State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

Air Quality Board
Stephen C. Sands II, *Chair*
Kerry Kelly, *Vice-Chair*
Tammie G. Lucero
Erin Mendenhall
Robert Paine III
Amanda Smith
Michael Smith
Karma M. Thomson
Kathy Van Dame
Bryce C. Bird,
Executive Secretary

DAQ-089-14a

UTAH AIR QUALITY BOARD MEETING

FINAL AGENDA

Wednesday, December 3, 2014 - 1:30 p.m.
195 North 1950 West, Room 1015
Salt Lake City, Utah 84116

I. Call-to-Order

II. Date of the Next Air Quality Board Meeting: January 7, 2015

III. Approval of the Minutes for October 1, 2014, Board Meeting.

IV. Final Adoption: Amend R307-121. General Requirements: Clean Air and Efficient Vehicle Tax Credit. Presented by Mark Berger.

V. Final Adoption: New Rule R307-125. Clean Air Retrofit, Replacement, and Off-Road Technology Program. Presented by Mark Berger.

VI. Final Adoption: Amend R307-302. Solid Fuel Burning Devices in Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber Counties. Presented by Mark Berger.

VII. Final Adoption: Repeal and Replace SIP Subsection IX.A.21: Control Measures for Area and Point Sources. Fine Particulate Matter. $PM_{2.5}$ SIP for the Salt Lake City, UT Nonattainment Area. Presented by Bill Reiss.

VIII. Final Adoption: Repeal and Replace SIP Subsection IX.A.22: Control Measures for Area and Point Sources, Fine Particulate Matter, $PM_{2.5}$ SIP for the Provo, UT Nonattainment Area. Presented by Bill Reiss.

IX. Final Adoption: Repeal and Replace SIP Subsection IX.A.23: Control Measures for Area and Point Sources, Fine Particulate Matter, $PM_{2.5}$ SIP for Logan, UT-ID Nonattainment Area. Presented by Bill Reiss.

X. Final Adoption: Amend SIP Subsections IX.H.11, 12, and 13. Control Measures for Area and Point Sources, Emission Limits and Operating Practices, $PM_{2.5}$ Requirements. Presented by Bill Reiss.

XI. Final Adoption: Amend R307-110-10. Section IX, Control Measures for Area and Point Sources, Part A, Fine Particulate Matter; and Amend R307-110-17. Section IX, Control Measures for Area and Point Sources, Part H, Emissions Limits. Presented by Mark Berger.

XII. Stericycle, Incorporated Administrative Settlement Order. Presented by Harold Burge.

XIII. Propose for Public Comment: Amend R307-120. General Requirements: Tax Exemption for Air Pollution Control Equipment. Presented by Mark Berger.

XIV. Propose for Public Comment: Amend R307-302. Solid Fuel Burning Devices in Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber Counties. Presented by Mark Berger.

XV. Propose for Public Comment: New Rule R307-311. Utah County: Trading of Emission Budgets for Transportation Conformity. Presented by Mark Berger.

XVI. Informational Items.
- A. Environmental Protection Agency Clean Power Plan Briefing. Presented by Glade Sowards.
- B. Air Toxics. Presented by Robert Ford.
- C. Compliance. Presented by Jay Morris and Harold Burge.
- D. Monitoring. Presented by Bo Call.
- E. Other Items to be Brought Before the Board.

In compliance with the American with Disabilities Act, individuals with special needs (including auxiliary communicative aids and services) should contact Dana Powers, Office of Human Resources at (801) 536-4413 (TDD 536-4414).

ITEM 3

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

Air Quality Board
Stephen C. Sands II, *Chair*
Kerry Kelly, *Vice-Chair*
Erin Mendenhall
Tammie G. Lucero
Robert Paine III
Amanda Smith
Michael Smith
Karma M. Thomson
Kathy Van Dame
Bryce C. Bird,
Executive Secretary

UTAH AIR QUALITY BOARD MEETING
October 1, 2014 – 1:30 p.m.
195 North 1950 West, Room 1015
Salt Lake City, Utah 84116

DRAFT MINUTES

DRAFT

I. Call-to-Order

Kerry Kelly called the meeting to order at 1:30 p.m.

Board members present: Kathy Van Dame, Kerry Kelly, Amanda Smith, Michael Smith, Karma Thomson, Tammie Lucero, Steve Sands (attended part of meeting by telephone), and Erin Mendenhall

Excused: Robert Paine

Executive Secretary: Bryce Bird

II. Date of the Next Air Quality Board Meeting: November 5, 2014

In place of a Board meeting it was tentatively scheduled that the Board take a field trip of oil and gas facilities in the Uinta Basin on November 5, 2014.

III. Approval of the Minutes for September 3, 2014, Board Meeting.

Ms. Van Dame would like future minutes to document specific suggestions or changes to items made by the Board during meeting.

- Kathy Van Dame moved to approve the minutes as submitted to the Board. Tammie Lucero seconded. The Board approved in favor with Steve Sands and Erin Mendenhall absent.

In order for Mr. Sands and Ms. Mendenhall to hear the discussion on the oil and gas rules, the order of the agenda was changed. The final adoption of the four oil and gas rules was presented after the proposal for public comment of the operating permit program fee for fiscal year 2016 agenda item.

Mr. Bird stated that when the Board is hearing and taking final vote of an action item, it is not the time to accept public comment on an item, as per the Utah Administrative Rulemaking Act. All public comments should be received by the agency during the public comment period or at a hearing

established for the rulemaking. However, during discussion of an item, it is the Board's prerogative to ask questions from all parties if needed. Individuals wishing to address the Board are reminded to fill out a yellow comment card provided.

IV. Final Adoption: Amend R307-202. Emission Standards: General Burning. Presented by Mark Berger.

Mark Berger, Environmental Planning Consultant at DAQ, stated the proposed amendment to exempt ceremonial burning when conducted by a Native American spiritual advisor has gone through a 30-day public comment period. During the public comment period, several comments supporting the proposed change were received. No other comments were received. Staff recommends the Board adopt R307-202 as proposed. During discussion by the Board, staff was asked to maintain contact with the affected community and attempt to track use of sweat lodge activity in nonattainment areas.

- Tammie Lucero motioned that the Board approve final adoption to amend R307-202, Emission Standards, General Burning. Kathy Van Dame seconded. The Board approved the motion with Steve Sands and Erin Mendenhall absent.

V. Final Adoption: Amend R307-335, R307-342 through R307-350, and R307-352 through R307-355. Presented by Mark Berger.

Mark Berger, Environmental Planning Consultant at DAQ, stated that a 30-day public comment period was held for the proposed changes to these rules to clarify that the amount of control removal specified in each rule is based on the entire system and explains the inspection and recordkeeping requirements for these systems. During the comment period, inquiries were received asking why DAQ does not permit the use of exempt solvents for cleaning in the rules. As staff reviewed the rules, it was determined that because R307-101-2 adopts the definition of volatile organic compound (VOC) found in 40 CFR 51.100(s)(1) by reference, that the rules do in fact allow for the use of exempt compounds for cleaning. To clarify this point in the rules, DAQ is proposing to specify that exempt compounds are not VOC by definition in each of the rules. In addition, conflicts were pointed out in R307-354 and R307-357. To resolve the conflict DAQ is proposing to further revise R307-354 to state that automotive spray gun solvent cleaners that are defined as a "consumer product" under R307-357 are exempt from the vapor pressure requirement in R307-354 and are regulated under the requirements in R307-357. Staff recommends the Board adopt R307-348 as proposed and R307-342 through R307-350 and R307-352 through R307-355 as amended.

In response to why the EPA is requesting information in the Federal Register about adhesives and sealants, staff responded that it is because industry has moved along in accordance with the Ozone Transport Commission (OTC) and California Air Resources Board (CARB) model rules that EPA should revise its rule and update it to be consistent with the OTC and CARB rules.

- Michael Smith motioned that the Board approve final adoption to amend R307-335 as proposed, and R307-342 through R307-350 and R307-352 through R307-355 as amended. Kathy Van Dame seconded. The Board approved the motion with Steve Sands and Erin Mendenhall absent.

DRAFT

VI. Propose for Public Comment with Department Fee Schedule: Operating Permit Program Fee for Fiscal Year 2016. Presented by Reginald Olsen.

Reginald Olsen, Permitting Branch Manager at DAQ, stated that each year an annual emissions fee is established to fund the operating permit program as required by the Clean Air Act (CAA). For fiscal year 2016 a fee of $69.61 per ton of emissions is being proposed. This is a $10.55 increase per ton of emissions from the fiscal year 2015 rate, which is due mainly to an 8% decrease in chargeable emissions. Staff recommends the Board submit this fee as part of the Departments fee schedule for approval by the Legislature.

In discussion, staff responded that the Supreme Court's decision on the tailoring rule and its effects to Title V was considered by staff in establishing the new fee. There are also some actions being investigated to ask the Legislature for authority to restructure the program to allow more flexibility.

- Kathy Van Dame moved that the Board propose for public comment the Department fee schedule for the operating permit program fee for fiscal year 2016. Tammie Lucero seconded. The Board approved the motion with Steve Sands and Erin Mendenhall absent.

VII. Final Adoption: New Rules R307-501. Oil and Gas Industry: General Provisions; R307-502. Oil and Gas Industry: Pneumatic Controllers; R307-503. Oil and Gas Industry: Flares; and R307-504. Oil and Gas Industry: Tank Truck Loading. Presented by Mark Berger.

Colleen Delaney, Environmental Scientist at DAQ, stated that in June 2014 the Board proposed for public comment four rules related to the oil and gas industry. A public comment period was held for these rules from July 1 to July 3, 2014, and no hearing was requested. A number of public comments were received and a summary of the comments and staff response to the comments were given to the Board for review.

R307-501 establishes general provisions statewide for the oil and gas industry. The rule is an expansion of existing requirements for all sources in the state but it provides more detail for the oil and gas industry that companies need to maintain their equipment, operate pollution control equipment according to manufacture specifications, and general provisions. In response to comments, staff made some clarifying changes, added some definitions, and also excluded the component of distribution from coverage under the rule. The rule was originally drafted to apply for production, transmission, and distribution but commenters pointed out that it would take it all the way into where the natural gas or oil is being used by consumers, which staff agreed was not the intention of this rule.

R307-502 applies to pneumatic controllers, which would require the replacement of existing high bleed pneumatic devices with low bleed devices. This rule is designed to apply statewide. It would be implemented first in the Uinta Basin by December 2015 so controls can be in place prior to the 2015/2016 winter ozone season. The rule would be required statewide by April 2017 to correspond to the 2017 summertime ozone season. In response to comments received staff also made some clarifying changes and added definitions.

R307-503 applies to flares. This rule requires all new flares for the oil and gas industry to have a self-igniter in case a flare blow out. The rule also requires a retrofit of enclosed flares to have a self-igniter installed. This was drafted as a statewide rule with an earlier adoption in the Uinta Basin by December 2015 and statewide by April 2017.

DRAFT

R307-504 applies to tank truck loading. This rule requires trucks being loaded with oil or produced water condensate would come in as bottom loading. For trucks that are not equipped for bottom loading, a simple pipe would be put in place so that the liquids would come in at the bottom of the tank which would reduce VOC emissions.

Steve Sands enters the meeting by telephone and attended for approximately 30 minutes. Mr. Sands was absent from any voting of action items. Erin Mendenhall enters the meeting.

Ms. Delaney summarized staff's responses to the comments received on the proposed new rules. Until recently there have not been a lot of air pollution requirements for the area source oil and gas industry. EPA adopted new source performance standards in 2011 and those apply to new sources but there are no comparable requirements for existing sources. These rules are filling in gaps that are not covered by federal regulations and are designed to complement rules already in place on the federal side to have a more complete program. Over the last few years DAQ has learned more about the oil and gas industry and that the emissions from these sources are higher than what was originally understood. As DAQ reviewed its inventory it showed that oil and gas emissions are the largest source of anthropogenic VOC emissions in the state at 55 percent. As staff looked at this category, strategies were chosen that are very cost effective and that help ensure existing pollution control equipment is operating effectively. Staff is also aware that EPA is currently under court order to finalize changes to the ozone national ambient air quality standards (NAAQS) by October 1, 2015, and it is expected that EPA will tighten the standard. VOC and NOx are main precursors to ozone which is why these two pollutants are being focused on. In addition, summertime ozone is a regional issue and depending upon where EPA establishes the standard summertime ozone is going to be an issue statewide, including in the Uinta Basin where the wintertime ozone problem is a very confined issue. Finally, hazardous air pollutants (HAPs) are also a component of VOC emissions and anything that can be done to reduce VOC emissions would also have a benefit in reducing HAPs.

In discussion, staff addressed several questions from the Board. A monitor location does not mean there is an exceedance of ozone and permanent monitors are not required in all areas of the state. As part of the analysis of ozone DAQ looked at the effects of local ozone production, transport from Utah into other states, and transport into Utah from other states. When EPA sets the new ozone standard, a process that is specified in the CAA will be triggered. Beginning from the date that EPA finalizes the standard in October 2015, we will be required to do a demonstration to EPA of every area in the state whether or not the area attains the standard. This is one of the reasons DAQ did ozone monitoring using 2B Technologies monitoring. By using 2B monitors DAQ was able to determine permanent monitoring sites and to also show that those monitors are able to represent a huge portion of the state.

The number of pneumatic controllers and flares in the Uinta Basin and statewide that will be required to be controlled by these rules is not known. DAQ's analysis is based on a detailed survey inventory conducted by the Western Regional Air Partnership (WRAP) that surveyed companies and then that information was aggregated up to the county level for the devices. In addition, information was pulled from EPA's natural gas star program about the cost effectiveness of individual device installation. Similar information from the state of Colorado was also supplemented. The overall program is not the same in Utah as it is in Colorado. Colorado is requiring the replacement of pneumatic devices and the installation of self-igniters on flares statewide. Pneumatic controllers were required in the Denver ozone nonattainment area in 2009 and are required statewide by March 2015. In looking at Utah's five-county area it is estimated a reduction of 3,716 tons per year of VOC will be achieved with these rules.

DRAFT

Comments from Lowell Braxton and Jim Holtkamp representing Western Energy Alliance (WEA) were received addressing their legal and policy concerns with these rules. They commented that to their knowledge this is the first time that rules requiring retrofit of equipment in anticipation of future ozone NAAQS will have been implemented. One of WEA's concerns is a matter of policy in that a new ozone standard has not been finalized and they feel it is not a good idea to require retrofitting of existing equipment in anticipation of a standard that has not been implemented. Once a new standard is implemented then a determination can be made of what is needed in order to come into attainment, which is what the SIP process is for. These rules in WEA's view are pre-SIP pre-nonattainment reasonable available control technology (RACT). Furthermore, Utah needs solutions to Utah problems and the Uinta Basin ozone stakeholder process is a perfect example of this. Before requiring existing sources to retrofit we need to go through the same stakeholder process that has been productive in the Uinta Basin. They are concerned this will set a significant potential precedence to do something beyond that which the structure of the CAA and Utah Air Conservation Act (UACA) provide. The CAA and the UACA are set up to deal with existing sources in attainment areas, which is what the prevention of significant deterioration (PSD) program is for. We have the approval order process in which not only is an approval order required for emissions of air contaminants subject to certain de minimus levels but also for installation of control devices. WEA's conclusion is that the Board should not approve statewide application of the proposed DAQ oil and gas rules.

The Board elected to vote on each rule separately.

- Kathy Van Dame motioned that the Board finalize R307-501, Oil and Gas Industry: General Provisions, as presented. Karma Thomson seconded. The Board approved unanimously.

- Kathy Van Dame motioned that the Board finalize R307-502, Oil and Gas Industry: Pneumatic Controllers, as presented. Erin Mendenhall seconded. The Board approved the motion with five in favor (K. Van Dame, K. Kelly, E. Mendenhall, K. Thomson, and T. Lucero) and one opposed (M. Smith).

- Erin Mendenhall motioned that the Board finalize R307-503, Oil and Gas Industry: Flares, as presented. Kathy Van Dame seconded. The Board approved the motion with five in favor (K. Van Dame, K. Kelly, E. Mendenhall, K. Thomson, and T. Lucero) and one opposed (M. Smith).

- Kathy Van Dame motioned that the Board finalize R307-504, Oil and Gas Industry: Tank Truck Loading, as presented. Erin Mendenhall seconded. The Board approved unanimously.

A five minute break was taken at this time.

VIII. VIII. Propose for Public Comment: Amend Utah SIP. Section XX.D.6. Regional Haze. Long-Term Strategy for Stationary Sources. Best Available Control Technology (BART) Assessment for NOx and PM. Add new Utah SIP Subsections IX.H.21 and 22. General Requirements: Control Measures for Area and Point Sources, Emission Limits and Operating Practices, Regional Haze Requirements; and Source Specific Emission Limitations: Regional Haze Requirements, Best Available Retrofit Technology. Presented by Colleen Delaney.

Colleen Delaney, Environmental Scientist at DAQ, stated that on December 14, 2012, EPA approved the majority of Utah's Regional Haze SIP (RH SIP), but disapproved Utah's best available retrofit technology (BART) determinations for nitrogen oxides (NOx) and particulate matter (PM) for PacifiCorp's Hunter Unit 1, Hunter Unit 2, Huntington Unit 1, and Huntington Unit 2 that were adopted by the Board in 2008. Utah's BART determination met the presumptive BART emission

DRAFT

rate for NOx that was established by rule in 40 CFR part 51 Appendix Y (BART Rule) and required the installation of fabric filter baghouses, the most stringent control technology available, for PM. The 2008 RH SIP contained a 5-factor BART analysis that relied on the extensive technical work that EPA had completed to establish the presumptive BART emission rates for coal-fired electric generating units (EGUs) in the BART rule. EPA disapproved Utah's BART determination for NOx and PM because EPA did not agree that their own analysis satisfied the 5-factor analysis requirement. EPA, therefore, determined that the SIP did not contain a 5-factor analysis as required by the rule. In June 2012, PacifiCorp prepared a new 5-factor BART analysis to satisfy the requirements of the BART rule. PacifiCorp submitted an update to that analysis on August 5, 2014, to address issues that EPA had raised with other regional haze SIPs.

Staff recommends the Board retain the 2008 BART determination with the following changes. Correct the typographical error in Table 5 of the SIP to reflect the 0.015 lb/MMBtu PM limit in the approval orders for Hunter Units 1 and 2 and include the 74 lb/hr emission rate for Huntington Unit 1 and the 70 lb/hr emission rate for Huntington Unit 2. Add an enforceable requirement to shut down Carbon Unit 1 and Carbon Unit 2 by April 15, 2015. And add enforceable BART conditions to Part H of the SIP to address EPA's determination that the approval orders and operating permits for PacifiCorp's Hunter and Huntington plants are not practicably enforceable.

- Kathy Van Dame motioned that the Board propose for public comment to amend Utah SIP, Section XX.D.6, Regional Haze, Long-Term Strategy for Stationary Sources, Best Available Control Technology (BART) Assessment for NOx and PM. Add new Utah SIP Subsections IX.H.21 and 22, General Requirements: Control Measures for Area and Point Sources, Emission Limits and Operating Practices, Regional Haze Requirements; and Source Specific Emission Limitations: Regional Haze Requirements, Best Available Retrofit Technology. Tammie Lucero seconded. The Board approved unanimously.

IX. IX. Propose for Public Comment: Amend R307-110-17. General Requirements: State Implementation Plan. Section IX, Control Measures for Area and Point Sources, Part H, Emission Limits; and R307-110-28. General Requirements: State Implementation Plan. Regional Haze. Presented by Mark Berger.

Mark Berger, Environmental Planning Consultant at DAQ, stated the new SIPs for regional haze, along with the new emission limits added to Part H, will have to be incorporated into the Air Quality Rules. R307-110-17 is the rule that incorporates Part H into the rules, and R307-110-28, is the rule that incorporates the regional haze SIP into the rules. These rules should go out for public comment at the same time as the proposed SIPs they adopt. Staff recommends the Board propose for public comment R307-110-17 and R307-110-28.

- Michael Smith motion that the Board propose for public comment to amend R307-110-17, General Requirements: State Implementation Plan, Section IX, Control Measures for Area and Point Sources, Part H, Emission Limits; and R307-110-28, General Requirements: State Implementation Plan, Regional Haze. Kathy Van Dame seconded. The Board approved unanimously.

X. X. Propose for Public Comment: Amend R307-401-19. General Approval Order. Presented by Mark Berger.

Mark Berger, Environmental Planning Consultant at DAQ, stated in November 2013 the Air Quality Board adopted a new rule that provides authority for the Director to issue a general approval order (GAO) that would apply to a category of similar type sources. The first GAO developed by DAQ

DRAFT

was issued in June 2014 and applies to crude oil and natural gas well sites. During the development of this GAO, DAQ engineers discovered that a limitation in the rule is unnecessarily restrictive as the first level of review could potentially screen out sources that could meet the second level of review. The proposed change to the rule allows coverage under a GAO if a demonstration is completed that meets the requirements of R307-410-5(1)(c)(ii), which is the second level of review. It requires sources with proposed maximum pounds per hour emissions increase, equal to or greater than the emissions threshold value, to provide documentation of comparisons of the estimated ambient concentration of the proposed emissions with an applicable toxic screening level. Staff recommends the Board propose for public comment R307-401-19.

- Tammie Lucero motioned that the Board propose for public comment to amend R307-401-19, General Approval Order. Erin Mendenhall seconded. The Board approved unanimously.

XI. Informational Items.

Public comment from Christopher Thomas of Healthy Environment Alliance of Utah (HEAL Utah) was introduced. Mr. Thomas stated that HEAL Utah is focusing on air quality and energy. They are disappointed with DAQ's regional haze SIP as presented today because the plan does not require two coal-fired power plants to cut emissions enough. In addition to the health benefits of cutting pollution, Utah's national parks are part of its identity and worth protecting. Last year's statistics show Utah had ½ million visitors. As HEAL Utah prepares its comments they will be addressing costs and looking at how EPA's carbon rule will affect utilization.

A. Utah Clean Air Action Team Legislative Recommendations. Presented by Lonnie Bullard and Robert Grow.

Lonnie Bullard of Envision Utah explained that the Clean Air Action Team (CAAT) started a year ago as an advisory group made up of members from community groups such as the medical community, business, municipal, political leaders, and scientists. The focus of CAAT's recommendations to Governor Herbert is on technologies which they believe have to be embraced in Utah to allow growth.

Robert Grow of Envision Utah briefly described their recommendations to the Board which included the importance of using low-sulfur tier 3 fuels in automobiles. They recommend a major information campaign to promote public transportation and active transportation. Wood burning is both a $PM_{2.5}$ and health issue and they support the ban on wood burning and to help those who have wood stoves as sole source heat be able to convert to a cleaner burning source. They recommended that the Air Quality Board be allowed to adopt more stringent rules and to continue with funding levels for the Division to continue effectively achieve its mission. Approximately 45% of emissions from homes and buildings come from water heaters and they would like to see a rule for the use of ultra-low NOx water heaters. A property assessed clean energy (PACE) program be implemented to fund retrofit for homes to lower energy costs and also to better advertise the existing programs to retrofit older homes. CAAT would like to recognize and continue with the current cooperative efforts in the Uinta Basin to reduce emissions within the Basin. They would like to see the state adopt the 2015 International Energy Conservation Codes which will cut emission of new homes in half. They also recommend the oil and gas rules that were passed by the Board.

Tammie Lucero exits the meeting.

DRAFT

B. Five-Year Progress Report for Utah's State Implementation Plan for Regional Haze. Presented by Mark Berger.

Mark Berger, Environmental Planning Consultant at DAQ, stated that as required under 40 CFR 41.309(d)(10), DAQ prepared a five-year progress report for the first five-year progress period of 2005 to 2009 for the Regional Haze SIP that the state submitted to EPA on December 12, 2013, and which the EPA mostly approved on December 14, 2012. EPA disapproved the BART determination for nitrogen oxides and particulate matter. A great deal of this report comes from the Western Regional Air Partnership (WRAP) progress report in conjunction with western state air agencies and Air Resource Specialists, Inc. It was intended to provide the technical basis for use of western states to develop the first of their individual five-year progress reports. This report has been sent to federal land managers for their review prior to the scheduled hearing for this report and the Regional Haze SIP to be held on December 1, 2014. Staff is working with EPA and it is anticipated that a few changes will need to be made prior to its release for public comment on November 1, 2014.

Staff reports that the control measures in the Regional Haze SIP have all been implemented and that we are seeing significant emissions reductions from them. Table 2.1 on page 4 shows that for the progress period of 2005 to 2009 we saw visibility improve for all five Class I areas on the 20% best visibility days and for three of the Class I areas on the 20% worst visibility days. Bryce Canyon and Capitol Reef are the two areas that did not show visibility improvement on the 20% worst days. The largest contributor to increases at these sites was particulate organic mass, which is attributed to large wild fires in July and August of 2009. Data for the next progress period of 2010 to 2014 indicates we are on track to both improve visibility at all sites on both the 20% best and worst visibility days and also to meet the 2018 Preliminary Reasonable Progress Case established by WRAP.

Hearing officers from the Board were requested. Kathy Van Dame will be the hearing officer for the $PM_{2.5}$ SIP hearing on October 20, 2014, at 10:00 a.m. Kerry Kelly will be the hearing officer for the Regional Haze hearing on December 1, 2014, at 1:00 p.m.

C. Air Toxics. Presented by Robert Ford.

D. Compliance. Presented by Jay Morris and Harold Burge.

E. Monitoring. Presented by Bo Call.

Bo Call updated the Board on monitoring information.

F. Other Items to be Brought Before the Board.

When asked about an update on Stericycle, staff responded that in response to allegations concerning public health and safety, Governor Herbert launched investigations into alleged misconduct at the Stericycle facility. DEQ is working on a facility investigation of possible regulatory violations relating to their permits and the findings will be posted when the investigation is complete.

Meeting adjourned at 5:03 p.m.

DRAFT

ITEM 4

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-093-14

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Mat Carlile, Environmental Planning Consultant

DATE: November 21, 2014

SUBJECT: FINAL ADOPTION: Amend R307-121. General Requirements: Clean Air and Efficient Vehicle Tax Credit.

On September 3, 2014, the Air Quality Board proposed for public comment amendments to R307-121. This proposed amendment was necessitated by revisions made to the statutes that govern the Clean Fuel Tax Credit during the 2014 legislative session.

A public comment period was held from October 1 to October 31, 2014. No hearing was requested, and no comments were received.

Staff Recommends: Staff recommends the Board adopt the amendments to R307-121 as proposed.

195 North 1950 West • Salt Lake City, Utah
Mailing Address: P.O. Box 144820 • Salt Lake City, Utah 84114-4820
Telephone (801) 536-4000 • Fax (801) 536-4099 • T.D.D. (801) 536-4414
www.deq.utah.gov
Printed on 100% recycled paper

R307. Environmental Quality, Air Quality.
R307-121. General Requirements: Clean Air and Efficient Vehicle Tax Credit.
R307-121-1. Authorization and Purpose.

(1) This rule is authorized by Sections 59-7-605 and 59-10-1009. These statutes establish criteria and definitions used to determine eligibility for an income tax credit.

(2) R307-121 establishes procedures to provide proof of purchase or lease, in accordance with 59-7-605(3)(b) or 59-10-1009(3)(b), to the director for an OEM vehicle or the conversion of a motor vehicle or special mobile equipment for which an income tax credit is allowed under Sections 59-7-605 or 59-10-1009.

R307-121-2. Definitions.

The following additional definitions apply to R307-121.

"Air quality standards" means air quality standards as defined in Subsection 59-7-605(1)(a) and 59-10-1009(1)(a).

"Clean fuel" means clean fuel as defined in Subsection 19-1-402(1).

"Clean fuel vehicle" means clean fuel vehicle as defined in Subsection 19-1-402(2).

"Conversion equipment" means a package that may include fuel, ignition, emissions control, and engine components that are modified, removed, or added to a motor vehicle or special mobile equipment to make that motor vehicle or equipment eligible for the tax credit.

"Motor Vehicle" means a motor vehicle as defined in 41-1a-102.

"Original equipment manufacturer(OEM) vehicle" means original equipment manufacturer(OEM) as defined in Subsection 19-1-402(8).

"Original purchase" means original purchase as defined in Subsection 59-7-605(1)(g) and 59-10-1009(1)(g).

"Qualifying electric vehicle" means qualifying electric vehicle as defined in 59-7-605(1)(h) or 59-10-1009(1)(h).

"Qualifying plug-in hybrid vehicle" means qualifying plug-in hybrid vehicle as defined in 59-7-605(1)(i) or 59-10-1009(1)(i).

"Window Sticker" means the label required by United States Code Title 15 Sections 1231 and 1232, as effective January 3, 2012.

R307-121-3. Proof of Purchase to Demonstrate Eligibility for New OEM Natural Gas, Propane, Qualifying Electric or Qualifying Plug-in Hybrid Vehicles.

To demonstrate that an OEM natural gas, propane, qualifying electric, or qualifying plug-in hybrid motor vehicle is eligible for the tax credit, proof of purchase shall be made in accordance with 59-7-605(3)(b) or 59-10-1009(3)(b), by submitting the following documents to the director:

(1)(a) a copy of the motor vehicle's window sticker, which includes its Vehicle Identification Number (VIN), or equivalent manufacturer's documentation showing that the motor vehicle is an OEM natural gas, propane, qualifying electric or qualifying plug-in hybrid vehicle, or

(b) a signed statement by either an Automotive Service Excellence (ASE)-certified technician or Canadian Standards

Association (CSA) America CNG Fuel System Inspector that includes the VIN, the technician's ASE or CSA America certification number, and states that the motor vehicle is an OEM natural gas, propane, qualifying electric or qualifying plug-in hybrid vehicle;

(2) an original or copy of the purchase order, customer invoice, or receipt that includes the name of the taxpayer seeking the credit, the name of the seller of the motor vehicle, the VIN, purchase date, and price of the motor vehicle;

(3) a copy of the current Utah vehicle registration in the name of the taxpayer seeking the credit;

(4) an original or copy of the odometer disclosure statement required in Utah Code Annotated Title 41 Chapter 1a Section 902 for the motor vehicle that was acquired as an original purchase; and

(5) the underhood identification number or engine group of the motor vehicle.

R307-121-4. Proof of Lease to Demonstrate Eligibility for New OEM Natural Gas, Propane, Qualifying Electric or Qualifying Plug-in Hybrid Vehicles.

To demonstrate that an OEM natural gas, propane, qualifying electric or qualifying plug-in hybrid vehicle is eligible for the tax credit, proof of lease shall be made in accordance with 59-7-605(3)(b) or 59-10-1009(3)(b), by submitting the following documents to the director:

(1)(a) a copy of the motor vehicle's window sticker, which includes its Vehicle Identification Number (VIN), or equivalent manufacturer's documentation showing that the motor vehicle is an OEM natural gas, propane, qualifying electric or qualifying plug-in hybrid vehicle; or

(b) a signed statement by either an Automotive Service Excellence (ASE)-certified technician or Canadian Standards Association (CSA) America CNG Fuel System Inspector that includes the VIN, the technician's ASE or CSA America certification number, and states that the motor vehicle is an OEM natural gas, propane, qualifying electric or qualifying plug-in hybrid vehicle;

(2) an original or copy of the lease agreement that includes the name of the taxpayer seeking the credit, the name of the lessor of the vehicle, the VIN, the beginning date of the lease, the value of the vehicle at the beginning of the lease, and the value of the vehicle at the end of the lease;

(3) a copy of the current Utah vehicle registration in the name of the taxpayer seeking the credit;

(4) an original or copy of the odometer disclosure statement required in Utah Code Annotated Title 41 Chapter 1a Section 902 for the motor vehicle that was acquired as an original purchase; and

(5) the underhood identification number or engine group of the motor vehicle.

R307-121-5. Proof of Purchase to Demonstrate Eligibility for Motor Vehicles Converted to a Clean Fuel.

To demonstrate that a conversion of a motor vehicle to be fueled by a clean fuel is eligible for the tax credit, proof of purchase

shall be made, in accordance with 59-7-605(3)(b) or 59-10-1009(3)(b), by submitting the following documentation to the director:

(1) an original or copy of the purchase order, customer invoice, or receipt that includes the name of the taxpayer seeking the credit; the name, address, and phone number of the person that converted the motor vehicle to run on a clean fuel; the VIN; the date of conversion; and the price of the conversion equipment installed on the motor vehicle; and

(2) a copy of the current Utah vehicle registration in the name of the taxpayer seeking the credit.

R307-121-6. Proof of Purchase to Demonstrate Eligibility for Special Mobile Equipment Converted to Clean Fuels.

