Utah Division of Air Quality

State Implementation Plan

2015 Ozone NAAQS Northern Wasatch Front Moderate Nonattainment Area

2023

Section IX Part D.11

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY

AIR QUALITY

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List of Acronyms

ACT = Alternative Control Techniques
AO = Approval Order
BDV = Base Design Value
CAA = Clean Air Act
CAMx = Comprehensive Air Quality Model with Extensions
CFR = Code of Federal Register
CO = Carbon Monoxide
CTG = Control Techniques Guidelines
DERA = Diesel Emissions Reduction Act
DV = Design Value
EGU = Electric Generating Units
EMP = Enhanced Monitoring Program
EPA = U.S. Environmental Protection Agency
EV = Electric Vehicles
FDV = Future Design Value
FHWA = Federal Highway Administration
FIP = Federal Implementation Plan
FR = Federal Register
HAP = Hazardous Air Pollutants
HYSPLIT = Hybrid Single–Particle Lagrangian Integrated Trajectory
ICT = Interagency Consultation Team
I/M = Inspection and Maintenance
MDA8 = Maximum Daily Average Ozone Over an 8-Hour period
MOVES3 = Motor Vehicle Emission Simulator (2014 Release)
MPE = Model Performance Evaluation
MPO = Metropolitan Planning Organization
MVEB = Motor Vehicle Emissions Budgets
NAA = Nonattainment Area
NAAQS = National Ambient Air Quality Standard
NESHAP = National Emission Standards for Hazardous Air Pollutants
NMOG – Non-Methane Organic Gases
NOx = Nitrogen Oxides
NSPS = New Source Performance Standards
NNSR = Nonattainment New Source Review
OBD = On-Board Diagnostics
OSAT = Ozone Source Apportionment
PPB = Parts per Billion
PPM = Parts per Million
PPMV = Parts Per Million by Volume
RACM = Reasonably Available Control Measures
RACT = Reasonably Available Control Technology
RFP = Reasonable Further Progress
RRF = Relative Response Factor
SIP = State Implementation Plan
SMOKE = Sparse Matrix Operator Kernel Emissions

TIP = Transportation Improvement Program
TPD = Tons per Day
TPY = Tons per Year
TSD = Technical Support Document
UDAQ = Utah Division of Air Quality
VMT = Vehicle Miles Traveled
VOC = Volatile Organic Compounds
WOE = Weight of Evidence
WRF = Weather Research and Forecasting
ZEV = Zero Emission Vehicles

Chapter 1 – Background and State Implementation Plan (SIP) Requirements

1.1 How Ozone is Formed

Ozone is a highly unstable and oxidative gas made up of three atoms of oxygen covalently bonded together. Tropospheric ozone is not directly emitted but is formed in the atmosphere through a complex series of secondary and tertiary reactions. In short, Volatile Organic Compounds (VOCs) from a variety of natural and anthropogenic sources react in the atmosphere with Nitrogen Oxides (NO_x), and to a lesser extent Carbon Monoxide (CO), in the presence of sunlight and heat to form ozone (Equation 1).

Equation 1

VOC + NO_x + Sunlight + Heat = O_3

Anthropogenic sources of VOCs and NO_x include, but are not limited to automobile exhaust, refueling vapors, solvents, complete and incomplete combustion of fuels, and industrial activities. Natural sources include wildfires, biogenic activities, and soil respiration.

In the Northern Wasatch Front (NWF), elevated concentrations of ground-level ozone are predominantly a summertime phenomenon associated with extended periods of high-pressure coinciding with high temperatures, low relative humidity, limited cloud cover, and intense incoming solar radiation. In addition to favorable atmospheric conditions for the local formation of ozone, the high elevation of the NWF and its location within the Intermountain West contribute to the observed elevated ozone concentrations.

1.2 Health Effects of Ozone

Exposure to elevated levels of ozone is linked to an array of respiratory and pulmonary problems, primarily among susceptible populations and those participating in outdoor activities.[1] These health problems can include increased susceptibility to respiratory illnesses like pneumonia and bronchitis, chest pain, inflammation of the respiratory tract, irritated and or permanently damaged lung tissues, and cardiac impacts and aggravation of preexisting respiratory issues like asthma or chronic obstructive pulmonary disease (COPD).

The Clean Air Act (CAA) requires the US Environmental Protection Agency (EPA) to set air quality standards for certain criteria air pollutants, known as the National Ambient Air Quality Standards (NAAQS), to protect both public health and the environment. States must develop plans to attain and maintain these health-based standards called State Implementation Plans (SIPs). If an area is determined to not meet these standards, then the SIP must be revised with plans on how the area will achieve the standard by deadlines established in the CAA.

[1] Devlin BR, Raub AJ, Folinsbee JL. (1997). Health effects of ozone. Science & Medicine;(3):8-17.

1.3 History of Ozone NAAQS in the Northern Wasatch Front

Significant efforts have been made in reducing precursor emissions, primarily NO_x and VOCs, throughout the NWF over the last 40 years. Much of the more recent efforts have been targeted at reducing Utah's wintertime fine particulate matter ($PM_{2.5}$), however, there is a long history of efforts to combat ozone directly.

1.3.1 1979 1-Hour Ozone Standard

In 1977 EPA designated parts of the Wasatch Front including Davis, Salt Lake, Utah, and Weber Counties as nonattainment for the 1-hour ozone standard of 0.120 parts per million (ppm). In 1981 both Weber and Utah Counties were re-designated as attainment. In April of 1981, an ozone SIP was submitted to EPA that demonstrated attainment of the standard for both Davis and Salt Lake Counties by May 1, 1984. This ozone SIP submittal was fully approved by the EPA.

In November of 1990, Congress amended the CAA. Under the 1990 Amendments, each area of the country that was designated nonattainment for the 1-hour ozone NAAQS, including Salt Lake County and Davis County, was classified by operation of law as marginal, moderate, serious, severe, or extreme nonattainment depending on the severity of the area's air quality problem. The ozone nonattainment designation for Salt Lake County and Davis County continued by operation of law according to section 107(d)(1)(C)(i) of the CAA, as amended in 1990. Furthermore, this area was classified by operation of law as moderate for ozone under CAA section 181(a)(1). On November 12, 1993, Utah submitted a formal request to EPA that the Salt Lake/Davis County nonattainment area (NAA) be redesignated to attainment of the 1-hour ozone NAAQS, and the State, in accordance with the CAA, submitted a maintenance plan. In July of 1997, the EPA approved the Ozone Maintenance Plan for Salt Lake and Davis Counties, effective August 18, 1997, and redesignated both counties to attainment for 1-hour ozone NAAQS.

1.3.2 1997 8-Hour Ozone Standard

In July 1997, the EPA established a new, more rigorous standard for the 8-hour ozone NAAQS. The new 8-hour standard was set at a level of 0.080 ppm averaged over an eight-hour period. To better account for variable meteorological conditions that can influence ozone formation, a violation of the standard occurs when the three-year average of the fourth-highest maximum value at a monitor exceeds the federal standard. On April 30, 2004, EPA published the first phase of its final rule (Phase 1 Rule) to implement the 8-hour ozone NAAQS.[2] At the same time, EPA also published 8-hour ozone designations for all areas of the country. All areas of Utah were designated attainment or unclassifiable. These designations became effective on June 15, 2004. The Phase 1 Rule provided that the 1979 1-hour ozone NAAQS would be revoked following the effective date of the 8-hour ozone NAAQS, or June 15, 2005. This revocation action was affirmed on August 3, 2005.[3] On November 29, 2005, EPA published the Final Rule to Implement the 8-hour Ozone NAAQS - Phase 2.[4]

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[2] Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard—Phase 1, 69 Fed. Reg. 23,951 (April 30, 2004).

[3] Identification of Ozone Areas for Which the 1-Hour Standard Has Been Revoked and Technical Correction to Phase 1 Rule, 70 Fed. Reg. 44,470 (Aug. 3, 2005).

[4] Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard—Phase 2; Final Rule to Implement Certain Aspects of the 1990 Amendments Relating to New Source Review and Prevention of Significant Deterioration as They Apply in Carbon Monoxide, Particulate Matter and Ozone NAAQS; Final Rule for Reformulated Gasoline, 70 Fed. Reg. 71,612 (Nov. 29, 2005).

The Utah Air Quality Board adopted a revised maintenance plan on January 3, 2007. Salt Lake and Davis Counties were found to be in attainment on July 18, 1995, under the 1-hour ozone NAAQS[5] and had been operating under an approved maintenance plan (62 Federal Register [FR] 38213) since July 17, 1997.[6] This maintenance plan demonstrated that Salt Lake and Davis Counties had achieved the 8-hour ozone standard and could maintain compliance with the standard through 2014.

1.3.3 2008 8-Hour Ozone Standard

In March, 2008, the EPA revised the 1997 8-hour NAAQS from 0.080 to 0.075 ppm averaged over an 8-hour period. In 2012, EPA finalized the standard and issued rulemaking relevant to the implementation of the rule.[7] In 2015, EPA finalized the SIP requirements and NAA classifications and determinations for this standard.[8] Monitoring data indicated that all areas of Utah were attaining the standard, and thus no SIP revisions were required for the state of Utah for this NAAQS.

1.4 2015 NAAQS Ozone NAAs

On October 26, 2015, the EPA promulgated a revision to the primary NAAQS for ground-level ozone in accordance with Section 107(d) of the CAA. 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.[9] As a result of the more stringent standard, effective on August 3, 2018, the EPA designated two areas along the Wasatch Front as marginal NAA including the Northern Wasatch Front and Southern Wasatch Front.[10] The NWF NAA includes Salt Lake and Davis counties as well as portions of Tooele and Weber counties (Figure 1).

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5 Determination of Attainment of Ozone Standard for Salt Lake and Davis Counties, Utah, and Determination Regarding Applicability of Certain Reasonable Further Progress and Attainment Demonstration Requirements, 60 Fed. Reg. 36,723 (July 18, 1995).

6 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, Approval of Related Elements, Approval of Partial NOX RACT Exemption, and Approval of Weber County I/M Program, 62 Fed. Reg. 38,213 (July 17, 1997).

7 77 FR 30160

8 FR 80 12264

9 National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65,292 (Oct. 26, 2015).

10 Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards, 83 Fed. Reg. 25,776 (June 4, 2018).

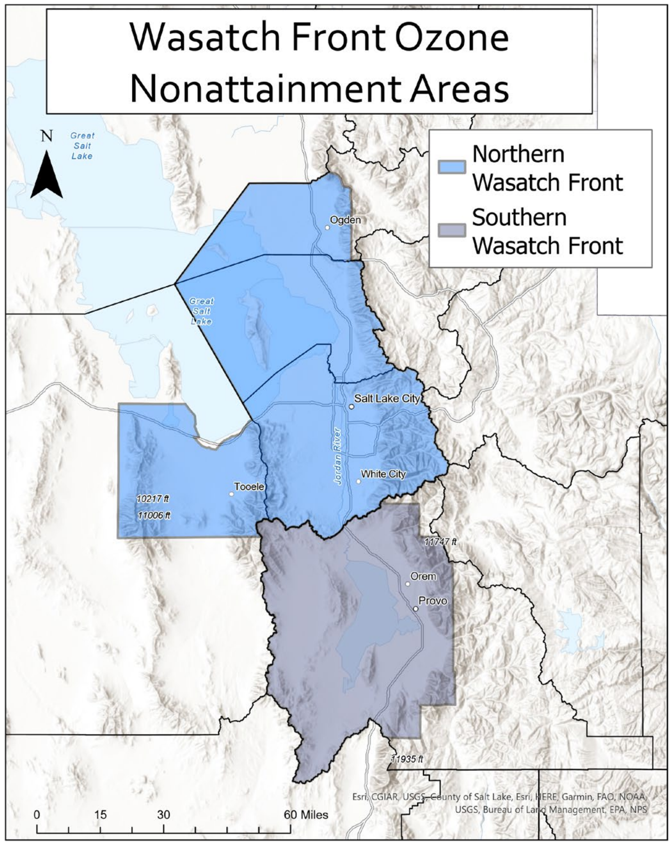

Figure 1: Wasatch Front Ozone NAAs

1.4.1 Northern Wasatch Front Ozone NAA

The boundaries for the NWF NAA include three valleys that are part of the Intermountain West's basin and range geological province: Tooele Valley, the North Salt Lake Valley, and the Salt Lake Valley. The majority of the approximately 1.8 million residents within the NAA reside in the Salt Lake valleys situated along the base of the Wasatch Mountains. The three valleys consist of a variety of complex topography including low and large valleys bordered by steep mountain terrain and a large body of water—the Great Salt Lake. The average elevation of the three valleys is 4,327 feet above sea level with the bordering Wasatch Mountains rising to elevations over 11,000 feet. The area experiences a dry-summer continental climate with hot and dry summers dominated by persistent high-pressure systems. The relatively high baseline elevation of over 4,000 feet, coupled with its warm and dry climate, and its prominent location in the Intermountain West, results in a naturally high contribution of background ozone in the NWF NAA[11] during the typical summer ozone season.

1.4.2 NWF Marginal Ozone NAA Requirements

The NWF NAA failed to attain the standard by the marginal attainment date but has met all statutory requirements for a marginal NAA under the CAA Section 182(a) as shown in Table 1.

[11] Scientific assessment of background ozone over the U.S.: Implications for air quality management. Jaffe et al.

Table 1: NWF NAA marginal requirements under the CAA.

CAA Requirement	Federal Register Approval
2017 Base Year Emission Inventory	86 FR 35404, July 6, 2021
Emission Inventory Statement Rule	87 FR 24273, April 25, 2022
Nonattainment New Source Review	87 FR 24273, April 25, 2022

The design value (DV) calculated from data collected from 2018-2020 was used to determine if the area attained the standard by the attainment date of August 3, 2021. 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).

Table 2: Ozone values in ppm from sites in NWF NAA from 2018 - 2020. Values calculated in accordance with 40 CFR Part 50, Appendix U.

Ozone Summary						
Site ID	Site Name	County	Annual 4th Highest (ppm)			Three Year Average (ppm)
			2018	2019	2020	2018-2020
49-057-1003	Harrisville	Weber	0.077	0.064	0.074	0.071
49-011-0004	Bountiful	Davis	0.080	0.073	0.080	0.077
49-035-2005	Copperview	Salt Lake	0.079	0.067	0.075	0.073
49-035-3006	Hawthorne	Salt Lake	0.074	0.073	0.075	0.074
49-035-3010	Rose Park	Salt Lake	0.080	0.071	0.080	0.077
49-035-3013	Herriman	Salt Lake	0.078	0.070	0.073	0.073
49-045-0004	Erda	Tooele	0.074	0.065	0.070	0.069

On October 7, 2022, the EPA finalized rulemaking where it determined that the NWF did not attain by the attainment date and reclassified the area to moderate with a new attainment date of August 3, 2024.[12] The effective date of this rulemaking was November 7, 2022, marking the effective date of moderate designation for the NWF NAA.

1.4.3 Utah's Request to Adjustment the NWF NAA Boundary

On February 27, 2023, Governor Spencer J. Cox submitted a letter[13] and supporting documentation[14] to EPA Region 8 administrator Kathleen Becker. In this letter, Governor Cox used his authority under Section 107(d)(3)(D) of the CAA to request an adjustment to the existing NWF NAA boundary (figure 1). The requested modification would extend the western edge of the existing boundary in Tooele County 7.6 miles further west. This adjustment would result in the inclusion of US

[12] 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, 87 Fed. Reg. 60,897 (Oct. 7, 2022).

[13] Utah's Request for Boundary Adjustment for the Northern Wasatch Front NAA. Feb. 27, 2023: https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-002065.pdf

[14] Request for Adjustment of the Northern Wasatch Front NAA Boundary for the 2015 8-hour Ozone National Ambient Air Quality Standard. Feb. 27, 2023: https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-002086.pdf

Magnesium LLC (section 4.15) into the NWF NAA. US Magnesium's Rowley plant is currently one of the largest point sources of VOCs and NO_x in the greater Wasatch Front. US Magnesium is also a unique source of halogen emissions which have been shown to impact both summer and wintertime pollution.[15] Upon the receipt of the letter, EPA has 18 months to either approve or deny the state's request. EPA has not formally acted on this request and thus the extent of the NWF NAA remains as described in section 1.4.3 (Figure 1). However, given the magnitude of emissions from US Magnesium LLC, and their impacts on the NWF NAA, the Utah Division of Air Quality (UDAQ) has included US Magnesium LLC in this SIP revision where it is appropriate.

1.5 Responsible Air Agencies

1.5.1 Utah Division of Air Quality (UDAQ)

Section 19-2-104 of the Utah Code gives the Utah Air Quality Board the authority to promulgate rules "regarding the control, abatement, and prevention of air pollution from all sources and the establishment of the maximum quantity of air pollutants that may be emitted by an air pollutant source."[16] The UDAQ develops, prepares, and submits SIPs to the Utah Air Quality Board for consideration and promulgation. UDAQ is the primary state agency responsible for the development and implementation of SIPs once they are approved by the Utah Air Quality Board, and associated administrative rules, as required by the CAA.

1.5.2 Interagency Consultation Team

UDAQ works in close coordination with local Metropolitan Planning Organizations (MPOs) on relevant traffic and travel-related aspects of SIP and transportation conformity activities. The Interagency Consultation Team[17] (ICT) is a group of MPOs and transportation planning agencies, that undertake the interagency consultation process as it relates to the development of the SIP, applicable control measures related to transportation included in the SIP, transportation plans, the Transportation Improvement Program (TIP), and Transportation Conformity determinations. Within the NWF NAA, the Wasatch Front Regional Council (WFRC) serves as the MPO for Box Elder, Davis, Salt Lake, Tooele, and Weber Counties. The Utah Department of Transportation (UDOT), Federal Highway Transportation Administration, Federal Transit Administration, and the EPA, are all part of the ICT as well.

1.6 Moderate SIP Elements

As part of the reclassification to a moderate NAA, EPA has required that Utah submit a SIP revision.[18] A moderate SIP revision requires mandatory planning elements per CAA section 182(b) which are outlined in the final SIP Requirements Rule as well as in Table 3.[19]

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[15] Womack CC, Chace WS, Wang S, Baasandorj M, Fibiger DL, Franchin A, Goldberger L, Harkins C, Jo DS, Lee BH, Lin JC, McDonald BC, McDuffie EE, Middlebrook AM, Moravek A, Murphy JG, Neuman JA, Thornton JA, Veres PR, Brown SS. Midlatitude Ozone Depletion and Air Quality Impacts from Industrial Halogen Emissions in the Great Salt Lake Basin. Environ Sci Technol. 2023 Feb 7;57(5):1870-1881. doi: 10.1021/acs.est.2c05376. Epub 2023 Jan 25. PMID: 36695819.

[16] Utah Code Ann. § 19-2-104(1)(a).

[17] Utah State Implementation Plan Section XII; Transportation Conformity Consultation (May 2, 2007), available at https://documents.deq.utah.gov/legacy/laws-and-rules/air-quality/sip/docs/2007/05May/SECXII.PDF

[18] 87 Fed. Reg. 60,897.

[19] Implementation of the 2008 National Ambient Air Quality Standards for Ozone: NAA Classifications Approach, Attainment Deadlines and Revocation of the 1997 Ozone Standards for Transportation Conformity Purposes, 77 Fed. Reg. 30,160 (May 21, 2012).

Table 3: SIP Requirements

Category	Requirement	Reference	Addressed in Section
Reasonable Further Progress (RFP)	Demonstrate a 15% reduction of VOCs from the base year inventory to the attainment year.	CAA §182(b)(1)(A)(i) and 40 CFR §51.1310	Chapter 7 (IX D.11)
Base Year and Projected Emission Inventories	Establish the base year emission inventory (2017) and attainment year inventory (2023) for use in establishing RFP and demonstration of attainment.	CAA §182(b)(1)(B) and 40 CFR §51.1315	Chapter 3 (IX D.11)
Attainment Demonstration	Demonstration that the NAA will attain the standard using a photochemical model and methods approved in EPA modeling guidance.	CAA §182(c)(2)(A) and 40 CFR §51.1308	Chapter 8 (IX D.11)
Reasonable Available Control Technology (RACT)	Evaluation of the application of reasonable control technology (technically and economically feasible) at major sources.	CAA §182(b)(2) and 40 CFR §51.1312	Chapter 4 (IX D.11)
Reasonable Available Control Measure (RACM)	Evaluation of application of RACM for all other sources of ozone precursors.	CAA §182(b)(2) and 40 CFR §51.1312	Chapter 5 (IX D.11)
Motor Vehicle Inspection and Maintenance (I/M) Program	Evaluate if current I/M program meets CAA requirements.	CAA §182(b)(4)	Chapter 6 (IX D.11)
Nonattainment New Source Review (NNSR) Program	General offsets for VOCs shall be a ratio of at least 1.15 to 1.0.	CAA §182(b)(5) and 40 CFR §51.1314	Chapter 4 (IX D.11)
Contingency Measures	Emission reduction measure triggered if the NAA fails to attain the standard by the attainment date.	CAA §182(c)(9)	Chapter 11 (IX D.11)

Motor Vehicle Emission Budgets	Establishment of maximum allowable emissions from on-road mobile sector for ozone precursor emissions used in transportation conformity analysis.	CAA §182(c)(5)	Chapter 10 (IX D.11)

1.7 Moderate Area SIP Development Process

UDAQ led the development of the moderate SIP and coordinated with the MPOs and EPA on the development of the various SIP elements. Work began in September 2019 in anticipation of the reclassification of the area from marginal to moderate status. Throughout the SIP development, public stakeholder meetings were held to solicit comment and engagement from interested parties as detailed in Chapter 10 of this SIP revision. The UDAQ holds regular bi-monthly meetings with both industry representatives and environmental advocates. These meetings provide the opportunity to maintain open dialogue and transparency in the development of a SIP with interested parties. Once aspects of the SIP were developed to the point where they could be shared, UDAQ scheduled public outreach meetings to present data and information to the public, and the public was provided with the opportunity to comment or make suggestions. UDAQ also posted all documents related to the development of this SIP revision, including all technical supporting documentation, to its public webpage[20] as soon as they became available.

[20] https://deq.utah.gov/air-quality/northern-wasatch-front-moderate-ozone-sip-technical-support-documentation#supporting-tsd

Chapter 2 – NWF Monitoring Network

2.1 Monitoring Network

The UDAQ maintains a highly reliable, continuous near-surface ambient air monitoring network that meets the requirements of 40 CFR Parts 50, 53, and 58.[21] The 1970 CAA and subsequent amendments provide the framework for an ambient air monitoring network that is designed to collect data addressing five basic needs to:

1. Activate emergency control procedures that prevent or alleviate air pollution episodes.
2. Provide air pollution data to the public in a timely manner.
3. Judge compliance with and progress towards meeting ambient air quality standards.
4. Observe pollution trends throughout the region, including non-urban areas.
5. Provide a database for research evaluation of the following effects: urban, land-use, transportation planning, development and evaluation of abatement strategies, and development and validation of diffusion models.

The UDAQ collects monitoring data for five NAAQS criteria pollutants including: sulfur dioxide (SO_2), CO, ozone (O_3), nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). In addition, UDAQ currently operates one continuous gas chromatograph for the collection and analysis of ozone precursor data for the Photochemical Assessment Monitoring Station (PAMS) program. Each year, a network review is performed by staff and the Annual Monitoring Network Plan is submitted as a separate document to EPA Region 8 for approval. In addition, Utah has established a comprehensive meteorological monitoring network to supply data for modeling activities, including measurements of temperature, relative humidity, wind speed, and wind direction.

As part of the air monitoring network, the UDAQ specifically operates an extensive network of ground level in-situ ambient air quality monitoring stations throughout the NWF NAA. The network consists of eight active sites that monitor atmospheric concentrations of ozone that are used for regulatory purposes, as well as two historic sites which help provide context for the extent and length of UDAQs monitoring network (Figure 2). Beyond the UDAQ operated network of sites, there are several research grade ozone monitoring stations within the NAA boundary that are supported by UDAQ including: The Red Butte Ozone Monitoring Network, the mobile based TRAX Air Quality Observation Project platform and the Mobile Electric Bus Air Quality Monitoring Project. While these projects are not regulatory and are not included in the EPA's Air Quality System and determination of a DV for the NAA, they significantly contribute to the understanding of transport, production, and the spatiotemporal patterns of ozone throughout the NAA.

[21] Title 40 Protection of the Environment, Chapter 1 Environmental Protection Agency, Subchapter C Air Programs, Part 50 National Primary and Secondary Ambient Air Quality Standards, Part 53 Ambient Air Monitoring Reference and Equivalent Methods and Part 58 Ambient Air Quality Surveillance.

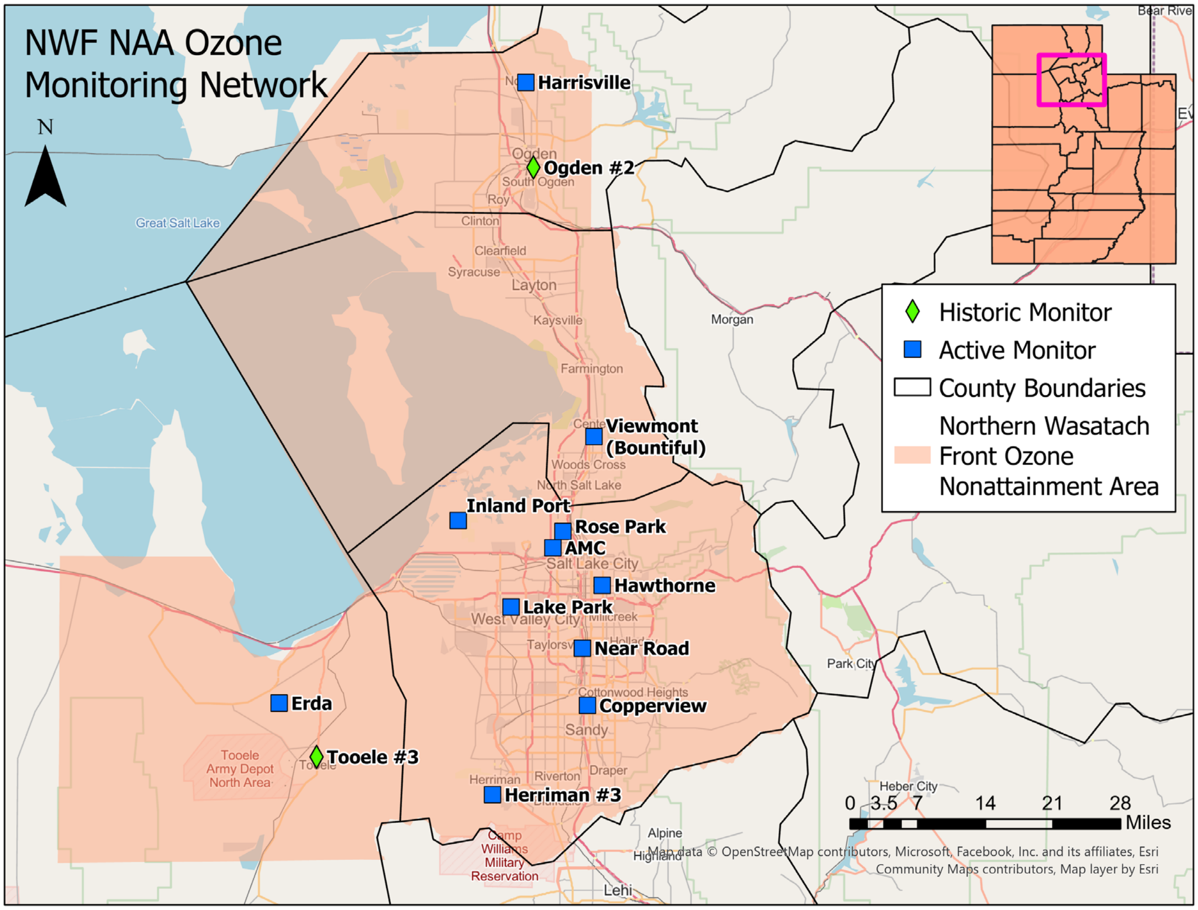

Figure 2: Monitoring sites in the NWF NAA

The UDAQ currently operates one PAMS site at Hawthorne, located in Salt Lake County. The PAMS program is a subset of the State or Local Air Monitoring Stations (SLAMS) network for enhanced monitoring of ozone precursor chemicals at sites located in an area with a population over 1,000,000 and in areas of moderate and above nonattainment status. The PAMS program is designed with the objective to produce an air quality database to be used to evaluate and refine ozone prediction models. In addition, the program will assist to identify and quantify the ozone precursors and establish the temporal patterns and associated meteorological conditions to assist and refine the control strategies. UDAQ is measuring the following parameters at the PAMS required site:

- Carbonyls
- Meteorological parameters: ambient temperature, wind direction, wind speed, atmospheric pressure, relative humidity, precipitation, mixing layer height, solar radiation, and UV radiation
- Speciated VOCs
- True NO_2
- NO & NO_y
- Ozone

Since significant portions of the NWF NAA overlap with the Salt Lake City $PM_{2.5}$ NAA, the UDAQ operates the PAMS site for the full calendar year to account for both wintertime $PM_{2.5}$ and summertime ozone seasons.

In order to meet the Enhanced Monitoring Plan (EMP) requirements for a moderate NAA the UDAQ is developing an EMP in fulfillment of federal regulations, 40 CFR Part 58, Appendix D 5(h). These regulations require that a state with any area designated moderate or above for the 8-hour ozone standard, and any state within the Ozone Transport Region (OTR), develop, implement, and submit an EMP for ozone to the regional EPA office two years following the effective date of a designation to a classification of moderate or above. The EMP is intended to provide monitoring organizations the flexibility to implement any additional monitoring beyond the minimum requirements for the SLAMS to complement the needs of their area.

As part of UDAQ's proposed EMP, UDAQ plans to expand PAMS monitoring beyond the existing site at Hawthorne to include 5 additional sites throughout the NWF NAA. These sites will represent an array of land use types and will be distributed to provide insight into the underlying atmospheric chemical regimes present at a variety of locations.

2.2 Ozone Monitoring Data

Table 4 and Table 5 show the monitoring data for the past twelve years for the NWF ozone monitoring sites. The MDA8, and the 3-year averages of the MDA8 at each site are shown, respectively. A trend graph of data from 2002 – 2021 for the key sites in the NWF is presented in Figure 3.

Table 4: NWF MDA8 reported in ppm.

NWF NAA Ozone MDA8 (ppm)														
Site	**ID**	**AQS #**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Bountiful	BV	49-011-0004	0.074	0.068	0.067	0.062*	0.074	0.073*	0.076	0.078	0.080	0.073	0.080	0.082
Copperview	CV	49-035-2005	---	---	---	---	---	---	---	---	0.079*	0.067	0.075	0.086
Hawthorne	HW	49-035-3006	0.073	0.075	0.078	0.077	0.072	0.081	0.074	0.081	0.074	0.073	0.075	0.081
Rose Park	RP	49-035-3010	---	---	---	---	---	---	---	---	0.080	0.071	0.080	0.079
Herriman	H3	49-035-3013	---	---	---	---	---	0.074	0.076	0.078	0.078	0.070	0.073	0.087
Lake Park	LP	49-035-3014	---	---	---	---	---	---	---	---	---	---	0.062*	0.082
Tech Center	UT	49-035-3015	---	---	---	---	---	---	---	---	---	0.038*	0.071*	0.083
Near Road	NR	49-035-4002	---	---	---	---	---	---	---	---	---	0.064	0.072	0.083
Tooele #3	T3	49-045-0003	0.074	0.071	0.074	0.072	0.069	---	---	---	---	---	---	---
Erda	ED	49-045-0004	---	---	---	---	---	0.071*	0.072	0.077	0.074	0.065	0.070	0.075
Harrisville	HV	49-057-1003	0.070	0.074	0.076	0.073	0.070	0.074	0.073	0.073	0.077	0.064	0.074	0.077
Ogden	O2	49-057-0002	0.073	0.074	0.066	0.076	0.070	0.072	0.072	0.075	0.079	0.059*	---	---
*** Indicates numbers that do not meet the data completeness requirements**														

Table 5: NWF 8-Hour Ozone Three-Year Average 4th Maximum Ozone Values.

3-yr. Average MDA8 (ppm)												
Site	**ID**	**AQS #**	**2010-2012**	**2011-2013**	**2012-2014**	**2013-2015**	**2014-2016**	**2015-2017**	**2016-2018**	**2017-2019**	**2018-2020**	**2019-2021**
Bountiful	BV	49-011-0004	0.069	0.065*	0.067*	0.069*	0.074*	0.075*	0.078	0.077	0.077	0.078
Copperview	CV	49-035-2005	---	---	---	---	---	---	0.079*	0.073*	0.073*	0.076*
Hawthorne	HW	49-035-3006	0.075*	0.076	0.075	0.076	0.075	0.078	0.076*	0.076	0.074	0.076
Rose Park	RP	49-035-3010	---	---	---	---	---	---	0.08*	0.075*	0.077*	0.076*
Herriman	H3	49-035-3013	---	---	---	0.074	0.075	0.076	0.077	0.075	0.073	0.076
Lake Park	LP	49-035-3014	---	---	---	---	---	---	---	---	---	---
Tech Center	UT	49-035-3015	---	---	---	---	---	---	---	---	---	0.064*
Near Road	NR	49-035-4002	---	---	---	---	---	---	---	---	---	0.073*
Tooele #3	T3	49-045-0003	0.073	0.072	0.071	0.07	---	---	---	---	---	---
Erda	ED	49-045-0004	---	---	---	0.071*	0.071*	0.073*	0.074	0.072	0.069	0.07
Harrisville	HV	49-057-1003	0.073	0.074	0.073	0.072	0.072	0.073	0.074	0.071	0.071	0.071
Ogden	O2	49-057-0002	0.071	0.072	0.07	0.072	0.071	0.073	0.075	0.071*	---	---
*** Indicates numbers that do not meet the data completeness requirements**												

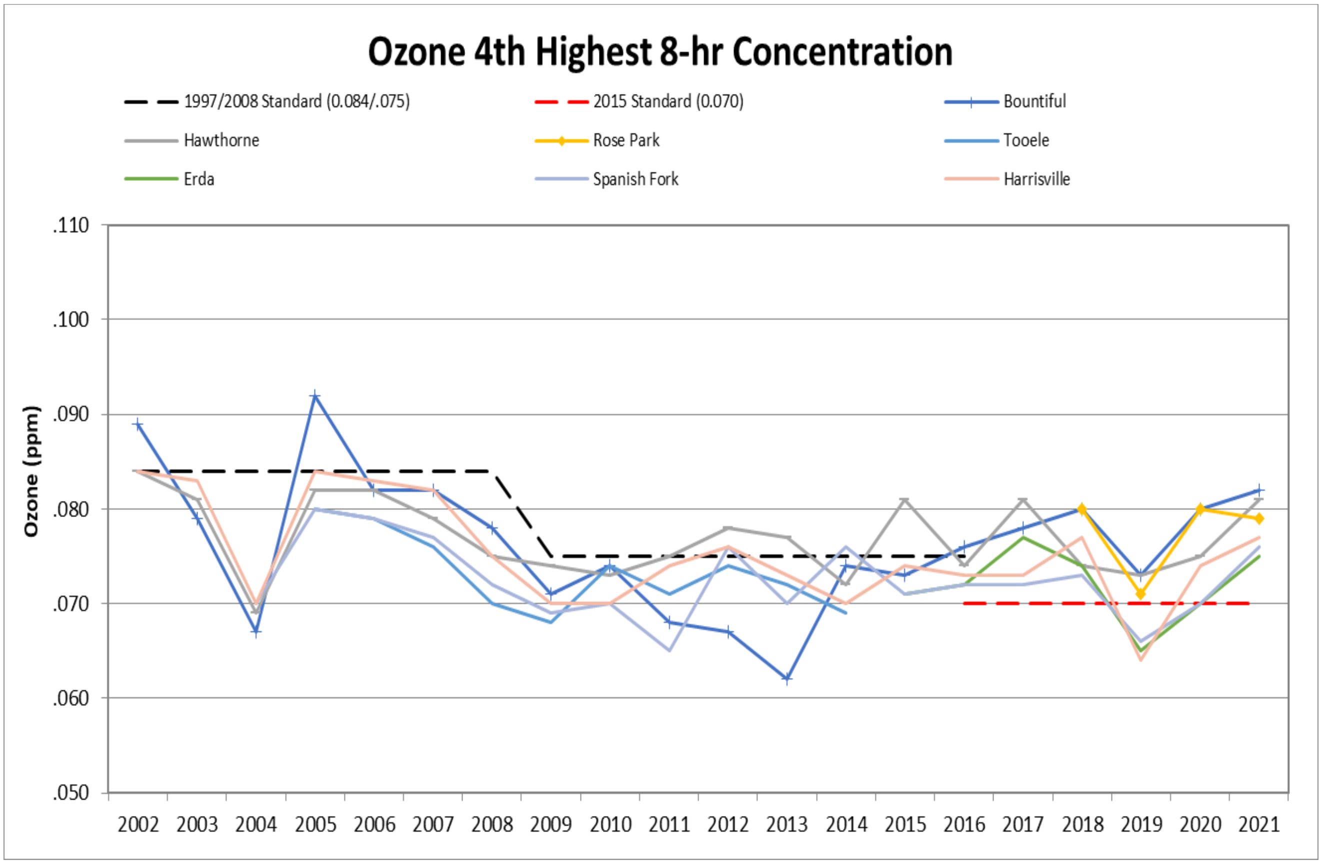

Figure 3: MDA8 in Wasatch Front

As shown in Figure 3, the combined state air agency and federal regulatory actions have been successful at reducing ozone values in the NWF. However, the area is still experiencing exceedances of the ozone standard at all regulatory air monitors within the NAA. Ozone represents a unique challenge in the Intermountain West. Despite years of success in reducing precursor emissions of NO_X 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,[22] increasing instances and contributions of emissions from wildfire events,[23] significant biogenic contributions,[24] as well as both interstate and international[25] transport.

2.3 Data Quality Assurance

The primary purpose of UDAQ's ambient air monitoring network is to determine whether the area is meeting the criteria pollutant NAAQS. Other purposes for air monitoring include, but are not limited to, determining the impact of sources on air quality, establishing background concentrations, and determining the extent of regional ozone transport. The goal of UDAQ's Air Monitoring Section is to

[22] Scientific Assessment of background ozone over the U.S.: Implications for air quality management

[23] Influence of Fires on O3 Concentrations in the Western U.S.; Dan Jaffe, Duli Chand, Will Hafner, Anthony Westerling, and Dominick Spracklen; Environmental Science & Technology 2008 42 (16), 5885-5891. DOI: 10.1021/es800084k

[24] EPA Webinar; Description and preliminary evaluation of BELD 6 and BEIS 4. ORD. Jesse O. Bash and Jeff Vukovich

[25] Entrainment of stratospheric air and Asian pollution by the convective boundary layer in the southwestern U.S.; Langford, A.O. et al. (2017), J. Geophysics. Res. Atmos., 122, 1312-1337, doi:10.1002/2016JD025987

produce data that are complete, comparable, representative, precise, and accurate in accordance with 40 CFR Part 58, Appendix A. Data quality is calculated at least annually according to EPA's accepted statistical procedures to determine compliance with the recommended limits. Data outside these limits are still reported to Air Quality System (AQS), but UDAQ flags the data internally and attempts to determine the source of the problems. The UDAQ Air Monitoring Quality Assurance Program Plan provides details of how UDAQ meets the requirements of 40 CFR Part 58, Appendix A and is made available to the public for review.[26]

Table 6 shows the data recovery rates for each monitoring site in the NWF NAA as a percentage. The percent of data recovery is the number of valid sampling hours occurring within the ozone season divided by the total number of hours encompassing the ozone season. The ozone season for Utah was defined as from January 1 to December 31, thus is year-round.[27] A valid sampling day is one in which at least 75% of the hourly averages are recorded.

Table 6: NWF Ozone Data Recovery Rates shown as percentages.

Site	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bountiful 49-011-0004	99%	97%	98%	64%	99%	53%	100%	99%	99%	98%	99%	99%
Copperview 49-035-2005	---	---	---	---	---	---	---	---	96%	93%	98%	97%
Hawthorne 49-035-3006	99%	97%	98%	64%	99%	53%	100%	99%	99%	98%	99%	96%
Rose Park 49-035-3010	---	---	---	---	---	---	---	---	87%	80%	98%	99%
Herriman 49-035-3013	---	---	---	---	---	100%	98%	98%	97%	99%	99%	98%
Lake Park 49-035-3014	---	---	---	---	---	---	---	---	---	---	99%	98%
Tech Center 49-035-3015	---	---	---	---	---	---	---	---	---	99%	99%	98%
Near Road	---	---	---	---	---	---	---	---	---	99%	98%	99%
Tooele 49-045-0003	64%	98%	99%	100%	99%	100%	83%	83%	97%	99%	92%	---
Erda 49-045-0004	---	---	---	---	---	61%	100%	99%	93%	97%	99%	99%
Harrisville 49-057-1003	83%	99%	98%	99%	100%	96%	99%	89%	99%	82%	98%	96%
Ogden 49-057-0002	98%	94%	96%	99%	100%	100%	99%	99%	99%	99%	---	---

As shown in Table 6, the UDAQ monitoring program is extremely robust with a consistently high level of data recovery. On an annual basis, the monitoring network is evaluated, assessed, and adjusted as necessary to ensure that the agency and the public have an accurate understanding of local air quality

[26] https://documents.deq.utah.gov/air-quality/planning/air-monitoring/DAQ-2022-007189.pdf

[27] 83 FR 25776

concentrations and trends. What these monitoring values represent and how they are impacted will be evaluated and discussed in other SIP chapters.

Chapter 3 - Baseline and Future Year Emission Inventories

3.1 Emission Inventory Background

3.1.1 2017 Base Year Inventory

In accordance with the CAA and 40 CFR §51.1315, when the NWF was designated as a marginal ozone NAA, the UDAQ was required to submit a base year emission inventory 24 months after the effective date of designation. A base year inventory is comprised of a comprehensive, accurate, current inventory of actual emissions from sources of VOCs and NO_X emitted within the boundaries of the NAA as required by CAA Section 182(a)(1). The base year for this SIP submittal is 2017, which is the most recent calendar year for which a complete triennial inventory was submitted to the EPA. The inventory is compiled in ozone season day emissions, which is an average day's emissions for a typical ozone season work weekday. This requirement was met and approved by EPA in 86 FR 35404, on July 6, 2021. As a result of being reclassified as a moderate ozone NAA, the 2017 base year inventory is being resubmitted as part of this NWF moderate SIP as some refinements have been made since the submittal of the marginal base year inventory. The methodology for each inventory source category will be provided in this chapter, with a more detailed description provided in the technical support document (TSD) for this SIP.

