQ's recent e-mail communications have cost effectiveness of $24,000 per ton and greater and, therefore, cannot be deemed to be "reasonably available." In fact, the UDAQ RACT determinations are ***three to four times more costly than appropriate*** and even exceed levels typically used for the higher level of control for BACT determinations, as shown in the February 2023 letter.

No justification exists to make RACT determinations at such high cost effectiveness levels. While we understand that UDAQ may be reluctant to offer an exact cost effectiveness threshold, there must be some reasonable upper-bound cost effectiveness that guides its decision making. We find no other examples of RACT determinations approaching this cost effectiveness threshold. Moreover, setting the cost effectiveness level this high – and significantly higher than other similarly-situated states – sets a discouraging precedent for those that do, or might seek to do, business in Utah. Such a precedent will discourage business and industry from relocating to Utah or from investing further within Utah due to the high costs of emission controls.[7] The precedent would carry into future SIPs and even into minor NSR BACT determinations for air permitting.

Deadline for Installation of RACT Controls

Furthermore, the installation deadline provided to the refineries (summer 2026) for the new controls fails to consider (i) the regulatory timeline requirement for RACT installation or (ii) whether the work could be done within the existing refinery planned turnaround schedule or even whether the engineering and procurement can be completed on time.

EPA's recently published Determination of Attainment by Attainment Date ("DAAD") for the 2015 ozone NAAQS established an installation date of January 1, 2023, for installation of all VOC and NOx RACT controls:

> *SIP revisions required for the newly reclassified Moderate areas must be submitted no later than January 1, 2023, and RACM/RACT for these areas must be implemented as expeditiously as practicable, but* ***no later than the same date***.[8, 9] [emphasis added]

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[6] Letter, Rikki Hrenko-Browning to Bryce Bird, *Criteria for Selection of Reasonably Available Control Technology*, February 2, 2023 ("February 2023 Letter")

[7] We are assuming that UDAQ is applying its cost effectiveness threshold equally across all industries and not singling out the refineries for disparate treatment. A central purpose of cost effectiveness is to create a level playing field so that all sources and industries are treated equally.

[8] 87 FR 60897, *Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as Marginal for the 2015 Ozone National Ambient Air Quality Standards* ("DAAD"), p. 60907/1.

[9] This RACT installation date set in the DAAD comports with the requirements of the SIP implementation rule for the 2015 ozone standard:

> *For RACT required pursuant to reclassification, the state shall provide for implementation of such RACT as expeditiously as practicable, but* ***no later than the start of the attainment year ozone season associated with the area's new attainment deadline****, or January 1 of the third year after the associated SIP revision submittal deadline,* ***whichever is earlier****;* ***or the deadline established by the Administrator in the final action issuing the area reclassification****. (*40 CFR Part 51 Subpart CC §51.1312(a)(3)(ii)) [emphasis added]

UDAQ has not explained how these controls can be justified as RACT if such a clear, unambiguous deadline requirement cannot possibly be satisfied. We are unaware of any authority that would allow UDAQ to ignore the regulatory requirement under which it purports to be acting pursuant to.

Even assuming that UDAQ had a basis for ignoring the legal deadline for RACT installation, the arbitrary summer of 2026 deadline that it would substitute is flawed for several reasons. First, we are unaware of any analysis – by the subject companies or UDAQ – that has been completed to determine if the installation of these control systems could be accomplished that date. The engineering, design, procurement, contracting, and scheduling associated with such significant projects is extensive and, at present, there is no basis for concluding that UDAQ's summer 2026 deadline is feasible.

An additional consideration impacting scheduling relates to refinery "turnaround" schedules. Due to the integrated operating nature of refineries, projects of this magnitude are typically planned for a refinery's scheduled turnaround. Refineries establish their turnaround schedules years in advance to accommodate extensive engineering, maintenance, equipment codes, upgrades, product delivery commitments, and other factors, and typically spend years planning the myriad of details so they can procure the necessity parts and equipment including long-delivery items and execute the turnaround safely, on time, on budget, and without incident. Disruptions to the schedule and inadequately planned turnarounds risk the safety of those involved as well as cost and schedule overruns and can lead to incidents including environmental incidents.

Requiring installation of controls without accounting for the established turnaround schedule could add millions of dollars to the installation cost based on the duration of the required additional turnaround and the lost profit opportunity associated with the additional turnaround. Refineries did ***not*** consider disruptions to the normal planned turnaround schedule or lost profit opportunity in their cost effectiveness calculations in their RACT evaluations, nor did they think it would be necessary to do so because they did not anticipate being told to install controls as RACT with such high cost effectiveness values (even without accounting for these additional costs) and within a short time window.

Thus, the controls in the RACT determinations cannot be installed by the regulatory time frame – which has passed. Nor can they be installed by the (unexplained) summer of 2026 deadline that UDAQ proposed.

Necessity of Controls to Attain/Maintain NAAQS

As noted, the definition of RACT specifically provides for taking into consideration, "[t]he necessity of imposing such controls in order to attain and maintain a national ambient air quality standard." UDAQ has not shown if or how the controls in the RACT determinations would support the

EPA initially designated the NWF as nonattainment in 2018 with an effective date of August 3, 2018 (83 FR 25776). Based on the effective initial designation date, the attainment date for the NWF at Moderate is six years later, in other words August 3, 2024 (See Table 1 of 40 CFR §51.1303). EPA considers the "attainment year" to be the last full calendar year prior to the attainment date, and thus 2023 is the attainment year for the NWF at Moderate. Thus, the installation date for RACT for the NWF, per the 2015 ozone NAAQS implementation rule, must be set no later than the start of the ozone season in 2023. The date set in the DAAD for RACT installation – January 1, 2023 – comports with the SIP implementation requirements.

attainment demonstration at Moderate. Furthermore, in UDAQ's industry stakeholder meeting held on February 15, 2023, UDAQ explained that they can provide a successful attainment demonstration by accounting for the combination of exceptional events and international emissions.[10] Thus, the controls included in the RACT determinations are not necessary for the attainment demonstration.

UPA Supports Controls Shown to be Cost Effective Towards Lowering Ozone

UPA and its member companies support installing those controls shown to be cost effective towards lowering NWF ozone levels. We demonstrated our support for improving air quality through the voluntary implementation of Tier 3 gasoline in Utah, installation of controls that have been effective towards reducing $PM_{2.5}$ concentrations, and decades of cooperation with UDAQ to improve local air quality under other State Implementation Plans ("SIPs").

As shown in part A of the figure below, UDAQ's source apportionment modeling study shows that only 14% of the ozone during an episode (episode average) results from anthropogenic emissions *throughout Utah* (including point sources located in the NWF).[11] The remaining 86% of NWF ozone arises from additional sources that ***cannot be controlled within Utah*** including the following:

- Anthropogenic sources located outside Utah including other states and international sources
- Various local and non-local natural sources (including biogenic emissions)

Furthermore, the 14% of ozone arising from anthropogenic sources throughout Utah includes onroad and off-road motor vehicle emissions. Utah has no control over the motor vehicle emissions; the federal government controls these sources. Yet they comprise 77% and 46% of NWF NOx and VOC emissions, respectively (61% of total NWF emissions as shown in part B of the figure).[12] In other words, Utah can only control a fraction of the 14% of ozone during an episode that arises from anthropogenic emissions in Utah, that portion which does not come from on or off-road mobile sources.

Point sources generate only a small portion of NWF ozone and the four major source petroleum refineries account for only a small portion of that, as shown in part B of the figure. The modeling study indicates that all point source emissions in the NWF account for approximately only 1 ppb of NWF ozone.[13] Presumably, this includes point source volatile organic compound ("VOC") and NOx emissions. The result is not surprising, for the following reasons:

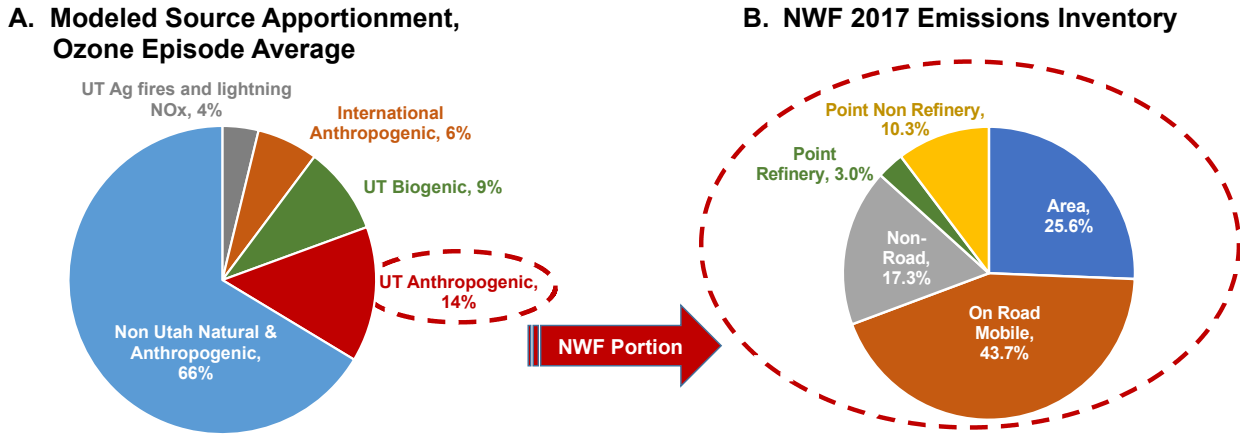
[10] In view of UDAQ's findings in this regard, it would seem that UDAQ would be persuaded towards a lower – not higher – cost effectiveness threshold for making RACT determinations; or at least a threshold that is in keeping with norms.
[11] See *Northern Wasatch Front, O3 State Implementation Plan: Modeling Updates*, presented by UDAQ's Technical Analysis Section on February 15, 2023 ("Modeling Update"), slide 11.
[12] Utah Division of Air Quality, *Marginal Ozone Inventory, Northern Wasatch Front, UT*, June 2020, available on UDAQ website at https://documents.deq.utah.gov/air-quality/planning/air-quality-policy/DAQ-2022-012149.pdf ("NWF 2017 Inventory") (accessed on March 6, 2023).
[13] See Modeling Update, slide 13. (The slide does not indicate if the point source contribution shown represents an average modeled day, episode average day, or exceedance day.)

- UDAQ's NWF emission inventory for 2017 indicates that point sources account for only 21% of NWF anthropogenic NOx emissions and only 6% of NWF anthropogenic VOC emissions, or 13% of all NWF anthropogenic emissions.[14]

- The point source inventory for 2017 indicates that the four major source petroleum refineries account for 11% of the NWF point source NOx, corresponding to only 2.4% of the NWF anthropogenic NOx emissions (11% of 21%).

- While the major source petroleum refineries account for 53% of NWF anthropogenic point source VOC emissions, that amount equates to only 3.2% of all NWF anthropogenic VOC emissions (53% of 6%).[15]

In other words, ***the petroleum refineries emit only a very small portion of NWF anthropogenic emissions and therefore account for only a very small fraction of locally formed ozone***.



We are also not surprised that the RACT evaluations submitted by our member companies did not identify very many additional controls that would qualify as RACT or very large emission reductions as RACT. ***Our member company petroleum refineries are already very well controlled.*** The petroleum refineries comply with various federal rules under New Source Performance Standards ("NSPS") and Maximum Achievable Control Technology ("MACT"), including complying with the recent 2015 extensive revisions to petroleum refinery requirements.[16] The petroleum refineries have undergone decades of new source review air permitting. Furthermore, they have also installed controls for prior SIPs including most recently RACT and BACT for the $PM_{2.5}$ Moderate and Serious SIPs, respectively.

Considering the very small effect of the petroleum refineries on local ozone and the already high level of control on their operations, UDAQ has not demonstrated the need for the NOx emission reductions that they have called for.

[14] NWF 2017 Inventory.
[15] *Base Year Ozone SIP Point Source Inventory*, located on UDAQ website at https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001356.pdf (accessed on March 6, 2023).
[16] 80 FR 75178, *Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards*.

The Controls are Not Needed for Inclusion in the Moderate SIP

The proposed controls do not comport with the RACT determination requirements and will not contribute to the attainment demonstration for the Moderate SIP. The remaining Moderate SIP requirement for adding controls to existing sources is the requirement for Reasonable Further Progress ("RFP").

RFP for the NWF at Moderate requires reducing VOC by 15% from the 2017 baseline emissions inventory amount.[17] The requested controls will not help to fulfill the Moderate RFP requirements for the NWF because they would reduce NOx and would not contribute to the required *VOC reductions*.

Additional Discussion

We understand the difficulties in developing the Moderate SIP for the NWF, especially in light of the large effects of wildfire exceptional events and international emissions on NWF ozone, as shown in the Modeling update presented in February 2023.[18] Although EPA disapproved the retroactive 179B demonstration submitted by UDAQ in May 2021, we encourage UDAQ to prepare a new package with appropriate exceptional events justifications and a new 179B demonstration, a prospective demonstration this time, using UDAQ's much more refined photochemical modeling and other weight-of-evidence technical information such as EPA or peer-reviewed studies showing the effect of international emissions on ozone in the intermountain west. To its credit, UDAQ has shown through its modeling that the combination of exceptional events and international emissions accounts for the NWF not attaining the 2015 ozone NAAQS. These results and information should not be ignored.

Conclusion

As detailed above, the incremental controls deemed to be RACT by UDAQ do not meet the reasonableness or the timing requirements of RACT, and therefore cannot be RACT.[19]

We have further shown that these controls will not contribute to fulfilling any other Moderate SIP requirement and will not contribute to attaining and maintaining the NAAQS. We remind UDAQ of the terms of its rulemaking authority. Any controls that go beyond federal requirements must have written justification meeting certain requirements.[20]

Considering the relatively large effects of exceptional events plus international anthropogenic emissions on the NWF compared to the relatively small portion of NWF ozone produced by NWF anthropogenic emissions, there is no prospect for bringing the area into attainment in the near term. We encourage UDAQ to utilize the tools provided in the CAA, namely exceptional events and 179B for international emissions, to help to fulfill the SIP requirements at this time. When Congress amended the CAA in 1990, they provided these tools for areas like the NWF that are

[17] See 40 CFR 51.1310(a)(4)(i). Note that EPA also uses the term "ROP", Rate of Progress, instead of RFP.
[18] See Modeling Update, slides 15 through 17.
[19] Consistent with UDAQ's communications, we understand that the controls are being proposed as satisfying the RACT requirements for Utah's Moderate ozone SIP for the NWF nonattainment area. If UDAQ is assuming some other legal authority for its proposal, we request that UDAQ promptly disclose such authority so that we may evaluate it.
[20] See Utah Code 19-2-106.

impacted by ozone concentrations that are effectively beyond their control. Using these tools would allow UDAQ more time to study appropriate ways to achieve beneficial emission reductions that will improve air quality and to work with sources to implement reductions on appropriate and achievable timelines. Forcing the petroleum refineries to implement unjustified controls under the pretense of RACT will not achieve the goal of attainment and only serves to divert technical and financial resources from the only path that will reasonably satisfy the SIP requirements.

We re-emphasize that our member company petroleum refineries are already very well controlled, through a litany of other requirements. Both the model and emission inventory evidence discussed above validate this point, demonstrating that the petroleum refineries contribute only a small fraction of a ppb to local ozone during an episode.

Finally, for all the reasons stated the requested controls are not RACT and so are not appropriate at this time, but nonetheless we remain committed to working with UDAQ on potential solutions that have a demonstrated air quality benefit.

Sincerely,

Rikki Hrenko-Browning
President, Utah Petroleum Association

cc: Gordon Larson - gordonlarsen@utah.gov
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Brian Somers - bsomers@utahmining.org

Attachment: February 2023 letter (Rikki Hrenko-Browning to Bryce Bird, Criteria for Selection of Reasonably Available Control Technology, February 2, 2023)

Attachment I.
February 2023 Letter

Rikki Hrenko-Browning to Bryce Bird, *Criteria for Selection of Reasonably Available Control Technology*, February 2, 2023

Utah Petroleum Association

6905 S. 1300 E. #288, Cottonwood Heights, UT 84047-1817

FUELING UTAH'S GROWTH & PROSPERITY

February 2, 2023

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

Submitted by email to bbird@utah.gov

Subject: Criteria for Selection of Reasonably Available Control Technology

Dear Bryce:

In a recent meeting between the Utah Petroleum Association (UPA) and staff members from the Utah Division of Air Quality (UDAQ), we discussed the question of objective criteria for establishing cost-effectiveness thresholds in Reasonably Available Control Technology (RACT) for the ozone Moderate State Implementation Plan (SIP). Staff were not certain how the RACT cost-effectiveness thresholds would be established for the case-by-case facility RACT analyses.

RACT cost-effectiveness thresholds should be selected on objective measures comparable to RACT cost-effectiveness thresholds in other jurisdictions. Towards that end, this memo summarizes some research on RACT decisions in other jurisdictions nationwide. Based on this research, ***we recommend that the RACT cost-effectiveness thresholds for the Moderate ozone SIP be selected in a range no higher than $5,000 to $7,500 per ton of emissions reduced.***

The Clean Air Act (CAA) and SIP rules for various National Ambient Air Quality Standards (NAAQS) call for implementing the RACT level of control.[1] Additionally, states often apply RACT for Regional Haze SIPs. The regulations for procedural requirements for SIPs define RACT as follows:

> *Reasonably available control technology (RACT) means devices, systems, process modifications, or other apparatus or techniques* ***that are reasonably available*** *taking into account:*
>
> *(1) The necessity of imposing such controls in order to attain and maintain a national ambient air quality standard;*

[1] See, for example, CAA §182(b)(2), CAA §182(f), and 40 CFR §51.1312 for ozone nonattainment areas; CAA §189(a)(1)(C) and 40 CFR 51.1009(a)(4) for particulate matter nonattainment areas.

(2) The social, environmental, and economic impact of such controls; and

(3) Alternative means of providing for attainment and maintenance of such standard. (This provision defines RACT for the purposes of § 51.341(b) only.)[2] [emphasis added]

The NOx Supplement to the General Preamble indicates that, "decisions on RACT may be made on a case-by-case basis, considering the technological and economic circumstances of the individual source."[3]

Generally, states have made decisions on RACT cost-effectiveness thresholds by evaluating the cost (dollars) per ton of emission reduced and comparing that to a threshold value deemed to be economically reasonable.

Our research, provided in Table 1, shows that states have recently generally selected the RACT level of control at about $3,000 per ton of emission reduced and no higher than $5,500 per ton for RACT applied outside of Regional Haze SIPs. The highest RACT values that we identified, $10,000 per ton, were selected for Regional Haze by Utah and Oregon.

Based on this research, ***we recommend that Utah select RACT for the Moderate ozone SIP in a range no higher than $5,000 to $7,500 per ton***, which would put Utah at the high end of non-Regional Haze RACT evaluations among the states identified.

For comparison purposes, we also researched Best Available Control Technology (BACT). BACT is defined as follows:

Best Available Control Technology means an emissions limitation (including a visible emission standard) based on the ***maximum degree of reduction*** *for each pollutant subject to regulation under the Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR part 60, 61, or 63. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.*[4] [emphasis added]

BACT provides a higher level of control than RACT, evidenced by the "maximum degree of reduction" for BACT compared to controls that are "reasonably available" for RACT in the regulatory definitions noted above. For example, the $PM_{2.5}$ SIP implementation rule requires

[2] 40 CFR Part 51 Subpart F Procedural Requirements §51.100(o).
[3] 57 FR 55624/3.
[4] 40 CFR §52.21(b)(12).

RACT for Moderate nonattainment areas and BACT for Serious nonattainment areas.[5] Furthermore, RACT for both ozone and $PM_{2.5}$ considers controls that are reasonably available but, on the other hand, EPA considers BACT, a concept included for $PM_{2.5}$ SIPs but not included for ozone SIPs, to be generally independent of achieving attainment.[6] BACT is also considered in New Source Review for major precursors of both ozone and $PM_{2.5}$.

As provided in Table 2, our research shows that, outside of a few outliers, states have generally applied BACT at control levels ranging from $10,000 to $20,000 per ton of emissions reduced. Considering that BACT is a higher level of control than RACT, these values further substantiate our conclusion and recommendation above, that ***RACT should be chosen no higher than the range of $5,000 to $7,500 per ton.***

We hope that you will find our research into objective measures for RACT to be useful. Please do not hesitate to contact me if you have any questions or feedback.

Sincerely,

Rikki Hrenko-Browning
President, Utah Petroleum Association

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[5] See 40 CFR Part 51 Subpart Z "Provisions for implementation of $PM_{2.5}$ National Ambient Air Quality Standards".
[6] See, for example, 81 FR 58081.