To demonstrate that a conversion of special mobile equipment to be fueled by clean fuel is eligible for the tax credit, proof of purchase shall be made, in accordance with 59-7-605(3)(b) or 59-10-1009(3)(b), by submitting the following documentation to the director:

(1) a description, including serial number, of the special mobile equipment for which credit is to be claimed; and

(2) an original or copy of the purchase order, customer invoice, or receipt that includes the name of the taxpayer seeking the credit, the serial number, the date of conversion, and the price of the conversion equipment installed on the special mobile equipment.

KEY: air pollution, alternative fuels, tax credits, motor vehicles
Date of Enactment or Last Substantive Amendment: January 1, 2015
Notice of Continuation: January 23, 2012
Authorizing, and Implemented or Interpreted Law: 19-2-104; 19-1-402; 59-7-605; 59-10-1009

ITEM 5

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-090-014

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Lisa Burr, Senior Research Analyst

DATE: November 19, 2014

SUBJECT: FINAL ADOPTION: New Rule R307-125. Clean Air Retrofit, Replacement, and Off-Road Technology Program.

On September 3, 2014, the Board proposed for public comment new rule R307-125, Clean Air Retrofit, Replacement, and Off-Road Technology (CARROT) Program. The CARROT program allows for grants and other programs such as exchange, rebate, or low-cost purchase programs for activities that reduce emissions from heavy-duty diesel (on-road and off-road) and small non-road engines. R307-125 specifies the requirements and procedures of the CARROT Program.

A public comment period was held from October 1 to October 31, 2014. One comment was received in support of the rule, and no public hearing was requested.

Staff Recommendation: Staff recommends the Board adopt new rule R307-125, Clean Air Retrofit, Replacement, and Off-Road Technology, as proposed.

195 North 1950 West • Salt Lake City, Utah
Mailing Address: P.O. Box 144820 • Salt Lake City, Utah 84114-4820
Telephone (801) 536-4000 • Fax (801) 536-4099 • T.D.D. (801) 536-4414
www.deq.utah.gov
Printed on 100% recycled paper

R307. Environmental Quality, Air Quality.
R307-125. Clean Air Retrofit, Replacement, and Off-road Technology Program
R307-125-1. Authority and Purpose.

(1) This rule specifies the requirements and procedures of the Clean Air Retrofit, Replacement and Off-Road Technology Program that is authorized in 19-2-203.

(2) The procedures of this rule constitute the minimum requirements for the application for and the awarding of funds that are designated for the Clean Air Retrofit, Replacement, and Off-Road Technology Program.

R307-125-2. Definitions.

The terms "certified," "cost," "director," "division," "eligible equipment," "eligible vehicle," and "verified" are defined in 19-2-202.

R307-125-3. Allocation of Funds.

The director may apportion up to 50% of the funds allocated for this program for an exchange, rebate, or low-cost purchase program under 19-2-203(2). The remainder may be allocated to a grant program under 19-2-203(1).

R307-125-4. Grants Under 19-2-203(1).

(1) A grant under 19-2-203(1) may only be used for:

(a) verified technologies for eligible vehicles or equipment; and

(b) certified vehicles, engines, or equipment.

(2) In prioritizing grant awards, the director shall consider:

(a) whether and to what extent the applicant has already secured some other source of funding;

(b) the air quality benefits to the state and local community attributable to the project;

(c) the cost-effectiveness of the proposed project;

(d) the feasibility and practicality of the project; and

(e) other factors that the director determines should apply based on the nature of the application.

(3) In prioritizing grant awards, the director may also, at the request of an applicant, consider the financial need of the applicant.

(4) A successful grant applicant will be required to agree:

(a) to provide information to the division about the vehicles, equipment, or technology acquired with the grant proceeds;

(b) to allow inspections by the division to ensure

compliance with the terms of the grant;

(c) to permanently disable replaced vehicles, engines, and equipment from use; and

(d) for any grant that is not given on a reimbursement basis, to commit to complete the project as proposed;

(e) not to change the location or use of the vehicle, engine or equipment from the location or use proposed in their application without approval of the director; and

(f) to any additional terms as determined by the director.

(5) Eligible vehicles are defined in 19-2-202(7). No additional vehicles under 19-2-202(7)(e) are eligible at this time.

(6) The division shall use the following procedures to implement the grant program:

(a) The division shall provide notice on the division's website of the availability of grants and of cut-off dates for applications.

(b) An application for a grant shall be on a form provided by the division.

(c) The director may provide grants on a reimbursement basis or as an advance award.

(d) Successful grant applicants will be required to sign a grant agreement that contains the terms described in R307-125-4(4).

(e) State agencies and employees are eligible to participate in the program and are subject to program requirements.

R307-125-5. Exchange, Rebate, or Low-Cost Purchase Programs Under 19-2-203(2).

(1) The director has discretion to choose whether to use an exchange, rebate or low-cost purchase program.

(2) The division shall use the following procedures to implement an exchange, rebate or low-cost purchase program:

(a) The division shall provide notice on the division's website of any exchange, rebate or low-cost purchase program.

(b) An application for an exchange, rebate, or low-cost purchase shall be on a form provided by the division.

(c) State agencies and employees are eligible to participate in any program and are subject to program requirements.

(d) The director may establish additional procedures appropriate to the specific program.

(3) A participant in an exchange, rebate, or low-cost purchase program will be required to agree to the terms outlined in the application as determined by the director.

KEY: air quality, grant, rebate, purchase program
Date of Enactment or Last Substantive Amendment: 2014
Authorizing, and Implemented or Interpreted Law: 19-2-203 ; 19-1-203

ITEM 6

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-096-14

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Joel Karmazyn, Environmental Scientist

DATE: November 24, 2014

SUBJECT: FINAL ADOPTION: Amend R307-302. Solid Fuel Burning Devices in Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber Counties.

The Air Quality Board approved for public comment a proposal to amend R307-302 to include:

1. Expanding the rule to include all solid fuel burning sources.
2. Exempting commercial and industrial food preparation using solid fuels.
3. Exempting commercial and industrial boilers and electrical generating facilities existing prior to the effective date of the rule.
4. Re-opening the sole source registry until June 1, 2015.
5. There is no proposed amendment to permit the transfer of non EPA Phase 2 certified stoves located within businesses and institutions as part of a real estate transaction. (A similar provision is currently within the rule for residential properties.)

The public comment period was held from October 1 to October 31, 2014. No comments were received directed towards item 2.

Public Comments Summaries

1. <u>Wasatch Integrated Waste Management District (WIWMD) and The Local Government Coalition for Renewable Energy (Coalition).</u>

   The comments from these commenters have been combined (and summarized) because they submitted similar comments and because the Coalition stated that they submitted comments in support of the WIWMD.

Comment: The WIWMD is a municipal waste management authority in Davis County. The WIWMD operates a waste to energy facility that provides steam to Hill Air Force Base for heating. The facility is currently regulated under R307-223, Emissions Standards: Existing Small Municipal Waste Combustion Units. WIWMD stated that the proposed rule would conflict with R307-223 and that the proposal under R307-302 is not necessary for industrial boilers because these units must meet the Best Available Control Technology (BACT) under our permitting rule and the Maximum Achievable Control Technology (MACT) under the Act Section 129(a)(2), 42 U.S.C. Section 7429(a)(2).

The Coalition is an alliance of local government entities that own waste-to-energy (WTE) facilities. The Coalition recognizes the need to control thousands of small sources that are not subject to pre-construction air quality permitting. That is in sharp contrast to the elaborate pre-construction permitting process – and comprehensive ongoing regulatory oversight and control – that the federal Clean Air Act (CAA) requires (together with Utah regulatory standards) for new or expanded major stationary sources, such as a possible future expansion of the Wasatch WTE facility (WIWMD).

WTE is recognized as a renewable energy in 31 states, including Utah and plays a significant role in mitigating greenhouse gas. The Coalition provided citations, including those from EPA regarding the value and reduced emissions with the use of WTE. The proposed amendment is unnecessary for WTE facilities given their excellent emissions control. The Coalition proceeded to reference state and federal standards that require MACT to support their claim of excellent emission control.

Intermittent shut-down/start-up due to intermittent burn restrictions would result in adverse emissions and would require many hours to actually achieve shut-down.

For each of these reasons, the Coalition respectfully requests that the Board not adopt the proposed amendment to Rule 307-302 without modifications (as further described in the Wasatch District's comments) to address the concerns described above.

DAQ response: We agree with the commenters that expanding the rule applicability to all sources of solid fuel burning devices opens up broad categories within industrial settings which were never intended to be subject to this rule. Consequently, we have modified the definition of a solid fuel burning device to clarify the intent of this rule is for fireplaces, wood stoves and boilers. All solid fuel burning boilers with emissions under 5 tons per year (tpy) would be regulated under this rule.

We have further clarified that the rule does not apply to industrial sources subject to an approval order issued under the permitting rule R307-401. Solid fuel burning boilers with emissions in excess of 5 tpy would thus need to demonstrate BACT in order to obtain a permit. MACT standards are federally enforceable and therefore are not impacted by state rules.

2. <u>ATK</u>

Comment: ATK recommends that a clarification should be made to the applicability that the rule applies to appliances that provide comfort heating for commercial, institutional and industrial buildings. ATK cites portions of the rule that [infer] that the rule is intended to apply to comfort heating. These citations include the definition of a sole source that is limited to residential heating and the opacity requirement for heating appliances. ATK further provided dialogue from past Board minutes which support the Board's intended expansion of the rule for heating comfort. ATK believes that DAQ may have unintentionally exceeded the original scope of the Board's directive to revise the rule in response to the wood smoke workgroup suggestions.

DAQ response: Broadening the scope of the rule to include boilers may have unintended consequences that can be resolved by clarifying the applicability. We have modified the applicability as follows:

> "R307-302 establishes emission standards for fireplaces and solid fuel burning devices used in residential, commercial, institutional and industrial facilities and associated outbuildings used to provide comfort heating"

Comment: ATK suggests inserting exemptions eliminating stationary sources already covered by existing state and federal regulatory programs, such as, open burning, construction permitting, or conditions in the $PM_{2.5}$ State Implementation Plan.

DAQ response: As explained above, we have clarified that the rule does not apply to industrial sources subject to an approval order issued under the permitting rule R307-401. This provision would also address SIP items.

3. Town of Alta and Alta Lodge

The public comments from the Town of Alta and Alta Lodge have been combined (and summarized) because they submitted similar comments.

Comment: An outright restriction of burning during those days would be a hardship on our operations for a very little reduction in solid fuel burning emissions, a reduction that has no effect on the Salt Lake Valley inversions.

Some ski lodges have converted all of their fireplaces to natural gas. Others have left wood burning fireplaces for only large common areas. Alta has 16 remaining wood burning fireplaces in commercial establishments. Twelve of those fireplaces are in the ski lodge common areas, serving 150 to 200 guests. These remaining fireplaces are important economic resources for the establishments that go far beyond mere aesthetic considerations.

Basic weather science tells us that burning wood in the canyon above the winter inversion does not affect the air below the top of the inversion. Alta's few remaining fireplaces do not contribute to the inversion in the Salt Lake Valley. Further, there appear to be no monitoring stations in Alta. Monitoring stations should be installed in Alta to definitively identify the levels of emissions and their direction of flow before any outright ban.

Application of the rule according to a county line, where topographic elevations vary by over 4,000 feet, would be arbitrary and capricious. Applying the rule to wood fireplaces in Alta would be arbitrary and capricious. Although we believe the Director should have the discretion to apply the rules equitably and only to the areas actually affected, good public policy calls for the rule to be amended to reflect the right policy. This concern applies to residences as well as businesses in Alta. We ask that any rulemaking be based upon solid scientific study and evidence.

Alta requests an exemption to the burning restriction for our remaining 16 fireplaces. This is the same type of exemption being recommended for the 47 wood, charcoal, and barbeque (wood and smokers) restaurant facilities in Salt Lake County, except that those restaurant exemptions are in the heart of the inversion while the Alta facilities are not. Wood burning fireplaces in Alta do not have any relationship to the valley inversion.

DAQ response: Dave Whiteman and John Horel of the University of Utah conducted a persistent cold-air pool study (PCAP) that was published by the American Meteorological Society in 2013. Their research determined that the top of the winter-time inversion is at 2,200 meters or 7,218 feet in elevation.

A yet unpublished graduate thesis by Joseph Swyler Young at the University of Utah shows that the aerosol depth within the inversion is 550 meters from the valley floor or at a top height of 6,070 ft. (1850 meters) in elevation. This is consistent with common visual observations of inversions, including photographs presented in the PCAP.

As a conservative measure, an exemption could be established for elevations across the Wasatch Front above 7,000 feet. This would provide about a 1,000 foot buffer zone. The Town of Alta and the Big Cottonwood community are located well above 7,000 feet in elevation.

We have shared the publications with EPA for their analysis. EPA's modeler agrees with the concept of a high elevation exemption.

We recommend that the Board approve a wood burning exemption for elevations above 7,000 feet in the Wasatch Front. This exemption would also eliminate the sole source registry eligibility for residences above 7,000 feet.

Comment: The language of Rule R-307-302-3(2) should be amended to read:

> [When] the National Weather Service forecasted weather for the specific area includes a temperature inversion which is predicted to continue for at least 24 hours, the director will issue a public announcement and will distribute such announcement to the local media notifying the public that a mandatory no-burn period for solid fuel burning devices and fireplaces is in effect for that specific area. The mandatory no-burn periods will only apply to those specific areas [delete: or counties] impacting the real-time monitoring site … The amended language should be adopted in Subsection R-307-302-3(4) as well.

DAQ response: DAQ meteorologists perform inversion predictions in accordance with the provisions within the rule. There is no need to amend the rule by including the National Weather Service.

The text already specifies that inversion predictions are based on "specific areas." DAQ meteorologists make their predictions based on regional/local meteorological conditions and monitoring station data. Further, R307-302-3(2) and R307-302-3(3) make it clear that burn restrictions are designated per specific areas by stating that " Residents of the affected areas shall not use…" No further action is necessary.

4. <u>Commenters Residing at High Elevations</u>

Carolyn Keigley: This commenter resides in Big Cottonwood Canyon and is opposed to any wood burning restriction, citing financial hardships by some local residents who cannot afford to always pay for propane. She also stated that snow bound areas also restricts propane delivery. Consequently, some residences must rely on wood burning.

Karen Travis: This commenter lives in Alta and has requested an exemption for residents at high elevations. This commenter cites the need for a backup heating source.

Steve Jorgensen: This commenter lives in Brighton and stated that it would be both a physical and financial hardship to live without a wood heat source. He has lived this life style for more 43 years.

Big Cottonwood Community Council: The residents have never experienced inversion related air pollution and request an exemption from the rule.

DAQ response: We have proposed an exemption for elevations above the inversion layer.

5. Hill Air Force Base

The Base uses a device that could be classified as a fireplace for firefighting training purposes. The air flow can be adjusted in this device to simulate flash back. The rule is not intended to control firefighting training equipment; therefore, we have added an exemption for this type of equipment.

6. Keith Averett

Comment: The proposed wood burning ban really has some serious items to consider. Last year's winter weather patterns were exception rather than the rule. There were longer stretches of time between storms that would generate winds to help refresh the air. Example, take a look at this year's July, August, and September weather. Weather patterns change from year to year. Yet, we are willing to HURRY and to JUMP to conclusions based on the exception rather than the rule. This rule contributes to driving up natural gas consumption which is financially hurting the elderly.

DAQ response: The commenter is incorrect in describing the last winter season as exceptional. We have experienced many severe inversion years, as supported in the Technical Support Document prepared for the $PM_{2.5}$ SIP. Wood smoke is a contributing area source that has been managed under our SIP programs since the early 1990s. The commenter did not provide documentation to support the claim that the wood smoke management program affects the natural gas market price.

7. Wasatch Clean Air Coalition (WCAC)

Comment: Future biomass & waste-to-energy. Wasatch Clean Air Coalition supports renewable solid fuel biomass for district heating, with the stringent controls that are possible in larger combustors. We oppose new waste-to-energy, as it exerts a perverse incentive on waste reduction & recycling.

Sole source registry reopening should be well publicized & the opportunity used to increase public understanding of the air & health impacts of solid fuel emissions.

Transfer of non-EPA Phase 2 certified stoves. Utah should follow the example of Missoula and work diligently at reducing the population of uncertified stoves from our NA areas, to reduce the health impacts of $PM_{2.5}$ when burning is permitted.

The WCAC supports the DAQ outreach to the health departments in the effort to define our food service industry and believes that further consumer outreach would help consumers make wise cooking choices.

DAQ response: The Air Quality Board has put into place R307-223, which permits small municipal waste combustion units and the 400 series rules for permitting other units. These rules require controls

that are considered to be BACT. The objection to new waste-to-energy units is noted, as well as the support for re-opening the sole source registry and no transfer on non-EPA certificated stoves from commercial, industrial and institutional sources.

Staff Recommendation: Staff recommends that the Board adopt R307-302 as amended.

R307. Environmental Quality, Air Quality.
R307-302. Solid Fuel Burning Devices in Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber Counties.
R307-302-1. Purpose and Definitions.

(1) R307-302 establishes emission standards for fireplaces and solid fuel burning devices used in residential, commercial, institutional and industrial facilities and associated outbuildings used to provide comfort heating.

(2) The following additional definitions apply to R307-302:

"Sole source of heat" means the solid fuel burning device is the only available source of heat for the entire residence, except for small portable heaters.

"Solid fuel burning device" means [~~any device~~]fireplaces, wood stoves and boilers used for burning wood, coal, or any other nongaseous and non-liquid fuel, both indoors and outdoors, but excluding outdoor wood boilers, which are regulated under R307-208.

R307-302-2. Applicability.

(1) R307-302-3 and R307-302-6 shall apply to any solid fuel burning device in PM10 and PM2.5 nonattainment and maintenance areas as defined in 40 CFR 81.345 (July 1, 2011) and geographically described as all regions of Salt Lake and Davis counties; all portions of the Cache Valley; all regions in Weber and Utah counties west of the Wasatch mountain range; in Box Elder County, from the Wasatch mountain range west to the Promontory mountain range and south of Portage; and in Tooele County, from the northernmost part of the Oquirrh mountain range to the northern most part of the Stansbury mountain range and north of Route 199.

(2) R307-302-4 shall apply only within the city limits of Provo in Utah County.

(3) R307-302-5 shall apply in all portions of Box Elder, Cache, Davis, Salt Lake, Tooele, Utah and Weber counties.

[~~(4) R307-302 does not apply to restaurant and institutional food preparation.~~

~~(5) R307-302 does not apply to commercial and industrial boilers and electrical generating facilities existing prior to the effective date of this rule.~~]

(4) The following exemptions apply to R307-302:

(a) R307-302 does not apply to restaurant and institutional food preparation.

(b) R307-302 does not apply to commercial and industrial boilers subject to an approval order issued under R307-401.

(c) R307-302-3 does not apply to sources located above 7000 feet in elevation within Box Elder, Davis, Salt Lake, Tooele, Utah and Weber counties.

(d) R307-302 does not apply to firefighting training devices that meet the definition of a solid fuel burning device.

R307-302-3. No-Burn Periods for Fine Particulate.

(1) By June 1, 2015, sole sources of residential heating using solid fuel burning devices must be registered with the director in order to be exempt during mandatory no-burn periods.

(2) When the ambient concentration of PM10 measured by the monitors in Salt Lake, Davis, Weber, or Utah counties reaches the level of 120 micrograms per cubic meter and the forecasted weather for the specific area includes a temperature inversion which is predicted to continue for at least 24 hours, the director will issue a public announcement and will distribute such announcement to the local media notifying the public that a mandatory no-burn period for solid fuel burning devices and fireplaces is in effect. The mandatory no-burn periods will only apply to those areas or counties impacting the real-time monitoring site registering the 120 micrograms per cubic meter concentration. Residents, commercial, institutional and industrial facilities of the affected areas shall not use solid fuel burning devices or fireplaces except those that are the sole source of heat for the entire residence and registered with the director.

(3) PM10 Contingency Plan. If the PM10 Contingency Plan described in Section IX, Part A, of the State Implementation Plan has been implemented, the trigger level for no-burn periods as specified in R307-302-3(2) will be 110 micrograms per cubic meter for that area where the PM10 Contingency Plan has been implemented.

(4) When the ambient concentration of PM2.5 measured by monitors in Box Elder, Cache, Davis, Salt Lake, Tooele, Utah or Weber counties are forecasted to reach or exceed 25 micrograms per cubic meter, the director will issue a public announcement to provide broad notification that a mandatory no-burn period for solid fuel burning devices and fireplaces is in effect. The mandatory no-burn periods will only apply to those counties identified by the director. Residents, commercial, institutional and industrial facilities within the geographical boundaries described in R307-302-2(1) shall not use solid fuel burning devices or fireplaces except those that are the sole source of heat for the entire residence and registered with the director.

(5) PM2.5 Contingency Plan. If the PM2.5 contingency plan of the State Implementation Plan has been implemented, the trigger level for no-burn periods as specified in R307-302-3(4) shall be 15 micrograms per cubic meter for the area where the PM2.5 contingency plan has been implemented.

R307-302-4. No-Burn Periods for Carbon Monoxide.

(1) Beginning on November 1 and through March 1, the director will issue a public announcement and will distribute such announcement to the local media notifying the public that a mandatory no-burn period for solid fuel burning devices and fireplaces is in effect when the running eight-hour average carbon monoxide concentration as monitored by the state at 4:00 PM reaches a value of 6.0 ppm or more.

(2) In addition to the conditions contained in R307-302-4(1), the director may use meteorological conditions to initiate a no-burn period. These conditions are:

(a) A national weather service forecasted clearing index value of 250 or less;

(b) Forecasted wind speeds of three miles per hour or less;

(c) Passage of a vigorous cold front through the Wasatch Front; or

(d) Arrival of a strong high pressure system into the area.

(3) During the no-burn periods specified in R307-302-4(1) and (2), residents, commercial, institutional and industrial facilities in Provo City shall not use solid fuel burning devices or fireplaces except those that are the sole source of heat for the entire residence and are registered with the director or the local health district office.

R307-302-5. Opacity for Heating Appliances.

Except during no-burn periods as required by R307-302-3 and 4, visible emissions from solid fuel burning devices and fireplaces shall be limited to a shade or density no darker than 20% opacity as measured by EPA Method 9, except for the following:

(1) An initial fifteen minute start-up period, and

(2) A period of fifteen minutes in any three-hour period in which emissions may exceed the 20% opacity limitation for refueling.

R307-302-6. Prohibition.

(1) Beginning September 1, 2013, no person shall sell, offer for sale, supply, install, or transfer a wood burning stove that is not EPA Phase 2 certified or a fireplace that is not EPA qualified.

(2) Ownership of a non EPA Phase 2 certified stove within a residential dwelling installed prior to March 6, 2014 may be transferred as part of a real estate transaction, so long as the unit remains intact within the real property of sale.

KEY: air pollution, fireplaces, stoves, solid fuel burning
Date of Enactment or Last Substantive Amendment: 2014
Notice of Continuation: June 2, 2010
Authorizing, and Implemented or Interpreted Law: 19-2-101; 19-2-104

ITEM 7

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-097-14

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Bill Reiss, Environmental Engineer

DATE: November 25, 2014

SUBJECT: FINAL ADOPTION: Add new SIP Subsection IX.A.21: Control Measures for Area and Point Sources, Fine Particulate Matter, PM2.5 SIP for the Salt Lake City, UT Nonattainment Area.

On December 14, 2009, EPA made its designations concerning areas that were not attaining the 2006 National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$. Among those areas designated was the Salt Lake City, UT $PM_{2.5}$ Nonattainment Area.

The Clean Air Act (CAA) required Utah to submit a nonattainment plan for the area. For several years, the Utah Division of Air Quality (UDAQ), in consultation with many stakeholders including EPA Region 8, worked to develop a State Implementation Plan (SIP) for the 2006 24-hour NAAQS for $PM_{2.5}$. On December 4, 2013, the Board adopted that SIP and it was subsequently submitted to EPA.

As the SIP was nearing completion, the D.C. Circuit Court of Appeals found that EPA had incorrectly interpreted the Clean Air Act when determining how to implement the NAAQS for $PM_{2.5}$. The January 4, 2013, court ruling held that EPA should have implemented the $PM_{2.5}$ NAAQS based on *both* CAA Subpart 1 *and* Subpart 4 of Part D, Title I. It also remanded the 2007 $PM_{2.5}$ Implementation Rule back to EPA so that the agency could address implementation of the $PM_{2.5}$ NAAQS under Subpart 4.

Utah was therefore required to supplement its SIP in order to address the additional requirements of Subpart 4. The most fundamental departure of Subpart 4 is that it classifies PM nonattainment areas as either Moderate or Serious and includes somewhat different planning requirements for each.

In the wake of the court ruling, EPA issued a "Deadlines Rule" that: 1) classified the Salt Lake City, UT $PM_{2.5}$ Nonattainment Area as a Moderate Area, 2) established a deadline of December 31, 2014, for Utah to submit the necessary SIP elements, and 3) established the attainment date for the area as December 31, 2015.

To meet this due-date in the Deadlines Rule, a SIP addressing the Subpart 4 planning requirements for Moderate Areas was proposed by the Board on September 3, 2014.

A 30-day public comment period was held, which included a public hearing. A summary of the comments received during the comment period along with the responses from UDAQ is attached.

One central point made throughout the responses to those comments is that there is still no new $PM_{2.5}$ implementation rule to guide states in the development of their SIPs, even as those SIPs are now coming due.

Any recommended revision to SIP Subsection IX.A.21resulting from these comments has been identified in the amended attachment using strikeout and underline.

Staff Recommendation: Staff recommends the Board adopt SIP Subsection IX.A.21: Control Measures for Area and Point Sources, Fine Particulate Matter, $PM_{2.5}$ SIP for the Salt Lake City, UT Nonattainment Area as amended.

UTAH

State Implementation Plan

Control Measures for Area and Point Sources, Fine Particulate Matter,

$PM_{2.5}$ SIP for the Salt Lake City, UT Nonattainment Area

Section IX. Part A.21

Adopted by the Utah Air Quality Board

December 3, 2014

1 Acronyms 3

2 Table of Contents 5

3 List of Figures 8

4 List of Tables 10

Acronyms

BACT	Best Available Control Technology
CAA	Clean Air Act
CFR	Code of Federal Regulations
CMAQ	Community Multiscale Air Quality
CTG	Control Techniques Guideline Documents
DAQ	Utah Division of Air Quality (also UDAQ)
EPA	Environmental Protection Agency
FRM	Federal Reference Method
MACT	Maximum Available Control Technology
MATS	Model Attainment Test Software
MPO	Metropolitan Planning Organization
$\mu g/m^3$	Micrograms Per Cubic Meter
Micron	One Millionth of a Meter
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NH_3	Ammonia
NO_x	Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
PM	Particulate Matter
PM_{10}	Particulate Matter Smaller Than 10 Microns in Diameter
$PM_{2.5}$	Particulate Matter Smaller Than 2.5 Microns in Diameter

1	RACM	Reasonably Available Control Measures
2	RACT	Reasonably Available Control Technology
3	RFP	Reasonable Further Progress
4	SIP	State Implementation Plan
5	SMOKE	Sparse Matrix Operator Kernal Emissions
6	SO_2	Sulfur Dioxide
7	SO_x	Sulfur Oxides
8	TSD	Technical Support Document
9	VOC	Volatile Organic Compounds
10	UAC	Utah Administrative Code
11	WRF	Weather Research and Forecasting

TABLE OF CONTENTS

Chapter 1 – INTRODUCTION AND BACKGROUND

1.1 Fine Particulate Matter 11

1.2 Health and Welfare Impacts of $PM_{2.5}$ 11

1.3 Fine Particulate Matter in Utah 12

1.4 2006, NAAQS for $PM_{2.5}$ 12

1.5 $PM_{2.5}$ Nonattainment Areas in Utah 13

1.6 $PM_{2.5}$ Precursors 14

Chapter 2 - REQUIREMENTS FOR 2006, $PM_{2.5}$ PLAN REVISIONS

2.1 Requirements for Nonattainment SIPs 16

2.2 $PM_{2.5}$ SIP Guidance 17

2.3 Summary of this SIP Proposal 17

Chapter 3 - AMBIENT AIR QUALITY DATA

3.1 Measuring Fine Particle Pollution in the Atmosphere 18

3.2 Utah's Air Monitoring Network 18

3.3 Annual $PM_{2.5}$ – Mean Concentrations 19

3.4 Daily $PM_{2.5}$ – Averages of 98th Percentiles and Design Values 20

3.5 Composition of Fine Particle Pollution – Speciated Monitoring Data 21

3.6 PCAP Study 24

3.7 Ammonia (NH_3) Studies 24

Chapter 4 - EMISSION INVENTORY DATA

4.1 Introduction 25

4.2 The 2008 Emissions Inventory 26

4.3 Characterization of Utah's Airsheds 26

Chapter 5 - ATTAINMENT DEMONSTRATION

5.1 Introduction **30**
5.2 Photochemical Modeling **30**
5.3 Domain/Grid Resolution **30**
5.4 Episode Selection **31**
5.5 Meteorological Data **34**
5.6 Photochemical Model Performance Evaluation **35**
5.7 Summary of Model Performance **42**
5.8 Modeled Attainment Test **43**
5.9 Air Quality as of the Attainment Date **44**

Chapter 6 - CONTROL MEASURES

6.1 Introduction **45**
6.2 Utah Stakeholder Workgroup Efforts **45**
6.3 Identification of Measures **46**
6.4 Existing Control Measures **47**
6.5 SIP Controls **55**
6.6 Reasonably Available Control Measures (RACM/RACT) **55**

Chapter 7 - TRANSPORTATION CONFORMITY

7.1 Introduction **65**
7.2 Consultation **65**
7.3 Regional Emission Analysis **66**
7.4 Interim $PM_{2.5}$ Conformity Test **67**

Chapter 8 - REASONABLE FURTHER PROGRESS

8.1 Introduction **68**
8.2 Moderate Area Planning Requirements **68**
8.3 RFP for the Salt Lake City, UT Nonattainment Area **69**

Chapter 9 - CONTINGENCY MEASURES

9.1 Background 73

9.2 Contingency Measures and Implementation Schedules for the Nonattainment Area 73

9.3 Conclusions 74

List of Figures

Figure 1.1, Nonattainment Areas for the 2006, $PM_{2.5}$ NAAQS 13

Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network 19

Figure 5.1: Northern Utah photochemical modeling domain. 31

Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007 32

Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008 33

Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10. 34

Figure 5.5: UDAQ monitoring network. 35

Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ ($\mu g/m^3$) for 2010 Jan. 03. 36

Figure 5.7: 24-hr PM2.5 time series (Hawthorne). Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace). 37

Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace). 38

Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace). 38

Figure 5.10: 24-hr $PM_{2.5}$ time series (Logan). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace). 39

Figure 5.11: An example of the Salt Lake Valley at the end of a high $PM_{2.5}$ episode. The lowest elevations of the Salt Lake Valley are still experiencing an inversion and elevated $PM_{2.5}$ concentrations while the $PM_{2.5}$ has been 'cleared out' throughout the rest of the valley. These 'end of episode' clear out periods are difficult to replicate in the photochemical model. 39

Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 $\mu g/m^3$ at the Hawthorne STN site. 40

Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Bountiful STN site. 41

Figure 5.14: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Lindon STN site. 41

Figure 5.15: The composition of model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when a modeled day had 24-hr concentrations > 35 µg/m^3 at the Logan monitoring site. No observed speciation data is available for Logan. 42

Figure 5.16, Model Results for the Salt Lake City, UT Nonattainment Area 43

LIST OF TABLES

Table 3.1, $PM_{2.5}$ Annual Mean Concentrations 20

Table 3.2, 24-hour $PM_{2.5}$ Monitored Design Values 21

Table 4.1, Emissions Summary for 2010 (SMOKE). Emissions are presented in tons per average winter day. 28

Table 4.2, Emissions Summaries for the Salt Lake City, UT Nonattainment Area; Baseline, RFP and Attainment Years (SMOKE). Emissions are presented in tons per average winter day. 29

Table 5.1, Modeled Concentrations ($\mu g/m^3$) for the Salt Lake City, UT Nonattainment Area 44

Table 6.1, Tier 1 Emission Standards 50

Table 6.2, Tier 2 Emission Standards 52

Table 6.3, Point Source Emissions; Baseline and Projections with Growth and Control 58

Table 6.4 Area Source Strategy Screening 60

Table 6.5, Emissions Reductions from Area Source SIP Controls 63

Table 8.1, Reasonable Further Progress in the Salt Lake City, UT nonattainment area 71

Chapter 1 – INTRODUCTION AND BACKGROUND

1.1 Fine Particulate Matter

According to EPA's website, particulate matter, or PM, is a complex mixture of extremely small particles and liquid droplets. Particulate matter is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles.

The size of particles is directly linked to their potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Other negative effects are reduced visibility and accelerated deterioration of buildings.