3.1.2 2023 Projected Year Inventory

To support the CAA requirement for a moderate NAA to demonstrate RFP towards attainment, 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 date of August 3, 2024, thus the state is required to demonstrate a 15% reduction in VOCs between 2017 and 2023 in accordance with 40 CFR § 51.1310. The emission inventory presented here represents the projected inventory for sources with no additional emission controls implemented beyond actions taken under the $PM_{2.5}$ SIPs. A discussion of proposed or potential emission controls and how they will help achieve the required VOC reductions and demonstration of attainment will be discussed in Chapter 7, RFP. This chapter provides the methodology and results of developing the baseline and future year inventories in accordance with available EPA guidance.[28]

3.2 Baseline 2017 Emission Inventory and Projected 2023 Emission Inventory

Both inventories developed for the SIP are reported as an average day's emissions for a typical ozone season work weekday, in the unit of tons per day (tpd). This is an average summer day for the NWF. The 2017 inventory of actual emissions is the basis for any projections made to represent future years. Emission inventories are generally collected and reported as annual emissions. These annual inventories are processed through the Sparse Matrix Operating Kernel Emissions Model (SMOKE).[29] SMOKE modeling spatially allocates, temporalizes, and chemically speciates annual emissions estimations from the emissions inventories. Post-SMOKE, annual emissions are temporalized and can be represented in tons per day. Spatial allocation, temporalization, and chemical speciation are SCC-specific operations. UDAQ typically tabulates emissions from area and mobile sources on a county-by-county

[28] SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf

[29] SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf

basis, however the NAA includes two partial counties. To obtain the typical ozone season day, emission inventories are entered into the SMOKE model such that it is assigned a geographic location (grid cell). To report emissions specific to the NAA, UDAQ cropped the post-SMOKE processed gridded emissions using a Geographic Information System (GIS) tool using polygons representing the boundaries of the NAA.

An inventory of emissions was developed for the major source categories as presented in Table 7 for the 2017 emission inventory. Residential wood combustion is excluded as this source is not a significant emitter of ozone precursors when compared to more predominant sources in the NAA and is not seasonally relevant to summertime ozone production in the NWF. More detailed post-SMOKE emissions inventory tables can be found in the SMOKE TSD.[30]

Table 7: 2017 Nonattainment Emission Inventory (tons per day)

NWF NAA 2017 base year		
Sector	**NO_x TPD**	**VOC TPD**
Solvents	0.56	43.20
Area (non-point)	5.36	8.51
Livestock		0.69
Non-road	10.52	12.53
Rail	9.25	0.47
Airports	3.14	1.25
Electric Generating Units (EGUs)	0.44	0.03
Point Sources	20.43	5.85
On-road Mobile	55.53	20.47
ERC Bank	3.1	0.7
TOTAL ANTHROPOGENIC	**108.33**	**93.7**

The projection year emissions inventory was prepared for 2023 as this is the year prior to the attainment date of August 3, 2024. The emission projections reflect changes due to growth and existing controls. The 2023 emission inventories presented here do not account for controls put in place specifically from actions taken for this SIP.

[30] SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf

Table 8: 2023 Projected Nonattainment Emission Inventory (tpd)

NWF NAA 2023 future year		
Sector	**NO_X TPD**	**VOC TPD**
Solvents	0.71	44.52
Area (non-point)	4.85	8.26
Livestock		0.71
Non-road	8.05	12.62
Rail	8.77	0.44
Airports	3.74	1.42
Electric Generating Units (EGUs)	0.45	0.03
Point Sources	22.00	6.00
On-road Mobile	35.40	15.32
ERC Bank	3.1	0.7
TOTAL ANTHROPOGENIC	**87.07**	**90.02**

3.2.1 Fires and Biogenic Sources

Emissions from wildland and prescribed fires, and biogenic sources, which are dependent on meteorological conditions, are accounted for during the modeling phase and are not traditionally inventoried.[31] Emissions from wildfires are accounted for using the Blue-Sky Framework in the SMOKE model. Biogenic emissions are modeled with the Biogenic Emissions Inventory System (BEIS) version 3.6.1. BEIS creates gridded, hourly, model-species emissions from vegetation and soils. Forests are significant sources of VOCs, and the burning of forest material is a source of ozone precursors and particulate matter. These source categories are crucial to include in any ozone modeling demonstration. The emissions from biogenic sources are shown in Table 9 and are held constant between 2017 and 2023.

Table 9: Biogenic Emissions (tons per day)

NWF NAA COUNTIES (includes all of Tooele and Weber Counties) 2017 base year		
Sector	**NO TPD**	**VOC TPD**
TOTAL NAA COUNTY-WIDE BIOGENIC	**5.57**	**246.88**

3.2.2 Solvent Emissions

The solvents sector includes VOC emissions from everyday items such as cleaners, personal care products, adhesives, architectural and aerosol coatings, printing inks, asphalt, and pesticides. Emissions estimates were sourced from EPA's 2016v2 platform, which were generated with the VCPy framework. EPA's 2017 platform predates EPA's 2016v2 platform, and it does not include emissions from solvents according to the VCPy framework. The VCPy framework features better VOC emissions estimates than previous platforms, thus UDAQ made every effort to include improved emissions in the solvents inventory.[32] Since EPA's 2016 modeling base year did not align with the NWF SIP 2017 base year, the inventory was projected to 2017. The only relation expected to change between 2016 and 2017 base years is the mass of chemical products used. To determine a change in product used, UDAQ evaluated

[31] SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf
[32] SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf

the average Producer Price Index (PPI) across the summer months represented during our modeling episode: June, July, and August. In 2016, the average summer PPI for all commodities was 187.3. In 2017 the PPI was 193.6. This shows a 3% increase in PPI from 2016 to 2017, so all solvents emissions from the 2016v2 platform VCPy inventory were increased by 3% to produce the 2017 base year VCPy inventory used in this modeling demonstration. The 2016v2 platform includes projected emissions inventories for 2023 that were utilized by UDAQ. Table 10 and Table 11 provide the 2017 baseline inventory for solvents and the projected 2023 inventory respectively.

Emissions from hot mix asphalt (HMA) plants are submitted as point source inventories, however, all HMA plants in the NAA have 2017 NO_x and/or VOC emissions less than 100 tons per year (tpy). Point sources with NO_x and/or VOC emissions less than 100 tpy are assumed to be represented in nonpoint sectors, but emissions from asphalt plants are technically not represented in the solvents or nonpoint sectors. To accommodate planned rulemaking, UDAQ added emissions from HMA plants to the solvents sector. It is important to note that the emissions associated with HMA facilities discussed in this section represent UDAQ's best assumptions for actual annual emissions associated with the production of HMA products based on known metrics like annual production. Elsewhere in this SIP revision emissions may be reported based on the combined potential to emit based on permitted maximums from all HMA facilities, and thus represent the upper bounds of potential emissions from HMA facilities.

Table 10: Solvent Emissions Inventory

NWF NAA 2017 base year		
Sector	**NO_X TPD**	**VOC TPD**
Solvents	0.56	43.20
Consumer Products	-	18.23
HMA plants	0.56	0.06
Other Solvents	-	24.91

Table 11: 2023 Solvent Emissions Inventory

NWF NAA 2023 future year		
Sector	**NO_X TPD**	**VOC TPD**
Solvents	0.71	44.52
Consumer Products	-	18.80
HMA plants	0.71	0.11
Other Solvents	-	25.62

3.2.3 Area Sources

Nonpoint (area) sources are typically smaller, yet pervasive sources that do not qualify as point sources under the relevant emissions cutoffs. Area sources encompass more widespread sources that may be abundant, but that, individually, release small amounts of a given pollutant. These are sources for which emissions are estimated as a group rather than individually. Examples typically include residential heating and residential charcoal grilling. Area sources generally are not required to submit individual emissions estimates, and instead are reported as county totals.

Area source calculation methods are consistent with Utah's methods for reporting the EPA's tri-annual National Emissions Inventory. Area source emissions are calculated based on activity data, which is gathered from sources such as Departments of Transportation, State Tax Commissions, State Data Centers, State Offices of Planning and Budget, State Energy Commissions, federal agencies such as the U.S. Census Bureau, county and local government agencies, airports, natural gas suppliers, and local trade associations. These data include population, employment, vehicle miles traveled (VMT), fuel usage, animal, crop, and other estimates. Area source calculations are often based on combining these activity data with emission factors. Emission factors were also gathered from similar sources, mostly EPA documents. Area sources were adjusted for potential overlaps and double counts with point sources.[33]

Emission projections for 2023 were based on 2017 data and projected forward. Projection methods were consistent with methods used in past Utah SIPs. Emission projections were based on activity data, similar to their baseline estimates. Depending on the specific source, emissions were projected to scale with population, manufacturing, agricultural, employment data, Energy Information Agency energy use projections, VMT, and other similar data sources.

Livestock emissions were calculated using EPA generated emission factors for livestock animals and multiplying them by the respective livestock populations for each county. Future emissions were forecast using a linear regression model to predict future year livestock emissions as based on agricultural employment.

Table 12: 2017 Area Source Emission Inventory

NWF NAA 2017 base year		
Sector	**NO_X TPD**	**VOC TPD**
Livestock	-	0.69
Nonpoint	5.36	8.51
2 - 5 MMBTU boilers	0.91	0.05
Other Nonpoint Sources	4.45	8.46

Table 13: Area Source Emission Inventory

NWF NAA 2023 future year		
Sector	**NO_X TPD**	**VOC TPD**
Livestock	-	0.71
Nonpoint	4.85	8.26
2 - 5 MMBTU boilers	0.87	0.05
Other Nonpoint Sources	3.99	8.21

3.2.4 Non-Road, Rail, and Airport Sources

EPA's Motor Vehicle Emission Simulator (MOVES3) model was used to obtain emission inventories for non-road mobile vehicles and equipment that operate on unpaved roads and other areas but not on paved roads.[34] They include non-road engines and equipment, such as lawn and garden equipment, construction equipment, engines used in recreational activities, portable industrial, commercial, and agricultural engines. Emissions from MOVES3 for the month of July are input to SMOKE to obtain the typical ozone season day value.

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[33] Area Source Inventories; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001348.pdf

[34] 2017 BASELINE, EPISODIC AND 2023 PROJECTION OZONE EMISSIONS INVENTORY NON-ROAD MOBILE SOURCE; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001585.pdf

Emissions from snow blowers and snowmobiles have been removed from the non-road sector, assuming that these emissions are zero during the summertime modeling episode. Emissions from pleasure craft (personal watercraft and recreational boats with outboard or inboard/sterndrive motors) are allocated to counties according to the number of watercraft registrations in each county. However, along the Wasatch Front, personal watercraft is not operated in the county of residence. Bodies of water on which pleasure craft may be operated exist in mainly rural counties beyond the urban corridor of the Wasatch Front. Assuming that pleasure craft owners transport their recreational vehicles to use them, UDAQ removes any pleasure craft emissions from Salt Lake, Davis, Weber, and Tooele counties. These four counties do not include any bodies of water on which pleasure craft may be operated. [35]

Emissions in the airports sector include all emissions from aircraft and associated ground support equipment. UDAQ's platform base year airport emissions are sourced from EPA's 2017 platform within Utah, and from EPA's 2016v2 platform outside Utah. All future year 2023 emissions were copied from EPA's 2016v2 platform future year emissions inventories (2023). Rail emissions within the state of Utah include all locomotives, railway maintenance locomotives, and point source yard locomotives.[36]

Table 14: Non-Road, Rail and Airports Emission Inventory

NWF NAA 2017 base year		
Sector	**NO_x TPD**	**VOC TPD**
Non-road	**10.52**	**12.53**
2-stoke Lawn/garden Equipment	0.11	3.33
Other Lawn/garden Equipment	1.48	4.35
Other Non-road Sources	8.94	4.86
Rail	**9.25**	**0.47**
Airports	**3.14**	**1.25**

Table 15: 2023 Non-Road, Rail and Airports Emission Inventory

NWF NAA 2023 future year		
Sector	**NO_x TPD**	**VOC TPD**
Non-road	**8.05**	**12.62**
2-stoke Lawn/garden Equipment	0.12	3.63
Other Lawn/garden Equipment	1.46	4.42
Other Non-road Sources	6.47	4.57
Rail	**8.77**	**0.44**
Airports	**3.74**	**1.42**

3.2.5 Point Sources and Electric Generating Units (EGUs)

The definition of a Type B Source under Title V of the CAA (as specified in 40 CFR Appendix A to Subpart A of Part 51) includes point source thresholds in the NAA. This definition includes all facilities with the potential to emit 100 tpy or more of VOC or NO_X. Emissions from sources under the Type B thresholds are included in the area source baseline inventory, as they do not have large enough

[35] SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf

[36] SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf

potential emissions to qualify for the point source inventory. According to the Type B Source definition, Utah had 53 major point sources of NO_x and VOC in 2017, 12 of which are located in the NWF NAA.

UDAQ has improved emissions inventory data management with the implementation of the State and Local Emissions Inventory System (SLEIS). This system has established an online emissions inventory system, whereby point sources can submit their air emissions inventories to UDAQ. SLEIS includes built-in calculation capabilities which simplify the process and reduce the workload for point sources. SLEIS also contains extensive Quality Assurance and Quality Control (QA/QC) tools which guide point sources as they submit their data, thereby greatly reducing oversight required by UDAQ staff. The 2017 triannual emissions inventory was submitted to UDAQ by point sources using the SLEIS online system. The submitted emissions inventories were thoroughly reviewed using additional QA/QC by UDAQ staff before being finalized. The QA/QC contained in the SLEIS online system along with the review performed by UDAQ staff greatly surpasses EPA guidance requiring 10% QA/QC as the minimum criteria necessary for a SIP inventory.

The 2017-point source emissions inventory was used for the baseline emissions inventory for the SIP.[37] Point source emissions were represented as the actual emissions from the 2017 triannual emissions inventory which coincides with the most recent triannual inventory that has been compiled and reviewed by UDAQ.

Point source emissions, as based on annual actual emissions, in the NAA and affecting the NWF NAA was grown on a case-by-case basis for each source and represented in the ozone SIP workbooks for 2023. Emission estimates were projected to future years and to display any control technologies that will be applied. Data from Kem C. Gardner Policy Institute County Projections were used for developing projected emissions for all major point sources. [38] More information on how the Kem C. Gardner data was used is found on page 3 of the 2023 Point Source TSD.

Point source operators provided a monthly percentage of annual emissions from January to December as part of their emissions inventory submission, which was used to generate source-specific monthly temporal profiles in SMOKE for point sources in Utah's emissions inventory. Emissions summaries are provided on a per-facility basis in the SMOKE TSD.[39]

Table 16: 2017 Point Sources and EGUs Emission Inventory

NWF NAA 2017 base year		
Sector	**NO_x TPD**	**VOC TPD**
EGUs	**0.44**	**0.03**
Point Sources	**20.43**	**5.85**
5+ MMBTU boilers	1.90	0.12
Other Point Sources	18.52	5.74

[37] Base Year Ozone SIP Point Source Inventory; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001356.pdf

[38] Projected Ozone SIP Point Source Inventory; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001361.pdf

[39] SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf

Table 17: 2023 Point Sources and EGUs Emission Inventory

NWF NAA 2023 future year		
Sector	**NO_x TPD**	**VOC TPD**
EGUs	**0.45**	**0.03**
Point Sources	**22.00**	**6.00**
5+ MMBTU boilers	1.48	0.14
Other Point Sources	20.52	5.86

3.2.6 On-Road Mobile

On-road mobile source emissions include vehicles that travel on paved roads that produce exhaust, evaporative, and road dust emissions. The on-road mobile inventory was compiled using Motor Vehicle Emissions Simulator (MOVES3) according to the document "MOVES3 Technical Guidance: Using MOVES to Prepare Emissions Inventories for SIPs and Transportation Conformity" November 2020. The baseline year and projection year inventories was compiled through the ICT. The interagency consultation team is primarily used to discuss and decide what MOVES modeling inputs should be used with the SIP modeling domain. The ICT includes representatives from EPA, Federal Highway Administration (FHWA), Federal Transit Authority, Utah Department of Transportation, Utah Transit Authority, Wasatch Front Regional Council (WFRC), Mountainland Association of Governments (MAG), Cache MPO, and UDAQ.[40]

On-road mobile source baseline and projection emission inventories are prepared for an average ozone season weekday based on average hourly temperatures and relative humidity from 2017 July data. VMT were reported as an average ozone season day weekday.

Table 18: 2017 On-road emission inventory for ozone weekday

NWF NAA 2017 base year		
Sector	**NO_x TPD**	**VOC TPD**
On-road Mobile	**55.53**	**20.47**
Heavy Duty Vehicles	27.21	3.65
Light Duty Vehicles	28.32	16.82

Table 19: 2023 On-road emission inventory for ozone weekday

NWF NAA 2023 future year		
Sector	**NO_x TPD**	**VOC TPD**
On-road Mobile	**35.40**	**15.32**
Heavy Duty Vehicles	23.41	2.74
Light Duty Vehicles	11.98	12.58

[40] 2017 THE NORTHERN WASATCH FRONT, UT NONATTAINMENT OZONE AREA SUMMER BASELINE OZONE INVENTORY ON-ROAD TECHNICAL SUPPORT DOCUMENTATION; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001725.pdf & 2023 NORTHERN WASATCH FRONT, UT NONATTAINMENT OZONE AREA SUMMER PROJECTION OZONE INVENTORY ON-ROAD TECHNICAL SUPPORT DOCUMENT; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001699.pdf

3.2.7 Emission Reduction Credit Bank

The NAA has Emission Reduction Credit Bank (ERC) from past ozone SIP revisions that include NO_x and VOC credits available. Emission credit banks for VOCs and NO_x were reviewed for the four NAA counties. All banked credits were reviewed for validity concerning applicable emission credits meeting 2017 RACT or better for controlled or reduced emissions. Upon review, the majority of credits were awarded as a result of a unit or facility closure or decommissioning. Credits are valid and remained in the bank if the applicable change was RACT or better. These credits are available in the ERC offset bank moving forward and were included in the ERC portion of both the baseline and projected year inventories to represent all potential emissions within the NAA boundary.[41]

Table 20: 2017 ERC Bank Emission Inventory

NWF NAA 2017 base year		
Sector	**NO_x TPD**	**VOC TPD**
ERC Bank	**3.10**	**0.70**

Table 21: 2023 ERC Bank Emission Inventory

NWF NAA 2023 future year		
Sector	**NO_x TPD**	**VOC TPD**
ERC Bank	**3.10**	**0.70**

[41] SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf

Chapter 4 – Reasonably Available Control Technology (RACT) Analysis and Nonattainment New Source Review (NNSR)

4.1 Reasonably Available Control Technology (RACT) Overview

Under the CAA 182(b)(2), all areas designated moderate nonattainment for the 2015 8-hour ozone NAAQS are required to implement RACT for all existing major sources of VOCs or NO_x that emit 100 tpy of either pollutant, as well as all VOC sources subject to an EPA Control Technique Guideline (CTG).

CTGs are documents issued by the EPA to provide states with recommendations on how to control VOC emissions from specific sources or products in an ozone NAA. When determining what is RACT, in addition to existing CTGs and alternative control techniques (ACTs), states should consider, "all relevant information (including recent technical information and information submitted by the public) that is available at the time they develop the RACT SIPs."[42]. "States may require VOC and NO_X reductions that are "beyond RACT" if such reductions are needed to provide for timely attainment of the ozone NAAQS."[43]

A RACT analysis identifies controls that could be implemented at the lowest emission limitation that a source is capable of meeting by the application of a control technology that is reasonably available, considering technological and economic feasibility.[44] Implementation of controls identified under the RACT process must be implemented by January 1, 2023, for emission reductions to be creditable towards RFP requirements (section 7).[45] A RACT analysis must include the latest information when evaluating control technologies. Control technologies evaluated for a RACT analysis can range from work practices to add-on controls. As part of the RACT analysis, current control technologies already in use for VOCs or NO_X sources can be taken into consideration. To conduct a RACT analysis, a top-down analysis is used to rank all control technologies.

4.1.1 Top Down RACT Analysis Steps

For sources that meet or exceed the applicable emission thresholds, the following steps are followed:

- Step 1. Identify all RACT options applicable to the source
- Step 2. Eliminate technically infeasible control technologies
- Step 3. Rank remaining control technologies based on capture and control efficiencies
- Step 4. Evaluate remaining control technologies based on economic, energy, and environmental feasibility
- Step 5. Select RACT options

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[42] Implementation of the 2015 National Ambient Air Quality Standards for Ozone: NAA State Implementation Plan Requirements, 83 Fed. Reg. 62,998, 63,007 (Dec. 6, 2018).

[43] Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements, 80 Fed. Reg. 12,264, 12,279 (March 6, 2015).

[44] 40 CFR § 51.1312 Requirements for reasonably available control technology (RACT) and reasonably available control measures (RACM).

[45] 87 Fed. Reg. 60,897.

All available control technologies must be included in a RACT analysis for all VOC and NO_x sources, with a thorough description and discussion of technological feasibility. Economic feasibility is determined through Step 4 of a RACT analysis using EPA's Air Pollution Control Cost Manual as guidance.[46]

4.2 Utah RACT Process

The UDAQ relied on multiple available analyses when determining if sources within the NWF NAA met RACT requirements, or if the implementation of additional RACT were required to demonstrate that the NWF NAA will attain the standard at the earliest possible date. First, the UDAQ reviewed and reconsidered control options submitted as part of the Salt Lake City, UT $PM_{2.5}$ serious SIP, which required the implementation of the more stringent Best Available Control Technologies (BACT) for both NO_x and VOCs.[47] BACT relies on more restrictive emission control requirements than RACT, and thus emission reduction strategies identified and implemented under BACT are more stringent than those identified through the RACT process. Therefore, by reexamining past BACT analyses, the UDAQ relied on a recently conducted analysis which implemented controls that conform to a higher economic and technological standard. In doing so, the UDAQ is remaining consistent with guidance provided by the EPA[48], in which the EPA concludes that states may conclude a source has already addressed RACT based on a RACT determination for a previous NAAQS SIP revision. For instance, the EPA proposes that in some instances a RACT analysis submitted for the 1997 NAAQS are appropriate for meeting RACT requirements for the 2008 NAAQS.[49] In this example, states are granted the discretion to rely on a like-for-like RACT analysis with a substantial time laps between respective SIP revisions under each NAAQS. For this SIP revision, the UDAQ reexamined the more stringent BACT analyses submitted with a shorter time lapse than that provided in the example, with BACT reports being submitted just 4 to 5 years earlier.

In addition to reexamining past BACT reports, the UDAQ identified three emission sources that were not evaluated as part of the $PM_{2.5}$ serious SIP. Those analyses were provided to UDAQ by Tesoro Refining and Marketing Company LLC[50], Holly Energy Partners Woods Cross Terminal[51], and Chevron Salt Lake Marketing Terminal[52]. These three RACT reports were later included in facility wide updated RACT analyses by each of the respective sources and therefore were analyzed in multiple rounds of RACT analysis conducted as part of this SIP revision.

Beyond the past $PM_{2.5}$ BACT reports, and three additional RACT reports submitted for review, the UDAQ notified sources that they could opt-in to submitting an updated facility wide RACT analysis for consideration in this SIP revision. Subsequently, 9 sources within the NAA provided UDAQ with new RACT analyses for emissions of both VOCs and NO_x. The UDAQ reviewed all analyses submitted in

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[46] EPA's Air Pollution Control Cost Manual can be found at: https://www.epa.gov/sites/default/files/2020-07/documents/c_allchs.pdf

[47] Utah State Implementation Plan; Control Measures for Area and Point Sources, Fine Particulate Matter, Serious Area $PM_{2.5}$ SIP for the Salt Lake City, Utah NAA; Section IX. Part A.31: https://deq.utah.gov/air-quality/control-strategies-serious-area-pm2-5-sip

[48] 80 FR 12264 & 83 FR 62998

[49] 80 FR 12264 p.12278

[50] The RACT analysis from the Tesoro Refinery and Marketing Company can be found at: https://documents.deq.utah.gov/air-quality/planning/air-quality-policy/DAQ-2022-011275.pdf

[51] The RACT analysis for the Holly Energy Partners Woods Cross Terminal can be found at: https://documents.deq.utah.gov/air-quality/planning/air-quality-policy/DAQ-2022-011295.pdf

[52] The RACT analysis for the Chevron Salt Lake Marketing Terminal can be found at: https://documents.deq.utah.gov/air-quality/planning/air-quality-policy/DAQ-2022-011292.pdf

conjunction with past BACT reports, and where warranted, requested updated RACT reports with additional or clarifying information. All RACT analyses, and all follow-up reports, were made available for public review at the earliest possible date[53].

UDAQ determined that one major source located outside the NWF NAA impacts the ability of the NAA to attain the NAAQS, and as such was required to provide a RACT analysis to UDAQ. This source, US Magnesium, its RACT analysis, and identified control options, will be discussed in detail in Section 4.15.

4.2.1 Actual Emissions and Potential to Emit (PTE)

Utah Administrative Rule R307-101; General Requirements, contains the definitions for the terms “Actual Emissions”, “Potential to Emit”, and “Enforceable”. Thus, the actual emissions of a source refers to the actual rate of emissions of an air pollutant from an emissions unit. Actual emissions are calculated using the unit’s actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period. The actual emissions of a source can fluctuate from year-to-year due to changes in a source’s year-to-year operations.

The PTE of a source means the estimated maximum capacity of a source to emit an air pollutant under its physical and operational design. A source’s PTE is not an enforceable limitation in itself, but is instead the maximum amount of air pollutants a source could emit if each emission unit operated at 100% of its design capacity, 24 hours a day, 365 days a year. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and operational or process restrictions or limitations, are treated as part of a source’s design if the limitation is enforceable.

Enforceable limitations and conditions include requirements developed pursuant to 40 CFR Parts 60 and 61, requirements within the Utah SIP and Utah Administrative Rule Series R307, and any permit requirements established pursuant to Utah Administrative Rule R307-401; Permit: New and Modified Sources.

4.3 Big West Oil LLC - Refinery

4.3.1 Introduction

This section specifically serves as an evaluation of Big West Oil LLC – Big West Oil Refinery (Big West). The UDAQ relied on past submitted BACT reports and an additional RACT analysis submitted by Big West for evaluation on January 31, 2023; specific sections from this analysis are referenced in the RACT analysis. Specific ozone SIP conditions for Big West can be found in Section IX, Part H.32.a.

4.3.2 Facility Process Summary

The Big West Oil Refinery is a petroleum refinery capable of processing 30,000 barrels per day of crude oil. The source consists of a specific type of Fluidized Catalytic Cracking Unit (FCCU), a Millisecond Catalytic Cracker (MSCC); catalytic reforming unit; hydrotreating units; and a sulfur recovery unit. The source also has an assortment of heaters, boilers, cooling towers, storage tanks, flares, and fugitive emissions.

[53] https://deq.utah.gov/air-quality/northern-wasatch-front-moderate-ozone-sip-technical-support-documentation#supporting-tsd

4.3.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from Big West processes and equipment are summarized in Table 22. The 2017 actual emissions were used as the baseline emissions. The current PTE values for Big West were established by the most recent active Approval Orders (AOs) issued to the source. Big West currently has several open AO modifications that will include updating their PTE to more accurately reflect their operations.

- AO DAQE-AN101220077-22 issued January 13, 2022 (0077-22)
- AO DAQE-AN101220074-19 issued October 23, 2019 (0074-19)
- AO DAQE-AN101220072-19 issued July 10, 2019 (0072-19)

Table 22: Big West Oil LLC Refinery Facility-Wide Emissions

Big West Oil LLC Refinery Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**115.15**	**195.00**
VOC	**676.59**	**432.78**

4.3.4 RACT Analysis

The RACT evaluations were performed using data from Big West Oil, AOs and supporting documentation, and Utah SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 23.

Table 23: Big West Oil LLC - Refinery

Big West Oil LLC - Refinery						
RACT Section #[54]	**Emission Unit/Activity**	**Pollutant**	**RACT Determination**	**Enforceability**		**Comments**
				AO Conditions	**$PM_{2.5}$ SIP Conditions**	
3.1	FCCU (MSCC) Regenerator	NO_x	Low-NO_x regeneration with low-NO_x promoter catalyst - meets MACT Subpart UUU.	(0077-22) II.B.3.b	H.12.b.ii & H.12.b.vi	Current operations meet RACT, no further action warranted.
		VOCs	Good combustion practices, no	(0077-22) I.5	No	

[54] https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001493.pdf

			additional controls.			
3.2 - 3.4	Process Heaters and Boilers	NO_x	LNB & ULNB required on various units, & refinery-wide NO_x limit.	(0077-22) II.B.1.d & II.B.8.d	H.12.b.ii & H.12.b.vi	Current operations meet RACT, no further action warranted.
		VOCs	Good combustion practices, no additional controls.	(0077-22) I.5	No	
3.5	Refinery Flares	NO_x VOCs	Evaluated through control of flare gases, not through individual pollutants, requirement to meet New Source Performance Standards (NSPS) Subpart Ja and MACT Subpart CC for flares.	(0077-22) II.B.4 & II.B.7.c	H.11.g.v, H.12.b.ii, & H.12.b.vi	Current operations meet RACT, no further action warranted.
3.4	SRU	NO_x	Existing tail gas incinerator & refinery-wide NO_x limit.	(0077-22) II.B.8.d	H.12.b.ii & H.12.b.vi	Current operations meet RACT, no further action warranted.
3.13	Cooling Towers	VOCs	MACT Subpart CC requirements on cooling towers servicing high VOC heat exchangers.	(0077-22) II.B.7.a	H.11.g.iii	Current operations meet RACT, no further action warranted.
3.7	Fugitive emissions	VOCs	Low leak LDAR requirements of NSPS Subpart GGGa.	(0077-22) II.B.1.a & II.B.7.b	H.11.g.iv	Current operations meet RACT, no further action warranted.

3.10 & 3.11	Tanks	VOCs	Submerged fill operations & tank degassing requirements - eventual compliance with NSPS Subpart Kb or MACT Subpart CC.	(0072-19) II.B.1.a & II.B.1.b	H.11.g.vi	Current operations meet RACT, no further action warranted.
3.12	Wastewater System	VOCs	API separator with fixed cover, carbon canisters for VOC control, 90% removal efficiency.	No	H.12.b.vi	Current operations meet RACT, no further action warranted.
3.6	Standby Fire Pumps	VOCs	Proper maintenance and operation, and compliance with applicable NSPS or MACT requirements.	(0074-19) I.5	H.12.b.iv	Current operations meet RACT, no further action warranted.
		NO_x		(0074-19) II.B.1.c		
3.8	Truck Loading Rack	VOCs	Vapor recovery unit with carbon adsorption in compliance with MACT Subpart CC.	(0077-22) I.5	H.12.b.vi	Current operations meet RACT, no further action warranted.
3.9	Railcar Loading Rack	VOCs	Vapor recovery with vapor combustion unit in compliance with MACT Subpart R.	(0077-22) I.5	H.12.b.vi	Current operations meet RACT, no further action warranted.
N/A	Refinery General Approach	NO_x	Refinery-wide NO_x limit.	(0077-22) II.B.8.d	H.12.b.ii	Current operations meet RACT, no further action warranted.

4.3.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emission limitations are considered RACT for the Big West Oil Refinery. RACT evaluations showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for Big West Oil Refinery as required by this SIP revision.

4.4 Chevron Products Company – Salt Lake Refinery

4.4.1 Introduction

This section specifically serves as an evaluation of Chevron Products Company – Salt Lake Refinery (Chevron Refinery). In addition to its past submitted BACT reports, Chevron Refinery submitted an additional RACT analysis for evaluation January 31, 2023, with supporting information submitted February 23, 2023, and February 24, 2023; specific sections from this analysis are referenced in the RACT analysis. Specific Ozone SIP conditions for Chevron Refinery can be found in Section IX, Part H.32.b.

4.4.2 Facility Process Summary

The Chevron Refinery is a petroleum refinery with a nominal capacity of approximately 50,000 barrels per day of crude oil. The source consists of two FCCUs, a delayed coking unit, a catalytic reforming unit, hydrotreating units, and two sulfur recovery units. The source also has an assortment of heaters, boilers, cooling towers, storage tanks, flares, and fugitive emissions. The refinery operates with a flare gas recovery system on its hydrocarbon flares.

4.4.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the Chevron Refinery processes and equipment are summarized in Table 24. The 2017 baseline actual emissions were used as the baseline emissions. The current PTE values for Chevron Refinery were established by the most recent active AOs issued to the source.

- AO DAQE-AN101190106-22 issued August 24, 2022 (0106-22)
- AO DAQE-AN101190104-22 issued September 26, 2022 (0104-22)

Table 24: Chevron Products Company – Salt Lake Refinery Facility-Wide Emissions

Chevron Products Company – Salt Lake Refinery Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**265.50**	**766.50**
VOC	**339.60**	**1,242.06**

4.4.4 RACT Analysis

The RACT evaluations were performed using data from Chevron Refinery, AOs and supporting documentation, and Section IX, Utah SIP Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPs. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 25.

Table 25: Chevron Products Company – Salt Lake Refinery

Chevron Products Company – Salt Lake Refinery						
RACT Section #[55]	Emission Unit / Activity	Pollutant	RACT Determination	Enforceability		Comments
				AO Conditions	$PM_{2.5}$ SIP Conditions	
II.A	FCCU Regenerator	NO_x	Feed hydrotreating & refinery-wide NO_x limit.	(0106-22) II.B.1.h & II.B.7.b	H.12.d.ii	Current operations meet RACT, no further action warranted.
		VOCs	Good combustion practices, no additional controls.	(0106-22) I.5	No	
II.B	Process Heaters and Boilers	NO_x	LNB, FGR (Boilers 5, 6,7), & refinery-wide NO_x limit, compliance with NSPS Subpart Ja.	(0106-22) II.B.1.h, II.B.2, & II.B.3	H.12.d.ii & H.12.d.vii	Current operations meet RACT, no further action warranted.
		VOCs	Good combustion practices,	(0106-22) I.5	No	

55 https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001911.pdf

			no additional controls, compliance with NSPS Subpart Ja.			
II.B	Crude Heaters	NO_x	LNB & refinery-wide NO_x limit.	(0106-22) II.B.1.h	H.12.d.ii & H.12.d.vii	Current operations meet RACT, no further action warranted.
		VOCs	Good combustion practices.	(0106-22) I.5	No	
II.C	SRU	NO_x	Existing tail gas treatment unit and thermal oxidizer & refinery-wide NO_x limit.	(0106-22) II.B.1.h	H.12.d.ii & H.12.d.vii	Current operations meet RACT, no further action warranted.
II.D	Cooling Towers	VOCs	MACT Subpart CC requirements on cooling towers servicing high VOC heat exchangers.	(0106-22) II.B.10.a	H.11.g.iii	Current operations meet RACT, no further action warranted.
II.E	Fugitive emissions	VOCs	Low leak LDAR requirements of NSPS Subpart GGGa.	(0106-22) II.B.10.b	H.11.g.iv	Current operations meet RACT, no further action warranted.
II.F	Tanks	VOCs	Submerged fill	(0106-22) II.B.10.c1	H.11.g.vi	Current operations

			operations & tank degassing requirements - compliance with NSPS Subpart Kb or MACT Subpart CC.	& (0104-22) II.B.2.c2		meet RACT, no further action warranted.
II.G	Wastewater System	VOCs	Induced air floatation & RTO, compliance with NSPS Subpart QQQ and National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart FF.	(0104-22) II.B.2.a & II.B.2.b	H.12.d.vii	Current operations meet RACT, no further action warranted.
II.H	Refinery Flares	NO_x VOCs	Evaluated through control of flare gases, not through individual pollutants, requirement to meet NSPS Subpart Ja for flares.	(0106-22) II.B.10.d	H.11.g.v, H.12.d.ii, & H.12.d.vii	Current operations meet RACT, no further action warranted.

II.I	Standby Fire Pumps and Emergency Diesel Engines	VOCs	Proper maintenance and operation, and compliance with NESHAP Subpart ZZZZ.	(0106-22) I.5	H.12.d.iv	Current operations meet RACT, no further action warranted.
		NO_x		(0106-22) II.B.8.c		
II.L	Reformer Compressor Engines	NO_x	Use of NSCR meeting NOx emission limits in SIP Section IX, Part H.12.d.v.	(0106-22) II.B.9.a	H.12.d.v & H.12.d.vii	SCR incorrectly required in SIP Section IX, Part H.12.d.vii. Correct control required is NSCR. Current operations meet RACT, no further action warranted.
II.J	Crude Oil Loading Racks	VOCs	Vapor Combustion Unit with a 98% VOC control efficiency.	(0104-22) II.B.3.a	H.12.d.vii	Current operations meet RACT, no further action warranted.
N/A	Refinery General Approach	NO_x	Refinery-wide NO_x limit.	(0106-22) II.B.1.h	H.12.d.ii	Current operations meet RACT, no further action warranted.

4.4.5 Conclusion of RACT Implementation

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.

4.5 Hexcel Corporation

4.5.1 Introduction

This section specifically serves as an evaluation of Hexcel Corporation (Hexcel). In addition to its past BACT reports, Hexcel submitted an additional RACT analysis for evaluation January 31, 2023. Specific Ozone SIP conditions for Hexcel can be found in Section IX, Part H.32.c.

4.5.2 Facility Process Summary

Hexcel owns and operates a carbon fiber and fabric pre-impregnation manufacturing plant in West Valley City. Products made at Hexcel are used in commercial aerospace primary and secondary structures, helicopters, defense aircraft, satellites, and sporting equipment. The facility consists of twelve production buildings, two raw material receiving warehouses, and a material testing laboratory. The plant manufactures carbon fibers and hot melt pre-impregnation fabrics. The plant also produces epoxy resins, adhesive films, and solvated fabrics.

4.5.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the Hexcel industrial processes and equipment are summarized in Table 26. The 2017 actual emissions were used as the baseline emissions. The current PTE values for Hexcel were established by the most recent active AOs issued to the source.

- AO DAQE-AN113860032-19 issued May 13, 2019 (0032-19)

Table 26: Hexcel Corporation Facility-Wide Emissions

Hexcel Corporation Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**187.90**	**197.51**
VOC	**154.20**	**168.34**

4.5.4 RACT Analysis

The RACT evaluations were performed using data from Hexcel, AOs and supporting documentation, and Utah SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 27.

Table 27: Hexcel Corporation

Hexcel Corporation					
		Pollutant		**Enforceability**	**Comments**

RACT Section #[56]	**Emission Unit/Activity**		**RACT Determination**	**AO Conditions**	**$PM_{2.5}$ SIP Conditions**	
4.0 - 4.2	All Fiber Lines	All	Consumption and production limits.	(0032-19) II.B.1.b	H.12.f.i & H.12.f.vi	Current operations meet RACT, no further action warranted.
4.0 - 4.2	Fiber Lines 2 thru 8, 10 thru 12	VOCs	Good combustion practices, natural gas as fuel, incineration and flaring technology.	(0032-19) I.5; II.B.1.d - II.B.1.l; II.B.3.a - II.B.3.d; II.B.4.a - II.B.4.c; & II.B.5.a - II.B.5.b	No	Current operations meet RACT, no further action warranted.
	Fiber Lines 2, 5, 6, 8, 10 thru 12	NO_x				
4.0 - 4.2	Fiber Lines 3, 4, and 7	NO_x	ULNB with FGR required to be installed by December 31, 2024.	No	H.12.f.iv	Current operations meet RACT, no further action warranted.
4.0 - 4.2	Fiber Lines 13 thru 16	VOCs	RTO, incineration and flaring technology.	(0032-19) I.5; II.B.1.d - II.B.1.l; II.B.6.a; & II.B.7.a	H.12.f.ii	Current operations meet RACT, no further action warranted.
		NO_x	LNB on thermal oxidizer and RTO, good combustion practices, natural gas as fuel.		H.12.f.ii, H.12.f.v	
4.3	Pilot	VOCs	Good combustion practices, natural gas as fuel, proper maintenance, incineration and flaring technology.	(0032-19) I.5 & II.B.1.d - II.B.1.l	No	Current operations meet RACT, no further action warranted.
		NO_x				

[56] https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001511.pdf

5.0	Matrix (Solvent Coating Operations)	VOCs	Good combustion practices, natural gas as fuel, proper maintenance, incineration and flaring technology.	(0032-19) I.5; II.B.1.j; II.B.1.o; & II.B.1.p	No	Current operations meet RACT, no further action warranted.
		NO_x				
6.0	Boilers	VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0032-19) I.5	No	Current operations meet RACT, no further action warranted.
		NO_x	Compliance with a NO_x emission rate of 9 ppm.	(0032-19) I.5	No	
7.0	Emergency Generators	VOCs	Proper maintenance and operation, Subpart IIII and Subpart ZZZZ.	(0032-19) I.5	No	Current operations meet RACT, no further action warranted.
		NO_x				
8.0	HVAC	VOCs	Proper maintenance and operation.	(0032-19) I.5 & II.B.1.o	No	Current operations meet RACT, no further action warranted.
		NO_x				

4.5.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for Hexcel. RACT evaluations showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for Hexcel as required by this SIP revision.

4.6 Hill Air Force Base

4.6.1 Introduction

This section specifically serves as an evaluation of Hill Air Force Base (Hill AFB). Hill AFB did not submit an additional RACT analysis for evaluation, and thus UDAQ relied on the more stringent BACT analysis submitted for NO_x and VOC emissions as evaluated for the Salt Lake City $PM_{2.5}$ serious SIP. Specific conditions as they relate to this SIP revision for Hill AFB can be found in Section IX, Part H.32.d.