Table 1. Regional Haze and RACT Cost-Effectiveness Determinations

Agency	Year	NO_x Cost-Effectiveness ($/ton)	Regulatory Driver	Type of Determination	Source
Colorado – Department of Public Health and Environment	2021	5,000	Regional Haze	Threshold	1
	2019				2
	2011				3
Illinois – Environmental Protection Agency	2020	2,500 - 3,000	RACT	Threshold	4
	2016				5
	2007	2,500			6
Maryland – Department of Environment	2020	3,500 - 5,000	RACT	Threshold	4
	2016				5
New York – Department of Environmental Conservation	2020	5,000 - 5,500	RACT	Threshold	4
	2016				5
	1994	3,000			7
Ohio – Environmental Protection Agency	2020	5,000	RACT	Threshold	4
	2016				5
	2007				6
Pennsylvania – Department of Environmental Protection	2020	2,800	RACT	Threshold	4
	2016				5
	2016	3,500	Regional Haze		8
Wisconsin – Department of Natural Resources	2020	2,500	RACT	Threshold	9
	2016				5
	2010				10
	2007				6
Texas – Texas Commission on Environmental Quality	2021	5,000	Regional Haze	Threshold	11
Oregon – Department of Environmental Quality	2021	10,000	Regional Haze	Threshold	12
Minnesota – Minnesota Pollution Control Agency	2022	7,600	Regional Haze	Threshold	13
Utah – Department of Environmental Quality	2022	10,000	Regional Haze	Threshold	14
Maine – Department of Environmental Protection	2010	<7,360	Regional Haze	Project Determination	15

[1] [EPA–R08–OAR–2020–0114; FRL–10019–22–Region 8]

[2] 5 CCR 1001-9 XVII.E.3.a.(ii)

[3] Colorado Visibility and Regional Haze State Implementation Plan for the Twelve Mandatory Class I Federal Areas in Colorado

[4] EPA–R03–OAR–2019–0657; FRL–10014–53–Region 3

[5] "Responses to Frequently Asked Questions" Final Rulemaking Additional RACT Requirements for Major Sources of NOx and VOCs 25 Pa. Code Chapters 121 and 129 46 Pa. B. 2036 (April 23, 2016)

[6] Order of the State of Wisconsin Natural Resource Board Amending and Creating Rules. State Implementation Plan

[7] DAR-20:Economic and Technical Analysis for Reasonably Available Control Technology (RACT) Networks (August 8, 2013)

[8] RACT II Overview and Implementation Presentation

[9] [EPA–R05–OAR–2020–0097; EPA–R05–OAR–2020–0199; EPA–R05–OAR–2020–0200; FRL–10011–90–Region 5]

[10] [EPA–R05–OAR–2007–0587; EPA–R05–OAR–2009–0732; FRL–9205–8]

[11] Texas Commission on Environmental Quality Agenda Item Request For Proposed State Implementation Plan Revision

[12] Oregon Regional Haze State Implementation Plan

[13] Minnesota Draft SIP

[14] Technical Support Document for Proposed Action on Area Source Rule Revisions

[15] 2010 Departmental Finding of Fact and Order Regional Haze Best Available Retrofit Technology Determination

Table 2. BACT Cost-Effectiveness Determinations

Agency	Applicability	NAAQS Designation (Applicable NAAQS)	Year	NO_x Cost-Effectiveness ($/ton)	Type of Determination	Source
California - San Diego County Air Pollution Control District	Local	Moderate Nonattainment (1997 Ozone)	2011	12,000	Threshold	1
California - San Joaquin Valley Air Quality District	Local	Extreme Nonattainment (1997 Ozone); Serious (1997, 2006, 2012 $PM_{2.5}$)	2022	18,000	Threshold	2
California - Bay Area Air Quality District	Local	Marginal Nonattainment (2008 Ozone); Moderate (2006 $PM_{2.5}$)	2016	17,500	Threshold	3
California - South Coast Air Quality District	Local	Extreme Nonattainment (all Ozone) and Serious (2006, 20012 $PM_{2.5}$)	2022	38,575	Threshold	4
Massachusetts - Massachusetts Department of Environmental Protection	Federal	Marginal Nonattainment (2008 Ozone); Moderate (1997 Ozone)	2011	11,000-13,000	Threshold	5
Alaska - Alaska Department of Environmental Conservation	Federal	Attainment	2022	7,133 < Threshold < 10,123	Project Determinations	6
	Federal	Attainment	2021			7
	Federal	Attainment	2020			8
Alabama - Alabama Department of Environmental Management	Federal	Attainment	2021	<20,400	Project Determinations	9
Minnesota - Minnesota Pollution Control Agency	Federal	Attainment	2007	3,201 < Threshold < 12,727	Project Determinations	10
	Federal	Attainment	2015			11
Washington - Washington Department of Ecology	Federal	Attainment	2018	10,000	Threshold	12

[1] June 2011 "New Source Review Requirements for Best Available Control Technology BACT"
[2] April 28, 2021, BACT Policy Updates
[3] September 2016 "BAAQMD New Source Review Permitting"
[4] 2022 South Coast Air Quality Management District BACT Maximum Cost Effectiveness Value ($/ton)
[5] June 2011 "Best Available Control Technology (BACT) Guidance"
[6] July 2022 Technical Analysis Report for Construction Permit AQ1539CPT01
[7] March 2021 Technical Analysis Report for Construction Permit AQ0083CPT07
[8] August 2020 Technical Analysis Report for Construction Permit AQ1524CPT01
[9] 2021 Preliminary Determination Tennessee Valley Authority (TVA) – Colbert
[10] October 2007 Minnesota Public Utilities Commission Staff Briefing
[11] May 2015 Air Emission Permit NO. 14100071-001
[12] Pollution Control Hearings Board State of Washington PCHB No. 17-055c

Attachment III

Utah Petroleum Association Legal Comments on Proposed Rulemaking for Northern Wasatch Front Moderate Nonattainment Area: Proposed Amendment to R-307-110-13, Section IX, Control Measures for Area and Point Sources, Part D, Ozone; Proposed Amendment to R-307-110-17, Section IX, Control Measures for Area and Point Sources, Part H, Emission Limits. Published in Utah State Bulletin, June 01, 2023, Vol. 2023, No. 11 at 68- 72

Utah Petroleum Association Legal Comments on Proposed Rulemaking for Northern Wasatch Front Moderate Nonattainment Area: Proposed Amendment to R-307-110-13, Section IX, Control Measures for Area and Point Sources, Part D, Ozone; Proposed Amendment to R-307-110-17, Section IX, Control Measures for Area and Point Sources, Part H, Emission Limits. Published in Utah State Bulletin, June 01, 2023, Vol. 2023, No. 11 at 68-72.

I. SUMMARY

UDAQ has misconstrued the Clean Air Act's (or "Act") authority for imposing beyond-RACT (or "B-RACT") control measures in fundamental ways. This has led UDAQ to, by its own admission, disregard the economic feasibility or reasonableness of the control measures it has proposed for two refineries pursuant to the Act's beyond-RACT authority. In fact, UDAQ acknowledges that the cost effectiveness for the proposed refinery beyond-RACT control measures exceeds what it deems to be reasonable. But as explained below, disregarding the economic feasibility of control measures is contrary to the Clean Air Act. EPA has made clear that B-RACT controls must be reasonable; that is, cost effective.

Additionally, UDAQ has acknowledged that the beyond-RACT controls proposed for the two refineries cannot be installed by the attainment-date deadline of August 3, 2024. Again, EPA has made clear that this is a fundamental criterion for B-RACT controls.

Furthermore, even if the proposed beyond-RACT controls were deemed to be economically feasible and could be implemented by the attainment-date deadline, UDAQ has failed to show that such controls are necessary for expeditiously attaining the NAAQS. In fact, while UDAQ acknowledges that such a showing is required, it makes no attempt to understand the affect the proposed B-RACT controls would have on ambient ozone concentrations, contrary to the requirements of the Act. Additionally, UDAQ claims that it has made a strong and compelling attainment demonstration that does not rely on the proposed B-RACT controls, belying any claim that such controls are, in fact, necessary.

Finally, UDAQ's Proposed SIP does not comply with the mandatory Reasonable Further Progress (15% VOC reduction) requirement that is a prerequisite to the State being able to impose beyond-RACT controls.

This comment will begin by outlining UDAQ's explanation of its basis for imposing B-RACT controls, focusing on the B-RACT proposal for the refineries. It next examines the legal basis and requirements under the Clean Air Act for imposing B-RACT control measures, relying principally on EPA's explanation of the Act's B-RACT authority as set forth in the Implementation Rule for the 2015 O3 NAAQS and other, relevant EPA rulemakings. This examination shows that UDAQ's rationale for imposing B-RACT controls on the refineries is contrary to the requirements of the Clean Air Act.

II. UDAQ'S STATED AUTHORITY FOR IMPOSING B-RACT

In the introduction to the chapter on RACT controls in the Proposed O3 SIP,[1] UDAQ quotes from the preamble to the Implementation Rule for the ***2008*** ozone NAAQS as the basis for imposing beyond-RACT controls: "States may require VOC and NOX reductions that are 'beyond RACT' if such reductions are needed to provide for timely attainment of the ozone NAAQS."[2] The quote is accurate as far as it goes, but is misleadingly incomplete in addressing the authority for imposing controls that go "beyond RACT."

In the source-specific RACT control evaluations for the refineries, UDAQ concludes that all of the current controls at the refineries constitute RACT and that, "no other additional add-on controls or limitations are technically or economically feasible options at this time."[3] Notwithstanding this determination, UDAQ proposes to require the installation of controls that it considers not to be economically feasible.[4] While acknowledging that the costs of the proposed beyond-RACT controls exceed what can properly qualify as reasonable for RACT, UDAQ attempts to justify imposing these extraordinary controls pursuant to its beyond-RACT authority:

> The UDAQ has determined that these controls are necessary for the NWF NAA to demonstrate attainment of the 2015 8-hour ozone NAAQS as expeditiously as practicable. While the financial feasibility of the identified controls may be beyond previously established RACT thresholds, the CAA provides states with "discretion to require ***beyond-RACT*** reductions from any source" if those reductions are necessary to "demonstrate attainment as expeditiously as practicable".[5]

In attempting to justify the beyond RACT controls for the refineries, UDAQ again references the Implementation Rule for the 2008 ozone NAAQS as the basis for its authority, but also includes a general reference to the directly applicable Implementation Rule for the 2015 ozone NAAQS.[6] Unfortunately, UDAQ ignores the very rulemakings that it references. Far from supporting UDAQ's proposal, these rulemakings make clear that UDAQ exceeded its authority to impose B-RACT controls.

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[1] Utah Division of Air Quality State Implementation Plan, 2015 Ozone NAAQS Northern Wasatch Front Moderate Nonattainment Area, 2023, Section IX Part D.11 (hereinafter "Proposed SIP").

[2] Proposed SIP at 33 (quoting EPA's preamble to the Implementation Rule for the 2008 ozone NAAQS, 80 Fed. Reg. 12,264, 12,279 (Mar. 6, 2015)). The subject of UDAQ's current rulemaking relates to the ***2015*** ozone NAAQS (70 ppb) and not the ***2008*** ozone NAAQS (75 ppb). As discussed in these comments, the directly applicable ***2015*** NAAQS rulemaking provides a more complete explanation of the scope and meaning of beyond-RACT controls.

[3] *See* Proposed SIP at 44 ("The emission units/activities examined in this RACT analysis indicates that all activities currently meet all RACT requirements, and all other existing controls and emissions limitations are considered RACT for the Chevron Refinery. No other additional add-on controls or limitations are technically or economically feasible options at this time.") *See also* Proposed SIP at 74 (addressing Marathon Refinery in similar terms).

[4] *See* Proposed SIP at 44 (imposing ULNB on crude heaters that UDAQ has determined to be economically infeasible); *Id*. at 73-74 (imposing SCR on cogens that UDAQ has determined to be economically infeasible).

[5] Proposed SIP at 74 (emphasis added). *See* also Proposed SIP at 44.

[6] *See* footnote 65 on page 74 of the Proposed SIP; footnote 54 on page 44 of the Proposed SIP.

As discussed in detail below, UDAQ's assertion that it can impose controls pursuant to its beyond-RACT authority without regard to economic feasibility is wrong. Additionally, UDAQ has failed to address the fact that the proposed beyond-RACT controls cannot be implemented by the August 3, 2024, attainment deadline, another basic requirement for B-RACT controls. Finally, the requirement – recognized by UDAQ – that beyond-RACT controls must be shown to be necessary to demonstrate attainment as expeditiously as practicable requires, in fact, a showing. UDAQ has provided none; to the contrary, it admits that it does not know what the effect of the beyond-RACT controls would have on air quality.

UDAQ's incomplete and incorrect understanding of its beyond-RACT authority results in it effectively and erroneously claiming the authority to impose ***any*** control that might have ***any*** beneficial effect on reducing ozone regardless of when it can be implemented. As discussed below, UDAQ has no authority to impose the B-RACT controls it proposes. EPA has made clear that beyond-RACT authority does not mean beyond reasonable; it does not do away with cost effectiveness; it does not allow UDAQ to override a RACT determination that concludes a particular control exceeds costs considered "reasonable"; it does not allow UDAQ to impose a control that cannot be installed by the August 3, 2024 attainment date; it does not allow UDAQ to impose a control without a showing that the control is necessary for expeditiously achieving attainment.

III. EPA'S EXPLANATION OF BEYOND RACT AUTHORITY

A. Summary

In the Implementation Rule for the 2015 O3 NAAQS[7] and other referenced rulemakings, EPA explains the basis for, and extent of, the beyond-RACT authority. Key points from EPA's explanation include:

i. Beyond-RACT authority derives from Section 172(c)(6) of the CAA.

ii. Beyond-RACT does not mean controls that are beyond reasonable. B-RACT controls (just like RACT controls) must be "reasonable," including from a cost perspective.

iii. The "beyond" in beyond-RACT does not mean imposing controls that are more stringent than RACT on sources that have already been subject to a RACT analysis; rather, it refers to imposing RACT-like (that is, reasonable) controls on sources that are not *per se* subject to RACT requirements but otherwise meet the technological and economic feasibility criteria to make them reasonable. This may include sources that fall outside of the formally designated nonattainment area ("NAA") but still have an impact on the NAA itself; or controls that cannot be installed by the deadline for installing RACT controls (January 1, 2023) but can be installed before the attainment date (August 3, 2024). It is in this sense that the controls are ***beyond***-RACT, and not in the sense that B-RACT controls may be beyond reasonable.

[7] The Implementation Rule for the 2015 O3 NAAQS (70 ppb) is directly applicable to UDAQ's Proposed SIP.

iv. B-RACT controls must be able to be implemented by no later than the attainment date which, in the case of the NWF NAA, is August 3, 2024.

v. B-RACT controls must be shown to be necessary to attain the NAAQS expeditiously.

A review of the above criteria against UDAQ's proposed rulemaking to require Marathon and Chevron to install ***economically infeasible*** controls pursuant to the Clean Air Act's beyond-RACT authority shows that that proposal fails to satisfy at least three of the criteria outlined above:

> *Controls Must be Reasonable/Cost Effective (point ii)*: UDAQ fails to even acknowledge the requirement that B-RACT controls must be reasonable/economically feasible; however, UDAQ readily admits that its B-RACT proposals for the refineries are not reasonable or cost effective.
>
> *B-RACT Controls Must be Capable of Being Implemented by the Attainment Date – August 3, 2024 (point iv.)*: UDAQ identifies the installation date for the B-RACT controls proposed for the refineries as May 1, 2026, which exceeds the deadline for a control to qualify as B-RACT.
>
> *B-RACT controls must be shown to be necessary for attainment (point v.)*: While UDAQ passingly acknowledges this requirement, it fails to make a demonstration that the B-RACT controls are necessary for achieving the NAAQS. In fact, UDAQ forthrightly admits that it does not know what the impact of the B-RACT controls will be on ambient ozone concentrations. At the same time (and contrary to its claim that the B-RACT controls are necessary for bringing about attainment), UDAQ represents that it has made a compelling and strong attainment demonstration without the B-RACT controls.

A more detailed review of the State's beyond-RACT authority is provided below, beginning with the directly applicable 2015 O3 NAAQS Implementation Rulemaking and followed by the PM2.5 NAAQS Implementation Rulemaking (that EPA specifically references in the O3 NAAQS rulemaking for additional background on beyond-RACT authority).

B. 2015 O3 NAAQS IMPLEMENTATION RULE

The 2015 O3 NAAQS Implementation Rulemaking is, of course, the most applicable rulemaking to UDAQ's Proposed SIP since it is the 2015 O3 NAAQS of 70 ppb that is the subject of the instant SIP rulemaking. While UDAQ's proposal drops a footnote reference to this rule as supporting its beyond-RACT authority,[8] it does not provide any substantive discussion of the rulemaking itself. This is unfortunate because EPA's rulemaking provides instructive discussion on beyond-RACT authority:

> CAA section 172(c)(6) requires that SIP provisions include enforceable emission limitations and other control measures, means or techniques as may be ***necessary or appropriate to attain a standard by the applicable attainment date***. The EPA interprets this provision to include "additional ***reasonable*** measures," which are

[8] *See* footnote 65 at page 74 and footnote 54 on page 44 of Proposed SIP. Additionally, UDAQ refers to the 2008 O3 NAAQS Implementation Rule as support for imposing B-RACT controls.

> those measures and technologies that can be applied to any emissions source within the state's jurisdiction, including those outside of a nonattainment area. Upwind sources within a state may have a significant impact on air quality in a downwind nonattainment area, and failure to consider and require, as appropriate, ***reasonable*** control measures for these sources may preclude attainment of a NAAQS by the attainment date. Though not directly a part of a nonattainment area RACM analysis, the EPA has addressed this "other control measures" provision in the preamble discussions for previous NAAQS implementation rulemakings,[fn34] and for clarity is codifying this interpretation in this final rule at 40 CFR 51.1312(c).[9]

Several points are worth noting from this concise discussion:

Terminology – Additional Reasonable Measures: EPA does not use the term "beyond-RACT" in this rulemaking. Instead, it uses the term, "additional ***reasonable*** measures." The term "beyond RACT reductions" appears only to be used in the preamble to the 2008 O3 NAAQS implementation rulemaking.[10] It is not used in other NAAQS implementation rulemakings.[11] We also note that EPA does not substantively elaborate on what it meant by beyond-RACT in the 2008 O3 implementation rulemaking. Our comments will continue to use the terminology "beyond RACT" or "B-RACT" since it is the term that UDAQ has chosen; however, and as explained below, its meaning is significantly more circumscribed than UDAQ's proposed rulemaking suggests.

Statutory Authority: The quoted excerpt notes that the underlying authority for B-RACT controls is Section 172(c)(6) of the CAA.[12] Section 172 of the CAA details the ***general*** nonattainment plan provisions that apply to all nonattainment areas. Subparagraph (c) identifies key required elements that must be included in a SIP for any nonattainment area. Subparagraph (c)(1) establishes the

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[9] 83 Fed. Reg. 62988, 63015 (Dec. 6, 2018) (final Implementation Rule for the 2015 O3 NAAQS) (emphasis added).

The footnote reference within the text (shown as "fn34") lists implementation rulemakings related to the 8-hour ozone NAAQS and the PM2.5 NAAQS. The 8-hour O3 NAAQS rulemaking provides little explanation and simply make passing reference to the underlying statutory authority found in section 172(c)(6) of the CAA. The implementation rulemaking for PM2.5 includes a more substantive discussion which is address later in these comments. The complete text of the footnote is as follows:

> *See* the Phase 2 proposed rulemaking (68 FR 32829; June 2, 2003) and final rule to implement the 8-hour ozone NAAQS (70 FR 71623; November 29, 2005), and the final rule to implement the PM2.5 NAAQS (81 FR 58035; August 24, 2016).

83 Fed. Reg. footnote 34 at 63015.

[10] *See* 80 Fed. Reg.12264, 12279 (Mar. 6, 2015).

[11] We suspect that the reason for EPA not carrying the term "beyond-RACT" forward into other rulemakings may have to do with the potentially misleading connotation that might be conveyed by that term. In fact, it appears that UDAQ incorrectly interpreted beyond-RACT to mean ***beyond reasonable***.

[12] CAA § 172(c)(6) provides in its entirety:

> Such plan provisions shall include enforceable emission limitations, and such other control measures, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emission rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date specified in this part.

general RACM/RACT requirement. As noted, subparagraph (c)(6) provides the authority for B-RACT controls.

Beyond-RACT does Not Mean Beyond Reasonable: The authority that section 172(c)(6) provides for B-RACT controls does not jettison the requirement that controls must be reasonable; that is, technologically and economically feasible. As the agency explains, "[t]he EPA interprets this provision to include 'additional ***reasonable*** measures.'" As discussed below in more detail, EPA explains that these are measures "that can be applied at sources in the nonattainment area that are otherwise technologically and ***economically feasible***." As noted, UDAQ has concluded that the B-RACT controls it is proposing for Marathon and Chevron are not economically feasible and, therefore, cannot be considered RACT. That determination is also necessarily conclusive to evaluating the reasonableness of the controls under the B-RACT authority of CAA § 172(c)(6).

In its determination to impose B-RACT measures, UDAQ provides no explanation whatsoever as to how it can disregard its own conclusion that the beyond-RACT controls it is proposing for Marathon and Chevron exceeds its own threshold for being considered reasonable. In fact, UDAQ has offered no criterion for proposing B-RACT controls besides its recognition that such controls must be shown to be necessary to attain the standard (which it fails to do). For example, UDAQ has not indicated how it identified emission units as beyond-RACT candidates, if there is any cost that is too high for B-RACT, or if there is any deadline for when a B-RACT control must be installed.

Beyond-RACT Refers to Sources that are Not Directly Subject to RACT but May Nonetheless be Subject to Reasonable Controls Pursuant to the Authority of CAA § 172(c)(6): As suggested from the previous point, beyond-RACT does ***not*** refer to controls on RACT-eligible sources that go beyond what is considered RACT (that is, beyond reasonable); rather, it is the imposition of ***reasonable*** controls on sources that are not directly subject to RACT review based, principally, on location or the timing for installing the controls. In other words, the "beyond" in beyond-RACT refers to imposing ***reasonable*** controls on sources that are not *per se* subject to RACT requirements, because, for example, they are located outside of the NAA or the required controls cannot be implemented by the deadline for RACT controls but otherwise meet the technological and economic feasibility criteria to make them reasonable. The 2015 O3 NAAQS Implementation rulemaking was focused on sources located outside of the NAA.[13] Additionally, as EPA has made clear in other implementation rulemakings (discussed below), another important category of sources eligible for B-RACT relates to the timing for when a control can be installed.