EPA groups particle pollution into two categories:

- "Inhalable coarse particles," such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter. Utah has previously addressed inhalable coarse particles as part of its PM_{10} SIPs for Salt Lake and Utah Counties, but this fraction is not measured as $PM_{2.5}$ and will not be a subject for this nonattainment SIP.

- "Fine particles," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller and thus denoted as $PM_{2.5}$. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.

PM concentration is reported in micrograms per cubic meter or $\mu g/m^3$. The particulate is collected on a filter and weighed. This weight is combined with the known amount of air that passed through the filter to determine the concentration in the air.

1.2 Health and Welfare Impacts of $PM_{2.5}$

Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:

- increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing, for example;
- decreased lung function;
- aggravated asthma;
- development of chronic bronchitis;
- irregular heartbeat;

- nonfatal heart attacks; and
- pre-mature death in people with heart or lung disease.

People with heart or lung diseases, children and older adults are the most likely to be affected by particle pollution exposure. However, even healthy people may experience temporary symptoms from exposure to elevated levels of particle pollution.

1.3 Fine Particulate Matter in Utah

Excluding wind-blown desert dust events, wild land fires, and holiday related fireworks, elevated $PM_{2.5}$ in Utah occurs when stagnant cold pools develop during the winter season.

The synoptic conditions that lead to the formation of cold pools in Utah's nonattainment areas are: synoptic scale ridging, subsidence, light winds, snow cover (often), and cool- to-cold surface temperatures. These conditions occur during winter months, generally mid-November through early March.

During a winter-time cold pool episode, emissions of $PM_{2.5}$ precursors react relatively quickly to elevate overall concentrations, and of course dispersion is very poor due to the very stable air mass. Episodes may last from a few days to tens of days when meteorological conditions change to once again allow for good mixing.

The scenario described above leads to exceedances and violations of the 24-hour health standard for $PM_{2.5}$. In other parts of the year concentrations are generally low, and even with the high peaks incurred during winter, are well within the annual health standard for $PM_{2.5}$.

1.4 2006, NAAQS for $PM_{2.5}$

In September of 2006, EPA revised the (1997) standards for $PM_{2.5}$. While the annual standard remained unchanged at 15 $\mu g/m^3$, the 24-hr standard was lowered from 65 $\mu g/m^3$ to 35 $\mu g/m^3$.

DAQ has monitored $PM_{2.5}$ since 2000, and found that all areas within the state have been in compliance with the 1997 standards. At this new 2006 level, all or parts of five counties have collected monitoring data that is not in compliance with the 24-hr standard.

In 2013, EPA lowered the annual average to 12 $\mu g/m^3$. Monitoring data shows no instances of noncompliance with this revised standard.

1.5 $PM_{2.5}$ Nonattainment Areas in Utah

There are two distinct nonattainment areas for the 2006, $PM_{2.5}$ standards residing entirely within the state of Utah. These are the Salt Lake City, UT, and Provo, UT nonattainment areas, which together encompass what is referred to as the Wasatch Front. A third nonattainment area is more or less geographically defined by the Cache Valley which straddles the border between Utah and Idaho (the Logan, UT – ID nonattainment area.) Figure 1.1 below shows the geographic extent of these areas.

None of these three areas has violated the annual NAAQS for $PM_{2.5}$. Without exception, the exceedances leading to 24-hr NAAQS violations are associated with relatively short-term meteorological occurrences.

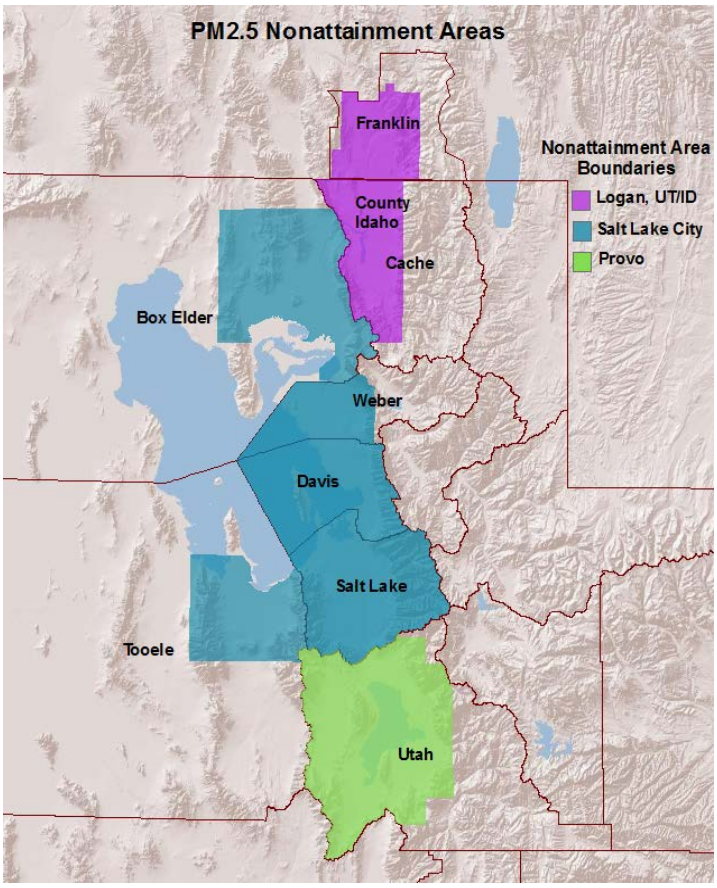


Figure 1.1, Nonattainment Areas for the 2006, $PM_{2.5}$ NAAQS

Each of these three areas was designated, by the EPA, based on the weight of evidence of the following nine factors recommended in its guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns
- growth
- meteorology
- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

EPA also used analytical tools and data such as pollution roses, fine particulate composition monitoring data, back trajectory analyses, and the contributing emission score (CES) to evaluate these areas.

While the general meteorological characteristics are identical between the Wasatch Front and Cache Valley, there are two important differences related to topography. First, the Cache Valley is a closed basin while the Wasatch Front has many large outlets that connect it to the larger Great Basin. The large outlets along the Wasatch Front provide the potential for greater advection of pollutants and for a potentially weaker cold pool. Second, the Cache Valley is a narrow (<20 km) valley bordered by extremely steep mountains. These topographical differences lead to faster forming, more intense, and more persistent cold pools in Cache Valley relative to the Wasatch Front.

Because of these differences, the two Wasatch Front areas and the Cache Valley are designated as separate nonattainment areas; however, they have all been modeled together within the same modeling domain.

1.6 $PM_{2.5}$ Precursors

The majority of ambient $PM_{2.5}$ collected during a typical cold-pool episode of elevated concentration is secondary particulate matter, born of precursor emissions. The precursor gasses associated with fine particulate matter are SO_2, NOx, volatile organic compounds (VOC), and ammonia (NH_3).

Clean Air Act Section 189(e) requires that the control requirements applicable in plans for major stationary sources of PM_{10} shall also apply to major stationary sources of PM_{10} precursors, except where the Administrator determines that such sources do not contribute significantly to PM_{10} levels which exceed the standard in the area.

As this paragraph now applies also to $PM_{2.5}$ plans the following should be said about the way this plan is structured.

CAA Section 172 does not include any specific applicability thresholds to identify the size of sources that States and EPA must consider in the plan's RACT and RACM analysis. In developing the emissions inventories underlying the SIP, the criteria of 40 CFR 51 for air emissions reporting requirements was used to establish a 100 ton per year threshold for identifying a sub-group of stationary point sources that would be evaluated individually. For the Salt Lake City, UT nonattainment area, there are 28 stationary point sources that met or meet the criteria of 100 tons per year for $PM_{2.5}$ or any $PM_{2.5}$ precursor.

The control evaluations for each of these sources included $PM_{2.5}$ as well as $PM_{2.5}$ precursors. This principle was extended to the non-stationary source categories as well.

When evaluating the cost per ton necessary to reduce emissions, consideration was given to the resulting $PM_{2.5}$ concentrations. Through this process, reasonable controls were identified affecting $PM_{2.5}$, SO_2, NOx and VOC.

No such controls were identified for ammonia. Ammonia occurs in such abundance that $PM_{2.5}$ concentrations are not sensitive to reductions in ammonia unless those reductions are very large. Within the stationary source category, there really were no significant amounts of ammonia to evaluate. The largest contributor to the ammonia inventory was the agricultural sector, and the maximum possible amount of ammonia reduction from that sector would still not be enough to affect a reduction in $PM_{2.5}$.

Additional information regarding control measures may be found in Chapter 6 as well as the Technical Support Document (TSD).

Chapter 2 – REQUIREMENTS FOR 2006, $PM_{2.5}$ PLAN REVISIONS

2.1 Requirements for Nonattainment SIPs

Section 110 of the Clean Air Act lists the requirements for implementation plans. Many of these requirements speak to the administration of an air program in general. Section 172 of the Act contains the plan requirements for nonattainment areas. Some of the more notable requirements identified in these sections of the Act that pertain to this SIP include:

- Implementation of Reasonably Available Control Measures (RACM) as expeditiously as practicable
- Reasonable Further Progress (RFP) toward attainment of the National Ambient Air Quality Standards by the applicable attainment date
- Enforceable emission limits as well as schedules for compliance
- A comprehensive inventory of actual emissions
- Contingency measures to be undertaken if the area fails to make reasonable further progress or attain the NAAQS by the applicable attainment date

On January 4, 2013, D.C. Circuit Court of Appeals found that EPA had incorrectly interpreted the Clean Air Act when determining how to implement the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$. The January 4, 2013 court ruling held that the EPA should have implemented the $PM_{2.5}$ NAAQS based on *both* Clean Air Act (CAA) Subpart 1 ("Nonattainment Areas in General" of "Part D – Plan Requirements for Nonattainment Areas") *and* Subpart 4 ("Additional Provisions for Particulate Matter Nonattainment Areas") of Part D, title 1. EPA had (incorrectly) required states to develop their SIPs based only on Subpart 1. Therefore, as of January 4, 2013, Subpart 4 also applies.

Under Subpart 4, nonattainment areas for particulate matter may carry the classification of either moderate or serious. Subpart 4 addresses the attainment dates and planning provisions for both moderate and serious PM nonattainment areas.

In the wake of the decision by the D.C. Circuit, EPA has promulgated a "Deadlines Rule" that identifies each of Utah's three $PM_{2.5}$ nonattainment areas as moderate. It specifies December 31, 2014 as the SIP submission deadline for these moderate $PM_{2.5}$ nonattainment areas, and further specifies December 31, 2015 as the attainment date for each area.

More specific requirements for the preparation, adoption, and submittal of implementation plans are specified in 40 CFR Part 51. Subpart Z of Part 51 had contained provisions for Implementation of $PM_{2.5}$ National Ambient Air Quality Standards. However, one consequence of the January 4, 2013 Court ruling was to revoke Subpart Z. This leaves only the more general requirements of Part 51.

2.2 $PM_{2.5}$ SIP Guidance

Beyond what had been codified in Subpart Z of Part 51 concerning the Implementation of the $PM_{2.5}$ NAAQS, EPA had provided additional clarification and guidance in its Clean Air Particulate Implementation Rule for the 1997, $PM_{2.5}$ NAAQS (FR 72, 20586) and its subsequent Implementation Guidance for the 2006, 24-Hour Fine Particle NAAQS (March 2, 2012). This too was revoked by the D.C. Circuit Court's decision. Until such time as a new implementation rule for $PM_{2.5}$ is promulgated, the Deadlines Rule recommends the General Preamble, EPA's longstanding general guidance that interprets the 1990 amendments to the CAA, as the applicable guidance for states to follow while preparing SIPs for $PM_{2.5}$ nonattainment areas.

2.3 Summary of this SIP Proposal

This implementation plan was developed to meet the requirements specified in the law, rule, and appropriate guidance documents identified above. Discussed in the following chapters are: air monitoring, reasonably available control measures, modeled attainment demonstration, emission inventories, reasonable further progress toward attainment, transportation conformity, and contingency measures. Additional information is provided in the technical support document (TSD).

Chapter 3 – Ambient Air Quality Data

3.1 Measuring Fine Particle Pollution in the Atmosphere

Utah has monitored $PM_{2.5}$ in its airsheds since 2000 following the promulgation of the 1997, $PM_{2.5}$ NAAQS which was set at 65 µg/m^3 for a 24-hour averaging period. $PM_{2.5}$ monitoring sites were initially located based on concentrations of PM_{10}, which historically were measured at sites located based on emissions of primary particles. $PM_{2.5}$ concentrations, especially during Utah's wintertime valley temperature inversions, tend to be distributed more homogenously within a specific airshed. Homogeneity of $PM_{2.5}$ concentrations means that one or two monitors are adequate to determine compliance with the NAAQS in specific airsheds. DAQ's monitors are appropriately located to assess concentration, trends, and changes in $PM_{2.5}$ concentrations. During Utah's wintertime cold-pool episodes, every day sampling and real time monitoring are needed for modeling and public notification.

3.2 Utah's Air Monitoring Network

The Air Monitoring Center (AMC) maintains an ambient air monitoring network in Utah that collects both air quality and meteorological data. Figure 3.1 shows the location of sites along the Wasatch Front that collect $PM_{2.5}$ data. Twelve sites collect $PM_{2.5}$ data using the Federal Reference Method (FRM); $PM_{2.5}$ is collected on filters over a 24 hour period and its mass is measured gravimetrically. Seven of those sites also measure $PM_{2.5}$ concentrations continuously in real-time. Real-time $PM_{2.5}$ data is useful both for pollution forecasting and to compare with 24-hour concentrations of $PM_{2.5}$ collected on filters. Of the twelve sites that use the FRM to measure $PM_{2.5}$, six sites collect $PM_{2.5}$ data daily and six sites collect $PM_{2.5}$ data on every third day. Three sites along the Wasatch Front collect speciated $PM_{2.5}$. Particulate matter on the speciated $PM_{2.5}$ filters is analyzed for organic and inorganic carbon and a list of 48 elements. $PM_{2.5}$ speciation data is particularly useful in helping to identify sources of particulate matter. The ambient air quality monitoring network along Utah's Wasatch Front and in the Cache Valley meets EPA requirements for monitoring networks.

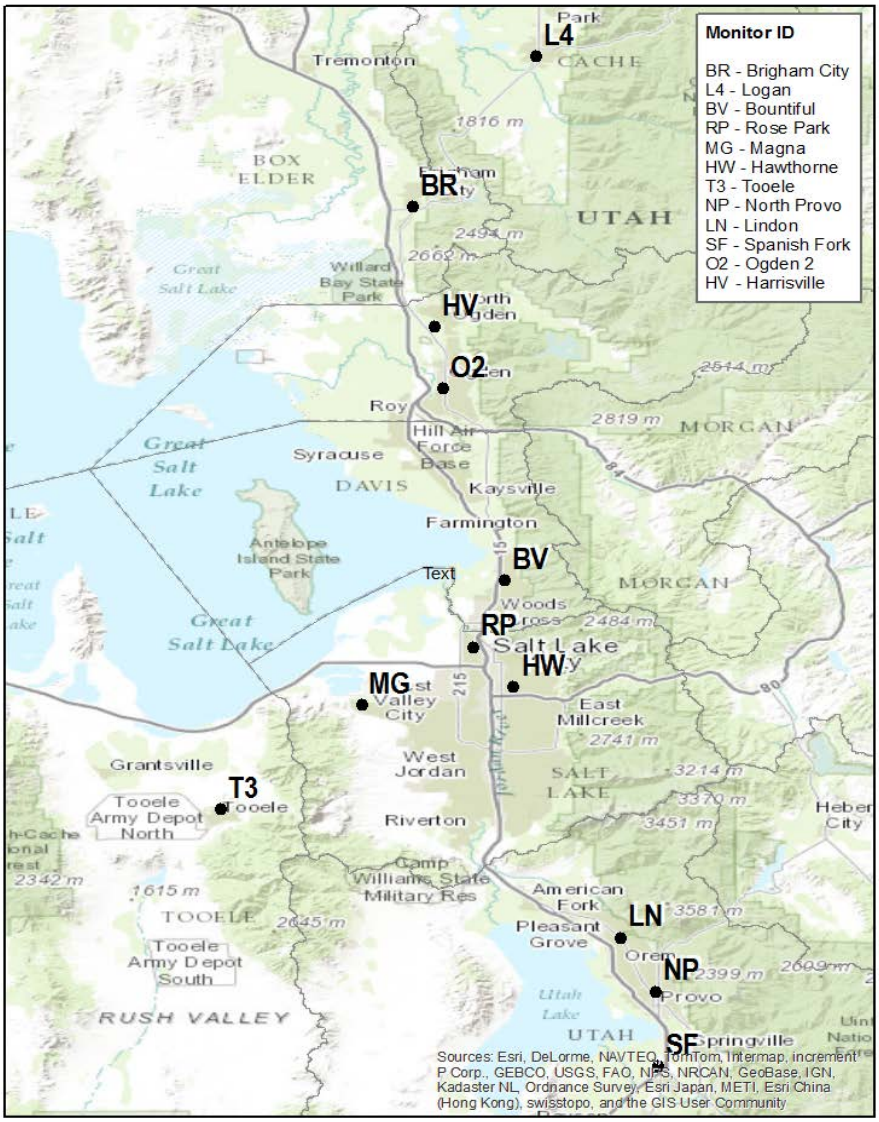


Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network

3.3 Annual $PM_{2.5}$ – Mean Concentrations

The procedure for evaluating $PM_{2.5}$ data with respect to the NAAQS is specified in Appendix N to 40 CFR Part 50. Generally speaking, the annual $PM_{2.5}$ standard is met when a three-year average of annual

mean values is less than or equal to 12.0 µg/m^3. Each annual mean is itself an average of four quarterly averages.

Table 3.1, below shows the running 3-year averages of annual mean values for each of Utah's monitoring locations. The data in the table spans the years 2008 through 2012. These are the years surrounding 2010, the year for which the baseline modeling inventory was prepared. It can be seen from the data that there are no locations at which the annual NAAQS was violated. It should be noted that the conclusion would be no different if the most recent data from 2013 were considered.

		3-Year Average of Annual Mean Concentrations		
Location	**County**	**08 - 10**	**09 - 11**	**10 - 12**
Logan (Combined POC 1 & 2)	Cache	10.0	9.7	8.7
Brigham City	Box Elder	8.3	8.2	7.7
Ogden 2 (POC 1)	Weber	9.7	9.5	9.1
Harrisville	Weber	8.6	8.3	7.6
Bountiful	Davis	9.8	9.2	8.3
Rose Park (POC 1)	Salt Lake	10.4	9.7	9.2
Magna	Salt Lake	8.5	8.4	7.7
Hawthorn (POC 1)	Salt Lake	10.4	9.7	8.8
Tooele	Tooele	6.8	6.8	6.3
Lindon (POC 1)	Utah	9.8	9.1	8.3
North Provo	Utah	9.4	8.7	8.1
Spanish Fork	Utah	8.8	8.5	7.7

Table 3.1, $PM_{2.5}$ Annual Mean Concentrations

3.4 Daily $PM_{2.5}$ – Averages of 98th Percentiles and Design Values

The procedure for evaluating $PM_{2.5}$ data with respect to the NAAQS is specified in Appendix N to 40 CFR Part 50. Generally speaking, the 24-hr. $PM_{2.5}$ standard is met when a three-year average of 98th percentile values is less than or equal to 35 µg/m^3. Each year's 98th percentile is the daily value below which 98% of all daily values fall.

Table 3.2, below shows the running 3-year averages of 98th percentile values for each of Utah's monitoring locations. Again, the data in the table spans the years 2008 through 2012 which are the years surrounding 2010, the baseline modeling inventory. It can be seen from the data that there are many locations at which the 24-hr. NAAQS has been violated, and this SIP has been structured to specifically address the 24-hr. standard.

Site-Specific Baseline Design Values:		3-Year Average of 98th Percentiles			Baseline Design Value
Location	**County**	**08 - 10**	**09 - 11**	**10 - 12**	
Logan (Combined POC 1 & 2)	Cache	42.6	42.4	37.2	**40.7**
Brigham City	Box Elder	42.5	40.1	37.2	**39.9**
Ogden 2 (POC 1)	Weber	37.0	41.1	37.4	**38.5**
Harrisville	Weber	35.6	36.6	33.2	**35.1**
Bountiful	Davis	37.7	40.3	34.4	**37.5**
Rose Park (POC 1)	Salt Lake	40.9	40.7	35.4	**39.0**
Magna	Salt Lake	32.8	34.5	30.3	**32.5**
Hawthorn (POC 1)	Salt Lake	43.6	44.5	38.1	**42.1**
Tooele	Tooele	25.9	27.1	24.4	**25.8**
Lindon (POC 1)	Utah	40.5	40.9	32.4	**37.9**
North Provo	Utah	36.4	35.1	28.6	**33.4**
Spanish Fork	Utah	39.3	41.7	34.6	**38.5**

Table 3.2, 24-hour $PM_{2.5}$ Monitored Design Values

As mentioned in the foregoing paragraph, this SIP is structured to address the 24-hr. $PM_{2.5}$ NAAQS. As such the modeled attainment test must consider monitored baseline design values from each of these locations. EPA's modeling guidance[1] recommends this be calculated using three-year averages of the 98th percentile values. To calculate the monitored baseline design value, EPA recommends an average of three such three-year averages that straddle the baseline inventory. 2010 is the year represented by the baseline inventory. Therefore, the three-year average of 98th percentile values collected from 2008-2010 would be averaged together with the three-year averages for 2009-2011 and 2010-2012 to arrive at the site-specific monitored baseline design values. These values are also shown in Table 3.2[2].

3.5 Composition of Fine Particle Pollution – Speciated Monitoring Data

DAQ operates three $PM_{2.5}$ speciation sites. The Hawthorne site in Salt Lake County is one of 54 Speciation Trends Network (STN) sites operated nationwide on an every-third-day sampling schedule. Sites at Bountiful/Viewmont in Davis County and Lindon in Utah County are State and Local Air

[1] Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze (EPA -454B-07-002, April 2007)

[2] Recalculating the design values by replacing the 98th percentiles from 2008 with the most recent 98th percentiles from 2013 has a mixed effect throughout the monitoring network, with some sites increasing and others decreasing. The design value for Hawthorne, the controlling monitor, would decrease by 0.8 µg/m3. This decrease is not significant enough to change the conclusion drawn in Section 5.9.

Monitoring Stations (SLAMS) $PM_{2.5}$ speciation sites that operate on an every-sixth-day sampling schedule.

Filters are prepared by the EPA contract laboratory and shipped to Utah for sampling. Samples are collected for particulate mass, elemental analysis, identification of major cations and anions, and concentrations of elemental and organic carbon as well as crustal material present in $PM_{2.5}$. Carbon sampling and analysis changed in 2007 to match the Interagency Monitoring of Protected Visual Environments (IMPROVE) method using a modified IMPROVE sampler at all sites.

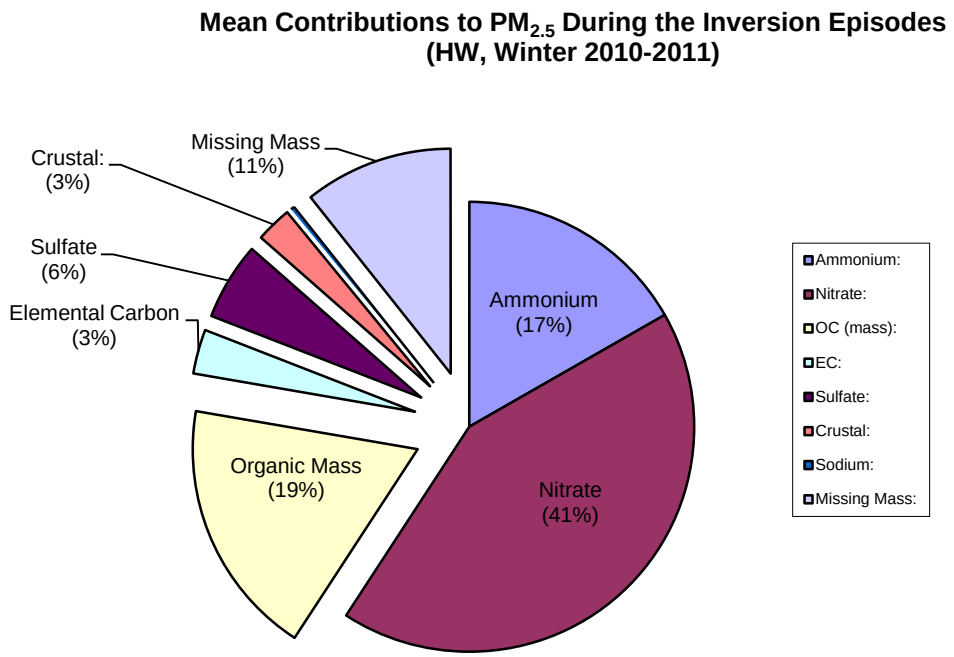
The $PM_{2.5}$ is collected on three types of filters: Teflon, nylon, and quartz. Teflon filters are used to characterize the inorganic contents of $PM_{2.5}$. Nylon filters are used to quantify the amount of ammonium nitrate, and quartz filters are used to quantify the organic and inorganic carbon content in the ambient $PM_{2.5}$.

Data from the speciation network show the importance of volatile secondary particulates during the colder months. These particles are significantly lost in FRM $PM_{2.5}$ sampling.

During the winter periods between 2009 and 2011, DAQ conducted special winter speciation studies aimed at better characterization of $PM_{2.5}$ during the high pollution episodes. These studies were accomplished by shifting the sampling of the Chemical Speciation Network monitors to 1-in-2-day schedule during the months of January and February. Speciation monitoring during the winter high-pollution episodes produced similar results in $PM_{2.5}$ composition each year.

The results of the speciation studies lead to the conclusion that the exceedances of the $PM_{2.5}$ NAAQS are a result of the increased portion of the secondary $PM_{2.5}$ that was chemically formed in the air and not primary $PM_{2.5}$ emitted directly into the troposphere.

Figure 3.2 below shows the contribution of the identified compounds from the speciation sampler both during a winter temperature inversion period and during a well-mixed winter period.



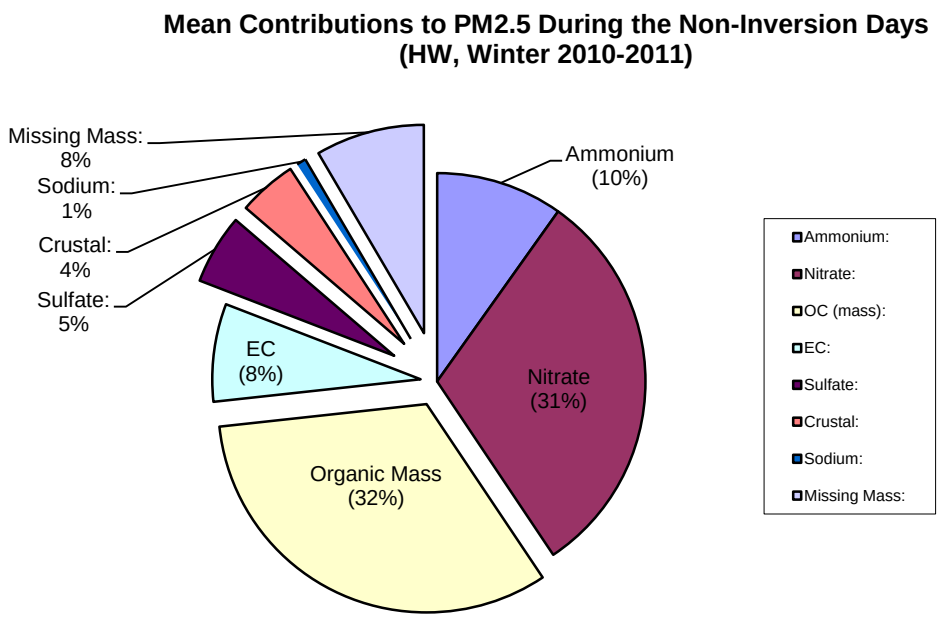


Figure 3.2, Composite Wintertime PM2.5 Speciation Profiles

3.6 PCAP Study

The Persistent Cold Air Pooling Study (PCAPS) is National Science Foundation-funded project conducted by the University of Utah to investigate the processes leading to the formation, maintenance and destruction of persistent temperature inversions in Salt Lake Valley. The study ended in March of 2014. Field work for the project was conducted in the winter of 2010-2011 and focused on the meteorological dynamics of temperature inversions in the Salt Lake Valley and in the Bingham Canyon pit mine in the southwest corner of Salt Lake Valley. In addition to identifying key meteorological processes involved in the dynamics of temperature inversions in Salt Lake Valley, the other primary objectives of PCAPS is to determine how persistent temperature inversions affect air pollution transport and diffusion in urban basins and to develop more accurate meteorological models describing the formation, persistence and dispersion of temperature inversions in Salt Lake Valley.

Analyses of most data sets collected during the PCAPS are still underway. However, one study examining $PM_{2.5}$ concentrations along an elevation gradient north of Salt Lake City (1300-1750 meters) showed that $PM_{2.5}$ concentrations generally decreased with altitude and increased with time during a single temperature inversion event.[1] Final results from PCAPS will help DAQ understand both how persistent temperature inversions affect $PM_{2.5}$ concentrations along the Wasatch Front and will enhance DAQ's ability to accurately forecast the formation and breakup of temperature inversion that lead to poor wintertime air quality.

3.7 Ammonia (NH_3) Studies

The Division of Air Quality deployed an ammonia monitor as a part of the special winter study for 2009. A URG 9000 instrument was used to record hourly values of ambient ammonia between the months of December and February.

The resulting measurements showed that the ambient concentration of ammonia tended to be generally an order of magnitude higher than those of nitric acid: 12-17 ppbv and 1-2 ppbv, respectively.

Unfortunately, the use of the instrument proved to be excessively labor intensive due to the high frequency of calibrations and corrections for drift. The data obtained during the winter of 2009, albeit valuable for rough estimation of the ambient ammonia concentrations, contained an abnormal amount of error for accurate mechanistic analysis.

[1] Silcox, G.D., K.E. Kelly, E.T. Crosman, C.D. Whiteman, and B.L. Allen, 2012: Wintertime $PM_{2.5}$ concentrations in Utah's Salt Lake Valley during persistent multi-day cold air pools. Atmospheric Environment, 46, 17-24.

Chapter 4 – EMISSION INVENTORY DATA

4.1 Introduction

The emissions inventory is one means used by the state to assess the level of pollutants and precursors released into the air from various sources. The methods by which emissions inventories are collected and calculated are constantly improving in response to better analysis and more comprehensive rules. The inventories underlying this SIP were compiled using the best information available.

The sources of emissions that were inventoried may be discussed as belonging to four general categories: industrial point sources; on-road mobile sources; off-road mobile sources; and area sources which represent a collection of smaller, more numerous point sources, residential activities such a home heating, and in some cases biogenic emissions.

This SIP is concerned with $PM_{2.5}$, both primary in its origin and secondary, referring to its formation removed in time and space from the point of origin for certain precursor gasses. Hence, the pollutants of concern, at least for inventory development purposes, included $PM_{2.5}$, SO_2, NO_x, VOC, and NH_3.

On-road mobile sources are inventoried using EPA's MOVES2010 model, in conjunction with information generated by travel demand models such as vehicle speeds and miles traveled. The inventory information is calculated in units of tons per day, adjusted for winter conditions. Emissions from the other three categories are calculated in terms of tons per year.

Prior to use in the air quality model, the emissions are pre-processed to account for the seasonality of Utah's difficulty with secondary $PM_{2.5}$ formation during winter months. These temporal adjustments also account for daily and weekly activity patterns that affect the generation of these emissions.

To acknowledge the episodic and seasonal nature of Utah's elevated $PM_{2.5}$ concentrations, inventory information presented herein is, unless otherwise noted, a reflection of the temporal adjustments made prior to air quality modeling. This makes more appropriate the use of these inventories for such purposes as correlation with measured $PM_{2.5}$ concentrations, control strategy evaluation, establishing budgets for transportation conformity, and tracking rates of progress.

There are various time horizons that are significant to the development of this SIP. It is first necessary to look at past episodes of elevated $PM_{2.5}$ concentrations in order to develop the air quality model. The episodes studied as part of the SIP occurred in 2007, 2008, 2009, and 2010. It is then necessary to look several years into the future when developing emission control strategies. The significant time horizon for this plan relates to the statutory attainment date, December 31, 2015. A projected inventory for 2015 is prepared and compared with a baseline inventory that is contemporaneous with the monitored design values discussed in Section 3.4. This baseline is represented by the year 2010. Inventories must be prepared to evaluate all of these time horizons.

4.2 The 2008 Emissions Inventory

The forgoing paragraph identified numerous points in time for which an understanding of emissions to the air is important to plan development. The basis for each of these assessments was the 2008 tri-annual inventory. This inventory represented, at the time it was selected for use, the most recent comprehensive inventory compiled by UDAQ. In addition to the large major point sources that are required to report emissions every year, the tri-annual inventories consider emissions from many more, smaller point sources. These inventories are collected in accordance with state and federal rules that ensure proper methods and comprehensive quality assurance.