4.6.2 Facility Process Summary

Hill AFB is a large U.S. Air Force base located in northern Utah, just south of the city of Ogden. Hill AFB is the home of the Air Force Material Command's Ogden Air Logistics Complex, which is the worldwide manager for a wide range of aircraft, engines, missiles, software, avionics, and accessories components, and provides worldwide logistics support for Air Force and Defense Department weapon systems. Additional tenant units include the Air Combat Command and the Air Force Reserve Command. Hill AFB has extensive industrial facilities for painting, paint stripping, plating, parts warehousing/distribution, wastewater treatment, and manages and maintains air munitions, solid propellants, landing gear, and training devices.

4.6.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the Hill AFB processes and equipment are summarized in Table 28. The 2017 actual emissions were used as the baseline emissions. The current PTE values for Hill AFB were established by the most recent active AOs issued to the source.

- AO DAQE-AN101210245-16 issued September 1, 2016 (0245-16)
- AO DAQE-AN101210200A-09 issued December 17, 2009 (0200A-09)
- AO DAQE-AN0121175-06 issued October 16, 2006 (175-06)
- AO DAQE-AN101210266-19 issued May 8, 2019 (0266-19)
- AO DAQE-AN0101210195-09 issued August 10, 2009 (0195-09)
- AO DAQE-AN101210233-12 issued January 27, 2012 (0233-12)
- AO DAQE-AN101210225-12 issued April 19, 2012 (0225-12)
- AO DAQE-AN101210248-17 issued June 7, 2017 (0248-17)
- AO DAQE-AN101210228-12 issued June 13, 2012 (0228-12)
- AO DAQE-AN0101210214-11 issued June 28, 2011 (0214-11)
- AO DAQE-AN101210229-12 issued October 29, 2012 (0229-12)
- AO DAQE-AN101210233-14 issued June 26, 2014 (0233-14)
- AO DAQE-AN101210237-15 issued March 9, 2015 (0237-15)
- AO DAQE-AN101210241-15 issued November 5, 2015 (0241-15)
- AO DAQE-AN101210260-19 issued April 3, 2019 (0260-19)
- AO DAQE-AN101210240B-16 issued February 8, 2016 (0240B-16)

Table 28: Hill Air Force Base Facility-Wide Emissions

Hill Air Force Base Facility Emissions		
Pollutant	**Baseline Emissions**	**PTE**

	(TPY)	(TPY)
NO_x	**101.43**	**279.81**
VOC	**140.24**	**330.41**

4.6.4 RACT Analysis

The RACT evaluations were performed using data from Hill AFB, AOs and supporting documentation, and Utah SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 29.

Table 29: Hill Air Force Base

Hill Air Force Base						
TSD Section #[57]	**Emission Unit/Activity**	**Pollutant**	**BACT Determination**	**Enforceability**		**Comments**
				AO Conditions	**$PM_{2.5}$ SIP Conditions**	
2.1.1	Boilers	VOCs	Use of pipeline quality natural gas (low sulfur fuel), good combustion practices, good design, and proper operation.	(0245-16) I.5	No	Current operations meet RACT, no further action warranted.
		NO_x	All boilers older than January 1, 1989, will be removed. The combined heat NO_x emissions for all boilers (except those less than 5 MMBtu/hr) shall not exceed 95 lb/hr.	(0245-16) II.B.1.a & II.B.2.a	H.12.q.ii	Current operations meet RACT, no further action warranted.
2.1.2	Surface Coating, Cleaning & Chemically De-painting Operations	VOCs	Low VOC coatings, work practice standards, emissions limit of 0.58 tpd, and proper maintenance.	(0200A-09) II.B.1.a through II.B.1.m	H.12.q.i	Current operations meet RACT, no further action warranted.

[57] https://documents.deq.utah.gov/air-quality/pm25-serious-sip/DAQ-2018-007651.pdf

2.1.3	Emergency Equipment Operations	VOCs NO_x	Limited hours of operation for maintenance and testing, good combustion practices, use of a tier-certified engine when required under NSPS Subpart IIII and JJJJ, the use of ULSD and proper equipment operation, maintenance schedules and protocols.	(175-06) I.E & II.C (0266-19) I.5 & II.B.1.b	No	Current operations meet RACT, no further action warranted.
2.1.4	Testing Operations	VOCs NO_x	Site-wide fuel limit and proper operation, maintenance, and protocols.	(0195-09) I.5, II.B.1.a, II.B.2.a, & II.B.3.a (0233-12) I.5 & II.B.1.b (0225-12) I.5 & II.B.1.a (0248-17) I.4, II.B.1.a, & II.B.1.b	No	Current operations meet RACT, no further action warranted.
2.1.5	Degreasing Operations	VOCs	Use of low volatility solvents, proper operation, maintenance and operation protocols with	(0228-12) I.6, II.B.1.a through II.B.1.f	No	Current operations meet RACT, no further action warranted.

			a limit on VOC emissions.			
2.1.6	Misc. Coating and Blasting	VOCs	Scrubbers, low-sulfur fuel, limited use, proper operation, maintenance and protocols.	(0214-11) I.5 & II.B.1.a (0229-12) I.5 (0233-14) I.5 & II.B.1.a	No	Current operations meet RACT, no further action warranted.
		NO_x	Limited use, proper operation, maintenance, and protocols.			
2.1.7	Air Handlers & Heaters	VOCs	LNBs, low sulfur fuel, limited use, proper operation, maintenance, and protocols.	(0237-15) I.5 & II.B.1.a	No	Current operations meet RACT, no further action warranted.
		NO_x				
2.1.8	Fuel Operations	VOCs	Fuel storage: vapor balancing system and submerged loading as required by R307-328, limited use, proper operation, maintenance and protocols. Distillation: Limited use, proper operation, Maintenance and protocols.	(0241-15) I.5 and II.B.1.a (0260-19) I.5, II.B.1.a, & II.B.1.b	No	Current operations meet RACT, no further action warranted.
2.1.10	Industrial Wastewater Operation	VOCs	Limiting VOC emission, proper operation,	(0240B-16) I.5, II.B.1.a, & II.B.1.b	No	Current operations meet RACT, no further action warranted.

			maintenance and protocols.			

4.6.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for Hill AFB. Re-evaluation of BACT showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for Hill AFB as required by this SIP revision.

4.7 Holly Frontier Sinclair Woods Cross Refinery

4.7.1 Introduction

This section specifically serves as an evaluation of Holly Frontier Sinclair Woods Cross Refinery (HF Sinclair Refinery). In addition to its BACT report submitted as part of the Salt Lake City $PM_{2.5}$ serious SIP, HF Sinclair Refinery submitted an additional RACT analysis for evaluation on January 31, 2023, with supporting information submitted February 23, 2023. Specific conditions related to this SIP revision for HF Sinclair Refinery can be found in Section IX, Part H.32.e.

4.7.2 Facility Process Summary

The HF Sinclair Refinery is a petroleum refinery capable of processing 60,000 barrels per day of crude oil, primarily heavier black wax and yellow wax crudes from eastern Utah. The refinery produces a variety of products including gasoline, natural gas liquids, propane, butanes, jet fuels, fuel oils, and kerosene products. The refinery receives and distributes products by tanker truck, rail car, and pipeline. The source consists of two FCCUs, both controlled with wet gas scrubbers. A single sulfur recovery unit controls the sulfur content of the fuel gas. The source also has an assortment of heaters, boilers, cooling towers, storage tanks, flares, and related fugitive emissions.

4.7.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the HF Sinclair Refinery processes and equipment are summarized in Table 28. The 2017 actual emissions were used as the baseline emissions. The current PTE values for HF Sinclair Refinery were established by the most recent active AOs issued to the source.

- AO DAQE-AN101230053-22 issued September 1, 2022 (0053-22)

Table 30: Holly Frontier Sinclair Woods Cross Refinery Facility-Wide Emissions

Holly Frontier Sinclair Woods Cross Refinery Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**170.51**	**347.10**
VOC	**217.45**	**223.63**

4.7.4 RACT Analysis

The RACT evaluations were performed using data from HF Sinclair Refinery, AOs and supporting documentation, and Utah SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 31.

Table 31: Holly Frontier Sinclair Woods Cross Refinery

Holly Frontier Sinclair Woods Cross Refinery						
RACT Section #[58]	**Emission Unit/Activity**	**Pollutant**	**RACT Determination**	**Enforceability**		**Comments**
				AO Conditions	**$PM_{2.5}$ SIP Conditions**	
3.4 & 4.5	FCCU Regenerator	NO_x	Wet gas scrubber with use of LoTOx add-on & refinery-wide NO_x limit.	(0053-22) II.B.4 & II.B.8.b	H.12.g.ii & H.12.g.vi	Current operations meet RACT, no further action warranted.
4.5		VOCs	Good combustion practices, no additional controls.	(0053-22) I.5	No	
3.1 & 4.1	Process Heaters and Boilers	NO_x	LNB, ULNB, some use of SCR, & refinery-wide NO_x limit.	(0053-22) II.B.4.a & II.B.6.b	H.12.g.ii & H.12.g.vi	Current operations meet RACT, no further action warranted.
4.1		VOCs	Good combustion practices, no additional controls.	(0053-22) I.5 & II.B.6.d	No	
3.3 & 4.4	Sulfur Recovery Unit Tail Gas incinerator	NO_x	Wet Gas Scrubber, Low-NO_x burner & refinery-wide NO_x limit.	(0053-22) I.5 & II.B.4.a	H.12.g.ii & H.12.g.vi	Current operations meet RACT, no further action warranted.
4.4		VOCs	Wet Gas Scrubber.			
4.3	Cooling Towers	VOCs	MACT Subpart CC requirements on cooling	(0053-22) II.B.12.a	H.11.g.iii	Current operations meet RACT, no further

[58] https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001865.pdf

			towers servicing high VOC heat exchangers.			action warranted.
4.9	Fugitive emissions/ Equipment Leaks	VOCs	Low leak LDAR requirements of NSPS Subpart GGGa.	(0053-22) II.B.1.h	H.11.g.iv	Current operations meet RACT, no further action warranted.
4.6	Fixed Roof Tanks	VOCs	Compliance with NSPS Subpart Kb, MACT Subpart WW, and LDAR.	(0053-22) I.5	H.11.g.vi	Current operations meet RACT, no further action warranted.
4.7	Internal Floating Roof Storage tanks	VOCs	Submerged fill operations & tank degassing requirements - eventual compliance with NSPS Subpart Kb or MACT Subpart CC and MACT Subpart WW.	(0053-22) I.5	H.11.g.vi	Current operations meet RACT, no further action warranted.
4.8	External Floating Roof	VOCs	Compliant with NSPS Subpart Kb or MACT Subpart CC and MACT Subpart WW.	(0053-22) I.5	H.11.g.vi	Current operations meet RACT, no further action warranted.
4.10	Wastewater System	VOCs	Closed vent system with carbon adsorption. Compliance with NSPS Subpart QQQ and MACT Subpart FF.	(0053-22) I.5	H.12.g.vi	Current operations meet RACT, no further action warranted.
3.2 & 4.2	Refinery Flares	NO_x	Flare Gas recovery system, requirement to	(0053-22) II.B.1.g	H.11.g.v, H.12.g.ii, & H.12.g.vi	Current operations meet RACT, no further action warranted.
4.2		VOCs				

			meet NSPS Subpart Ja.			
3.5 & 4.12	Standby Diesel Engines	VOCs	Proper maintenance and operation, compliance with MACT Subpart ZZZZ.	(0053-22) I.5	H.12.g.iv	Current operations meet RACT, no further action warranted.
4.1		NO_x				
3.6 & 4.13	Standby Emergency Nat Gas Engines	VOCs	Proper maintenance and operation, compliance with NSPS Subpart JJJJ and MACT Subpart ZZZZ.	(0053-22) I.5	No	Current operations meet RACT, no further action warranted.
4.1		NO_x				
4.11	Product Loading	VOCs	Submerged or bottom loading as well as vapor balancing.	(0053-22) I.5	No	Current operations meet RACT, no further action warranted.
N/A	Refinery General Approach	NO_x	Refinery-wide NO_x limit.	(0053-22) II.B.4	H.12.g.ii	Current operations meet RACT, no further action warranted.

4.7.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for the HF Sinclair Refinery. RACT evaluations showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for the HF Sinclair Refinery as required by this SIP revision.

4.8 Kennecott Utah Copper Bingham Canyon Mine and Copperton Concentrator

4.8.1 Introduction

This section specifically serves as an evaluation of Kennecott Utah Copper (KUC) – Bingham Canyon Mine (BCM) and Copperton Concentrator (CC). In addition to past submitted BACT reports, KUC submitted an additional RACT analysis for evaluation January 30, 2023. Specific conditions for this SIP revision for KUC BCM & CC can be found in Section IX, Part H.32.f.

4.8.2 Facility Process Summary

The KUC BCM is an open pit mining operation located in the southwest corner of Salt Lake County. The ore and waste rock at the BCM are transferred from the mining areas to other areas of the mine through a series of transfers using haul trucks and conveyor belts. Ore is crushed in the in-pit crusher. After the ore is crushed, it is conveyed to the KUC CC located approximately five miles north of the open pit. At the CC, semi-autogenous grinding mills and ball mills grind the ore into a slurry. The slurry is sent through cyclone clusters, and the cyclone overflow is fed into flotation circuits and mixed with reagents. The flotation circuits are aerated to float copper and other valuable by-products from the ore. Once the ore is processed at the concentrator, it is transferred to the smelter.

4.8.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the KUC BCM & CC processes and equipment are summarized in Table 32. The 2017 actual emissions were used as the baseline emissions. The current PTE values for KUC BCM & CC were established by the most recent active AOs issued to the source.

- AO DAQE-AN105710047-21 issued May 10, 2021 (0047-21)
- AO DAQE-AN105710044-18 issued August 21, 2018 (0044-18)

Table 31: KUC Bingham Canyon Mine and Copperton Concentrator Facility-Wide Emissions

KUC Bingham Canyon Mine & Copperton Concentrator Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**4,209.19**	**5,852.77**
VOC	**210.03**	**318.17**

4.8.4 RACT Analysis

The RACT evaluations were performed using data from KUC, AOs and supporting documentation, and Utah SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPs. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 33.

Table 33: Kennecott Utah Copper: Bingham Canyon Mine and Copperton Concentrator

Kennecott Utah Copper: Bingham Canyon Mine & Copperton Concentrator						
Bingham Canyon Mine						
RACT Section #[59]	**Emission Unit/Activity**	**Pollutant**	**RACT Determination**	**Enforceability**		**Comments**
				AO Condition	**$PM_{2.5}$ SIP Conditions**	

[59] https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001509.pdf

2.1.1	Tailpipe Emissions from Mobile Sources	NO_x	Compliance with non-road EPA Standards.	(0047-21) II.B.1.f	H.12.h.i.A	Current operations meet RACT, no further action warranted.
2.1.5	Solvent Extraction and Electrowinning Process	NO_x VOCs	Use of mist eliminators and covers in tanks, mixers, and settlers.	(0047-21) II.B.2.f & II.B.2.g	No	Current operations meet RACT, no further action warranted.
2.1.2	Gasoline Fueling	VOCs	Stage I and Stage 2 recovery systems.	(0047-21) I.5	No	Current operations meet RACT, no further action warranted.
2.1.3	Cold Solvent Degreasing Washers	VOCs	Compliance with R307-335.	(0047-21) I.5	No	Current operations meet RACT, no further action warranted.
2.1.4	Propane Communications Generator	VOCs NO_x	Proper maintenance and operation, and compliance with applicable NSPS or MACT requirements.	(0047-21) I.5	No	Current operations meet RACT, no further action warranted.
$PM_{2.5}$ BACT TSD 1.4[60]	Diesel-Fired Emergency Generators	VOCs NO_x	BACT determination: proper maintenance and operation, and compliance with applicable NSPS or MACT requirements.	(0047-21) I.5	No	Equipment not operated during evaluation period, no additional RACT submitted. Current operations meet RACT, no further action warranted.

60 https://documents.deq.utah.gov/air-quality/pm25-serious-sip/DAQ-2018-007709.pdf

Copperton Concentrator						
RACT Section #	Emission Unit/Activity	Pollutant	RACT Determination	Enforceability		Comments
				AO Condition	$PM_{2.5}$ SIP Conditions	
2.2.1	Tioga Heaters	VOCs	Use of pipeline quality natural gas, good combustion practices, and good design and proper operation	(0044-18) I.5	No	Current operations meet RACT, no further action warranted.
		NO_x				
2.2.4	Feed and Product Dryer Oil Heaters	VOC_s	Use of pipeline quality natural gas and good combustion practices.	(0044-18) I.5	No	Current operations meet RACT, no further action warranted.
		NO_x	LNBs		H.12.h.ii.A	
2.2.2	Degreasing Parts Washers	VOCs	Compliance with the requirements of R307-335.	(0044-18) I.5	No	Current operations meet RACT, no further action warranted.
2.2.3	Gasoline Fueling Stations	VOCs	Stage I and Stage 2 recovery systems.	(0044-18) I.5	No	Current operations meet RACT, no further action warranted.
$PM_{2.5}$ BACT TSD 1.4	Three Storage Tanks (Sodium Cyanide)	VOCs	BACT determination: use of submerged pipes.	(0044-18) I.5	No	Equipment not operated during evaluation period, no additional RACT submitted. Current operations meet RACT, no further action warranted.

2.1.4	Liquid Propane-Fired Emergency Generator	VOCs	Proper maintenance and operation, and compliance with applicable NSPS or MACT requirements.	(0044-18) I.5	No	Current operations meet RACT, no further action warranted.
		NO_x				

4.8.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for KUC BCM & CC. RACT evaluations showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for KUC BCM & CC as required by this SIP revision.

4.9 KUC Smelter and Refinery

4.9.1 Introduction

This section specifically serves as an evaluation of KUC – Smelter and Refinery. In addition to past BACT reports, KUC submitted an additional RACT analysis for evaluation January 30, 2023. Specific conditions for this SIP revision for the KUC Smelter and Refinery can be found in Section IX, Part H.32.g.

4.9.2 Facility Process Summary

KUC operates a copper smelter and refinery in Salt Lake County. The Smelter employs flash smelting technology with flash converting technology to produce copper anodes and high concentration sulfur dioxide gases. Copper ore concentrates from the Copperton Concentrator are first dewatered, dried, blended with fluxes and secondary copper-bearing materials, then fed to a flash smelting furnace where the ore is melted and reacts to produce copper matte. The copper matte is converted to blister copper by oxidization, reduced in the anode furnace to produce a high purity copper, and then poured in molds to cast solid copper ingots (anodes). The anodes are moved to the Refinery co-located near the Smelter. The Refinery uses an electrolytic refining process to convert the Smelter-produced anodes to high-purity cathode copper and also recover precious metals from the electrolytic refinery slimes in a precious metals circuit.

4.9.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the KUC Smelter and Refinery processes and equipment are summarized in Table 34. The 2017 actual emissions were used as the baseline emissions. The current PTE values for the KUC Smelter and Refinery were established by the most recent active AOs issued to the source.

- AO DAQE-AN103460058-20 issued November 12, 2020 (0058-20)
- AO DAQE-AN103460061-22 issued June 23, 2022 (0061-22)

Table 34: KUC Smelter and Refinery Facility-Wide Emissions

KUC Smelter and Refinery Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**154.87**	**198.13**
VOC	**10.94**	**20.47**

4.9.4 RACT Analysis

The RACT evaluations were performed using data from KUC, AOs and supporting documentation, and Utah SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 35.

Table 35: Kennecott Utah Copper: Smelter and Refinery

Kennecott Utah Copper: Smelter and Refinery						
Refinery						
RACT Section #[61]	**Emission Unit/Activity**	**Pollutant**	**RACT Determination**	**Enforceability**		**Comments**
				AO Condition	**$PM_{2.5}$ SIP Conditions**	
3.2.1	Boiler	VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0058-20) I.5 & II.B.4.a	No	Current operations meet RACT, no further action warranted.
		NO_x	Installation of ULNB (9 ppmvd) on the boiler & continued use of FGR.	(0058-20) II.B.1.A	H.12.j.ii.A & H.12.j.ii.C	
3.2.2	CHP	VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0058-20) I.5 & II.B.4.d	H.12.j.ii.D	Current operations meet RACT, no further action warranted.

[61] https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001509.pdf

		NO_x	Use of SoLoNO$_x$ burner technology (9 ppmv) on turbine.	(0058-20) II.B.1.A	H.12.j.ii.A	
3.1.8	Space Heaters	VOCs NO_x	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0058-20) I.5	No	Current operations meet RACT, no further action warranted.
3.1.6	Gasoline Fueling	VOCs	Stage I and Stage 2 recovery systems.	(0058-20) I.5	No	Current operations meet RACT, no further action warranted.
$PM_{2.5}$ BACT TSD 1.4[62]	Degreasing	VOCs	BACT determination: compliance with R307-335.	(0058-20) I.5	No	Equipment not operated during evaluation period, no additional RACT submitted. Current operations meet RACT, no further action warranted.
3.2.8	Paint	VOCs	Enclosures.	(0058-20) I.5	No	Current operations meet RACT, no further action warranted.
3.2.7	Prime Diesel Generators	VOCs NO_x	Proper maintenance and operation, and compliance with applicable NSPS or MACT requirements.	(0058-20) I.5	No	Current operations meet RACT, no further action warranted.
3.1.4	Refinery LPG Emergency	VOCs	Proper maintenance and operation, and	(0058-20)	No	Current operations meet RACT, no further

[62] https://documents.deq.utah.gov/air-quality/pm25-serious-sip/DAQ-2018-007702.pdf

	Communication Generator	NO_x	compliance with applicable NSPS or MACT requirements.	I.5 & II.B.4.e		action warranted.
Smelter						
RACT Section #	**Emission Unit/Activity**	**Pollutant**	**RACT Determination**	**Enforceability**		**Comments**
				AO Condition	**$PM_{2.5}$ SIP Conditions**	
3.1.1	Main Stack	NO_x	Controls are described for each source that vents to the Main Stack. The following sources vent to the Main Stack: anode furnaces, secondary gas system, matte grinding, concentrate dryer, acid plant, and vacuum cleaning system. Compliance with MACT Subpart EEEEEE.	(0061-22) II.B.1.a & II.B.3.a	H.12.j.i.A.I.3	Current operations meet RACT, no further action warranted.
3.1.1.1	Anode Furnaces	NO_x	LNB (30 ppmvd)	(0061-22) II.B.1.a & II.B.3.a	No	Current operations meet RACT, no further action warranted.
		VOCs	Use of pipeline quality natural gas and oxy-fuel, good combustion practices, good design, & proper operation.	(0061-22) I.5		
3.1.1	Concentrate Dryer	NO_x	Use of LNB & good combustion practices.	(0061-22) II.B.1.a & II.B.3.a	No	Current operations meet RACT, no further action warranted.
		VOCs	Use of pipeline quality natural gas and oxy-fuel,	(0061-22) I.5		

			good combustion practices, good design, & proper operation.			
3.1.2	Powerhouse Holman Boiler	VOCs	Use of pipeline quality natural gas, good combustion practices, good design, proper operation, & limited natural gas consumption.	(0061-22) I.5	No	Current operations meet RACT, no further action warranted.
		NO_x	Use of continuous monitoring to ensure NO_x emissions do not exceed 14 lbs/hr (calendar-day average); FGR.	(0061-22) II.B.1.a & II.B.2	H.12.j.i.A.II	
3.1.3	Powerhouse Foster Wheeler Boiler (Now Rentech Boiler)	VOCs	Use of pipeline quality natural gas, good combustion practices, good design, proper operation, & limited natural gas consumption.	(0061-22) I.5	No	Replaced by Rentech Boiler in AO DAQE-AN103460056-20 issued January 10, 2020. Current operations meet RACT, no further action warranted.
		NO_x	ULNB, 15 ppm	(0061-22) II.B.1.a & II.B.2		
3.1.5	Cold Solvent Degreaser	VOCs	Compliance with R307-335	(0061-22) I.5	No	Current operations meet RACT, no further action warranted.
3.1.8	Space Heaters	VOCs NO_x	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0061-22) I.5	No	Current operations meet RACT, no further action warranted.

3.1.6	Fueling	VOCs	Stage I and Stage 2 recovery systems.	(0061-22) I.5	No	Current operations meet RACT, no further action warranted.
3.2.7, 3.1.7	Emergency Backup Power Generators	VOCs NO_x	Proper maintenance and operation, and compliance with applicable NSPS or MACT requirements.	(0061-22) I.5	No	Current operations meet RACT, no further action warranted.
$PM_{2.5}$ BACT TSD 1.4	Diesel Compressor	VOCs NO_x	BACT determination: proper maintenance and operation.	(0061-22) I.5	No	Equipment not operated during evaluation period, no additional RACT submitted. Current operations meet RACT, no further action warranted.
3.1.4	Smelter LPG Emergency Communication Generator	VOCs NO_x	Proper maintenance and operation, and compliance with applicable NSPS or MACT requirements.	(0061-22) I.5	No	Current operations meet RACT, no further action warranted.
3.1.9	Hot Water Boilers	VOCs NO_x	Proper maintenance and operation.	(0061-22) I.5	No	Current operations meet RACT, no further action warranted.

4.9.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for the KUC Smelter and Refinery. RACT evaluations showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for the KUC Smelter and Refinery as required by this SIP revision.

4.10 LHoist North America of Arizona, Inc.

4.10.1 Introduction

This section specifically serves as an evaluation of LHoist North America of Arizona, Inc. (LHoist). LHoist did not submit an additional RACT analysis for evaluation. UDAQ referenced the more stringent BACT for NO_x and VOCs evaluated as part of the Salt Lake City $PM_{2.5}$ serious SIP. Specific conditions for this SIP revision for LHoist can be found in Section IX, Part H.32.h.

4.10.2 Facility Process Summary

LHoist operates a lime production facility near Grantsville that consists of a Quarry and Lime Plant. Kiln operations were placed in temporary care and maintenance mode November 14, 2008, with support operations having had limited operation since that date. Activities at the facility include mining of limestone ore, limestone processing through various crushing and screening processes, operation of a rotary kiln that heats the crushed limestone ore and converts it into quicklime, lime hydration equipment to create hydrated lime, bagging facilities, and load-out operations. When operating, the facility produces a variety of products including quicklime, hydrate, aggregate kiln-grade limestone, overburden/low-grade limestone, and limestone chat.

4.10.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the LHoist processes and equipment are summarized in Table 36. The 2017 actual emissions were used as the baseline emissions. The current PTE values for LHoist were established by the most recent active AOs issued to the source.

- AO DAQE-AN0707015-06 issued August 14, 2006 (015-06)

Table 36: LHoist North America of Arizona Facility Facility-Wide Emissions

LHoist North America of Arizona Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**0.11**	**328.66**
VOC	**0.07**	**3.01**

4.10.4 RACT Analysis

The RACT evaluations were performed using data from LHoist, AOs and supporting documentation, and Utah SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 37.

Table 37: Lhoist North America of Arizona, Inc.

LHoist North America of Arizona, Inc.						
TSD Section #[63]	**Emission Unit/Activity**	**Pollutant**	**BACT Determination**	**Enforceability**		**Comments**
				AO Conditions	**$PM_{2.5}$ SIP Conditions**	
4.0	Rotary Kiln System	NO_x	SNCR required upon facility startup.	No	H.12.c.i & H.12.c.ii	Current operations meet RACT, no further action warranted.
		VOCs	Good combustion practices and burner/process optimization.	(015-06) #22	No	
5.0	Pressure Hydrator	NO_x	Good combustion practices and natural gas as fuel.	(015-06) #22	No	Current operations meet RACT, no further action warranted.
		VOCs				
7.0	Kiln Shaft Motor	NO_x	Good combustion practices and proper maintenance.	(015-06) #22	No	Current operations meet RACT, no further action warranted.
		VOCs				

4.10.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for LHoist. Re-evaluation of BACT showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for LHoist as required by this SIP revision.

4.11 Pacificorp Energy Gadsby Power Plant

4.11.1 Introduction

This section specifically serves as an evaluation of Pacificorp Energy – Gadsby Power Plant (Pacificorp Gadsby). Pacificorp Gadsby did not opt to submit an additional RACT analysis for evaluation, therefore UDAQ referenced the more stringent BACT for NO_x and VOCs evaluated as part of the $PM_{2.5}$ serious SIP, with support information submitted by Pacificorp Gadsby March 10, 2023. Specific conditions for this SIP revision for Pacificorp Gadsby can be found in Section IX, Part H.32.i.

[63] https://documents.deq.utah.gov/air-quality/pm25-serious-sip/DAQ-2018-007681.pdf

4.11.2 Facility Process Summary

Pacificorp Energy operates the Gadsby Power Plant located in Salt Lake City. The Gadsby Power Plant is a natural gas-fired electric generating plant consisting of three steam boilers (Units #1-3) and three simple-cycle combustion turbines (Units #4-6). Unit #1 is a 65 MW unit equipped with low NO_x burners; Unit #2 is an 80 MW unit equipped with low NO_x burners; and Unit #3 is a 105 MW unit. All three units are capable of using fuel oil as a back-up fuel during natural gas curtailments. Units #4-6 are 43.5 MW combustion turbine engines. The plant also has small emergency generators, cooling towers, and small storage tanks.

4.11.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from Pacificorp Gadsby processes and equipment are summarized in Table 38. The 2017 actual emissions were used as the baseline emissions. The current PTE values for Pacificorp Gadsby were established by the most recent active AOs issued to the source.

- AO DAQE-AN103550015-09 issued January 12, 2009 (0015-09)

Table 38: Pacificorp Energy Gadsby Power Plant Facility-Wide Emissions

Pacificorp Energy Gadsby Power Plant Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**38.81**	**716.10**
VOC	**2.26**	**23.00**

4.11.4 RACT Analysis

The RACT evaluations were performed using data from Pacificorp Gadsby, AOs and supporting documentation, and SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 39.

Table 39: PacifiCorp Energy: Gadsby Power Plant

PacifiCorp Energy: Gadsby Power Plant						
TSD Section #[64]	**Emission Unit/Activity**	**Pollutant**	**BACT Determination**	**Enforceability**		**Comments**
				AO Conditions	**$PM_{2.5}$ SIP Conditions**	
4.0	Steam Generating Units (Boilers 1-3)	NO_x	Natural gas as fuel, good combustion practices, ULSD as backup fuel, NO_x emission limits.	(0015-09) II.B.4	H.12.l.i, H.12.l.ii, H.12.l.iii, & H.12.l.iv	Current operations meet RACT, no further action warranted.

[64] https://documents.deq.utah.gov/air-quality/pm25-serious-sip/DAQ-2018-006882.pdf

		VOCs	Good combustion practices, proper design.	(0015-09) I.5	No	
5.0	Combustion Turbines (Units 4-6)	NO_x	SCR, water/steam injection.	(0015-09) II.B.3	H.12.l.v	Current operations meet RACT, no further action warranted.
		VOCs	GCP and oxidation catalysts.	(0015-09) I.5	No	
6.3	Fuel Storage Tanks	VOCs	Submerged fill operations, no additional controls.	(0015-09) I.5	No	Current operations meet RACT, no further action warranted.
6.5	Misc. Painting Operations	VOCs	Use of low-VOC compliant coatings, high transfer efficiency applications, & proper operation.	(0015-09) I.5	No	Current operations meet RACT, no further action warranted.
6.2	Standby Emergency Engines	VOCs NO_x	Proper maintenance and operation.	(0015-09) I.5	No	Current operations meet RACT, no further action warranted.
5.5	Startup/Shutdown at Combustion Turbines	NO_x	Limitation of hours of operation for startup/shutdown to limit NOx, alternative operating scenarios included.	(0015-09) I.5	H.12.l.vi	Current operations meet RACT, no further action warranted.

4.11.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for Pacificorp Gadsby. Re-evaluation of BACT showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for Pacificorp Gadsby as required by this SIP revision.

4.12 Tesoro Refining & Marketing Company LLC dba Marathon Refinery

4.12.1 Introduction

This section specifically serves as an evaluation of Tesoro Refining and Marketing Company LLC dba Marathon Refinery (Marathon Refinery). In addition to past BACT reports, Marathon Refinery submitted an additional RACT analysis for evaluation January 31, 2023, with a subsequent submission including additional information submitted on March 31, 2023. Specific conditions for this SIP revision for Marathon Refinery can be found in Section IX, Part H.32.j.

4.12.2 Facility Process Summary

The Marathon Refinery is a petroleum refinery capable of processing 57,500 barrels per day of crude oil. The source consists of one FCCU, a catalytic reforming unit, hydrotreating units, a sulfur recovery unit, and cogeneration units. The source also has assorted heaters, boilers, cooling towers, storage tanks, flares, and similar fugitive emissions.

4.12.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the Marathon Refinery processes and equipment are summarized in Table 40. The 2017 actual emissions were used as the baseline emissions. The current PTE values for Marathon Refinery were established by the most recent active AOs issued to the source.

- AO DAQE-AN103350075-18 issued January 11, 2018 (0075-18)
- AO DAQE-AN103350081A-21 issued January 12, 2021 (0081A-21)

Table 40: Tesoro Marathon Refinery Facility-Wide Emissions

Tesoro Marathon Refinery Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**313.27**	**638.05**
VOC	**230.77**	**769.88**

4.12.4 RACT Analysis

The RACT evaluations were performed using data from Marathon Refinery, AOs and supporting documentation, and Utah SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 41.

Table 41: Tesoro Refining and Marketing Company LLC dba Marathon Refinery

Tesoro Refining and Marketing Company LLC dba Marathon Refinery					
		Pollutant		**Enforceability**	**Comments**

RACT Section #[65]	Emission Unit/Activity		RACT Determination	AO Conditions	$PM_{2.5}$ SIP Conditions	
4.0	FCCU Regenerator & CO Boiler	NO_x	Wet gas scrubber with use of LoTOx add-on & refinery-wide NO_x limit.	(0075-18) II.B.1.g, II.B.4.a, II.B.4.f, & II.B.7.a	H.12.m.ii & H.12.m.vi	Current operations meet RACT, no further action warranted.
		VOCs	Good combustion practices, no additional controls.	(0075-18) I.5	No	
5.0	Process Heaters and Boilers	NO_x	LNB & ULNB required on various units, & refinery-wide NO_x limit.	(0075-18) II.B.1.g, II.B.3.a, & II.B.7.a	H.12.m.ii & H.12.m.vi	Current operations meet RACT, no further action warranted.
		VOCs	Good combustion practices, no additional controls.	(0075-18) I.5	No	

[65] https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001490.pdf

6.0	Cogeneration Turbines	NO_x	Good combustion practices, use of gaseous fuels, & refinery-wide NO_x limit. SCR installation required.	(0075-18) II.B.1.g & II.B.7.a	H.12.m.ii	Installation of SCR that meets a 5 ppm NO_x limit by October 1, 2028. Required by SIP Section IX, Part H.32.j.
		VOCs	Good combustion practices, no additional controls.	(0075-18) I.5	No	
7.0	SRU	NO_x	Good combustion practices & refinery-wide NO_x limit.	(0075-18) II.B.1.g	H.12.m.ii & H.12.m.vi	Current operations meet RACT, no further action warranted.
13.0	Cooling Towers	VOCs	MACT Subpart CC requirements on cooling towers servicing high VOC heat exchangers.	(0075-18) I.5	H.11.g.iii	Current operations meet RACT, no further action warranted.

8.0	Fugitive emissions	VOCs	Low leak LDAR requirements of NSPS Subpart GGGa.	(0075-18) I.5	H.11.g.iv	Current operations meet RACT, no further action warranted.
16.0 - 18.0	Tanks	VOCs	Submerged fill operations, and tank degassing requirements - eventual compliance with NSPS Subpart Kb or MACT Subpart CC. Secondary seal installation on Tank 321 required.	(0075-18) II.B.9	H.11.g.vi & H.12.m.vi	Installation of secondary seal on Tank 321 by May 1, 2026. Required by SIP Section IX, Part H.32.j. All other current operations meet RACT, no further action warranted.
9.0	Wastewater System	VOCs	API separator unit with fixed cover; installation of closed vent system to carbon adsorption required.	(0075-18) I.5	H.12.m.vi	Installation of a closed vent system to carbon adsorption by December 31, 2025 in compliance with NSPS Subpart QQQ. Required by SIP Section IX, Part H.32.j.
11.0 & 12.0	Refinery Flares	NO_x VOCs	Evaluated through control of flare gases, not through individual pollutants, requirement to meet Subpart Ja for flares.	(0075-18) II.B.1.f	H.11.g.v & H.12.m.vi	Current operations meet RACT, no further action warranted.

19.0	Standby Emergency Engines	VOCs NO_x	Proper maintenance and operation, and compliance with applicable NSPS or MACT requirements.	(0075-18) I.5	H.12.m.vi	Current operations meet RACT, no further action warranted.
15.0	K1 Compressors (natural gas engines)	VOCs NO_x	Catalytic converters, proper maintenance and operation, & refinery-wide NO_x limit	(0075-18) I.5 (0075-18) II.B.4.a, II.B.7.a, & II.B.7.c	H.12.m.ii	Current operations meet RACT, no further action warranted.
N/A	Refinery General Approach	NO_x	Refinery-wide NO_x limit.	(0075-18) II.B.1.g & II.B.7.a	H.12.m.ii	Current operations meet RACT, no further action warranted.

4.12.5 Conclusion of RACT Implementation

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. The evaluations showed that the following control options are technically feasible:

- Installation of selective catalytic reduction (SCR) that meets a NO_x emission rate of 5 ppm on the Cogeneration Turbines
- Installation of a secondary seal on Tank 321
- Installation of a closed vent system controlled by carbon adsorption on the Wastewater System

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”. [66]

No other additional add-on controls or limitations are technically or economically feasible options at this time. The installation of SCR on the Cogeneration Turbines will control total emissions from these two turbines by approximately 68.7%. The installation of SCR will result in an annual emission reduction of 68.78 tpy of NO_x. The SCR shall be installed and operational by October 1, 2028. The installation of a secondary seal on Tank 321 will result in 2.30 TPY of VOC emission reductions. The secondary seal shall be installed and operational by May 1, 2026. The installation of a closed vent system with carbon

[66] 80 FR 12279 & 83 FR 62998

adsorption on the Wastewater System is a planned refinery modification that shall be installed and operational by December 31, 2025, and result in approximately 10 TPY of VOC emission reductions.

All requirements for the Cogeneration Turbines, Tank 321, and the Wastewater System are incorporated into SIP Section IX, Part H.32.j. No additional RACT measures were identified, and all other identified RACT determinations are already being implemented.

4.13 Utah Municipal Power Agency West Valley Power Plant

4.13.1 Introduction

This section specifically serves as an evaluation of Utah Municipal Power Agency (UMPA) West Valley Power Plant (WVPP). In addition to past BACT reports, UMPA submitted an additional RACT analysis for evaluation January 31, 2023, with supporting information submitted March 1, 2023. Specific conditions for this SIP revision for UMPA WVPP can be found in Section IX, Part H.32.l.

4.13.2 Facility Process Summary

UMPA operates the WVPP in West Valley City. The WVPP is a natural gas-fired electric generating plant consisting of 5 natural gas simple cycle turbines. Each turbine has a power output rated at 43.4 MW and is equipped with water injection, evaporative spray mist inlet air cooling, selective catalytic reduction catalyst, and CO oxidation catalyst. The primary purpose of the plant is to produce electricity for sale via the utility power distribution system to meet the demands of the Salt Lake Valley service area.

4.13.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the WVPP processes and equipment are summarized in Table 42. The 2017 actual emissions were used as the baseline emissions. The current PTE values for the WVPP were established by the most recent active AOs issued to the source.

- AO DAQE-282-02 issued April 18, 2002 (282-02)

Table 42: West Valley Power Plant Facility-Wide Emissions

UMPA West Valley Power Plant Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**10.09**	**162.06**
VOC	**1.47**	**18.33**

4.13.4 RACT Analysis

The RACT evaluations were performed using data from UMPA WVPP, AOs and supporting documentation, and Utah SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 43.

Table 43: Utah Municipal Power Agency West Valley Power Plant

Utah Municipal Power Agency West Valley Power Plant						
RACT Section #[67]	Emission Unit/Activity	Pollutant	RACT Determination	Enforceability		Comments
				AO Conditions	$PM_{2.5}$ SIP Conditions	
4.1 & 4.2	Combustion Turbines	NO_x	SCR, water/steam injection and maintenance of NO_x emissions at or below 5 ppmv for each turbine.	(282-02) #10, #17	H.12.o.i, ii, iii, iv	Current operations meet RACT, no further action warranted.
4.2		VOCs	Good combustion practices and oxidation catalysts.	(282-02) #14, #19	No	
$PM_{2.5}$ BACT TSD 5.0[68]	Startup/Shutdown at Combustion Turbines	NO_x	BACT determination: limitation of hours of operation for startup/shutdown to limit NO_x, alternative operating scenarios included.	(282-02) #19	No	No additional RACT submitted. Current operations meet RACT, no further action warranted.

4.13.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for the UMPA WVPP. RACT evaluations showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being

67 https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-002084.pdf

68 https://documents.deq.utah.gov/air-quality/pm25-serious-sip/DAQ-2018-006862.pdf

implemented. Therefore, there are no additional implementation schedules or requirements for the UMPA WVPP as required by this SIP revision.

4.14 University of Utah

4.14.1 Introduction

This section specifically serves as an evaluation of the University of Utah (U of U). In addition to past BACT reports, the U of U submitted an additional RACT analysis for evaluation January 31, 2023. Specific conditions for this SIP revision for the U of U can be found in Section IX, Part H.32.m.

4.14.2 Facility Process Summary

The U of U is a higher education institution in Salt Lake City. The U of U campus consists of several different types of buildings and facilities, including classroom buildings, hospitals and clinics, research facilities, and housing. The emission sources at the U of U are primarily boilers, comfort heating equipment, emergency generator engines, and miscellaneous small VOC sources. Industrial high temperature boilers that provide hot water for distribution heating systems are located in the two main heating plants on campus: the Upper Campus High Temperature Water Plant (UCHTWP) and the Lower Campus High Temperature Water Plant (LCHTWP). A cogeneration turbine with waste heat recovery unit is also located at the LCHTWP.

4.14.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the U of U processes and equipment are summarized in Table 44. The 2017 actual emissions were used as the baseline emissions. The current PTE values for the U of U were established by the most recent active AOs issued to the source.