The salient point is that the B-RACT authority of CAA 172(c)(6) does not negate the requirement that controls be "reasonable," it does not allow an agency to reject a specific conclusion that a control is not reasonable based on cost effectiveness. At no time does EPA suggest that this authority can be wielded to impose controls that are not "reasonable." The B-RACT authority simply allows an agency to evaluate the application of other reasonable control measures that are shown to be necessary to expeditiously achieve attainment that are not otherwise directly subject to RACT due to a source's location outside of the NAA or the timing for the installation of controls.

[13] In fact, EPA explicitly codified this aspect of the B-RACT authority in the Implementation Rulemaking for the 2015 O3 NAAQS. *See* 40 CFR 51.1312(c).

B-RACT Controls Must be Able to be Implemented by the Attainment Date. As the 2015 O3 NAAQS Implementation Rulemaking makes clear, B-RACT controls must be capable of being implemented "by the applicable attainment date." UDAQ has acknowledged that this is not possible for the proposed B-RACT controls for Marathon and Chevron and has proposed installation of the controls by May 1, 2026,[14] well beyond the attainment-date deadline of August 3, 2024.

B-RACT Controls Must be Shown to be Necessary to Attain the NAAQS Expeditiously: Although UDAQ acknowledges this requirement, UDAQ fails to show that its suite of B-RACT controls satisfy this requirement; in fact, it acknowledges that it has not evaluated the effect that B-RACT controls would have on ambient ozone concentrations. Furthermore, as discussed below, UDAQ has asserted that it has made a strong and compelling attainment demonstration that does not rely on the B-RACT controls, belying any claim that such controls are necessary for achieving attainment.

Additional References Provided: EPA's discussion of B-RACT authority in the 2015 O3 NAAQS Implementation Rule, while brief, is packed with information that informs the scope of this authority. For a more in-depth discussion of the B-RACT authority, EPA references past implementation rulemakings that have expounded more fully on this authority. The most recent and substantive of these rulemakings referenced by EPA is the PM2.5 NAAQS implementation rulemaking from 2016. This rulemaking is examined in the next section of these comments.

C. PM2.5 NAAQS IMPLEMENTATION RULEMAKING

In support of its beyond-RACT authority, UDAQ properly cites to the 2015 O3 NAAQS Implementation Rule as the basis for its authority. As discussed in the preceding section of these comments, while that rulemaking provides a relatively brief (but informative) instruction on the scope of the authority for imposing B-RACT control measures, it includes references to other NAAQS implementation rulemakings that provide a more fulsome discussion of the B-RACT authority: "EPA has addressed this 'other control measures' provision in the preamble discussions for previous NAAQS implementation rulemakings."[15] In particular, EPA cites to the implementation rule for the PM2.5 NAAQS. That rulemaking provides one of the most complete discussions of the scope of the B-RACT authority.

In the PM2.5 Implementation rulemaking, EPA methodically lays out the requirements for an attainment plan strategy, including requirements for B-RACT. EPA begins with an overview of RACM/RACT requirements. The Agency explains that, "RACT has historically been defined as the lowest emission limit that a source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility."[16] It explains that RACM/RACT authority derives from both the general NAA planning requirements contained in section 172(c)(1) of the CAA and specific particulate matter NAA planning

[14] UPA understands that even an installation date of May 1, 2026, may not be feasible for installing the proposed beyond-RACT controls.

[15] *See* 83 Fed. Reg. at 63015/2.

[16] 81 Fed. Reg. 58034/2.

requirements contained in section 189(a)(1)(C).[17] "The EPA reads CAA sections 172(c)(1) and 189(a)(1)(C) together to require that attainment plans for Moderate nonattainment areas must provide for the implementation of RACM and RACT for existing sources of PM2.5 and PM2.5 precursors in the nonattainment area as expeditiously as practicable but ***no later than 4 years after designation***."[18] The requirement that a control qualifies as RACM/RACT only if it can be employed "no later than 4 years after designation" derives from CAA 189(a)(1)(C). As will be discussed, this deadline constitutes a dividing line for whether ***reasonable*** controls are considered RACT or whether they may qualify as beyond-RACT controls.

EPA next sets forth the methodology for determining RACM/RACT and beyond-RACT control measures.

> [T]he state should follow a process by which it first identifies ***all sources of emissions*** of direct PM2.5 … and all PM2.5 precursors in the nonattainment area, and all ***potential control measures*** to reduce emissions from those source categories. The state next determines if any of the identified potential control measures are not technologically feasible and whether any of the identified technologically feasible control measures are not ***economically feasible***. Measures that are not necessary for attainment need not be considered as RACM/RACT.[19]

This results in the state identifying all sources and controls that are potential RACM/RACT or B-RACT candidates. To this point, this is the methodology generally followed by UDAQ for selecting RACM/RACT. In particular, UDAQ's RACT determinations are based on a determination of technological and economic feasibility. But as UDAQ moves from RACM/RACT to B-RACT, it radically departs from the law as explained by EPA. UDAQ misconstrues its authority to such an extent that it effectively concludes that it has the authority to impose controls that are beyond reasonable.

Recognizing that RACM/RACT must statutorily be implemented no later than 4 years after an area is designated as moderate nonattainment, but that there may be some technologically and economically feasible control measures that can be installed after that date that can contribute to attainment ***by the attainment date***, EPA explains that such measures may potentially be imposed pursuant to the B-RACT authority of CAA 172(c)(6):

> Measures that can only be implemented ***after the 4-year deadline for RACM and RACT, but before the end of the sixth calendar year following designation***, are defined in the final rule as "***additional reasonable measures***."[fn72] The EPA has created this new definition based on the recognition that in some areas there could be emission reduction strategies that still could be implemented beginning 4 years

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[17] Title I of the CAA contains most of the Act's foundational air quality programs including the nonattainment planning provisions which are found in Part D of Title I. Part D is subdivided into subparts. Subpart 1 includes overarching, general provisions that apply to all nonattainment areas. Section 172 is found in subpart 1. Subpart 4 contains provisions that apply specifically to areas that are nonattainment for particulate matter. Section 189 is found in subpart 4.

[18] 81 Fed. Reg. at 58034/1 (emphasis added).

[19] *Id*. 58035/1 (internal footnotes omitted) (emphasis added).

> after designation through the attainment date that could help to improve air quality and attain the standard expeditiously in the area.[20]

Importantly, these "additional reasonable measures" are measures that a state has determined to be both technologically and economically feasible. The only limitation is on the timing for when a control can be implemented; those that can be implemented within 4 years of the date an area is designated as moderate nonattainment are properly considered to constitute RACT, while those that can only be implemented after that time may be considered as beyond-RACT measures. But in either case, ***the control must be economically feasible***.

In footnote 72 of the above excerpt, EPA explains that its authority for imposing "additional reasonable measures" is based on the so-called B-RACT authority of CAA 172(c)(6). In the ensuing pages of the preamble, EPA provides a methodical, step-by-step methodology for establishing control measures as RACM/RACT or as additional reasonable measures (that is, B-RACT measures). The steps are identified by EPA as follows:

> Step 1: Identify Sources of Emissions
>
> Step 2: Identify Existing and Potential Control Measures
>
> Step 3: Determine Whether an Available Control Measure or Technology Is Technologically Feasible
>
> ***Step 4: Determine Whether an Available Control Measure or Technology Is Economically Feasible***
>
> ***Step 5: Determine the Earliest Date by Which a Control Measure or Technology Can be Implemented in Whole or in Part***
>
> Step 6: Evaluate the Collective Impact of Potential Control Measures To Determine Whether the Area Can Attain Expeditiously or Whether it is Impracticable to Attain by the Attainment Date, and Adopt the Appropriate Set of Control Measures

EPA provides an in-depth discussion of each of these steps.[21] As indicated by Step 4, a critical element to imposing a control measure – whether it be RACT or B-RACT – is that the measure be shown to be economically feasible:

> The EPA believes that it is appropriate for states to give substantial weight to cost effectiveness in evaluating the economic feasibility of an emission reduction measure or technology. The cost effectiveness of a measure is its annualized cost ($/year) divided by the emissions reduced (tons/ year) which yields a cost per amount of emission reduction ($/ton). Cost effectiveness provides a relative value

[20] *Id*. 58035 (emphasis added).

[21] *See* 81 Fed. Reg. 58035-048.

> for each emissions reduction option that is comparable with other options and, in the case of control technologies, other facilities.[22]

In Step 5 EPA explains how control measures are categorized as either RACT or B-RACT based on a control measure's implementation date. EPA explains that RACM/RACT must be capable of being implemented no later than 4 years after designation.[23] But even if a control measure cannot be implemented within that timeframe, it might still be required as a B-RACT control measure:

> In addition, a state must separately identify those technologically and ***economically feasible*** control measures that can only be implemented after the statutory window for implementing RACM and RACT, but before the attainment date. The statutory 4-year timing requirement for implementing RACM and RACT under CAA section 189(a)(1)(C) limits the control measures and technologies that can qualify as RACM and RACT for a Moderate PM2.5 nonattainment area. However, the statutory requirement of ***CAA 172(c)(6)*** also requires states to implement "other measures" necessary to provide for timely attainment in an area. The EPA interprets this provision to include "***additional reasonable measures***," which are those measures and technologies that can be applied at sources in the nonattainment area that are ***otherwise technologically and economically feasible*** but can only be implemented in whole or in part later than 4 years after designation.[24]

As EPA makes clear, the authority provided by Section 172(c)(6) of the Act to impose beyond-RACT control measures does not dispense with the requirement for these measures to be economically feasible.

Consistent with the foregoing explanation, EPA codified in the regulation its interpretation of B-RACT authority when it defined the term "additional reasonable measures":

> *Additional reasonable measure* is any control measure that ***otherwise meets the definition of "reasonably available control measure"*** (RACM) but can only be implemented in whole or in part during the period beginning 4 years after the effective date of designation of a nonattainment area and no later than the end of the sixth calendar year following the effective date of designation of the area.[25]

Again, this makes clear that B-RACT measures must meet the technological and economic feasibility criteria for RACT.[26]

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[22] *Id*. at 58042/2.

[23] *Id*. at 58043/2.

[24] *Id*. at 58043/3 (emphasis added).

[25] 40 CFR 51.1000.

[26] While the definition refers only to RACM, the definition of RACM expressly includes RACT. *See* 40 CFR 51.1000 (definition of reasonably available control measure).

IV. UDAQ'S PROPOSAL TO REQUIRE B-RACT CONTROLS ON MARATHON AND CHEVRON DOES NOT COMPLY WITH BEYOND-RACT CRITERIA AS ARTICULATED BY EPA

A. THE PROPOSED B-RACT CONTROLS ARE NOT "REASONABLE"; THAT IS, ECONOMICALLY FEASIBLE

UDAQ forthrightly acknowledges that the proposed B-RACT controls for Marathon and Chevron are not economically feasible and, for this reason, rejects those controls as qualifying as RACT.[27] As EPA has made clear, B-RACT controls are not beyond reasonable. Economic feasibility remains a key criterion. Furthermore, as EPA's step-by-step methodology set forth in the Implementation Rulemaking for the PM2.5 NAAQS makes clear, the assessment of economic feasibility for a control is the same for B-RACT as it is for RACT. In other words, a determination that a control is not economically feasible for RACT is conclusive for beyond-RACT.[28] And this makes sense when one understands that B-RACT refers to additional ***reasonable*** controls that do not qualify for RACT due to their location (outside of the formally designated nonattainment area) or the timing for their installation (that is, after the RACT deadline but before the attainment date).

B. B-RACT Controls Must be Capable of Being Installed by No Later Than the Attainment Date – August 3, 2024

Perhaps the clearest demonstration that UDAQ's proposed B-RACT control measures for Marathon and Chevron are not authorized by the beyond-RACT authority of the CAA, is the fact that such controls cannot be implemented by the attainment-date deadline of August 3, 2024. UDAQ's own proposal identifies the installation date for the B-RACT controls for the two refineries as May 1, 2026.[29] Even assuming that installation by that date would be possible, that would be beyond the August 3, 2024 deadline required for B-RACT controls.

As EPA explains in the Implementation Rule for the 2015 O3 NAAQS, "CAA section 172(c)(6) requires that SIP provisions include [B-RACT] as may be necessary or appropriate to attain a standard ***by the applicable attainment date***."[30] Similarly, in the PM2.5 NAAQS Implementation rulemaking (that EPA specifically references as authority for its B-RACT authority in the Implementation Rule for the 2015 O3 NAAQS),[31] EPA explains that B-RACT control measures

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[27] *See* Proposed SIP at 44 ("The emission units/activities examined in this RACT analysis indicates that all activities currently meet all RACT requirements, and all other existing controls and emissions limitations are considered RACT for the Chevron Refinery. No other additional add-on controls or limitations are technically or economically feasible options at this time."); *See also* Proposed SIP at 73-74 (concluding that Marathon has implemented all technically and economically feasible controls). Indeed, the cost of such controls would not only significantly exceed typical cost-effectiveness thresholds applied for RACT but also the (higher) cost-effectiveness thresholds deemed feasible for BACT. *See* Letter from Rikki Hrenko-Browning, Utah Petroleum Association, to Bryce Bird, UDAQ, regarding, Criteria for Selection of Reasonably Available Control Technology (Feb. 2, 2023).

[28] This can be contrasted to the fact that BACT is generally considered to support a higher cost-effectiveness threshold than RACT.

[29] *See* Proposed SIP at 41 and 71.

[30] 83 Fed. Reg. 62988, 63015 (Dec. 6, 2018) (final Implementation Rule for the 2015 O3 NAAQS) (emphasis added).

[31] *Id*. at 63015, footnote 34.

are "those technologically and economically feasible control measures that can only be implemented after the statutory window for implementing RACM and RACT, ***but before the attainment date***."[32]

EPA established the attainment date for the NWF NAA as August 3, 2024.[33] Accordingly, since the B-RACT controls cannot be installed by this date, they cannot be considered as viable control measures (either as RACT or B-RACT) in the current, Moderate SIP. [34]

C. UDAQ has Failed to Show that the Control Measures Proposed for Beyond RACT are Necessary for Attainment of the NAAQS – or if They Will Even Provide a Marginal Benefit

In attempting to justify the B-RACT controls for the refineries, UDAQ asserts that, "[w]hile the financial feasibility of the identified controls may be beyond previously established RACT thresholds, the CAA provides states with 'discretion to require beyond-RACT reductions from any source' ***if those reductions are necessary to 'demonstrate attainment as expeditiously as practicable***.'"[35] As discussed above in these comments, this statement provides only a partial statement of the demonstration that must be made before beyond-RACT control measures may be imposed. In particular, such controls must be reasonable, including cost effective and must be able to be installed by the attainment date.

But even putting those legal limitations on UDAQ's authority aside for arguments sake, and assuming that UDAQ could impose ***any*** additional control without regard to "reasonableness" or when a control could be installed, UDAQ must still satisfy its own standard; that is, the reductions must be shown to be "needed in order to provide for timely attainment of the ozone NAAQS." By UDAQ's own admission, that standard has not been met. To the contrary, UDAQ has forthrightly admitted that it has not evaluated what, if any, impact the suite of B-RACT measures will have on ambient ozone concentrations.

While the Proposed SIP asserts that, "UDAQ has determined that these controls are necessary for the NWF NAA to demonstrate attainment of the 2015 8-hour ozone NAAQS as expeditiously as practicable,"[36] such assertion is belied by what UDAQ staff forthrightly acknowledged during the April 5th Air Quality Board meeting. Under questioning by Board members of what analysis UDAQ had undertaken to determine that the B-RACT control measures are, in fact, necessary for the NWF NAA to demonstrate attainment of the ozone NAAQS as expeditiously as practicable, staff responded that the effect of the B-RACT measures "***have not been modeled*** because all of

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[32] *See* 81 Fed. Reg. at 58043/3 (emphasis added).

[33] *See* 87 Fed. Reg. 60897 (Oct. 7, 2022) (EPA rulemaking reclassifying NWF NAA to moderate status); Proposed SIP at 141).

[34] We note that it is irrelevant as to whether SCR for Marathon's cogens might be a viable control measure as part of a ***Serious*** SIP control measure (should the NWF NAA eventually be reclassified to that status) since the ***current rulemaking*** is being undertaken as part of the ***Moderate*** SIP rulemaking. *See* Utah State Bulletin (Jun. 1, 2023) at 68 (Notice of Proposed Rule, explaining that the B-RACT controls being proposed by UDAQ is being done "to comply with the Clean Air Act Section 182(b) requirements for ***moderate*** ozone nonattainment areas.").

[35] *See* Proposed SIP at 74 (emphasis added); *see also* Proposed SIP at 44.

[36] *Id*.

them will be implemented after this SIP timeline …. So, we've modeled up through 2023, which is our attainment date. ***We have not been able to model controls beyond that***."[37] This begs the question of how, without any analytical assessment whatsoever, UDAQ can take the position that the B-RACT controls are "needed in order to provide for timely attainment of the ozone NAAQS."

UDAQ seems to be taking the position that the beyond-RACT authority allowed by Section 172(c)(6) of the Act conveys unfettered authority to impose any controls regardless of what effect it will have on the airshed. When asked at the Board meeting to explain how the State determined that the proposed beyond-RACT controls were determined to be necessary for attaining the NAAQS if no modeling of those controls was completed, staff essentially shrugged it off, implying that UDAQ could impose any control it wishes to impose regardless of what its modeling shows: "We have a statutory obligation to attain the standard as expeditiously as practicable regardless of what our modeling demonstration shows."[38]

Still trying to understand the extent of the State's beyond-RACT authority, one Board member followed up and asked for an explanation of what the guiding principles were for UDAQ to exercise this discretion: "Does that mean that [UDAQ] can just implement anything at any time or does that mean it has to come before the board, or what does discretion mean?" In response, UDAQ offered no explanation of a methodology or criteria that guided its beyond-RACT determinations, saying only that pursuant to that authority, "we don't have to completely confine to what other areas have done or a traditionally established threshold, for instance. It gives us a little more leeway to consider the position we're in and the reduction requirements that we really need in order to attain the standard."[39]

In fact, as discussed elsewhere in these comments, the State is not free to dispense with reasonable economic feasibility thresholds or the timing for installation of the controls when assessing what constitutes beyond-RACT measures. Furthermore, the implication that the State's authority under section 172(c)(6) of the Act can be exercised without regard to a modeling analysis that shows that the beyond-RACT measures are necessary for achieving expeditious attainment is contradicted by the NAAQS Implementation Rule for the 2015 O3 NAAQS and other longstanding EPA guidance.

In explaining a state's obligation to adopt RACM/RACT and beyond-RACT measures, EPA instructs that,

> The EPA is retaining our existing general RACM requirements for purposes of the 2015 ozone NAAQS, as codified at 40 CFR 51.1312(c). The EPA interprets the RACM provision to require a demonstration that an air agency has adopted all reasonable measures (including RACT) to meet RFP requirements and to demonstrate attainment as expeditiously as practicable and, thus, that no additional measures that are reasonably available will advance the attainment date or contribute to RFP for the area. Further, the EPA requires that air agencies consider

[37] April 5, 2023, Utah Air Quality Board Meeting audio recording at 0:29:35 minute mark (hereinafter ("AQB Hearing"). Recording available at Apr_5_2023_Audio.mp3 - 4/7/23 10:05 AM.

[38] AQB Hearing at 0:30:08.

[39] AQB Hearing at 0:33:35.

> ***all available measures***, including those being implemented in other areas, but must adopt measures for an area ***only if those measures are economically and technologically feasible*** and ***will advance the attainment date***, or if those measures are necessary for RFP. The EPA is retaining our existing general RACM requirements for the 2015 ozone NAAQS based on the current rationale and approach articulated in the final 2008 Ozone NAAQS SIP Requirements Rule, and the requirements of CAA section 172(c)(6).[40]

In addition to reiterating that the beyond-RACT measures must be economically feasible, EPA adds that such measures must "advance the attainment date." The phrase, "advance the attainment date" has a very definite meaning in this context.

In the PM2.5 NAAQS Implementation Rulemaking,[41] EPA explains that if a group of control measures "would not enable the area to attain the standard at least 1 year earlier (i.e., 'advance the attainment date' by 1 year)," they are not required.[42] Continuing, the Agency states that, "[t]he EPA has long applied this particular test to satisfy the statutory provision related to an area demonstrating attainment 'as expeditiously as practicable.'"[43]

Less there be any doubt that modeling is the tool utilized to determine the need for control measures, EPA explains that, "one of the key features of attainment demonstration modeling and related analysis is that they provide a means of synthesizing the effects of emissions reductions from all existing and potential new control measures identified for sources …."[44]

In summary, in addition to disregarding the economic feasibility and the timing for implementation of the proposed beyond-RACT measures, UDAQ has failed to provide any analysis of the air quality impact of the reductions from the proposed beyond-RACT controls and certainly has not assessed whether they would collectively advance attainment expeditiously (that is, advance attainment by 1 year or more).

D. Requiring Beyond-RACT Controls is Inconsistent with UDAQ's Claim that it has "a strong case that [Utah has] met … the statutory requirements for a moderate nonattainment area demonstration."

Perhaps what most directly undercuts UDAQ's claim that the B-RACT measures "are necessary for the NWF NAA to demonstrate attainment," is UDAQ's own position to the contrary. As noted, UDAQ's predicate for imposing B-RACT controls is that they are necessary to demonstrate attainment as expeditiously as practicable: "The UDAQ has determined that these controls are necessary for the NWF NAA to demonstrate attainment of the 2015 8-hour ozone NAAQS as

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[40] 83 Fed. Reg. at 63007-08 (footnotes omitted) (emphasis added).

[41] EPA specifically references the PM2.5 NAAQS rulemaking in the 2015 NAAQS Implementation Rulemaking for a more in-depth discussion of beyond-RACT authority. *See, e.g.*, 83 Fed. Reg. at footnote 34 at 63015.

[42] 81 Fed. Red. at 58035.