Thus, to develop other inventories for each of the years discussed above, the 2008 inventory was either back-cast and adjusted for certain episodic conditions, or forecast to represent more typical conditions.

4.3 Characterization of Utah's Airsheds

As said at the outset, an emissions inventory provides a means to assess the level of pollutants and precursors released into the air from various sources. This in turn allows for an overall assessment of a particular airshed or even a comparison of one airshed to another.

The modeling analysis used to support this SIP considers a regional domain that encompasses three distinct airsheds belonging to three distinct $PM_{2.5}$ nonattainment areas; The Cache Valley (the Logan UT/ID nonattainment area), the central Wasatch Front (Salt Lake City, UT nonattainment area), and the southern Wasatch Front (Provo, UT nonattainment area).

The inventories developed for each of these three areas illustrate many similarities but also a few notable differences. All three areas are more or less dominated by a combination of on-road mobile and area sources. However, emissions from large point sources are non-existent in the Cache Valley. These emissions are mostly situated along the Wasatch Front, and primarily exhibited in the Salt Lake City nonattainment area. Conversely, most of the agricultural emissions are located in the Cache Valley.

The tables presented below provide a broad overview of the emissions in the respective areas. They are organized to show the relative contributions of emissions by source category (e.g. point / area / mobile).

Table 4.1 shows the 2010 Baseline emissions in each area of the modeling domain.

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Logan, UT-ID						
Sum of Emissions (tpd)		Area Sources	0.54	1.63	4.16	4.31	0.26
		Mobile Sources	~~0.37~~	~~6.48~~	~~4.99~~	~~0.12~~	~~0.04~~
		NonRoad	0.13	1.15	2.28	0.00	0.02
		Point Sources	0.00	0.02	0.63	0.00	0.00
		Total	~~1.05~~	~~9.28~~	~~12.06~~	~~4.43~~	~~0.32~~
2010	Provo, UT						
Sum of Emissions (tpd)		Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	~~1.38~~	~~25.39~~	~~15.62~~	~~0.44~~	~~0.16~~
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Sources	0.26	0.93	0.67	0.29	0.03
		Total	~~3.81~~	~~36.28~~	~~30.78~~	~~7.26~~	~~0.56~~
2010	Salt Lake City, UT						
Sum of Emissions (tpd)		Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	~~5.49~~	~~99.60~~	~~62.49~~	~~1.86~~	~~0.62~~
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Sources	3.89	20.14	6.48	0.64	10.64
		Total	~~16.52~~	~~160.48~~	~~130.01~~	~~20.47~~	~~12.81~~
2010	Surrounding Areas						
Sum of Emissions (tpd)		Area Sources	1.78	3.08	13.95	34.29	1.13
		Mobile Sources	~~1.34~~	~~28.88~~	~~11.03~~	~~0.33~~	~~0.15~~
		NonRoad	0.57	7.73	10.66	0.00	0.14
		Point Sources	3.39	129.34	2.92	0.75	43.43
		Total	~~7.07~~	~~169.03~~	~~38.56~~	~~35.38~~	~~44.85~~
2010 Total							

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Logan, UT-ID						
Sum of Emissions (tpd)		Area Sources	0.54	1.63	4.16	4.31	0.26
		Mobile Sources	0.67	6.48	4.99	0.12	0.04
		NonRoad	0.13	1.15	2.28	0.00	0.02
		Point Sources	0.00	0.02	0.63	0.00	0.00
		Total	1.35	9.28	12.06	4.43	0.32
2010	Provo, UT						
Sum of Emissions (tpd)		Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	2.20	25.39	15.63	0.44	0.16
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Sources	0.26	0.93	0.67	0.29	0.03
		Total	4.63	36.29	30.78	7.26	0.56
2010	Salt Lake City, UT						
Sum of Emissions (tpd)		Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	8.59	99.63	62.51	1.86	0.63
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Sources	3.89	20.14	6.48	0.64	10.64
		Total	19.62	160.51	130.02	20.47	12.81
2010	Surrounding Areas						
Sum of Emissions (tpd)		Area Sources	1.78	3.08	13.95	34.29	1.13
		Mobile Sources	2.31	28.89	11.03	0.33	0.15
		NonRoad	0.57	7.73	10.66	0.00	0.14
		Point Sources	3.39	129.34	2.92	0.75	43.43
		Total	8.04	169.03	38.57	35.38	44.85
2010 Total							

Table 4.1, Emissions Summary for 2010 (SMOKE). Emissions are presented in tons per average winter day.
Mobile source emissions summaries are from the AP-42 (road dust) and MOVES model output. $PM_{2.5}$ for mobile sources includes tire and brake wear, sulfate, elemental and organic carbon, and road dust. VOC for mobile sources includes refueling spillage and displacement vapor loss emissions.

Table 4.2 is specific to the Salt Lake, UT nonattainment area, and shows emissions for both the baseline year and the attainment year. These totals include projections concerning growth in population, vehicle miles traveled, and the economy. They also include the effects of emissions control strategies that are either already promulgated or were required as part of the SIP.

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Salt Lake City, UT						
Sum of Emissions (tpd)		Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	~~5.49~~	~~99.60~~	~~62.49~~	~~1.86~~	~~0.62~~
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Sources	3.89	20.14	6.48	0.64	10.64
		Total	~~16.52~~	~~160.48~~	~~130.01~~	~~20.47~~	~~12.81~~
2015	Salt Lake City, UT						
Sum of Emissions (tpd)		Area Sources	5.22	16.18	39.04	17.66	0.90
		Mobile Sources	~~4.59~~	~~77.57~~	~~47.31~~	~~1.59~~	~~0.72~~
		NonRoad	1.00	18.56	7.50	0.01	0.57
		Point Sources	4.26	22.81	8.59	1.29	7.87
		Total	~~15.07~~	~~135.12~~	~~102.44~~	~~20.55~~	~~10.06~~

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Salt Lake City, UT						
Sum of Emissions (tpd)		Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	8.59	99.63	62.51	1.86	0.63
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Sources	3.89	20.14	6.48	0.64	10.64
		Total	19.62	160.51	130.02	20.47	12.81
2015	Salt Lake City, UT						
Sum of Emissions (tpd)		Area Sources	5.22	16.18	39.04	17.66	0.90
		Mobile Sources	8.20	77.59	47.33	1.59	0.72
		NonRoad	1.00	18.56	7.50	0.01	0.57
		Point Sources	4.26	22.81	8.59	1.29	7.87
		Total	18.68	135.14	102.45	20.55	10.06

Table 4.2, Emissions Summaries for the Salt Lake City, UT Nonattainment Area; Baseline, RFP and Attainment Years (SMOKE). Emissions are presented in tons per average winter day. Mobile source emissions summaries are from the AP-42 (road dust) and MOVES model output. $PM_{2.5}$ for mobile sources includes tire and brake wear, sulfate, elemental and organic carbon, and road dust. VOC for mobile sources includes refueling spillage and displacement vapor loss emissions.

The 2010 Baseline and 2015 projected emissions estimates are calculated from the Sparse Matrix Operator Kernel Model (SMOKE). More detailed inventory information may be found in the Technical Support Document (TSD).

Chapter 5 – ATTAINMENT DEMONSTRATION

5.1 Introduction

UDAQ conducted a technical analysis to support the development of Utah's 24-hr $PM_{2.5}$ State Implementation Plan (SIP). The analyses include preparation of emissions inventories and meteorological data, and the evaluation and application of regional photochemical model. An analysis using observational datasets will be shown to detail the chemical regimes of Utah's Nonattainment areas.

5.2 Photochemical Modeling

Photochemical models are relied upon by federal and state regulatory agencies to support their planning efforts. Used properly, models can assist policy makers in deciding which control programs are most effective in improving air quality, and meeting specific goals and objectives.

The air quality analyses were conducted with the Community Multiscale Air Quality (CMAQ) Model version 4.7.1, with emissions and meteorology inputs generated using SMOKE and WRF, respectively. CMAQ was selected because it is the open source atmospheric chemistry model co-sponsored by EPA and the National Oceanic Atmospheric Administration (NOAA), thus approved by EPA for this plan.

5.3 Domain/Grid Resolution

UDAQ selected a high resolution 4-km modeling domain to cover all of northern Utah including the portion of southern Idaho extending north of Franklin County and west to the Nevada border (Figure 5.1). This 97 x 79 horizontal grid cell domain was selected to ensure that all of the major emissions sources that have the potential to impact the nonattainment areas were included. The vertical resolution in the air quality model consists of 17 layers extending up to 15 km, with higher resolution in the boundary layer.

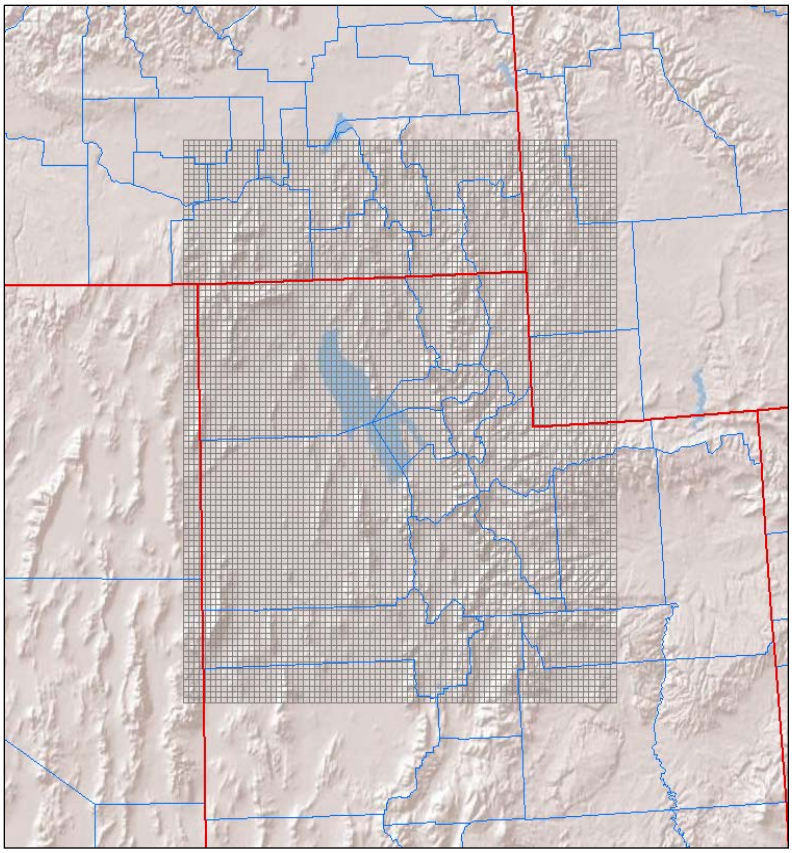


Figure 5.1: Northern Utah photochemical modeling domain.

5.4 Episode Selection

According to EPA's April 2007 "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze" the selection of SIP episodes for modeling should consider the following 4 criteria:

1. Select episodes that represent a variety of meteorological conditions that lead to elevated $PM_{2.5}$.
2. Select episodes during which observed concentrations are close to the baseline design value.
3. Select episodes that have extensive air quality data bases.
4. Select enough episodes such that the model attainment test is based on multiple days at each monitor violating NAAQS.

In general, UDAQ wanted to select episodes with hourly $PM_{2.5}$ concentrations that are reflective of conditions that lead to 24-hour NAAQS exceedances. From a synoptic meteorology point of view, each selected episode features a similar pattern. The typical pattern includes a deep trough over the eastern United States with a building and eastward moving ridge over the western United States. The episodes typically begin as the ridge begins to build eastward, near surface winds weaken, and rapid stabilization due to warm advection and subsidence dominate. As the ridge centers over Utah and subsidence peaks, the atmosphere becomes extremely stable and a subsidence inversion descends towards the surface. During this time, weak insolation, light winds, and cold temperatures promote the development of a persistent cold air pool. Not until the ridge moves eastward or breaks down from north to south is there enough mixing in the atmosphere to completely erode the persistent cold air pool.

From the most recent 5-year period of 2007-2011, UDAQ developed a long list of candidate $PM_{2.5}$ wintertime episodes. Three episodes were selected. An episode was selected from January 2007, an episode from February 2008, and an episode during the winter of 2009-2010 that features multi-event episodes of $PM_{2.5}$ buildup and washout. Further detail of the episodes is below:

- **Episode 1: January 11-20, 2007**

A cold front passed through Utah during the early portion of the episode and brought very cold temperatures and several inches of fresh snow to the Wasatch Front. The trough was quickly followed by a ridge that built north into British Columbia and began expanding east into Utah. This ridge did not fully center itself over Utah, but the associated light winds, cold temperatures, fresh snow, and subsidence inversion produced very stagnant conditions along the Wasatch Front. High temperatures in Salt Lake City throughout the episode were in the high teens to mid-20's Fahrenheit.

Figure 5.2 shows hourly $PM_{2.5}$ concentrations from Utah's 4 $PM_{2.5}$ monitors for January 11-20, 2007. The first 6 to 8 days of this episode are suited for modeling. The episode becomes less suited after January 18 because of the complexities in the meteorological conditions leading to temporary $PM_{2.5}$ reductions.

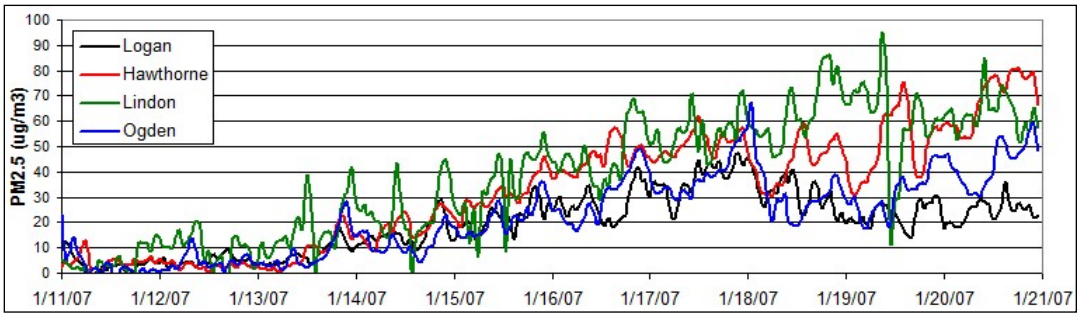


Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007

- **Episode 2: February 14-18, 2008**

The February 2008 episode features a cold front passage at the start of the episode that brought significant new snow to the Wasatch Front. A ridge began building eastward from the Pacific Coast and centered itself over Utah on Feb 20th. During this time a subsidence inversion lowered significantly from February 16 to February 19. Temperatures during this episode were mild with high temperatures at SLC in the upper 30's and lower 40's Fahrenheit.

The 24-hour average $PM_{2.5}$ exceedances observed during the proposed modeling period of February 14-19, 2008 were not exceptionally high. What makes this episode a good candidate for modeling are the high hourly values and smooth concentration build-up. The first 24-hour exceedances occurred on February 16 and were followed by a rapid increase in $PM_{2.5}$ through the first half of February 17 (Figure 5.3). During the second half of February 17, a subtle meteorological feature produced a mid-morning partial mix-out of particulate matter and forced 24-hour averages to fall. After February 18, the atmosphere began to stabilize again and resulted in even higher $PM_{2.5}$ concentrations during February 20, 21, and 22. Modeling the 14th through the 19th of this episode should successfully capture these dynamics. The smooth gradual build-up of hourly $PM_{2.5}$ is ideal for modeling.

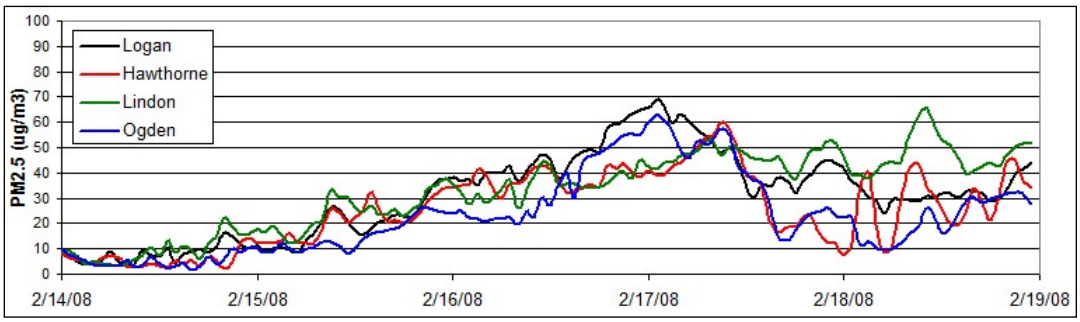


Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008

- **Episode 3: December 13, 2009 – January 18, 2010**

The third episode that was selected is more similar to a "season" than a single $PM_{2.5}$ episode (Figure 5.4). During the winter of 2009 and 2010, Utah was dominated by a semi-permanent ridge of high pressure that prevented strong storms from crossing Utah. This 35 day period was characterized by 4 to 5 individual $PM_{2.5}$ episodes each followed by a partial $PM_{2.5}$ mix out when a weak weather system passed through the ridge. The long length of the episode and repetitive $PM_{2.5}$ build-up and mix-out cycles makes it ideal for evaluating model strengths and weaknesses and $PM_{2.5}$ control strategies.

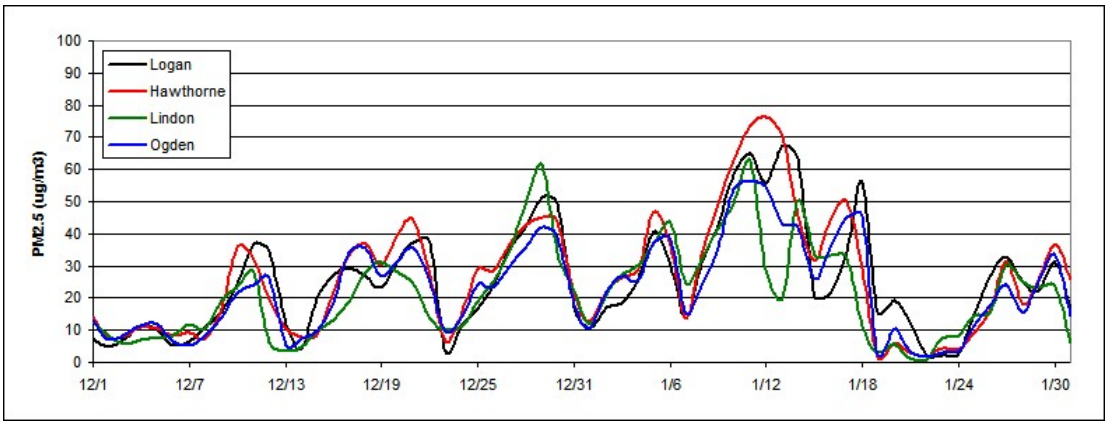


Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10.

5.5 Meteorological Data

Meteorological inputs were derived using the Weather Research and Forecasting (WRF), Advanced Research WRF (WRF-ARW) model version 3.2. WRF contains separate modules to compute different physical processes such as surface energy budgets and soil interactions, turbulence, cloud microphysics, and atmospheric radiation. Within WRF, the user has many options for selecting the different schemes for each type of physical process. There is also a WRF Preprocessing System (WPS) that generates the initial and boundary conditions used by WRF, based on topographic datasets, land use information, and larger-scale atmospheric and oceanic models.

Model performance of WRF was assessed against observations at sites maintained by the Utah Air Monitoring Center. A summary of the performance evaluation results for WRF are presented below:

- The biggest issue with meteorological performance is the existence of a warm bias in surface temperatures during high $PM_{2.5}$ episodes. This warm bias is a common trait of WRF modeling during Utah wintertime inversions.
- WRF does a good job of replicating the light wind speeds (< 5 mph) that occur during high $PM_{2.5}$ episodes.
- WRF is able to simulate the diurnal wind flows common during high $PM_{2.5}$ episodes. WRF captures the overnight downslope and daytime upslope wind flow that occurs in Utah valley basins.
- WRF has reasonable ability to replicate the vertical temperature structure of the boundary layer (i.e., the temperature inversion), although it is difficult for WRF to reproduce the inversion when the inversion is shallow and strong (i.e., an 8 degree temperature increase over 100 vertical meters).

5.6 Photochemical Model Performance Evaluation

The model performance evaluation focused on the magnitude, spatial pattern, and temporal variation of modeled and measured concentrations. This exercise was intended to assess whether, and to what degree, confidence in the model is warranted (and to assess whether model improvements are necessary).

CMAQ model performance was assessed with observed air quality datasets at UDAQ-maintained air monitoring sites (Figure 5.5). Measurements of observed $PM_{2.5}$ concentrations along with gaseous precursors of secondary particulate (e.g., NO_x, ozone) and carbon monoxide are made throughout winter at most of the locations in Figure 5.5. $PM_{2.5}$ speciation performance was assessed using the three Speciation Monitoring Network Sites (STN) located at the Hawthorne site in Salt Lake City, the Bountiful site in Davis County, and the Lindon site in Utah County.

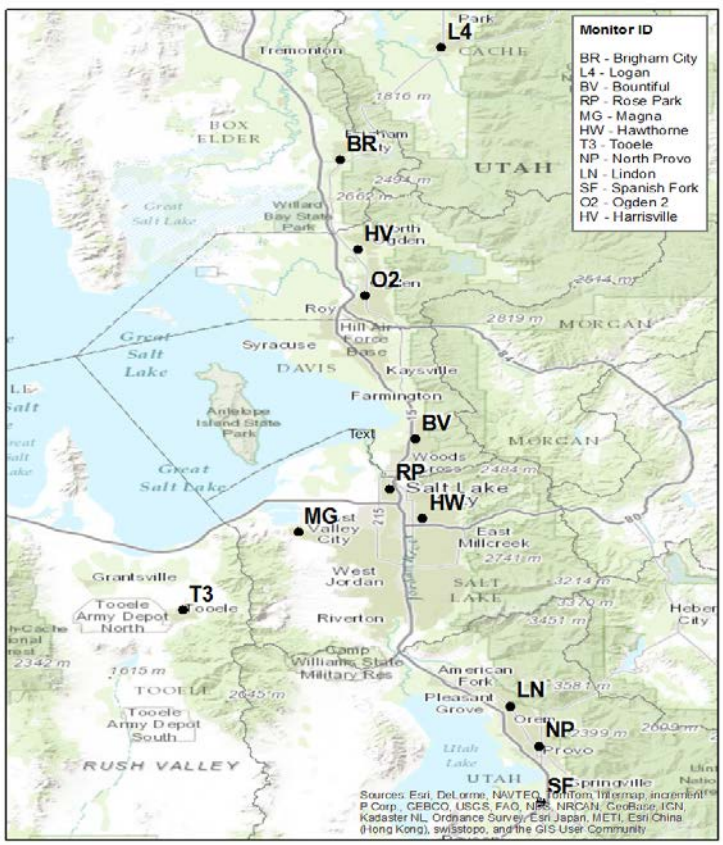


Figure 5.5: UDAQ monitoring network.

A spatial plot is provided for modeled 24-hr $PM_{2.5}$ for 2010 January 03 in Figure 5.6. The spatial plot shows the model does a reasonable job reproducing the high $PM_{2.5}$ values, and keeping those high values confined in the valley locations where emissions occur.

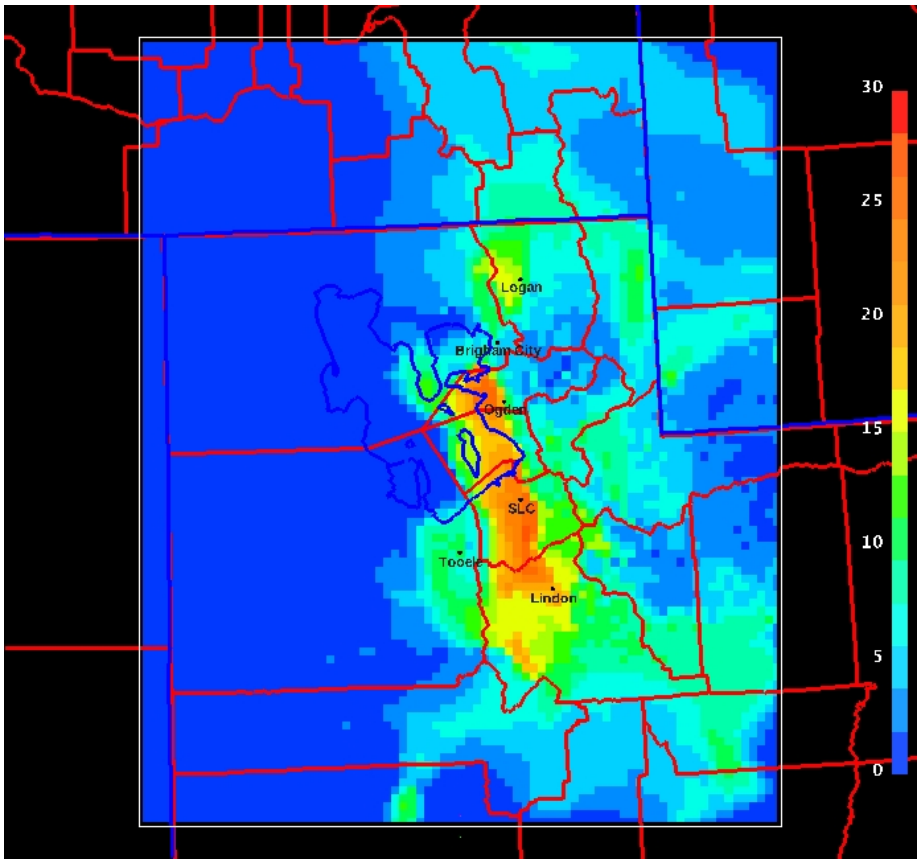


Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ ($\mu g/m^3$) for 2010 Jan. 03.

Time series of 24-hr $PM_{2.5}$ concentrations for the 13 Dec. 2009 – 15 Jan. 2010 modeling period are shown in Figs. 5.7 – 5.10 at the Hawthorne site in Salt Lake City (Fig. 5.7), the Ogden site in Weber County (Fig 5.8), the Lindon site in Utah County (Fig. 5.9), and the Logan site in Cache County (Fig. 5.10). For the most part, CMAQ replicates the buildup and washout of each individual episode. While CMAQ builds 24-hr $PM_{2.5}$ concentrations during the 08 Jan. – 14 Jan. 2010 episode, it was not able to produce the > 60 $\mu g/m^3$ concentrations observed at the monitoring locations.

It is often seen that CMAQ "washes" out the $PM_{2.5}$ episode a day or two earlier than that seen in the observations. For example, on the day 21 Dec. 2009, the concentration of $PM_{2.5}$ continues to build while CMAQ has already cleaned the valley basins of high $PM_{2.5}$ concentrations. At these times, the observed cold pool that holds the $PM_{2.5}$ is often very shallow and winds just above this cold pool are

southerly and strong before the approaching cold front. This situation is very difficult for a meteorological and photochemical model to reproduce. An example of this situation is shown in Fig. 5.11, where the lowest part of the Salt Lake Valley is still under a very shallow stable cold pool, yet higher elevations of the valley have already been cleared of the high $PM_{2.5}$ concentrations.

During the 24 – 30 Dec. 2009 episode, a weak meteorological disturbance brushes through the northernmost portion of Utah. It is noticeable in the observations at the Ogden monitor at 25 Dec. as $PM_{2.5}$ concentrations drop on this day before resuming an increase through Dec. 30. The meteorological model and thus CMAQ correctly pick up this disturbance, but completely clears out the building $PM_{2.5}$; and thus performance suffers at the most northern Utah monitors (e.g. Ogden, Logan). The monitors to the south (Hawthorne, Lindon) are not influence by this disturbance and building of $PM_{2.5}$ is replicated by CMAQ. This highlights another challenge of modeling $PM_{2.5}$ episodes in Utah. Often during cold pool events, weak disturbances will pass through Utah that will de-stabilize the valley inversion and cause a partial clear out of $PM_{2.5}$. However, the $PM_{2.5}$ is not completely cleared out, and after the disturbance exits, the valley inversion strengthens and the $PM_{2.5}$ concentrations continue to build. Typically, CMAQ completely mixes out the valley inversion during these weak disturbances.

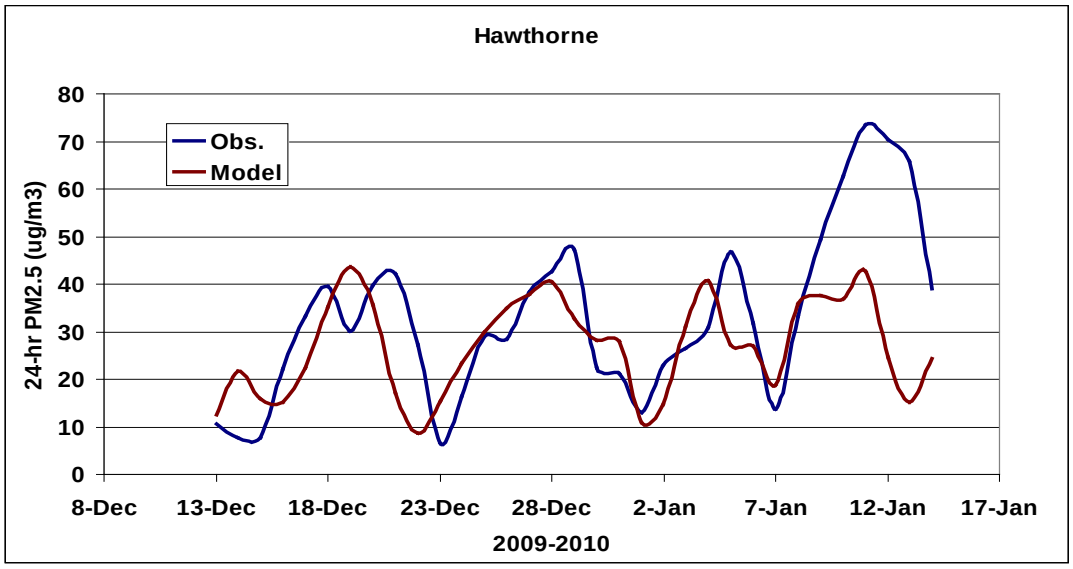


Figure 5.7: 24-hr PM2.5 time series (Hawthorne). Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

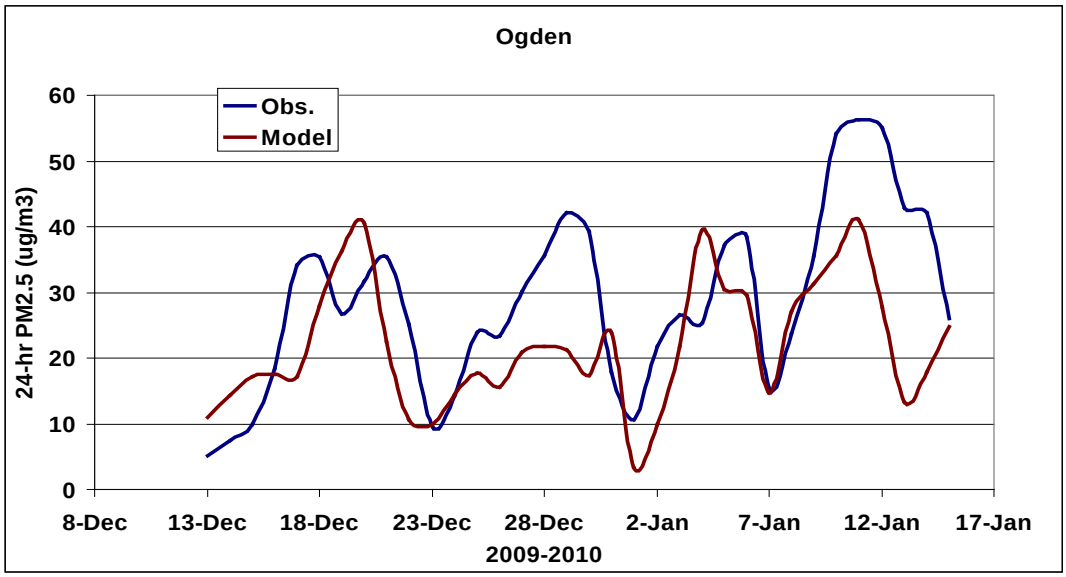


Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

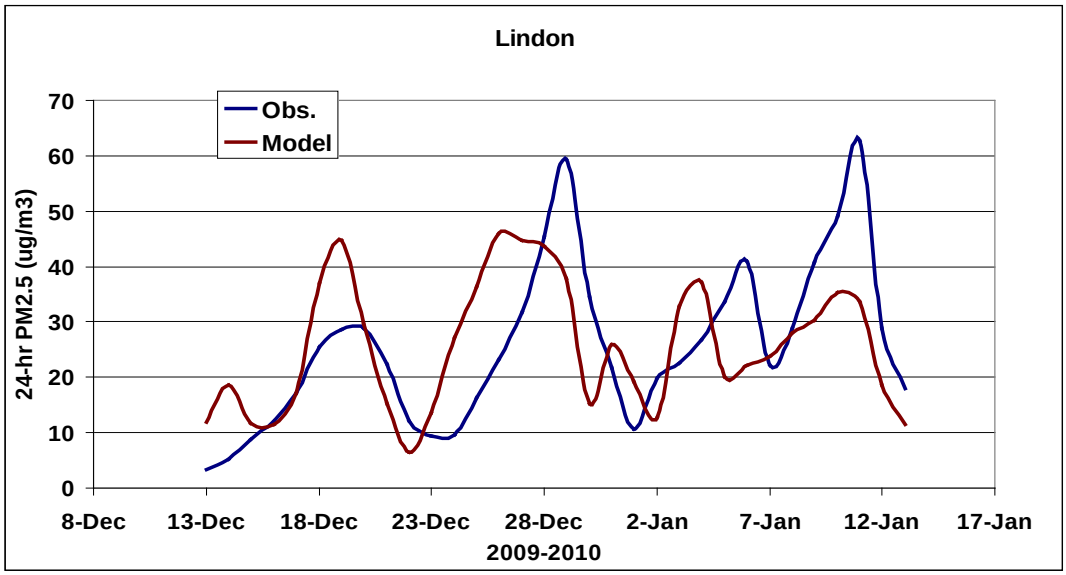


Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

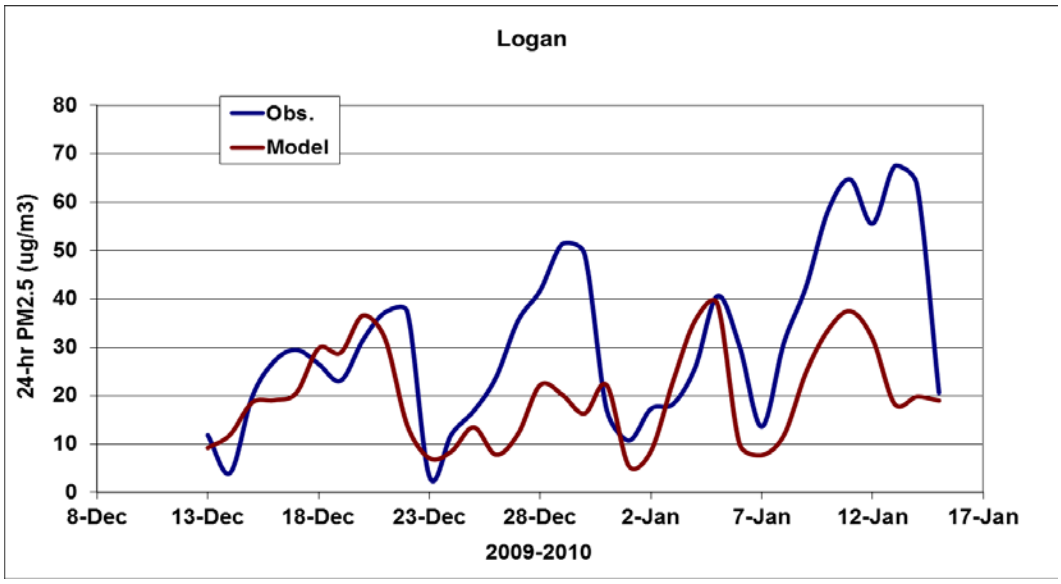


Figure 5.10: 24-hr $PM_{2.5}$ time series (Logan). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

Figure 5.11: An example of the Salt Lake Valley at the end of a high $PM_{2.5}$ episode. The lowest elevations of the Salt Lake Valley are still experiencing an inversion and elevated $PM_{2.5}$ concentrations while the $PM_{2.5}$ has been 'cleared out' throughout the rest of the valley. These 'end of episode' clear out periods are difficult to replicate in the photochemical model.