- AO DAQE-AN103540030-22 issued December 22, 2022 (0030-22)

Table 44: University of Utah Facility-Wide Emissions

University of Utah Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**41.65**	**126.50**
VOC	**8.13**	**13.53**

4.14.4 RACT Analysis

The RACT evaluations were performed using data from the U of U, AOs and supporting documentation, and Utah SIP Section IX, Parts H.11 and H.12. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 45.

Table 45: University of Utah

University of Utah						
RACT Section #[69]	Emission Unit/Activity	Pollutant	RACT Determination	Enforceability		Comments
				AO Conditions	$PM_{2.5}$ SIP Conditions	
4.0	Building 302 UCHWTP Boilers	VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0030-22) I.5	H.12.p.iv.	Current operations meet RACT, no further action warranted.
		NO_x	Boilers limited to back-up/peaking boilers with natural gas limitations and FGR.	(0030-22) II.B.1.b		
5.0	Building 303 LCHWTP Boilers	NO_x	Boiler 4 required to be decommissioned and replaced by Boiler 9, use of ULNB (9ppmvd) on Boiler 9, & use of LNBs and FGR (9 ppmvd) for boilers 6 and 7.	(0030-22) II.b.2.a	H.12.p.i., H.12.p.ii., & H.12.p.iii.	Current operations meet RACT, no further action warranted.
		VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0030-22) I.5	No	Current operations meet RACT, no further action warranted.
6.0	Building 303 LCHWTP Cogeneration Plant	NO_x	SoLoNO$_x$ burners and compliance with NSPS Subpart KKKK.	(0030-22) II.B.2.a	No	Current operations meet RACT, no further action warranted.

69 https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001487.pdf

		VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0030-22) I.5		
7.0	Dual Fuel Boilers	NO_x	LNBs on various boilers; the use of specialized mixing heads and mixing assemblies.	(0030-22) I.5 & II.B.3.a	H.12.p.v.	Current operations meet RACT, no further action warranted.
		VOCs	Use of pipeline quality natural gas with diesel fuel as backup, good combustion practices, good design, & proper operation.	(0030-22) I.5	No	
8.0	Backup Diesel Boiler	NO_x	Meet a NO_x emission rate of 30 ppm.	(0030-22) I.5 & II.B.3.a	No	Current operations meet RACT, no further action warranted.
		VOCs	Use of diesel fuel, good combustion practices, good design, & proper operation.	(0030-22) I.5	No	
9.0	Small Boilers	VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0030-22) II.B.1.b & II.B.3.a	No	Current operations meet RACT, no further action warranted.
		NO_x	LNBs on various boilers.	(0030-22) II.B.3.c	H.12.p.v	
10.0	Diesel Emergency Generator Engines	VOCs NO_x	Proper maintenance and operation, and compliance with applicable	(0030-22) I.5	No	Current operations meet RACT, no further action warranted.

			NSPS or MACT requirements.			
11.0	Natural Gas Emergency Generator Engines	VOCs NO_x	Use of pipeline quality natural gas, good combustion practices, good design, proper operation, and compliance with applicable NSPS or MACT requirements.	(0030-22) I.5	No	Current operations meet RACT, no further action warranted.
12.0	Paint Booth and Parts Washer	VOCs	Good housekeeping practices, routine inspections, & compliance with R307-351.	(0030-22) I.5	No	Current operations meet RACT, no further action warranted.
12.0	Fuel Storage Tanks	VOCs	Good operating and maintenance practices.	(0030-22) I.5	No	Current operations meet RACT, no further action warranted.
N/A	Ethylene Oxide Sterilizer	VOCs	Preparing to decommission.	(0030-22) I.5	No	Current operations meet RACT, no further action warranted.

4.14.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for the U of U. RACT evaluations showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for the U of U as required by this SIP revision.

4.15 US Magnesium LLC

4.15.1 Introduction

This section specifically serves as an evaluation of US Magnesium LLC (US Magnesium) RACT. UDAQ identified US Magnesium as a major stationary source with the potential to impact the ozone formation in the NWF NAA. The UDAQ required US Magnesium to submit a RACT analysis under CAA 172(c)(6) Other Measures for all major stationary sources located outside a NAA but impacting the NAA, which applied to one source. US Magnesium submitted a NO_x-specific RACT analysis for evaluation May 17, 2021, with a supporting VOC-specific RACT analysis submitted May 20, 2022, and an updated VOC-specific RACT analysis submitted January 31, 2023. Specific conditions for this SIP revision for US Magnesium can be found in Section IX, Part H.32.k. While US Magnesium was included in the RACT process, the emissions from this facility were not included in the point source inventories found in section 3 of this SIP revision as the facility was located outside of the NAA.

4.15.2 Facility Process Summary

US Magnesium operates a primary magnesium production facility at its Rowley plant located in Tooele County. US Magnesium produces magnesium metal from the waters of the Great Salt Lake, using a system of solar evaporation ponds to create a brine solution. This brine solution is purified and dried to a powder in spray dryers. The powder is melted and further purified in the melt reactor before going through an electrolytic process to separate magnesium metal from chlorine. The magnesium is then refined and/or alloyed and cast into molds. The separated chlorine is combusted in the chlorine reduction burner and converted into hydrochloric acid, which is removed through a scrubber train. The chlorine generated at the electrolytic cells is collected and piped to the chlorine plant. The on-site lithium carbonate plant recovers lithium from cell salt created through the magnesium plant production.

4.15.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the US Magnesium processes and equipment are summarized in Table 46. The 2017 actual emissions were used as the baseline emissions. The current PTE values for US Magnesium were established by the most recent active AOs issued to the source.

- AO DAQE-AN107160050-20 issued April 20, 2020 (0050-20)

Table 46: US Magnesium LLC Facility-Wide Emissions

US Magnesium LLC Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**1,061.59**	**1,260.99**
VOC	**660.26**	**894.25**

4.15.4 RACT Analysis

The RACT evaluations were performed using data from US Magnesium, AOs, and supporting documentation. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; other state SIPS; and UDAQ's Appendix A – $PM_{2.5}$ serious SIP BACT for Small Sources. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 47.

Table 47: US Magnesium RACT Determination

US Magnesium LLC					
RACT Section #[70]	**Emission Unit/Activity**	**Pollutant**	**RACT Determination**	**AO Conditions**	**Comments**
5.1	Turbines and Duct Burners	VOCs	Use of pipeline quality natural gas with fuel oil as backup, good combustion practices, good design, & proper operation.	(0050-20) I.4	Current operations meet RACT, no further action warranted.
		NO_x	Compliance with a plant-wide natural gas consumption limit.	(0050-20) II.B.1.b	
5.2	Chlorine Reduction Burner	NO_x	Compliance with a plant-wide natural gas consumption limit.	(0050-20) II.B.1.b	Current operations meet RACT, no further action warranted.
		VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0050-20) I.4	
5.3	Riley Boiler	NO_x	Compliance with a plant-wide natural gas consumption limit. Installation of flue gas recirculation required by	(0050-20) II.B.1.b	Current operations meet RACT, no further action warranted.

70 https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001863.pdf

			January 1, 2028 under SIP Section IX, Part H.23.g.		
		VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0050-20) I.4	
5.5	Hydrochloric Acid Plant Burner	VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0050-20) I.4	Current operations meet RACT, no further action warranted.
		NO_x	Compliance with a plant-wide natural gas consumption limit.	(0050-20) II.B.1.b	
5.4	Diesel Engines	VOCs	Proper maintenance and operation, compliance with applicable MACT requirements, and compliance with a horsepower-hour operational limitation.	(0050-20) I.4 & II.B.4.b	Current operations meet RACT, no further action warranted.
		NO_x			

5.6	Casting House	VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0050-20) I.4	Current operations meet RACT, no further action warranted.
		NO_x	Compliance with a plant-wide natural gas consumption limit.	(0050-20) II.B.1.b	
5.7	Lithium Carbonate Plant Boilers & Burners	VOCs	Use of pipeline quality natural gas, good combustion practices, good design, & proper operation.	(0050-20) I.4	Current operations meet RACT, no further action warranted.
		NO_x	ULNBs on boilers and LNBs on burners; compliance with a plant-wide natural gas consumption limit.	(0050-20) II.B.1.b & II.B.12.d	
VOC RACT[71]	Boron Plant	VOCs	Installation of a steam stripper and RTO system that will achieve 98% control efficiency by October 1, 2024.	N/A	Installation of a steam stripper and RTO system by October 1, 2024, required by SIP Section IX, Part H.32.k.

[71] https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001495.pdf

Small Source BACT[72]	Fuel Storage Tanks	VOCs	Proper maintenance and operation.	(0050-20) I.4	Current operations meet RACT, no further action warranted.
Small Source BACT	Paint Booths	VOCs	Good operating practices and compliance with consumption and VOC limitations.	(0050-20) I.4, II.B.11.a, & II.B.11.d	Current operations meet RACT, no further action warranted.

4.15.5 Conclusion of RACT Implementation

The UDAQ determined that the emission units/activities currently meet all RACT requirements, and all other existing controls and emissions limitations are considered RACT for US Magnesium. However, RACT evaluations showed that the installation of a steam stripper in series with a regenerative thermal oxidizer (RTO) to control VOC emissions from the Boron Plant Process Wastewater Ponds is technically feasible.

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". [73]

The installation of a steam stripper with RTO on the Boron Plant Process Wastewater Ponds will control emissions from this process by approximately 98% resulting in 161.70 tpy of VOC emissions reductions. The steam stripper with RTO shall be installed and operational by October 1, 2024. All requirements for the Boron Plant are incorporated into SIP Section IX, Part H.32.k. No other additional RACT measures were identified, and all other RACT determinations are already being implemented.

4.16 Chevron Salt Lake Marketing Terminal

4.16.1 Introduction

This section specifically serves as an evaluation of Chevron Salt Lake Marketing Terminal (Chevron Terminal). The emissions units at the Chevron Terminal were not included in the $PM_{2.5}$ serious SIP. At that time, UDAQ considered the Chevron Terminal as a separate source from the Chevron Refinery. However, recent permitting actions have since established that the Chevron Terminal and Chevron Refinery are considered one stationary source. Therefore, UDAQ requested a RACT analysis for the emission units at the Chevron Terminal. Chevron Terminal submitted a RACT analysis for evaluation

[72] https://documents.deq.utah.gov/air-quality/pm25-serious-sip/DAQ-2018-007161.pdf

[73] 80 FR 12279 & 83 FR 62998

March 30, 2021, with supporting information submitted January 4, 2023. Specific conditions applicable for this SIP revision for Chevron Terminal can be found in Section IX, Part H.32.b.

4.16.2 Facility Process Summary

The Chevron Terminal is a bulk gasoline terminal, which receives product by pipeline from the Chevron Refinery, as well as ethanol and additives from outside vendors by truck and railcar. Products are dispensed through the primary truck loading rack to cargo tank trucks where the product is delivered to gasoline dispensing facilities. Storage tanks at the site store gasoline, ethanol, Transmix, diesel fuel, water, additives, hydraulic fluid, motor oil, and jet fuel. Ethanol and other additives are blended in line with refined products at the truck loading rack.

4.16.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from Chevron Terminal processes and equipment are summarized in Table 48. The 2017 actual emissions were used as the baseline emissions. The current PTE values for Chevron Terminal were established by the most recent active AOs issued to the source.

- AO DAQE-AN105560017-15 issued May 18, 2015 (0017-15)

Table 48: Chevron Salt Lake Marketing Terminal Facility-Wide Emissions

Chevron Salt Lake Marketing Terminal Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**N/A**	**N/A**
VOC	**13.64**	**33.60**

4.16.4 RACT Analysis

The RACT evaluations were performed using data from Chevron Terminal, AOs, and supporting documentation. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 49.

Table 49: Chevron Salt Lake Marketing Terminal

Chevron Salt Lake Marketing Terminal					
RACT Section #[74]	**Emission Unit/Activity**	**Pollutant**	**RACT Determination**	**AO Conditions**	**Comments**
2.2.1	Transport Loading Rack	VOCs	Vapor recovery unit with carbon adsorption in compliance with MACT Subpart R.	(0017-15) II.B.1.b & II.B.1.c	Current operations meet RACT, no further action warranted.

[74] https://documents.deq.utah.gov/air-quality/planning/air-quality-policy/DAQ-2022-011292.pdf

2.2.3	Fugitive Emissions	VOCs	LDAR in accordance with MACT Subpart R and NSPS Subparts XX and Kb.	(0017-15) I.5	
2.2.1	Specialty Rack	VOCs	Bottom loading with good work practice standards.	(0017-15) I.5 & II.B.1.c	Current operations meet RACT, no further action warranted.
2.2.2	Storage Tanks	VOCs	Top-submerged or bottom loading of tanks; good design methods and operating procedures; and compliance with applicable NSPS Subpart Kb requirements.	(0017-15) II.B.1.c	Current operations meet RACT, no further action warranted.

4.16.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for the Chevron Terminal. RACT evaluations showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for the Chevron Terminal as required by this SIP revision.

4.17 Holly Energy Partners Woods Cross Terminal

4.17.1 Introduction

This section specifically serves as an evaluation of Holly Energy Partners Terminal (Holly Terminal). The emissions units at the Holly Terminal were not included in the $PM_{2.5}$ serious SIP. At that time, UDAQ considered the Holly Terminal as a separate source from the main refinery. However, recent permitting actions have since established that the Holly Terminal and Woods Cross Refinery are considered one stationary source. Therefore, UDAQ requested a RACT analysis for the emission units at the Holly Terminal. Holly Terminal submitted a RACT analysis for evaluation February 12, 2021. Specific conditions applicable to this SIP revision for Holly Terminal can be found in Section IX, Part H.32.e.

4.17.2 Facility Process Summary

The Holly Terminal is a petroleum products loading facility located in Woods Cross. The terminal consists of a loading rack and a soil remediation system. The bulk terminal is used by the Holly Terminal to load gasoline and diesel products into tanker trucks. The Holly Terminal receives gasoline, diesel, and jet fuel via pipeline from the HF Sinclair Woods Cross Refinery. The petroleum products are loaded into tanker trucks for offsite transportation. The Holly Terminal doesn't have aboveground storage tanks.

4.17.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the Holly Terminal processes and equipment are summarized in Table 50. The 2017 actual emissions were used as the baseline emissions. The current PTE values for the Holly Terminal were established by the most recent active AOs issued to the source.

- AO DAQE-AN101230023B-07 issued October 17, 2007 (0023B-07)
- AO DAQE-AN101230034-10 issued November 18, 2010 (0034-10)

Table 50: Holly Energy Partners Woods Cross Terminal Facility-Wide Emissions

Holly Energy Partners Woods Cross Terminal Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**0.32**	**2.53**
VOC	**2.14**	**9.13**

4.17.4 RACT Analysis

The RACT evaluations were performed using data from Holly Terminal, AOs, and supporting documentation. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 51.

Table 51: Holly Energy Partners Woods Cross Terminal

Holly Energy Partners Woods Cross Terminal					
RACT Section #[75]	**Emission Unit/Activity**	**Pollutant**	**RACT Determination**	**AO Conditions**	**Comments**

[75] https://documents.deq.utah.gov/air-quality/planning/air-quality-policy/DAQ-2022-011295.pdf

5.1	Transport Loading Rack	VOCs	Vapor recovery unit with carbon adsorption in compliance with MACT Subpart CC; vapor combustion unit backup.	(0023B-07) #7, #9, & #16	Current operations meet RACT, no further action warranted.
5.2	Fugitive Emissions	VOCs	LDAR required by NSPS Subpart VVa.	(0023B-07) #12	Current operations meet RACT, no further action warranted.
5.3	Soil Remediation System	VOCs	Thermal/catalytic oxidizer.	(0034-10) I.5; II.B.1.b	Current operations meet RACT, no further action warranted.

4.17.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for the Holly Terminal. RACT evaluations showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for the Holly Terminal as required by this SIP revision.

4.18 Tesoro Logistics Operations LLC Truck Loading Rack and Remote Tank Farm

4.18.1 Introduction

This section specifically serves as an evaluation of Tesoro Logistics Operations LLC Truck Loading Rack and Remote Tank Farm (Tesoro TLR). The emissions units at the Tesoro TLR were not included in the $PM_{2.5}$ serious SIP. At that time, UDAQ considered the Tesoro TLR as a separate source from the main refinery. However, recent permitting actions have since established that the Tesoro TLR and Marathon

Refinery are considered one stationary source. Therefore, UDAQ requested a RACT analysis for the emission units at the Tesoro TLR. Tesoro TLR submitted a RACT analysis for evaluation March 31, 2021, with an updated RACT analysis submitted January 31, 2023. Specific conditions applicable to this SIP revision for Tesoro TLR can be found in Section IX, Part H.32.j.

4.18.2 Facility Process Summary

The Tesoro TLR is a bulk gasoline terminal, which receives products from the Marathon Refinery. Products are dispensed through the primary truck loading rack to cargo tank trucks where the product is delivered to gasoline dispensing facilities. Storage tanks at the site store gasoline, diesel fuel, kerosene, heavy oils, and fuel additives.

4.18.3 Facility Baseline Actual Emissions and Current PTE

The baseline and current PTE from the Tesoro TLR processes and equipment are summarized in Table 52. The 2017 actual emissions were used as the baseline emissions. The current PTE values for the Tesoro TLR were established by the most recent active AOs issued to the source.

- AO DAQE-AN156590008-18 issued March 12, 2018 (0008-18)

Table 52: Tesoro Logistics Operations LLC TLR and RTF Facility-Wide Emissions

Tesoro Logistics Operations LLC TLR and RTF Facility Emissions		
Pollutant	**Baseline Emissions (TPY)**	**PTE (TPY)**
NO_x	**N/A**	**N/A**
VOC	**18.24**	**107.92**

4.18.4 RACT Analysis

The RACT evaluations were performed using data from Tesoro TLR, AOs, and supporting documentation. Various resources were evaluated to identify all existing and potential controls and emission rates, including EPA's RBLC; technical documents, EPA fact sheets, applicable CTGs, and other applicable literature; state and federal regulations; and other state SIPS. The RACT determinations for each emission unit or activity emitting NO_x and VOCs are provided in Table 53.

Table 53: Tesoro Logistics Operations LLC TLR and RTF

Tesoro Logistics Operations LLC Truck Loading Rack and Remote Tank Farm					
RACT Section #[76]	**Emission Unit/Activity**	**Pollutant**	**RACT Determination**	**AO Conditions**	**Comments**

[76] https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001507.pdf

5.1	Transport Loading Rack	VOCs	Vapor recovery unit with carbon adsorption in compliance with MACT Subpart CC.	(0008-18) II.B.1.l	Current operations meet RACT, no further action warranted.
4.1	Fugitive Emissions	VOCs	Enhanced LDAR required by NSPS Subpart GGGa and maintenance vent monitoring.	(0008-18) I.7	Current operations meet RACT, no further action warranted.
6.1	Fixed Roof Tanks	VOCs	Good design methods and operating procedures; closed vent system to a carbon adsorber on OWS Tank.	(0008-18) I.7; II.B.1.c - II.B.1.k	Current operations meet RACT, no further action warranted.
7.1	Internal Floating Roof Tanks	VOCs	Good design methods and operating procedures; compliance with applicable NSPS Subpart Kb requirements; and tank degassing requirements.	(0008-18) I.7; II.B.1.c - II.B.1.k	Current operations meet RACT, no further action warranted.

4.18.5 Conclusion of RACT Implementation

The emission units/activities currently meet all RACT requirements, and the existing controls and emissions limitations are considered RACT for the Tesoro TLR. RACT evaluations showed that additional add-on controls or limitations are not technically or economically feasible options at this time. No additional RACT measures were identified, and all RACT determinations are already being implemented. Therefore, there are no additional implementation schedules or requirements for the Tesoro TLR as required by this SIP revision.

4.19 CTG and ACT

For all sources located within the NWF NAA examined as part of this RACT analysis, any applicable CTGs or ACTs were found to have been implemented to the relevant source through existing AOs or SIP conditions. Any published CTG or ACT not enacted within the NAA boundary results from the fact that the NWF does not have sources in which those CTGs are applicable. Details regarding this analysis and additional information about source specific CTG and ACT applicability can be found in the CTG VOC Source Categories Analysis TSD.[77]

Thus, the UDAQ conducted no further RACT analysis for CTG source categories not included in AOs or SIP conditions as there are not sources subject to those CTGs within the NWF NAA. Therefore, this SIP revision has met the CTG requirements as required under CAA Section 182(b)(2).

4.20 RACT Conclusions

Upon completion of RACT analysis for each of the major industrial sources located within the NWF NAA, or nearby in the case of US Magnesium, the UDAQ has concluded that the controls identified in Table 54, with the corresponding emission limitations included in Utah SIP Section IX, Part H.31 and H.32, 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 some of these 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". [78] The precedent for the requirement of "beyond-RACT" controls for an ozone NAA demonstrating attainment at the earliest achievable date has been previously established in 2001,[79] and further upheld in 2009.[80]

The implementation timeline of controls identified in Table 54 are beyond the implementation deadline of January 1, 2023[81] and therefore will not count towards RFP under this SIP revision. However, the state of Utah has ongoing obligations under Section 182 of the CAA to demonstrate attainment of the NAAQS. The timing of compliance for states meeting statutory deadlines established in the CAA does not impact or nullify those obligations for future SIP revisions. Thus, a state submitting a SIP revision late, or meeting 182(b)(2) requirements late, does not negate the obligations imposed by the CAA. As a result, the UDAQ has determined that the implementation of the controls identified in Table 54 are

[77] NWF CTG VOC Source Categories Analysis: https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-005467.pdf

[78] 80 FR 12279 & 83 FR 62998

[79] 66 FR 26914

[80] 74 FR 1927

[81] 87 Fed. Reg. 60,897.

required to be implemented on the most expeditiously practicable timelines to comply with these ongoing CAA obligations.

While the controls identified in Table 54 have been determined to be beyond-RACT, the UDAQ has concluded that these controls meet the definition of reasonable when considering their cost effectiveness for controls considered beyond-RACT. This determination was made when examining three variables that impact what constitutes reasonable including: 1) the regulatory landscape of the NWF NAA (i.e. availability of control options), 2) other NAA determination of cost thresholds, 3) appropriate adjustments for inflationary and other price pressures.

First, as noted in sections 5 and 7 of this SIP revision, Utah has previously implemented an extensive array of emission reduction strategies at the BACT threshold while the state worked to address wintertime $PM_{2.5}$ pollution. These emission reductions target the same precursor emissions for ozone, i.e. NO_x and VOCs. As a result, there are exceedingly few control options available for the State to implement at this time in the regulatory landscape of the NWF. In essence, the supply of available controls is exceptionally low, while the demand to implement controls to comply with CAA requirements is high. This same economic reality—what is considered a reasonable cost in one area will be different than another area based on supply and demand— is seen in a wide array of economic activities, such as housing. Therefore, it is reasonable to conclude that an appropriate cost threshold for controls in the NWF NAA would be higher than that seen in an area with greater control options available to it. This same reasoning follows that a reasonable cost threshold would be more similar to a cost threshold seen in an NAA with fewer control options available. Further, a recent analysis conducted by the UDAQ examining the cost effectiveness of emissions reduced from incentive programs identified a similar scenario, with the cost to reduce emissions increasing as a result of previously implemented incentive programs. In short, as programs (incentive or regulatory) reduce emissions from older, dirtier equipment, the remaining pool of emissions sources are relatively cleaner, and thus the emission reductions are more expensive per ton of pollutant removed.

Second, the UDAQ compared and contrasted the RACT cost thresholds with a number of other NAAs, and compared cost thresholds for both RACT and BACT implemented controls. While many contrasting NAAs that have recently implemented RACT determined an appropriate cost thresholds between $5,000 - $10,000 per ton of pollutant removed,[82] these areas are doing so with a wider array of emission reduction strategies available to them. In contrast, the UDAQ examined BACT cost thresholds in areas with more similar regulatory frameworks in place to see what the higher end of cost effectiveness could be considered reasonable. The Division found instances of BACT cost thresholds near $43,000 per ton of VOC and $41,000 per ton of NOx emission reductions.[83] While these higher end estimates are considered BACT, and thus represent a more stringent standard, the Division has concluded that, given the existing regulatory framework in place in the NWF and the similarities between these higher cost threshold NAAs, that a RACT cost threshold of approximately $10,000 per ton of pollutant removed below that reported on the high end is reasonable for the NWF. The controls outlined in Table 54 all fall near or below this threshold. Additionally, the UDAQ identified instances in which a cost threshold of $10,000 was determined reasonable for Regional Haze SIPs.[84] It's worth noting that Regional Haze SIPs are developed to meet visibility standards, not health-based standards as in this

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[82] Approval and Promulgation of Air Quality Implementation Plans; Pennsylvania; Reasonably Available Control Technology Determinations for Case-by-Case Sources Under the 1997 and 2008 8-Hour Ozone National Ambient Air Quality Standards, 85 Fed. Reg. 66,484, 66,486 (Oct. 20, 2020) (examples of benchmarks from several other states examined by Pennsylvania).

[83] 2022 South Coast Air Quality Management District BACT Maximum Cost Effectiveness Values.

[84] Oregon Regional Haze State Implementation Plan, for the period 2018 – 2028, available at https://www.oregon.gov/deq/rulemaking/Pages/rhsip2028.aspx.

moderate ozone SIP. The Division believes that a reasonable threshold for a control used to protect human health should be considerably higher than that determined reasonable for protecting visibility.

Lastly, the UDAQ also considered inflationary forces when determining a reasonable cost-effectiveness threshold. Since 2000, the United States has seen a cumulative price increase associated with inflationary pressures of 77.18%.[85] Similar upward price pressures have been observed in other parts of the economy that impact the price of pollution controls. For example, the building cost index for construction for nonresidential buildings over the same period cited for inflation above (2000 – 2023) has risen from ~50 to just over 130—a 160% increase.[86] If inflationary pressures are not taken into consideration over time when determining reasonable cost-effectiveness thresholds, the ever-increasing costs associated with building and installing controls would result in a diminished ability for responsible air agencies to identify and require effective controls. These same inflationary economic forces have been realized elsewhere in the regulatory world, resulting in an increase in the statutory civil monetary penalties for violations as enforced by the EPA for the CAA violations rising from $25,000 in 1991 to $55,808 in 2023 for each day of continued noncompliance.

When all three of these factors (existing regulatory framework, similar NAA thresholds, and inflationary pressures) are taken together, the UDAQ has determined that the controls outlined in Table 54 are reasonable for an area in which beyond-RACT controls are necessary to attain the standard.[87] A SIP is intended to be a plan that matches the unique characteristics of each NAA, which is why the responsible air agency has primacy to develop and implement the plan it determines best meets the unique challenges of its air shed. When considering appropriate cost thresholds for a NAA, it is important to recognize that the cost effectiveness for controls for that air shed will also be unique to the NAA in question.

Table 54: Controls identified by RACT analysis for the NWF NAA.

Source	Control	Part H Reference	Implementation Timeline	Emission Reductions
Tesoro Refining & Marketing Company LLC Marathon Refinery	NO_x emission limits on cogeneration turbines with heat recovery steam generation CG1 and CG2	XI.H.32.j.b	October 1, 2028	68.78 tpy NO_x
Tesoro Refining & Marketing Company LLC Marathon Refinery	Replacement of wastewater API separator and DAF unit with a closed vent to carbon adsorption controls	XI.H.32.j. d	December 31, 2025	10.0 tpy VOCs
Tesoro Refining & Marketing Company LLC	Secondary seal installation on Tank 321	XI.H.32.j.c	May 1, 2026	2.30 tpy VOCs

[85] Bureau of Labor Statistics Consumer Price Index (CPI), available at https://www.bls.gov/cpi/.

[86] Construction Analytics, Construction Inflation 2023, available at https://edzarenski.com/2022/12/20/construction-inflation-2023/.

[87] 42 U.S.C § 7545(d)(1); 40 CFR § 19.4.

Marathon Refinery				
US Magnesium LLC	Steam stripper in series with RTO	XI.H.32.k	October 1, 2024	161.70 tpy VOCs

Based on all available data including the examination of past submitted BACT reports, newly submitted RACT analyses, and by requiring the implementation of "beyond-RACT" controls as identified in Table 54, the NWF NAA has met all RACT criteria as required under CAA Section 182(b)(2) for this SIP revision. Furthermore, the implementation of technologically feasible "beyond-RACT" controls demonstrates not only completion of RACT requirements, but that the area will demonstrate attainment as expeditiously as practicable.

4.21 Nonattainment New Source Review (NNSR)

NNSR is a CAA permitting program which requires industrial facilities to install modern pollution control equipment when they are built, or when making a change that increases emissions significantly. The purpose of an NNSR program is to protect public health and the environment, even as new industrial facilities are built, by ensuring that air quality does not worsen in the NAA and air quality is not significantly degraded. This is accomplished through preconstruction permitting.

Utah Administrative Rule R307-403; Permits: New and Modified Sources in Nonattainment and Maintenance Areas,[88] implements federal NAA permitting programs for major sources as required by 40 CFR § 51.165 and contains new source review provisions for some non-major sources in the ozone NAAs. Rule R307-403 is applicable any new major stationary source or major modification that is major for the pollutant or precursor pollutant for which the area is designated nonattainment if the stationary source or modification is located anywhere in the designated NAA. 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. EPA determined that rule R307-403 meets the requirement for nonattainment new source review under 40 CFR § 51.1314[89] on February 02, 2022[90] Therefore, this SIP revision adequately addresses the CAA NAA requirements for NO_x and VOC emission offsets.

[88] Utah Admin. Code r. R307-403.
[89] 40 CFR § 51.1314 New source review requirements.
[90] Approval and Promulgation of Implementation Plans; Utah; Emissions Statement Rule and Nonattainment New Source Review Requirements for the 2015 8-Hour Ozone National Ambient Air Quality Standard for the Uinta Basin, Northern Wasatch Front and Southern Wasatch Front NAAs, 87 Fed. Reg. 5,435 (Feb. 1, 2022).

Chapter 5 - Reasonably Available Control Measures (RACM) Analysis

5.1 Overview

CAA section 172(c)(1) requires states to implement all RACM as expeditiously as practicable, including RACT, to meet both RFP requirements and to demonstrate attainment of the NAAQS. The CAA requires RACM to be implemented for point, area, non-road, and on-road sources categories to meet the attainment standard.

The general approach to the RACM analysis is to evaluate control measures that have been implemented at the federal level, in other states and other local air districts and, if reasonable and practicable, to implement the controls to help the area attain the ozone standard. A RACM analysis determines potential control measures for each source category by considering the following requirements:

- technological feasibility of the control measure,
- economic feasibility of the control measure,
- if the control measure would cause substantial widespread and long-term adverse impacts,
- if the control measure is absurd, unenforceable, or impracticable, and
- if the control measure can advance the attainment date by at least one year.

UDAQ conducted a RACM analysis by analyzing the following materials:

- EPA guidance documents and regulations including:
    - CTG,
    - ACT,
    - Ozone Transport Commission model rules.
- A comparison of existing Utah administrative rules to other EPA SIP-approved rules of the three western air districts that were moderate nonattainment for the 2008 ozone standard. The rationale for this comparison is that the selected air districts have already implemented ozone controls approved by EPA. The three air districts are Imperial County, CA, Mariposa County, CA, and Phoenix-Mesa (Maricopa County), AZ. These NAAs were selected for comparison since they have comparable climatic conditions to those experienced in the NWF NAA during summer and similar industrial activities present in the NWF NAA. Each area has served as a basis for RACT and RACM comparisons for other ozone NAAs, hence emission reduction strategies adopted in these areas serve as a base for many other current ozone NAAs.
- Lastly, an evaluation of newly identified technological and economically feasible controls, or if enhancement of existing controls were available.

The RACM analysis for the NWF NAA examined control measures for all potential VOC and NO_x emission sources. As part of this analysis, UDAQ reviewed existing Utah administrative rules, many of which were implemented as part of the Salt Lake $PM_{2.5}$ serious SIP and were developed under the regulatory guidelines of best available control measures (BACM) which allow for more stringent measures to be implemented than those conforming to RACM. The rules adopted under the BACM approach for state efforts to address $PM_{2.5}$ pollution include 24 VOC-related administrative rules, which are identified in Table 55. Furthermore, as the implementation rules under $PM_{2.5}$ allow for the implementation of emission reduction strategies beyond the attainment dates, the VOC emission reduction rules implemented during the $PM_{2.5}$ SIP were not constrained by timelines and further contribute to the exhaustive list of existing regulations in the NWF NAA. As the requirements for BACM are significantly more stringent than for RACM, the majority of this analyses concluded that current control measures are as, or more stringent than, the requirements for the moderate ozone SIP.

Table 55: Existing area source VOC rules in the NWF NAA[91]

Rule	Name
R307-211	Emission Standards: Emission Controls for Existing Municipal Solid Waste Landfills
R307-230	NO_x Emission Limits for Natural Gas-Fired Water Heaters
R307-303	Commercial Cooking
R307-304	Industrial Solvent Use
R307-328	Gasoline Transfer and Storage
R307-335	Degreasing
R307-341	Cutback Asphalt
R307-342	Adhesive and Sealants
R307-343	Emission Standards for Wood Furniture Manufacturing Operations
R307-344	Paper, Film & Foil Coating
R307-345	Fabric & Vinyl Coating
R307-346	Metal Furniture Surface Coating
R307-347	Large Appliance Surface Coating
R307-348	Magnet Wire Coating
R307-349	Flat Wood Panel Coating
R307-350	Miscellaneous Metal Parts & Products Coating
R307-351	Graphic Arts
R307-352	Metal Containers, Closure & Coil Coating
R307-353	Plastic Parts Coating
R307-354	Auto Body Refinishing
R307-355	Control of Emissions from Aerospace Manufacturing & Rework Facilities
R307-356	Appliance Pilot Light
R307-357	Consumer Products
R307-361	Architectural Coatings

5.2 RACM Analysis

To evaluate the VOC and NO_X sources in the NWF NAA, UDAQ first evaluated the 2017 baseline emission inventory described in section 3, examining emission categories with the highest emissions contributions first, then proceeding to examine smaller emission categories, in an attempt to identify the most impactful strategies first. Thus, Tables 56 and 57, which overview the results of UDAQ's RACM analysis, are presented in descending order of the magnitude of emission category, as is the corresponding TSD for this analysis.[92] Next, the UDAQ identified control techniques currently in place for

[91] All these rules are found in the Utah Administrative Code.

[92] Northern Wasatch Front Area Source Reasonable Available Control Measures (RACM) Analysis for Ozone Control. Technical Supporting Document (TSD). https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001246.pdf

source categories and determine if existing controls and rules are up to date with federal guidance and other states moderate ozone NAA rules.

Table 56: VOC RACM Assessment Summary

Source Category	Utah Existing Rules/Statute and Federal Rules	Comments
Solvent, Consumer/commercial Use Products	R307-357 Consumer Products	R307-357 is the most current OTC model rule, no further action warranted
Solvent, Graphic Arts	R307-351 Graphic Arts	UDAQ worked closely with the national printing trade association to derive a BACM rule that would be in line with printing rules found in the most stringent California air districts. No further analysis warranted.
Surface Coating, Industrial Maintenance*	Surface coating rules R307-343,344, 345,346, 347,348,349,350,352,353,354 and 355. Surface Coatings, Traffic Markings – R307-361 Architectural Coatings	Most current control strategies for surface coating and deemed to be BACM by UDAQ. R307-361 is the most current OTC model rule and deemed to be BACM by UDAQ.
Chemical Stripper	R307-304 Solvent Cleaning R307-335 Degreasing	UDAQ created the new rule R307-304 by removing sections of R307-335, in which the applicability was dramatically lowered, and a low vapor pressure solvent option was added. UDAQ determined that R307-304 was BACM. No further analysis warranted.
Surface Coatings, Architectural	R307-361 Architectural Coatings	R307-361 is the most current OTC model rule, no further action warranted
Gas Pipelines	40 CFR 49 Subtitle B	U.S. Dept. of Transportation is responsible for pipeline safety and spill prevention. No further action warranted.
Asphalt	R307-341 Cutback Asphalt	Imperial and Maricopa counties require lower VOC limits which were not considered in this evaluation for safety reasons. Reducing the VOC content requires the asphalt to be heated at a higher temperature leading to possible flashing and increase fuel usage negating any VOC reductions.
Industrial Bakery		UDAQ issued a proposed rule for public comment in 2016. Commenters submitted documentation that the estimated cost would be at least $19,000/ton, requiring double-walled stainless-steel stack plus catalytic

		oxidation of ethanol. High capital cost would require a rule with high applicability threshold that would preclude regulating most bakeries that comprise these emissions. No further action warranted.
Residential & Commercial Portable Gas Cans Evaporation/Spillage etc.	40 CFR Part 59, Subpart F, Control of Evap. Emission from New & In-use Portable Fuel Containers	No further action warranted
Gas Under Ground Storage Tank		DAQ enforces Federal UST regulation. No further action warranted.
Waste Disposal, Treatment, and Recovery; Composting;100% Green Waste	R315-312 Recycling and Composting Facility Standards	Composting operations are managed by the Utah Solid Waste Division. R315-312 includes facility and material management requirements to reduce air, soil and groundwater impairment. The 3 comparative air districts do not have air quality rules for compost operations. No further action warranted.
Leaking Underground Storage Tanks	Title 19 Chapter 6 Part 4, Underground Storage Tank Act	UDEQ enforces the EPA UST regulation, no further action warranted
Pesticide Application, Commercial/Consumer (FIFRA)	R307-357 Consumer Products	R307-357 is the most current OTC model rule, no further action warranted
Fuel Gas/Gasohol Bulk Plants	R307-328 Gasoline Transfer and Storage	Maricopa County has additional EPA SIP rules for gasoline transfer and storage based upon federal stage 1 vapor recovery guidance. An evaluation of Maricopa County's rules with Utah's determined that no additional control technique would be beneficial, and our current rules associated with these processes were determined to be BACM.
Landfills	R307-221 Emission Standards: Emission Controls for Existing Municipal Solid Waste Landfills	No further action warranted.
Combustion, Natural Gas, Residential	R307-356 Appliance Pilot Light	R307-356 prohibits appliance from utilizing a pilot light thereby reducing VOC's. No further action warranted.

Gas Stage 1	R307-328 Gasoline Transfer and Storage	Refer to discussion in section 5.2.1
Commercial Cooking		Researchers in California have been unable to identify cost effective technology for this emission source. Known control measures have a high capitol cost (>$50k) and demanding maintenance such that the removal cost would likely exceed $20K/ton. Prohibitive cost would shutter most sources. No further action warranted.
Livestock Production		According to local USDA representatives, most Utah producers use National Resource Service best management practices to protect soil, water and air. No further action warranted.
Sewer Treatment in Publicly Owned Treatment Works (POTW)	Clean Water Act: all POTW's have to report to EPA VOC concentrations in discharges.	All major POTW's meet Best Available Technology, no further action warranted.
Consumer and Commercial, Miscellaneous Products	R307-357 Consumer Products	R307-357 is the most current OTC model rule, no further action warranted
Fuel, Jet, Stage 1 (Storage)	Regulated under 40 CFR Subpart Kb	Not technically feasible for jet fuel due to low vapor pressure (0.125 psi). No further action warranted.
Fires, Structural		Uncontrollable, no further action warranted.
Backyard BBQ		Statutory Exemption, no further action warranted.
Dairy and Beef Cattle Composite		According to local USDA representative, most Utah producers use national conservation best management practices.
Gas Tank Truck Transport	R307-328 Gasoline Transfer and Storage	Refer to discussion in section 5.2.1
Solvent, Dry Cleaning		Solvent dry cleaners use no transfer machines that eliminate vapor loss during transfer from washing to drying. Additional built-in controls include refrigerated condensers. Some units also include built-in stills

		to further recover vapors. No further controls would be feasible. No further analysis warranted.
Poultry		According to the Utah Farm Bureau, operations apply best management practices to maintain healthy stock.
Fuel, Jet, Stage 2 (Dispensing)	Regulated under 40 CFR Subpart CC or Subpart R	Not technically feasible for jet fuel due to low vapor pressure (0.125 psi). No further action warranted.
Commercial Cooking - Conveyorized Charbroiling	R307-303 Commercial Cooking	R307-303 requires all units to utilize catalytic oxidizers. UDAQ and a nonprofit environmental group worked together to fund and install catalysts in all units in the Wasatch Front. No further action warranted.
Industrial Boiler Liquid Propane Gas (LPG)		No known control measures. Source may require permit with conditions under R307-401.
LPG Fuel		No known control measures exist, no further action warranted.
Fires, Vehicle		Uncontrollable, no further action warranted.
Combustion, Natural Gas, Industrial Boilers and IC Engines		No known control measures exist. Source may require permit conditions under air quality permitting R307-401-4(3) requiring low-NO_x burners.
Commercial/institutional wood Fuels		There are no reasonably cost-effective control strategies for this de minimis emission. No further action warranted.
Residential Oil Fuel		No known control exists, no further action warranted.
Cremation, Human and animal		Catalytic oxidizer control cost would readily exceed $15k/ton, an unreasonable cost for a de minimis emission. No further action warranted.
Commercial/institutional Kerosene Combustion		No known control, no further action warranted.
Aircraft/Rocket Engine Firing and Testing		Uncontrollable event for aircraft maintenance/testing (no rocket engine). No further action warranted.

Solvents; Hot Mix Asphalt	**NEW Administrative Rule: R307-313; VOC and Blue Smoke Controls for Hot Mix Asphalt Plants**	The UDAQ has identified blue smoke controls reducing VOC emissions associated with blue smoke from Hot Mix Asphalt plants being RACM. As a result, the Utah Air Quality Board has adopted Utah Administrative Rule R307-313 to fulfill this requirement.

*Surface Coating, Industrial Maintenance: EPA has aggregated coatings of the following surfaces: wood furniture, paper, film, foil, fabric, vinyl, metal furniture, large appliances, magnet wire, wood panel, metal parts, metal containers, plastic parts, autobody and aerospace parts.