[43] *Id.*

[44] *Id*. at 58044/2.

expeditiously as practicable."[45] But contrary to this assertion, UDAQ admits that even without the B-RACT measures,[46] it has made a "strong case that [its] attainment demonstration adequately demonstrates the NWF NAA attaining the 8-hour ozone NAAQS by the attainment date of August 3, 2024."[47] And during the April 5th Board meeting, UDAQ further represented that it has met the statutory requirements for a moderate nonattainment demonstration:

> So, the Clean Air Act does allow us to also provide what's called a Weight of Evidence Analysis. And this is essentially additional information to be taken into consideration, one, considering whether or not an area is modeling or demonstrating attainment. So, within our Weight of Evidence Analysis we provided additional pieces of information that weren't directly included in the modeling analysis so these are things like emissions reductions associated with grant works or as well as interstate transport, things like that. And so, the state believes that between the fact that the model is performing within all the metrics and the guidance EPA has provided, we're demonstrating close to attainment and this additional weight of evidence that ***we're making a strong case that we've met … the statutory requirements for a moderate nonattainment area demonstration***.[48]

While acknowledging that the attainment demonstration is ultimately subject to EPA review and approval, Staff concluded that the State's position is that it has made a "strong compelling case" for its attainment demonstration.[49] Of course, all SIP elements are subject to EPA approval and the possibility that EPA might disagree with UDAQ's attainment demonstration is speculative and irrelevant. UDAQ is charged with making an attainment demonstration in the first instance and it has gone on the record that it has made a strong and compelling case for an attainment demonstration.

In summary, UDAQ has represented that it has made a strong and compelling case that it has made a viable attainment demonstration, directly contradicting a claim that additional, beyond-RACT measures are necessary for demonstrating attainment. And, even if UDAQ had not made such a demonstration, UDAQ does not have the authority to impose B-RACT controls that it has not shown to be necessary for achieving attainment, and UDAQ readily admits that it has not conducted the necessary analytical work to make such a showing.

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[45] Proposed SIP at 74.

[46] At the April 5th Board meeting, UDAQ staff acknowledged that they have not included the B-RACT reductions in the modeling. *See* AQB Hearing at 0:29:35. Nor does UDAQ reference the B-RACT controls as part of its WOE demonstration. *See* Section 8.3, *Weight of Evidence (WOE)* of proposed SIP.

[47] Proposed SIP at 141.

[48] AQB Hearing at 0:17:12.

[49] *Id*.

V. UDAQ'S AUTHORITY UNDER CAA § 172(C)(6) TO IMPOSE BEYOND-RACT CONTROL MEASURES IS CONTINGENT UPON THE STATE FIRST HAVING COMPLIED WITH THE MANDATORY 15% VOC REDUCTION REQUIREMENT – WHICH IT HAS NOT DONE

The authority to impose beyond-RACT controls is contingent upon the State first implementing the other, mandatory SIP elements required for Moderate ozone nonattainment areas including a requirement to reduce VOC emissions by 15 percent over baseline conditions. UDAQ has forthrightly acknowledged that it has not satisfied this prerequisite for requiring beyond-RACT controls. Failing to satisfy this threshold requirement precludes UDAQ from exercising the Act's beyond-RACT authority (even putting aside the other deficiencies noted in these comments).

A. The Clean Air Act's Prerequisite for Imposing "Other [Beyond-RACT] Control Measures"

To understand the authority granted by a statute, it is obviously important to read it in the context in which it appears: "[W]e … expect Congress to speak clearly if it wishes to assign to an agency decisions of vast economic and political significance. That clarity may come from specific words in the statute, but context can also do the trick. Surrounding circumstances, whether contained within the statutory scheme or external to it, can narrow or broaden the scope of a delegation to an agency."[50] EPA adhered to this canon of statutory construction when it interpreted the scope of authority granted by CAA §172(c)(6), concluding that, in context, "other" in the term "other control measures," is a reference to those measures which precede it, in particular the RACM/RACT requirement of §172(c)(1).

An important contextual aspect relevant to the section 172(c)(6) grant of authority is the requirements that proceed it which must be satisfied before the "other control measures" authority is properly exercised. Nonattainment area planning requirements are found in Part D of the Clean Air Act. General nonattainment planning provisions are found in subpart 1, which includes CAA §172(c) detailing the main nonattainment planning provisions. Subpart 2 of the Clean Air Act sets forth specific nonattainment plan provisions for ozone. Several of the key nonattainment provisions are addressed in both the general provisions of Subpart 1 and the specific provisions of Subpart 2, with the latter providing more detail.

For example, CAA subpart 1, section 172(c)(2) contains a general requirement that nonattainment SIPs must provide for reasonable further progress. Correspondingly, CAA section 182(b)(1) under subpart 2 contains a specific 15 percent VOC reduction requirement for Moderate ozone nonattainment areas.[51] Similarly, subpart 1, section 172(c)(1) establishes a generally applicable RACM/RACT requirement and subpart 2, section 182(b)(2) sets forth more specific RACT requirements for Moderate ozone nonattainment areas.

The so-called "beyond-RACT" authority is found in subpart 1, section 172(c)(6) of the Act (it has no corresponding provision in subpart 2). The actual language of this provision refers to "emission

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[50] *See, e.g., Biden v. Nebraska*, No. 22-506, slip. op. at 8-9 (Barrett concurring) (U.S. 2023).

[51] For an explanation of the interplay between Subparts 1 and 2, *see* 80 Fed. Reg. 12264, 12271 (Mar. 6, 2015) (Implementation Rule for 2008 O3 NAAQS).

limitations, and such ***other*** control measures, means or techniques … as may be necessary or appropriate to provide for attainment."[52]

The structure of the statute makes clear that "such other control measures" refer to measures that are ***beyond*** the other statutorily mandated requirements. While the other statutory requirement includes the RACM/RACT requirement, they are not limited to that requirement. In particular, they include the 15% RFP VOC reduction requirements. This can be seen by looking at the relevant provisions of section 172(c) in fuller context. An abbreviated version of this provision is as follows:[53]

> **(c) Nonattainment plan provisions**
>
> The plan provisions (including plan items) required to be submitted under this part shall comply with each of the following:
>
> **(1) In general**
>
> Such plan provisions shall provide for the implementation of all [RACM/RACT].
>
> **(2) RFP**
>
> ***Such plan provisions shall require reasonable further progress [that is, 15% VOC reduction].***
>
> **(3) Inventory**
>
> Such plan provisions shall include [inventory requirement].
>
> **(4) Identification and quantification**
>
> Such plan provisions shall expressly identify and quantify the emissions [associated with projects allowed in certain economic development zones].
>
> **(5) Permits for new and modified major stationary sources**
>
> Such plan provisions shall require [a major nonattainment New Source Review permit program].
>
> **(6) Other measures**
>
> Such plan provisions shall include enforceable emission limitations, and ***such other control measures***, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emission

[52] As noted above, EPA has construed the term "other control measures" to mean "additional reasonable measures."

[53] This is an excerpted and abbreviated recitation of CAA § 172(c) for purposes of showing the context and intent of the Act's beyond-RACT authority.

> rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date specified in this part.

In its full context, the "other measures" (beyond-RACT) authority is properly understood as bestowing authority to impose additional limitations and control measures as may be shown to be necessary ***only after*** imposing the "other" mandatory requirements found in section 172(c), including not just RACT but also the 15% RFP requirement.

B. UDAQ has Not Satisfied the Mandatory 15% VOC Reduction Requirement

UDAQ's Proposed SIP does a good job of explaining the mandatory requirement to reduce VOC emissions:

> CAA section 172(c)(2) requires emission reductions referred to as RFP. Section 182(b)(1)(A) of the CAA further details RFP requirements for moderate NAAs, which is a demonstrated 15% reduction specifically for VOC emissions, known as Rate of Progress (ROP). Since the NWF does not have a previously approved ROP plan related to ozone, ***the state must meet the 182(b)(1)(A) requirements for this moderate SIP***.[54]

UDAQ goes on to explain the difficulty of achieving the 15% VOC reduction and notes that after accounting for credible reductions, "the State of Utah still has 11.1% of its RFP requirements to fulfill, or 10.3 tpd of additional emission reductions required to fulfill the CAA sections 172(c)(2) and 182(b)(1)(A) requirements."[55] Finally, UDAQ forthrightly concludes that it will not be able to comply with the 15% VOC reduction requirement for the current, Moderate SIP but will seek to do so "during the state's submission of a potential serious SIP for the same NAA."[56]

UDAQ's forthright admission that it has not satisfied the mandatory 15% VOC reduction requirement shows that it has not satisfied the legal prerequisite for imposing "other [beyond-RACT] measures" pursuant to CAA § 172(c)(6) – even assuming that such measures were economically feasible, could be timely implemented by the attainment date, and were shown to be necessary for achieving expeditious attainment.

VI. UDAQ'S INTERPRETATION OF ITS BEYOND-RACT AUTHORITY DIRECTLY CONFLICTS WITH THE CLEAN AIR ACT'S GRADUATED AND STRUCTURED APPROACH TO ACHIEVING ATTAINMENT

The basic framework of the Clean Air Act, including establishing the NAAQS and associated attainment planning requirements, was established in 1970 and 1977. The original deadlines for attaining the NAAQS proved overly ambitious, especially for three NAAQS: ozone, carbon monoxide, and particulate matter. This led to Congress significantly overhauling the attainment strategy for these pollutants in the 1990 Clean Air Act Amendments. Those amendments

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[54] Proposed SIP at 110 (emphasis added).

[55] *Id*. at 112.

[56] *Id*. at 115.

established a classification system based on the severity of an area's nonattainment problem. The more serious the nonattainment problem, the longer the attainment deadlines and the more stringent the control measure requirements.

Particulate matter offers an illustrative example of this approach. Areas not attaining the particulate matter NAAQS are classified as either Moderate or Serious nonattainment with Serious nonattainment areas having more "work" to do to reach attainment. In terms of control requirements, Moderate nonattainment areas are subject RACM/RACT, whereas Serious nonattainment areas are subject to the more stringent control requirements of BACM/BACT.[57]

We know that the (beyond-RACT/beyond-BACT) authority of CAA § 172(c)(6) also applies in particulate matter nonattainment areas (whether an area is classified as Moderate or Serious nonattainment).[58] But, under UDAQ's interpretation of the beyond-RACT authority of CAA § 172(c)(6), the carefully crafted, graduated approach to escalating the stringency of controls from RACT to BACT when going from a Moderate to Serious classification would be obliterated. The state could, in fact, jump right to or ***even over BACT*** in fashioning its Moderate nonattainment area SIP control strategy in contradiction to the carefully calibrated, incremental approach codified by Congress.[59] This is necessarily so because UDAQ has by its own admission disregarded economic feasibility in interpreting its authority pursuant to CAA § 172(c)(6).

While the Act's ozone nonattainment area provisions do not have the same RACT to BACT bump-up in control technology when going from Moderate to Serious nonattainment as the particulate matter nonattainment provisions do, they do contain a graduated and increasingly stringent approach depending on the severity of an area's nonattainment status. In fact, the nonattainment provisions for ozone found in subpart 2 have ***five*** separate classifications for nonattainment compared to the two classifications found in subpart 4 for particulate matter.[60]

As noted, and as expected, the stringency of the requirements increases with the level of nonattainment classification. For example, the major NSR offset ratio increases from 1.1:1 (Marginal) to 1.15:1 (Moderate) to 1.2:1 (Serious) to 1.3 to 1 (Severe) to 1.5 to 1 (Extreme), as an area's classification increases through the five levels of nonattainment classification. Similarly, the major source threshold for RACT (and major NSR) purposes decreases from 100 tpy (Marginal and Moderate) to 50 tpy (Serious) to 25 tpy (Severe) to 10 tpy (Extreme). So, for example, a 75 tpy source that may have avoided RACT during an area's Moderate SIP rulemaking process would be subject to RACT should the area be reclassified to Serious. This is the carefully calibrated

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[57] *See* CAA §§ 189(a)(1)(C), (b)(1)(B).

[58] *See, e.g.*, 81 Fed. Reg. at 58083 (PM2.5 NAAQS Implementation Rule) ("EPA interprets the requirement under CAA section 172(c)(6) for a state to adopt 'other measures' needed for attainment to apply … whether the area is classified as Moderate or Serious ….").

[59] It is also noteworthy that EPA explains that whether part of the control strategy for a Moderate area (requiring RACT) or a Serious area (requiring BACT), imposing controls that go "beyond" RACT or BACT, as the case may be, requires an assessment of economic feasibility that is equivalent to RACT or BACT, respectively. *See, e.g.*, 40 CFR 51.1000 (definitions of "additional feasible measure" and "additional reasonable measure").

[60] *Compare* CAA § 188 (establishing Moderate and Serious classifications for particulate matter nonattainment areas) *with* CAA § 181 (establishing Marginal, Moderate, Serious, Severe, and Extreme classifications for ozone nonattainment areas).

approach that Congress designed. It is also noteworthy that none of the ozone nonattainment classifications require BACT.[61] It would surely be an odd statutory scheme for Congress to not mandate BACT for any of the nonattainment classifications for ozone, on the one hand, but to nonetheless provide beyond-RACT authority that – under UDAQ's reading of the law – would allow the State to not only exceed reasonable RACT controls but to go well beyond the more stringent level of BACT control.

VII. THE AIR QUALITY BOARD HAS NOT MADE THE FINDINGS NECESSARY TO IMPOSE THE PROPOSED BEYOND-RACT CONTROLS

The Notice of Proposed Rule states that the beyond-RACT controls are being proposed "to comply with the Clean Air Act Section 182(b) requirements for ***moderate*** ozone nonattainment areas."[62] As these comments demonstrate, however, the proposed beyond-RACT controls are inconsistent with and exceed this authority. Accordingly, should the Air Quality Board wish to proceed with the rulemaking as proposed, it must make a written finding "based on evidence, studies, or other information contained in the record that relates to the state of Utah and type of source involved" that the more stringent requirements "will provide reasonable added protections to public health or the environment of the state or a particular region of the state." UCA 19-2-106. The UAQB has not taken this step.

[61] However, Congress did provide states with the ***option*** of ratcheting up the level of control on existing major sources from RACT to BACT in Severe and Extreme nonattainment areas if they chose to in exchange for a reduction in the otherwise applicable NSR offset ratios. *See* CAA § 182(d)(2), (e)(1).

[62] Utah State Bulletin (Jun. 1, 2023) at 68.

Attachment IV

Suggested Editorial Corrections

Moderate Ozone SIP Proposal – Suggested Editorial Corrections

1. Footnotes have been flagged inconsistently, some inside the punctuation and some outside. All footnotes should be flagged consistently and outside any applicable punctuation.
2. Table of Acronyms – Add "EMP" for Enhanced Monitoring Plan (introduced on p. 20).
3. Tables that run onto two or more pages should have the header row(s) repeated for improved readability.
4. Page 11 - To better account for variable meteorological conditions that can influence ozone formation, a violation of the standard ~~occurs~~ occurred when the three-year average of the fourth-highest maximum value at a monitor ~~exceeds~~ exceeded the level of the federal standard.
5. Page 12 - This revision lowered the standard from 0.075 to 0.070 ppm for the 4th highest daily maximum 8-hour concentration (MDA8) averaged over three years.
6. Page 14 - Validated data in EPA's Air Quality System (AQS) shows a 3-year average of the 4th high maximum daily 8-hour ozone value at the NWF Bountiful monitor of 0.077 ppm, with exceedances also observed at all other monitoring sites in the NAA except Erda in Tooele County (Table 2).
7. Page 16, Table 3, 7th row - General offsets for VOCs and NOx increase to a ratio of 1.15 ~~to 1.0~~ from 1.1.
    a. Page 93, the statement, "This includes requirements that a major stationary source in the NWF NAA obtain a ratio of total actual emission reductions of VOCs compared to the emission increase of VOCs of at least 1.15:1 prior to commencement of operations and permitting by the UDAQ," should also be updated to include NOx.
8. Page 16, Table 3, 8th row - Emission reduction measures triggered if EPA makes a finding that the NAA ~~fails~~ failed to attain the standard by the attainment date or a finding that the SIP fails to meet RFP requirements.
9. Page 19 – remove the comma after "and UV radiation" in the second bullet.
10. Page 20, Table 4, caption and title. respectively – NWF 4th high MDA8 reported in ppm *and* NWF NAA Ozone 4th high MDA8 (ppm).
11. Page 22, Figure 3, caption – 4th high MDA8 in Wasatch Front.
12. Page 25 - . . . UDAQ has developed a projected emission inventory for 2023 based on the base year inventory described in Section 3.1.1. 2023 is the year prior to the required attainment ~~data~~ date of August 3, 2024 . . .
13. Page 27 - The VCPy framework features better ~~VCP~~ VOC emissions estimates than previous platforms . . .
14. Page 94 - These NAAs were selected for comparison since they have comparable climatic conditions to those experienced in the NWF NAA during summer and similar industrial ~~activates~~ activities present in the NWF NAA.
15. Page 102 – The following sentence will need to be updated to past tense for the final SIP since the boiler rules have now been adopted: "Additionally, the UDAQ has proposed for adoption administrative rules R307-315; NOx Emission Controls for Natural Gas-Fired Boilers 2.0-5.0 MMBtu and R307-316: NOx Emission Controls for Natural Gas-fired Boiler greater than 5.0 MMBtu."
16. Page 105 - I/M programs were adopted in the early 1980's in Utah as a required strategy to attain ~~the both~~ both the ozone and CO NAAQS.
17. Page 107, Table 60, caption and title – 2023 Salt Lake County Basic Performance Modeling.

18. Page 128 - . . . with the remaining 14.5% attributable to Utah anthropogenic emissions.
19. Page 131 - This range is well in line with those reported in the literature and is highly similar in scale when compared to inter-state transport contributions.
20. Page 137 - ~~Target~~ Targeted Air Shed Grants provide funds to reduce air pollution in the nation's NAAs with the highest levels of ozone and $PM_{2.5}$.
21. Page 137 - UDAQ expects these activities to reduce ~~the emission~~ emissions annually by 1.26 tons of Nonmethane Organic Gas (NMOG) and NOx and reduce lifetime emissions of NMOG and NOx by 11.17 tons (Table 72).
22. Page 143 – The first paragraph on section 9.2 includes a font change that should be updated to match the rest of the test. When doing so, "Table 73" on line 34 belongs with the paragraph that needs the font correction.
23. Page 146, end of first full paragraph – The paragraph ends in the middle of a sentence, "The resulting" and is missing some text.
24. Page 149, top of page - modeled ~~changed~~ change in ozone between a 2023 baseline and 2023 sensitivity modeling scenario that includes emissions from all sources except for international anthropogenic emissions.
25. Page 149 - In its document overviewing the disapproval of Utah's ~~prospective~~ retroscpective 179B(b) demonstration, EPA cited a lack of "sufficient technical information"165 to support the modeled conclusions including: a lack of emission data, observations, and meteorological analyses.
26. Page 155 – The sentence, "These rules are expected to be adopted by the Utah Air Quality Board in May of 2023, with an implementation beginning in May of 2024," will need to be updated to indicate the rules were adopted.
27. Page 157 - and facilitate the involvements of these potentially-~~affect~~ affected populations.

Appendix 3 – Detailed Legal Comments on the Draft Ozone SIP

Marathon Petroleum Corporation Legal Comments on Proposed Rulemaking for Northern Wasatch Front Moderate Nonattainment Area: Proposed Amendment to R-307-110-13, Section IX, Control Measures for Area and Point Sources, Part D, Ozone; Proposed Amendment to R-307-110-17, Section IX, Control Measures for Area and Point Sources, Part H, Emission Limits. Published in Utah State Bulletin, June 01, 2023, Vol. 2023, No. 11 at 68-72.

I. SUMMARY

UDAQ has misconstrued the Clean Air Act's (or "Act") authority for imposing beyond-RACT (or "B-RACT") control measures in fundamental ways. This has led UDAQ to, by its own admission, disregard the economic feasibility or reasonableness of the control measures it has proposed pursuant to the Act's beyond-RACT authority. In fact, UDAQ has acknowledged that the cost effectiveness of the B-RACT control it is proposing for Marathon's cogen (SCR) exceeds what it deems to be reasonable. But as explained below, disregarding the economic feasibility of control measures is contrary to the Clean Air Act. EPA has made clear that B-RACT controls must be reasonable; that is, cost effective.

Additionally, UDAQ has acknowledged that SCR controls cannot be installed by the attainment-date deadline of August 3, 2024. Again, EPA has made clear that this is a fundamental criterion for B-RACT controls.

Furthermore, even if the B-RACT controls proposed for Marathon's cogens were deemed to be economically feasible and could be implemented by the attainment-date deadline, UDAQ has failed to show that such controls are necessary for expeditiously attaining the NAAQS. In fact, while UDAQ acknowledges that such a showing is required, it also acknowledges that it has not evaluated the affect the proposed B-RACT controls would have on ambient ozone concentrations, contrary to the requirements of the Act. Additionally, UDAQ has asserted that it has made a strong and compelling attainment demonstration that does not rely on the proposed B-RACT controls, belying any claim that such controls are, in fact, necessary.

Finally, UDAQ's Proposed SIP does not comply with the mandatory Reasonable Further Progress (15% VOC reduction) requirement that is a prerequisite to the State being able to impose beyond-RACT controls.

This comment will begin by outlining UDAQ's explanation of its basis for imposing B-RACT controls, focusing on the B-RACT proposal for Marathon's cogens. It next examines the legal basis and requirements under the Clean Air Act for imposing B-RACT control measures, relying principally on EPA's explanation of the Act's B-RACT authority as set forth in the Implementation Rule for the 2015 O3 NAAQS and other, relevant EPA rulemakings. This examination shows that UDAQ's rationale for imposing B-RACT controls on Marathon's cogens is contrary to the requirements of the Clean Air Act.