Generally, the performance of CMAQ to replicate the buildup and clear out of $PM_{2.5}$ is good. However, it is important to verify that CMAQ is replicating the components of $PM_{2.5}$ concentrations. $PM_{2.5}$ simulated and observed speciation is shown at the 3 STN sites in Figures 5.12 – 5.14. The observed speciation is constructed using days in which the STN filter 24-hr $PM_{2.5}$ concentration was > 35 µg/m^3. For the 2009-2010 modeling period, the observed speciation pie charts were created using 8 filter days at Hawthorne, 6 days at Lindon, and 4 days at Bountiful. The speciation of this small dataset appears similar to a comparison of a larger dataset of STN filter speciated data from 2005-2010 for high wintertime $PM_{2.5}$ days (see Figure 3.2 for one of these at Hawthorne).

The simulated speciation is constructed using modeling days that produced 24-hr $PM_{2.5}$ concentrations > 35 µg/m^3. Using this criterion, the simulated speciation pie chart is created from 18 modeling days for Hawthorne, 14 days at Lindon, and 14 days at Bountiful.

At all 3 STN sites, the percentage of simulated nitrate is greater than 40%, while the simulated ammonium percentage is at ~15%. This indicates that the model is able to replicate the secondarily formed particulates that typically make up the majority of the measured $PM_{2.5}$ on the STN filters during wintertime pollution events.

The percentage of model simulated organic carbon is ~13% at all STN sites, which is in agreement with the observed speciation of organic carbon at Hawthorne and slightly overestimated (by ~3%) at Lindon and Bountiful.

There is no STN site in the Logan nonattainment area, and very little speciation information available in the Cache Valley. Figure 5.15 shows the model simulated speciation at Logan. Ammonium (17%) and nitrate (56%) make up a higher percentage of the simulated $PM_{2.5}$ at Logan when compared to sites along the Wasatch Front.

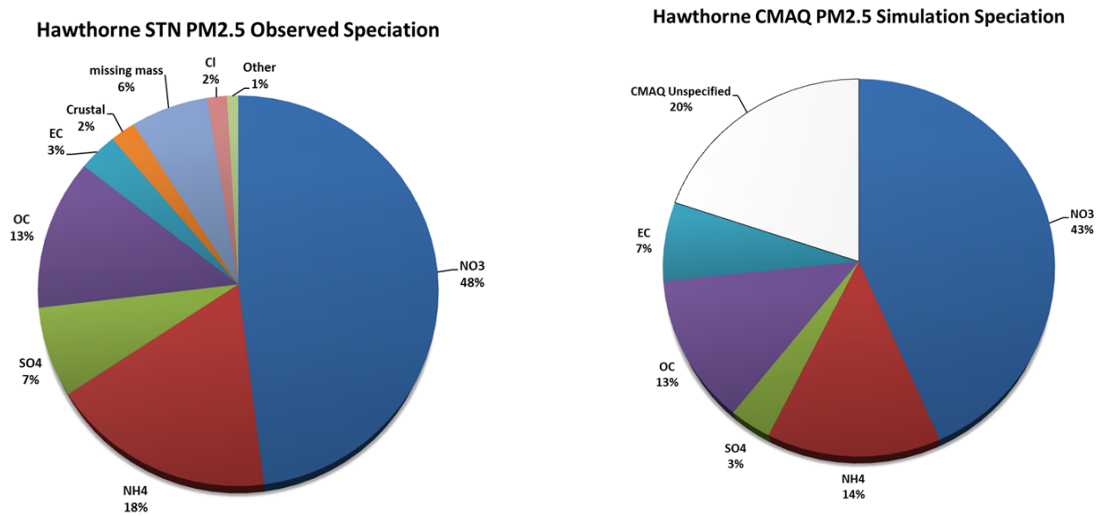


Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Hawthorne STN site.

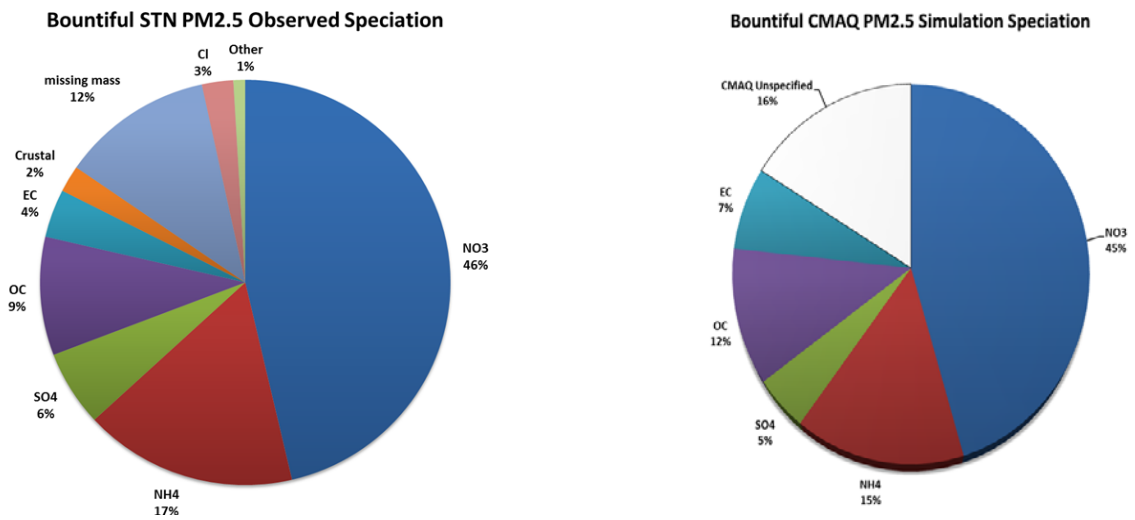


Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Bountiful STN site.

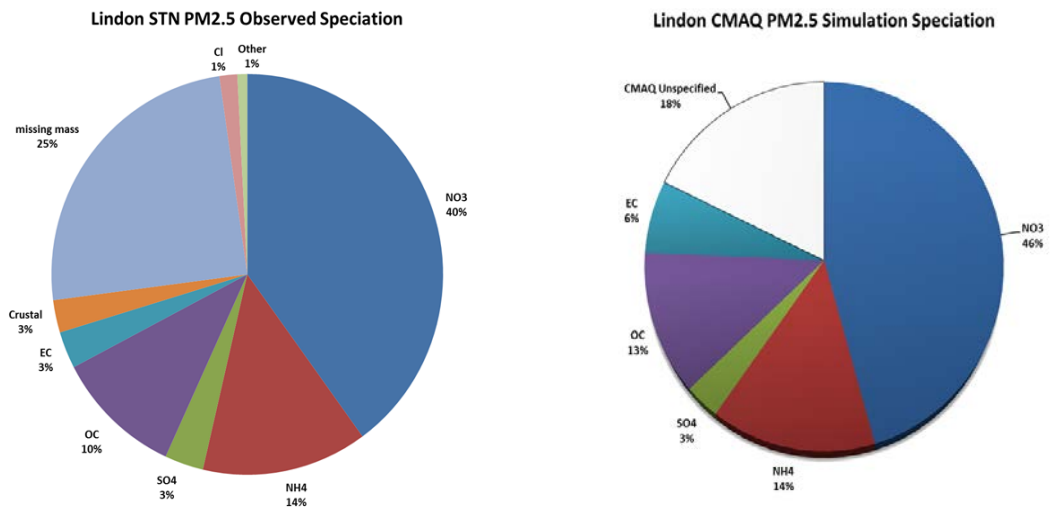


Figure 5.14: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Lindon STN site.

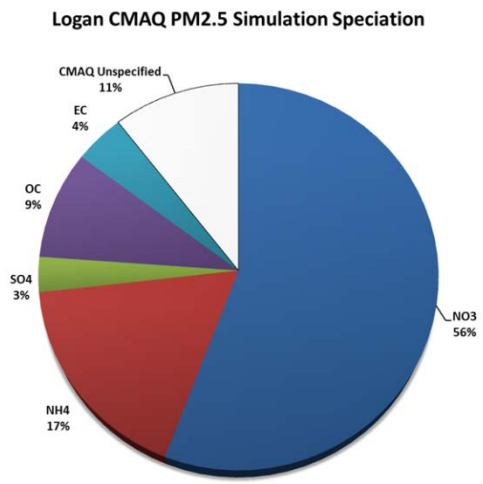


Figure 5.15: The composition of model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when a modeled day had 24-hr concentrations > 35 µg/m^3 at the Logan monitoring site. No observed speciation data is available for Logan.

5.7 Summary of Model Performance

Model performance for 24-hr $PM_{2.5}$ is good and generally acceptable and can be characterized as follows:

- Good replication of the episodic buildup and clear out of $PM_{2.5}$. Often the model will clear out the simulated $PM_{2.5}$ a day too early at the end of an episode. This clear out time period is difficult to model (i.e., Figure 5.11).
- Good agreement in the magnitude of $PM_{2.5}$, as the model can consistently produce the high concentrations of $PM_{2.5}$ that coincide with observed high concentrations.
- Spatial patterns of modeled 24-hr $PM_{2.5}$, show for the most part, that the $PM_{2.5}$ is being confined in the valley basins, consistent to what is observed.
- Speciation and composition of the modeled $PM_{2.5}$ matches the observed speciation quite well. Modeled and observed nitrate are between 40% and 50% of the $PM_{2.5}$. Ammonium is between 15% and 20% for both modeled and observed $PM_{2.5}$, while modeled and observed organic carbon falls between 10% to 13% of the total $PM_{2.5}$.

Several observations should be noted on the implications of these model performance findings on the attainment modeling presented in the following section. First, it has been demonstrated that model performance overall is acceptable and, thus, the model can be used for air quality planning purposes. Second, consistent with EPA guidance, the model is used in a relative sense to project future year values. EPA suggests that this approach "should reduce some of the uncertainty attendant with using absolute model predictions alone." Furthermore, the attainment modeling is supplemented by additional information to provide a weight of evidence determination.

5.8 Modeled Attainment Test

UDAQ employed Model Attainment Test Software (MATS) for the modeled attainment test at grid cells near monitors. MATS is designed to interpolate the species fractions of the PM mass from the Speciation Trends Network (STN) monitors to the FRM monitors. The model also calculates the relative response factor (RRF) for grid cells near each monitor and uses these to calculate a future year design value for these cells.

MATS results for future year modeling is presented in Figure 5.16. The future year design values are presented with and without SIP controls for 2015 (the attainment year). For comparison purposes, the monitored design value is also presented for the base year, 2010.

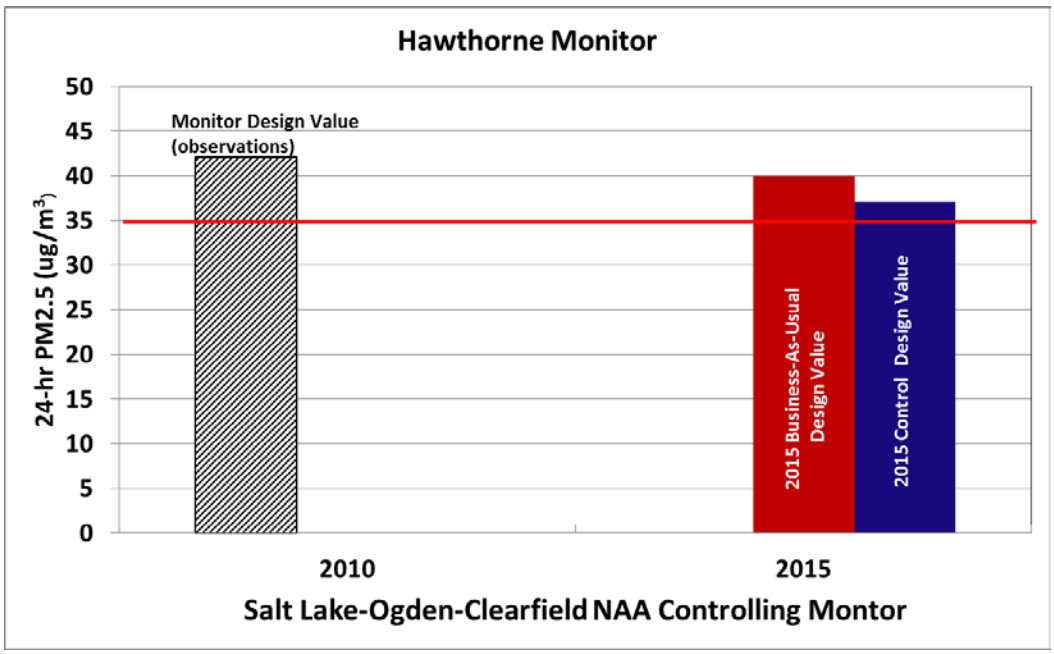


Figure 5.16, Model Results for the Salt Lake City, UT Nonattainment Area

Table 5.1 presents the same information in tabular form, and also includes any additional monitoring locations in the nonattainment area.

	2010	2015	
	Observed	Business-As-Usual	Control Basket
Bountiful	*37*	*34*	*32*
Brigham City	*40*	*34*	*31*
Harrisville	*35*	*33*	*30*
Hawthorne	*42*	*40*	*37*
Magna	*32*	*30*	*27*
Ogden 2	*38*	*35*	*33*
Rose Park	*39*	*38*	*34*
Tooele	*25*	*22*	*19*

Table 5.1, Modeled Concentrations (µg/m^3) for the Salt Lake City, UT Nonattainment Area

The "Control Basket" inventory that is presented in Table 5.1 consists of a combination of SIP reductions on point sources and new rules to be implemented that will affect smaller commercial and industrial businesses. All of these changes are detailed in Chapter 6 - Control Measures. Summary tables of the emission inventories that result from the Control Basket reductions are available in the TSD: Section 3 Baseline and Control Strategies.

5.9 Air Quality as of the Attainment Date

The attainment date for this moderate $PM_{2.5}$ nonattainment area is December 31, 2015. The plan provisions for moderate areas call, in Section 189(a)(1)(B), for either a demonstration that the plan will provide for attainment by the applicable attainment date or a demonstration that attainment by such date is impracticable.

As shown in the modeled attainment test, the emissions reductions achievable in 2015 do not allow for a demonstration that the Salt Lake City, UT nonattainment area can attain the 24-hour $PM_{2.5}$ NAAQS. Although predictions at seven of the eight monitors are less than 35 µg/m3, the predicted concentration at the Hawthorne monitor is still above the standard.

As discussed in Section 6.6, the emissions modeled in the “control basket” scenario reflect (at least) all RACM and RACT measures achievable in practice by the statutory implementation date (December 14, 2014). Therefore, what has been demonstrated is that attainment of the 24-hour standard by December 31, 2015 is impracticable.

Chapter 6 – CONTROL MEASURES

6.1 Introduction

Attaining the 2006, 24-hour NAAQS for $PM_{2.5}$ will require emission controls from directly emitted $PM_{2.5}$ as well as $PM_{2.5}$ precursors (SO_2, NO_x and VOC). It will involve emission sources from each of the four sectors identified in the discussion on emission inventories (stationary point sources, area sources, on-road mobile sources and off-road mobile sources). Furthermore, it will entail control measures of two basic types: existing measures; and measures imposed through this SIP.

This chapter summarizes the overall control strategy for the plan. Additional detail concerning individual emission control measures, including the emissions reductions to be expected, is contained in the Technical Support Document.

6.2 Utah Stakeholder Workgroup Efforts

In response to increasing interest in Utah's air quality problems and the need for greater participation in reducing air emissions, the Utah Division of Air Quality (DAQ) created a significant and meaningful role for public participation in the $PM_{2.5}$ SIP development process. The public involvement process was driven by a need for transparency and inclusivity of public health and business interests impacted by air quality issues.

DAQ's measures of success for the public involvement process were:

- Buy-in from public, stakeholders, and elected officials,
- SIP recommendations that are championed and implemented, and ;
- Close working relationship with partner organizations to deliver a unified message.

Measures of success for participants were:

- Having a say in plans that impacted their communities,
- Access to information and time to understand issues and provide input,
- Access to DAQ staff and the SIP development process,
- Meaningful participation in the process, and;
- Transparency of the process.

Public participation centered on creating workgroups with members from each county within the $PM_{2.5}$ nonattainment area—Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber. More than 100 people from agriculture, academia, environmental groups, state and local elected officials, industry, and the public volunteered to participate. Their participation ensured that the SIP development process would have grassroots-level input about strategies and their impacts on a countywide level.

Workgroup members were engaged in four rounds of meetings created to provide and gather information. After providing a baseline level of knowledge during Meeting One, draft emissions reductions were discussed during Meetings Two and Three, each followed by a survey to capture new ideas and feedback. Responses from the survey, and other feedback received during the process, were used to refine emissions inventories, in some cases significantly, refine mitigation strategies, provide new strategies, and provide ideas for implementation. Meeting Four was an opportunity for workgroup members to introduce the SIP package to the public and talk about the development process before one of several public comment hearings held in the nonattainment counties.

The public participation process was not without challenges. One of the most difficult was providing information that could get a diverse group of stakeholders to understand very complex and technical air quality and emissions reductions issues. Despite the challenges, the process was successful and contributed to a well-rounded and well-vetted SIP package.

6.3 Identification of Measures

In considering the suite of control measures that could be implemented as part of this plan several important principles were applied to expedite the analysis.

Filter data shows that secondary particulate is the portion of mass most responsible for exceedances of the standard on episode days, and specifically shows that ammonium nitrate is the single largest component of that material. In addition, it shows that organic carbon represents the bulk of primary $PM_{2.5}$.

Priority was given to those source categories or pollutants responsible for relatively larger percentages of the emissions leading to exceedances of the $PM_{2.5}$ NAAQS. The emissions inventory compiled to represent base-year conditions was useful in identifying the contributors to these emissions, particularly in their relation to the formation of ammonium nitrate.

At the same time, the air quality modeling shed light on the sensitivity of the airshed in its response to changes in different pollutants. VOC was immediately identified as a significant contributor to elevated $PM_{2.5}$ concentrations, and proved to be more limiting in the overall atmospheric chemistry than NO_x. This pointed the search for viable control strategies toward VOC emissions, and somewhat away from NO_x. It also became apparent that directly emitted $PM_{2.5}$, while a relatively small portion of the overall filter mass, is independent of the non-linear chemical transformation to particulate matter. Therefore,

any reduction in $PM_{2.5}$ emissions will directly improve future $PM_{2.5}$ concentrations, and like VOC, made these emissions an attractive target for potential control measures. Subsequent modeling revealed that, as time progressed and the relative concentrations of NO_x and VOC changed, controlling for NO_x would yield more benefit in terms of controlling $PM_{2.5}$. Ammonia is also prominent in chemical reactions that produce secondary $PM_{2.5}$, but it occurs in such abundance that $PM_{2.5}$ concentrations are sensitive only to unachievable reductions in ammonia.

6.4 Existing Control Measures

Since about 1970 there have been regulations at both state and federal levels to mitigate air contaminants. It follows that the estimates of emissions used in modeled attainment demonstration for this Plan take into account the effectiveness of existing control measures. These measures affect not only the levels of current emissions, but some continue to affect emissions trends as well.

An example of the former would be the effectiveness of an add-on control device at a stationary point source. It is presently effective in controlling emissions, and will continue to be that effective five years from now.

An example of the latter would be a federal rule that affects the manufacture of engines. The engines already sold into the airshed are effective in reducing emissions, but the number of these engines replacing older, higher emitting engines is increasing. Therefore, a rule such as this also affects the trend of emissions for that source category in a positive way.

The effectiveness of any control measure that was in place, and enforceable, at the time this Plan was written has been accounted for in the tabulation of baseline emissions and projected emissions.

The following paragraphs discuss some of the more important control strategies that are already in place for the four basic sectors of the emissions inventory.

<u>Stationary Point Sources:</u>

Utah's permitting rules require a review of new and modified major stationary sources in nonattainment areas, as is required by Section 173 of the Clean Air Act. Beyond that however, even minor sources and minor modifications to major sources planning to locate anywhere in the state are required to undergo a new source review analysis and receive an approval order to construct. Part of this review is an analysis to ensure the application of Best Available Control Technology (BACT). This requirement is ongoing and ensures that Utah's industry is well controlled.

Along the central Wasatch Front, stationary sources were required to reduce emissions at several junctures to address nonattainment issues with SO_2, ozone and PM_{10}.

SIPs for ozone and SO_2 in 1981 each resulted in control of precursors to secondary particulate. There were SO_2 reductions at the copper smelter and VOC reductions at the refineries. In addition, Control Techniques Guideline documents (CTGs) affecting VOC emissions at a variety of industrial source categories were incorporated into Utah's air quality rules.

In the early 1990s, stationary sources were required to reduce PM_{10}, SO_2, and NO_x to address wintertime PM_{10} nonattainment.

Any of the source-specific emission controls or operating practices that has been required as a result of the forgoing has been reflected in the baseline emissions calculated for the large stationary sources, and therefore evaluated in the modeled demonstration.

<u>Area sources:</u>

Stage 1 vapor control was introduced in Salt Lake and Davis Counties as part of the 1981 ozone SIP. This is a method of collecting VOC vapors, as underground gasoline storage tanks are filled at gas stations, and returning those vapors to a facility where they are collected and recycled. Since that time it has been extended to include the entire state.

Part of the PM_{10} control for Salt Lake and Davis Counties in the early 1990s was a program to curtail woodsmoke emissions during periods of atmospheric stagnation. Woodsmoke is rich in VOC emissions in addition to the particulate matter which is almost entirely within the $PM_{2.5}$ size fraction. In 2006 the woodburning program was extended to include the western half of Weber County as well.

CTGs adopted into Utah's air quality rules to control VOC emissions in Salt Lake and Davis Counties, as part of the 1981 ozone SIP, are also effective in controlling emissions from area sources.

Energy Efficiency

EPA recognizes the benefits of including energy efficiency programs in SIP's as a low cost means of reducing emissions. Two established energy efficiency programs that result in direct emission reductions within the Wasatch Front are already in place.

Questar Gas ThermWise Rebate Programs

Questar started the ThermWise Rebate Programs on January 1, 2007 as a way to promote the use of energy-efficient appliances and practices among its customers. The ThermWise Programs offer rebates to help offset the initial cost of energy-efficient appliances and weatherization. There are also rebates available for energy efficient new construction. The cost of rebates is built into the Questar gas rate. The rebates are vetted by the Utah Public Service Commission's strict "cost-effectiveness" tests. To pass these tests, Questar must prove that the energy cost savings produced by the ThermWise Programs exceeds the cost of the rebates. There is no scheduled end to the ThermWise Programs. According to the Questar program information, the program will remain in place as long as rebates remain cost-effective.

UDAQ calculates area source emissions for natural gas by multiplying emission factors against actual and projected yearly gas usage data submitted by Questar. In this way, actual realized program reductions are expressed in the past year (baseline) emission inventory. Future investment in energy efficiency is not captured in our projected future gas usage. Continuance of this program will result in future gas emissions that are lower than projected.

Weatherization Assistance Program

The Weatherization Assistance Program helps low-income individuals and families reduce energy costs. Individuals, families, the elderly and the disabled who are making no more than 200 percent of the current federal poverty income level are eligible for help. However, priority is given to the elderly and disabled, households with high-energy consumption, emergency situations and homes with preschool-age children.

The Utah Division of Housing and Community Development administer the program statewide through eight government and nonprofit agencies. Benefits are provided in the form of noncash grants to eligible households to make energy-efficiency improvements to those homes.

The energy efficiency realized from this program is also imbedded within the gas usage data UDAQ receives from Questar.

On-road mobile sources:

The federal motor vehicle control program has been one of the most significant control strategies affecting emissions that lead to $PM_{2.5}$. Since 1968, the program has required newer vehicles to meet ever more stringent emission standards for CO, NO_x, and VOC. Tier 1 standards were established in the early 1990s and were fully implemented by 1997. The Tier 1 emission standards can be found in Table 6.1. The EPA created a voluntary clean car program on January 7, 1998 (63 FR January 7, 1998), which was called the National Low Emission Vehicle (NLEV) program. This program asked auto manufacturers to commit to meet tailpipe standards for light duty vehicles that were more stringent than Tier 1 standards.

EPA Tier 1 Emission Standards for Passenger Cars and Light-Duty Trucks, FTP 75, g/mi

	100,000 miles/10 years[1]					
Category	**THC**	**NMHC**	**CO**	**NO_x[2] diesel**	***NO_x* *gasoline***	**PM[3]**
Passenger cars	-	0.31	4.2	1.25	*0.6*	0.1
LLDT, LVW <3,750 lbs	0.8	0.31	4.2	1.25	*0.6*	0.1
LLDT, LVW >3,750 lbs	0.8	0.4	5.5	0.97	*0.97*	0.1
HLDT, ALVW <5,750 lbs	0.8	0.46	6.4	0.98	*0.98*	0.1
HLDT, ALVW > 5,750 lbs	0.8	0.56	7.3	1.53	*1.53*	0.12

1 - Useful life 120,000 miles/11 years for all HLDT standards and for THC standards for LDT

2 - More relaxed NO_x limits for diesels applicable to vehicles through 2003 model year

3 - PM standards applicable to diesel vehicles only

Abbreviations:

LVW - loaded vehicle weight (curb weight + 300 lbs)

ALVW - adjusted LVW (the numerical average of the curb weight and the GVWR)

LLDT - light light-duty truck (below 6,000 lbs GVWR)

HLDT - heavy light-duty truck (above 6,000 lbs GVWR)

Table 6.1, Tier 1 Emission Standards

Shortly thereafter, EPA promulgated the Tier 2 program. This program went into effect on April 10, 2000 (65 FR 6698 February 10, 2000) and was phased in between 2004 and 2008. Tier 2 introduced more stringent numerical emission limits compared to the previous program (Tier 1). Tier 2 set a single set of standards for all light duty vehicles. The Tier 2 emission standards are structured into 8 permanent and 3 temporary certification levels of different stringency, called "certification bins," and an average fleet standard for NO_x emissions. Vehicle manufacturers have a choice to certify particular vehicles to any of the available bins. The program also required refiners to reduce gasoline sulfur levels nationwide, which was fully implemented in 2007. The sulfur levels need to be reduced so that Tier 2 vehicles could run correctly and maintain their effectiveness. The EPA estimated that the Tier 2 program will reduce oxides of nitrogen emissions by at least 2,220,000 tons per year nationwide in 2020[1]. Tier 2 has also contributed in reducing VOC and direct PM emissions from light duty vehicles. Tier 2 standards are summarized in Table 6.2 below.

Tier 2 Emission Standards, FTP 75, g/mi					
Bin#	**Full Useful Life**				
	NMOG*	**CO**	**NO_x†**	**PM**	**HCHO**
Temporary Bins					
11 MDPV[c]	0.28	7.3	0.9	0.12	0.032
10[a,b,d]	0.156 (0.230)	4.2 (6.4)	0.6	0.08	0.018 (0.027)
9[a,b,e]	0.090 (0.180)	4.2	0.3	0.06	0.018
Permanent Bins					
8[b]	0.125 (0.156)	4.2	0.2	0.02	0.018
7	0.09	4.2	0.15	0.02	0.018
6	0.09	4.2	0.1	0.01	0.018
5	0.09	4.2	0.07	0.01	0.018
4	0.07	2.1	0.04	0.01	0.011
3	0.055	2.1	0.03	0.01	0.011
2	0.01	2.1	0.02	0.01	0.004
1	0	0	0	0	0

* for diesel fueled vehicle, NMOG (non-methane organic gases) means NMHC (non-methane hydrocarbons)

† average manufacturer fleet NO_x standard is 0.07 g/mi for Tier 2 vehicles

[1] 65 FR 6698 February 10, 2000

a - Bin deleted at end of 2006 model year (2008 for HLDTs)

b - The higher temporary NMOG, CO and HCHO values apply only to HLDTs and MDPVs and expire after 2008

c - An additional temporary bin restricted to MDPVs, expires after model year 2008

d - Optional temporary NMOG standard of 0.280 g/mi (full useful life) applies for qualifying LDT4s and MDPVs only

e - Optional temporary NMOG standard of 0.130 g/mi (full useful life) applies for qualifying LDT2s only

Abbreviations:

LDT2 – light duty trucks 2 (0-6,000 lbs. GVWR, 3,751-5,750 lbs. LVW)

LDT4 – light duty trucks 4 (6,001-8,500 lbs. GVWR, 5,751 lbs. and greater ALVW)

MDPV – medium duty passenger vehicle

HLDT - heavy light duty truck (above 6,000 lbs GVWR)

Table 6.2, Tier 2 Emission Standards

In addition to the benefits from Tier 2 in the current emissions inventories, the emission projections for 2015 in this SIP continue to reflect significant improvements in both VOC and NO_x as older vehicles are replaced with Tier 2 vehicles. This trend may be seen in the inventory projections for on-road mobile sources despite the growth in vehicles and vehicle miles traveled that are factored into the same projections.