Table 57: NO_X RACM Assessment Summary

Source Category	Utah Existing Rules/Statute and Federal Rules	Comments
Combustion, Natural Gas	R307-356 Appliance Pilot Light. R307-230 NO_x Emission Limits for Natural Gas-Fired Water Heaters **PROPOSED: R307-315 & R307-316**	Prohibits the sale of appliance pilot lights (with the exception of water heaters) after January 1, 2014. A Canadian study determined that a gas fireplace pilot light accounts for 48% of the annualized gas usage for the appliance. Reduced gas consumption translates to a reduction in $PM_{2.5}$, VOC, NO_x, SO_x and NH_3. We are not aware of other comparable rules. Ultra-low NO_x water heaters reduce emissions to 10 ng/Joule for residential units and slightly higher limits for commercial units. R307-230 is consistent with the most stringent California rules. No further action warranted. The UDAQ has identified ultra-low NO_x burners (9 ppmv) as being RACM in most instances when applied to replacement of end-of-life equipment or replacement burners. Some instances, particularly for high MMBtu units, may exceed RACM requirements and require regulatory flexibility. UDAQ is proposing the adoption of administrative rules R307-315 and R307-316 to fulfill this RACM requirement.
Combustion, Natural Gas, Commercial & Institutional Boilers and IC Engines		May be subject to air quality permitting. R307-401-4(3) may apply requiring low-NO_x burners.

Industrial Boiler LPG		May be subject to air quality permitting depending on size of emission sources.
Combustion, Industrial, Distillate Oil, All IC Engines		May be subject to air quality permitting depending on size of emission sources.
Combustion, Commercial, Institutional LPG		No known control.
Combustion, Industrial, Distillate Oil, All Boilers		May be subject to air quality permitting. R307-401-4(3) may apply requiring low-NO_x burners depending on the size of emission source.
Residential LPG Fuel		No known control.
Combustion, Natural Gas, Industrial Boilers and IC Engines		May be subject to air quality permitting. R307-401-4(3) may apply requiring low-NO_x burners.
Commercial, institutional wood Fuels		There are no reasonably cost-effective control strategies for this de minimis emission. No further action warranted.
Backyard BBQ		Statutory Exemption, no further action warranted.
Structural fires		Uncontrollable
Residential Oil Fuel		No known control, no further action warranted.
Waste Disposal, Open Burning, Yard Waste and Household Waste	R307-202, General Burning regulates yard waste burning by permit and prohibits household waste burning by homeowners.	No further action warranted.
Cremation, Human and animal		Catalytic oxidizer control cost would readily exceed $15k/ton, an unreasonable cost for a de minimis emission. No further action warranted.
Combustion, Kerosene		No known control, no further action warranted.
Aircraft/Rocket Engine Firing and Testing		Uncontrolled event for aircraft maintenance/testing (no rocket engine). No further action warranted.
Motor vehicle fires		Uncontrollable.

Table 58: RACM Identified Control Strategies

Source Category	New or Proposed Administrative Rules	Comments
Combustion, Natural Gas	**Proposed:** **R307-315; NO_x Emission Controls for Natural Gas-Fired Boilers 2.0-5.0 MMBtu** **R307-316; NO_x Emission Controls for Natural Gas-fired Boiler greater than 5.0 MMBtu**	The UDAQ has identified ultra-low NO_x burners (9 ppmv) as being RACM in most instances when applied to replacement of end-of-life equipment or replacement burners. Some instances, particularly for high MMBtu units, may exceed previously established RACM thresholds and require regulatory flexibility. UDAQ is proposing the adoption of administrative rules R307-315 and R307-316 to fulfill this RACM requirement.
Solvents; Hot Mix Asphalt	**Utah Administrative: R307-313; VOC and Blue Smoke Controls for Hot Mix Asphalt Plants**	The UDAQ has identified blue smoke controls reducing VOC emissions associated with blue smoke from Hot Mix Asphalt plants being RACM. As a result, the Utah Air Quality Board has adopted Utah Administrative Rule R307-313 to fulfill this requirement.

5.3 RACM Analysis Conclusion

The evaluation of existing Utah administrative rules, EPA issued CTGs, ACTs, and OTC rules, as well as similar western counties with moderate ozone NAAs determined that the NWF NAA has adopted an expansive list of both VOC and NO_x emission reduction rules for area sources. Through this process, and in parallel with UDAQ working groups, two additional control techniques were identified as RACM that will result in the reduction of NO_x emissions from natural gas boiler as well as VOC emission reduction from hot mix asphalt facilities (Table 58). These controls were determined to be reasonable and will help the NAA reach attainment as expeditiously as practicable. As a result, the UDAQ has adopted administrative rule R307-313; VOC and Blue Smoke Controls for Hot Mix Asphalt Plants as a RACM strategy to reduce VOC emissions. Additionally, the UDAQ has adopted administrative rules R307-315; NO_x Emission Controls for Natural Gas-Fired Boilers 2.0-5.0 MMBtu and R307-316: NO_x Emission Controls for Natural Gas-fired Boiler greater than 5.0 MMBtu. These reduction strategies, and their implementation timelines, are discussed further in section 7. The UDAQ has determined that the NWF NAA has met RACM requirements with the RACM analysis and the implementation of the two new control strategies.

Beyond the RACM controls identified for natural gas-fired boilers and hot mix asphalt facilities, the UDAQ has identified that the application of in-use limitations for small non-road engines, particularly those used in lawn and garden operations, are likely to be reasonable in scope and could result in significant emission reductions of both VOCs and NO_x. Section 209 of the CAA prohibits states from regulating mobile sources in certain ways,[93] with section 209(e) specifically preempting states from regulating emissions from non-road sources. While section 209 does prohibit a state from regulating

[93] 42 U.S.C. § 7543

mobile source emissions, the prohibition is not absolute. In particular, section 209(d) allows states to impose restrictions on when or where these engines can be operated (i.e., "in use" restrictions), including for source covered under 209(e). Thus, the UDAQ has identified that states are not preempted from implementing meaningful emission reduction strategies covering non-road mobile sources through in-use requirements. The UDAQ plans to develop and implement policies that address emissions from these sources as the NAA works towards demonstrating attainment as expeditiously as possible. However, the scope of implementing a policy that covers such a large amount of small and distributed sources like non-road engines requires more time than allotted for in this SIP revision. The UDAQ intends to develop and implement a policy aimed at reducing VOC emissions from these sources in subsequent SIP revisions.

Chapter 6 – Inspection and Maintenance (I/M) Program

6.1 Overview of I/M Programs

The transportation sector is a major source of both NO_x and VOCs in and around the NWF NAA. Although modern vehicles (1996 and newer) emit far less pollution than older vehicles due to improved emission reduction technologies, these reductions depend on the on-board emission control systems being adequately maintained and operating. If not properly maintained, vehicles will not perform as originally designed, resulting in increased emissions. Malfunctions in emission control technologies can cause emissions to increase substantially beyond federal vehicle standards, with even minor malfunctions resulting in increased emissions. Therefore, identifying and repairing malfunctioning vehicles is imperative to reducing vehicle-related emissions in NAAs.

Vehicle I/M programs require mandatory and periodic testing of on-road motor vehicles for compliance with emission standards, and the repair of vehicles that do not meet standards. These tests are designed to determine whether a vehicle's emission controls are functioning properly, and whether emissions levels are acceptable. The goal of an I/M program is to identify and repair high-emitting vehicles to improve air quality in areas not attaining the NAAQS. EPA sets vehicle emission standards to protect public health, however, these regulations do not guarantee proper operation and maintenance of a vehicle's emission controls over its lifetime. State and local governments implement I/M programs to identify high-emitting vehicles and notify owners and operators to have these vehicles repaired. Once repaired, vehicles must be retested to verify their emissions are within the standards. The 1990 amendments to the CAA mandated I/M programs for ozone and CO NAAs based on criteria such as air quality status, population, and/or geographic location.

In parallel with CAA requirements, Utah Code requires that, if identified as necessary to attain or maintain any NAAQS, a county must create an I/M program as authorized by the Utah Air Quality Board to formally establish those requirements for county I/M programs after obtaining agreement from the affected counties.[94] Similarly, Utah Code also allows any county with an established I/M program to subject individual motor vehicles to I/M testing at times other than the annual inspection.[95]

As a result of the NWF NAA's previous designation as marginal nonattainment, as well as a CO NAA that overlaps portions of the NWF NAA, under CAA Section 182(a) and Section 187, Utah was previously required to implement and maintain an I/M program in the most populated counties in the NWF NAA including: Davis, Salt Lake, and Weber Counties. Beyond the NWF NAA, Utah was also required to implement an I/M program in the SWF NAA, which includes Utah County, to the south of the NWF NAA (figure 1). These programs are required to be at least as effective as the EPA's Basic Performance Standard.[96]

6.2 Federal Requirements

I/M programs are mandatory under CAA Section 182 for ozone NAAs. These programs may be removed if the state can demonstrate that the program is no longer needed. However, the I/M program would still be retained in the SIP as a contingency control measure, which would be triggered if the area

[94] Utah Code Section 41-6a-1642 & Utah Code Ann. § 19-2-104(1)(g).

[95] Utah Code Section 41-6a-1642

[96] 40 CFR § 51.352

ever exceeds the applicable NAAQS.[97] Additionally, states have the flexibility to develop their own I/M programs based on local conditions, if the state can show that impacted areas will continue to meet air quality standards.

There are two performance levels of any I/M program—basic or enhanced. Basic I/M programs are a requirement for moderate ozone NAAs[98] which requires testing for light-duty cars for any urbanized population over 200,000 residents.[99] An enhanced I/M program is required for serious, severe, and extreme ozone NAAs[100] with urbanized populations over 200,000. An enhanced I/M program requires inspection of both light duty cars and light duty trucks.[101] As a moderate NAA, the NWF is only required to demonstrate that its existing I/M programs meet the basic I/M criteria. Since all counties in the NWF NAA with populations over 200,000 have existing programs, no new I/M programs are required as part of this SIP revision.

6.3 I/M Testing

There are three types of I/M testing that can be performed on vehicles:

- Visual Inspections: These inspections discourage tampering by checking for the presence of certain required emission control parts such as catalytic converters.
- Tailpipe Testing: This inspection consists of measuring the exhaust emissions when a vehicle is idle or under certain engine loads. This inspection is typically for models made in 1995 and older.
- On-Board Diagnostics (OBD): Vehicles made in 1996 or later have been equipped with OBD computerized systems. These systems continuously monitor emission control systems and will activate the “check engine” light if a diagnostic trouble code is detected concerning the vehicle’s emission controls.

6.4 Utah I/M Program History and General Authority

I/M programs were adopted in the early 1980’s in Utah as a required strategy to attain both the ozone and CO NAAQS.[102] These programs have played a critical role in reducing emissions that contribute to ozone and CO and have been highly effective in improving air quality in urbanized parts of the state. Utah's I/M programs are initially authorized in Utah Code Section 41-6-163.61, which was enacted during the First Special Session of the Utah legislature in 1983. [103] I/M programs were initially implemented in Davis and Salt Lake counties in 1984, by Utah County in 1986, and by Weber County in 1990. In 1994, Utah Code was amended to authorize the implementation of I/M programs stricter than minimum federal requirements in counties where it is necessary to attain or maintain a NAAQS. [104]

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[97] 40 CFR § 51.905 (A)(4)(i).

[98] CAA Section 182(b)(4), 42 U.S.C. § 7511a(b)(4).

[99] 40 CFR § 51.350(a)(4).

[100] CAA Section 182(c)(3), 42 U.S.C. § 7511a(c)(3).

[101] 40 CFR § 51.350(7) and (8).

[102] Davis, Salt Lake, Utah, and Weber counties are required to have I/M programs under Section 182(b)(4) and/or Section 187(a)(4) of the CAA.

[103] This section has been renumbered as section 41-6a-1642 by Laws 2005, c. 2, § 216, eff. Feb. 2, 2005.

[104] 1994 Utah Code.

This section of the Utah Code required preference be given to a decentralized program to the extent that a decentralized program would attain and maintain ambient air quality standards and would meet federal requirements. Thus, I/M programs in Utah are implemented at the county level, and not directly by the state of Utah. Utah Code also required affected counties and the Utah Air Quality Board to give preference to the most cost-effective means to achieve and maintain the maximum benefit regarding air quality standards, and to meet federal air quality requirements related to motor vehicles. The Utah legislature indicated preference for a reasonable phase-out period for replacement of air pollution test equipment made obsolete by program in accordance with applicable federal requirements, and if such a phase-out does not otherwise interfere with attainment of ambient air quality standards.

By January 1, 2002, OBD inspections and OBD-related repairs were required as a routine component of Utah I/M programs on model year 1996 and newer light-duty vehicles and light-duty trucks equipped with certified OBD systems. The federal performance standard requires repair of malfunctions or system deterioration identified by or affecting OBD systems. In addition, in 2002, the Utah State Legislature amended the Utah Code to allow for biannual inspection of cars six years old or newer.[105] This provision is applicable to the extent allowed under the current SIP for each county within the NAA. Meaning the state would need to determine if the I/M programs in counties within the NAA would need to have their testing frequency modified to comply with NAAQS standards. The state would then work with local health departments to alter their requirements.

Most recently, in 2005 the Utah State Legislature renumbered and amended Utah Code to allow counties with an I/M program to require college students and employees who park a motor vehicle on college or university campus that is not registered in a county subject to I/M provisions to provide proof of compliance with an emission inspection.[106]

6.5 UDAQ Evaluation of Current I/M Program

I/M programs in Utah are currently using OBD and tailpipe testing. However, I/M programs rely mostly on OBD testing because most of the fleet is equipped with OBD systems, but there are still some tailpipe tests being performed. Details on Utah existing I/M programs, relevant county ordinances and regulations, network types and enforceability can be found in the applicable I/M TSD.[107]

In an effort to evaluate if existing I/M programs in the NWF NAA meet the requirements of a moderate NAA, the UDAQ conducted basic performance standard modeling to show how the existing I/M programs of Davis, Salt Lake, and Weber counties meet the applicable performance standard for a basic I/M Program for the summer of 2023. 2023 was chosen as the analysis year to be consistent with the year used for this modeling demonstration. This evaluation used the same MOVES modeling assumptions used to develop the on-road mobile source 2023 projection inventory for the NWF NAA covering Davis, Salt Lake, Weber, and Utah counties.[108] Utah County provides reciprocity testing and, given the proximity of Utah County to the NWF, its I/M program was included in the analysis. Tooele County was not included in this analysis since the area does not meet the population threshold of 200,000 or more residents in which an I/M program is required.[109]

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[105] Utah Code Section 41-6-163.6

[106] Utah Code Section 41-6a-1642

[107] NWF Inspection and Maintenance (I/M) Program; 2015 Ozone NAAQS Moderate Ozone SIP, TSD

[108] 2023 EXISTING BASIC INSPECTION AND MAINTENANCE PERFROMANCE STANDARD MODELING TECHNICAL SUPPORT DOCUMENT: https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001726.pdf

[109] 40 CFR § 51.350(a)(2) and (a)(3).

The performance standard compares the modeling results of the existing program and performance standard benchmark for a basic program for 2023. For a basic I/M program, if the proposed/existing program achieves the same or lower emissions levels for VOC and NO_x as the performance standard benchmark program, then the proposed/existing program is considered to have met the basic performance standard. Areas required to operate an I/M program as the result of being classified (or reclassified) as moderate for an 8-hour ozone NAAQS must use the basic performance standard, using the program design elements at 40 CFR § 51.352(e). Emission estimates are confined to the EPA approved MOVES 3.0.3. This model produces emissions daily estimates for on-road vehicles by providing emissions profiles for starts, exhaust, evaporative and hot soak conditions. Inputs include speeds, vehicle fuel profiles and specifications, VMT, I/M profiles, VMT mix, vehicle age distributions, and meteorological conditions. These inputs were chosen to meet EPA and Department of Transportation guidance on updating local planning assumptions every 5 years.[110]

Compliance factors were compiled utilizing local 2017 I/M EPA data covering: Total Vehicles tested, Total Failures, Waivers, and Failure Rate for the following testing procedures: Two Speed Idle, OBD, and Gas Cap. The compliance data is from EPA prepared compliance data dated 2/21/2019. Since this modeling exercise had been completed, 2020 I/M testing compliance factors have become available (EPA prepared compliance data dated 8/12/2021)[111]. The only difference between the 2017 I/M and 2020 I/M compliance factors is in Weber County for light duty trucks model years 1996-2007 creating a difference of 1%. Results of this analysis including county specific I/M program details utilized within MOVES 3.0.3 are included in the Table 59 to Table 62.[112]

Table 59: 2023 Davis County Summer Basic Performance Modeling

2023 Davis County Summer Basic Performance Modeling (Tons Per Day)		
	NO_x	VOC
Davis I/M	7.42	2.77
Basic I/M	7.55	2.91
Difference	0.14	0.13

Table 60: 2023 Salt Lake Summer Basic Performance Modeling

2023 Salt Lake County Summer Basic Performance Modeling (Tons Per Day)		
	NO_x	VOC
Salt Lake I/M	20.98	8.51
Basic I/M	21.42	8.94
Difference	0.44	0.43

[110] EPA420-B-08-901 Dec 2008

[111] https://www.epa.gov/compliance-and-fuel-economy-data/annual-certification-data-vehicles-engines-and-equipment

[112] Utah's 2023 Existing Basic Inspection and Maintenance Performance Standard Modeling Technical Support Document can be found on the NWF Moderate Ozone SIP TSD web page at https://deq.utah.gov/air-quality/northern-wasatch-front-moderate-ozone-sip-technical-support-documentation#supporting-tsd.

Table 61: 2023 Utah County Summer Basic Performance Modeling

2023 Utah County Summer Basic Performance Modeling (Tons Per Day)		
	NO_x	VOC
Utah I/M	10.39	3.37
Basic I/M	10.56	3.48
Difference	0.16	0.12

Table 62: 2023 Weber County Summer Basic Performance Modeling

2023 Weber County Summer Basic Performance Modeling (Tons Per Day)		
	NO_x	VOC
Weber I/M	5.87	2.12
Basic I/M	5.97	2.22
Difference	0.11	0.10

The analysis provided in this section, with the results highlighted in tables 59 – 62, indicates that the existing I/M programs currently in place in the NWF meet the CAA requirements for moderate ozone NAAs.

6.6 Implementation of I/M Program in Tooele County

To determine if the implementation of an I/M program in Tooele County would provide significant benefit for the NWF NAA to demonstrate attainment of the NAAQS, UDAQ conducted an analysis of the effects of implementing an I/M program in Tooele County using MOVES parameters similar to those described in section 6.5. Tooele county has a relatively small population of approximately 76,000 residents, and only a portion of the total county is included within the boundary of the NWF NAA (Figure 1). Tooele county has not previously been required to implement an I/M program since they are below the population threshold of 200,000 residents.

The results of this analysis are shown in Table 63. Based on these results, the UDAQ has concluded that the emission reductions associated with implementing a Basic I/M program in Tooele County would yield minimal emission reductions. Thus, the UDAQ has decided not to implement an I/M program in Tooele County especially in light of the fact that the county does not meet the population requirements found in 40 CFR § 51.350(a)(3), and the associated emission reductions would be small. This determination does not exclude the possibility of an I/M program implemented in Tooele County at a later date.

Table 63: I/M Program Implementation Evaluation for Tooele County in 2023

	NO_x	VOC	VOC Refuel	NH3	$PM_{2.5}$	Vehicle Miles Traveled
No I/M Program	3.783	0.875	0.13	0.097	0.081	3,476,298
OBD I/M Program	3.74	0.833	0.13	0.097	0.081	3,476,298
Percentage Emission Reduction	-1.14%	-4.80%	0.00%	0.00%	0.00%	0.00%
TPD Emission Reduction	-0.043	-0.042	0	0	0	0

Chapter 7 – Reasonable Further Progress (RFP)

7.1 Reasonable Further Progress

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.

The RFP requirement for this SIP is to reduce VOC emissions by 15% within six years of the established 2017 baseline year. The state must identify and implement emission reduction strategies equal to or greater than 15% of the 2017 baseline inventory described in Section 3.2 (Table 7) by January 1, 2023. In order for reductions to count towards RFP, they must occur at sources located within the boundary of the NAA, and "have actually occurred"[113], meaning they are quantifiable with strategies developed to reduce emissions being enforceable.

7.2 Methodology

The methodology for determining compliance with CAA Section 182(b)(1)(A) RFP requirements are as follows:

1) Develop an anthropogenic VOC baseline inventory (2017) for the NAA.
2) Develop an anthropogenic VOC projected inventory (2023) for the NAA that incorporates anticipated emission reductions.
3) Demonstrate that VOC emissions in the projected year inventory (2023) are at least 15% lower than the baseline (2017) (i.e., 2023 emissions – 2017 emissions >= 15% of 2017 emissions) and meet the criteria described in Section 7.1.

7.3 RFP and Anthropogenic VOC Emission Reductions

Table 64 shows anthropogenic VOC emission for the NWF NAA for the baseline year of 2017 and the projected year of 2023, as well as the change in emissions from 2017 compared to 2023 (i.e., 2017 – 2023 VOC emissions). The total anthropogenic VOC emissions for the NWF NAA in 2017 account for 93.7 tpd. As a result, the RFP requirement for the NWF NAA is 14.0 tpd reduction to achieve the 15% reduction.

[113] 42 USC 7511a(b)(1)(C)

Table 64: Anthropogenic VOC Emission Reductions from 2017 to 2023 for the NWF

Source Sector	2017 Baseline Anthropogenic VOC Emissions (tpd)	2023 Projected Anthropogenic VOC Emissions (tpd)	Δ Anthropogenic VOC Emissions (tpd)	% Δ Anthropogenic VOC Emissions
Airports	1.3	1.4	0.2	15.4
Livestock	0.7	0.7	----	----
Area	8.5	8.3	-0.2	-2.4
Non-Road Mobile	12.5	12.6	0.1	0.8
On-Road Mobile	20.5	15.3	-5.2	-25.4
Point	5.9	6	0.1	1.7
Point-Electric Generating Units	0	0	----	----
Rail	0.5	0.4	-0.1	-20
Solvents	43.2	44.5	1.3	3.0
ERC Bank	0.7	0.7	----	----
Total	93.7	90	-3.7	-3.9

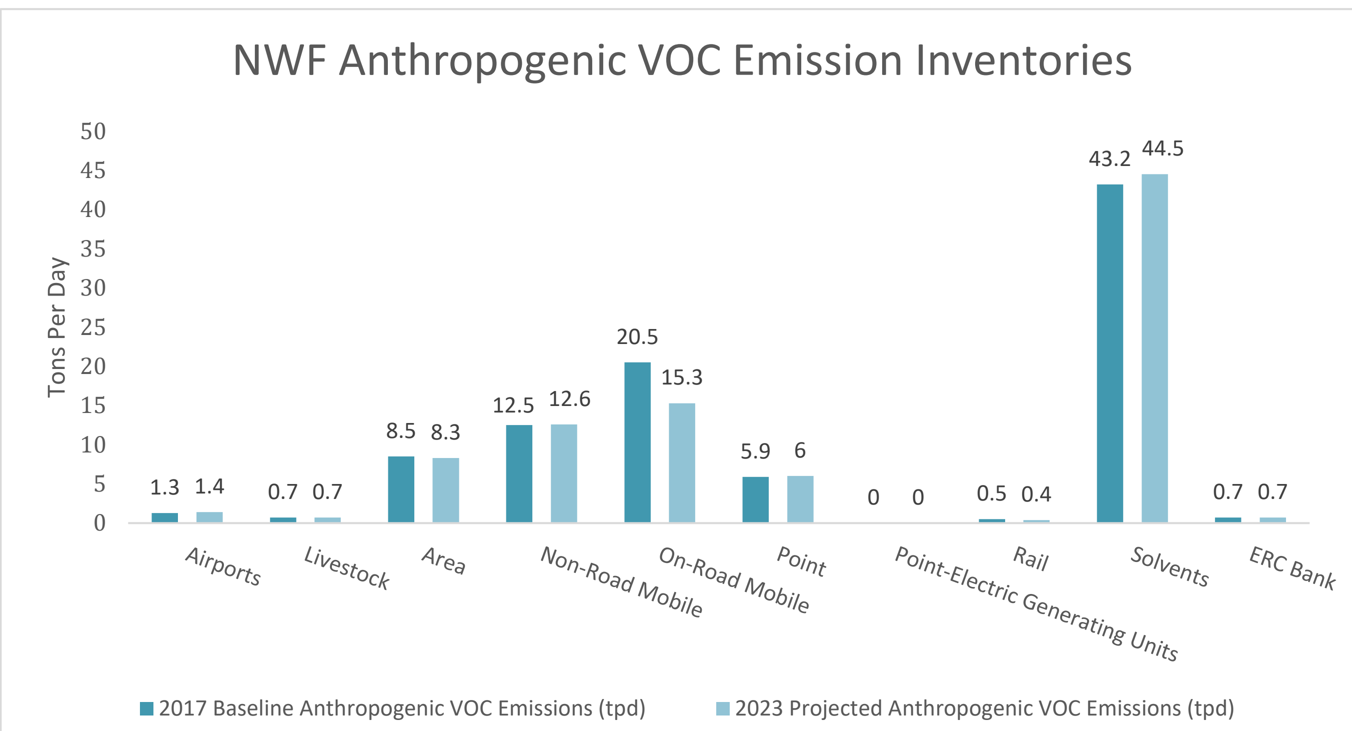

Figure 4: NWF Anthropogenic VOC Emission Inventories

As shown in Table 64 and Figure 4, there have been substantial VOC reductions in the on-road mobile sector, resulting in 5.2 tpd of VOC reductions. These reductions are overwhelmingly due to improvements in vehicle emission reduction technologies for personal automobiles and the introduction of cleaner, tier 3 fuels, into the NAA. Other source sectors such as rail and area sources show small emission reductions of 0.2 and 0.1 tpd, respectively.

While the area has experienced emission reductions across multiple sectors, the area is also experiencing rapid population growth, with Utah being the fastest growing state in the nation in 2022 and projected to add 2.2 million more residents by 2060.[114] As a result of this rapid population growth, the NWF NAA has had emission increases in certain source sectors, including the non-road and solvents sectors accounting for an added 0.2 tpd and 1.3 tpd, respectively.

The increased emissions in some source sectors that closely track population growth offset the emission reductions in other sectors. As a result, the net total reductions of anthropogenic VOC emissions in the NWF NAA are 3.7 tpd, accounting for a decrease of 3.9% of the baseline 2017 emissions. This means that 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.

7.4 Anthropogenic NO_x Emissions

Table 65 shows anthropogenic NO_x emissions for the NWF NAA for the baseline year of 2017 and the projected year of 2023, as well as the change in emissions from 2017 compared to 2023 (i.e., 2017 – 2023 NO_x emissions). NO_x emissions are not part of the ROP requirement for this moderate SIP; however, the area has experienced significant NO_x reductions despite the substantial population growth. While NO_x reductions do not count towards the CAA sections 172(c)(2) and 182(b)(1)(A) requirements, these reductions have played an important role in the area progressing towards attaining the standard as expeditiously as possible, which is further discussed in section 7.4.1.

[114] Kem C. Gardner Policy Institute research and data, available at https://gardner.utah.edu/utah-population-to-increase-by-2-2-million-people-through-2060/

Table 65: Anthropogenic NO_x Emission Reductions from 2017 to 2023 for the NWF

Source Sector	2017 Baseline Anthropogenic NO_x Emissions (tpd)	2023 Projected Anthropogenic NO_x Emissions (tpd)	Δ Anthropogenic NO_x Emissions (tpd)	% Δ Anthropogenic NO_x Emissions
Airports	3.1	3.7	+0.6	19.4
Livestock	0	0.0	----	----
Area	5.4	4.9	-0.5	-9.3
Non-Road Mobile	10.5	8.0	-2.5	-23.8
On-Road Mobile	55.5	35.4	-20.1	-36.2
Point	20.4	22.0	+1.6	7.8
Point-Electric Generating Units	0.4	0.4	----	----
Rail	9.2	8.8	-0.5	-5.4
Solvents	0.6	0.7	+0.1	16.7
ERC Bank	3.1	3.1	----	----
Total	108.3	87.0	-21.3	-19.7

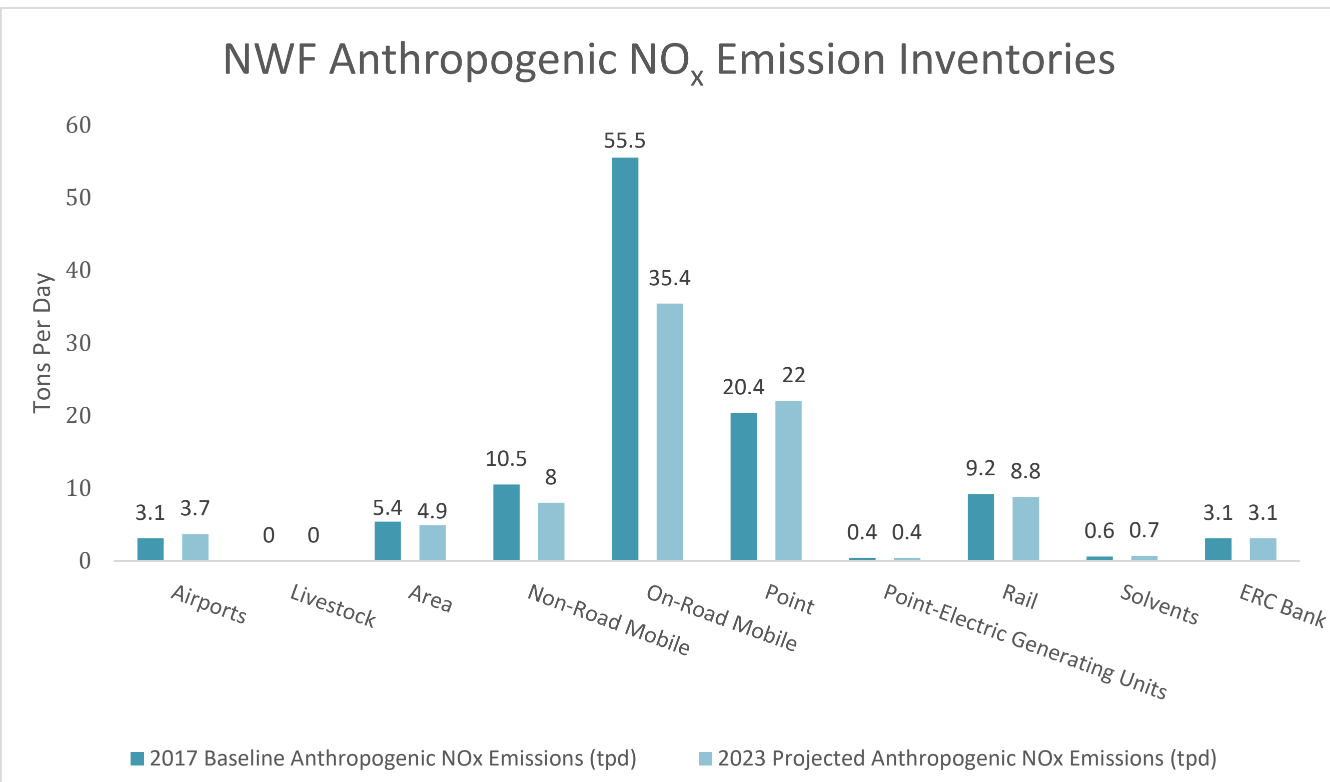

Figure 5: NWF Anthropogenic NO_x Emission Inventories

As shown in both Table 65 and Figure 5, the total anthropogenic NO_x emissions for the NWF NAA in 2017 account for 108.3 tpd, decreasing to 87.0 tpd in 2023, accounting for a 21.3 tpd reduction in daily NO_x emissions in this time period from 2017 to 2023. A substantial portion of these emission reductions, much like those observed in VOC emission reductions (Section 7.3), come from the on-road mobile sector because of continued improvements to vehicle engine standards and the introduction of cleaner burning fuels, resulting in 20.1 tpd of emission reductions relative to the baseline year. The NAA has also experienced NO_x reductions in other sectors including non-road mobile, rail and area sources, accounting for an additional 2.5, 0.5, and 0.5 tpd respectively. While some sectors have had small amounts of emission growth, such as airports, the majority of emission source sectors are showing reductions of anthropogenic NO_x emissions.

7.4.1 Effectiveness of NO_x emission reductions in the NWF NAA

Reductions in NO_x have been identified as an effective strategy in reducing ozone formation in the NWF NAA. A source apportionment modeling analysis conducted by the UDAQ using CAMx (Comprehensive Air Quality Model with Extensions) OSAT (Ozone Source Apportionment) (section 9.2) at the Hawthorne and Bountiful monitoring stations found that a little more than half of the modeled ozone at both monitoring sites is attributable to NO_x sources (Figure 6). Specifically, on average, 54% of the ozone is attributable to NO_x sources and 46% is attributable to VOC sources at the Hawthorne station. Similarly, 53% of the ozone is attributable to NO_x and 47% is attributable to VOCs at the Bountiful station. These results indicate that ozone at the controlling monitors in the NWF NAA is formed under both NO_x- and VOC-limited conditions, with a little more than half of the ozone formed under NO_x-limited conditions.

While the modeling results have some uncertainty, the findings are consistent with those from a VOC/NO_x ratio analysis conducted by the UDAQ which utilized VOC measurements collected at the Hawthorne monitoring site during the summer of 2021[115]. 8-hr time-integrated carbonyls measurements and hourly Gas Chromatograph (GC) data with VOC concentrations weighted by their Maximum Incremental Reactivity (MIR) (i.e. reactivity respective to ozone production/per unit VOC), collected from June-August 2021, were used in this ratio analysis. Results showed that the area is in a transitional regime, with controls on both VOCs and NO_x emissions as potentially effective strategies to reduce ozone formation. These findings are consistent with the CAMX results reported in this section.

[115] https://harbor.weber.edu/Airqualityscience/docs/conferences/AQSfS-2022/AQSfS2022Posters/sghiatti_sci_4_sol_poster_2022.pdf

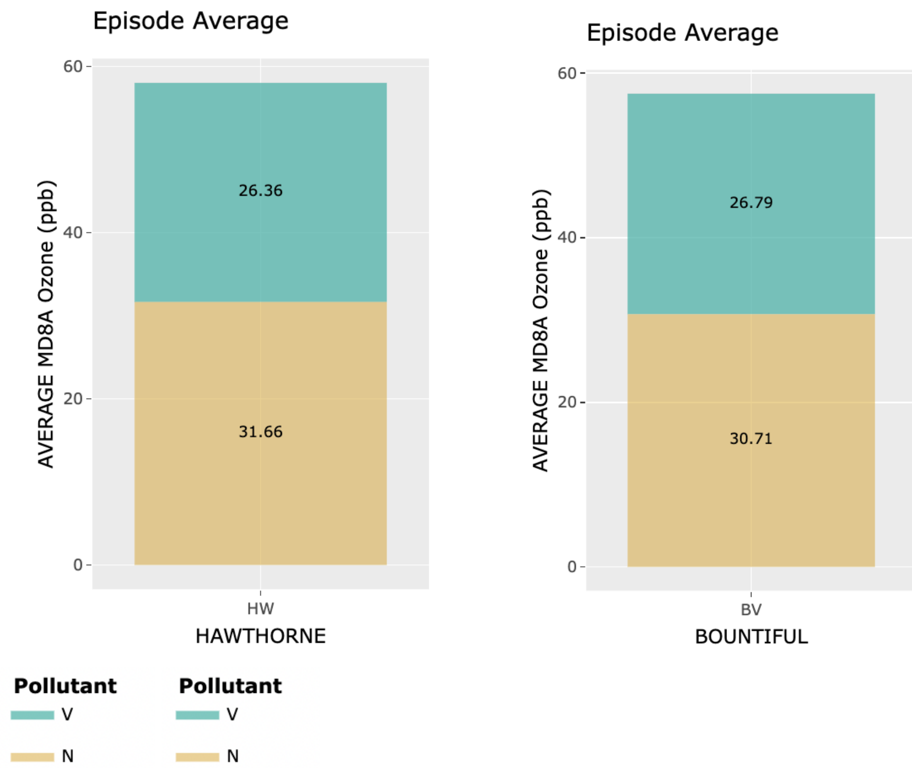

Figure 6: NOx-attributable (brown) and VOC-attributable (green) ozone at Hawthorne (left panel) and Bountiful (right) monitoring stations on average over all days of the modeling episode.

These findings support the UDAQ's conclusion that the implementation of NO_x reduction controls as identified in section 4 (Table 54) as part of this SIP revision are necessary for the NWF NAA to demonstrate attainment of the NAAQS as expeditiously as practicable.

7.5 Future SIP Emission Reductions

The UDAQ has identified several emission reduction strategies that, once fully implemented, will result in the reduction of both VOC and NO_x emissions within the NWF NAA and count towards RFP requirements. However, due to the short implementation timeframe afforded to states under this SIP revision, paired with the added difficulty of finding viable VOC reduction strategies after the extensive emission reductions associated with Utah's $PM_{2.5}$ planning efforts, these strategies will not be fully implemented by the implementation deadline of January 1, 2023[116] and thus, will not count towards RFP under the moderate SIP. Utah is working to have these strategies fully implemented prior to the summer of 2026 in an effort to count these reductions towards RFP requirements during the state's submission of a potential serious SIP for the same NAA. The UDAQ is simultaneously implementing NO_x emission reductions both in anticipation of future SIP creditability as well as in an effort to demonstrate attainment of the standard at the earliest achievable date.

[116] 87 Fed. Reg. 60,897.

7.5.1 Hot Mix Asphalt; Utah Administrative Code Rule R307-313

The UDAQ has identified reducing VOC emissions associated with hot mix asphalt manufacturing as a technologically viable and economically feasible control strategy. UDAQ has proposed R307-313 requiring hot mix asphalt (HMA) plants in the NAA to install emission capture and control devices to reduce VOC and blue Smoke emissions associated with the production and loading of HMA and oil storage tanks. Blue smoke is a visible emission generated during the production of HMA plants that results from the process of mixing hot oil with aggregate which consists of oils heated to the point of volatilization resulting in aerosols containing VOCs. Blue Smoke controls work to control both the visible emissions and VOC emissions from HMA plants by capturing the emissions at various points of the production process and routing these emissions through ducting to a destruction point, either using filters and activated carbon, or through post-capture combustion. Emissions from the associated oil tanks can be captured and reduced using similar technologies.

The UDAQ identified 15 HMA plants operating in the NWF NAA as well as 48 oil tanks associated with asphalt manufacturing at these plants. UDAQ estimates that the aggregated PTE emissions from these activities result in a combined 0.34 tpd (125.32 tpy) of VOC emissions in the NAA, of which 0.26 tpd (95.63 tpy) would be reduced with the implementation of controls as required by R307-313. It is important to note that these numbers are represented as PTE, and when applied to actual emissions from the sources based on annual production the emission reductions will be lower. This difference explains why associated inventoried emissions described in section 3 do not match those reported here, and thus it is expected that the actual emission reductions will be lower as many facilities are permitted to produce more asphalt per year than what is actually produced annually.

Administrative rule R307-313 was adopted by the Utah Air Quality Board on February 1, 2023. However, the lead time for the engineering and installation of these controls, as well as the additional testing and emission destruction verification required for the implementation of a novel emission reduction strategy, mean that the emission reductions associated with this rule will not be creditable under the moderate SIP timeline. As impacted facilities have until May 1, 2025 to install controls, these emissions reductions are expected to be creditable for future SIP reductions.

7.5.2 Boilers; Utah Administrative Code Rules R307-315 and R307-316

In an effort to reduce NO_x emissions in and around the NWF NAA, UDAQ has proposed the adoption of R307-315; NO_x Emissions Controls for Natural Gas-Fired Boilers 2.0-5.0 MMBtu and R307-316; NO_x Emission Controls for Natural Gas-Fired Boilers greater than 5.0 MMBtu. These rules both implement an emission standard of 9ppmv for natural gas-fired boilers in the NAA in the effected MMBtu ranges. In aggregate, these rules will apply to an estimated 2,136 boilers in the NAA which combine to emit an estimated 8.55 tpd (3,122 tpy) of NO_x emissions. It is important to note that these emission estimates are independent bottom-up estimates of the total potential emissions from boilers, and were determined using different datasets and methods than those used in the development of the inventories described in section 3. The UDAQ believes that these numbers are a more accurate representation of actual emissions from boilers within the NAA. However, these numbers may be different than those reported in section 3, and any future SIP credited emission reductions associated with the implementation of these rules would rely instead on the numbers reported in the inventory. The implementation of R307-315 and R307-316 has the potential to reduce 6.9 tpd (2,522 tpy) of these combined emissions. However, R307-315 and R307-316 do not require the retrofit or replacement of any boiler currently operating in the NAA, and instead require new boilers or burner replacements to meet the 9ppmv standard. Thus, the implementation of this rule will take place over a long period of time as the average lifespan of this equipment can be greater than 20 years.

Since the emission reductions from the implementation of R307-315 and R307-316 are targeted at the reduction of NO_x emissions, the reductions associated with these rules will not count towards RFP requirements for this SIP revision but are anticipated to be creditable for future SIP reductions.

7.5.3 US Magnesium LLC

The UDAQ also examined major industrial point sources that contribute to the degradation of the NWF NAA's airshed but are located outside of the existing boundary. This examination identified one source that met this criteria, US Magnesium LLC, located in Tooele County on the southwestern edge of the Great Salt Lake. This facility produces significant amounts of highly reactive precursor emissions that contribute to both ozone and $PM_{2.5}$ formation along the Wasatch Front.

US Magnesium LLC is the largest producer of primary magnesium in the US and operates the Rowley Plant production facility on the western edge of the Great Salt Lake in Tooele County near the NAA boundary. Here, water from the Great Salt Lake is evaporated to produce a brine solution that is then purified and dried before going through a melt reactor and electrolytic process which separates magnesium metal from chlorine. Byproducts of this industrial process include VOCs and NO_x, as well as chlorine which is converted into hydrochloric acid. All of these byproducts contribute to ozone and secondary particulate matter formation in the NWF NAA. In 2021, US Magnesium's permitted potential to emit was 894 tpy of VOCs, 1,261 tpy of NO_x and 8,522 tpy of Hazardous Air Pollutants (HAPs). These emissions make US Magnesium's Rowley plant one of the largest point sources of VOCs and NO_x in the greater Wasatch Front and the largest point source of HAPs in Utah.