II. UDAQ'S STATED AUTHORITY FOR IMPOSING B-RACT

In the introduction to the chapter on RACT controls in the Proposed O3 SIP,[1] UDAQ quotes from the preamble to the Implementation Rule for the ***2008*** ozone NAAQS as the basis for imposing beyond-RACT controls: "States may require VOC and NOX reductions that are 'beyond RACT' if such reductions are needed to provide for timely attainment of the ozone NAAQS."[2] The quote is accurate as far as it goes, but is misleadingly incomplete in addressing the authority for imposing controls that go "beyond RACT."

In the source-specific RACT control evaluation for Marathon, UDAQ concludes that all of the current controls at Marathon's refinery, including those on the cogens, constitute RACT: "The RACT analysis determined that all emission units/activities currently meet all RACT requirements, and all other existing controls and emissions limitations are considered RACT for the Marathon Refinery."[3] Notwithstanding this determination, UDAQ proposes to require the "[i]nstallation of selective catalytic reduction (SCR) that meets a NOx emission rate of 2 ppm on the [Marathon] Cogeneration Turbines."[4] While acknowledging that the cost of the SCR controls exceed what can properly qualify as reasonable for RACT, UDAQ attempts to justify imposing these extraordinary controls pursuant to its beyond-RACT authority:

> The UDAQ has determined that these controls are necessary for the NWF NAA to demonstrate attainment of the 2015 8-hour ozone NAAQS as expeditiously as practicable. While the financial feasibility of the identified controls may be beyond previously established RACT thresholds, the CAA provides states with "discretion to require ***beyond-RACT*** reductions from any source" if those reductions are necessary to "demonstrate attainment as expeditiously as practicable".[5]

In attempting to justify the beyond RACT controls for Marathon's cogen, UDAQ again references the Implementation Rule for the 2008 ozone NAAQS as the basis for its authority, but also includes a general reference to the directly applicable Implementation Rule for the 2015 ozone NAAQS.[6] Unfortunately, UDAQ ignores the very rulemakings that it references. Far from supporting UDAQ's proposal, these rulemakings make clear that UDAQ exceeded its authority to impose B-RACT controls.

As discussed in detail below, UDAQ's assertion that it can impose controls pursuant to its beyond-RACT authority without regard to economic feasibility is wrong. Additionally, UDAQ has failed

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[1] Utah Division of Air Quality State Implementation Plan, 2015 Ozone NAAQS Northern Wasatch Front Moderate Nonattainment Area, 2023, Section IX Part D.11 (hereinafter "Proposed SIP").

[2] Proposed SIP at 33 (quoting EPA's preamble to the Implementation Rule for the ***2008*** ozone NAAQS, 80 Fed. Reg. 12,264, 12,279 (Mar. 6, 2015)). The subject of UDAQ's current rulemaking relates to the ***2015*** ozone NAAQS (70 ppb) and not the ***2008*** ozone NAAQS (75 ppb). As discussed in these comments, the directly applicable ***2015*** NAAQS rulemaking provides a more complete explanation of the scope and meaning of beyond-RACT controls.

[3] Proposed SIP at 73.

[4] *Id*.

[5] Proposed SIP at 74 (emphasis added).

[6] See footnote 65 on page 74 of the Proposed SIP.

to address the fact that SCR controls cannot be implemented on the cogens by the August 3, 2024, attainment deadline, another basic requirement for B-RACT controls. Finally, the requirement – recognized by UDAQ – that beyond-RACT controls must be shown to be necessary to demonstrate attainment as expeditiously as practicable requires, in fact, a showing. UDAQ has provided none; to the contrary, it admits that it does not know what the effect of the B-RACT controls would be on air quality.

UDAQ's incomplete and incorrect understanding of its beyond-RACT authority results in it effectively and erroneously claiming the authority to impose ***any*** control that might have ***any*** beneficial effect on reducing ozone regardless of when it can be implemented. As discussed below, UDAQ has no authority to impose the B-RACT controls it proposes. EPA has made clear that beyond-RACT authority does not mean beyond reasonable; it does not do away with cost effectiveness; it does not allow UDAQ to override a RACT determination that concludes a particular control exceeds costs considered "reasonable"; it does not allow UDAQ to impose a control that cannot be installed by the August 3, 2024 attainment date; it does not allow UDAQ to impose a control without a showing that the control is necessary for expeditiously achieving attainment.

III. EPA'S EXPLANATION OF BEYOND RACT AUTHORITY

A. Summary

In the Implementation Rule for the 2015 O3 NAAQS[7] and other referenced rulemakings, EPA explains the basis for, and extent of, the beyond-RACT authority. Key points from EPA's explanation include:

i. Beyond-RACT authority derives from Section 172(c)(6) of the CAA.

ii. Beyond-RACT does not mean controls that are beyond reasonable. B-RACT controls (just like RACT controls) must be "reasonable," including from a cost perspective.

iii. The "beyond" in beyond-RACT does not mean imposing controls that are more stringent than RACT on sources that have already been subject to a RACT analysis; rather, it refers to imposing RACT-like (that is, reasonable) controls on sources that are not *per se* subject to RACT requirements but otherwise meet the technological and economic feasibility criteria to make them reasonable. This may include sources that fall outside of the formally designated nonattainment area ("NAA") but still have an impact on the NAA itself; or controls that cannot be installed by the deadline for installing RACT controls (January 1, 2023) but can be installed before the attainment date (August 3, 2024). It is in this sense that the controls are ***beyond***-RACT, and not in the sense that B-RACT controls may be beyond reasonable.

iv. B-RACT controls must be able to be implemented by no later than the attainment date which, in the case of the NWF NAA, is August 3, 2024.

[7] The Implementation Rule for the 2015 O3 NAAQS (70 ppb) is directly applicable to UDAQ's Proposed SIP.

v. B-RACT controls must be shown to be necessary to attain the NAAQS expeditiously.

A review of the above criteria against UDAQ's proposed rulemaking to require Marathon to install SCR on its cogens pursuant to the Clean Air Act's B-RACT authority shows that that proposal fails to satisfy at least three of the criteria outlined above:

> *Controls Must be Reasonable/Cost Effective (point ii)*: UDAQ fails to even acknowledge the requirement that B-RACT controls must be reasonable/economically feasible; however, UDAQ readily admits that its B-RACT proposal for Marathon's cogens is not reasonable or cost effective.
>
> *B-RACT Controls Must be Capable of Being Implemented by the Attainment Date – August 3, 2024 (point iv.)*: UDAQ identifies the installation date for the SCR as May 1, 2026, which exceeds the deadline for a control to qualify as B-RACT.
>
> *B-RACT controls must be shown to be necessary for attainment (point v.)*: While UDAQ acknowledges this requirement, it fails to make a demonstration that the B-RACT controls are necessary for achieving the NAAQS. In fact, UDAQ forthrightly admits that it does not know what the impact of the B-RACT controls will be on ambient ozone concentrations. At the same time (and contrary to its claim that the B-RACT controls are necessary for bringing about attainment), UDAQ represents that it has made a compelling and strong attainment demonstration without the B-RACT controls.

A more detailed review of the State's beyond-RACT authority is provided below, beginning with the directly applicable 2015 O3 NAAQS Implementation Rulemaking and followed by the PM2.5 NAAQS Implementation Rulemaking (that EPA specifically references in the O3 NAAQS rulemaking for additional background on beyond-RACT authority).

B. 2015 O3 NAAQS IMPLEMENTATION RULE

The 2015 O3 NAAQS Implementation Rulemaking is, of course, the most applicable rulemaking to UDAQ's Proposed SIP since it is the 2015 O3 NAAQS of 70 ppb that is the subject of the instant SIP rulemaking. While UDAQ's proposal drops a footnote reference to this rule as supporting its beyond-RACT authority,[8] it does not provide any substantive discussion of the rulemaking itself. This is unfortunate because EPA's rulemaking provides instructive discussion on beyond-RACT authority:

> CAA section 172(c)(6) requires that SIP provisions include enforceable emission limitations and other control measures, means or techniques as may be ***necessary or appropriate to attain a standard by the applicable attainment date***. The EPA interprets this provision to include "additional ***reasonable*** measures," which are those measures and technologies that can be applied to any emissions source within the state's jurisdiction, including those outside of a nonattainment area. Upwind sources within a state may have a significant impact on air quality in a downwind

[8] *See* footnote 65 at page 74 of Proposed SIP. Additionally, UDAQ refers to the 2008 O3 NAAQS Implementation Rule as support for imposing B-RACT controls.

> nonattainment area, and failure to consider and require, as appropriate, ***reasonable*** control measures for these sources may preclude attainment of a NAAQS by the attainment date. Though not directly a part of a nonattainment area RACM analysis, the EPA has addressed this "other control measures" provision in the preamble discussions for previous NAAQS implementation rulemakings,[fn34] and for clarity is codifying this interpretation in this final rule at 40 CFR 51.1312(c).[9]

Several points are worth noting from this concise discussion:

Terminology – Additional Reasonable Measures: EPA does not use the term "beyond-RACT" in this rulemaking. Instead, it uses the term, "additional ***reasonable*** measures." The term "beyond RACT reductions" appears only to be used in the preamble to the 2008 O3 NAAQS implementation rulemaking.[10] It is not used in other NAAQS implementation rulemakings.[11] We also note that EPA does not substantively elaborate on what it meant by beyond-RACT in the 2008 O3 implementation rulemaking. Our comments will continue to use the terminology "beyond RACT" or "B-RACT" since it is the term that UDAQ has chosen; however, and as explained below, its meaning is significantly more circumscribed than UDAQ's proposed rulemaking suggests.

Statutory Authority: The quoted excerpt notes that the underlying authority for B-RACT controls is Section 172(c)(6) of the CAA.[12] Section 172 of the CAA details the ***general*** nonattainment plan provisions that apply to all nonattainment areas. Subparagraph (c) identifies key required elements that must be included in a SIP for any nonattainment area. Subparagraph (c)(1) establishes the general RACM/RACT requirement. As noted, subparagraph (c)(6) provides the authority for B-RACT controls.

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[9] 83 Fed. Reg. 62988, 63015 (Dec. 6, 2018) (final Implementation Rule for the 2015 O3 NAAQS) (emphasis added).

The footnote reference within the text (shown as "fn34") lists implementation rulemakings related to the 8-hour ozone NAAQS and the PM2.5 NAAQS. The 8-hour O3 NAAQS rulemaking provides little explanation and simply make passing reference to the underlying statutory authority found in section 172(c)(6) of the CAA. The implementation rulemaking for PM2.5 includes a more substantive discussion which is address later in these comments. The complete text of the footnote is as follows:

> *See* the Phase 2 proposed rulemaking (68 FR 32829; June 2, 2003) and final rule to implement the 8-hour ozone NAAQS (70 FR 71623; November 29, 2005), and the final rule to implement the PM2.5 NAAQS (81 FR 58035; August 24, 2016).

83 Fed. Reg. footnote 34 at 63015.

[10] *See* 80 Fed. Reg.12264, 12279 (Mar. 6, 2015).

[11] We suspect that the reason for EPA not carrying the term "beyond-RACT" forward into other rulemakings may have to do with the potentially misleading connotation that might be conveyed by that term. In fact, it appears that UDAQ incorrectly interpreted beyond-RACT to mean ***beyond reasonable***.

[12] CAA § 172(c)(6) provides in its entirety:

> Such plan provisions shall include enforceable emission limitations, and such other control measures, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emission rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date specified in this part.

Beyond-RACT does Not Mean Beyond Reasonable: The authority that section 172(c)(6) provides for B-RACT controls does not jettison the requirement that controls must be reasonable; that is, technologically and economically feasible. As the agency explains, "[t]he EPA interprets this provision to include 'additional ***reasonable*** measures.'" As discussed below in more detail, EPA explains that these are measures "that can be applied at sources in the nonattainment area that are otherwise technologically and ***economically feasible***." As noted, UDAQ has concluded that the SCR controls it is proposing for Marathon are not economically feasible and, therefore, cannot be considered RACT. That determination is also necessarily conclusive to evaluating the reasonableness of the controls under the B-RACT authority of CAA § 172(c)(6).

In its determination to impose B-RACT measures, UDAQ provides no explanation whatsoever as to how it can disregard its own conclusion that the beyond-RACT control it is proposing for Marathon exceeds its own threshold for being considered reasonable. In fact, UDAQ has offered no criterion for proposing B-RACT controls besides its recognition that such controls must be shown to be necessary to attain the standard (which it fails to do). For example, UDAQ has not indicated how it identified emission units as beyond-RACT candidates, if there is any cost that is too high for B-RACT, or if there is any deadline for when a B-RACT control must be installed.

Beyond-RACT Refers to Sources that are Not Directly Subject to RACT but May Nonetheless be Subject to Reasonable Controls Pursuant to the Authority of CAA § 172(c)(6): As suggested from the previous point, beyond-RACT does ***not*** refer to controls on RACT-eligible sources that go beyond what is considered RACT (that is, beyond reasonable); rather, it is the imposition of ***reasonable*** controls on sources that are not directly subject to RACT review based, principally, on location or the timing for installing the controls. In other words, the "beyond" in beyond-RACT refers to imposing ***reasonable*** controls on sources that are not *per se* subject to RACT requirements, because, for example, they are located outside of the NAA or the required controls cannot be implemented by the deadline for RACT controls, but otherwise meet the technological and economic feasibility criteria to make them reasonable. The 2015 O3 NAAQS Implementation rulemaking was focused on sources located outside of the NAA.[13] Additionally, as EPA has made clear in other implementation rulemakings (discussed below), another important category of sources eligible for B-RACT relates to the timing for when a control can be installed.

The salient point is that the B-RACT authority of CAA 172(c)(6) does not negate the requirement that controls be "reasonable," it does not allow an agency to reject a specific conclusion that a control is not reasonable based on cost effectiveness. At no time does EPA suggest that this authority can be wielded to impose controls that are not "reasonable." The B-RACT authority simply allows an agency to evaluate the application of other reasonable control measures that are shown to be necessary to expeditiously achieve attainment that are not otherwise directly subject to RACT due to a source's location outside of the NAA or the timing for the installation of controls.

B-RACT Controls Must be Able to be Implemented by the Attainment Date. As the 2015 O3 NAAQS Implementation Rulemaking makes clear, B-RACT controls must be capable of being implemented "by the applicable attainment date." UDAQ has acknowledged that this is not

[13] In fact, EPA explicitly codified this aspect of the B-RACT authority in the Implementation Rulemaking for the 2015 O3 NAAQS. *See* 40 CFR 51.1312(c).

possible for the proposed SCR controls for Marathon's cogens and has proposed installation of the controls by May 1, 2026,[14] well beyond the attainment-date deadline of August 3, 2024.

B-RACT Controls Must be Shown to be Necessary to Attain the NAAQS Expeditiously: Although UDAQ acknowledges this requirement, UDAQ fails to show that its suite of B-RACT controls satisfy this requirement; in fact, it acknowledges that it has not evaluated the effect that B-RACT controls would have on ambient ozone concentrations. Furthermore, as discussed below, UDAQ has asserted that it has made a strong and compelling attainment demonstration that does not rely on the B-RACT controls, belying any claim that such controls are necessary for achieving attainment.

Additional References Provided: EPA's discussion of B-RACT authority in the 2015 O3 NAAQS Implementation Rule, while brief, is packed with information that informs the scope of this authority. For a more in-depth discussion of the B-RACT authority, EPA references past implementation rulemakings that have expounded more fully on this authority. The most recent and substantive of these rulemakings referenced by EPA is the PM2.5 NAAQS implementation rulemaking from 2016. This rulemaking is examined in the next section of these comments.

C. PM2.5 NAAQS IMPLEMENTATION RULEMAKING

In support of its beyond-RACT authority, UDAQ properly cites to the 2015 O3 NAAQS Implementation Rule as the basis for its authority. As discussed in the preceding section of these comments, while that rulemaking provides a relatively brief (but informative) instruction on the scope of the authority for imposing B-RACT control measures, it includes references to other NAAQS implementation rulemakings that provide a more fulsome discussion of the B-RACT authority: "EPA has addressed this 'other control measures' provision in the preamble discussions for previous NAAQS implementation rulemakings."[15] In particular, EPA cites to the implementation rule for the PM2.5 NAAQS. That rulemaking provides one of the most complete discussions of the scope of the B-RACT authority.

In the PM2.5 Implementation rulemaking, EPA methodically lays out the requirements for an attainment plan strategy, including requirements for B-RACT. EPA begins with an overview of RACM/RACT requirements. The Agency explains that, "RACT has historically been defined as the lowest emission limit that a source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility."[16] It explains that RACM/RACT authority derives from both the general NAA planning requirements contained in section 172(c)(1) of the CAA and specific particulate matter NAA planning requirements contained in section 189(a)(1)(C).[17] "The EPA reads CAA sections 172(c)(1) and

[14] Elsewhere in Marathon's comments, we clarify that even the May 1, 2026, implementation date is not realistic.

[15] *See* 83 Fed. Reg. at 63015/2.

[16] 81 Fed. Reg. 58034/2.

[17] Title I of the CAA contains most of the Act's foundational air quality programs including the nonattainment planning provisions which are found in Part D of Title I. Part D is subdivided into subparts. Subpart 1 includes overarching, general provisions that apply to all nonattainment areas. Section 172 is found in subpart 1. Subpart 4 contains provisions that apply specifically to areas that are nonattainment for particulate matter. Section 189 is found in subpart 4.

189(a)(1)(C) together to require that attainment plans for Moderate nonattainment areas must provide for the implementation of RACM and RACT for existing sources of PM2.5 and PM2.5 precursors in the nonattainment area as expeditiously as practicable but ***no later than 4 years after designation***."[18] The requirement that a control qualifies as RACM/RACT only if it can be employed "no later than 4 years after designation" derives from CAA 189(a)(1)(C). As will be discussed, this deadline constitutes a dividing line for whether ***reasonable*** controls are considered RACT or whether they may qualify as beyond-RACT controls.

EPA next sets forth the methodology for determining RACM/RACT and beyond-RACT control measures.

> [T]he state should follow a process by which it first identifies ***all sources of emissions*** of direct PM2.5 … and all PM2.5 precursors in the nonattainment area, and all ***potential control measures*** to reduce emissions from those source categories. The state next determines if any of the identified potential control measures are not technologically feasible and whether any of the identified technologically feasible control measures are not ***economically feasible***. Measures that are not necessary for attainment need not be considered as RACM/RACT.[19]

This results in the state identifying all sources and controls that are potential RACM/RACT or B-RACT candidates. To this point, this is the methodology generally followed by UDAQ for selecting RACM/RACT. In particular, UDAQ's RACT determinations are based on a determination of technological and economic feasibility. But as UDAQ moves from RACM/RACT to B-RACT, it radically departs from the law as explained by EPA. UDAQ misconstrues its authority to such an extent that it effectively concludes that it has the authority to impose controls that are beyond reasonable.

Recognizing that RACM/RACT must statutorily be implemented no later than 4 years after an area is designated as moderate nonattainment, but that there may be some technologically and economically feasible control measures that can be installed after that date that can contribute to attainment ***by the attainment date***, EPA explains that such measures may potentially be imposed pursuant to the B-RACT authority of CAA 172(c)(6):

> Measures that can only be implemented ***after the 4-year deadline for RACM and RACT, but before the end of the sixth calendar year following designation***, are defined in the final rule as "***additional reasonable measures***."[fn72] The EPA has created this new definition based on the recognition that in some areas there could be emission reduction strategies that still could be implemented beginning 4 years after designation through the attainment date that could help to improve air quality and attain the standard expeditiously in the area.[20]

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[18] 81 Fed. Reg. at 58034/1 (emphasis added).

[19] *Id*. 58035/1 (internal footnotes omitted) (emphasis added).

[20] *Id*. 58035 (emphasis added).

Importantly, these "additional reasonable measures" are measures that a state has determined to be both technologically and economically feasible. The only limitation is on the timing for when a control can be implemented; those that can be implemented within 4 years of the date an area is designated as moderate nonattainment are properly considered to constitute RACT, while those that can only be implemented after that time may be considered as beyond-RACT measures. But in either case, ***the control must be economically feasible***.

In footnote 72 of the above excerpt, EPA explains that its authority for imposing "additional reasonable measures" is based on the so-called B-RACT authority of CAA 172(c)(6). In the ensuing pages of the preamble, EPA provides a methodical, step-by-step methodology for establishing control measures as RACM/RACT or as additional reasonable measures (that is, B-RACT measures). The steps are identified by EPA as follows:

> Step 1: Identify Sources of Emissions
>
> Step 2: Identify Existing and Potential Control Measures
>
> Step 3: Determine Whether an Available Control Measure or Technology Is Technologically Feasible
>
> ***Step 4: Determine Whether an Available Control Measure or Technology Is Economically Feasible***
>
> ***Step 5: Determine the Earliest Date by Which a Control Measure or Technology Can be Implemented in Whole or in Part***
>
> Step 6: Evaluate the Collective Impact of Potential Control Measures To Determine Whether the Area Can Attain Expeditiously or Whether it is Impracticable to Attain by the Attainment Date, and Adopt the Appropriate Set of Control Measures

EPA provides an in-depth discussion of each of these steps.[21] As indicated by Step 4, a critical element to imposing a control measure – whether it be RACT or B-RACT – is that the measure be shown to be economically feasible:

> The EPA believes that it is appropriate for states to give substantial weight to cost effectiveness in evaluating the economic feasibility of an emission reduction measure or technology. The cost effectiveness of a measure is its annualized cost ($/year) divided by the emissions reduced (tons/ year) which yields a cost per amount of emission reduction ($/ton). Cost effectiveness provides a relative value for each emissions reduction option that is comparable with other options and, in the case of control technologies, other facilities.[22]

In Step 5 EPA explains how control measures are categorized as either RACT or B-RACT based on a control measure's implementation date. EPA explains that RACM/RACT must be capable

[21] *See* 81 Fed. Reg. 58035-048.