Additional on-road mobile source emissions improvement stemmed from federal regulations for heavy-duty diesel vehicles. The Highway Diesel Rule, which aimed at reducing pollution from heavy-duty diesel highway vehicles, was finalized in January 2001. Under the rule, beginning in 2007 (with a phase-in through 2010) heavy-duty diesel highway vehicle emissions were required to be reduced by as much 90 percent with a goal of complete fleet replacement by 2030. In order to enable the updated emission-reduction technologies necessitated by the rule, beginning in 2006 (with a phase-in through 2009) refiners were required to begin producing cleaner-burning ultra-low sulfur diesel fuel. Specifically, the rule required a 97 percent reduction in sulfur content from 500 parts per million (ppm) to 15 ppm. The overall nationwide effect of the rule is estimated to be equivalent to removing the pollution from over 90 percent of trucks and buses when the fleet turnover is completed in 2030.

To supplement the federal motor vehicle control program, Inspection / Maintenance (I/M) Programs were implemented in Salt Lake and Davis Counties in 1984. A program for Weber County was added in 1990. These programs have been effective in identifying vehicles that no longer meet the emission specifications for their respective makes and models, and in ensuring that those vehicles are repaired in a timely manner.

<u>Off-road mobile sources:</u>

Several significant regulatory programs enacted at the federal level will affect emissions from non-road mobile emission sources. This category of emitters includes airplanes, locomotives, hand-held engines, and larger portable engines such as generators and construction equipment. The effectiveness of these controls has been incorporated into the “NONROAD” model UDAQ uses to compile the inventory information for this source category. Thus, the controls have already been factored into the projection inventories used in the modeled attainment demonstration.

EPA rules for non-road equipment and vehicles are grouped into various "tiers" in a manner similar to the tiers established for on-road motor vehicles. To date, non-road rules have been promulgated for Tiers 0 through IV, where the oldest equipment group is designated "Tier 0" and the newest equipment, some of which has yet to be manufactured, falls into "Tier IV."

Of note are the following:

Locomotives

Locomotive engine regulation began with Tier 0 standards promulgated in 1998, which apply to model year 2001 engines.

In addition, because of the very long lifetimes of these engines, often up to forty years, Tier 0 standards include remanufacturing standards, which apply to locomotive engines of model years 1973 through 2001.

Subsequent tier standards for line-haul locomotives apply as follows:

Tier	Applicable Model Years
Tier I	2002 - 2004
Tier II	2005 - 2011
Tier III	2012 - 2014
Tier IV	2015 - newer

Yard or "switch" locomotives are regulated under different standards than line-haul locomotives.

Lastly, EPA has promulgated remanufacturing standards for Tier I and 2 locomotive engines to date.

Large Engines

Large non-road engines are usually diesel-powered but include some gasoline-powered equipment.

Large land-based diesel equipment (> 37 kw or 50 hp) used in agricultural, construction and industrial applications are regulated under Tier I rules, which apply to model years 1996 through 2000. Subsequent Tier II through IV rules apply to newer model-year equipment.

Some large non-road engines are gasoline-powered (spark-ignition). These include equipment such as forklifts, some airport ground support equipment, recreational equipment such as ATVs, motorcycles and snowmobiles. These are regulated under various tiers in a manner similar to diesel equipment.

Small Engines

Small engines are generally gasoline-powered (spark-ignition). Equipment includes handheld and larger non-handheld types. Handheld equipment includes lawn and garden power tools such as shrub trimmers, saws and dust blowers. Non-handheld equipment includes equipment such as lawnmowers and lawn tractors. From an emissions standpoint, smaller engine size is offset by the large number of pieces of equipment in use by households and commercial establishments. This equipment is regulated under a tiered structure as well.

Emissions Benefit

Each major revision of the non-road tier standards results in a large reduction of carbon monoxide, hydrocarbons, nitrogen oxides and particulate matter.

For example, the Non-road Diesel Tier II and III Rule, which regulates model-year 2001 through 2008 diesel equipment (> 37 kw or 50 hp) is estimated by EPA, in its Regulatory Announcement for this rule dated August 1998, to decrease NO_x emissions by a million tons per year by 2010, the equivalent of taking 35 million passenger cars off the road.

EPA further estimates, in its Regulatory Announcement dated May 2004, that the Tier IV non-road diesel rule is expected to decrease exhaust emissions per piece of equipment by over 90 percent compared to older equipment.

Low-Sulfur Diesel

Non-road diesel equipment is required to operate on diesel fuel with a sulfur content of no greater than 500 ppm beginning June 1, 2007.

Beginning June 1, 2010, non-road diesel equipment must operate on "ultra-low" sulfur diesel with a sulfur content of no more than 15 ppm.

Locomotives and certain marine engines must operate on ultra-low sulfur diesel by June 1, 2012.

6.5 SIP Controls

Beyond the benefits attributable to the controls already in place, there are new controls identified by this SIP that provide additional benefit toward reaching attainment. A summary of the plan strategy is presented here for each of the emission source sectors.

Overall, within the Salt Lake City – UT nonattainment area, the strategy to reduce emissions results in 27.4 tons per day of combined $PM_{2.5}$, SO_2, NO_x and VOC in 2015.

6.6 Reasonably Available Control Measures (RACM/RACT)

Section 172 of the CAA requires that each attainment plan "provide for the implementation of all reasonably available control measures (RACM) as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology (RACT)), and shall provide for attainment of the NAAQS."

Now that the Courts have determined that Subpart 4 applies to $PM_{2.5}$ nonattainment areas, it is also instructive to consider paragraph 189(a)(1)(C), which requires that "provisions to assure that reasonably available control measures … shall be implemented no later than … 4 years after designation in the case of an area classified as moderate after the date of the enactment of the Clean Air Act Amendments of 1990." All three of Utah's nonattainment areas for $PM_{2.5}$ were designated so on December 14, 2009. Hence, December 14, 2013 was the date by which all RACM was to have been implemented.

EPA interprets RACM as referring to measures of any type that may be applicable to a wide range of sources (mobile, area, or stationary), whereas RACT refers to measures applicable to stationary sources. Thus, RACT is a type of RACM specifically designed for stationary sources. For both RACT and RACM, potential control measures must be shown to be both technologically and economically feasible.

Pollutants to be addressed by States in establishing RACT and RACM limits in their $PM_{2.5}$ attainment plans will include primary $PM_{2.5}$ as well as precursors to $PM_{2.5}$. For the control strategy in this plan, those pollutants include SO_2, NO_x and VOC.

In general, the combined approach to RACT and RACM includes the following steps: 1) identification of potential measures that are reasonable, 2) modeling to test the control strategy, and 3) selection of RACT and RACM.

This basic process was applied to each of the four basic sectors of the emissions inventory:

<u>Stationary Point sources:</u>

Reasonably Available Control Technology – As stated above, RACT refers to measures applicable to stationary sources. Thus, RACT is a type of RACM specifically designed for stationary sources.

Section 172 does not include any specific applicability thresholds to identify the size of sources that States and EPA must consider in the RACT and RACM analysis. In developing the emissions inventories underlying the SIP, the criteria of 40 CFR 51 for air emissions reporting requirements was used to establish a 100 ton per year threshold for identifying a sub-group of stationary point sources that would be evaluated individually. The cut-off was applied to either a sources reported emissions for 2008 or for its potential to emit in a given year. The rest of the point sources were assumed to represent a portion of the overall area source inventory.

Sources meeting the criteria described above were individually evaluated to determine whether their operations would be consistent with RACT.

SIPs for $PM_{2.5}$ must assure that the RACT requirement is met, either through a new RACT determination or a certification that previously required RACT controls (e.g. for another pollutant such as PM_{10}) represent RACT for $PM_{2.5}$.

In conducting the analysis, UDAQ found that, as a whole, the large stationary sources were already operating with a high degree of emission control. It follows that the percentage of SIP related emissions reductions is not large relative to the overall quantity of emissions. As stated before, many of these sources were required to reduce emissions to address nonattainment issues with SO_2, ozone and PM_{10}. Routine permitting in these areas of nonattainment already includes BACT as an ongoing standard of review, even for minor sources and modifications. In order to find additional emission reductions at these sources, UDAQ identified a level of emission control that goes beyond reasonable, or RACT, and achieves the best available control.

Additional information regarding the RACT analysis for each of the sources in the nonattainment area may be found in the Technical Support Document.

For the Salt Lake City, UT nonattainment area, there are 28 stationary point sources that met or meet the criteria of 100 tons per year for $PM_{2.5}$ or any precursor. The emissions from these sources that were modeled for the 2010 baseline as well as the 2015 attainment year are shown below in Table 6.3.[1] Note that these emissions also include the growth projections that were applied. Information is provided in the TSD regarding the emissions reductions specific to reduction strategies resulting from the SIP.

[1] As noted above, the RACT implementation date given in CAA section 189(a)(1)(c), in Subpart 4, was December 14, 2013. As an editorial note, UDAQ had initially prepared this SIP under guidance pointing only to Subpart 1 of the CAA. That reading of the Act had resulted in a SIP with a different construct. It had identified an attainment date that was as expeditious as practicable, yet that date would have required all of the additional 5 years availed under section 172(a)(2)(A). Implementation of RACM and RACT, under that construct, was also to be as expeditious as practicable but in no case later that one year prior to the attainment date identified in the plan. Thus, RACT measures could have been implemented as late as December 14, 2018. Additionally, the requirement to address reasonable further progress (RFP) had identified two earlier milestones (2014 and 2017), and these presented additional targets for RACT implementation. Thus, the overall plan had incorporated a phased-in implementation schedule for measures identified as RACT.

When Subpart 4 superseded the more general planning requirements of Subpart 1, it was no longer permissible to request an extension of the attainment date. Instead, it became incumbent on the planning agency to determine either that the plan will provide for attainment by the applicable attainment date, or that attainment by such date is impracticable.

The attainment date for this moderate nonattainment area is December 31, 2015 and the RACT implementation date (having passed) was December 14, 2013. Many of the control strategies initially identified, under only Subpart 1, as RACT cannot be implemented by that prescribed date. This raises the question as to whether such measures would even be considered reasonable, either technologically or economically.

Nevertheless, UDAQ has retained this portion of the control strategy in the Emission Limits section of this State Implementation Plan. UDAQ is also demonstrating in this plan that attainment of the 2006, 24-hour NAAQS for $PM_{2.5}$ is impracticable by the attainment date. As part of that showing, the emissions reductions associated with all of the technologies and measures identified as RACT under only Subpart 1 were reflected in the emissions inventory modeled for the year 2015. This overstates the degree of control in 2015, however, from the standpoint of demonstrating that it is impracticable to attain the standard in 2015, provides a measure of conservatism to the overall conclusion.

Typical Winter Inversion Weekday Emissions (tpd)			2010_(R2) Baseline					2015_(R9) Growth & Control				
Source Category	NA-Area	Site	PM2.5	NOX	VOC	NH3	SO2	PM2_5	NOX	VOC	NH3	SO2
Point Sources	Salt Lake City, UT											
		ATK Thiokol Promontory	0.135	0.360	0.141	0.002	0.042	0.144	0.354	0.150	0.003	0.045
		Bountiful City Power	0.174	0.697	1.284	0.311	1.065	0.087	0.624	1.264	0.311	0.392
		Central Valley Water	0.000	0.005	0.001		0.000	0.082	0.209	0.049		0.002
		CER Generation II LLC - WVC	0.004	0.034	0.137	0.000	0.003	0.004	0.043	0.033	0.000	0.003
		Chemical Lime Company	0.015	0.039	0.005		0.002	0.015	0.039	0.005		0.002
		Chevron Refinery	0.036	0.043	0.001	0.000	0.034	0.008	0.058	0.002	0.000	0.044
		Flying J Refinery	0.501	2.991	0.663	0.026	1.774	0.105	1.950	1.234	0.022	1.092
		Geneva Rock Point of Mountain	0.069	0.269	0.050		0.037	0.084	0.323	0.060		0.026
		Great Salt Lake Minerals - Production Plant	0.132	0.249	0.023	0.002	0.018	0.107	0.304	0.061	0.003	0.026
		Hexcel Corporation Salt Lake Operations	0.048	0.217	0.180	0.079	0.024	0.103	0.102	0.111	0.129	0.009
		Hill Air Force Base Main	0.037	0.525	0.826	0.006	0.008	0.035	0.373	0.800	0.006	0.008
		Holly Refining Marketing	0.147	0.851	0.663	0.057	1.318	0.134	0.933	0.700	0.654	0.309
		Interstate Brick Brick	0.175	0.114	0.010		0.036					
		Kennecott Mine Concentrator	0.647	8.492	0.504	0.003	0.008	0.854	12.130	0.651	0.004	0.014
		Kennecott NC-UPP-Lab-Tailings	0.014	0.016	0.005	0.001	0.000	0.300	0.197	0.069	0.001	0.034
		Kennecott Smelter & Refinery	0.610	0.470	0.027	0.016	3.023	0.837	0.767	0.068	0.025	3.827
		Murray City Power	0.000	0.001	0.000		0.000					
		Nucor Steel	0.158	0.502	0.202	0.006	0.118	0.351	0.978	0.353	0.004	0.833
		Olympia Sales Co.	0.014	0.001	0.072	0.000	0.000	0.000	0.001	0.091	0.000	0.000
		Pacificorp Gadsby	0.067	0.443	0.031	0.065	0.006	0.067	0.437	0.031	0.065	0.006
		Pacificorp Little Mountain	0.021	1.014	0.007		0.011					
		Proctor & Gamble Paper Products Co.	0.099	0.043	0.067		0.003	0.575	0.674	0.654		0.007
		Silver Eagle Refining	0.011	0.246	0.359	0.012	0.003					
		Tesoro Refinery	0.710	1.162	0.806	0.011	2.808	0.272	1.297	1.005	0.010	0.819
		University of Utah	0.024	0.313	0.023	0.009	0.003	0.030	0.159	0.022	0.008	0.003
		Utility Trailer	0.002	0.117	0.215		0.001					
		Vulcraft	0.017	0.020	0.147	0.000	0.001	0.044	0.030	1.134	0.000	0.002
		Wasatch Integrated IE	0.019	0.903	0.033	0.039	0.292	0.024	0.832	0.042	0.049	0.371
		Salt Lake City, UT Total	3.885	20.138	6.482	0.645	10.638	4.261	22.811	8.590	1.294	7.874

Table 6.3, Point Source Emissions; Baseline and Projections with Growth and Control

New Source Review / Banked Emission Reduction Credits – Under Utah's new source review rules in R307-403-8, banking of emission reduction credits (ERCs) is permitted to the fullest extent allowed by applicable Federal Law as identified in 40 CFR 51, Appendix S, among other documents. Under Appendix S, Section IV.C.5, a permitting authority may allow banked ERCs to be used under the preconstruction review program (R307-403) as long as the banked ERCs are identified and accounted for in the SIP control strategy. In the past, Utah has accounted for existing banked ERCs in SIP control strategies, ensuring that a pool of ERCs was available for new or modified sources in nonattainment areas. For the $PM_{2.5}$ SIP, however, it was not possible to include banked ERCs in the attainment demonstration. The $PM_{2.5}$ SIP adopted by the Air Quality Board on December 4, 2013 did not include banked $PM_{2.5}$ or $PM_{2.5}$ precursor ERCs in the attainment demonstration[1] and therefore under R307-403-8 any ERCs that were banked prior to December 4, 2013 may not be used as $PM_{2.5}$ major source or major modification emission offsets for $PM_{2.5}$ nonattainment areas. The use of these existing banked ERCs to meet the requirements of existing SIPs for PM_{10}, SO_2 and ozone are not affected by the $PM_{2.5}$ SIP and would be evaluated according to the provisions of those SIPs. Any ERCs generated after December 4, 2013 for $PM_{2.5}$ or $PM_{2.5}$ precursors would have been accounted for in the $PM_{2.5}$ attainment demonstration and are eligible to be used as emission offsets for $PM_{2.5}$ or $PM_{2.5}$ precursors. DAQ has established a new registry for $PM_{2.5}$ ERCs generated after December 4, 2013 to ensure that qualifying ERCs are tracked.

Area sources:

The area source RACM analysis consisted of a thorough review of the entire area source inventory for anthropocentrically derived direct $PM_{2.5}$ and precursors constituents. There was no emission threshold level established in the review process; instead, the analysis centered on whether reasonable control measures are available for a given source category. The following table identifies these categories as well as the pollutant(s) likely to be controlled, and provides some remarks as to whether a control strategy was ultimately pursued. In considering what source categories might be considered, Utah made use of EPA recommendations included in Control Techniques Guideline Documents (CTG's), as well as control strategies from other states. DAQ evaluated each strategy for technical feasibility as part of the RACM analysis. The screening column in the table identifies whether or not a strategy was retained for rulemaking or screened out for impracticability.

[1] The SIP revision adopted by the Utah Air Quality Board on December 4, 2013 had demonstrated attainment by December 14, 2019. This SIP revision includes a demonstration under CAA Section 189(a)(1)(B) that it impracticable to attain the NAAQS in 2015. Banked emission credits were not included in this demonstration either.

1 **Table 6.4 Area Source Strategy Screening**

Strategy	Constituent(s)	Screening Status	Remarks
1. Repeal current surface coating rule, R307-340. Replace this rule with individual rules for each category. New rules include $PM_{2.5}$ nonattainment areas. New rules update applicability and control limits to most current CTG. Current rule includes, paper, fabric and vinyl, metal furniture, large appliance, magnet wire, flat wood, miscellaneous metal parts and graphic arts.	VOC	Retained	R307-340 previously applied to Davis and Salt Lake counties. R307-340 was withdrawn and re-enacted as separate rules for each existing category. The new rules were expanded to nonattainment areas and updated to the most current RACT based limit(s).
2. New separate surface coating rules for following sources: a. Aerospace b. High performance c. Architectural d. Marine e. Sheet, strip & coil f. Traffic markings g. Plastic parts	VOC	See Remarks Column	Aerospace – retained High performance – not retained, regulated under Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Architectural – initially nor retained, further research indicated that adopting the Ozone Transport Commission model rule is feasible. Marine – not retained, only 1.2 tpy Sheet, strip & coil – retained Traffic markings – not retained, regulated under FIFRA Plastic parts - retained
3. Agricultural practices using Natural Resources Conservation Service (NRSC) practice standards	VOC, $PM_{2.5}$, ammonia	Not Retained	The NRCS has already enrolled most farmers in the erodible regions in their program thereby negating the need for rulemaking
4. Consumer products rule regulating VOC content	VOC	Retained	
5. Adhesives and sealant rule	VOC	Retained	
6. Expand current solvent degreasing rule R307-335 to $PM_{2.5}$ nonattainment areas and add a new section on industrial solvent cleaning	VOC	Retained	
7. Automobile refinishing rule	VOC	Retained	
8. Expand wood furniture manufacturing rule to $PM_{2.5}$ nonattainment areas. Update to most current CTG.	VOC	Retained	
9. Lower the no burn cut point for residential use of solid fuel burning devices. Require new sale of EPA certified stoves/fireplaces. Prohibit the sale/resale of noncertified stoves in nonattainment areas.	VOC, $PM_{2.5}$, NO_x, SO_x, ammonia	Retained	
10. Ban new sales of stick type outdoor wood boilers in nonattainment areas.	VOC, $PM_{2.5}$, NO_x, SO_x, ammonia	Retained	
11. Industrial bakery rule	VOC	Initially Retained	Screened out after analysis of public comment, cost benefit analysis does not support rulemaking, high cost-low VOC reduction
12. Restaurant charbroiler emission control: - Chain-driven -Underfire	VOC, $PM_{2.5}$	Chain-driven Retained Underfire-Not Retained	No reasonable control measures available at this time for underfire charbroiling
13. Appliance pilot light phase out	VOC, $PM_{2.5}$,	Retained	

Strategy	Constituent(s)	Screening Status	Remarks
	NO_x, SO_x, ammonia		
14. Expand current fugitive dust rule, R307-309 to $PM_{2.5}$ nonattainment areas. Require BMP's for dust plans.	$PM_{2.5}$	Retained	
15. Amend fugitive dust rule to include cattle feed lot	$PM_{2.5}$	Not Retained	Sizeable feed lots are not located in nonattainment areas
16. Ultra-low NO_x burners in commercial, industrial, and institutional boilers	NO_x	Tentatively Retained for Future Consideration	Developing technology not readily available at this time
17. Ultra-low NO_x burners in water heaters	NO_x	Tentatively Retained for Future Consideration	High cost and availability concerns
18. Manure management	VOC, ammonia	Not Retained	NRCS best management practices already encourages manure management. Limited viable options during winter months and treatment options are costly with low control efficiency that would not yield significant ammonia reduction in an ammonia rich inventory
19. Ban testing of back-up generators on red-alert days	VOC, $PM_{2.5}$, NO_x, SO_x	Initially Retained	Screened out after review of public comment, rule implementation was more complicated than anticipated, generators cannot be easily re-programmed
20. Prohibit use of cutback asphalt	VOC	Not Retained	Cities and highway administration personnel need stockpile for winter time road repair. Very small inventory.
21. Control limits on aggregate processing operations and asphalt manufacturing	$PM_{2.5}$, NO_x, SO_x	Retained	
22. R307-307 Road Salt and Sanding	PM	Retained	Expand current rule to nonattainment areas

EPA published CTGs and Alternative Control Techniques documents (ACTs) for VOCs for a host of emission sources. The CTGs are used to presumptively define VOC RACT. The VOC ACTs describe available control techniques and their cost effectiveness, but do not define presumptive RACT levels as the CTGs do. Therefore, CTG's are given highest priority in rule development.

Where a CTG does not exist for an emission source or where a CTG is so dated that it no longer represents current industry practice, UDAQ considered rules from other states as reference sources.

Additional reference sources include the Ozone Transport Commission (OTC) and the Northeast States for Coordinated Air Use Management.

As noted above, many CTGs were previously adopted into Utah's air quality rules to address ozone nonattainment in Salt Lake and Davis Counties. In conducting this evaluation, consideration was given to whether an expansion of applicability for an existing CTG into additional counties would provide a benefit for $PM_{2.5}$, and whether a strengthening of existing CTG requirements in Salt Lake and Davis Counties would result in an incremental benefit that was economically feasible. Furthermore, EPA has updated some of its existing CTGs and added some new ones to the list.

As part of this SIP, Utah has identified relevant source categories covered by CTGs, and promulgated rules based on the CTGs for reducing emissions from these categories. These rules apply to the following source categories:

- Control of Volatile Organic Emissions from Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks
- Control of Volatile Organic Emissions from Solvent Metal Cleaning
- Control of Volatile Organic Emissions from Surface Coating of Insulation of Magnet Wire
- Control of Volatile Organic Emissions from Graphic Arts
- Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations
- Control Techniques Guidelines for Industrial Cleaning Solvents
- Control Techniques Guidelines for Flat Wood Paneling Coatings
- Control Techniques Guidelines for Paper, Film, and Foil Coatings
- Control Techniques Guidelines for Large Appliance Coatings
- Control Techniques Guidelines for Metal Furniture Coatings
- Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings
- Control of Volatile Organic Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations

While most VOC sources are addressed by CTGs, the remaining emission sources must be evaluated by engineering analysis, including an evaluation of rulings by other states including model rules developed by the Ozone Transport Commission. These include VOCs from autobody refinishing, restaurant charbroiling, and phasing out appliance pilot lights.

CTGs for $PM_{2.5}$ emissions sources do not exist. RACT for $PM_{2.5}$ has been established through information from varied EPA and other state SIP sources. A useful source of data is the AP 42 Compilation of Air Pollutant Emission Factors, first published by the US Public Health Service in 1968. In 1972, it was revised and issued as the second edition by the EPA. The emission factor/control information was applied to fugitive dust and mining strategies.

Table 6.5 shows the effectiveness of the area source SIP control strategy for the Salt Lake City, UT nonattainment area by indicating the quantities of emissions eliminated from the inventory in 2015. Most of these rules became effective January 1, 2014.

Salt Lake City, UT Nonattainment Area				
	2015 lbs/day reduced			
	NOX	PM2.5	SOX	VOC
Area Source Rules				
R307-302, Solid fuel burning	632	5,114	105	6,400
R307-303, Commercial cooking		361		93
R307-309, Fugitive dust		191		
R307-312, Aggregate processing operations		5		
R307-335, Degreasing				2,908
R307-342, Adhesives & sealants				2,112
R307-343, Wood manufacturing				1,146
R307-344, Paper, film & foil coating				1,244
R307-345, Fabric & vinyl coating				2,887
R307-346, Metal furniture coating				95
R307-347, Large appliance coating				3
R307-348, Magnet wire coating				9
R307-349, Flat wood panel coating				73
R307-350 Miscellaneous metal parts coating				2,522
machinery				143
other transportation				447
Special				4
R307-351, Graphic arts				1,917
R307-352, Metal containers				180
R307-353, Plastic coating				1,098
R307-354, Auto body refinishing				2,485
R307-355, Aerospace coatings				718
R307-356, Appliance pilot light	877	4	6	51
R307-357, Consumer products				3,637
R307-361, Architectural coatings				8,038
Grand Totals	**1,584**	**6,276**	**123**	**38,964**

Table 6.5, Emissions Reductions from Area Source SIP Controls

On-road mobile sources:

A decentralized, test-and-repair program was evaluated for Box Elder and Tooele counties within the nonattainment area. For the evaluation, all model year 1968 and newer vehicles would be subject to a biennial test except for exempt vehicles. The program would exempt vehicles less than four years old as of January 1 on any given year from an emissions inspection. Year 1996 and newer vehicles would be subject to an On-Board Diagnostics (OBD) inspection. Year 1995 and older vehicles would be subject to a two-speed idle inspection (TSI). Based on this evaluation, this program was not included because it was determined that implementation of such a program would not affect PM 2.5 concentrations at the controlling monitor (Hawthorne) for the Salt Lake-Ogden-Clearfield nonattainment area. Additional information is provided in the Technical Support Document.

Off-road mobile sources:

Beyond the existing controls reflected in the projection-year inventories and the air quality modeling there are no emission controls that would apply to this source category.

Chapter 7 – TRANSPORTATION CONFORMITY

7.1 Introduction

The federal Clean Air Act (CAA) requires that transportation plans and programs within the Salt Lake City, Utah $PM_{2.5}$ nonattainment area conform to the air quality plans in the region prior to being approved by the Wasatch Front Regional Council (WFRC) Metropolitan Planning Organization. Demonstration of transportation conformity is a condition to receive federal funding for transportation activities that are consistent with air quality goals established in the Utah State Implementation Plan (SIP). Transportation conformity requirements are intended to ensure that transportation activities do not interfere with air quality progress. Conformity applies to on-road mobile source emissions from regional transportation plans (RTPs), transportation improvement programs (TIPs), and projects funded or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) in areas that do not meet or previously have not met the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide, particulate matter less than 10 micrometers in diameter (PM_{10}), particulate matter 2.5 micrometers in diameter or less ($PM_{2.5}$), or nitrogen dioxide.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFTEA-LU) and section 176(c)(2)(A) of the CAA require that all regionally significant highway and transit projects in air quality nonattainment areas be derived from a "conforming" transportation plan. Section 176(c) of the CAA requires that transportation plans, programs, and projects conform to applicable air quality plans before being approved by an MPO. Conformity to an implementation plan means that proposed activities must not (1) cause or contribute to any new violation of any standard in any area, (2) increase the frequency or severity of any existing violation of any standard in any area, or (3) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The plans and programs produced by the transportation planning process of the WFRC are required to conform to the on-road mobile source emissions budgets established in the SIP, or absent an approved or adequate budget, required to meet the interim conformity test. Approval of conformity is determined by the FHWA and FTA.

7.2 Consultation

The Interagency Consultation Team (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 responsibilities of the participating agencies. Members of the ICT workgroup collaborated on a regular basis during the development of the $PM_{2.5}$ 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.

ICT Workgroup Agencies

- Utah Division of Air Quality (UDAQ)
- Metropolitan Planning Organizations MPOs
  - Cache MPO
  - Wasatch Front Regional Council
  - Mountainland Association of Governments
- Utah Department of Transportation (UDOT)
- Utah Local Public Transit Agencies
- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)
- U.S. Environmental Protection Agency (EPA)

During the SIP development process the WFRC coordinated with the ICT workgroup and developed $PM_{2.5}$ SIP motor vehicle emissions inventories using the latest planning assumptions and tools for traffic analysis and the EPA-approved Motor Vehicle Emission Simulator (MOVES2010) emissions model. Local MOVES2010 modeling data inputs were cooperatively developed by WFRC and the ICT workgroup using EPA-recommended methods where applicable.

7.3 Regional Emission Analysis

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 nonattainment area. In December 2009, EPA designated all of Davis and Salt Lake Counties and parts of Box Elder, Tooele, and Weber as the Salt Lake City, Utah $PM_{2.5}$ nonattainment area. The Deadlines Rule (signed April 25, 2014) later classified this as a moderate $PM_{2.5}$ nonattainment area. The responsible transportation planning organization for the Salt Lake City, UT nonattainment area is the Wasatch Front Regional Council (WFRC).

As a condition to receive federal transportation funding, transportation plans, programs, and projects are required to meet the criteria and procedures for demonstrating and assuring conformity to the applicable implementation plan developed pursuant to Section 110 and Part D of the CAA. The criteria, specified in 40 CFR 93.109, differ based on the action under review and the status of the

implementation plan. The satisfaction of criteria and procedures, for implementation plans submitted under Section 189(a)(1)(B)(ii) of the CAA, which demonstrate the impracticability of demonstrating attainment of the applicable NAAQS by the applicable attainment date, are addressed in paragraph 93.109(g)(4) of the conformity rule. For such implementation plan revisions, it is the interim emissions tests which must be satisfied, as specified in Section 93.119.

7.4 Interim $PM_{2.5}$ Conformity Test

The EPA interim conformity test, for the purposes of this plan revision, will require that NOx, VOC, and direct $PM_{2.5}$ (elemental carbon, organic carbon, SO_4, brake and tire wear) emissions from RTPs, TIPs, and projects funded or approved by the FHWA or the FTA not exceed 2008 levels.

VOC is included because UDAQ has identified volatile organic compounds (VOCs) as a $PM_{2.5}$ precursor that significantly impacts $PM_{2.5}$ concentrations.

The EPA conformity rule presumes that $PM_{2.5}$ re-entrained road dust does not need to be included in the interim conformity test unless either the State or EPA decides that re-entrained road dust emissions are a significant contributor to the $PM_{2.5}$ nonattainment problem. The UDAQ conducted a re-entrained road dust study that concluded that $PM_{2.5}$ re-entrained road dust emissions are negligible in the Salt Lake City, Utah $PM_{2.5}$ nonattainment area, and thus meet the criteria of 40 CFR 93.102(b)(3). EPA Region 8 reviewed the study and concurred with the UDAQ's findings.

Chapter 8 – REASONABLE FURTHER PROGRESS

8.1 Introduction

Clean Air Act Section 172(c)(2) requires that plans for nonattainment areas "shall require reasonable further progress (RFP)." The definition of RFP is given in Section 171 of the CAA. It means "such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date."

In general terms, the goal of these RFP requirements is for areas to achieve generally linear progress toward attainment, as opposed to deferring implementation of all measures, where possible, until the end.

The pollutants to be addressed in the RFP plan are those pollutants that are identified for purposes of control measures in the attainment plan: $PM_{2.5}$, SO_2, NOx, and VOC.

8.2 Moderate Area Planning Requirements

Within the context of the moderate area planning requirements given in Subparts 1 and 4 of the CAA, RFP must be considered in light of the attainment date as well as the date by which all RACT and RACM must be implemented. The attainment date for all three of Utah's moderate $PM_{2.5}$ nonattainment areas was established in EPA's Deadlines Rule. That date is December 31, 2015. The deadline for implementation of all RACT and RACM is described in paragraph 189(a)(1)(C) as four years from the date these areas were designated nonattainment. That date for implementation of RACM was thus December 14, 2013.

There are other moderate area planning requirements in Subpart 4 that relate to the showing of RFP. Paragraph 189(a)(1)(B) requires "either (i) a demonstration (including air quality modeling) that the plan will provide for attainment by the applicable attainment date; or (ii) a demonstration that attainment by such date is impracticable."

This plan demonstrates the latter; that despite the implementation of all reasonably available controls, the area still will not attain the 2006, 24-hour standard for $PM_{2.5}$ by December 31, 2015.

Paragraph 189(c) discusses "milestones … which demonstrate reasonable further progress … toward attainment by the applicable date," but these are to be submitted with "plan revisions demonstrating attainment." Since this plan does not demonstrate attainment, the RFP showing will instead be addressed herein, as part of this plan revision.

8.3 RFP for the Salt Lake City, UT Nonattainment Area

Past Guidance on RFP, for showing generally linear progress towards attainment by the applicable attainment date, has described a straight line with a downward trend, ending at the attainment date and representing, there, a level of emissions that is consistent with attainment of the applicable NAAQS.

Since this plan does not show attainment of the standard by the attainment date (December 31, 2015), and furthermore does not show when or how attainment might be achieved, the "reductions in emissions of the relevant air pollutant as are required by this part" are left undefined. In terms of the straight line, the drop of the line, over its length, is an unknown quantity.