As a result of the magnitude of emissions and proximity to the NWF NAA boundary, UDAQ required US Magnesium to perform a RACT analysis for VOC and NO_x emissions. As described in detail in section 4.15, the RACT analysis submitted by US Magnesium identified that the installation of a steam stripper and regenerative thermal oxidizer on the wastewater ponds at the boron plant would be feasible. Once installed, this control will result in the reduction of 0.44 tpd (161.7 tpy) of VOC. However, since the source is located outside of the current NAA (see section 1.4.2), and the timeline for the installation of these controls are beyond what is statutorily required, these emission reductions are not creditable towards RFP requirements but will be included as a contingency measure as discussed in section 11.2.2.

7.5. 4 Tesoro Refining & Marketing Company LLC Marathon Refinery

As described in section 4.12, a RACT analysis submitted by Tesoro Refining & Marketing Company LLC Marathon Refinery identified that the installation of selective catalytic reduction for reducing NO_x emissions from the cogeneration turbines with heat recovery steam generation CG1 and CG2 would be technologically feasible. As a result, these controls will be required to be installed by October 1, 2028, in order for the NAA to demonstrate attainment of the standard as expeditiously as practicable. The installation of these controls will result in an emission reduction of approximately 0.18 tpd (68.78 tpy) of NO_x once installed. Since the timeline for the installation of these controls is beyond the implementation timeline for this SIP revision, and the controls will result in the reduction of NO_x emissions and not VOC emissions, these emission reductions are not creditable towards RFP requirements but are anticipated to be accounted for in subsequent SIP revisions.

In addition to the NO_x reductions associated with controls on CG1 and CG2, Tesoro Refining & Marketing Company LLC Marathon Refinery will be required to install a secondary seal on Tank 321 and replace the wastewater system API Separator and DAF unit with a closed vent to a carbon adsorption control system. These controls, once installed, will result in reductions of VOC emissions by 0.006 tpd

(2.30 tpy) and 0.027 tpd (10.0 tpy) respectively. Thus, the combined VOC reductions associated with these controls is expected to be .033 tpd (12.3 tpy).

7.5.5 Lawn and Garden Small Non-Road Engines

As noted in section 5.3, the UDAQ has identified emission reduction policies aimed at reducing VOCs and NO_x emissions from small non-road engines used in lawn and garden operations as being reasonable. While there are some substantial limitations on the state in how emissions from these sources can be regulated due to CAA Section 209 preemption, the implementation of in-use restrictions for this class of equipment on ozone exceedance days, colloquially known as "mandatory action days," complies with Section 209 preemption while simultaneously allowing for significant VOC emission reductions on days in which reductions are the most critical. The state has identified that the implementation of a rule based on these criteria could net a VOC emission reduction of approximately 2.84 tpd throughout the NWF NAA, which would account for a significant portion of the state's remaining RFP requirement. It is the intent of the UDAQ to introduce an administrative rule during subsequent ozone state implementation planning efforts that aligns with reducing emissions from these sources through mandatory action days restrictions.

Chapter 8 - Attainment Demonstration and Weight of Evidence

8.1 Background

CAA Section 182(b)(1)(I) requires SIP revisions for moderate ozone NAAs to contain an attainment demonstration, with the ozone implementation rule[117] further specifying that an approvable demonstration rely on a photochemical model, or another equivalent analytical method determined to be at least as effective as that required for a serious NAA. For this SIP revision, the UDAQ has developed a photochemical model following EPA guidance, with supplemental analyses to perform the attainment demonstration modeling. In the previous sections of this SIP revision, ozone concentrations have been reported using the unit ppm to be consistent with CAA and CFR (Code of Federal Regulations) language. In this all subsequent sections (sections 8 – 12), the UDAQ will be reporting ozone concentrations in the unit of parts per billion (ppb), in order to be consistent with literature and EPA technical guidance.

The photochemical model developed for this SIP serves as a useful tool for projecting future ozone concentrations, determining source regions that contribute to local ozone levels, and estimating the impacts of emission source categories. This model also represents a significant step forward in understanding the transport and formation of ozone throughout the NWF and the broader state of Utah. Though the predictive ability of this model is scientifically sound and meets established performance criteria, all models have inherent limitations since they are a simplified approximation of complex real-world systems. Therefore, results presented from this modeling analysis should not be considered the sole source of information relied upon when determining if a region will attain the 2015 ozone standard by the attainment date.

EPA's modeling guidance[118] overviews supplemental analyses, termed "weight of evidence" (WOE), that can be used to further support an attainment determination if the maximum MDA8 ozone DV is close to the 70-ppb (0.070 ppm) standard at one or more monitoring sites. A WOE analysis is "a totality of the circumstances approach, one that considers all available data to evaluate the reasonableness of the modeled result which supplements those results."[119] EPA's modeling guidance outlines the basic types of analysis that could be included a part of a WOE analysis including:

- Additional modeling analyses,
- Analysis of trends in ambient air quality and/or emissions, and
- Additional unaccounted emission controls or reactions

The results of the UDAQ's photochemical modeling and WOE are presented in section 8.2.

8.2 Photochemical Modeling Platform

The UDAQ conducted an air quality modeling analysis in support of the NWF NAA attainment demonstration. Modeling was performed following EPA's modeling guidance[120]. This modeling platform

[117] 83 FR 62998

[118] Modeling Guidance for Demonstrating Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze: https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf

[119] Environmental Defense Fund v. Unites States EPA, 369 F.3d 193, 198 (2d Cir. 204).

120 Modeling Guidance for Demonstrating Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze: https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf

includes emissions modeling, meteorological modeling, and photochemical modeling. Photochemical modeling was conducted using the CAMxv7.1 model. Emissions inventories were collected and processed through the Sparse Matrix Operating Kernel Emissions Model (SMOKE) version 4.8.1. With the exception of lightning NO_x and oceanic emissions, modeling was based on scripts and data from EPA's 2016v2 modeling platform.[121] Sea salt and lightning NO_x emissions were calculated in CAMx by running the corresponding CAMx tools (oceanic_v4.2 and lnox_v1.1, respectively). Meteorological fields for input into CAMx were produced using the Weather Research and Forecasting (WRFv4.2) model. A detailed description of each of these models, their configuration, settings, and performance are provided in their respective TSDs.[122]

For this attainment demonstration, the period of June 15 - August 1, 2017, was selected as the modeling episode, where June 15 - 25 corresponds to spin-up days. 2017 was also selected as the base year for modeling and 2023 was selected as the future year with local emissions projected from the 2017 inventory as described in section 3. The modeling domain consisted of three nested grid domains at 12/4/1.33 km. The 12 km domain covers the Western United States and is aligned with EPA's 12US1 domain, with the north-south extent of this domain matching the EPA's domain. The 4 km domain is nested within the 12 km domain and covers the state of Utah as well as parts of neighboring states. The 1.33 km domain is nested within the 12/4 km domains and extends over the northern Wasatch Front non-attainment area to provide higher resolution modeling within this area. The 12/4/1.33 km nested grid modeling domain configuration is shown in Figure 7.

121 EPA 2016v2 Emissions Modeling Platform TSD https://www.epa.gov/system/files/documents/2021-09/2016v2_emismod_tsd_september2021.pdf

122 SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration: https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf & Meteorological Modeling for Wasatch Front O3 SIP Technical Support Documentation and Model Performance Evaluation: https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001605.pdf

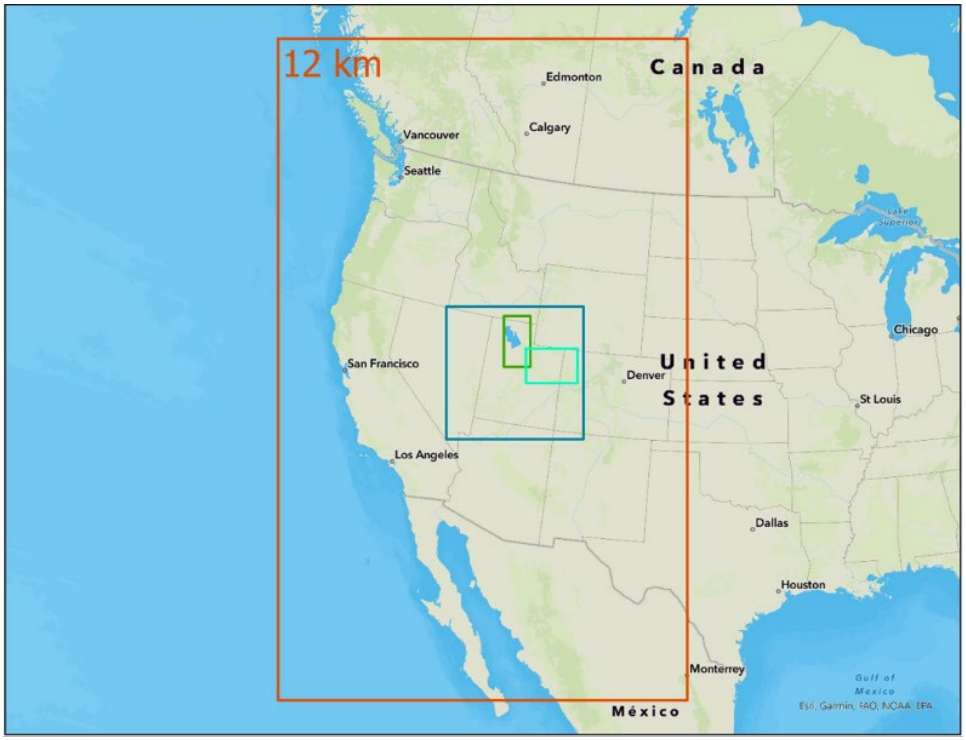

Figure 7: 12/4/1.33 km CAMx Modeling Domains

Time- and space-variable initial and boundary conditions (ICs and BCs, respectively) for the outermost domain (i.e., 12 km domain) were derived from GEOS-Chem global chemistry model outputs for 2017, with the modeling performed by Ramboll under contract with WESTAR.[123] Following EPA guidance, the same GEOS-Chem-derived ICs and BCs for the 2017 base case were used for the 2023 future case. BCs and ICs for the 4 km domain, which was run in a two-way nested configuration with the 1.33 km domain, were extracted from the 3-D CAMx output concentration files for the 12 km domain. Concentrations were extracted along the lateral boundaries of the 4 km domain.

CB6r5h (version 6, revision 5 with halogens) gas-phase chemical mechanism, which includes halogens chemistry, was used for all simulations. At the request of the UDAQ, this mechanism was specifically developed and implemented by Ramboll, developer of CAMx, in a special version of CAMx v7.1 as a replacement for CB6r5 (version 6, revision 5). CB6r5h was developed to account for interactions between inorganic halogen species, ozone, VOCs, and NO_x, where reactions involving chlorine (Cl) and bromine (Br) were added to CB6r5. Halogens emissions are significant in the valley and play a significant role in PM and ozone formation in the NWF. An aircraft monitoring campaign conducted by the National Oceanic and Atmospheric Administration (NOAA) in winter 2017 indicated that US Magnesium, an industrial plant located on the southwest edge of the Great Salt Lake, emits large quantities of HCl and dihalogens (Cl_2, Br_2, BrCl), with the facility being the single largest halogen emission source in the US.[124] Using a photochemical box model and a 3D chemical transport model, the investigators also showed that, while these halogens induce ozone depletion near the plant, they lead to

123 [1] https://views.cira.colostate.edu/docs/IWDW/Modeling/WRAP/2017/Ramboll_WESTAR_GEOS-Chem_Report_8Apr_2021.pdf

124 C. C. Womack, W. S. Chace, S. Wang, M. Baasandorj, D. L. Fibiger, A. Franchin, L. Goldberger, C. Harkins, . S. Jo, B. H. Lee, J. C. Lin, B. C. McDonald, E. E. McDuffie, A. M. Middlebrook, A. Moravek, J. G. Murphy, J. A. Neuman, J. A. Thornton, P. R. Veres, S. Brown. Midlatitude Ozone Depletion and Air Quality Impacts from Industrial Halogen Emissions in the Great Salt Lake Basin. Environ. Sci. Technol. 2023, 57, 5, 1870–1881.

significant increases in the formation of particulate ammonium nitrate, $PM_{2.5}$, ozone, and other oxidants in populated regions of the Salt Lake Valley located downwind of the plant. Regional $PM_{2.5}$ increases of 10%-25% were attributed to this single industrial halogen source. Given that the chemical cycles leading to ozone and ammonium nitrate are linked[125] implementing CB6r5h in our summertime ozone modeling is increasingly important.

8.2.1 Model Performance Evaluation (MPE)

Model performance was evaluated by comparing the 2017 modeled ozone concentrations to measured concentrations of ozone and ozone precursors, including NO_x, NO_2 and VOCs. The evaluation was focused on results for the 1.33 km modeling domain and results for spin-up days are excluded from this analysis. Results showed that the CAMx model performs well at simulating ozone at all sites within the NWF NAA. While the model generally underestimates MDA8 ozone concentrations at the local monitors, site-specific performance statistics are within established performance criteria. For all days of the modeling episode, modeled MDA8 ozone concentrations are within established performance criteria for Normalized Mean Bias (NMB), Normalized Mean Error (NME) and correlation coefficient (R). NMB values for all sites are within the performance criteria of ±15% (Table 66). Similarly, NME and R values for all sites are within their respective performance criteria of < 25% and > 0.5 (Table 67). These performance statistics suggest that the model performs well at simulating MDA8 ozone concentrations. On days with elevated ozone (observed MDA8 > 60 ppb), model performance was overall acceptable with NME values falling within their performance thresholds at all sites (< 25%) and NMB performance threshold being slightly exceeded at one of the sampling sites (NMB of -15.86%) (Table 67). At some sites, the correlation coefficient R displayed some values below 0.5, which is likely related to the model switching from an underprediction to an overestimation of MDA8 ozone on a few days (< 8% of high ozone modeling days), which impacted the modeled ozone temporal trend. These days were characterized by a variable cloud cover, which WRF did not simulate completely. More details on this are provided in the CAMx MPE TSD.

Table 66: Performance statistics for MDA8 ozone on all days of the modeling episode. Results are shown for monitors in the 1.33 km modeling domain.

AQS Site ID	Site Name	NMB (%)	NME (%)	R
49-011-0004	Bountiful	-11.36	13.32	0.735
49-035-3006	Hawthorne	-9.75	12.48	0.653
49-035-3013	Herriman	-13.73	14.46	0.61
49-045-0004	Erda	-14.66	16.04	0.663
49-057-0002	Ogden	-10.51	12.8	0.652
49-057-1003	Harrisville	-14.12	14.56	0.763

[125] C.C. Womack, E.E. McDuffie, P.M. Edwards, R. Bares, J.A. de Gouw, K.S. Docherty, W.P. Dubé, D.L. Fibiger, A. Franchin, J.B. Gilman, L. Goldberger, B.H. Lee, J.C. Lin, R. Long, A.M. Middlebrook, D.B. Millet, A. Moravek, J.G. Murphy, P.K. Quinn, T.P. Riedel, J.M. Roberts, J.A. Thornton, L.C. Valin, P.R. Veres, A.R. Whitehill, R.J. Wild, C. Warneke, B. Yuan, M. Baasandorj, S.S. Brown, An Odd Oxygen Framework for Wintertime Ammonium Nitrate Aerosol Pollution in Urban Areas: NO x and VOC Control as Mitigation Strategies. Geophys. Res. Lett., 46, 4971-4979 (2019).

Table 67: Performance statistics for MDA8 ozone on high O3 days (observed MDA8 > 60 ppb). Results are shown for monitors in the 1.33 km modeling domain.

AQS Site ID	Site Name	NMB (%)	NME (%)	R
49-011-0004	Bountiful	-11.49	13.22	0.56
49-035-3006	Hawthorne	-9.12	12.22	0.276
49-035-3013	Herriman	-13.86	13.9	0.294
49-045-0004	Erda	-15.86	16.78	0.565
49-057-0002	Ogden	-10.16	12.46	0.318
49-057-1003	Harrisville	-14.02	14.57	0.586

Moreover, the model generally captures well the temporal variability of MDA8 ozone concentrations, with the timing of peak and low ozone values being well represented (Figure 8 to Figure 13). The underestimation in modeled MDA8 ozone concentrations is likely primarily related to an underestimation in local emissions, rather than background emissions. Background ozone is well-replicated as indicated by the overall good agreement between modeled and observed MDA8 ozone concentrations at Gothic Colorado, a high-altitude (10,000 ft) monitoring site in the Colorado Rockies that serves as a good indicator of mid-tropospheric air (Figure 14).

Overall, the model exhibited a level of agreement with measurements that has typically been achieved for US regulatory modeling for this region.[126] 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.

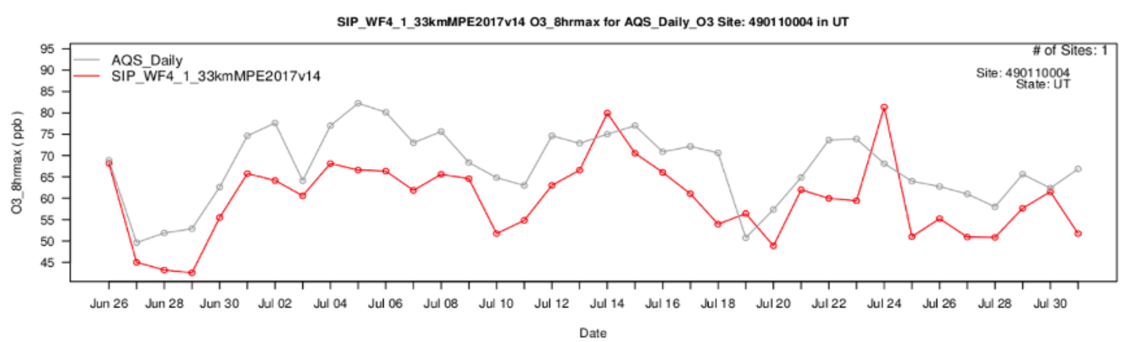

Figure 8: Time series of observed (grey line) and modeled (red line) maximum daily 8-hr average ozone concentration (O3_8hrmax) at the Bountiful monitoring station.

126 https://www.epa.gov/system/files/documents/2022-03/aq-modeling-tsd_proposed-fip.pdf & Denver Metro/North Front Range 2017 8-Hour Ozone State Implementation Plan: 2011 Base Case Modeling and Model Performance Evaluation. https://views.cira.colostate.edu/wiki/Attachments/Source%20Apportionment/Denver/Denver_2017SIP_MPE_Finalv1.pdf

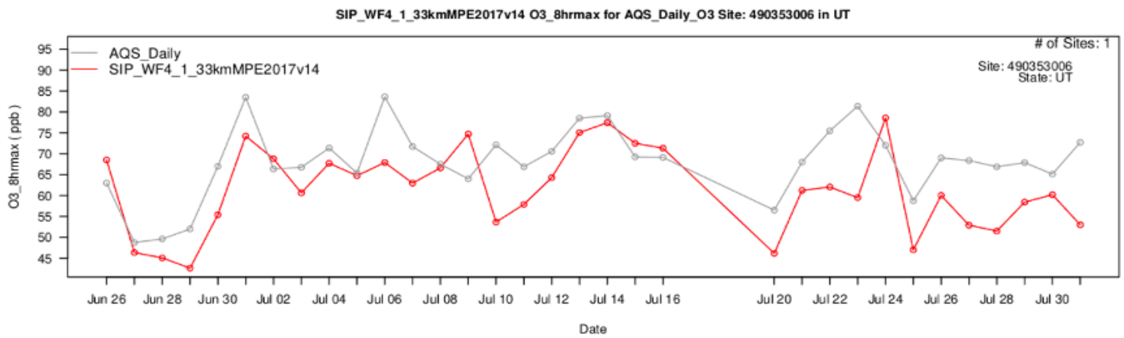

Figure 9: Time series of observed (grey line) and modeled (red line) maximum daily 8-hr average ozone concentration (O3_8hrmax) at the Hawthorne monitoring station.

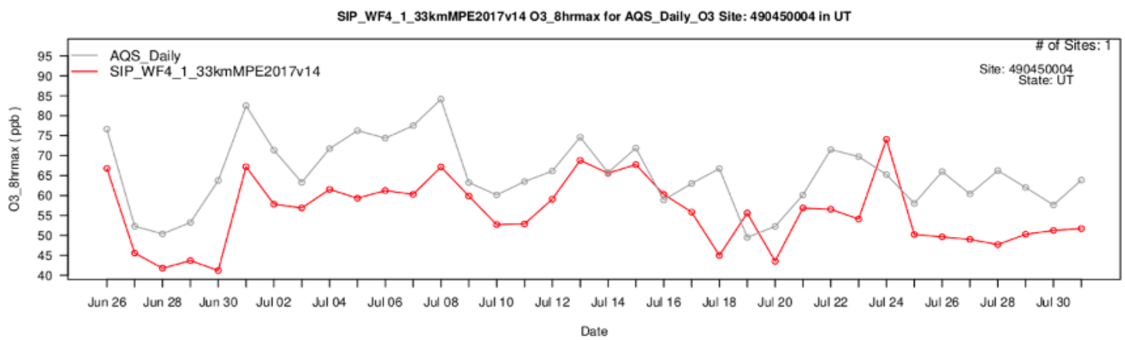

Figure 10: Time series of observed (grey line) and modeled (red line) maximum daily 8-hr average ozone concentration (O3_8hrmax) at the Erda monitoring station.

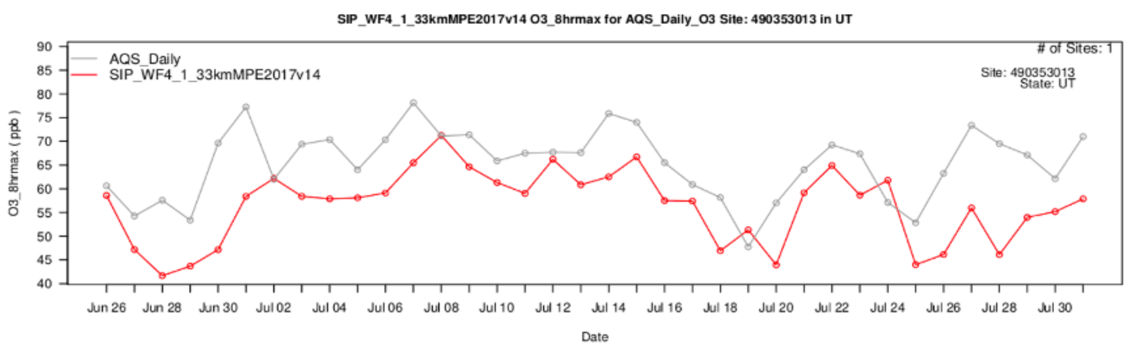

Figure 11: Time series of observed (grey line) and modeled (red line) maximum daily 8-hr average ozone concentration (O3_8hrmax) at the Herriman monitoring station.

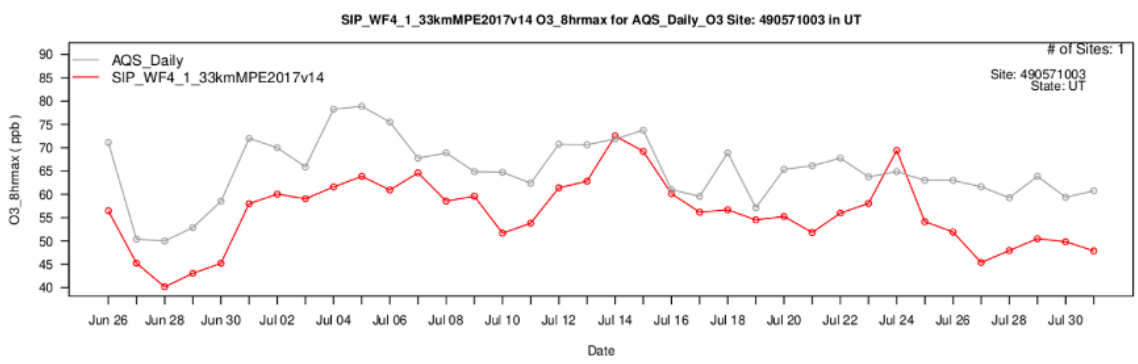

Figure 12: Time series of observed (grey line) and modeled (red line) maximum daily 8-hr average ozone concentration (O3_8hrmax) at the Harrisville monitoring station.

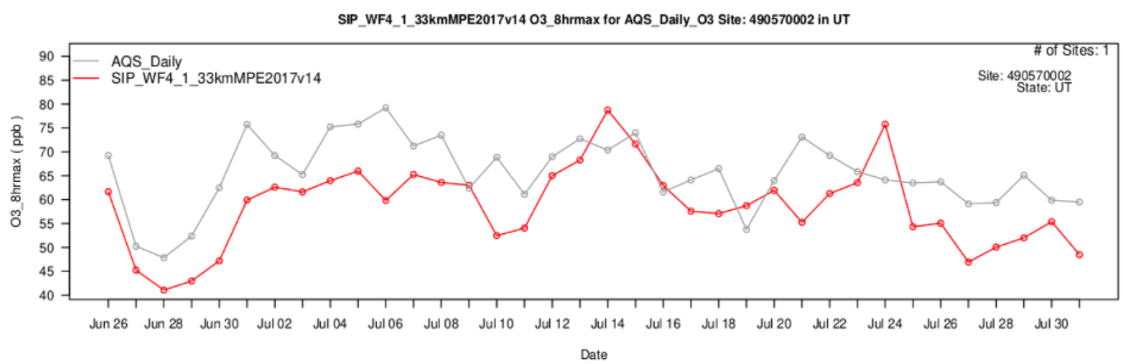

Figure 13: Time series of observed (grey line) and modeled (red line) maximum daily 8-hr average ozone concentration (O3_8hrmax) at the Ogden monitoring station.

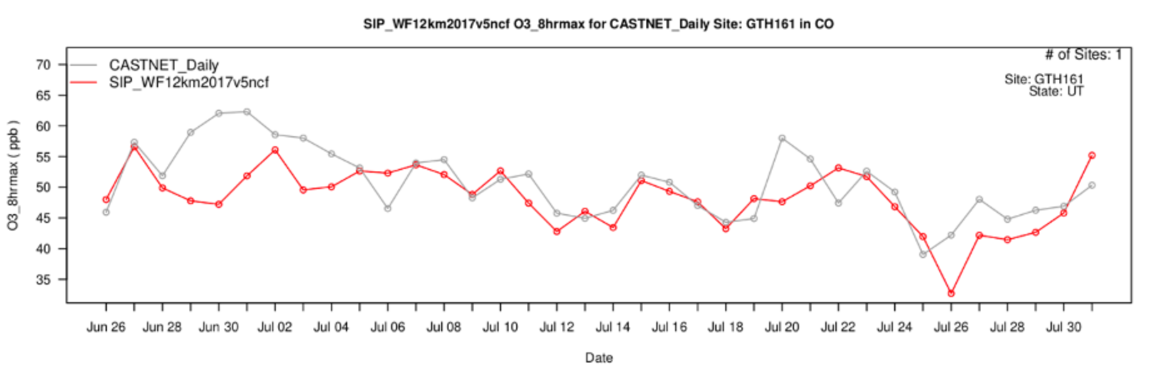

Figure 14: Time series of observed (grey line) and modeled (red line) maximum daily 8-hr average ozone concentration (O3_8hrmax) at Gothic Colorado monitoring station.

8.2.2 Determination of Future Year (2023) Design Values

The ozone predictions from the CAMx model simulations were used to project ambient ozone DVs for the year 2023 following EPA's ozone modeling guidance for SIP demonstrations[127]. Five-year weighted average DVs centered on the base modeling year of 2017 were first calculated by averaging ambient 8-hour ozone DVs for 2015-2017, 2016-2018, and 2017- 2019. The 5-year weighted average

[127] https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf

DVs at each site were then projected to 2023 using the Software for Model Attainment Test Software – Community Edition (SMAT-CE version 1.6).[128] This program predicts future year ozone DVs (FDV_i) for each monitoring site within the NWF NAA by calculating site-specific relative response factors (RRF_i) and scaling the 5-year weighted average base year ozone DV (BDV_i) at each site (i) using its corresponding RRF_i.

Equation 2

$$\boldsymbol{FDV_i = RRF_i \times BDV_i}$$

The RRF_i for each monitoring site corresponds to the fractional change in MDA8 ozone between the base and future year. It is based on the average ozone on model-predicted "high" ozone days in a 3x3 grid cell array centered on the grid cell containing the monitor. Following EPA modeling guidance, RRFs were calculated based on the highest 10 modeled ozone days in the base year simulation at each monitoring site. Specifically, the RRF for an individual monitoring site is the ratio of the average MDA8 ozone concentration in the future year to the average MDA8 concentration in the 2017 base year. The average values are calculated using MDA8 model predictions in the future year and in 2017 for the 10 highest days in the 2017 base year modeling. High ozone days correspond to days when modeled ozone MD8A concentration exceeds, or is or equal, to 60 ppb. For cases in which the base year model simulation does not include 10 days with MDA8 ozone values >= 60 ppb at a site, all days with ozone >= 60 ppb are used in the calculation, as long as there were at least 5 days that meet this criterion. At monitor locations with less than 5 days with modeled 2017 base year ozone >= 60 ppb, no RRF or FDV is calculated for the site and the monitor in question is not included in the analysis. A detailed description of SMAT configuration is provided in the SMAT TSD.[129]

Following this approach, FDVs and RRFs were calculated for each monitoring site within the NWF NAA, where FDV for Bountiful, Hawthorne and Herriman were based on an adjusted BDV (Table 68). BDV for Bountiful, Hawthorne and Herriman, which correspond to the three highest monitors in the NAA, were adjusted to reflect DVs after exclusion of wildfire smoke-impacted ozone exceedance values. In a separate technical document ("Analysis in Support of Exceptional Event Flagging and Exclusion from Modeling for the Weight of Evidence Analysis"), the UDAQ determined that ozone concentrations exceeding the 2015 ozone NAAQS on August 4, 2016, and September 2, 5 and 6 2017 qualify as wildfire smoke-impacted ozone exceedances. These events were excluded from the 2017 BDV calculations for Hawthorne, Bountiful and Herriman. Excluding these events results in a decrease of 1.7 - 2.0 ppb in the BDV and 2.0 ppb in the FDV for these sites (Table 68). Note that consistent with the truncation and rounding procedures for the 8-hour ozone NAAQS, the projected DVs are truncated to the first decimal place in units of ppb.

[128] https://www.epa.gov/scram/photochemical-modeling-tools & UDAQ Ozone SIP SMAT-CE Configuration Utah Division of Air Quality TSD: https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001838.pdf

[129] UDAQ Ozone SIP SMAT-CE Configuration Utah Division of Air Quality: https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001838.pdf

Table 68: Baseline design values (BDV), relative response factors (RRF), future design values (FDV) at Bountiful, Hawthorne and Herriman monitoring locations. DVs before and after exclusion of days impacted by wildfire smoke are shown. indicates DV after removal of wildfire smoke-impacted ozone exceedance values.*

			Flagged Data Not Excluded 3x3 grid-cell array Max Paired in Space				Flagged Data Excluded 3x3 grid-cell array Max Paired in Space			
Site	**Site ID**	**County**	**BDV**	**RRF**	**FDV**	**Final FDV**	**BDV**	**RRF**	**FDV**	**Final FDV**
Bountiful	490110 004	Davis	76.7	0.9593	73.5	73	75*	0.9593	71.9*	71
Hawthorne	490353 006	Salt Lake	76.7	0.9698	74.3	74	75*	0.9698	72.7*	72
Herriman	490353 013	Salt Lake	76	0.9686	73.6	73	75*	0.9686	72.6*	72
Erda	490450 004	Tooele	73	0.9673	70.6	70	73	0.9673	70.6	70
Harrisville	490571 003	Weber	72.7	0.9676	70.3	70	72.7	0.9676	70.3	70

8.2.3 Model Attainment Test

Table 69 summarizes the finalized BDV, FDV and RRF at each monitoring site within the NWF NAA, where the BDV for Bountiful, Hawthorne and Herriman, are adjusted to reflect BDV after removal of ozone exceedance values impacted by wildfire smoke. Only sites that had an ozone monitor operating in the 5-year period (2015-2019) were used to calculate the 5-year weighted average ambient BDV and are currently still part of UDAQ air monitoring network were included in this analysis.

Results show that the FDV are projected to reach between 70 - 72 ppb by the attainment date across all sites in the non-attainment area, with the Hawthorne monitoring site projected to be the controlling monitor at 72 ppb. It is important to note the way in which ozone DVs are truncated to the lowest whole number when being calculated, a FDV of 70.9 ppb is needed to demonstrate attainment. Therefore, considering the range of projected FDV, monitoring sites that show nonattainment are all demonstrating FDV very near attaining the standard.

Table 69: Baseline design values (BDV), relative response factors (RRF), future design values (FDV) at monitors within the northern Wasatch Front ozone non-attainment area.

			3x3 grid-cell array Max Paired in Space			
Site	**Site ID**	**County**	**BDV**	**RRF**	**FDV**	**Final FDV**
Bountiful	490110004	Davis	75	0.9593	71.9	71
Hawthorne	490353006	Salt Lake	75	0.9698	72.7	72
Herriman	490353013	Salt Lake	75	0.9686	72.6	72
Erda	490450004	Tooele	73	0.9673	70.6	70
Harrisville	490571003	Weber	72.7	0.9676	70.3	70

8.3 Weight of Evidence (WOE)

8.3.1 Overview

While the modeled attainment demonstration described in section 8.1 (Table 69) indicates that the MDA8 at the Hawthorne monitor will reduce to 72 ppb by the attainment date, slightly above the 70.9 ppb required to demonstrate attainment, the UDAQ has implemented substantial additional efforts to combat summertime ozone not accounted for during this modeling effort should be taken into consideration when determining if the area is demonstrating attainment. In this section, as part of a WOE approach[130], the UDAQ will present an overview of additional efforts and analysis to provide further insights into to be considered when determining if the area is demonstrating attainment.

8.3.2 Uncertainties in Modeling and Inventory

While the photochemical modeling results presented in section 8.1 meet EPA performance metrics and represent a significant improvement in past efforts to model ozone in the NWF, there are uncertainties in any modeling effort that may result in an overestimation in future predicted ozone concentrations.

These uncertainties can result from a wide array of parameters involved in complex modeling efforts, including the process of compiling the emission inventories modeling efforts rely on. For instance, the mobile on-road sector of the inventory is estimated using models developed by the EPA that have many versions EPA released over the years. Estimations of NO_x have differed significantly as one model replaced the next, and changes in the vehicle fleets over time such as the electrification of the mobile sector may be underrepresented (see section 8.3.4). Further, since SIPs are legally binding documents and will be enforced in the event certain conditions are not met, emission reductions associated with past SIP efforts have included conservative estimates of total reductions. Therefore, emission reductions accounted for in inventories may underrepresent the full extent of real-world reductions.

Additionally, for the development of the attainment demonstration included in this SIP revision, the UDAQ relied on VOC emissions estimates within the solvent sector from an EPA supplied product. This product, VCPy, has substantial benefits over past methods used in the quantification of emissions within this category. However, some uncertainties remain in the emission estimates produced by VCPy that could result in overestimations of VOC emissions within the NWF NAA. For instance, as described in section 3.2.2, this SIP revision sourced its VOC emissions for the solvents sector from EPA's 2016v2 platform. EPA has subsequently released an updated version (2016v3) of this platform[131] in which EPA revised its estimated for Utah statewide VOC emissions as adjusted to account for "indoor usage assumptions" as well as "control assumptions". These updates resulted in a statewide decrease of estimated VOC emissions by 1,699 tpy. As these emissions are generally allocated in modeling based on population metrics, and the NWF represents a significant proportion of Utah's population, it stands to reason that the majority of the decrease in VOC emission from 2016v2 to 2016v3 would be observed in the NWF NAA.

[130] Modeling Guidance for Demonstrating Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze

[131] Technical Support Document (TSD): Preparation of Emissions Inventories for the 2016v3 North American Emissions Modeling Platform. U.S. EPA. January 2023

8.3.3 Background, Interstate, and International Transport

8.3.3.1 Background Ozone

The EPA identifies "background" ozone in the United States (USB) as ozone formed from sources or processes other than anthropogenic emissions of NO_x, VOCs, methane (CH_4) and CO originating from within the United States.[132] This definition does not include intra or inter-state transport of ozone impacting downwind areas, which are covered by other sections of the CAA including section 110(a)(2)(D). NAAs in the Intermountain West face significant and regionally specific challenges meeting ozone standards especially as it relates to the amount of USB present.[133] The region faces further challenges due to the increasing instances of wildfire,[134] significant regional and local biogenic contributions,[135] as well as the influence of internationally transported pollutants,[136] all of which contributing to a large proportion of ozone on any given day. These challenges are highlighted in multiple analysis identifying significantly elevated USB ozone concentrations throughout the region when compared to the eastern United States.[137]

The substantial contribution of USB ozone impacting Utah's total ozone concentrations and can be seen at the remote sites located throughout the state, such as the monitoring sites located in Escalante National Monument, or Bryce and Canyonlands National Parks. These sites are typically free of impacts from localized anthropogenic emissions, and they regularly report 8-hour summertime ozone concentrations above 0.050 ppm. Source apportionment modeling performed by the UDAQ (see section 9.2 for details) further found USB ozone concentrations (including interstate anthropogenic emissions) along the Wasatch Front account for up to 85.5% of the ozone comprising the daily 8-hour concentrations observed at the Hawthorne site (Figure 15 and Figure 16), with the remaining 14.5% attributable to Utah anthropogenic emissions.

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[132] Implementation of the 2015 Primary Ozone NAAQS: Issues Associated with Background Ozone". USEPA, December 2015

[133] Scientific Assessment of background ozone over the U.S.: Implications for air quality management

[134] Buchholz, R.R., Park, M., Worden, H.M. et al. New seasonal pattern of pollution emerges from changing North American wildfires. Nature Communications 13, 2043 (2022). https://doi.org/10.1038/s41467-022-29623-8

[135] EPA Webinar; Description and preliminary evaluation of BELD 6 and BEIS 4. ORD. Jesse O. Bash and Jeff Vukovich

[136] Entrainment of stratospheric air and Asian pollution by the convective boundary layer in the southwestern U.S.; Langford, A.O. et al. (2017), J. Geophysics. Res. Atmos., 122, 1312-1337, doi:10.1002/2016JD025987

[137] Entrainment of stratospheric air and Asian pollution by the convective boundary layer in the southwestern U.S.; Langford, A.O. et al. (2017), J. Geophysics. Res. Atmos., 122, 1312-1337, doi:10.1002/2016JD025987 & Implementation of the 2015 Primary Ozone NAAQS: Issues Associated with Background Ozone; USEPA, December 2015

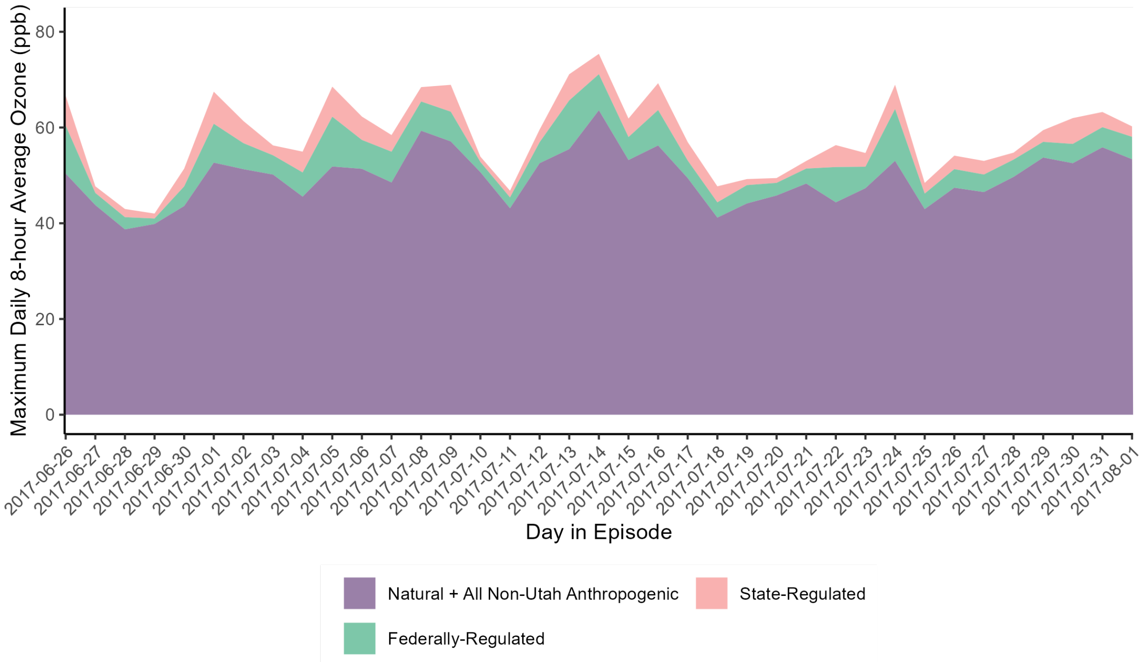

Figure 15: Ozone Attributed to Domain-Wide Sources at Hawthorne as simulated 8-hour daily ozone concentrations along the Wasatch Front.

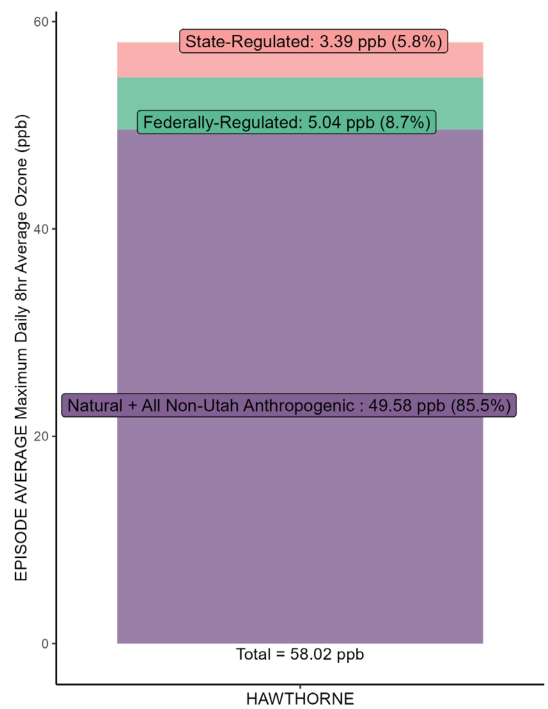

Figure 16: Episode average of simulated 8-hour daily ozone concentrations at Hawthorne along the Wasatch Front.