[22] *Id*. at 58042/2.

of being implemented no later than 4 years after designation.[23] But even if a control measure cannot be implemented within that timeframe, it might still be required as a B-RACT control measure:

> In addition, a state must separately identify those technologically and ***economically feasible*** control measures that can only be implemented after the statutory window for implementing RACM and RACT, but before the attainment date. The statutory 4-year timing requirement for implementing RACM and RACT under CAA section 189(a)(1)(C) limits the control measures and technologies that can qualify as RACM and RACT for a Moderate PM2.5 nonattainment area. However, the statutory requirement of ***CAA 172(c)(6)*** also requires states to implement "other measures" necessary to provide for timely attainment in an area. The EPA interprets this provision to include "***additional reasonable measures***," which are those measures and technologies that can be applied at sources in the nonattainment area that are ***otherwise technologically and economically feasible*** but can only be implemented in whole or in part later than 4 years after designation.[24]

As EPA makes clear, the authority provided by Section 172(c)(6) of the Act to impose beyond-RACT control measures does not dispense with the requirement for these measures to be economically feasible.

Consistent with the foregoing explanation, EPA codified in the regulation its interpretation of B-RACT authority when it defined the term "additional reasonable measures":

> *Additional reasonable measure* is any control measure that ***otherwise meets the definition of "reasonably available control measure"*** (RACM) but can only be implemented in whole or in part during the period beginning 4 years after the effective date of designation of a nonattainment area and no later than the end of the sixth calendar year following the effective date of designation of the area.[25]

Again, this makes clear that B-RACT measures must meet the technological and economic feasibility criteria for RACT.[26]

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[23] *Id*. at 58043/2.

[24] *Id*. at 58043/3 (emphasis added).

[25] 40 CFR 51.1000.

[26] While the definition refers only to RACM, the definition of RACM expressly includes RACT. *See* 40 CFR 51.1000 (definition of reasonably available control measure).

IV. UDAQ'S PROPOSAL TO REQUIRE SCR ON MARATHON COGENS DOES NOT COMPLY WITH BEYOND-RACT CRITERIA AS ARTICULATED BY EPA

A. SCR IS NOT "REASONABLE"/ECONOMICALLY FEASIBLE

UDAQ forthrightly acknowledges that the proposed SCR controls for Marathon's cogens are not economically feasible and, for this reason, rejects those controls as qualifying as RACT.[27] As EPA has made clear, B-RACT controls are not beyond reasonable. Economic feasibility remains a key criterion. Furthermore, as EPA's step-by-step methodology set forth in the Implementation Rulemaking for the PM2.5 NAAQS makes clear, the assessment of economic feasibility for a control is the same for B-RACT as it is for RACT. In other words, a determination that a control is not economically feasible for RACT is conclusive for B-RACT.[28] And this makes sense when one understands that beyond-RACT refers to additional ***reasonable*** controls that do not qualify for RACT due to their location (outside of the formally designated nonattainment area) or the timing for their installation (that is, after the RACT deadline but before the attainment date).

B. B-RACT Controls Must be Capable of Being Installed by No Later Than the Attainment Date – August 3, 2024

Perhaps the clearest demonstration that UDAQ's proposed SCR control measure for Marathon's cogens is not authorized by the beyond-RACT authority of the CAA, is the fact that such controls cannot be implemented by the attainment-date deadline of August 3, 2024. UDAQ's own proposal identifies the installation date for the SCR control as May 1, 2026.[29] Even assuming that installation by that date would be possible,[30] that would be beyond the August 3, 2024, deadline required for B-RACT controls.

As EPA explains in the Implementation Rule for the 2015 O3 NAAQS, "CAA section 172(c)(6) requires that SIP provisions include [B-RACT] as may be necessary or appropriate to attain a standard ***by the applicable attainment date***."[31] Similarly, in the PM2.5 NAAQS Implementation rulemaking (that EPA specifically references as authority for its B-RACT authority in the Implementation Rule for the 2015 O3 NAAQS),[32] EPA explains that B-RACT control measures are "those technologically and economically feasible control measures that can only be

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[27] *See* Proposed SIP at 73-74. Indeed, the cost of such controls would not only significantly exceed typical cost-effectiveness thresholds applied for RACT but also the (higher) cost-effectiveness thresholds deemed feasible for BACT. *See* Letter from Rikki Hrenko-Browning, Utah Petroleum Association, to Bryce Bird, UDAQ, *regarding*, Criteria for Selection of Reasonably Available Control Technology (Feb. 2, 2023).

[28] This can be contrasted to the fact that BACT is generally considered to support a higher cost-effectiveness threshold than RACT.

[29] Proposed SIP at 71.

[30] As explained in additional comments submitted by Marathon, Marathon ***does not*** agree that it would be realistically possible to implement such a complex project by May 1, 2026.

[31] 83 Fed. Reg. 62988, 63015 (Dec. 6, 2018) (final Implementation Rule for the 2015 O3 NAAQS) (emphasis added).

[32] *Id*. at 63015, footnote 34.

implemented after the statutory window for implementing RACM and RACT, ***but before the attainment date***."[33]

EPA established the attainment date for the NWF NAA as August 3, 2024.[34] Accordingly, since the SCR controls cannot be installed by this date, they cannot be considered as a viable control measure (either as RACT or B-RACT) in the current, Moderate SIP.[35]

C. UDAQ has Failed to Show that the Control Measures Proposed for Beyond RACT are Necessary for Attainment of the NAAQS – or if They Will Even Provide a Marginal Benefit

In attempting to justify the B-RACT controls for Marathon's cogens, UDAQ asserts that, "[w]hile the financial feasibility of the identified controls may be beyond previously established RACT thresholds, the CAA provides states with 'discretion to require beyond-RACT reductions from any source' ***if those reductions are necessary to 'demonstrate attainment as expeditiously as practicable***.'"[36] As discussed above in these comments, this statement provides only a partial statement of the demonstration that must be made before beyond-RACT control measures may be imposed. In particular, such controls must be reasonable, including cost effective and must be able to be installed by the attainment date.

But even putting those legal limitations on UDAQ's authority aside for arguments sake, and assuming that UDAQ could impose ***any*** additional control without regard to "reasonableness" or when a control could be installed, UDAQ must still satisfy its own standard; that is, the reductions must be shown to be "needed in order to provide for timely attainment of the ozone NAAQS." By UDAQ's own admission, that standard has not been met. To the contrary, UDAQ has forthrightly admitted that it has not evaluated what, if any, impact the suite of B-RACT measures will have on ambient ozone concentrations.

While the Proposed SIP asserts that, "UDAQ has determined that these controls are necessary for the NWF NAA to demonstrate attainment of the 2015 8-hour ozone NAAQS as expeditiously as practicable,"[37] such assertion is belied by what UDAQ staff forthrightly acknowledged during the April 5th Air Quality Board meeting. Under questioning by Board members of what analysis UDAQ had undertaken to determine that the B-RACT control measures are, in fact, necessary for the NWF NAA to demonstrate attainment of the ozone NAAQS as expeditiously as practicable, staff responded that the effect of the B-RACT measures "***have not been modeled*** because all of them will be implemented after this SIP timeline …. So, we've modeled up through 2023, which

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[33] *See* 81 Fed. Reg. at 58043/3 (emphasis added).

[34] *See* 87 Fed. Reg. 60897 (Oct. 7, 2022) (EPA rulemaking reclassifying NWF NAA to moderate status); Proposed SIP at 141).

[35] We note that it is irrelevant as to whether SCR for Marathon's cogens might be a viable control measure as part of a ***Serious*** SIP control measure (should the NWF NAA eventually be reclassified to that status) since the ***current rulemaking*** is being undertaken as part of the ***Moderate*** SIP rulemaking. *See* Utah State Bulletin (Jun. 1, 2023) at 68 (Notice of Proposed Rule, explaining that the B-RACT controls being proposed by UDAQ is being done "to comply with the Clean Air Act Section 182(b) requirements for ***moderate*** ozone nonattainment areas.").

[36] Proposed SIP at 74 (emphasis added).

[37] Proposed SIP at 74 (emphasis added).

is our attainment date. ***We have not been able to model controls beyond that***."[38] This begs the question of how, without any analytical assessment whatsoever, UDAQ can take the position that the B-RACT controls are "needed in order to provide for timely attainment of the ozone NAAQS."

UDAQ seems to be taking the position that the beyond-RACT authority allowed by Section 172(c)(6) of the Act conveys unfettered power to impose any controls regardless of what effect it will have on the airshed. When asked at the Board meeting to explain how the State determined that the proposed beyond-RACT controls were determined to be necessary for attaining the NAAQS if no modeling of those controls was completed, staff essentially shrugged it off, implying that UDAQ could impose any control it wishes to impose regardless of what its modeling shows: "We have a statutory obligation to attain the standard as expeditiously as practicable regardless of what our modeling demonstration shows."[39]

Still trying to understand the extent of the State's beyond-RACT authority, one Board member followed up and asked for an explanation of what the guiding principles were for UDAQ to exercise this discretion: "Does that mean that [UDAQ] can just implement anything at any time or does that mean it has to come before the board, or what does discretion mean?" In response, UDAQ offered no explanation of a methodology or criteria that guided its beyond-RACT determinations, saying only that pursuant to that authority, "we don't have to completely confine to what other areas have done or a traditionally established threshold, for instance. It gives us a little more leeway to consider the position we're in and the reduction requirements that we really need in order to attain the standard."[40]

In fact, as discussed elsewhere in these comments, the State is not free to dispense with reasonable economic feasibility thresholds or the timing for installation of the controls when assessing what constitutes beyond-RACT measures. Furthermore, the implication that the State's authority under section 172(c)(6) of the Act can be exercised without regard to a modeling analysis that shows that the beyond-RACT measures are necessary for achieving expeditious attainment is contradicted by the NAAQS Implementation Rule for the 2015 O3 NAAQS and other longstanding EPA guidance.

In explaining a state's obligation to adopt RACM/RACT and beyond-RACT measures, EPA instructs that,

> The EPA is retaining our existing general RACM requirements for purposes of the 2015 ozone NAAQS, as codified at 40 CFR 51.1312(c). The EPA interprets the RACM provision to require a demonstration that an air agency has adopted all reasonable measures (including RACT) to meet RFP requirements and to demonstrate attainment as expeditiously as practicable and, thus, that no additional measures that are reasonably available will advance the attainment date or contribute to RFP for the area. Further, the EPA requires that air agencies consider ***all available measures***, including those being implemented in other areas, but must

[38] April 5, 2023 Utah Air Quality Board Meeting audio recording at 0:29:35 minute mark (hereinafter ("AQB Hearing"). Recording available at Apr_5_2023_Audio.mp3 - 4/7/23 10:05 AM.

[39] AQB Hearing at 0:30:08.

[40] AQB Hearing at 0:33:35.

> adopt measures for an area ***only if those measures are economically and technologically feasible*** and ***will advance the attainment date***, or if those measures are necessary for RFP. The EPA is retaining our existing general RACM requirements for the 2015 ozone NAAQS based on the current rationale and approach articulated in the final 2008 Ozone NAAQS SIP Requirements Rule, and the requirements of CAA section 172(c)(6).[41]

In addition to reiterating that the beyond-RACT measures must be economically feasible, EPA adds that such measures must "advance the attainment date." The phrase, "advance the attainment date" has a very definite meaning in this context.

In the PM2.5 NAAQS Implementation Rulemaking,[42] EPA explains that if a group of control measures "would not enable the area to attain the standard at least 1 year earlier (i.e., 'advance the attainment date' by 1 year)," they are not required.[43] Continuing, the Agency states that, "[t]he EPA has long applied this particular test to satisfy the statutory provision related to an area demonstrating attainment 'as expeditiously as practicable.'"[44]

Less there be any doubt that modeling is the tool utilized to determine the need for control measures, EPA explains that, "one of the key features of attainment demonstration modeling and related analysis is that they provide a means of synthesizing the effects of emissions reductions from all existing and potential new control measures identified for sources …."[45]

In summary, in addition to disregarding the economic feasibility and the timing for implementation of the proposed beyond-RACT measures, UDAQ has failed to provide any analysis of the air quality impact of the reductions from the proposed beyond-RACT controls and certainly has not assessed whether they would collectively advance attainment expeditiously (that is, advance attainment by 1 year or more).

D. Requiring Beyond-RACT Controls is Inconsistent with UDAQ's Claim that it has "a strong case that [Utah has] met … the statutory requirements for a moderate nonattainment area demonstration."

Perhaps what most directly undercuts UDAQ's claim that the B-RACT measures "are necessary for the NWF NAA to demonstrate attainment," is UDAQ's own position to the contrary. As noted, UDAQ's predicate for imposing B-RACT controls is that they are necessary to demonstrate attainment as expeditiously as practicable: "The UDAQ has determined that these controls are necessary for the NWF NAA to demonstrate attainment of the 2015 8-hour ozone NAAQS as expeditiously as practicable."[46] But contrary to this assertion, UDAQ admits that even without the

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[41] 83 Fed. Reg. at 63007-08 (footnotes omitted) (emphasis added).

[42] EPA specifically references the PM2.5 NAAQS rulemaking in the 2015 NAAQS Implementation Rulemaking for a more in-depth discussion of beyond-RACT authority. *See, e.g.*, 83 Fed. Reg. at footnote 34 at 63015.

[43] 81 Fed. Red. at 58035.

[44] *Id.*

[45] *Id*. at 58044/2.

[46] Proposed SIP at 74.

B-RACT measures,[47] it has made a "strong case that [its] attainment demonstration adequately demonstrates the NWF NAA attaining the 8-hour ozone NAAQS by the attainment date of August 3, 2024."[48] And during the April 5th Board meeting, UDAQ further represented that it has met the statutory requirements for a moderate nonattainment demonstration:

> So, the Clean Air Act does allow us to also provide what's called a Weight of Evidence Analysis. And this is essentially additional information to be taken into consideration, one, considering whether or not an area is modeling or demonstrating attainment. So, within our Weight of Evidence Analysis we provided additional pieces of information that weren't directly included in the modeling analysis so these are things like emissions reductions associated with grant works or as well as interstate transport, things like that. And so, the state believes that between the fact that the model is performing within all the metrics and the guidance EPA has provided, we're demonstrating close to attainment and this additional weight of evidence that ***we're making a strong case that we've met … the statutory requirements for a moderate nonattainment area demonstration***.[49]

While acknowledging that the attainment demonstration is ultimately subject to EPA review and approval, Staff concluded that the State's position is that it has made a "strong compelling case" for its attainment demonstration.[50] Of course, all SIP elements are subject to EPA approval and the possibility that EPA might disagree with UDAQ's attainment demonstration is speculative and irrelevant. UDAQ is charged with making an attainment demonstration in the first instance and it has gone on the record that it has made a strong and compelling case for an attainment demonstration.

In summary, UDAQ has represented that it has made a strong and compelling case that it has made a viable attainment demonstration, directly contradicting a claim that additional, beyond-RACT measures are necessary for demonstrating attainment. And, even if UDAQ had not made such a demonstration, UDAQ does not have the authority to impose B-RACT controls that it has not shown to be necessary for achieving attainment, and UDAQ readily admits that it has not conducted the necessary analytical work to make such a showing.

V. UDAQ'S AUTHORITY UNDER CAA § 172(C)(6) TO IMPOSE BEYOND-RACT CONTROL MEASURES IS CONTINGENT UPON THE STATE FIRST HAVING COMPLIED WITH THE MANDATORY 15% VOC REDUCTION REQUIREMENT – WHICH IT HAS NOT DONE

The authority to impose beyond-RACT controls is contingent upon the State first implementing the other, mandatory SIP elements required for Moderate ozone nonattainment areas including a

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[47] At the April 5th Board meeting, UDAQ staff acknowledged that they have not included the B-RACT reductions in the modeling. *See* AQB Hearing at 0:29:35. Nor does UDAQ reference the B-RACT controls as part of its WOE demonstration. *See* Section 8.3, *Weight of Evidence (WOE)* of proposed SIP.

[48] Proposed SIP at 141.

[49] AQB Hearing at 0:17:12.

[50] *Id*.

requirement to reduce VOC emissions by 15 percent over baseline conditions. UDAQ has forthrightly acknowledged that it has not satisfied this prerequisite for requiring beyond-RACT controls. Failing to satisfy this threshold requirement precludes UDAQ from exercising the Act's beyond-RACT authority (even putting aside the other deficiencies noted in these comments).

A. The Clean Air Act's Prerequisite for Imposing "Other [Beyond-RACT] Control Measures"

To understand the authority granted by a statute, it is obviously important to read it in the context in which it appears: "[W]e … expect Congress to speak clearly if it wishes to assign to an agency decisions of vast economic and political significance. That clarity may come from specific words in the statute, but context can also do the trick. Surrounding circumstances, whether contained within the statutory scheme or external to it, can narrow or broaden the scope of a delegation to an agency."[51] EPA adhered to this canon of statutory construction when it interpreted the scope of authority granted by CAA §172(c)(6), concluding that, in context, "other" in the term "other control measures," is a reference to those measures which precede it, in particular the RACM/RACT requirement of §172(c)(1).

An important contextual aspect relevant to the section 172(c)(6) grant of authority is the requirements that proceed it which must be satisfied before the "other control measures" authority is properly exercised. Nonattainment area planning requirements are found in Part D of the Clean Air Act. General nonattainment planning provisions are found in subpart 1, which includes CAA §172(c) detailing the main nonattainment planning provisions. Subpart 2 of the Clean Air Act sets forth specific nonattainment plan provisions for ozone. Several of the key nonattainment provisions are addressed in both the general provisions of Subpart 1 and the specific provisions of Subpart 2, with the latter providing more detail.

For example, CAA subpart 1, section 172(c)(2) contains a general requirement that nonattainment SIPs must provide for reasonable further progress. Correspondingly, CAA section 182(b)(1) under subpart 2 contains a specific 15 percent VOC reduction requirement for Moderate ozone nonattainment areas.[52] Similarly, subpart 1, section 172(c)(1) establishes a generally applicable RACM/RACT requirement and subpart 2, section 182(b)(2) sets forth more specific RACT requirements for Moderate ozone nonattainment areas.

The so-called "beyond-RACT" authority is found in subpart 1, section 172(c)(6) of the Act (it has no corresponding provision in subpart 2). The actual language of this provision refers to "emission limitations, and such ***other*** control measures, means or techniques … as may be necessary or appropriate to provide for attainment."[53]

The structure of the statute makes clear that "such other control measures" refer to measures that are ***beyond*** the other statutorily mandated requirements. While the other statutory requirement

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[51] *See, e.g.*, *Biden v. Nebraska*, No. 22-506, slip. op. at 8-9 (Barrett concurring) (U.S. 2023).

[52] For an explanation of the interplay between Subparts 1 and 2, *see* 80 Fed. Reg. 12264, 12271 (Mar. 6, 2015) (Implementation Rule for 2008 O3 NAAQS).

[53] As noted above, EPA has construed the term "other control measures" to mean "additional reasonable measures."

includes the RACM/RACT requirement, they are not limited to that requirement. In particular, they include the 15% RFP VOC reduction requirements. This can be seen by looking at the relevant provisions of section 172(c) in fuller context. An abbreviated version of this provision is as follows:[54]

> **(c) Nonattainment plan provisions**
>
> The plan provisions (including plan items) required to be submitted under this part shall comply with each of the following:
>
> **(1) In general**
>
> Such plan provisions shall provide for the implementation of all [RACM/RACT].
>
> **(2) RFP**
>
> ***Such plan provisions shall require reasonable further progress [that is, 15% VOC reduction].***
>
> **(3) Inventory**
>
> Such plan provisions shall include [inventory requirement].
>
> **(4) Identification and quantification**
>
> Such plan provisions shall expressly identify and quantify the emissions [associated with projects allowed in certain economic development zones].
>
> **(5) Permits for new and modified major stationary sources**
>
> Such plan provisions shall require [a major nonattainment New Source Review permit program].
>
> **(6) Other measures**
>
> Such plan provisions shall include enforceable emission limitations, and ***such other control measures***, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emission rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date specified in this part.

In its full context, the "other measures" (beyond-RACT) authority is properly understood as bestowing authority to impose additional limitations and control measures as may be shown to be

[54] This is an excerpted and abbreviated recitation of CAA § 172(c) for purposes of showing the context and intent of the Act's beyond-RACT authority.

necessary ***only after*** imposing the "other" mandatory requirements found in section 172(c), including not just RACT but also the 15% RFP requirement.

B. UDAQ has Not Satisfied the Mandatory 15% VOC Reduction Requirement

UDAQ's Proposed SIP does a good job of explaining the mandatory requirement to reduce VOC emissions:

> CAA section 172(c)(2) requires emission reductions referred to as RFP. Section 182(b)(1)(A) of the CAA further details RFP requirements for moderate NAAs, which is a demonstrated 15% reduction specifically for VOC emissions, known as Rate of Progress (ROP). Since the NWF does not have a previously approved ROP plan related to ozone, ***the state must meet the 182(b)(1)(A) requirements for this moderate SIP***.[55]

UDAQ goes on to explain the difficulty of achieving the 15% VOC reduction and notes that after accounting for credible reductions, "the State of Utah still has 11.1% of its RFP requirements to fulfill, or 10.3 tpd of additional emission reductions required to fulfill the CAA sections 172(c)(2) and 182(b)(1)(A) requirements."[56] Finally, UDAQ forthrightly concludes that it will not be able to comply with the 15% VOC reduction requirement for the current, Moderate SIP but will seek to do so "during the state's submission of a potential serious SIP for the same NAA."[57]

UDAQ's forthright admission that it has not satisfied the mandatory 15% VOC reduction requirement shows that it has not satisfied the legal prerequisite for imposing "other [beyond-RACT] measures" pursuant to CAA § 172(c)(6) – even assuming that such measures were economically feasible, could be timely implemented by the attainment date, and were shown to be necessary for achieving expeditious attainment.