Furthermore, since $PM_{2.5}$ has a secondary component born of non-linear chemical reactions involving precursor gasses, it is not practical to extrapolate what reductions in which emissions would be necessary to attain the standard at some future date.

The magnitude then, for this plan revision, of emissions reductions required for a showing of RFP, must have the meaning of those that "may reasonably be required by the Administrator."

Since RFP considers the overall magnitude of emissions reductions "for the purpose of ensuring attainment … by the applicable date," it is also necessary to define a period of time over which this determination will be made.

The starting point for evaluating RFP should be the baseline year used in the modeling analysis. This is a year (2010) selected to coincide with the period used to establish the monitored design value for the modeling analysis; a period in which the area is violating the applicable NAAQS.

Thus, the magnitude of emissions reductions should be evaluated over a period spanning from 2010 through 2015, though it should be recognized that meaningful SIP controls were not required until 2014.

Quantitatively, the following assessment of emissions and incremental emissions reductions in Table 8.1 will show that RFP is met using the criteria discussed above:

Reasonable Further Progress							
Salt Lake City, UT PM2.5 Nonattainment Area							
***Emissions / Year**	**2010**		**2015**		**Difference**		**RFP**
			projected with growth and controls				Annualized Difference
PM2.5	~~16.5~~		~~15.1~~		~~1.4~~		~~0.3~~
NOx	~~160.5~~		~~135.1~~		~~25.4~~		~~5.1~~
SO2	~~12.8~~		~~10.1~~		~~2.7~~		~~0.5~~
VOC	~~130.0~~		~~102.4~~		~~27.6~~		~~5.5~~
Plan precursors	~~303.3~~		~~247.6~~		~~55.7~~		~~11.1~~
Total	~~319.8~~		~~262.7~~		~~57.1~~		~~11.4~~
****Concentration (ug/m3)**	42		37		5.0		1.0
* Emissions are presented in tons per average winter day							
**Value for 2010 is Baseline design value for the Hawthorne monitor							

Reasonable Further Progress						
Salt Lake City, UT PM2.5 Nonattainment Area						
*Emissions / Year	2010		2015	Difference		RFP
			projected with growth and controls			Annualized Difference
PM2.5	19.6		18.8	0.8		0.2
NOx	160.5		140.8	19.7		3.9
SO2	12.8		18.3	-5.5		-1.1
VOC	130.0		102.5	27.5		5.5
Plan precursors	303.3		261.6	41.7		8.3
Total	323.0		280.5	42.5		8.5
**Concentration (ug/m3)	42		37	5.0		1.0
* Emissions are presented in tons per average winter day						
**Value for 2010 is Baseline design value for the Hawthorne monitor						

Table 8.1, Reasonable Further Progress in the Salt Lake City, UT nonattainment area

In addition to the emissions totals, the table also includes the 2010 baseline design value for the controlling monitor in the nonattainment area (Hawthorne) and the predicted $PM_{2.5}$ concentration in 2015. These concentrations are presented as another metric to establish progress toward meeting the 24-hour standard.

Control Measures

The inventory for 2015 "with growth and controls" reflects the implementation of all the reasonably available control measures and reasonably available control technologies identified in this plan (up to and beyond the attainment date[1]), as well as all pre-existing control measures. As such, this inventory takes into account all controls that "may reasonably be required by the Administrator."

[1] The RACT measures for stationary sources include controls to be implemented past the implementation date of December 14, 2013. For reasons articulated in section 6.6 of this plan, these measures were retained in transitioning from the planning requirements of only Subpart 1 to those also including Subpart 4. These additional measures are not relied upon for a showing of attainment. Rather, their inclusion in the modeling analysis underscores that attainment by December 31, 2015 is impracticable. For the purposes of RFP however, it is not appropriate to include the effectiveness of control measures with implementation dates not required until after the attainment date (December 31, 2015.) Thus, the 2015 emissions shown in Table 8.1 differ from the emissions shown in Table 4.2 by the amount of these controls. Nevertheless, from a qualitative standpoint, their inclusion in

For a complete discussion of RACM & RACT, and the control measures factored into the modeled demonstration for 2015, see Chapter 6 of the Plan.

---

the Emission Limitations portion of this plan also underscores the fact that this plan continues to require measures to further the progress toward attainment, even beyond the applicable attainment date.

Chapter 9 – CONTINGENCY MEASURES

9.1 Background

Consistent with section 172(c)(9) of the Act, the State must submit in each attainment plan specific contingency measures to be undertaken if the area fails to make reasonable further progress, or fails to attain the $PM_{2.5}$ NAAQS by its attainment date. The contingency measures must take effect without significant further action by the State or EPA.

Nothing in the statute precludes a State from implementing such measures before they are triggered, but the credit for a contingency measure may not be used in either the attainment or reasonable further progress demonstrations.

The SIP should contain trigger mechanisms for the contingency measures, specify a schedule for implementation, and indicate that the measures will be implemented without further action by the State or by EPA.

The CAA does not include the specific level of emission reductions that must be adopted to meet the contingency measures requirement under section 172(c)(9). Nevertheless, in the preamble to the Clean Air Fine Particulate Rule (see 72 FR 20643) EPA recommends that the "emissions reductions anticipated by the contingency measures should be equal to approximately 1 year's worth of emissions reductions necessary to achieve RFP for the area."

9.2 Contingency Measures and Implementation Schedules for the Nonattainment Area

The following measures have been set aside for contingency purposes:

Woodburning Control – As part of the control strategy for the SIP, rule R307-302 has been amended to change the no-burn call from 35 $\mu g/m^3$ to 25 $\mu g/m^3$. Credit for this change is included in the modeled attainment demonstration as well as the RFP demonstration. However, R307-302 also includes a mechanism to further revise the no-burn call to only 15 $\mu g/m^3$ should a contingency situation arise. The benefit of this rule is to prevent a buildup of particulate matter due to woodsmoke during periods of poor atmospheric mixing which typically precede exceedances of the 24-hour $PM_{2.5}$ NAAQS. This rule has been adopted, and can take effect immediately if so required.

This contingency measure will be triggered by an EPA determination that: 1) the area has failed to make RFP; or 2) has failed to attain the NAAQS by the applicable attainment date.

9.3 Conclusions

Control measures developed to meet increasingly stringent ozone and fine $PM_{2.5}$ standards in Utah's urbanized areas have likewise become increasingly stringent, and still it is a challenge to attain the 2006, $PM_{2.5}$ NAAQS. This leaves little room for additional reductions that can be set aside as contingency measures.

The control strategy analysis summarized in Chapter 6 shows that stationary sources already meet or exceed RACT, and represent at most about 20% of the emissions contributing to excessive $PM_{2.5}$ concentrations during winter. By contrast, area sources and on-road mobile sources contribute most of the emissions, but further emission control in these categories extends beyond the authorities of UDAQ. The most meaningful reductions in future emissions of VOC, an important $PM_{2.5}$ precursor, will likely result from additional restrictions of VOC in consumer products, and from what will likely result from Tier 3 of the federal motor vehicle control program.

PM2.5 SIP Sections IX.A.21, IX.A.22, IX.A.23 and SIP Sections IX.H.11, 12 and 13: Comments and Responses to Comments Made During the October 2014 Public Comment Period.

November 19, 2014

TABLE OF CONTENTS

General SIP Comments (G) ……..…… 3

Emission Inventories (EI) ……..…… 12

Emission Standards (ES) ……..……. 13

Technical Support Document (TSD)……..…… 30

Transportation and I/M (T) ……...……. 31

General SIP Comments

Comment G-1 (From EPA Cover Letter of Comments): EPA wishes to clarify that the SIPs will need to meet all Moderate area plan requirements even if the nonattainment areas are re-classified as Serious areas in the future. In that event, Serious area plan requirements will not replace Moderate area plan requirements. Instead, Serious area plan requirements will be in addition to Moderate area plan requirements.

DAQ Response: The comment raises an interesting question, and perhaps, in EPA's forthcoming proposal of a new $PM_{2.5}$ implementation rule[1] this will be addressed.

In that forum, comment may be taken, and a final rule can make the answer to this question clear for all to read.

Until then, Region 8 appears to be offering an opinion, and nothing more.

EPA Region 9 offered its interpretation as part of its proposal to promulgate a Federal Implementation Plan for the Arizona-Phoenix nonattainment area (FR Vol. 63, No. 62, April 1, 1998, pp. 15926), writing: "EPA believes that because Maricopa area was reclassified from a moderate to a serious nonattainment area, the moderate area attainment requirements (demonstration of impracticability or attainment by no later than December 31, 1994) have been superseded by the serious area attainment requirement (attainment by no later than December 31, 2001) and are therefore now moot. Having reviewed the CAA's moderate and serious area PM-10 attainment provisions, EPA has concluded that when a moderate PM-10 area has been reclassified after the moderate area attainment deadline has passed and been replaced with a new deadline, the moderate area deadline no longer has any logical, practical or legal significance. Similarly, once such a reclassification has occurred, the approval status of the SIP provisions addressing the previous attainment requirements is no longer of any consequence."

Again, until perhaps a final interpretation is noticed and acted upon in a new implementation rule for $PM_{2.5}$, these are just opinions.

In any case, UDAQ anticipates that it will need to address the Serious Area planning requirements, and remains committed to finding solutions to Utah's air quality issues, even prior to any action concerning reclassification**.**

[1] On January 4, 2013, in *Natural Resources Defense Council (NRDC) v. EPA*, the D.C. Circuit Court remanded to the EPA the "Final Clean Air Fine Particle Implementation Rule" (April 25, 2007) (the "2007 $PM_{2.5}$ Implementation Rule") and the "Implementation of the New Source Review (NSR) Program for Particulate Matter Less than 2.5 Micrometers ($PM_{2.5}$)" final rule (May 16, 2008) (the "2008 $PM_{2.5}$ NSR Rule). The Court found that the EPA erred in implementing the 1997 $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) pursuant solely to the general implementation provisions of subpart 1 of Part D of Title I of the Clean Air Act (CAA or Act), without also considering the particulate matter-specific provisions of subpart 4 of Part D. The Court's ruling remanded the rules to the EPA to address implementation of the 1997 $PM_{2.5}$ NAAQS under subpart 4.

Comment G-2 (From EPA Enclosure I, 1-a): Under section 189(c) in subpart 4 of the Clean Air Act, the Reasonable Further Progress (RFP) requirements in section 172(c) are tied to quantitative milestones. These requirements should be applied to the Salt Lake City and Provo $PM_{2.5}$ SIPs, and the appropriate milestone date should be December 31, 2017.

RFP for these two SIPs is addressed in Chapter 8. Therein, the discussion notes that the emissions inventory for 2015 (the attainment year) reflects the implementation of all Reasonably Available Control Measures (RACM and RACT), up to and beyond the attainment date (implementation of some of these RACT measures is not required until 2016, 2017, 2018, or 2019). This information is adequate to show that, even if all these controls were implemented by 2015, the areas would still not show attainment.

However, the RFP plan, as depicted in Tables 8.1, should remove any measures with an implementation date that is subsequent to the attainment date in 2015 and represent the effectiveness of those controls in the interim years. These controls should correlate to the annual RFP for 2016 or 2017. Furthermore, to ensure linear progress in future RFP considerations, the plan should identify additional controls, and those controls should also be reflected in Tables 8.1.

DAQ Response: In general, this comment illustrates the need for clear guidance at the time SIPs are developed. As part of its action on January 4, 2013, the D.C. Circuit Court remanded to EPA the task of preparing a new implementation rule for the $PM_{2.5}$ NAAQS. As the deadline for submitting the Subpart 4 Moderate Area SIPs approaches, we are still left without even a proposal of the forthcoming rule. The "Deadlines Rule" prepared in the wake of the Court's ruling noted this, and pointed to the 1993 General Preamble as well as to various actions in the FR. The commenter takes issue with the interpretation of the requirements made by UDAQ and offers its own interpretation instead. Having read the comment, UDAQ is still unpersuaded.

For "plan revisions demonstrating attainment," UDAQ agrees that the RFP requirements in Section 172(c) are in fact tied to the quantitative milestones described in Section 189(c)(1) of Subpart 4. However, the two plans at the focus of the comment (SLC and Provo) do not demonstrate attainment. Instead, they demonstrate that attainment by the applicable attainment date is impracticable. This distinction is introduced in Section 189(a)(1)(B) of Subpart 4, where the plan provisions for moderate nonattainment areas are discussed.

Therein, it is explained that "each state in which all or part of a Moderate Area is located shall submit an implementation plan that includes" "either (i) a demonstration (including air quality modeling) that the plan will provide for attainment by the applicable attainment date; or (ii) a demonstration that attainment by such date is impracticable."

The latter, a demonstration that attainment by such date is impracticable, is very unique. Nowhere else in the CAA is this option permissible. The general SIP requirements of Section 172(c) call for plan provisions that "…shall provide for attainment of the national primary ambient air quality standards." Even under paragraph 189(b)(1)(A) in Subpart 4 "Additional Provisions for Particulate Matter Nonattainment Areas," plan provisions for areas reclassified as Serious require a demonstration of attainment, either by the applicable attainment date or by the most expeditious alternative date practicable.

Having drawn this distinction in Section 189(a), the Act then applies it to the milestones described in Section 189(c), and requires these milestones in "plan revisions demonstrating attainment."

The commenter is correct in stating that the RFP requirements are tied to the quantitative milestones described in Section 189(c), where, in fact, they apply.

RFP however, as described in Subpart 1 of Part D of the CAA "Nonattainment Areas in General," is a much more general requirement. Section 172(c) says simply that plan provisions submitted under Part D shall require reasonable further progress. RFP itself is defined in Section 171 as "such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date."

As such, RFP is a required element for these two plans, but since they do not demonstrate attainment RFP takes the more general meaning described in Subpart 1.

The application of RFP, in the context of Moderate PM_{10} Area planning requirements, was addressed by EPA Region 9 in its proposal to promulgate a Federal Implementation Plan for the Arizona-Phoenix nonattainment area (FR Vol. 63, No. 62, April 1, 1998, pp. 15923). Noting that the planning requirements for PM_{10} nonattainment areas are set out in subparts 1 and 4 of (title I of) the CAA, and citing the "General Preamble" as describing EPA's preliminary views on how the Agency intends to review SIPs for moderate PM_{10} nonattainment areas, a listing was made of required plan elements. That list includes, in addition to other elements:

> "(d) For plan revisions demonstrating attainment, quantitative milestones which are to be achieved every 3 years and which demonstrate reasonable further progress (RFP), as defined in section 171(1), toward attainment by the applicable attainment date (CAA section 189(c));[6] and,"
>
> "(e) For plan revisions demonstrating impracticability, such annual incremental reductions in PM-10 emissions as are required by part D of the Act or may reasonably be required by the Administrator for the purpose of ensuring attainment of the PM-10 NAAQS by the applicable attainment date (CAA sections 172(c)(2) and 171(1))."

The footnote (6) referenced in paragraph (d) said the following: "As will be seen below, the proposed PM-10 FIP for the Maricopa area does not demonstrate attainment by the applicable attainment deadline, but rather includes the alternative demonstration that attainment by that date is impracticable. Therefore, section 189(c) does not apply and is not discussed further in this notice."

That same proposal (pp. 15927) states that "EPA has concluded that for PM-10 plans that demonstrate that it is impracticable for an area to attain the NAAQS by the applicable attainment date, the governing statutory requirement for RFP is section 172(c)(2) as defined by section 171(1)."

In the prior rulemaking and guidance for $PM_{2.5}$ (since remanded), RFP had been discussed in the context of Subpart 1 and was prescribed as generally linear progress between the base year of the plan and the applicable attainment date. Hence, as one tracks emissions in the area over time, the linear progress may be described, in geometric terms, by a line tracing (vertically) the reduction in emissions necessary to

show attainment and (horizontally) spanning the number of years between the attainment year and the base year.

Difficulties are encountered when trying to apply this definition of RFP to a Moderate Area SIP demonstrating the impracticability of attaining the applicable standard by the applicable attainment date. In geometric terms, the vertical trace of the line is unknown because the total reduction in emissions necessary to reach attainment has not been determined.

Such difficulties were described by EPA region 9 when the proposed FIP for the Phoenix nonattainment area was later promulgated (FR Vol. 63, No. 148, August 3, 1998, pp. 41326). In approving the RFP element, as proposed, EPA "interprets the RFP requirement for areas demonstrating impracticability as being met by a showing that the implementation of all RACM has resulted in incremental emission reductions below pre-implementation levels."

For the Salt Lake City and Provo SIPs, RFP is described in Section 8.3 of each SIP. The discussion therein identifies the afore mentioned difficulty in applying RFP in the traditional sense to a demonstration of impracticability. A table (8.1) is presented which illustrates instead the reduction in emission levels between the attainment year (2015) and the base year (2010). This is consistent with the interpretation given in the August 3, 1998 FR notice. Emission levels for 2017 are not shown because section 189(c) does not apply.

Footnote 1 in (each) Section 8.3 notes that the emission levels presented for 2015 in Table 8.1 reflect the inclusion of some RACT measures with implementation schedules beyond the attainment date. The commenter notes that this is acceptable for the purpose of the attainment demonstration element of the plan, but for the RFP element indicates that the emissions attributable to these measures should be removed from the 2015 totals. UDAQ agrees, and will make the necessary correction in both SIPs.

To the commenter's point that additional control measures should be identified and included in the plan, UDAQ anticipates that the Serious Area plans will require additional reductions in emissions and is already looking at what those reductions might be.

Comment G-3 (From EPA Enclosure I, 1-b): The draft SIPs' contingency provisions do not appear to satisfy applicable requirements.

First, as noted in the General Preamble, the measure should state that the measure will go into effect upon a determination by EPA that the area has failed to make RFP or attain the NAAQS by the statutory deadline. The SIP should state that the contingency measures will be triggered by an EPA determination that: 1) the area has, based on the state's milestone report under 189(c), failed to make RFP; or 2) has failed to attain the NAAQS by the applicable attainment date. Also, R307-302-3 should be revised to reflect that the measure applies once EPA has made one of these two determinations.

Second, the General Preamble notes that contingency measures "should be approximately equal to the emissions reductions necessary to demonstrate RFP for one year." The state should estimate the emission reductions that would be achieved by lowering the trigger level for no-burn periods to 15 µg/m3 and

assess whether those reductions would approximately equal the reductions necessary to demonstrate RFP for one year.

DAQ Response: Addressing each part in turn, First – UDAQ agrees that the SIP narrative can be augmented to explain the triggering mechanism for the contingency measure contained in R307-302-3. However, as explained above in responses to comments G-2 (in response to EPA Enclosure I, 1-a) above G-4 (in response to EPA Enclosure I, 1-c) below, Section 189(c) applies only to plan revisions demonstrating attainment.

Thus, the following language will be added to the SIP narrative in Section 9.2 within SIP Subsection IX.A.23, the $PM_{2.5}$ SIP for the Logan nonattainment area:

> This contingency measure will be triggered by an EPA determination that: 1) the area has, based on the state's milestone report under 189(c), failed to make RFP; or 2) has failed to attain the NAAQS by the applicable attainment date.

However, for SIP Subsections IX.A.21 and 22, $PM_{2.5}$ SIPs for the Salt Lake City and Provo nonattainment areas respectively, the SIP narratives will be supplemented as follows:

> This contingency measure will be triggered by an EPA determination that: 1) the area has failed to make RFP; or 2) has failed to attain the NAAQS by the applicable attainment date.

Concerning the rule itself, R307-302-3, the language can be modified as shown below:

(5) $PM_{2.5}$ Contingency Plan. If the EPA determines that a $PM_{2.5}$ nonattainment area has either 1) failed to make RFP as described (for each nonattainment area respectively) in SIP Subsection IX.A. 21, 22, or 23; or 2) has failed to attain the 2006 24-hour NAAQS by the applicable attainment date, the $PM_{2.5}$ contingency plan shall have been implemented within that nonattainment area, and [~~$PM_{2.5}$ contingency plan of the State Implementation Plan has been implemented,~~] the trigger level for no-burn periods as specified in R307-302-3(4) shall be 15 micrograms per cubic meter for the area where the $PM_{2.5}$ contingency plan has been implemented.

UDAQ will commit to making this rule revision at its earliest opportunity. It will be done well before the earliest of these events could possibly occur.

Second – Regarding the anticipated emissions reduction associated with a lowering of the trigger level, UDAQ will make the assessment and include it within the Technical Support Document.

Comment G-4 (From EPA Enclosure I, 1-c): Section 189(c) of subpart 4, "Milestones", is presented and reads as follows: *"Plan revisions demonstrating attainment submitted to the Administrator for approval under this subpart shall contain quantitative milestones which are to be achieved every 3 years until the area is redesignated attainment and which demonstrate reasonable further progress, as defined in section 171(1), toward attainment by the applicable date."*

EPA Region 8 notes that the SIP narratives for Salt Lake City and Provo state that this requirement does not apply because those plans "do not demonstrate attainment", and that this interpretation effectively

inserts the words "by the applicable attainment date" into section 189(c)(1). The comment then says that "Section 189(c)(1) does not specify that it only applies to plans that demonstrate attainment by the applicable attainment date. Instead, the commenter points to the General Preamble (57 FR 13488, 13598; April16, 1992) as "discussing the equivalent requirements for all Moderate area PM_{10} plans, regardless of whether the plans fall under 189(a)(1)(B)(i) or 189(a)(1)(B)(ii)." The passage from the General Preamble is presented and reads as follows: "*RFP/quantitative milestones. The PM-10 nonattainment area SIPs must include quantitative emissions reductions milestones which are to be achieved every 3 years and which demonstrate RFP, as defined in section 171(1), until the area is redesignated attainment [section 189(c)]*.," though the reference to section 189(c) in the Preamble was omitted from the comment. This portion of the comment then concludes with the statement that "While the General Preamble is not binding, it reflects EPA's intended interpretation of 189(c)(1)."

Having asserted that Section 189(c)(1) does apply in the cases of these two SIPs submitted under section 189(a)(1)(B)(ii), the comment then points again to the General Preamble in order to assign a starting-point for the counting of the 3-year increments. The Preamble states that it is reasonable to begin counting from the due-date for the applicable SIP; in this case December 31, 2014. Thus, December 31, 2017 is presented as the due-date for the next quantitative milestone, and again Region 8 asserts that the SIPs for these two areas should set quantitative milestones for December 31, 2017 that reflect RFP (i.e. annual incremental reductions out to the milestone date of December 31, 2017).

The comment concludes by noting that the SIPs for Salt Lake City and Provo should include motor vehicle emission budgets (MVEB) for the year 2017.

DAQ Response: UDAQ would again point to the need for a specific interpretation of this issue in the forthcoming implementation rule. Absent that guidance, UDAQ is left to look at the Clean Air Act alongside the "General Preamble" and note the difference.

The passage in the Preamble only paraphrases the Act, and in doing so omits a key phrase. The substitution of "*The PM-10 nonattainment area SIPs*" for "*Plan revisions demonstrating attainment*" is likely a careless error. Given that the Preamble includes a direct reference to Section 189(c), UDAQ is inclined to believe that EPA intended only to reiterate the requirements of that paragraph in the Preamble. If however, as the commenter asserts, it reflects EPA's intended interpretation of 189(c)(1), EPA most certainly should have included a discussion of the issue and explained why that key phrase should not be interpreted to exclude plan revisions submitted in accordance with Section 189(a)(1)(B)(ii). UDAQ might add that nowhere in the Preamble does it say that "all Moderate area PM_{10} plans" must contain quantitative milestones. In any case, the plain language of the Clean Air Act should carry more weight than a guidance document.

UDAQ takes no issue with the commenter's interpretation of how a milestone described in Section 189(c) should be counted, but would again point out that Section 189(c) does not apply in these instances. See also Response to Comment G-2 (in response to EPA Enclosure I, 1-a).

Similarly, the inclusion of a motor vehicle emissions budget does not apply to either of these SIPs either. See also Response to Comment T-6 (in response to EPA Enclosure IV, 2-b).

Comment G-5 (From EPA Enclosure I, 1-d): Nonattainment New Source Review, Banked Emission Credits. With regard to Chapter 6 in all three SIPs, "New Source Review/Banked Emission Reduction Credits," rule R307-403-8, banking of emission reduction credits (ERCs) continues to have problematic language. While the State has retired credits accumulated before December 31, 2013 for the purpose of offsetting increases in PM2.5 and PM2.5 precursor emissions, the State intends to bank credits after that date for this purpose. Under 40 CFR 51.165(a)(3)(ii)(C), the nonattainment NSR program must ensure that offsets are surplus, permanent, quantifiable, and federally enforceable. So that the nonattainment NSR program can meet these requirements, the State should address the issues identified in the May 10, 2001 letter from Richard R. Long, Director, Air and Radiation Program, EPA Region 8, to Rick Sprott, Director, UDAQ. EPA stated in that letter, "We do not consider [R307-403-8] to be sufficient to ensure that banked emission reductions meet all requirements to be creditable." We also note that, as Moderate area plan requirements now apply within the nonattainment areas, in order to be surplus and usable during the period of classification as Moderate, banked credits should exceed (in addition to any other applicable requirements) RACT/RACM requirements. UDAQ should be aware that the usability of any credits banked during the period of Moderate classification should be revisited if and when an area is reclassified to Serious or any other CAA requirements become applicable.

DAQ Response: The provisions of EPA's permitting rule for nonattainment areas, 40 CFR part 51, Appendix S are applicable in Utah under the both the federally approved new source review (NSR) rules in Utah's SIP, and the $PM_{2.5}$ implementation rule for NSR. EPA's own rules contain adequate provisions to address EPA's concerns.

Utah's federally-approved rules reference Appendix S. Utah's Nonattainment Area New Source Review (NAA NSR) rule, R307-403, was fully approved by EPA on May 5, 1995. R307-403-8 *Offsets: Banking of Emission Offset Credit*, states, "Banking of emission offset credit will be permitted to the fullest extent allowed by applicable Federal Law as identified in [among other provisions] 40 CFR 51, Appendix S."

Appendix S also applies in Utah under the $PM_{2.5}$ implementation rule for NSR. On May 16, 2008, EPA finalized regulations to implement the New Source Review Program for fine particulate. The transition provisions in the regulations state, "According to the provisions of 40 CFR 52.24(k), during such an interim period when a State lacks an approved NA NSR program for a particular pollutant, appendix S of 40 CFR part 51 applies for NA NSR permitting" (73 FR 28342). Utah's rules did not contain all of the required provisions, so Appendix S applies in Utah during the interim period until EPA approves revisions to Utah's rules to implement the requirements for $PM_{2.5}$. On May 1, 2013, the Air Quality Board adopted revisions to R307-403 to incorporate the new provisions for $PM_{2.5}$ and these revisions were submitted to EPA on August 20, 2013. A minor revision to these rules to clarify the significance level for VOC was adopted on December 4, 2013, and was submitted to EPA on March 24, 2014. EPA has not yet acted upon these submittals. Because both the $PM_{2.5}$ implementation rule for NSR and the approved banking provisions in R307-403-8 refer back to the federal requirements in 40 CFR 51, Appendix S, EPA's concerns are already addressed.

When the proposed SIPs are adopted, all RACT measures in Part H will become enforceable under State law. Under both Utah's rules and Appendix S, emission reductions to meet established RACT

requirements are not surplus and will not be eligible for banking or for use as an emission reduction credit.

DAQ has already committed to work with EPA through a separate process to address the issues raised in the May 10, 2001 letter from Richard R. Long, Director, Air and Radiation Program, EPA Region 8, to Rick Sprott, Director, DAQ. Many of the issues that were raised in 2001 have been resolved, and DAQ welcomes the opportunity to work with EPA to determine what additional issues remain. The federal requirements have changed since EPA's letter was drafted in 2001. On November 29, 2005, EPA revised its nonattainment area permitting rules to incorporate the 1990 Clean Air Act Amendments – in 2001 EPA was still relying on the 1992 General Preamble as guidance. There have been numerous other changes to the NSR requirements since 2005. In addition, as mentioned above, Utah's rule R307-403 was revised in 2013 to address many of EPA's concerns and EPA has not yet acted upon that submittal. A significant effort will be required, including staff from both DAQ and EPA, to identify and resolve any remaining issues. DAQ has delayed this effort, at the request of EPA, until after EPA has taken action on a backlog of SIP submittals from Utah and other states that are a priority for the Region. The language regarding Banked Emission Reduction Credits in Chapter 6 of each of the $PM_{2.5}$ SIPs was sent to EPA in March, 2014 for review. If EPA's concerns had been communicated earlier in the process, we could have accelerated the process to identify and resolve any remaining issues from the 2001 letter. EPA will need to commit resources to this process to ensure success.

Comment G-6 (From EPA Enclosure I, 1-e): In order to provide a complete RACT/RACM analysis, UDAQ should provide a review of other state's ammonia control rules that have already been implemented in the document within the TSD titled 'Area Source Ammonia Reasonably Available Control Technology (RACT).'

DAQ Response: We have amended the document in the TSD (5.b.ii) to include an analysis on other states' ammonia control rules. We have also added graphics and ammonia emissions for poultry and cattle CAFOs.

Comment G-7 (From the Wasatch Clean Air Coalition (WCAC)): There are some questions that deserve continued public consideration, especially in light of the likelihood of another [SIP] iteration for serious nonattainment under Subpart 4.

a. One such question surrounds decisions concerning [motor vehicle] fleets. Some examples are the ground fleet at the SLC airport, FrontRunner, school and transit buses, cabs, rental cars and fleets at larger industrial sites. The public needs explicit cost per ton information on potential emission reductions within these fleets.
b. Another question is how can we ensure vehicles driven to and parked regularly at large lots in nonattainment areas have emission inspections?
c. Another question is how to get Tier 3 fuel into Utah gas tanks.

Another question is how to identify and require lower emission operations by commercial and industrial sources during our inversions.

DAQ Response: UDAQ agrees with WCAC, and supports an assessment of possible emission reduction strategies. As the control strategies for the next round of SIPs are developed, these are ideas that are worth pursuing even if the SIP credits are only voluntary.

Emission Inventories Comment

Comment EI-1 (From EPA Enclosure V,1): EPA states in Enclosure 5 of EPA Region 8 Comments on Utah's Proposed State Implementation Plans and Technical Support Documents that: "A triennial emission inventory encompassing the Salt Lake, Provo and Logan nonattainment areas has been developed by the state for the year 2011. Utah should compare the emissions released during 2011 within the nonattainment areas with their projection of emissions for the attainment demonstration. This comparison would provide some indication of any bias introduced into the data from the projections. Corrections in the projections could be made based on actual emissions for 2011. A 2014 triennial inventory is currently being developed by the state. Depending on the timing of its completion, it also could be used to assess the State projections for future years."

DAQ Response: According to EPA's request, UDAQ compared emissions projected forward to 2011 to actual 2011 emissions.

This analysis indicated that the emissions projected forward to 2011 were 10% greater than the actual 2011 emissions. However, since the modeling baseline year is 2010, UDAQ believes that it is more appropriate to compare the projected to actual emissions for the 2010 calendar year. In order to perform this analysis UDAQ needed to first compile the actual 2010 emissions. However, since 2010 is not a triennial inventory year some adaptation of the dataset was necessary. Since only the large major sources were required to submit emissions inventories in 2010, UDAQ compiled the overall 2010 emissions by combining the actual 2010 emissions from the large major sources with the actual 2011 emissions from the remaining sources. The emissions projected forward to 2010, which were used in the SIP modeling, were then compared to the overall actual 2010 emissions. This analysis indicated that the emissions projected forward to 2010 were only 3.5% greater than the overall actual 2010 emissions.

UDAQ believes that a 3.5% difference between projected and actual 2010 point source emissions is negligible due to uncertainties in the model inputs, including the emissions inventory. For this reason UDAQ believes that no discernable bias is being introduced into the data.

Emission Standards Comments

EPA Comments (Comments ES-1 through ES-13)

In Enclosure II of EPA's submitted comments, EPA submitted several comments on Utah $PM_{2.5}$ SIP subsections IX.H.11, 12, and 13, RACT Discussion in SIP Narratives and RACT Technical Support Documents. In addressing EPA's comments, UDAQ has condensed several of them as they were applied similarly in several places. UDAQ will therefore respond to these multiple comments only once.

Comment ES-1: The Reasonably Available Control Technology (RACT) limits, in some cases, need revisions to make the limits practically enforceable, to include monitoring, recordkeeping, and reporting requirements, and to align the limit's averaging period to be appropriate to the 24-hour $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS). There are also some problematic startup and shutdown exemptions included in the RACT limits.