8.3.3.2 Interstate Transport

In 2022, as part of its ongoing efforts to model nationwide ozone and transport of precursor emissions, the EPA released results from its updated North American Emission Modeling Platform 2016v2. This analysis identified the contributions from multiple upwind states for the modeled year of 2023 to ozone concentrations along the NWF NAA (Table 70).[138] The states impacting the NWF NAA include California, Nevada, Arizona, Idaho, Oregon, and Washington. The combined contributions to counties in the NWF from these upwind states result in impacts ranging from 4.0 ppb to 4.91 ppb. Given that the attainment demonstration described in section 8.2 identified the FDV of 72 ppb for Salt Lake, and 71 ppb for Davis counties, the combined upwind contribution from western states accounts for 6 - 7% of the total predicted ozone concentrations in the NWF NAA.

Table 70: 2023 contributions from upwind states to NWF NAA (ppb) as identified by EPA 2016v2 modeling

	Salt Lake	Davis	Weber
California	2.46	2.25	2.24
Nevada	0.89	0.86	0.58
Arizona	0.22	0.22	0.13
Idaho	0.55	0.37	0.57
Oregon	0.58	0.44	0.41
Washington	0.21	0.16	0.13
Total	**4.91**	**4.30**	**4.06**

Section 110(a)(2)(D)(i)(I) of the CAA, known as the "Good Neighbor" provision, requires states with a contribution more than the EPA's determined significance threshold to develop a SIP revision with provisions to address contributions to downwind states. This threshold was set at 1% of the NAAQS, or 0.7 ppb for the 2015 ozone NAAQS. Of the six states listed in Table 70, both California and Nevada were identified by the EPA as contributing to Utah's ability to attain or maintain the NAAQS in a regulatorily significant way (>= 0.7 ppb). On April 4, 2022, the EPA proposed a Federal Implementation Plan (FIP) to address disapprovals or deficiencies in twenty-six states' Good Neighbor SIPs, including those of California and Nevada.[139] The proposed FIP will require emission reductions from an array of industrial activities including fossil fuel-fired power plants, natural gas pipeline transportation, cement production, glass, iron and steel manufacturing, as well as reductions from chemical, petroleum, and paper manufacturing processes. If the proposed FIP becomes final, emission reductions covered under this rule will begin taking effect the summer of 2023, with full implementation of emission reductions by summer 2026. Given that California and Nevada combine to generate upwind contributions of 3.35 ppb of ozone to the NWF NAA, as these proposed controls take effect, they may further aid in the NWF NAA's ability to attain the standard by the attainment date.

[138] Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard, 87 Fed. Reg. 20,036 (April 6, 2022).

[139] *Id.*

8.3.3.3 International Transport

The transport of ozone and its precursor emissions from international sources will be discussed in depth in section 9 of this SIP revision. However, international contributions to ozone along the Wasatch Front, much like interstate contributions described in section 8.3.3.2, plays an important role in the area's observed ozone concentrations and the NWF NAA's ability to meet ozone health-based standards. Thus, it is important to include a discussion of international contributions in a WOE analysis.

In short, emissions from international sources have long been shown to impact ozone concentrations throughout the Intermountain West.[140] These studies generally identified international contributions in the range of 3 – 4 ppb, predominantly observed as contributing to USB ozone conditions. International contributions tend to be relatively consistent throughout the spring and summer seasons. The range of international contributions reported in these studies are similar in scale to those seen from upwind states impacting the NWF NAA as described in section 8.3.3.2 and shown in Table 70.

To examine international contributions to the NWF NAA, the UDAQ conducted source apportionment modeling (see section 9.2 for details), in which international contributions were tagged. The results of this exercise (Figure 17 & Figure 18) identified a contribution of 6.2% of ozone along the Wasatch Front attributable to international transport on non-exceedance days, with a similar but slightly higher contribution identified during exceedance days of 6.7%. While the model underestimates absolute ozone concentrations when compared to monitored values, and thus absolute apportioned contributions should be considered with that limitation in mind, the reported concentrations of international contributions range from 3.74 ppb over the episode and average, up to 4.5 ppb on the top 10 modeled exceedance days. 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.

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[140] Langford, A.O., Alvarez, R.J., Brioude, J., Fine, R., Gustin, M.S., Lin, M.Y., Marchbanks, R.D., Pierce, R.B., Sandberg, S.P., Senff, C.J., Weickmann, A.M., Williams, E.J., 2017. Entrainment of stratospheric air and Asian pollution by the convective boundary lauer in the southern U.S. J. Geophysical Res. Atmos., 122, 1312-1337, doi:10.1002/2016JD025987 & Jaffe, D.A., O.R. Cooper, A.M. Fiore, B.H. Henderson, G.S. Tonnesen, A.G. Russell, D.K. Henze, A.O. Langford, M. Lin, T. Moore, 2018. Scientific assessment of background ozone over the U.S.: Implications for air quality management. Elem. Sci. Anth., 6: 56. DOI: https://doi.org/10.1525/elementa.309.

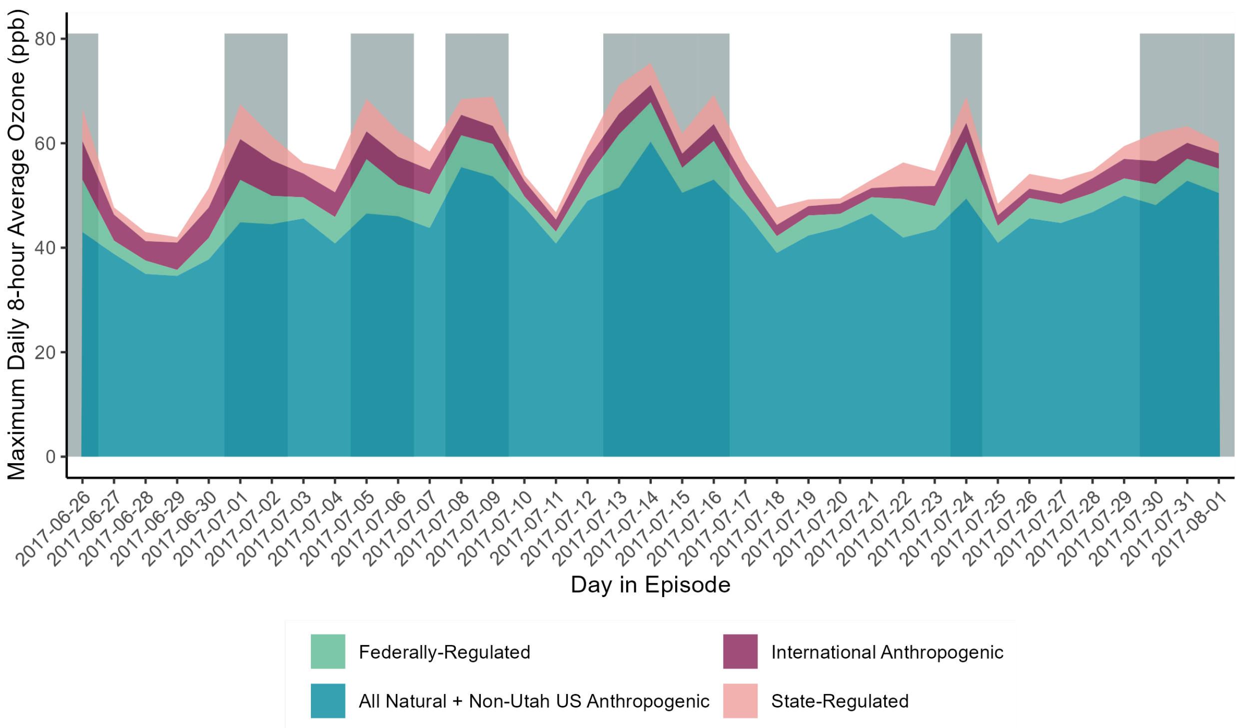

Figure 17: Ozone Attributed to Domain-Wide Sources

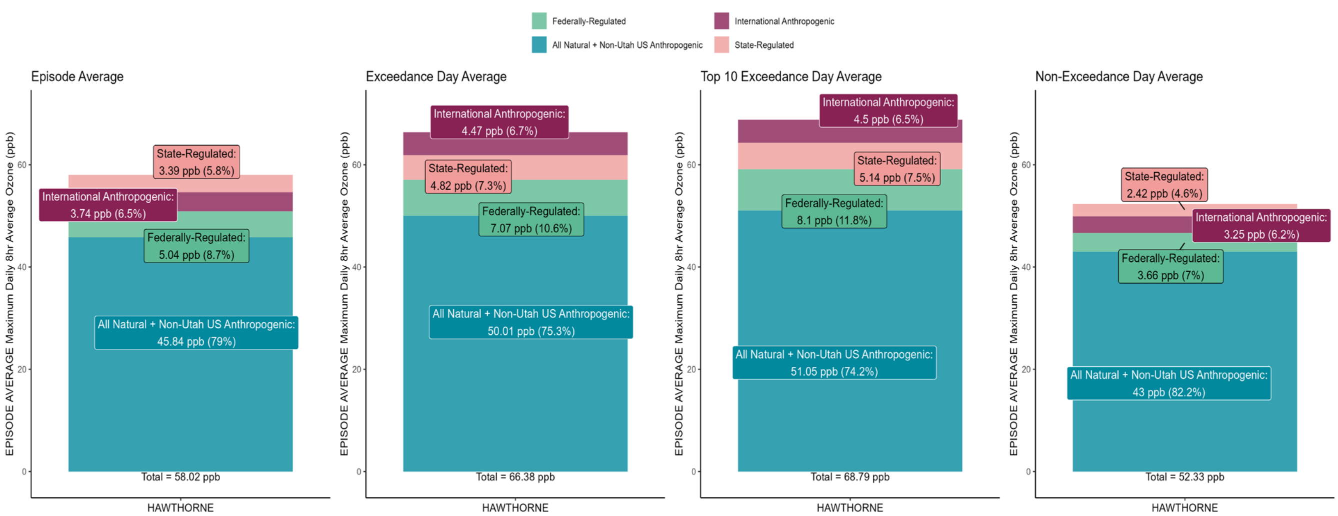

Figure 18: Domain-Wide OSAT exceedance vs. non-exceedance days

8.3.3.4 Federal vs. State Regulatory Authority

As noted in Utah's comments[141] submitted to EPA on EPA's proposed FIP for interstate transport,[142] "A significant portion of states' total contribution to downwind areas include emissions that states have limited regulatory authority and, in some cases, no regulatory authority at all, including emissions that are federally regulated." These federally regulated emission sources include the mobile sector, an area in which the state has significantly limited authority to regulate due to CAA section 209's preemption. This is particularly relevant for anthropogenic NO_x emissions, which are dominated by the mobile sector. For the NWF NAA, the emissions from federally regulated sources account for 55.96 tpd (64%) of the total NAA NO_x inventory, and 29.8 tpd (33%) of the VOC inventory (section 3).

The discrepancy between regulatory authority can be further seen in Figures 15 – 18, where federally regulated sources account for 59.7% of the ozone attributable to anthropogenic emissions, while emissions under state authority account for the remaining 40.3% of ozone formation. As the state of Utah strives to attain the NAAQS, it is doing so with limited authority to reduce a substantial portion of the emissions contributing to the formation of ozone within the NAA.

8.3.4 Trends in Emissions

Trends in emission reductions along the Wasatch Front are presented in Table 71, providing further evidence that the area is progressing towards attaining the standard by the attainment date. As described in detail in section 3 and section 7 of this SIP revision, the NWF NAA has experienced substantial emission reductions of both anthropogenic VOCs and NO_x during the corresponding years of this implementation timeframe—2017 to 2023. During this time, NO_x emissions decreased by 21.3 tpd and VOC emissions decreased by 3.7 tpd in large part due to improvements in the on-road mobile sector and as a result of past SIP efforts.

Table 71: NO_x and VOC reductions resulting from $PM_{2.5}$ SIPs.

State Implementation Plan	Years	NO_x Reduction (tpd)	VOC Reductions (tpd)
***Salt Lake City Moderate $PM_{2.5}$ SIP (2014)**[143]	2010 - 2015	24.86	27.57
***Salt Lake City Serious $PM_{2.5}$ SIP (2019)**[144]	2016 - 2020	15.75	8.27
Total		40.61	35.84
*** Includes portions of Box Elder County which is not included in NWF ozone NAA**			

As shown in Table 71, past SIP efforts have resulted in significant reductions of NO_x and VOC emissions along the Wasatch Front. Additionally, as described in detail in section 7.3 and section 7.4, the areas have experienced significant decreases in both precursor pollutants as a result of 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 (ZEV),

[141] Docket ID No. EPA-HQ-OAR-2021-0668, Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Primary Ozone National Ambient Air Quality Standard. Comments Submitted by Utah Department of Environmental Quality (UDAQ). DAQP-055-22. June 21, 2022

[142] 87 Fed. Reg. 20,0036.

[143] Utah State Implementation Plan Section IX. Part A.21; Control Measures for Area and Point Sources, Fine Particulate Matter, $PM_{2.5}$ SIP for the Salt Lake City, UT NAA

[144] Utah State Implementation Plan Section XI. Part A.31; Control Measures for Area and Point Sources, Fine Particulate Matter, Serious Area $PM_{2.5}$ SIP for the Sal Lake City, UT NAA.

predominantly in the light duty sector. The growth of ZEV and electric-hybrid vehicles has grown 940.3% and 101.6% respectively from 2015 – 2021 in the state of Utah.[145] While the total proportion of ZEV and electric-hybrid vehicles in Utah's fleet was still relatively low, at ~2.4% in 2021[146], given the growth rate of electric vehicle (EV) adoption in the state, and the fact that Utah is ranked fifth in the nation for access to EV charging infrastructure per capita,[147] the percentage of Utah's on-road fleet is likely to continue to shift towards ZEV and low emission vehicles which will further advance emission reductions in this sector.

In addition to the potential underestimation in the electrification of the on-road mobile sector, further market penetration of Tier 3 fuels is expected to continue. In 1970, the EPA set the first light-duty vehicle emission standards. These standards have been updated over time with generations of the standard termed Tier 1, Tier 2, and most recently, Tier 3. The Tier 2 and Tier 3 standards also included sulfur standards for gasoline to help ensure that vehicle emissions control operates optimally. By 2025, NO_x emission standards for light-duty vehicles will represent a 98% improvement from 1975 levels, with sizable improvements for VOCs.

The UDAQ anticipates that the transition from Tier 2 and older vehicles to Tier 3 vehicles will yield dramatic reductions in ozone precursor emissions. While MOVES modeling attempts to capture these emissions reductions, and thus should be represented to some degree in emissions inventories used for this SIP revision, it is important to note that Utah has taken significant additional steps to ensure that the benefit of the Tier 3 vehicle and fuel standards is fully realized throughout the NWF NAA and thus some emission reductions may be underestimated in this modeling demonstration.

Unlike many other metropolitan areas throughout the U.S., the NWF is served by the relatively small number of refineries. Importantly, all but one of these refineries (Sinclair) are considered to be "small volume" under the Tier 3 regulations[148] – i.e., they produce less than 75,000 barrels per day. Because of this, and due to the older age of facilities in the NWF, it may be more cost-effective for operators to comply with Tier 3 regulations by upgrading their larger, or newer, refineries elsewhere and using credits generated at these facilities and the averaging, banking, and trading provisions of the Tier 3 rule to comply in Utah. This compliance structure would result in higher-sulfur gasoline being sold throughout the NWF NAA, which would erode the benefits of Tier 3 fuels.

Although states are restricted from directly establishing new fuel requirements by the Energy Policy Act of 2005, the State of Utah has used a combination of state-led pressure, public awareness initiatives, and incentives in the form of tax credits, to encourage refineries to produce Tier 3 fuel instead of using credits to comply, giving UDAQ greater confidence that the full benefits of the Tier 3 fuels will be realized locally. This is especially important in the early years of the Tier 3 program when most of the emissions reduction benefits stem from using Tier 3 fuels in Tier 2 and older vehicles. In particular, the WFRC found that the use of Tier 3 fuel in existing light-duty vehicles results in a NO_x reduction of 14.5% and in a VOC reduction of 3.9% as compared with the same vehicles using Tier 2 fuel (30 ppm sulfur).[149] These dramatic benefits begin to accrue almost immediately after the first few

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[145] Adoption of Electric and Alternative Fuel Vehicles. OFFICE OF LEGISLATIVE RESEARCH AND GENERAL COUNSEL; May 18, 2021: https://le.utah.gov/interim/2021/pdf/00002047.pdf

[146] Adoption of Electric and Alternative Fuel Vehicles. OFFICE OF LEGISLATIVE RESEARCH AND GENERAL COUNSEL; May 18, 2021: https://le.utah.gov/interim/2021/pdf/00002047.pdf

[147] https://www.governing.com/next/new-data-shows-states-ith-highest-and-lowest-number-of-ev-charging-stations?utm_campaign=Newsletter%20-%20GOV%20-%20Daily&utm_medium=email&_hsmi=235987835&_hsenc=p2ANqtz--VWjg_LxXqDi4qNgUMKfC7NQ8O47DG-58ltMXtUweN0QB986ZcszciRfLRxIBQmqBB1mJcfUdxIrvMrh7tWVVucfX1yw&utm_content=235987835&utm_source=hs_email

[148] 81 FR 23641: Amendments Related to: Tier 3 Motor Vehicle Emission and Fuel Standards

[149] "Improved air quality through the use of Tier 3 fuels in Utah", Utah Clean Air Caucus, June 14, 2016

refueling cycles once the lower-sulfur fuel is available, making the State's efforts to bring these cleaner burning fuels to the NWF NAA critical for reducing ozone precursor emissions and ultimately demonstrating attainment of the NAAQS.

There are seven refineries that provide the majority of the fuel consumed within the NWF NAA. Five of those refineries are located in the NWF NAA, while two additional facilities – the Sinclair refineries in Sinclair and Casper, WY – are connected to the NWF via a product pipeline. Utah has received public commitments from all but one of these refineries that the fuel provided along the Wasatch Front meets the Tier 3 10-ppm sulfur average requirements. The last remaining refinery is expected to make the full transition to Tier 3 fuels by 2024.[150] As the last of Utah's refineries makes the transition to refining and distributing the cleaner burning Tier 3 fuels, additional potentially underestimated reductions in estimated on-road mobile emissions are possible.

In addition to potential underestimations of on-road emission reductions, the state of Utah has taken steps to reduce emissions through improving the effectiveness of existing administrative rules. On February 1, 2023, the Utah Air Quality Board adopted amendments to Utah Administrative Rule R307-328; Gasoline Transfer and Storage. These amendments resulted in the addition of clarifying language to the rule which requires all gasoline service stations to install pressure relief valves to underground storage tanks. While the requirement for pressure relief valves was preexisting in R307-328, the language did not adequately explain the requirements. The UDAQ had identified 266 underground storage tanks located in the NWF NAA that either did not have, or could not be confirmed to have, the required pressure relief valve. The resulting emission reductions from these amendments are not represented in the inventory since the inventory assumed compliance with this requirement, however these amendments will result in additional reductions of VOC emissions within the NWF NAA.

8.3.5 Unaccounted Controls and Emission Reductions

As described in section 7, emissions reductions that are creditable towards RFP, and thus included in a subsequent attainment demonstration, emission reductions have strictly prescriptive requirements attached. While the attainment demonstration in this SIP revision utilized inventories that attempt to quantify emission reductions associated with past SIP work and improvements to the on-road sector, the inventory does not account for emission reductions associated with non-RFP creditable reductions. However, the state of Utah has multiple and extensive incentive and non-creditable emission reduction programs that result in substantial emission reductions. As a result, the attainment demonstration outlined in Section 8.2 does not fully account for ongoing emission reduction in, and around, the NWF NAA. This section highlights these programs and, where possible, reports emission reductions associated with these programs. Some of these programs include regions beyond the NWF NAA, however being the most densely populated region in the State, a substantial portion of the emission reductions highlighted in this section are targeted to areas within the NAA boundary.

8.3.5.1 Utah Clean Diesel Program (UCDP) and Diesel Emission Reduction Act (DERA)

Utah's Clean Diesel Program provides incentives to fleet owners to retire older vehicles and replace them with newer vehicles that meet more stringent emission standards. The program began in 2008 and will continue beyond this SIP revision and includes incentives available under the Diesel Emission Reduction Act (DERA)[151] and the National Clean Diesel (NCD) program. Table 72 indicates the

[150] "Four Utah refineries now produce cleaner Tier 3 fuels, and the fifth says it will soon." Salt Lake Tribune. January 22, 2023: https://www.sltrib.com/renewable-energy/2023/01/22/four-utah-refineries-now-produce/

[151] 42 U.S.C. §§ 16131 through 16137.

annual targeted number of vehicles included in the program and their estimated annual and lifetime emission reductions for both NO_x and VOCs for the years associated with this SIP revision.

8.3.5.2 Volkswagen Settlement Funds

In 2016, Volkswagen (VW) entered into a settlement[152] as a result of a lawsuit filed against the company for defeating emission testing programs and engine certifications for its light-duty diesel vehicles. The state of Utah was the beneficiary of this settlement and received $35,177,506. The Utah Department of Environmental Quality was designated as the lead agency to administer this funding, which has been used to replace older class 4 – 8 freight trucks, school buses, shuttle and transit buses, fund electrical vehicle supply equipment, and assist the Diesel Emissions Reduction Act (DERA) program described in section 8.2.6.1. The results of this program are highlighted in Table 72.

8.3.5.3 Vehicle Repair and Replacement Assistance Program (VRRAP)

In 2018 the EPA awarded the state of Utah with Targeted Air Shed Grant funding. Targeted Air Shed Grants provide funds to reduce air pollution in the nation's NAAs with the highest levels of ozone and $PM_{2.5}$. UDAQ application was for the development of a Vehicle Repair and Replacement Assistance Program (VRRAP) for the Salt Lake $PM_{2.5}$ NAA.

Through the VRRAP, low-income individuals with a vehicle that fails an emissions inspection are offered funding assistance to either repair the vehicle or replace it with a newer, cleaner vehicle. Qualifications for financial assistance are based on a matrix that considers the vehicle owner's household income as a percent of the national income poverty level, the value of the repairs being done on the vehicle, and the vehicle's mechanical life expectancy. The program is set up to augment and improve the overall effectiveness of counties' I/M programs.

Since starting in 2020 the VRRAP has repaired 163 and replaced 48 vehicles. UDAQ expects these activities to reduce emissions annually by 1.26 tons of Nonmethane Organic Gas (NMOG) and NO_x and reduce lifetime emissions of NMOG and NO_x by 11.17 tons (Table 72).

[152] VOLKSWAGEN "CLEAN DIESEL" MARKETING, SALES PRACTICES, AND PRODUCTS LIABILITY LITIGATION. Case Number: MDL No. 2672 CRB (JSC)

*Table 72: Emission reductions associated with incentive programs in and around the NWF NAA. * VOC emission reductions not available. ** Combined NO_x and NMOG emission reductions*

Year	Vehicles Replaced	NO_x Annual Reduction (tpy)	NO_x Lifetime Reduction (tpy)	VOC Annual Reduction (tpy)	VOC Lifetime Reduction (tpy)	Program
2017	95	35.77	144.19	8.68	12.77	DERA / NCD
2018	87	9.66	176.40	0.89	16.91	DERA / NCD
2019	60	20.91	62.73	1.04	3.12	DERA / NCD
2020	44	4.75	14.26	0.55	1.65	DERA / NCD
2021	59	7.2	26.34	0.66	2	DERA / NCD
2019 - Ongoing	78	23.49	10.34	*	*	VW Settlement
2020 - Ongoing	48	11.17**	1.26**	**	**	VRRAP
2022	13	1.54	4.62			NCD
Total	484	103.32	438.88	11.82	36.45	

8.3.5.4 Diesel I/M Programs

In 2018 the Utah State Legislature passed H.B. 101, which established a pilot program to require diesel vehicle emissions inspections in Utah County. This program was made permanent in 2021 when the Utah State Legislature passed S.B. 146. While diesel I/M programs have not historically been awarded SIP emissions reduction credit, UDAQ nevertheless anticipates additional NO_x and VOC emissions reductions from this program. Currently, all counties that are required to have an emission inspection program are required to have a diesel emissions program for vehicles model year 2007 or newer with a gross vehicle weight of 14,000 pounds or less (see 41-6a-1642(7)). Salt Lake and Davis Counties also require all diesel vehicles to go have an emission inspection.

8.3.5.5 Lawn & Garden Equipment Exchange Program

Beginning in 2015, as part of the Utah Clean Air Retrofit, Replacement, and Off-Road Technology (CARROT) program,[153] the UDAQ has administered a lawn and garden exchange program aimed at replacing gas powered lawn and garden equipment with zero emission alternatives. This equipment includes lawn mowers and string trimmers but is expected to be expanded in the coming years to include a wider array of 2-stroke lawn and garden equipment. Since 2017, this program has replaced an estimated 6,638 pieces of summertime operated lawn and garden equipment resulting in an estimated reduction of 0.13 tpy of NO_x and 2.26 tpy of VOCs.

[153] Utah Code Ann. §§ 19-2-201 through 19-2-204.

8.3.5.6 UCAIR Summer Education Program

The Utah Clean Air Partnership (UCAIR) is a statewide non-profit entity created to bring together individuals, business, and communities to help improve Utah's air. In 2022, UCAIR received a grant from the Utah Department of Environmental Quality to conduct an outreach and education campaign aimed at educating Utah's population about summertime ozone pollution. The campaign ran from July 5 through September 11, 2022. During this time the campaign measured over 45 million unique impressions through a combination of television (2.9 million), outdoor (27.68 million) and online (14.45 million) outlets. Post-campaign research identified that 92% of residents were concerned with the air quality where they live during summer ozone season, with 99% of respondents familiar with personal actions they can take to improve air quality.

8.3.5.7 UCAIR Personal Fuel Can Exchange Program

In addition to the education campaign discussed in section 8.3.5.6, UCAIR operates a Personal Fuel Canister (PFC) exchange program, in which UCAIR collects and recycles old PFCs and replaces them with EPA compliant canisters, which reduces VOC emissions associated with the evaporative loss of gasoline. The program began targeting PFCs for replacement in 2019, and since that time has successfully upgraded over 5,000 PFCs in Utah's NAAs.

8.3.5.8 UTA Free Fare Days

In 2019, Utah enacted H.B. 353: Reductions of Single Occupancy Vehicle Trip Pilot Program.[154] This bill designated the UDAQ as the lead agency in administering a program to make all public transit free on days associated with poor air quality in an attempt to reduce emissions associated with vehicle emissions. While much of this program was aimed at reducing emissions during Utah's wintertime $PM_{2.5}$ season, the program has been enacted during two separate periods of high summertime ozone. These "free fare days" were August 12 - 13 of 2021, and September 1 - 2 of 2022.

8.3.5.9 Surge Teleworking

During the 2021 legislative session, Utah adopted S.B. 15: Workforce Solutions for Air Quality. This bill encourages eligible State employees to telecommute on mandatory action days for air quality and on other special circumstances to help decrease on-road emissions. This law covers an estimated 10,185 eligible state employees and contributes to reductions of NO_x and VOC emissions on ozone exceedance days throughout the NAA.

8.3.5.10 Emission Reductions Beyond the NAA Boundary

On July 6, 2022, the Utah Air Quality Board adopted SIP revisions including Utah's Second Implementation Period for Regional Haze[155] and associated emission limits[156]. The emission reductions associated with these actions are broad and include the following measures: (1) requiring flue gas recovery on boilers at US Magnesium by summer of 2028; (2) mandating a shutdown of units 1 and 2 at the Intermountain Generation Station by December of 2027; (3) imposing new plantwide NO_x emission limits for the coal-fired Hunter and Huntington power plants that phase in between July of 2022 and January of 2028; and (4) making many existing permitted limits across the state federally enforceable. While much of the emission reductions highlighted here are beyond the temporal scope of this SIP

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[154] *Id*. § 19-2a-104, repealed pursuant to § 63I-1-219, eff. July 1, 2022.

[155] Utah State Implementation Plan. Section XX.A, Regional Haze

[156] Utah State Implementation Plan, Emission Limits and Operating Practices. Section IX, Part H.21 and Part H.23

revision, occur outside of the NWF NAA, or make permanent emission reductions that have already occurred, they serve to further demonstrate efforts by the state of Utah to reduce ozone forming precursor emissions.

8.3.5.11 Science for Solutions Applied Research Grants

In 2018, UDAQ received an ongoing annual $500,000 appropriation from the Utah State Legislature specifically intended to fund applied air quality research projects. In response, the UDAQ established the competitive Science for Solutions research grant program. Over the last five years, successful grant applicants have submitted proposals targeting UDAQ's goals and priorities. In recent years, UDAQ has placed a high emphasis on improving the understanding of summertime ozone pollution throughout the NWF NAA.

An abbreviated list of applied research projects funded by the UDAQ's Science for Solutions research grant are listed below. These projects focus on summertime ozone in the NWF NAA:

- **The Salt Lake Regional Smoke, Ozone and Aerosol Study (SAMOZA)**; University of Washington
- **Improving Smoke Detection and Quantifying the Wildfire Smoke Impacts on Local Air Quality Using Modeling and Machine Learning Techniques**; University of Utah
- **Improved Vegetation Data for the Biogenic Emission Inventory of Wasatch Front**; Ramboll US Consulting
- **Impacts of the Great Salt Lake on Summer Ozone Concentrations Along the Wasatch Front**; University of Utah
- **Development of a WRF-based Urban Canopy Model for the Greater Salt Lake City Area**; Brigham Young University
- **Quantitative Attribution of Wildfires on Summertime Ozone Concentrations along the Wasatch Front**; San Jose State University

These projects, along with others, were specifically funded to improve UDAQ's SIP model performance and better inform state policy and rulemaking. Science for Solutions projects have already made a difference in improving UDAQ's model performance. For example, these projects have improved shortwave albedo in the CAMx model to realistically reflect salt-crust and playa surfaces around the Great Salt Lake. UDAQ also learned more about the unique role of halogens in ozone formation in the Salt Lake Valley. Motivated by this information, UDAQ funded the development of an enhanced chemical mechanism (CB6r5h) that includes a broader range of halogen pathways to use in our air quality modeling. These enhancements have led to demonstrable improvements in model performance.

Future projects will help UDAQ determine critical factors in summertime ozone formation. Biogenic emissions are a large source of uncertainty in the region. Recent evaluations of BEIS/BELD have shown that isoprene, a key reactive biogenic VOC, is largely underpredicted in regional modeling. Through Science for Solutions, UDAQ is funding a comprehensive project to greatly improve inputs (e.g., leaf area index, tree species) to biogenic models using local information and high-resolution satellite imagery. In addition, UDAQ is funding projects to better understand wildfire impact on ozone pollution. These projects will not only enhance UDAQ's understanding of wildfire contributions to ozone concentrations throughout the NWF NAA but will also improve the UDAQ's understanding of local contributions.

8.4 Conclusion

Results of any modeled outcome will include some degree of uncertainties. As a result of these uncertainties, it is important to consider additional factors within the range of those uncertainties and consider factors beyond the scope of the analysis. The predicted FDV for ozone concentrations outlined in section 8.2, paired with the additional WOE analysis, results in a strong case that this attainment demonstration adequately demonstrates the NWF NAA attaining the 8-hour ozone NAAQS by the attainment date of August 3, 2024.

Chapter 9 - 179B(a) Prospective Demonstration

9.1 Overview

Section 179B(a) of the CAA states that a SIP revision shall be approved by the EPA if the state can demonstrate that the implementation plan is "adequate to attain and maintain the relevant national ambient air quality standards... but for emissions emanating from outside of the United States."[157] As noted in the preambles of both the 2008[158] and 2015[159] ozone implementation rules, section 179B of the CAA does not prohibit non-international border states from submitting a demonstration. However, as noted in EPA guidance,[160] demonstrations from states that do not directly share an international border will require additional technical rigor compared to international border areas.

Section 179B of the CAA has two mechanisms to demonstrate that international contributions impact a NAA's ability to attain or maintain a NAAQS. A state may demonstrate independent of a SIP revision that a NAA would have attained the standard at a past attainment date but for the presence of international emissions, known as a retrospective 179B(b) demonstration, and thus should not be advanced in nonattainment classifications.[161] Conversely, a state may demonstrate as part of a SIP revision that a NAA will attain the standard by a future attainment date, but for the presence of international emissions. This is known as a prospective 179B(a) demonstration.[162]

There are also substantial differences in the outcomes of approved prospective and retrospective 179B demonstrations. An approved retrospective 179B(b) acts to prevent a NAA from being further redesignated to a more stringent nonattainment status. A prospective 179B(a) however, acts as additional information used by the EPA in determining if a SIP modeling attainment demonstration adequately demonstrates attainment by the attainment date, but for the presence of international emissions. As a result, a NAA with an approved 179B(a) demonstration that subsequently fails to attain the standard by the attainment date would not be prevented from a further reclassification to a more stringent nonattainment status.

On May 28, 2021, the UDAQ submitted to the EPA for consideration a retrospective 179B(b) demonstration for the NWF NAA[163] for the marginal attainment date of August 3, 2021. In the demonstration, UDAQ provided three separate analyses examining international contributions including a synoptic weather analysis, Hybrid Single–Particle Lagrangian Integrated Trajectory (HYSPLIT) backward dispersion modeling, and photochemical modeling results performed by a third party showing that the area would have attained the standard by the marginal attainment date, but for the presence of international contributions.

Upon publication of the Determination of Attainment by the Attainment Date,[164] the EPA found Utah's demonstration was not approvable and subsequently reclassified the area as a moderate NAA.

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[157] 42 U.S.C. § 7509a(a)(2).

[158] Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements, 80 Fed. Reg. 12,264 (March 6, 2015).

[159] Implementation of the 2015 National Ambient Air Quality Standards for Ozone: NAA State Implementation Plan Requirements, 83 Fed. Reg. 62,998 (Dec. 6, 2018). s

[160] Guidance on the Preparation of Clean Air Act Section 179B Demonstrations for NAAs Affected by International Transport of Emissions (Dec. 2020) (179B Demonstrations Guidance).

[161] 42 U.S.C. § 7509a(b)-(d); *see also* 179B Demonstrations Guidance at 15-18.

[162] 42 U.S.C. § 7509a(a); *see also* 179B Demonstrations Guidance at 12-15.

[163] Retrospective 179B(b) Demonstration for Utah's Northern Wasatch Front Ozone NAA. May 28, 2021. DAQP-048-21

[164] 87 Fed. Reg. 60,897.

The EPA cited four primary reasons for its disapproval[165] including: (1) a lack of technical information; (2) a divergence in interpretation of section 179B including the importance of the proportion of local versus international contributions; (3) a failure to demonstrate sufficient implementation of feasible emission reduction measures; and (4) the presence of a nearby NAA that attained the standard despite the presence of international contributions.

In this section, the UDAQ will demonstrate attainment under Section 179B(a) prospectively, using an updated and improved photochemical modeling, that the NWF NAA would attain the 2015 8-hour ozone NAAQS by the attainment date of August 3, 2024, but for the presence of international emissions. Further, UDAQ will utilize and expand on the wealth of technical information included in this SIP revision to address each of EPA reasons for denying Utah's previous 179B(b) demonstration.

9.2 Ozone Source Apportionment (OSAT) Modeling

To determine the contribution of different source emission groups and regions to measured ozone concentrations at individual monitoring sites within the NAA, OSAT modeling was performed using emissions projected to 2023. Modeling was conducted using the OSAT tool in CAMx v7.1, which was used for this SIP demonstration modeling as described in section 8. At the request of the UDAQ, OSAT was integrated by Ramboll (developer of CAMx) with CB6r5h in a special version of CAMx v7.1. CB6r5h (version 6, revision 5 with halogens) gas-phase chemical mechanism, which includes halogens chemistry and was specifically developed by Ramboll for this SIP application, was used for all modeling simulations. Source apportionment was conducted for the 4 and 1.33 km domains, where the two domains were run in a two-way nested configuration. 2023 emission inputs were used for source apportionment modeling.[166] Meteorological fields, ozone column values and photolysis rates remained unchanged from those used for the attainment demonstration modeling.

Six geographic source regions were used in the source apportionment modeling (Figure 19), where each county within the NAA was considered as an individual region (Salt Lake, Davis, Weber, Tooele counties). Counties within Utah but outside the NAA were considered as a single region (Other Utah). Regions within the 4 km domain but outside the State of Utah were considered as a single region. 25 different source emission sectors were considered for this OSAT simulation and tracer species that track ozone formation from VOC and NO_x emissions from these source categories were tagged. Source groups that were considered in OSAT included emissions from consumer solvents, on-road heavy duty mobile source emissions, on-road light duty mobile source emissions, lawn and garden equipment emissions, point source emissions, biogenic emissions, in addition to several other source emission sectors. A complete list of these source emission groups is provided in Table 73.

To determine the contribution of international anthropogenic source emissions to local ozone concentrations, initial and boundary conditions (IC and BC) for the 4 km domain were also considered as their own separate source groups. The contribution of international anthropogenic source emissions was determined based on two CAMx simulations for the 12 km domain. These included a base (BASE) simulation and a sensitivity (ZROW) simulation. The BASE case simulation included 2023 emissions from all source emissions while the ZROW simulation included all 2023 emissions with the exception of non-US anthropogenic emissions, leaving only US and global natural emissions. This ZROW simulation was

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[165] Technical Support Document (TSD): Northern Wasatch Front (NWF), Utah: Failure to Attain the 2015 Ozone National Ambient Air Quality Standard by the Attainment Date; Reclassification and Disapproval of International Emission Demonstration, Docket Id. No. EPA-HQ-OAR-2021-0742-0043 (Jan. 2022) (179B NWF TSD).

[166] SMOKE Technical Support Documentation for NWF SIP Attainment Demonstration; https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001603.pdf

based on 2017 ZROW GEOS-Chem global chemistry model outputs, where all anthropogenic emissions outside the US were set to zero[167].

Source-apportioned boundary and initial conditions for the 4 km domain were then derived using CAMx "saicbc" tool and model outputs from the base and ZROW 12 km simulations. Using IC and BC extracted from model outputs from the base and ZROW 12 km simulations, the tool was used to generate two source apportionment IC and BC groups for the 4 km domain, where one group represents international anthropogenic emissions, and one represents global natural and US emissions within the 12 km CAMx domain that are transported into the 4 km domain from the lateral boundaries.

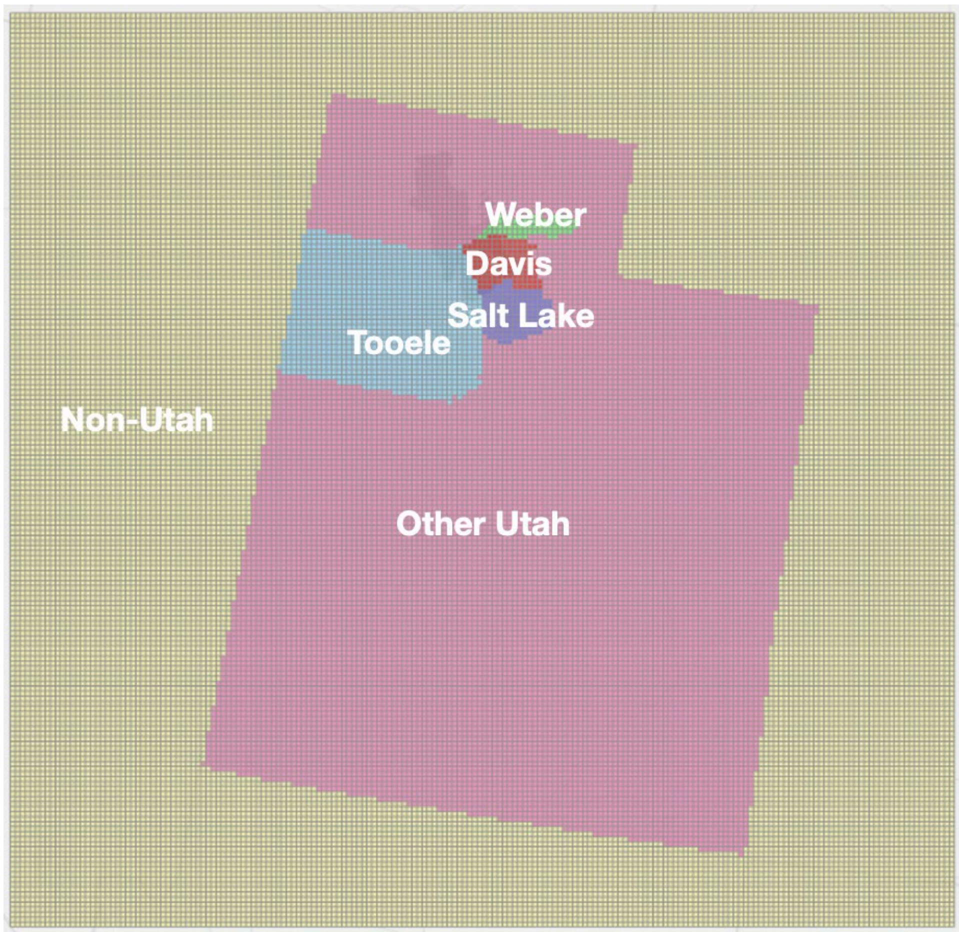

Figure 19: Map of source regions used in 2023 OSAT modeling for the 4 and 1.33 km domains. Each color represents a different source region.