VI. UDAQ'S INTERPRETATION OF ITS BEYOND-RACT AUTHORITY DIRECTLY CONFLICTS WITH THE CLEAN AIR ACT'S GRADUATED AND STRUCTURED APPROACH TO ACHIEVING ATTAINMENT

The basic framework of the Clean Air Act, including establishing the NAAQS and associated attainment planning requirements, was established in 1970 and 1977. The original deadlines for attaining the NAAQS proved overly ambitious, especially for three NAAQS: ozone, carbon monoxide, and particulate matter. This led to Congress significantly overhauling the attainment strategy for these pollutants in the 1990 Clean Air Act Amendments. Those amendments established a classification system based on the severity of an area's nonattainment problem. The more serious the nonattainment problem, the longer the attainment deadlines and the more stringent the control measure requirements.

Particulate matter offers an illustrative example of this approach. Areas not attaining the particulate matter NAAQS are classified as either Moderate or Serious nonattainment with Serious

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[55] Proposed SIP at 110 (emphasis added).

[56] *Id*. at 112.

[57] *Id*. at 115.

nonattainment areas having more "work" to do to reach attainment. In terms of control requirements, Moderate nonattainment areas are subject RACM/RACT, whereas Serious nonattainment areas are subject to the more stringent control requirements of BACM/BACT.[58]

We know that the (beyond-RACT/beyond-BACT) authority of CAA § 172(c)(6) also applies in particulate matter nonattainment areas (whether an area is classified as Moderate or Serious nonattainment).[59] But, under UDAQ's interpretation of the beyond-RACT authority of CAA § 172(c)(6), the carefully crafted, graduated approach to escalating the stringency of controls from RACT to BACT when going from a Moderate to Serious classification would be obliterated. The state could, in fact, jump right to or ***even over BACT*** in fashioning its Moderate nonattainment area SIP control strategy in contradiction to the carefully calibrated, incremental approach codified by Congress.[60] This is necessarily so because UDAQ has by its own admission disregarded economic feasibility in interpreting its authority pursuant to CAA § 172(c)(6).

While the Act's ozone nonattainment area provisions do not have the same RACT to BACT bump-up in control technology when going from Moderate to Serious nonattainment as the particulate matter nonattainment provisions do, they do contain a graduated and increasingly stringent approach depending on the severity of an area's nonattainment status. In fact, the nonattainment provisions for ozone found in subpart 2 have ***five*** separate classifications for nonattainment compared to the two classifications found in subpart 4 for particulate matter.[61]

As noted, and as expected, the stringency of the requirements increases with the level of nonattainment classification. For example, the major NSR offset ratio increases from 1.1:1 (Marginal) to 1.15:1 (Moderate) to 1.2:1 (Serious) to 1.3 to 1 (Severe) to 1.5 to 1 (Extreme), as an area's classification increases through the five levels of nonattainment classification. Similarly, the major source threshold for RACT (and major NSR) purposes decreases from 100 tpy (Marginal and Moderate) to 50 tpy (Serious) to 25 tpy (Severe) to 10 tpy (Extreme). So, for example, a 75 tpy source that may have avoided RACT during an area's Moderate SIP rulemaking process would be subject to RACT should the area be reclassified to Serious. This is the carefully calibrated approach that Congress designed. It is also noteworthy that none of the ozone nonattainment classifications require BACT.[62] It would surely be an odd statutory scheme for Congress to not mandate BACT for any of the nonattainment classifications for ozone, on the one hand, but to

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[58] *See* CAA §§ 189(a)(1)(C), (b)(1)(B).

[59] *See, e.g.*, 81 Fed. Reg. at 58083 (PM2.5 NAAQS Implementation Rule) ("EPA interprets the requirement under CAA section 172(c)(6) for a state to adopt 'other measures' needed for attainment to apply … whether the area is classified as Moderate or Serious ….").

[60] It is also noteworthy that EPA explains that whether part of the control strategy for a Moderate area (requiring RACT) or a Serious area (requiring BACT), imposing controls that go "beyond" RACT or BACT, as the case may be, requires an assessment of economic feasibility that is equivalent to RACT or BACT, respectively. *See, e.g.*, 40 CFR 51.1000 (definitions of "additional feasible measure" and "additional reasonable measure").

[61] *Compare* CAA § 188 (establishing Moderate and Serious classifications for particulate matter nonattainment areas) *with* CAA § 181 (establishing Marginal, Moderate, Serious, Severe, and Extreme classifications for ozone nonattainment areas).

[62] However, Congress did provide states with the ***option*** of ratcheting up the level of control on existing major sources from RACT to BACT in Severe and Extreme nonattainment areas if they chose to in exchange for a reduction in the otherwise applicable NSR offset ratios. *See* CAA § 182(d)(2), (e)(1).

nonetheless provide beyond-RACT authority that – under UDAQ's reading of the law – would allow the State to not only exceed reasonable RACT controls but to go well beyond the more stringent level of BACT control.

VII. THE AIR QUALITY BOARD HAS NOT MADE THE FINDINGS NECESSARY TO IMPOSE THE PROPOSED BEYOND-RACT CONTROLS

The Notice of Proposed Rule states that the beyond-RACT controls are being proposed "to comply with the Clean Air Act Section 182(b) requirements for ***moderate*** ozone nonattainment areas."[63] As these comments demonstrate, however, the proposed beyond-RACT controls are inconsistent with and exceed this authority. Accordingly, should the Air Quality Board wish to proceed with the rulemaking as proposed, it must make a written finding "based on evidence, studies, or other information contained in the record that relates to the state of Utah and type of source involved" that the more stringent requirements "will provide reasonable added protections to public health or the environment of the state or a particular region of the state." UCA 19-2-106. The UAQB has not taken this step.

[63] Utah State Bulletin (Jun. 1, 2023) at 68.

Appendix 4 –Cogeneration Unit SCR Technical Evaluation

ENTRUST SOLUTIONS GROUP

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NOx Emissions Reduction Performance and Technical Considerations for a Selective Catalytic Reduction Retrofit at the Marathon Salt Lake City Refinery's East (CG-1) and West (CG-2) Cogeneration Units

Prepared for
Tesoro Refining & Marketing Company LLC
d/b/a Marathon Salt Lake City Refinery (Marathon)

July 2023

NOx Emissions Reduction Performance and Technical Considerations for a Selective Catalytic Reduction Retrofit at the Marathon Salt Lake City Refinery's East (CG-1) and West (CG-2) Cogeneration Units

July 2023

Contents

Executive Summary

ENTRUST Solutions Group, LLC has completed a technical evaluation of the feasibility and performance level for NOx emissions at the existing East (CG-1) and West (CG-2) cogeneration units if they are retrofitted with a selective catalytic reduction (SCR) system. This SCR-retrofit scenario for the cogeneration units is included in the Utah Department of Air Quality's (UDAQ's) draft Ozone State Implementation Plan published on June 1, 2023, in the Utah State Bulletin (reference 21), referred to herein as the "Draft Ozone SIP." Specifically, the Draft Ozone SIP specifies a NOx emission limit of 2 parts per million dry volume (ppmv) at 15% dry mole percent of excess oxygen, applicable at all times of operation, by installing a new SCR system on each cogeneration unit. The Draft Ozone SIP requires demonstration of compliance by stack testing every two years following the initial compliance demonstration.

Based on a review of previous emissions testing reports, an engineering analysis of the entire cogeneration system, and the technical evaluation of the emissions reduction capability of an SCR by CECO Peerless (Peerless), the 2 ppmvd NOx limit is not achievable as a compliance limit for all of the cogeneration unit's operating conditions. Key technical constraints to meeting this limit at all times include the following:

1. Extreme temperature or low load conditions. 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 low load conditions (less than 50% load). At cold temperature extremes and low loads, the SoLoNOx burner emissions control system must be controlled differently to assure stable operation per the original equipment manufacturer (OEM) design requirements (reference 20).
2. Available SCR footprint at these cogeneration units. The available physical space at the existing cogeneration units establishes the size of the SCR system, restricting the location of the ammonia injection grid and the catalyst bed volume and spacing.
3. Higher NOx generation and potential ammonium bisulfate generation from refinery fuel gas combustion. Refinery fuel gas supplied to the duct burners associated with the GTG is variable in composition and heat content. Additional NOx is generated at the duct burners when the fuel gas contains higher relative levels of hydrogen concentration or fuel heat content, resulting in greater NOx generation to the SCR than a typical natural gas-fired GTG. Limiting ammonia slip to 5 ppmvd constrains the NOx control efficiency of the SCR during these conditions. Additionally, the refinery fuel gas contains sulfur, some of which oxidizes to sulfur trioxide and will form ammonium bisulfate (ABS) in the presence of ammonia. The ABS will embed onto the SCR catalyst surface, thus deteriorating NOx reduction performance.
4. Catalyst fouling, masking, and age degrade control efficiency over time. Even with proper design, fouling and poisoning will increase over time, and active catalyst sites become inactive.

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 described in this paper, 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.

Section 1 of this paper describes the SLC cogeneration units and their current NOx emissions levels. Key technical factors considered in an SCR retrofit at these cogeneration units and the corresponding recommendation for NOx emissions limits are described in Section 2.

1 Description of the Marathon SLC Cogeneration Units

A description of the cogeneration units' key physical and operational features and specifications related to NOx emissions is presented. The Marathon Salt Lake City Refinery operates two identical operating cogeneration units (East, CG-1 and West, CG-2) that were installed in 2004.

1.1 Physical Design Characteristics

Each of the cogeneration units consists of two major sections: the gas turbine generator set and the downstream heat recovery system.

1.1.1 Gas Turbine Generator (GTG) Set

Solar Turbines Incorporate (Solar), a wholly owned subsidiary of Caterpillar, Inc., is the manufacturer of the two GTG sets. The GTG model is Solar's Titan 130-19501 engine. The GTG produces electrical power by the combustion of a combination of natural gas and sweet sulfur recovery unit (SRU) fuel gas. The GTG engine consists of an axial air compressor, burners (i.e., combustor section), and gas turbine expander:

- The axial air compressor section supplies air to the burners to combust the combined fuel gas. An inlet air filter is used to capture particles in the ambient air to prevent erosion on the axial rotor blades. An inlet evaporator is used during hot ambient temperatures to improve power generation by cooling the air entering the axial compressor.
- Thermal NOx from the GTG is created in the burner section. The level of thermal NOx generation is a function of flame temperature, fuel gas composition (particularly the amount of hydrogen in the fuel gas), and excess oxygen (reference 7).
- The gas turbine expander extracts the energy from the fuel to power the axial compressor and to supply electrical power to the plant's electrical system. The GTG is connected to a gear reducer and an electric generator to generate power for the refinery. The hot flue gas exhaust from the gas turbine expander goes to a heat recovery system to produce superheated steam for the refinery's steam system.

To reduce thermal NOx, these GTG sets operate with Solar's "SoLoNOx" technology, which is a registered trademark of Solar. SoLoNox utilizes lean-premixed combustion technology to promote a uniform air-to-fuel mixture as a measure to manage the combustion process. Solar guarantees the NOx from the GTG proper to not exceed 25 ppmvd at 15% dry mole percent of excess oxygen for a load range of 50% to 100% and for an ambient air temperature range between 0°F and 120°F while firing natural gas. Outside of these conditions, the engine is controlled to increase fuel to the pilot burners pursuant to the OEM requirement to increase flame stability in the combustor section and transient response capability. This scenario results in a NOx emissions level from the GTG proper of 120 ppmvd at 15% dry mole percent of excess oxygen firing natural gas.

Please see Figure 1 for a profile illustration of the GTG set.

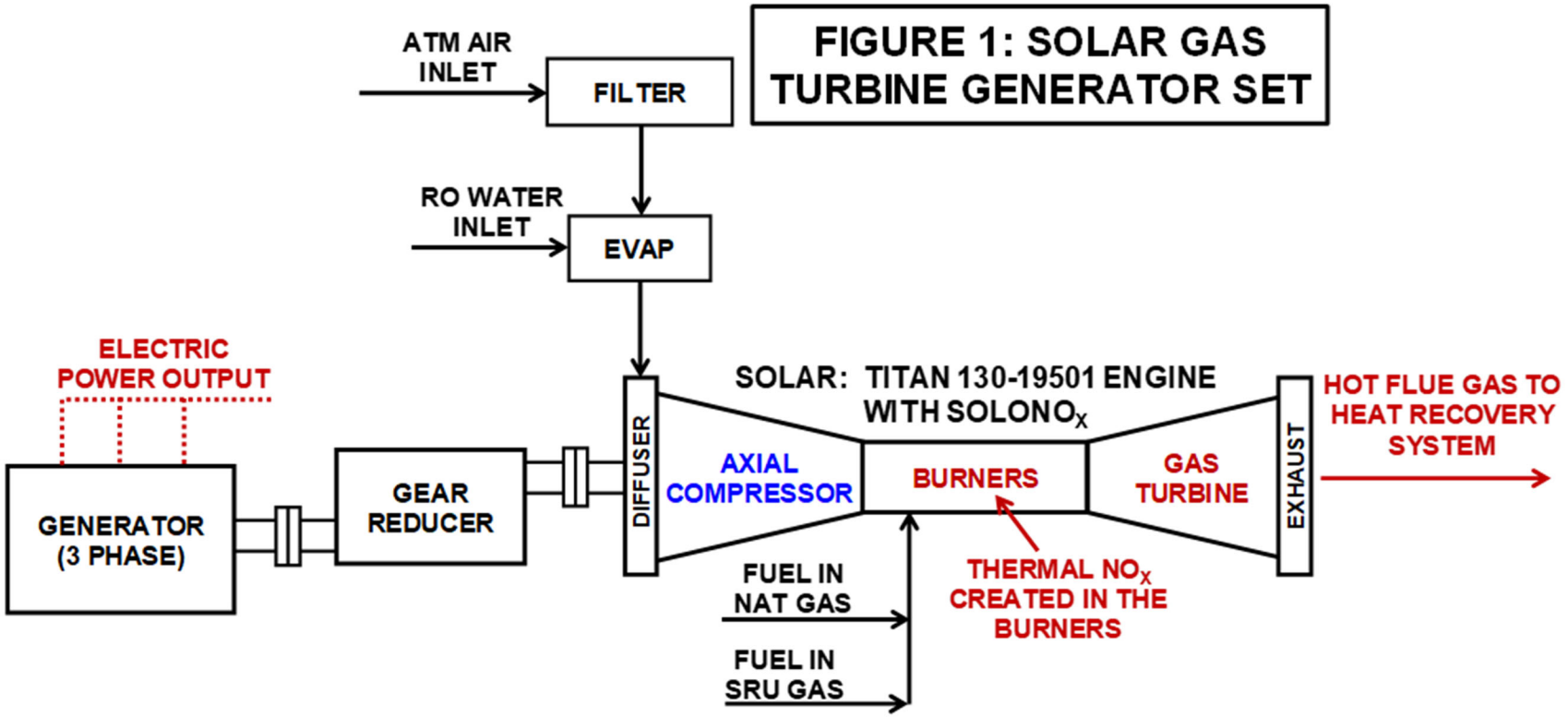
FIGURE 1: SOLAR GAS TURBINE GENERATOR SET
ATM AIR INLET
FILTER
RO WATER INLET
EVAP
ELECTRIC POWER OUTPUT
SOLAR: TITAN 130-19501 ENGINE WITH SOLONOX
HOT FLUE GAS TO HEAT RECOVERY SYSTEM
GENERATOR (3 PHASE)
GEAR REDUCER
DIFFUSER
AXIAL COMPRESSOR
BURNERS
GAS TURBINE
EXHAUST
FUEL IN NAT GAS
FUEL IN SRU GAS
THERMAL NOX CREATED IN THE BURNERS

1.1.2 Heat Recovery System

The heat recovery system's purpose is to recover the thermal energy in the GTG's hot exhaust gases and to produce steam on demand by supplementing the hot gases with additional energy. The heat recovery system components downstream of the GTG and their functions are as follows:

1. *Purge Air Fan:* The purge air fan is used only during start-up to purge the downstream equipment. During normal operation, after start-up, the purge air fan is turned off.
2. *Seal Air Fan:* Since the flue gas in the upstream duct is positive pressure, a seal air fan is needed after the purge air fan is turned off to keep hot flue gas from coming back down the purge air duct, going into the fan, and going out into the surroundings.
3. *Superheater:* The hot exhaust gases from the GTG first goes through the superheater to increase the saturated steam temperature.
4. *Attemperator:* In order to maintain the superheat temperature at the desired refinery level, an attemperator is added to cool the steam temperature.
5. *Duct Burners:* The duct burners are used to supplement the hot exhaust gases from the GTG to produce steam for refinery use. The duct burners have pilots that operate on natural gas, while the main burners operate on refinery fuel gas (RFG). The RFG composition and heat content is inherently variable from day to day due to the operating levels of multiple refinery process units that supply these gases to the fuel gas mix drum before it is treated for sulfur removal and routed to the refinery's fuel gas combustion devices. Specifically, the hydrogen concentration in RFG, an important contributor to higher flame temperature and additional thermal NOx generation in a combustion process, ranges from 4 to 8 percent. Thus, NOx production from the duct burner will vary based primarily on the volume of hydrogen in the RFG. Thermal NOx formed by the duct burners adds to the NOx formed in the GTG proper, resulting in the total NOx emissions at the existing stack.
6. *Heat Recovery Steam Generator (HRSG):* The HRSG is the main saturated steam producer and is downstream of the duct burners. Saturated steam from the HRSG goes through the superheater.
7. *Footprint for a Future SCR:* During the initial installation of the cogeneration units, a physical space was left downstream of the HRSG proper to install a future SCR. The flue gas temperature range in this provided space must be in the proper temperature range to allow the SCR system to function properly, typically 550 to 750 F.
8. *Evaporator:* An evaporator recovers energy from the flue gas leaving the SCR.
9. *Economizer:* An economizer recovers additional energy from the flue gas leaving the evaporator. The economizer heats the boiler feedwater (BFW) going into the steam drum.
10. *Stack:* The stack distributes the flue gas into the atmosphere.

Figure 2 is a schematic of the heat recovery system, including the location for a future SCR.

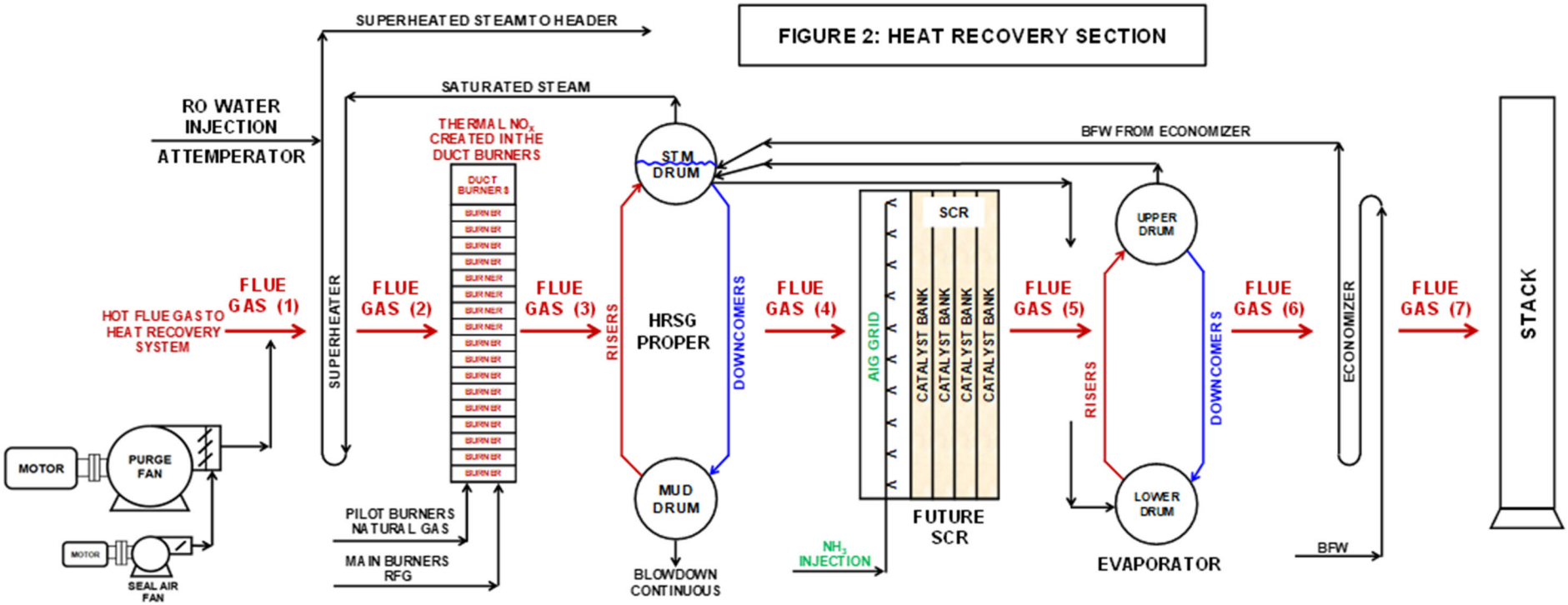
FIGURE 2: HEAT RECOVERY SECTION
SUPERHEATED STEAM TO HEADER
SATURATED STEAM
RO WATER INJECTION
ATTEMPERATOR
THERMAL NOx CREATED IN THE DUCT BURNERS
BFW FROM ECONOMIZER
STM DRUM
DUCT BURNERS
BURNER
HOT FLUE GAS TO HEAT RECOVERY SYSTEM
FLUE GAS (1)
FLUE GAS (2)
FLUE GAS (3)
FLUE GAS (4)
FLUE GAS (5)
FLUE GAS (6)
FLUE GAS (7)
SUPERHEATER
RISERS
HRSG PROPER
DOWNCOMERS
AIG GRID
SCR
CATALYST BANK
UPPER DRUM
LOWER DRUM
ECONOMIZER
STACK
MOTOR
PURGE FAN
SEAL AIR FAN
PILOT BURNERS NATURAL GAS
MAIN BURNERS RFG
MUD DRUM
BLOWDOWN CONTINUOUS
NH3 INJECTION
FUTURE SCR
EVAPORATOR
BFW

1.2 NOx Emissions from the Cogeneration Units

This section summarizes the general mechanisms of NOx generation in a combustion unit and the levels of NOx emissions from Marathon SLC's cogeneration units that are considered in the SCR performance evaluation in Section 2.