[167] https://views.cira.colostate.edu/docs/IWDW/Modeling/WRAP/2017/Ramboll_WESTAR_GEOS-Chem_Report_8Apr_2021.pdf

*Table 73: Emission source categories considered in 2023 OSAT modeling. *Only VOCs and NO_x tracer species from US Magnesium are tagged.*

Source Group ID	Source Group	Description
1	Solvents: Consumer Products	All personal care and household cleaning products
2	Solvents: Other	Any non-personal care or household cleaning product solvents: Surface coatings, dry cleaning, asphalt paving, degreasing, etc.
3	Non-road: Lawn & Garden	All lawn & garden equipment: 2- & 4-stroke gasoline-powered mowers, trimmers, leaf blowers etc.
4	Non-road: Other	Any non-lawn & garden non-road equipment: construction equipment, aircraft ground support equipment
5, 7	On-road: Light Duty	Passenger vehicles
6, 8	On-road: Heavy Duty	Commercial trucks, haul trucks, buses, motor homes
9	Rail	
10	Biogenics	
11	EGUs	
12	Point Oil & Gas	
13	Nonpoint Oil & Gas	
14	Point: Other	All other point sources not specifically tagged
15	Point: US Magnesium*	all emissions associated with US Magnesium Rowley Plant (point source ID = 10716)
16	Point: Mine Trucks	Mobile Sources; Off-highway Vehicle Diesel; Construction and Mining Equipment; Off-highway Trucks
17	Wildfires, Prescribed Fires	
18	Agricultural Fires	
19	Lightning NO_x	
20	Airports	
21	ERC Bank	Emissions Reduction Credit bank
22	Fertilizer	
23	Livestock	
24	Nonpoint	
25	Area Fugitive Dust	

International Anthropogenic		Non-US anthropogenic emissions estimated based on 12 km base case and zero-out modeling simulations that use GEOS-Chem global model outputs
Global Natural + Non-Utah US Anthropogenic		Global natural emissions plus any US anthropogenic emissions that are transported into the 4km domain (California anthropogenic, etc.). These were estimated based on 12 km base case and zero-out modeling simulations that use GEOS-Chem global model outputs
Top Boundary Conditions		

Source group contributions to MDA8 ozone concentrations at each monitoring station and on each day of the modeling episode were determined using modeled hourly contributions from each source sector and region, where, for each group, contributions under "NO_x-limited" and "VOC-limited" chemical regimes were combined to obtain the net contribution from each group. For each day and monitoring station, hourly contributions were processed to calculate 8-hour average source group contributions at each individual monitoring site, where the contribution values were calculated using model predictions for the grid cell that includes the monitoring station. For each day and monitoring station, 8-hr average contributions were then summed to calculate total 8-hr average ozone concentrations for each source group and region. Maximum daily 8-hr average ozone concentrations and their contributions were then determined based on these total 8-hr values.

9.3 Ozone Source Apportionment Modeling Results

Source apportionment modeling results showed that non-Utah natural and non-Utah US anthropogenic emissions contribute to most of the ozone measured at the Hawthorne monitoring station, which corresponds to the monitor with the highest predicted FDV, accounting for about 67% (39.07 ppb) of its modeled maximum daily 8-hour ozone concentrations on average during the modeling episode (Figure 20). Local anthropogenic and biogenic sources had smaller contributions, accounting for nearly 14.5% (8.44 ppb) and 7.4% (4.28 ppb) of ozone at the same location, while international anthropogenic emissions source contribution averaged 6.5% (3.74 ppb). The contributions for background ozone (international anthropogenic emissions, global natural and US anthropogenic emissions) are consistent with contributions reported for the Western US in other modeling studies[168],[169],[170]. Contributions from other sources, such as wildfires, prescribed (Rx) fires, lightning NO_x, were more minor (<= 4% at 2.3 ppb). Figures in this section represent a low bound of 8-hour ozone source apportionment results and are subject to increase in future modeling.

168 Denver Metro/North Front Range 2017 Ozone Source Apportionment Modeling. HYPERLINK "https://views.cira.colostate.edu/wiki/wiki/9132/denver-metronorth-front-range-2017-ozone-source-apportionment-modeling"https://views.cira.colostate.edu/wiki/wiki/9132/denver-metronorth-front-range-2017-ozone-source-apportionment-modeling

169 2017 Denver Metro/North Front Range Moderate Area 8-Hour Ozone SIP. https://raqc.egnyte.com/dl/uJJfKleU67/FinalModerateOzoneSIP_2016-11-29.pdf_

170 Scientific assessment of background ozone over the U.S.: Implications for air quality management . https://online.ucpress.edu/elementa/article/doi/10.1525/elementa.309/112835/Scientific-assessment-of-background-ozone-over-the

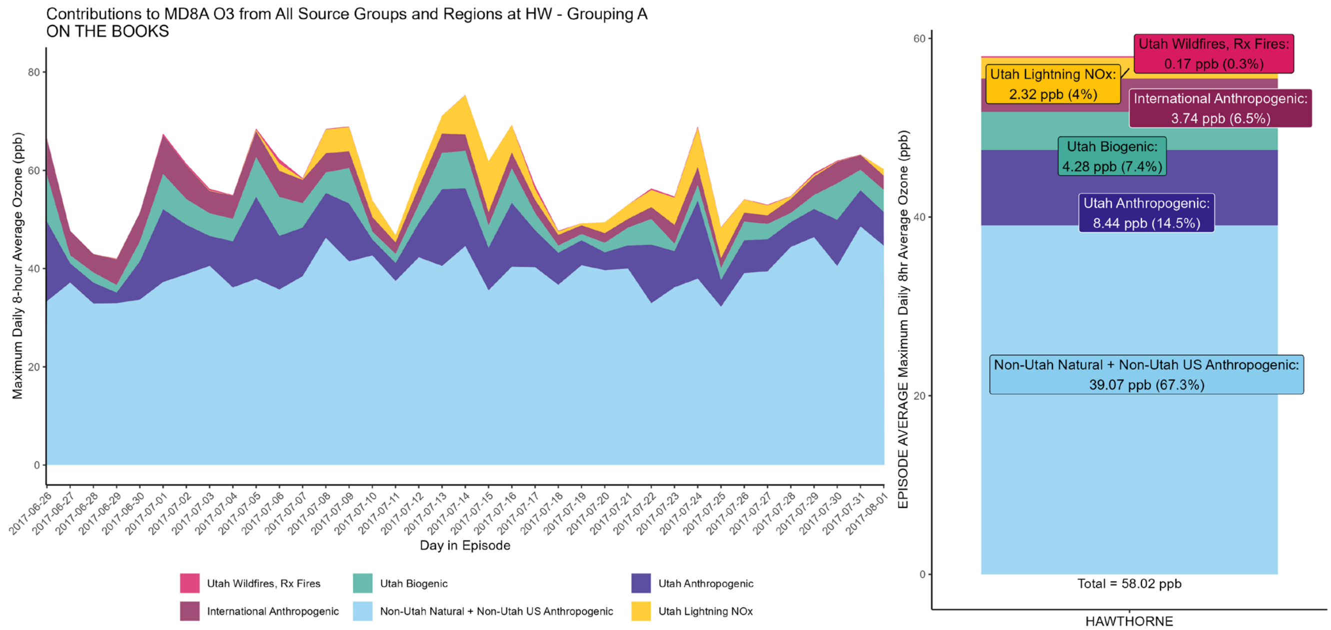

Figure 20: Source contributions by region and emission sector to 8-hour ozone concentration (ppb) at the Hawthorne monitoring station for each day of the modeling episode (left panel) and on average over all days of the modeling episode (right panel). Results are based on 2023 OSAT model outputs for the 1.33 km modeling domain and spin-up days are excluded.

These source contributions displayed some differences across exceedance, top 10 exceedance and non-exceedance days (Figure 20). Compared to contributions on non-exceedance days, the contributions from local anthropogenic and biogenic source emissions are greater on exceedance (modeled MDA8 ozone >= 60 ppb) and top 10 exceedance days, on average, consistent with expectations (Table 21). Ozone exceedance days are characterized by an upper-level high pressure system that brings warm temperatures, lack of frontal passage, low surface winds and increased solar radiation; all of which are conducive to the build-up of ozone and its precursors. The contribution of international anthropogenic emissions to average ozone also increased on exceedance days compared to non-exceedance days, but the increase was not as significant as that determined for local anthropogenic and biogenic source emissions. Their contribution estimate increased from 3.25 ppb (6.2%) on non-exceedance days to 4.47 ppb (6.7%) on exceedance days. A similar increase is also noted for background natural and US anthropogenic emissions. The upper-level ridge on exceedance days can increase background concentrations within the ridge, where the complex topography of the region can enhance vertical transport and recapture of ozone from aloft.[171]

[171] Reddy, P. J., & Pfister, G. (2016). Meteorological factors contributing to the interannual variability of midsummer surface ozone in Colorado, Utah, and other western U.S. states. Journal Of Geophysical Research-Atmospheres, 121, 2434-2456. doi:10.1002/2015JD023840.

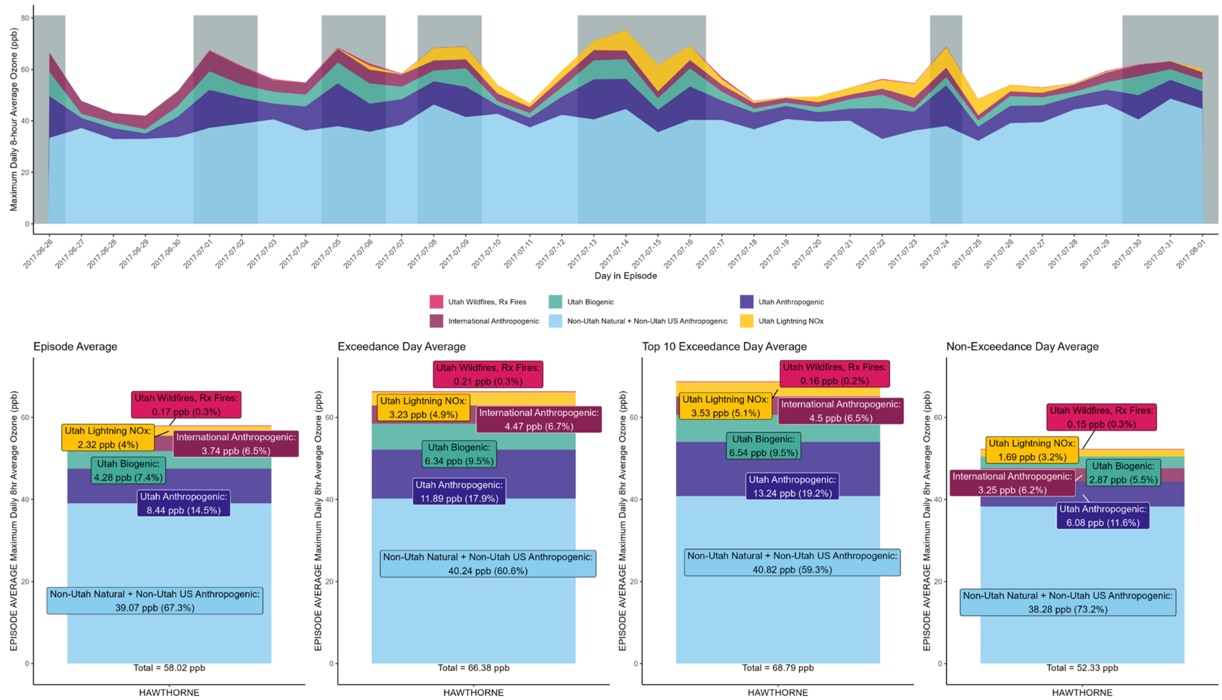

Figure 21: Source contributions by region and emission sector ozone concentration (ppb) at the Hawthorne monitoring station for each day of the modeling episode (upper panel) and on average over all days of the modeling episode, exceedance days, top 10 exceedance days and non-exceedance days (lower panel). Results are based on 2023 OSAT model outputs for the 1.33 km modeling domain and spin-up days are excluded.

9.4 Future Design Values after Removal of Contributions from International Anthropogenic Emissions

Overall, the source apportionment modeling results show that background ozone emission sources, contribute to the majority of the ozone measured along the Wasatch Front, accounting for about 66% of modeled ozone concentrations, on average on modeled top 10 exceedance days. This includes 59.3% (40.82 ppb) contribution from natural and US anthropogenic emissions outside Utah and 6.5% (4.5 ppb) contribution from international anthropogenic emission sources. Using the source contribution estimate for international anthropogenic emissions, the projected FDV were adjusted to reflect what the FDV would be but for the presence of international emissions. For each site, FDV were adjusted by subtracting the OSAT source contribution estimate for international anthropogenic emissions (IAE) from the FDV calculated in the attainment demonstration (section 8).

Average source contribution estimate for international anthropogenic emissions on top 10 exceedance days were used for this calculation. For cases in which the model simulation does not include 10 days with MDA8 ozone values >= 60 ppb at a site, all days with MDA8 O3 values >= 60 ppb are used in the calculation. Given that the model does well at simulating background ozone (section 8.2, Table 69), subtracting the OSAT source contribution estimate for international anthropogenic emissions from the FDV calculated in the attainment demonstration is considered adequate. This approach is shown in equation 3. Moreover, since the model tended to be biased low for local ozone production, this approach is more adequate than a scaling technique where the FDV at each monitoring site is scaled by the relative modeled changes in ozone between a 2023 baseline and a 2023 sensitivity modeling scenario that includes emissions from all sources except for international anthropogenic emissions.

Equation 3

$$FDV_{i,adj} = FDV_i - IAE_i,$$

where "i" corresponds to a given monitoring site.

Resulting adjusted FDV are shown in Table 74. Consistent with the truncation and rounding procedures for the 8-hour ozone NAAQS, the projected DVs are truncated to integers in units of ppb[172]. All sites demonstrate attainment when the contribution of international anthropogenic emission sources is subtracted from the FDV calculated in the attainment demonstration modeling.

Table 74: Future design values (FDV), source contribution estimates for international anthropogenic emissions (IAE) and adjusted future design values (FDV adj) at monitoring locations within the northern Wasatch Front non-attainment area.

Site	Site ID	County	FDV (ppb)	IAE (ppb)	FDV_adj
Bountiful	490110004	Davis	71	4.54	66
Hawthorne	490353006	Salt Lake	72	4.50	67
Herriman	490353013	Salt Lake	72	3.81	68
Erda	490450004	Tooele	70	4.06	65
Harrisville	490571003	Weber	70	3.12	66

9.5 Conclusion

In its document overviewing the disapproval of Utah's retrospective 179B(b) demonstration, EPA cited a lack of "sufficient technical information"[173] to support the modeled conclusions including: a lack of emission data, observations, and meteorological analyses. Further, EPA noted that the model UDAQ relied on for its submission did not demonstrate adequate model performance to creditably determine the influence of international contributions in the NAAs ability to attain the standard.[174]

The 179B(a) demonstration provided as part of this SIP revision leverages the wealth of information included within the SIP and in the technical supporting documentation. This includes detailed information on the underlying emission inventories (section 3), modeled and observed concentrations (section 8), and meteorological modeling (section 8).[175] The improved modeling also conforms with EPA's modeling performance metrics (section 8). Thus, the analysis and conclusions provided in this 179B(a) demonstration and SIP revision fulfill the technical deficiencies EPA noted in Utah's retrospective submission, and conclusively identifies the role international emissions play in the NWF NAA's ability to attaining the standard by the attainment date.

Beyond the lack of technical information cited by EPA in its disapproval of Utah's 179B(b) demonstration, EPA noted that the state's demonstration diverged from EPA's interpretation of criteria

[172] 40 CFR Part 50, Appendix P to Part 50 – Interpretation of the Primary and Secondary National Ambient Air Quality Standards for Ozone.

[173] 179B NWF TSD at 2.2

[174] *Id.*

[175] Meteorological Modeling for Wasatch Front O3 SIP. Technical Support Documentation and Model Performance Evaluation.

for a successful demonstration in several ways.[176] EPA noted that the states did not demonstrate that international transport is significantly different on ozone exceedance days compared to non-exceedance days and that international contributions appear to contribute less than local ozone production.[177]

As shown in Figure 22, the UDAQ has identified that international emissions contribute to ~6% of ozone in NWF NAA on non-exceedance days. That contribution increases to ~7% of the total modeled ozone across all exceedance days. The observed increase during exceedance days relative to non-exceedance days represents a significant additional contribution to the observed ozone concentrations when considering that only 18.5% of the overall ozone contributions are attributed to in-state anthropogenic emissions. Thus, the additional 1% observed international contributions on exceedance days represents excess international contributions relative to modeled non-exceedance day contributions.

Figure 22: International contributions at Hawthorne monitor site on exceedance and non-exceedance days.

As further demonstrated by Figure 22, international emissions represent a significant contribution to the NAA relative to ozone attributable to anthropogenic emissions within the NAA, and thus emissions which this SIP can regulate. For instance, on the top 10 exceedance day during the modeling episode, anthropogenic emissions represent just 19.3% of modeled ozone, with emissions from sources under federal jurisdiction accounting for 11.8% and emissions under state authority accounting for the remaining 7.5%. However, contributions from international anthropogenic emissions account for 6.5% of the modeled ozone concentrations.

176 179B NWF TSD at 2-3.

177 *Id*. at 3.

The EPA further notes in its disapproval of Utah's 179B(b) submission that the state failed to adequately demonstrate that all "feasible" emission reduction strategies had been implemented.[178] As noted in the ozone implementation rules,[179] emission reduction strategies implemented as part of ozone SIPs are to be reasonably available (i.e., RACT or RACM), and thus feasible controls in the context of ozone reductions strategies should be held to a comparable standard. While section 179B of the CAA makes no specific mention of the requirement for implementation of feasible controls, sections 4 and 5 of this SIP revision clearly demonstrate that the state of Utah has implemented an exhaustive list of VOC and NO_x emission reduction strategies throughout the NAA as a result of past SIPs targeting wintertime $PM_{2.5}$, many of which go beyond what would be considered reasonably available. Beyond the controls implemented to date, the UDAQ has identified additional emission reduction controls and strategies as outlined in Sections 4, 5 and 7 of this SIP revision, some of which have been determined to be "beyond-RACT". These emission reductions are planned to be implemented in the coming years and serve as further evidence that the state has implemented feasible controls, and thus the contributions of international emissions should be considered when determining attainment.

Lastly, in its disapproval of Utah's 179B(b) demonstration EPA argued that the presence of a nearby ozone NAA, the Southern Wasatch Front (SWF) (figure 1) which recently attained the standard by the marginal attainment date, is evidence that the NWF NAA can attain the current standard despite the presence of international emissions. However, in the same document, EPA demonstrates that the SWF has an order of magnitude lower anthropogenic NO_x emissions and almost a third of the anthropogenic VOC emissions when compared to the NWF[180]. To this point, the SWF has approximately 1.2 million fewer residents than the NWF and a substantially different industrial sector. While the SWF did attain the 2015 ozone NAAQS by the marginal attainment date of August 3, 2021, it did so by just 1.0 ppb, and has subsequently exceeded this standard. The fact that a bordering NAA, with fewer residents, fewer emissions, and a substantially different industrial make-up, is marginally attaining the standard further demonstrates why it is critical that the presence of international emissions be appropriately acknowledged as regulatorily significant. Unless it is the intent of the EPA to suggest that the NWF NAA must reduce its NO_x and VOC emissions to levels similar to that of the SWF, which is impossible given the lack of reasonably available control options available to the state as demonstrated in sections 4 and 5 of this SIP revision, the state does not see how the attainment status of the SWF is relevant. In fact, comparisons between two substantially different NAAs, both of which are facing the Intermountain West's regionally specific challenges in addressing ozone, only further supports that international emissions are regulatorily significant to the region. Thus, section 179B of the CAA is an appropriate mechanism to provide regulatory flexibility to NAAs within this unique geographic region.

As discussed in the introduction of this section, an approved 179B(a) demonstration would not prevent the NWF NAA from being reclassified to a more stringent nonattainment status if the area fails to attain the standard by the attainment date based on ambient monitoring data. Instead, this demonstration serves as further evidence that the modeling attainment demonstration and WOE analysis provided in section 8.3 of this SIP revision adequately demonstrates the NWF NAA is projected to attain the standard by the attainment date, but for the presence of international emissions.

[178] *Id.* at 3.

[179] 83 Fed. Reg. 62,998.

[180] 179B NWF TSD at 14, Tables 2 and 3.4

Chapter 10 - Transportation Conformity and Motor Vehicle Emission Budget

10.1 Introduction

Motor Vehicle Emission Budgets (MVEB) for NO_x and VOCs were submitted to the EPA in 1997 as part of Utah's maintenance plan for the 1979 1-hour ozone standard. EPA approved these MVEB for transportation conformity purposes when it finalized the approval of that maintenance plan,[181] further reaffirming this budget in subsequent rulemaking.[182] As a result, the local MPO Wasatch Front Regional Council (WFRC) has been using these budgets for subsequent transportation conformity determinations within the ozone NAA. Following this same approach, the UDAQ has developed an updated MVEB for the NWF NAA to be used in future transportation conformity determinations in relation to the 2015 NAAQS standard for ozone. As required by Section 176(c) of the CAA, this MVEB is based on the best available data for emissions, population, and travel estimates available during the development of this SIP.

10.2 Transportation Conformity

Transportation conformity is a requirement under CAA Section 176(c).[183] This requirement ensures that any federally funded or approved highway or transportation activity conforms to the relevant promogulated air quality SIPs, in a way that planned transportation activities do not interfere with a SIPs success in reducing the severity or number of exceedances of a NAAQS. The federal level transportation conformity rules establish the criteria and procedures for determining if a metropolitan transportation plan, TIP, or federally supported highway and transportation projects conform to the SIP.[184] State level transportation conformity requirements are codified in Utah's SIP Section XII.[185] Transportation conformity requirements apply to any designated NAA or maintenance area for a primary NAAQS and must be included in any SIP submitted for these areas.

The metropolitan planning responsibilities for the area encompassed by the NWF NAA are covered by a single MPO—Wasatch Front Regional Council (WFRC). WFRC serves as the MPO for Box Elder, Davis, Salt Lake, Tooele, and Weber counties.

Upon a finding of adequacy or approval by the EPA, the impacted MPO in the NAA will use these budgets to demonstrate that estimated emissions resulting from the implementation of approved transportation plans and TIPs are less than or equal to the budgets included in this SIP revision.

10.3 – Consultation

The ICT is an air quality workgroup in Utah that makes technical and policy recommendations regarding transportation conformity issues related to the SIP development and transportation planning process. Section XII of the Utah SIP established the ICT workgroup and defines the roles and

[181] 62 Fed. Reg. 38,213.

[182] Approval, Disapproval and Promulgation of Air Quality Implementation Plan; Utah; Maintenance Plan for the 1-Hour Ozone Standard for Salt Lake and Davis Counties, 77 Fed. Reg. 35,873 (June 15, 2012).

[183] 42 U.S.C. § 7506(c).

[184] 40 CFR Part 51; 40 CFR Part 93.

[185] Utah State Implementation Plan; Section XII, Transportation Conformity Consultation. Adopted by the Utah Air Quality Board May 2, 2007

responsibilities of the participating agencies. Members of the ICT workgroup collaborated on a regular basis during the development of the ozone SIP. They also meet on a regular basis regarding transportation conformity and air quality issues.

The ICT workgroup is comprised of management and technical staff members from the affected agencies associated directly with transportation conformity including the following agencies:

- UDAQ
- Cache MPO
- Mountainland Association of Governments
- Wasatch Front Regional Council
- Utah Department of Transportation (UDOT)
- Utah Local Public Transit Agencies
- FHWA
- Federal Transit Administration (FTA)
- EPA

The regional emissions analysis is the primary component of transportation conformity and is administered by the lead transportation agency located in the EPA designated air quality NAA. The responsible transportation planning organization for the Salt Lake City, UT NAA is the WFRC. During the SIP development process, the WFRC coordinated with the ICT workgroup and developed ozone SIP motor vehicle emissions inventories using the latest planning assumptions and tools for traffic analysis and the EPA-approved Motor Vehicle Emission Simulator (MOVES2014a) emissions model. The WFRC and the ICT worked cooperatively to develop local MOVES2014a modeling data inputs using EPA recommended methods where applicable.

10.4 Motor Vehicle Emission Budgets (MVEB)

MVEBs are defined as the *"portion of the total allowable emissions defined in the submitted or approved control strategy implementation plan revision or maintenance plan for a certain date for the purpose of meeting reasonable further progress milestones or demonstrating attainment or maintenance of the NAAQS, for any criteria pollutant or its precursors, allocated to highway and transit vehicle use and emissions."*[186]

Thus, a MVEB refers to the maximum allowable emissions originating from the on-road mobile sector for each applicable regulated pollutant (i.e., NO_x and VOCs) as defined in the SIP and required by the CAA. The MVEB must be used in all future transportation conformity analysis and areas must demonstrate that the estimated emissions from transportation plans, programs, and projects do not exceed the MVEB. MVEBs were developed in collaboration with the MPO WFRC. Details regarding the development of the budget can be found in the accompanying Technical Supporting Document (TSD).[187]

For the purpose of this SIP revision, MVEBs for precursor emissions of VOC and NO_x are established for the attainment year of 2023, and are based on the projected on-road mobile inventory

[186] 40 CFR § 93.101.

[187] TECHNICAL SUPPORT DOCUMENT FOR ON-ROAD MOBILE SOURCES: MOTOR VEHICLE EMISSIONS BUDGET DERIVIATION FOR THE NORTHERN WASATCH FRONT, UT NONATTAINMENT OZONE AREA: https://documents.deq.utah.gov/air-quality/planning/DAQ-2023-001700.pdf

for the same year as described in section 3.2.6. This MVEB represents a single NAA-wide MVEB to be used in transportation conformity purposes.

Within the NWF NAA, both Tooele and Weber counties are not entirely contained within the NAA boundary. Thus, portions of the counties are located outside of the boundary, while most of the population of each county resides within the boundary. To account for the proportion of on-road mobile emissions attributable to the NAA, and thus to be included in a MVEB, 2020 census data was used to determine the percentage of on-road vehicle activity relative to census tracts located within the NAA, and emissions were revised accordingly. For Salt Lake and Davis counties, which are entirely located within the NAA, no such adjustments were made.

10.5 Emission Budgets for the Northern Wasatch Front NAA

For the purposes of transportation conformity in the NWF NAA, Table 75 includes a MVEB in tpd for daily summertime weekday emissions of both VOCs and NO_x.

Table 75: NWF Ozone 2023 NAA MVEB

NWF, UT Ozone 2023 NAA MVEB			
Year	County	NO_x (tpd)	VOC** (tpd)
2023*	Davis (NA)	7.42	2.78
2023*	Salt Lake (NA)	20.98	8.53
2023*	Tooele (NA)	3.49	0.81
2023*	Weber (NA)	5.69	2.06
	Total	37.58	14.18
NA = NAA County Portion			
*** Gasoline 10 PPM Sulfur**			
****VOC = VOC does not include Refueling Displacement and Spillage**			

It is important to note that the MVEBs presented in Table 75 are somewhat different from the on-road mobile emission inventory presented in Table 8. The emissions established for this MVEB were calculated using MOVES3 to reflect an average summer weekday. The totals presented in the summary emissions inventory in section 3, however, represent a summer average-episode-day. Thus, the temporal averaging used to generate these two different products results in slightly different values.

10.6 Implementation of MVEB in Transportation Conformity Determinations

The MVEB for the NWF NAA, once determined adequate or approved by the EPA, will be used for purposes of transportation conformity determinations of Regional Transportation Plans (RTPs) and TIPs for the respective MPOs and planning areas. Once the included MVEB is in effect, the local MPO must make a new determination of conformity for their respective RTP and TIP within two years of EPA's finding of adequacy or SIP approval.[188] Throughout the process of determining conformity with the MVEB included in this SIP revision, the impacted MPO shall consult with federal, state, and local air agencies through the normal interagency consultation process established in Section XII of the Utah SIP.

[188] 40 CFR § 93.104(e).

Chapter 11 - Contingency Measures

11.1 Overview

Section 172(c)(9) of the CAA requires SIPs to include provisions for specific emission reduction measures to be undertaken if the area fails to demonstrate RFP requirements or attain the NAAQS by the attainment date. These provisions are known as contingency measures. These contingency measures shall take effect "without further action by the State, or the [EPA] Administrator", thus no further rulemaking activities by the State or EPA would be needed to implement them if the area fails to attain the standard by the attainment date or if a SIP revision fails to demonstrate RFP.[189] Contingency measures should consist of other available control measures or emission reduction strategies beyond those reasonably required (i.e., RACT or RACM) to expeditiously attain the NAAQS.[190]

The attainment date for the 2015 8-hour ozone NAAQS moderate SIP for the NWF NAA is August 3, 2024. Thus, if triggered, contingency measures must result in additional emission reductions after that date, or upon a disapproval of the RFP plan included in this SIP revision by the EPA. Contingency measures shall provide demonstratable emission reductions of one year's worth of emission reductions, or approximately 3% of the 2017 base year emission inventory.[191] Unlike the RFP requirements of a moderate SIP, emission reductions associated with contingency measures can consist entirely, or in part, of NO_x emission reduction strategies.[192]

11.2 Contingency Measures

11.2.1 NO_x Emission Reductions from Boilers

The UDAQ has proposed R307-315; NO_x Emission Controls for Natural Gas-Fired Boilers 2.0-5.0 MMBtu, and R307-316; NO_x Emission Controls for Natural Gas-Fired Boilers greater than 5.0 MMBtu, both of which were described in section 5.3, Table 58. These rules were adopted by the Utah Air Quality Board in May of 2023, with an implementation beginning in May of 2024. These rules require new and modified industrial and commercial boilers installed in the NWF NAA to comply with an emission threshold of 9 parts per million by volume (ppmv). The NO_x emission reductions from these combined rules are anticipated to result in a total reduction of 7.3 tpd, or 2,689 tpy once the full emission potential of the rules are realized. While these rules do not require retrofits or replacements of existing equipment, when accounting for the useful life span of this equipment it is anticipated that the full emission potential of these rules will be realized in 10 – 20 years. Thus, it is expected that these two rules combined will result in ~0.36 tpd of emission reductions per year, compounding over time to the full 7.3 tpd. Given the implementation timeline of these control strategies, one year of emission reductions (0.36 tpd) should be creditable towards contingency measure requirements.

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[189] State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, 57 Fed. Reg. 13,498, 13,512 (April 16, 1992).

[190] *Id.* 57 Fed. Reg. at 13,543.

[191] 83 Fed. Reg. 62,998; 80 Fed. Reg. 12,285.

[192] 83 Fed. Reg. 62,998.

11.2.2 US Magnesium

As part of this SIP revision, and as overviewed in section 4.15, the UDAQ is requiring US Magnesium to install a steam stripper and thermal oxidizer to reduce VOC emissions from its wastewater and deboronated pond water systems.[193] The installation of these controls will reduce 0.44 tpd (161.7 tpy) of VOC emissions from the airshed. It is anticipated that these controls will be installed by October of 2024. US Magnesium is located outside of the existing NAA boundary and thus emission reductions are not creditable towards RFP, emission reductions implemented in areas outside of a NAA may count towards contingency measures as long as they improve air quality in the subject NAA.[194]

11.2.3 NAA NO_x Emission Reductions

As described in detail in section 7.4, the NWF NAA has experienced significant emission reduction of anthropogenic NO_x. From the baseline year of 2017 to the attainment year for this SIP revision of 2023, NO_x emission decreased from 108.3 tpd down to 87.0 tpd. Thus, the area experienced a 21.3 tpd reduction in NO_x emissions, representing a 19.6% decrease. These emission reductions are largely the result of the introduction of more stringent vehicle emission reduction tiers and the introduction of cleaner burning Tier 3 fuels into the NWF NAA. Thus, as the market penetration of Tier 3 fuels continues throughout the NAA as the local refineries finish the transition to refining fuels at these standards, and older vehicles are replaced with newer cleaner vehicles, the emission reductions seen in this sector are expected to continue without further action required.

11.3 Contingency Measures Emission Reduction Demonstration

Currently, no rulemaking exists that precludes a state from implementing a contingency measure before they are triggered, but emission reductions credited towards contingency measures may not be accounted for as part of the RFP demonstration. The emission reductions described in sections 11.2.1 and 11.2.2 will be in effect prior to the attainment date but are not counted towards RFP. The emission reductions described section 11.2.3 are already in place and do not count towards RFP or are being used as a control measure for this SIP revision. Table 76 demonstrates how the area has met the contingency measure requirement of reductions of 3% of baseline emissions.

Table 76: Percent Emission Reductions Based on 2017 Base Year Inventory

	NO_x Emissions (tpd)	VOC Emissions (tpd)
2017 Baseline Inventory	108.3	93.7
3% Baseline Inventory	3.2	2.8
Emission Reductions for Contingency Measures (Percent of 2017 Inventory)	21.66 (20%)	0.44 (0.47%)
Meets Contingency Measure Requirements?	Yes	--

[193] Utah State Implementation Plan; Section IX, Part H.32.k

[194] *See e.g.*, *Louisiana Env't Action Network v. U.S. E.P.A.*, 382 F.3d 575, 585 (5th Cir. 2004).

Chapter 12 - Environmental Justice & Title VI Considerations

12.1 Environmental Justice

EPA defines Environmental Justice (EJ) as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to development, implementation, and enforcement of environmental laws, regulations, and policies.[195] Fair treatment ensures no group of people are disproportionately burdened by environmental harms or risks, including those resulting from industrial, governmental, and commercial operations, programs, or policies. Meaningful involvement ensures that populations potentially affected by an action have an opportunity to participate in decisions impacting their environment and health. Meaningful involvement also includes the stipulations that the public's contributions can influence a regulatory agency's decision, the concerns of the public will be considered in the decision-making process, and the rule-writers and decision-makers will seek out and facilitate the involvements of these potentially-affected populations. Executive Order (E.O.) 12898: Environmental Justice,[196] directs federal agencies to incorporate environmental justice initiatives into their missions. E.O. 14008 issued in 2021[197] further reiterated a national focus on EJ. As a result, EPA has encouraged states to consider EJ in their SIP development process as their resulting actions may have impacts on disproportionately affected areas. EPA has also issued guidance on incorporating EJ consideration during the development of regulatory actions.[198]

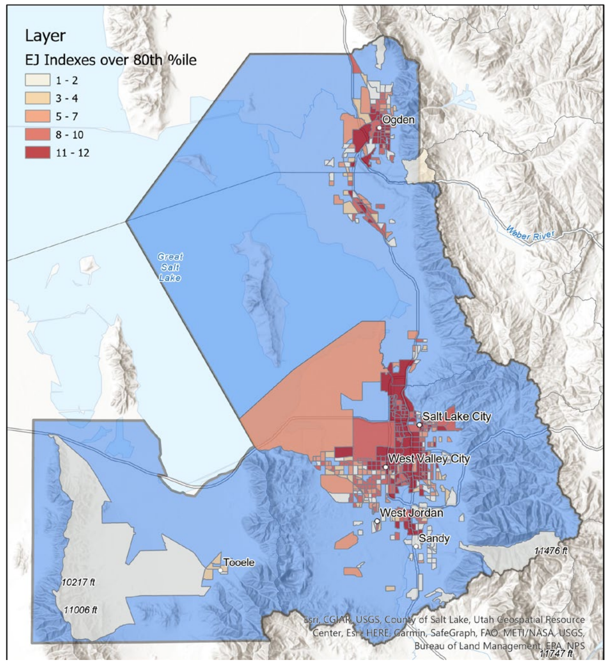

Figure 23: EJ Indexes >80th percentile in Each NWF NAA Census Block

12.2 Title VI of the Civil Rights Act

Title VI of the Civil Rights Act is a federal law that prohibits recipients of federal financial assistance (e.g., states, universities, and local governments) from discriminating based on race, color, or national origin in any program or activity.[199] This prohibition against discrimination under Title VI has been a statutory mandate since 1964 and EPA has had Title VI regulations since 1973. Title VI allows

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195 https://www.epa.gov/environmentaljustice

196 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 Fed. Reg. 7,629 (Feb. 11, 1994).

197 Tackling the Climate Crisis at Home and Abroad, 86 Fed. Reg. 7,619 (Jan. 27, 2021).

198 Guidance on Considering Environmental Justice During the Development of Regulatory Actions (May 2015), available at https://www.epa.gov/environmentaljustice/guidance-considering-environmental-justice-during-development-action.

199 Title VI, 42 U.S.C § 2000d et seq.

persons to file administrative complaints with federal departments and agencies alleging discrimination based on race, color, or national origin and EPA has a responsibility to ensure its funds are not being used to subsidize discrimination. Should a complaint be filed, EPA's Office of Civil Rights is responsible for the Agency's administration of Title VI, including investigation of such complaints. In accordance with Title VI, federal agencies shall ensure that all programs and activities receiving federal financial assistance that affect human health or the environment do not discriminate based on race, color, or national origin. The NWF NAA SIP revision falls under this category of programs and has potential impacts on such areas.

12.3 Screening-Level Analysis

Using Utah's Environmental Interactive Map,[200] UDAQ conducted an analysis of the EJ indices surrounding the NWF NAA. UDAQ reviewed all pollution and sources as well as socioeconomic indicators (a total of 20 indices) as percentiles calculated by comparing data from census blocks within the State of Utah. UDAQ notes that this SIP revision does not have the authority to control the following indexes included in this analysis: lead paint, superfund sites, wastewater discharge, RMP facilities, hazardous waste, or underground storage tanks. Figure 23 shows the count of EJ indexes above the 80th percentile in each of the census blocks within the NWF NAA. Table 77 shows the number of census blocks in the NFW NAA at the 80th percentile and above for each EJ index.

Table 77: Environmental Justice Indexes Over the 80th Percentile in the NWF NAA

EJ Index	Number of Census Blocks >80th Percentile
Superfund Proximity	400
$PM_{2.5}$	387
Ozone	364
Hazardous Waste Proximity	318
Air Toxics Respiratory Health Index	306
People of Color	294
Diesel PM	291
Air Toxics Cancer Risk	282
Underground Storage Tanks	267
Traffic Proximity	262
RMP Facility Proximity	258
Demographic Index	250
Less than High School Education	244
Lead Paint	236
Limited English Speaking	215
Low Income	181
Wastewater Discharge	153
Unemployment Rate	136
Under Age 5	113
Over Age 64	61

[200] https://enviro.deq.utah.gov/

12.3.1 EJ Screening Findings

Based on Figure 23, the areas within the NWF NAA with the highest concentrations of indexes above the 80th percentile include Ogden, Salt Lake City, West Valley City, and West Jordan. There is a total of 498 census blocks within the NWF NAA.

Table 77 shows a high number of census blocks at the 80th percentile or greater for all EJ indexes, with the most prevalent indexes in the NAA being:

- Superfund Proximity
- $PM_{2.5}$
- Ozone
- Hazardous Waste Proximity
- Air Toxics Respiratory Health Index
- People of Color
- Diesel PM
- Air Toxics Cancer Risk
- Underground Storage Tanks
- Traffic Proximity

12.4 Identified Stakeholders

As a result of this EJ analysis, UDAQ has identified the general public and public health departments within the Ogden, Salt Lake City, West Valley City, and West Jordan areas as populations potentially affected by the decisions made in this SIP. UDAQ identified these stakeholders as entities and groups requiring additional facilitation and involvement in the SIP development process.

12.5 Stakeholder Outreach, Meaningful Involvement, and Information Distribution

UDAQ made it a priority to ensure that the identified stakeholders would have ample and equal opportunity within the division's ability to participate in this SIP process through the measures described in section 12.5.1 to 12.5.5.

12.5.1 Public Informational Meetings

UDAQ hosted two virtual public meetings on the subject of "Finding Ozone Emissions Reduction Ideas." The first meeting took place on Wednesday, March 23, 2022, from 6 to 7 PM MST, and the second meeting took place on Saturday, May 3, 2022, also from 6 to 7 PM MST. These times were selected to maximize attendance from households with traditional working hours. Handouts for this meeting were issued via an interactive webpage[201] and potential attendees were invited to submit comments through a public Google Form to be addressed at each of the meetings. 67 individuals attended the first meeting. 45 individuals attended the second meeting. Recordings of each of these meetings are publicly available on YouTube.[202]

UDAQ also presented SIP-related updates to the State of Utah Governance Committee, a joint coordination effort by the Utah Department of Health and local health departments. These presentations took place on September 27, 2022, and on January 24, 2023, to inform the committee of the progress UDAQ has made in the SIP development process and emission reduction strategies employed.

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201 https://deq.utah.gov/air-quality/northern-wasatch-front-ozone-emissions-inventory

202 https://www.youtube.com/watch?v=ip5D7nRaLTI & https://www.youtube.com/watch?v=b0fHNSFczvE

12.5.2 Environmental Advocate and Industrial Stakeholder Meetings

UDAQ holds regular environmental advocate meetings, industrial stakeholder meetings, and academic stakeholder meetings where UDAQ updated these groups on the development of this SIP and online postings of the SIP-related documents. Members of all groups were provided equal opportunities to ask questions and were encouraged to comment during these meetings as well as follow up afterward.

12.5.3 Public Commenting Period

Upon the approval of the Air Quality Board on April 5, 2023, this SIP and all relating documents were made available for public comment from June 1 to July 17, 2023. Public notices for the commenting period were issued on the UDAQ webpage, via electronic mail, and in the Utah State Bulletin. Commenters included:

- 49 private citizens;
- US EPA Region 8;
- Breathe Utah;
- HEAL Utah;
- Utah Petroleum Association and Utah Mining Association;
- Chevron Products Company;
- Marathon Tesoro Refining & Marketing Company LLC;
- Rio Tinto Kennecott;
- Western Resource Advocates; and
- Utah Manufacturers Association

12.5.4 Public Hearing

As part of the public commenting period, a public hearing was conducted at the State of Utah Multi-Agency State Office Building on July 12, 2023 at 12:00 PM. The public hearing information was advertised in the Utah State Bulletin, and the UDAQ webpage 41 days prior to the event. Attendance to this hearing was available both in-person as well as virtually. Commenters included:

- Nick Schou of Western Resource Advocates;
- Alex Veilleux of Heal Utah; and
- Gregor Green a private citizen

All comments made by groups and individuals listed in Sections 12.5.3 and 12.5.4 were duly considered in the decision-making process of this SIP. These comments are summarized and responded to in APPENDIX B with original versions of each group or individual's comments available at https://deq.utah.gov/air-quality/northern-wasatch-front-moderate-ozone-sip-technical-support-documentation.

12.5.5 Information Dissemination

All materials related to this SIP have been posted on UDAQ's public platforms as the division has received and processed them throughout the development of this SIP. UDAQ uses all resources at its disposal to disseminate information to its stakeholders including:

- UDAQ webpage [203]
- State Bulletin
- Ozone SIP webpage [204]
- Stakeholder meetings
- Local newspapers in identified stakeholder communities.

[203] https://deq.utah.gov/division-air-quality

[204] https://deq.utah.gov/air-quality/northern-wasatch-front-moderate-ozone-sip-technical-support-documentation