1.2.1 Mechanisms of NOx Formation

NOx formation has been well-known for the past 40 years. NOx is formed by atomic nitrogen and oxygen combining to form nitric oxide (NO) and nitrogen dioxide (NO_2), plus other less prevalent NOx species. NOx formation is classified as thermal, fuel-bound, and prompt NOx. Thermal NOx is formed from the high-temperature dissociation of nitrogen and oxygen molecules into atomic nitrogen and oxygen. The atomic nitrogen and oxygen combine to produce NOx compounds, primarily NO. Fuel-bound NOx is produced by burning fuels with nitrogen compounds. The atomic nitrogen is released during the combustion process and combines with atomic oxygen to produce NOx. Prompt NOx occurs instantaneously, even when burning natural gas. Very little prompt NOx occurs during combustion.

Thermal NOx is the predominant NOx generator for gaseous fuels such as natural gas and refinery fuel gas. Since the cogeneration units burn gaseous fuels instead of fuel oils, thermal NOx formation is primarily addressed in this paper.

All refineries combust off gas from the refining process, referred to as refinery fuel gas (RFG). The composition of RFG can change at a moment's notice. For example, hydrogen concentrations can vary significantly based on operating conditions at other refinery process units. During this transient condition, the amount of excess air required for complete combustion of the fuel can drastically change. The combustion management process may not have sufficient time to respond to the change in RFG, which may result either in an unsafe sub-stoichiometric firing condition (i.e., insufficient excess oxygen within the unit for complete combustion) or a higher-than-normal flame temperature that generates greater levels of thermal NOx.

1.2.2 Emissions Testing and Process Simulation NOx Data

Each of the Marathon SLC cogeneration units can operate over a relatively wide range of operating and fuel gas conditions. The GTG normally operates from a 50%-to-100% load at customary ambient air temperatures. The HRSG can operate up to a maximum steam flow of 250,000 pounds per hour (lb/hr), depending upon the heat release provided by the duct burners and the refinery's steam demand.

A simulation program was developed to determine the total NOx generation for a wide range of operating conditions. The program was based on GTG performance data given by Solar (reference 16) and several previous emissions test reports (multiple references cited in Section 3). The NOx emissions concentration data in ppmvd and the corresponding dry excess oxygen mole percent values in the previous emissions test reports were independently measured and are used to inform the simulation.

In the simulation program, Solar guaranteed the NOx emission concentration with the SoLoNOx system in use for the GTG proper to be not greater than 25 ppmvd at 15% dry mole percent of excess oxygen for

the GTG load from 50% to 100% and from ambient temperature ranging from 0°F to 120°F while operating on natural gas. Per the OEM requirement to increase flame stability outside of these load or temperature conditions, fuel flow through the pilot burners is increased, resulting in a higher NOx generation level while operating on natural gas (reference 20). Since the Solar GTG can operate on a combination of natural gas and sweet SRU gas with some hydrogen content, higher NOx formation will occur from these levels, which is considered in the analysis.

Thermal NOx generation for the downstream duct burners is calculated separately and is based on the most recent emissions test report on 7 Sep 2022, run 1 for the West cogeneration unit (CG-2) (ref 6). The measured NOx emission concentration from the stack was 47.18 ppmvd at 7.88% dry mole percent of excess oxygen. These and related emissions test results for NOx and oxygen are considered in the algorithm development to determine NOx emissions for other cogeneration unit operating cases.

All engineering calculations or measurements have a tolerance: they are not exact. Therefore, to address that the SCR design will meet the cogeneration unit's operating conditions, such as hydrogen variability in the fuel gas, a 10% engineering safety factor is added to the values generated by the simulation program. This factor is intended to preclude the SCR from operating on a metastable point where a slight change in cogeneration operating conditions could cause the NOx generation to exceed the proposed NOx emission limit in the Draft Ozone SIP.

2 NOx Performance Considerations for an SCR Retrofit

There are several technical considerations for the retrofit of an SCR system at an existing cogeneration unit. This section describes those factors as they relate to establishing a NOx performance level that must be met during all periods of operation.

It is important to first recognize that design standards and recommended practice documents from the American Petroleum Institute (API), as well as company-specific documents, provide the technical criteria for the design of combustion systems for safe operation. Of relevance to this study is API-536, "Post-combustion NOx Control for Fired Equipment in General Refinery and Petrochemical Services" (reference 8) governing the design, operation, and maintenance of post-combustion NOx controls (e.g., SCR). This document has been revised over the years to address emerging issues as well as learnings from safety and operational incidences that have occurred for the various types of post-combustion NOx controls that are used today.

These API and related company-specific documents address recognized and generally accepted good engineering practices (RAGAGEP) for refinery fuel gas combustion systems and post-combustion NOx controls. The technical feasibility and NOx performance levels of such changes can be determined by adhering to the specified procedures and criteria when evaluating future modifications, such as adding combustion controls or installing post-combustion technology to a cogeneration unit. It is inappropriate to establish a NOx performance level at a given unit without first addressing these site- and equipment-specific technical factors associated with the SCR retrofit installation.

2.1 SCR Design Considerations

SCR technology uses ammonia (aqueous or anhydrous) or urea as a reducing agent to promote the conversion of NO and NO_2 to molecular nitrogen and water. Ammonia is injected into the flue gas, where it is mixed and flows over a catalyst bed. To improve NOx removal, a residual amount of ammonia remains in the flue gas. This residual ammonia is called ammonia slip.

SCR systems have several important design considerations. The NOx removal efficiency of SCR depends primarily on the following factors:

1. Ammonia injection distribution
2. Flue gas temperature entering the SCR catalyst
3. Catalyst fouling
4. Catalyst quantity
5. Catalyst age
6. Allowable ammonia slip

All these factors are considered by catalyst manufacturers for the combustion unit operating from startup, high turndown, and normal to maximum operations. However, accurately predicting these factors over a

several-year operation is difficult because unforeseen circumstances may occur during the operation. Additional details for each factor are discussed below.

Ammonia Injection Distribution

Ammonia distribution is critical in the proper operation of the NOx reduction in the SCR. The ammonia injection grid (AIG) sprays the reagent into the flue gas, where it is assumed to be homogeneously mixed with the NOx. To ensure even distribution, a computational fluid dynamic (CFD) model is required for each SCR installation. With proper ammonia distribution and mixing, the SCR NOx removal efficiency can be optimized during normal operating conditions, notwithstanding that the maximum allowable level of ammonia slip will constrain NOx control optimization. Theoretical CFD modeling may not be totally accurate in actual applications; therefore, an appropriate margin should be given for the SCR removal efficiency for compliance purposes.

Flue Gas Temperature Entering the SCR Catalyst

Flue gas temperatures in excess of 820°F may sinter SCR catalysts and shorten the catalyst life span. API-536 defines sintering as the irreversible loss of active catalyst surface due to high temperatures. High temperature causes the catalyst particles to combine, eliminating micropores and macropores, thus reducing the catalyst's effectiveness.

Conversely, at lower flue gas temperatures generally less than 600°F, depending upon the sulfur content of the fuel gas, and in the presence of sulfur trioxide formed from refinery fuel gas combustion with residual ammonia, ammonium bisulfate (ABS) will form and become embedded onto the catalyst surface. This process will deteriorate NOx performance from the SCR unless the temperature can be manageably increased to sublimate the ABS.

Catalyst Fouling or Masking

API-536 defines masking as a condition where the outer surfaces of the catalyst are covered with foreign material such as refractory dust, outside air dust, ceramic fibers, etc. Dust covers active catalyst surfaces and makes the catalyst less accessible for NOx reduction. Accurately predicting catalyst fouling while designing a SCR system is very difficult. To account for masking, SCR manufacturers add more catalyst and increase catalyst spacing to allow the foreign material to pass through. Even with proper design, fouling will increase over time, which reduces the NOx control efficiency; therefore, an appropriate margin should be given for the SCR removal efficiency in the establishment of NOx limits.

Further, API-536 defines catalyst poisons as flue gas components that can adsorb onto active catalyst surfaces and render them inactive. A list of poisons may be found in API-536, Table K.1, Catalyst Degradation Sources and Mechanisms (reference 2). An example catalyst poison is chromium. Many process tubes are made of chromium, which oxidizes over time, producing a scale (chromium oxide). This catalyst poison will hinder the SCR performance over time.

Catalyst Volume

NOx reduction is directly related to the amount of catalyst volume in the SCR unit. Also, the volume of the catalyst is determined by the amount of NOx and flue gas temperature entering the SCR and the required NOx destruction efficiency and/or controlled emissions level. Depending on the specific operating conditions of the combustion unit, the volume of catalyst may become very large, requiring significant costs for installation. Also, if the physical space is limited such that the catalyst bed volume cannot be optimized, then the level of NOx destruction cannot be maximized.

Catalyst Age

The removal efficiency for SCR systems is calculated at the end of the catalyst life. As the catalyst ages, the active catalyst sites become inactive. The level of degradation in NOx destruction efficiency for a new SCR between the start-of-run (SOR) and the end-of-run (EOR) when the catalyst is replaced, is approximately 1.5%. For example, if the SCR design efficiency at a combustion unit with a high inlet NOx concentration is 95% with a new catalyst, it is reasonably expected to degrade to 93.5% at the end of run. This level of SCR control efficiency will be less than these values for a combustion unit that has a much lower NOx concentration in the flue gas, as is the case for a cogeneration unit using low NOx technology.

Allowable Ammonia Slip

To maintain optimal removal efficiency, the ammonia slip must increase over time due to the commensurate increased inactivity of the SCR catalyst. Conversely, if the ammonia slip is fixed, then the NOx removal efficiency decreases. Simultaneously requiring stringent NOx emissions and ammonia limits will significantly decrease the useable life of the catalyst, and neither limit may be reliably met. An allowable ammonia slip of 5 ppmv at 15% O_2 was assumed. This rate has been established in other permits by agencies in nonattainment areas such as the South Coast Air Quality Management District. Ammonia is a precursor to $PM_{2.5}$ formation, and the area is currently designated as a serious nonattainment area for the $PM_{2.5}$ ambient air quality standards. Thereforer, a higher ammonia slip would result in other environmental impacts.

Additional Considerations

There are additional considerations to assess for an SCR system design and the corresponding NOx performance level.

- SCR catalyst installation is critical in achieving the optimal level of NOx reduction. If the final installed system does not accurately reflect the modeled CFD design, then the NOx removal efficiency will be reduced. In addition, usable space may not be available to install an SCR system and its ancillary equipment considering the amount of required catalyst needed to ensure a high NOx removal efficiency.
- The theoretical NOx reduction estimates for an SCR retrofit may not be exact. All engineering calculations have allowable tolerances and design margins. If the NOx limit is set too low and the

maximum ammonia slip is fixed, it allows for no margin of error or tolerances in the SCR design, especially given variability in fuel gas hydrogen content and burner operating conditions.

- Finally, accurately measuring low NOx concentrations for compliance with very low concentration NOx limits will be difficult. Individual readings may fluctuate as much as $\pm$ 2 ppmvd or more from a NOx stack test, thus not providing the level of precision that may be required to demonstrate compliance.

2.2 SCR Evaluation at the Cogeneration Units

Peerless, a premier SCR vendor, was provided with existing installation space information and process data for several different cogeneration operating cases to size an SCR for each unit and to provide the corresponding NOx emissions specification that can be met for all cogeneration operational periods.

The available space and corresponding physical size of the SCR are critical in determining the NOx reduction efficiency. As mentioned above and schematically shown in Figure 2, space for a future SCR is available between the HRSG proper and the evaporator. General arrangement drawings and pictures were given to the SCR vendor to determine the maximum SCR size that could fit and efficiently operate in the space. Figure 3 (Reference 17) is a profile view showing the available location for an SCR in the cogeneration unit.

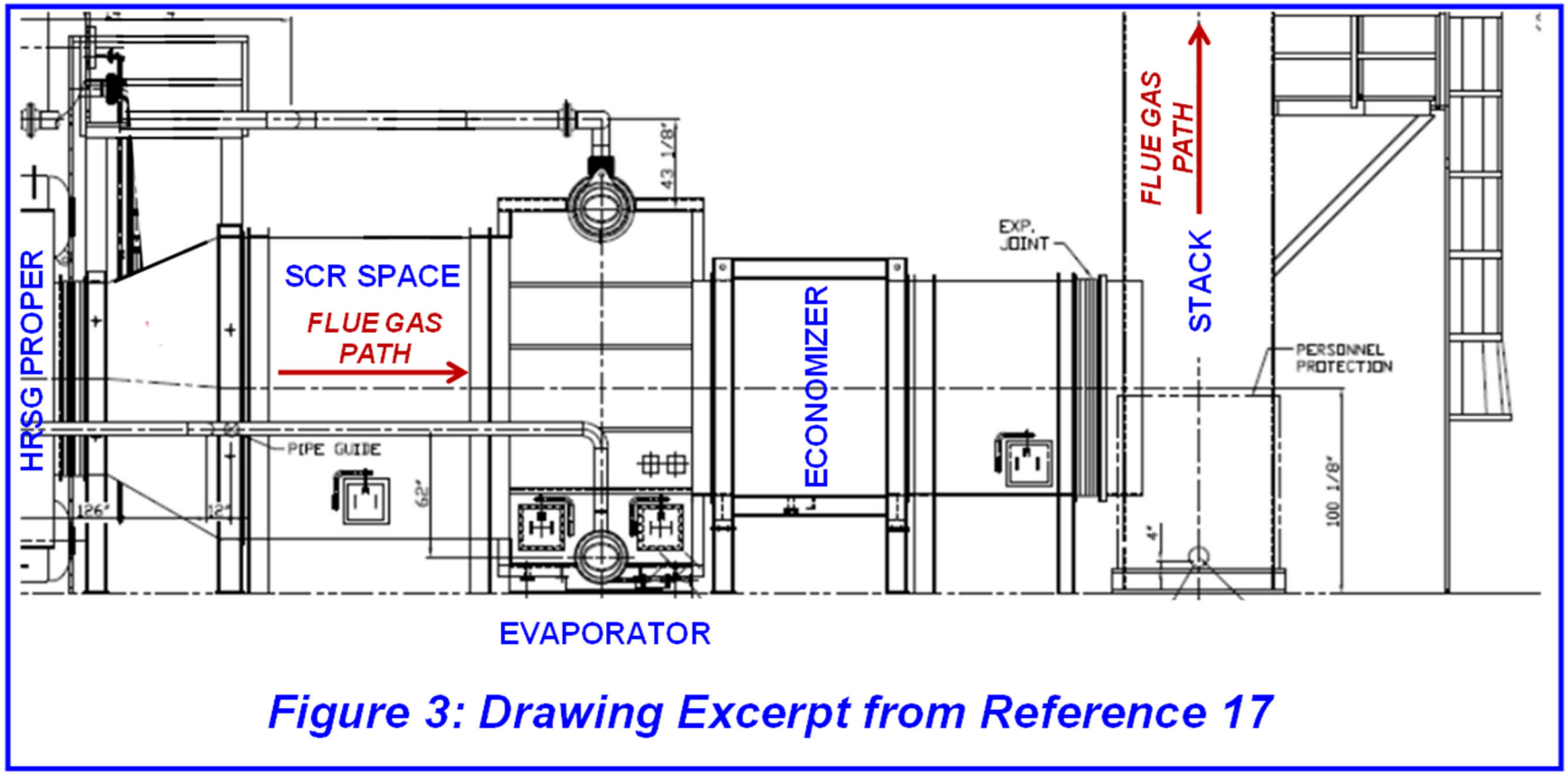

Figure 3: Drawing Excerpt from Reference 17

The flue gas temperature in this provided SCR location is not currently measured; however, it typically should be between 575°F and 650°F. This temperature will vary depending on the level of steam production from the heat recovery system. In this temperature range, Peerless determined the optimal NOx reduction efficiency for the SCR. If this space were larger within the confines of the existing equipment where more catalyst could be added, the reduction efficiency would nominally remain the same. Therefore, this existing space is used to size the SCR reactor to determine the corresponding NOx emission levels.

Peerless notes that at the low end of this temperature range, ammonium bisulfate (ABS) will form as a function of higher levels of sulfur that may be present in the refinery fuel gas combusted in the duct burner in conjunction with the residual ammonia from the SCR. As more ABS is generated and is embedded onto the SCR's catalyst bed, NOx reduction performance will deteriorate.

In conjunction with the physical size, the process data for different operating conditions of the cogeneration units are important for evaluating the NOx reduction and performance levels of an SCR. Therefore, both the SCR's physical size and process data are used to determine the best NOx reduction efficiency and subsequent NOx emissions on a ppmvd basis at 15% dry mole percent of excess oxygen. The cogeneration unit operating cases are based on previous emissions testing reports and the simulation program that was developed.

2.3 Recommended NOx Emissions Limits with an SCR Retrofit

Based on Peerless's technical review of this information and their assessment of an SCR retrofit at the existing cogeneration units, the achievable NOx emissions level over the range of normal operations and temperature conditions (i.e., ambient air temperature between 0°F and 120°F and GTG load range between 50% and 100%) for each unit is 5 ppm at 15% dry mole percent of excess oxygen on a 12-month rolling average. Peerless expects the NOx emissions performance to be less than 5 ppm under ideal operating conditions (e.g., new catalyst, consistently low hydrogen and sulfur content in the refinery fuel gas). A 5 ppm NOx compliance limit considers the realities of operating the SCR at the cogeneration units over the life of these systems, such as:

- operating the cogeneration unit at end-of-catalyst-life SCR conditions,
- the risk of ABS formation and corresponding catalyst inactivity from firing RFG,
- high hydrogen concentrations in the refinery fuel gas, creating greater levels of NOx formation, and
- precision concerns for measuring NOx emissions using EPA reference test methods.

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Appendix 5 – Revised Cogeneration Unit SCR Control Cost Analysis

Marathon SLC Refinery Ozone RACT Analysis
Cogeneration Unit
Selective Catalytic Reduction (SCR)

Current NOx Emission Rate	0.0588	lb NOx/MMBtu	Average emission factor for turbines and HRSGs (2017)
SCR NOx Emission Rate	0.0184	lb NOx/MMBtu	Equivalent to 5 ppmv at 15% O2

Control Equipment Costs

Category		Value	Basis
Total Capital Investment		$30,539,000	C&I Engineering, conceptual phase estimate for May 1, 2026 startup date
Capital Costs		$27,675,000	C&I Engineering, conceptual phase estimate for May 1, 2026 startup date
Temporary Boiler		$2,000,000	Estimate based on actual costs incurred during 2023 Cogeneration Unit maintenance
Electricity Costs (Installation)		$864,000	Estimate based on actual costs incurred during 2023 Cogeneration Unit maintenance ($0.1/kWh * 12 MW * 30 days)
Direct Annual Costs			
Maintenance		$152,695	0.5% of TCI; EPA Air Pollution Control Cost Manual (Eq. 2.57)
Operator		$87,600	EPA Air Pollution Control Cost Manual Section 4, Chapter 2, Response to Comments. = 365 days/yr * $60/hr operator rate * 4 hr/day. Operator rate of $60/hr from EPA's SCR Cost Calculation Spreadsheet.
Reagent		$8,933	6.1 lb/hr ammonia calculated using EPA Air Pollution Control Cost Manual, and Platts May 2023 market rate of $0.17/lb for ammonia.
Utilities		$62,776	87.5 kW usage based on vendor quotes and $0.0819/kWh US EIA August 2022 Industrial Costs for Utah
Catalyst Replacement (8.25%, 4 year life)	0.22	$222,109	Jacobs Engineering Cost Estimate (all layers replaced per 4-year replacement period including future worth factor calculation consistent with EPA Air Pollution Control Cost Manual)
Total Direct Annual Costs		$534,114	EPA Air Pollution Control Cost Manual (Eq. 2.56)
Indirect Annual Costs			
Administration [3% x (Operator + 40% x Maintenance)]		$4,460	EPA Air Pollution Control Cost Manual (Chapter 2, Equation 2.69).
Capital Recovery Factor (8.25%, 25 year life)	0.10	$2,922,195	EPA Air Pollution Control Cost Manual (Chapter 2, Equation 2.71). = (i*(1+i)^n) / ((1+i)^n-1), where i is the prime rate and n is the equipment life.
Total Indirect Annual Costs		$2,926,656	
Total Annual Cost		**$3,460,769**	

Emission Control Cost Calculation

Pollutant	Projected Emissions (tpy)	Control Efficiency (%)	Controlled Emissions (tpy)	Emission Reduction (tpy)	Control Costs ($/ton)	Basis
Nitrous Oxides (NOx)	100.13	68.7%	31.35	68.78	$50,320	Control efficiency based upon improvement from 16 ppmv at 15% O2 (2017 performance) to 5 ppmv at 15% O2 (with SCR).

Assumptions
Space is available for installation of SCR unit
Exhaust temperature allows implementation of SCR without reheating