DAQ Response: The UDAQ disagrees with the concept that all requirements a source will be subject to should be listed in the SIP. It has been UDAQ's intention from the outset to make the limits and limitations of the SIP practically enforceable. Utah has a federally approved State Implementation Program. The Utah air permitting program is an element of the federally approved SIP. The UDAQ believes that enforceability particularly related to the monitoring, recordkeeping and reporting, has been accomplished and will continue to be accomplished through Approval Orders issued in accordance with the EPA approved permitting program. In addition to Approval Order monitoring requirements, SIP subsection IX.H.11 contains general monitoring requirements that are applicable to all SIP sources.

Regarding the aligning of the averaging period of various limits to the 24-hour $PM_{2.5}$ NAAQS, UDAQ believes that in many cases this imposes an undue testing or monitoring burden on a source which is not needed. Further, since no specific controls or even control methodology has been implemented for the reduction of certain emissions, imposing frequent monitoring, recordkeeping and reporting requirements does not result in an expedited decrease in emissions or an expedited attainment date. UDAQ does acknowledge that some sources may have somewhat extended testing and/or monitoring requirements, but has generally imposed an alternate mechanism for achieving overall attainment with the NAAQS (such as 24-hr SIP Caps).

In regards to startup and shutdown exemptions, UDAQ acknowledges this comment. Although UDAQ has addressed startup and shutdown events and has attempted to eliminate all exemptions to emission limits or to supply alternatives during these periods, UDAQ agrees that some disagreement remains. However, UDAQ believes that this issue is best resolved during development of a serious nonattainment area SIP, rather than attempting to further address the issue at this time. No additional control method or control equipment is being installed or implemented during startup or shutdown events. Sources are already required to pursue best operating practices to minimize air emissions during periods of startup or shutdown; and seeking to impose additional limitations, with the associated monitoring, recordkeeping and reporting requirements, will not further expedite attainment or result in lower emissions.

Comment ES-2: The RACT limits must be in the SIPs and not just referenced in Approval Orders.

DAQ Response: UDAQ disagrees with this comment. DAQ notes that the CAA lists the requirements for nonattainment plan provisions at 172(c.) Among those requirements are: 1. the implementation of all reasonably available control measures, 2. the inclusion of enforceable emission limitations, … schedules and timetables for compliance, **as may be necessary or appropriate** to provide for attainment [emphasis added], and 3. the issuance of permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area.

DAQ recognizes the importance of identifying and ensuring the implementation of RACM / RACT and also the importance including enforceable emission limitations in the plan. We also recognize the overlap between the two requirements, but would point out that they are in fact separate.

Each of these nonattainment areas is a complex urbanized area, and includes sources ranging from small to those large-enough so as to have been identified in these $PM_{2.5}$ SIPs as warranting specific attention for purposes of ensuring RACM / RACT. Many of these larger sources include a litany of source components that also range from small to large. Many of these smaller source components are no different from those owned and operated by smaller sources. While it remains important to ensure that the operation of these components is in keeping with RACM / RACT, attainment or nonattainment of the NAAQS does not hinge on the emissions from such source components.

By contrast, there are other more significant source components that do, by themselves, have the potential to directly influence air quality. For source components such as these, it "may be necessary or appropriate" to include in the SIP an enforceable emission limitation or control measure. In essence, it is not necessary or appropriate to include, in the SIP, an enforceable emission limitation for every insignificant piece of equipment simply because it passed a RACT evaluation. Clearly, some discretion is necessary in determining how to distinguish these from the source contributions that do belong in the SIP.

Given this important distinction, DAQ would point to its NSR permitting program and the role of that program as a required element (from 172(c)(5)) of these plan provisions. This program has been approved by EPA into the Utah SIP. The approval orders issued as a consequence of this program offer a repository for the many emission limitations that would not rise to the level of importance compelled by the SIP. The DAQ also administers a minor source permitting program, and a BACT analysis is required for minor sources and for major sources that are below significance. Collectively, these limits and the NSR rules and regulations that prescribe them, are part of a control strategy that is adequate for timely attainment of the $PM_{2.5}$ NAAQS.

Hence, SIP Sections IX. Part H.11, 12, and 13 do not contain emission limitations for every individual control element described in the RACT Evaluation Reports. Each listed source is also subject to approval orders which contain multiple federally enforceable limits. It is UDAQ's intention that these limits remain in place as well as continue to improve as new AOs are developed and imposed. However, as the SIP is developed, UDAQ will include only those limitations that are necessary and appropriate to provide for attainment.

As a point of reference, the PM_{10} SIP included all permit requirements for all SIP listed sources. This approach has resulted in numerous problems that in some cases have resulted in the inability of UDAQ to issue Title V Permits. The UDAQ intends to put limits in the SIP that provide for reductions that lead to attainment of the standard; but the UDAQ will not put requirements in the SIP that prevent the source from using the permitting process to improve efficiency or to modernize processes. The UDAQ will also not put requirements in the SIP that become antiquated as new federal limits are implemented, or as new monitoring methods become available.

Comment ES-3: IX.H.11.g.vi: The EPA will continue to collaborate with Utah on addressing moderate area plan requirements for refineries that intend to produce Tier 3 gasoline

UDAQ Response: No response is required.

Comment ES-4: In our [EPA's] December 2, 2013 comment letter we made several general comments and a number of facility specific comments in reference to projected versus allowable emissions, and averages and frequency of monitoring, and how these items are used in modeling to support the SIP and meeting attainment requirements.

In general, we suggest that the UDAQ consolidate and/or clarify and provide more detail as applicable in SIP sections and/or RACT evaluations that explain these rationales and requirements.

DAQ Response: Concerning the use of projected actual emissions in the modeling demonstration, DAQ explained the validity of its approach in response to EPA's December 2, 2013 comments. Firstly, DAQ's approach is in accordance with EPAs guidance.

From a technical standpoint, DAQ relied upon "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze" (EPA – 454/B-07-002, April 2007).

DAQ believes the guidance makes this particular recommendation because of the chemical reactivity of both $PM_{2.5}$ and ozone. In both cases, the chemistry is non-linear, and model predictions regarding concentrations of these pollutants are functions of the chemical equilibrium present at any given time in the airshed. Overly conservative projections of emissions can misrepresent this equilibrium and lead to erroneous model results. DAQ was mindful of making reasonable projections in the future-year emissions, and did not use an overly conservative representation of permissible emissions from stationary sources. The modeling analysis also accounts for permitting actions that transpired between the 2010 baseline and now. This accounting is consistent with the notion of a reasonable projection.

More specifically, EPA addresses how emissions should be estimated for future years (see Section 17.6), and notes: "The goal of making projections is to obtain a reasonable estimate of future-year emissions that account for the key variables that will affect future emissions." Concerning growth as one of those variables: "A representative growth rate should be identified from the available data sources and all information known about the sources and sectors. Stakeholder review of the data can be helpful during

this step; for example, an industrial facility with large projected emissions may be able to review the data and provide additional information for a more informed future-year estimate."

The alternate approach would have been to model each of the identified point sources at its maximum allowable emission rate. This however leads to the projection of a worst-case scenario. It would assume that every one of these sources was emitting at its maximum allowable rate, all at the same time. Furthermore, this bias is made more extreme when one considers an averaging time that is less than an annual average. 24-hour emission rates (consistent with a 24-hr. $PM_{2.5}$ standard) naturally show more fluctuation than an annual rate; a fact that is accounted for in the establishment of emission limits.

A worst-case scenario may be satisfying from a legal standpoint, but would not represent a reasonable estimate of future emissions. Instead, it is more reasonable to look at the collection of these sources in aggregate. It is much more realistic to assume that while one or more sources are operating at rates higher than average, other sources are operating at lower rates. This is the law of averages.

DAQ has, in the past, relied on allowable emissions for SIP attainment demonstrations. Of particular note would be the 1991 SIP for PM_{10}. We note however, that this was done within the scope of an inventory based approach, used in conjunction with a receptor model that was not able to replicate the complex non-linear chemistry at work in these airsheds. Underlying that SIP was a 1 to 1 conversion rate from precursor to particle. Clearly this is not the case.

These draft SIPs are based on photochemical modeling that includes the ability to reconcile non-linear chemistry, and makes evaluations concerning $PM_{2.5}$ concentrations, in a relative sense. EPA's Modeling Guidance discusses the modeling of future concentrations in a relative sense and concludes: "Because the test is relative, in most cases, actual emissions should be used. The actual emissions should be representative of emissions on high $PM_{2.5}$ days (days that exceed the NAAQS). Since the absolute predicted concentrations are not used directly, allowable emissions may overestimate the changes in concentrations due to the identified sources." This is contrasted with modeling in other (non-SIP) applications: "Modeling with allowable emissions is sometimes warranted. For example, for permit modeling, we generally compare the absolute predicted modeled concentrations against the NAAQS or the PSD increment. Therefore, in the case of permit modeling, it is sometimes appropriate to model with allowable emissions."

Furthermore, in addressing the creation of future-year inventories and air quality model inputs, EPA notes: "Every attempt should be made to use consistent approaches between the future year and the base year for all of these modeling steps. Inconsistencies in approaches between the future-year modeling and the base-year modeling can lead to artificial differences in air quality modeling results that can affect conclusions. Therefore, it is critical to avoid such differences whenever possible." DAQ notes that the base-year inventories were constructed using actual emissions from 2008 (projected forward to the year 2010. Also, sources not present in the 2008 inventory were added into the projection-year inventories at 90% of their allowable emissions).

In its comment, EPA points us to the 1992 General Preamble which says: "When developing a control strategy and demonstrating attainment with *dispersion modeling*, the State *may* determine that some actual emissions must be reduced and also some allowable emissions must be reduced to the levels that the sources are actually emitting". (57 FR, 13498, April 16, 1992) This language does not definitively

indicate that states are required to base their attainment demonstrations on allowable emissions, rather, the language EPA provides is suggestive and somewhat discretionary. DAQ would note that air quality modeling has advanced a long way since 1992, and that the Modeling Guidance prepared in 2007 represents a more technically sound basis for assessing future-year emissions in a photochemical model.

Finally, DAQ would point out that Utah is not the only state to have based its SIP on projected allowable emissions. EPA approved SIPs for the San Joaquin Valley and the South Coast regions that estimated point source emissions using projected growth rather than allowable emissions. In taking action, EPA noted that: "These methodologies for projecting future emissions based on growth factors and existing Federal, State, and local controls were consistent with EPA guidance on developing projected baseline inventories… [W]e conclude that the projected baseline inventories for 2009, 2012, and 2014 were prepared consistent with EPA's guidance on development of emissions inventories and attainment demonstrations and, therefore, provide an adequate basis for the RACM, RFP, and attainment demonstrations in the Plan." (at 76 FR 69907-08)

Since the approach taken in the SIP modeling is consistent with the EPA's guidance, UDAQ sees no reason to reiterate the underlying reasoning in the SIP narrative.

Comment ES-5: Condensable particulate matter should be taken into account in determining emission inventories and in setting RACT limits. As mentioned above, the emission limit should at least be estimated and the estimating procedure provided in the SIP.

DAQ Response: UDAQ disagrees with this comment. In cases where a condensable particulate limit has been 'deferred' or language is present which requires the source to conduct testing to establish the ratio between condensable and filterable $PM_{2.5}$, it is UDAQ's measured opinion that it would be unwise to establish limits on the condensable fraction of $PM_{2.5}$ emissions without adequate testing data, especially as it pertains to setting the condensable/filterable ratio on new and previously unseen equipment and processes.

To date, these sources have not conducted stack testing or done so with sufficient frequency to develop an adequate condensable particulate matter speciation in order to appropriately set a limit.

Any attempt to set a limit based upon estimation, as suggested, is subject to several problems. For a set value to have any validity as a limit, then it must be enforceable as a practical matter, and be subject to compliance action. Therefore, basing the "estimated" limit off an invalid or incorrect assumption or erroneous data would subject the source to penalties and other compliance action, through no fault of their own. If the limit is so loosely interpreted that the source is not subject to such action, then it can easily be argued that the "limit" is not serving as a limit, and indeed serves no useful purpose. UDAQ believes that it is better to require that these sources collect condensable particulate matter emissions data and then establish a full $PM_{2.5}$ emission limitation by a specific date once that data has been collected, as we've outlined in our submitted SIP.

Comment ES-6: Please explain why stack test frequencies are sufficient to ensure continuous compliance with the limits.

UDAQ Response: Stack testing frequency is based on engineering judgment and the permit writer's knowledge regarding the specific sources process and history. How close a source is to a threshold (significance, PSD, etc.), what existing stack requirements are in place, and whether the equipment is controlled with industry wide accepted technology are some things considered when setting testing frequency. UDAQ has a long history of data collection, both with the specific source and with other similar sources. This data shows a lack of variability in emissions information.

Furthermore, stack testing alone is generally not enough to verify compliance. Facility compliance with emissions limits also depends on the verification of operating parameters, such as feed rates etc. These parameters are verified on an on-going basis. Periodic stack tests help to insure these parameters are accurate and effective in controlling emissions to within the limits specified.

Comment ES-7: Please explain how annual (or less frequent) reporting of excess emissions is adequate for enforcement of short-term emission limitations intended for attainment of a 24-hour standard. In addition, sources that are subject to only R307-150-7 are not specifically required to report either excess emissions or emissions of direct $PM_{2.5}$

DAQ Response: UDAQ did not base its attainment demonstration on the inclusion or expectation of excess emissions. While some level of excess emissions might be expected from industrial sources based on past performance, it is not UDAQ's policy to base permitting or attainment demonstrations upon the assumption of failure – and then to make a further assumption as to the severity of that failure. Instead, excess emissions resulting from breakdowns are handled through UDAQ's existing breakdown rules.

While it is true that a source only subject to R307-150-7 is not specifically required to report excess emissions or emissions of direct $PM_{2.5}$, this is not the case for any SIP listed source. All sources listed in either H.12 or H.13 of the SIP are subject to R307-150-6, and not 150-7 as was suggested by the commenter. This rule requires the submission of an inventory that includes both direct emissions of $PM_{2.5}$ and excess emissions [see R307-150-6(1)(a) and (b)]. While these emissions may be reported only annually, such emissions must be calculated on a far more frequent basis to be effectively and properly recorded. UDAQ requires that emissions be calculated on a rolling 12-month basis. For any emission inventory to be properly maintained, excess emissions and direct emissions of $PM_{2.5}$ would need to be recorded on a minimum of at least a monthly basis.

Comment ES-8: IX.H.11.g.v.A: While we support the requirement for the refineries to comply with Subpart Ja, we note that Subpart Ja contains an exemption from the H_2S limit in 40 CFR 60.103a(h) for

releases to the flare as a result of relief valve leakage or other emergency malfunctions. As we have noted above, this is inconsistent with CAA requirements that the SIP emission limits apply at all times, including periods of startup, shutdown and malfunction (SSM).

UDAQ Response: UDAQ does not believe that referencing the flaring requirements of Subpart Ja constitutes an exemption from a SIP limitation. Rather, UDAQ states that this specific limitation, "requiring the refineries to comply with subpart Ja," is the SIP limitation in question, and not the individual sub-limitation found within that subpart. Specifically, if the language of IX.H.11.g.v.A had not been added to the SIP in January of 2014, some of the refineries in the Salt Lake City $PM_{2.5}$ nonattainment area would not yet be fully subject to the requirements of NSPS Subpart Ja, and would not be required to comply with the fuel gas H_2S content requirement at all. UDAQ has added the SIP requirement of being subject to the subpart – whether the subpart would normally apply or not. The UDAQ did not specifically add the requirement of the fuel gas limitation.

Comment ES-9: Some RACT determinations, including wastewater treatment emissions control at refineries and numerous start-up/shutdown provisions need more support.

UDAQ Response: During the RACT review work for the initial version of the $PM_{2.5}$ SIP (issued in January 2014), UDAQ looked at the possibility of VOC control for wastewater treatment at the refineries based solely upon a general comment from its contractor. However, this "determination" was not delivered with any particular recommendations beyond this general comment. As the commenter has pointed out, one refinery does implement more involved VOC recovery/control than is utilized at the other refineries; but at this time UDAQ does not have the data available to adequately judge the amount of VOC reductions obtainable from the implementation of VOC controls. Consequently, no credit was taken for any VOC reductions at any of the refineries for this type of control method. This was explained in the RACT evaluation reports for the refineries.

Startup and shutdown provisions were based upon information received from the individual sources. Where possible, such provisions have also been extracted from existing permits (AOs) issued to those sources, and have been in use for some time.

The DAQ will review this issue again during the BACT process associated with the development of the serious area $PM_{2.5}$ SIP to assure sufficient documentation and support are provided.

Comment ES-10: Applicable MACT and NSPS standards must be listed in the SIP.

UDAQ Response: UDAQ disagrees with this comment. The applicable MACT and NSPS standards will still be applicable to the listed sources regardless of whether the individual listing is maintained in the SIP. The inclusion of such a listing serves only as a snapshot of applicability determination. As a non-dynamic listing, should circumstances change which render this applicability determination invalid, its inclusion serves no additional useful purpose and may even lead to future confusion as MACT and NSPS standards are revised and changed.

Comment ES-11: Page 5 of the Wasatch Integrated Waste Management RACT Evaluation Report indicates that RACT for $PM_{2.5}$, VOC and NOx includes replacement of the emergency diesel generator with a Tier 4 generator upon equipment replacement, but says there is no timeline established for this replacement at this time. Please explain why the state considers this to be RACT when there is no implementation timeline. The inability of the owner/operator to commit to an implementation date is not a basis for deferring CAA requirements.

DAQ Response: The $PM_{2.5}$ SIP demonstration for Wasatch Integrated Waste Management District evaluated the replacement of the current emergency diesel generator with a Tier 4 engine. It was concluded that the replacement was not required due to the excessive cost of $92,800 per ton of NOx removed. Additionally, the $PM_{2.5}$ SIP modeling demonstration did not include emission reductions for this generator replacement. Therefore, an installation date for a new tier 4 engine is unwarranted.

Comment ES-12: During the winter months, the draft SIP proposes to allow Unit #4 to burn coal during natural gas curtailments, and for a sufficient time to empty the coal bins following the curtailment. The DAQ should estimate this winter time usage (i.e. when natural gas will not be available), including the additional usage to empty the coal bins, via historical usage or some other applicable method. The resulting estimated emissions should then be used in the RACT analysis to determine control system viability, and the emissions included in the modeling if of a magnitude to be warranted.

DAQ Response: The UDAQ reviewed winter time usage of coal and does not believe there is sufficient data to estimate emissions as it is impossible to estimate the frequency and length of curtailments. As this is such a rare event, estimating such emissions to incorporate into the attainment demonstration would be overly conservative. As such, the inclusion of winter time emissions from curtailment of natural gas adds no value and UDAQ believes it inappropriate to include for attainment modeling.

Comment ES-13: The BYU RACT evaluation section 1.1 incorrectly states "Nucor Steel Facility Identification.

DAQ Response: Thank you for the comment. The title in this report will be corrected.

Comments from Wasatch Clean Air Coalition (WCAC) (Comments ES-14 through ES-17)

Comment ES-14:

> **IX.H.11.g.i.B.III - page 3 of 56, line 9-13**: By no later than Jan 1, 2019, each owner or operator of an FCCU shall install, operate & maintain a CPMS to measure & record operating parameters for determination of source-wide PM2.5 emissions as appropriate.

The position of 'as appropriate' is ambiguous. Is CPMS required if appropriate, or is appropriate CPMS required. The intention would be more clear to me if 'appropriate' were inserted before CPMS, 'an appropriate CPMS to measure...'

DAQ Response: The position of the words "as appropriate" is intentional. They are derived from NSPS Subpart Ja. Specifically:

60.105a(b) Control device operating parameters.

Each owner or operator of a FCCU or FCU subject to the PM per coke burn-off emissions limit in § 60.102a(b)(1) that uses a control device other than fabric filter or cyclone shall comply with the requirements in paragraphs (b)(1) and (2) of this section.

and

60.105a(b)(1)

The owner or operator shall install, operate and maintain continuous parameter monitor systems (CPMS) to measure and record operating parameters for each control device according to the applicable requirements in paragraphs (b)(1)(i) through (v) of this section.

Therefore, a CPMS is only required for those sources which are using a control device other than a fabric filter or cyclone for control of PM emissions. This requirement was specifically added based on comments received during the previous PM2.5 SIP submittal to address this shortcoming with NSPS Subpart Ja.

Comment ES-15: Now that the new MOVES model is available, the SIP would be improved by a brief discussion on the benefits of Tier 3 fuel on emissions, particularly mentioning the fact that EPA and DEQ analysis reveals that the use of this fuel is the best single strategy available.

DAQ Response: UDAQ agrees that this analysis would be interesting and perhaps useful in the interest of a public dialogue. However, Tier 3 was not included in the modeling for these SIPs, and could not even be introduced into these airsheds until after 2015, the attainment and analysis year for the SIPs. As work continues toward the Serious Area $PM_{2.5}$ planning requirements, Tier 3 will have implications that are within the pertinent time horizons. Also, users will likely be more comfortable with the results coming from MOVES 2014 at that time.

Comment ES-16: IX.H.12.a.i & ii - page 6 of 56, lines 7 & 16;

Please provide an analysis of 25 ug/m3 trigger for modified operations. Citizens want equity in air quality rules. If we cannot burn when a no burn period is called at 25 ug/m3, industry that is regulated by monitor levels should take action at the same level.

DAQ Response: R307-302 was developed to control emission from residential homes. The Approval Order and Title V permits written under the R307-400 rules were developed to control emissions from industrial sources. When a no burn period is declared, a residential home owner has the option of using natural gas to heat their homes. ATK may not have an option to switch fuel types when they are required to stop open burning, as is required in Section H.12.a.i and a.ii.

ATK is the only industrial source that has an operational restriction that is based on the $PM_{2.5}$ levels. The RACT process does not provide for curtailment of operations as a SIP limit. ATK volunteered to accept this restriction to help control the $PM_{2.5}$ levels during the Wasatch front inversion seasons. No change will be made to this SIP condition.

Comment ES-17: IX.H.12.o - Nucor

Please provide analysis the benefits of requiring NUCOR purchase vehicles of the lowest possible emissions when it replaces its onsite vehicles. On site vehicle fleets should enter into RACT analysis.

DAQ Response: When the $PM_{2.5}$ SIP was developed, all sources of emissions were taken into consideration. This included both minor (under 100 tpy) and major sources (over 100 tpy). The emissions from minor sources (area sources) are controlled by rules set to control the source type. These rules are listed in the UAC R307-300 series, Requirements for Specific Locations. It was determined that to include all of the minor sources into the SIP would not be effective when considering the time required and the required deadlines. This was because of the small or insignificant emissions from each individual source. When the requirements were developed for the major sources, a cutoff threshold was set that required DAQ to set limits at the most significant sources at each major source. The on-site vehicles at Nucor Steel are well below the cutoff threshold because there are very few vehicles at the Nucor site that are considered on-site vehicles.

Comments from Pacific States Cast Iron Pipe Company (Comments ES-18 through ES-20)

Comment ES-18: Subsection IX.H.13.d(iii). The version of the PM2.5 SIP available on UDAQ's website currently states:

iii. Emissions from the Annealing Oven furnace shall be routed through the operating baghouse prior to be emitted into the atmosphere.

In addition to fact that this condition was added to subsection IX.H.13 after the Air Quality Board's vote, the RACT analysis contained in the Technical Support Document determines that a baghouse for this source is infeasible. In discussing this issue with UDAQ personnel on October 9, UDAQ reported that the condition identified an incorrect unit at PSCIPCO's facility. UDAQ intended to require the Desulfurizaton and Ductile System at PSCIPCO's facility be routed through an existing baghouse as opposed to apply the baghouse requirement to the Annealing Oven. Consequently, PSCIPCO requests that subsection IX.H.13.d(iii) be revised as follows:

iii. Emissions from the desulfurization and ductile treatment system shall be routed through the operating baghouse prior to being emitted into the atmosphere.

UDAQ Response: UDAQ agrees with this comment. There was a typographical error made in the earlier language which inadvertently assigned the baghouse to the annealing oven furnace. The language of subsection IX.H.13.d(iii) will be changed as suggested by the commenter.

Comment ES-19: Current List of Changes to Part H. In the introduction to the Part H emission limitations proposed as part of the PM2.5 SIP, UDAQ included a description of the changes that were being applied to sources subject to the source-specific emission limitations. In this section, UDAQ states that PSCIPCO is subject to 40 CFR 63, subpart EEEEE. This is an incorrect statement as PSCIPCO is not subject to subpart EEEEE. PSCIPCO is subject to 40 CFR 63, subpart ZZZZZ, which are [sic] the NESHAP for Iron and Steel Foundries Area Sources. PSCIPCO's current Approval Order recognizes that PSCIPCO is subject to subpart ZZZZZ, but not subpart EEEEE. Moreover, UDAQ's RACT evaluation for PSCIPCO recognizes PSCIPCO is subject to subpart ZZZZZ and not subpart EEEEE.

Consequently, PSCIPCO requests that the provisions for PSCIPCO contained in the document titled Current List of Changes to Part H be revised to read:

In addition, the facility is subject to 40 CFR 63 Subpart ZZZZZ which requires operation of the cupola as to minimize emissions during startup and shutdown periods by creating a startup, shutdown, and malfunction plan (SSMP).

DAQ Response: UDAQ agrees with this comment. The change will be made as suggested by the commenter.

Comment ES-20: Comment regarding the proposed VOC limit for PSCIPCO: Subsection IX.H.13.d(i). The proposed PM2.5 SIP states, By January 1, 2015, all VOC emissions shall be limited to 118.66 tons per rolling 12-month period. In contrast, the PM2.5 SIP approved in January 2014 set the same VOC emission limitation at 141.84 tpy. PSICIPCO and UDAQ staff discussed the reduction from 141.84 tpy to 118.66 tpy during the same October 9 meeting. During this meeting, Ms. Harry reported that UDAQ erred when it set the original VOC limit at 141.84 tpy; the 141.84 tpy limitation, according to Ms. Harry, was the difference between PSCIPCO's current permit limit of 260 tpy and the amount of VOC's provided by PSCIPCO for its coating operations plus an amount for other plant operations. PSCIPCO reviewed the documentation it submitted for the PM2.5 SIP planning process and disagrees with this assessment. PSCIPCO provided to UDAQ a potential to emit (PTE) inventory at the start of the PM2.5 planning process. Attachment A provides a summary of changes pertaining only to VOC PTEs as part of this SIP rulemaking. VOC PTE emissions submitted in the October 31, 2013 correspondence were specific to the coating process, not to the entire facility. When all VOC PTE [sic] for PSCIPCO is totaled, as seen in Attachment A, the final value is 140.85, similar to the 141.84 in the currently approved SIP. Accordingly, PSCIPCO requests that UDAQ revise Part IX.H.13.d(i) to state that VOC emissions are limited to 140.85 tpy. Furthermore, the VOC emission limitation is also stated in the document titled Current List of Changes to Part H and PSCIPCO requests that UDAQ revise that document to recognize that PSCIPCO's VOC emissions are limited to 140.85 tpy.

DAQ Response: UDAQ has reviewed the documentation submitted by the commenter and agrees with the comment. After inclusion of the sources unrelated to coating operations UDAQ agrees that PSCIPCO's VOC total should be 140.85 tpy. The appropriate changes will be made in IX.H.13.d(i). The document titled "Current List of Changes to Part H" was an explanatory document made for the Air Quality Board prior to, and in preparation of, the public comment period, and is no longer applicable in any event. A similar document will most likely be prepared summarizing the changes resulting from public comments.

Comments from Tesoro Refining and Marketing (Comment ES-21)

Comment ES-21: The October 1, 2014 RACT Evaluation Report for the Tesoro Salt Lake City Refinery, Section 5.0 Implementation Schedule, page 15 states "NOx controls for the Ultraformer Unit are scheduled for May of 2015." On March 13, 2014, DAQ (DAQE-012-14) requested that Tesoro identify the earliest possible date that the RACT controls required by the SIP, [sic] can be implemented. Tesoro identified several RACT controls which could be expedited including a potential May 2015 install date for the ultraformer unit low NOx burners. Tesoro has since determined that the engineering for the low NOx burners was complex that initially estimated. The low NOx burners are now estimated to be installed during the 2016 ultraformer outage. The delayed installation will have no impact on Tesoro meeting the requirements in Subsections IX.11 and IX.12 [sic].

DAQ Response: UDAQ acknowledges this comment. As stated by the commenter, the updated RACT Evaluation Reports include a new Section 5 which lists an expected implementation schedule for the required controls for each listed source. Where possible, UDAQ also assigned specific Part H limits to these controls – either in Part H.11 General Requirements, or H.12 / H.13 for individual listed sources. However, when this was not possible – such as for sources with plant-wide SIP Cap allowables – a more general approach was taken. This was the case with the refineries, and with Tesoro in particular. In this circumstance, an appropriate date was assigned for the SIP Cap based on the anticipated completion date of **all** required controls necessary to achieve that Cap. While individual sub-control processes may have earlier anticipated completion dates, no specific limitation is required so long as the end result is still achieved. This allows for flexibility in long term planning and execution on such large capital projects. As the installation of the low NOx burners is required only for realization of the NOx SIP Cap, UDAQ agrees with Tesoro's assessment and acknowledges this comment. No further action is required.

Comments from Compass Minerals (Comments ES-22 through ES-23)

Comment ES-22: Compass has several concerns relating to the stack testing requirements and timeframes for the establishment of PM limits set forth in the Draft SIP. First, the Draft SIP requires compliance stack tests to be completed by January 1, 2015. In cases where limits in the Draft SIP have not changed from historic approval orders, and previously conducted stack tests are within the currently mandated testing cycle, UDAQ should allow such previously conducted stack tests to be utilized for SIP compliance demonstration. Such a compromise would save money and give Compass and other facilities some flexibility and extra time to complete the required stack testing. Similarly, the Draft SIP requires sources to establish PM2.5 emission limits within 120 days of the compliance test date-January 1, 2015. This requirement is also impractical in light of the number of sources to test and the short amount of time to analyze the information in an adequate way to set a reasonable $PM_{2.5}$ limit.

Furthermore, the standard Method 20la and Method 202 for testing $PM_{2.5}$ emissions from dryers does not work for dryers controlled by wet gas scrubbers that contain moisture (i.e. water droplets) in the emission stream. See 40 C.F.R Part 51, App. M. UDAQ acknowledges that other test methods may be more appropriate in certain circumstances, which is why in the general stack testing requirements of the Draft SIP, UDAQ states that sources may use "other EPA approved testing methods acceptable to the director." See Draft SIP Part H.1l.e.C. Compass will need to discuss with UDAQ the option of using another more accurate test method than 20la or 202 for testing the PM16 and $PM_{2.5}$ emissions from its dryers in order to establish an accurate $PM_{2.5}$ limit. This will understandably take more time than the allotted 120 day time frame because each testing methodology must be approved by UDAQ and then implemented by the source.

DAQ Response: The UDAQ agrees that it is unreasonable to require stack testing by January 1, 2015. The stack sampling compliance test date in H.12.h.ii.a and H.12 h.iii.a will be revised to no later than June 1, 2015, and the PM2.5 emission limits shall be established within 120 days of the compliance test date.

Comment ES-23: In the Draft SIP Part H.12.h.iv, UDAQ has imposed the requirement that for all of Compass's dryers, Low NOx burner technology with a minimum manufacturer guarantee of 77% NOx removal efficiency must be installed by January 1, 2017. This requirement is problematic for a number of reasons. First, it is unclear what the 77% removal efficiency is referring to. "Removal efficiency" generally refers to how much of a pollutant is being reduced using post combustion pollution controls, such as the removal of 99% of the particulate from an emission stream by installing a baghouse. However, Compass is not proposing to install secondary pollution control technology for its dryers. Therefore, the only other logical interpretation of this requirement is that Compass must install a Low NOx burner system as a retrofit to its dryers that achieves 77% reduction in NOx as compared to the emissions generated by conventional dryer systems. Compass is not certain that this is the correct interpretation of the requirement. Given the uncertainty surrounding this requirement, Compass proposes that UDAQ simply impose a 20 ppm NOx limit at 3% oxygen on the Compass dryers. Such a limit would reflect the level of control achievable by the installation of Low NOx Burners in the Compass dryers. The second problem with the 77% NOx reduction requirement is that no manufacturer is going to guarantee a77% removal efficiency of NOx from commercial dryers. This percentage reduction was presumably generated by performing a calculation of the AP-42 emission factor for natural gas combustion and the reduction achieved by imposing a 20 ppm NOx value promised by an undisclosed vendor. A vendor would be unable to verify such a calculation as estimated emission levels and thus, could not guarantee

any percentage of reduction. This is especially true where the baseline from which to calculate the percentage reduction is unclear.

In light of the problems associated with the 77% NOx reduction requirement, Compass believes limiting its dryers to 20 ppm of NOx is the most reasonable approach for UDAQ to impose in the Draft SIP.

DAQ Response: The 77% reduction resulted from the RACT analysis. The data in the RACT analysis showed that the use of LNB technology with a minimum NOx control efficiency of 77% is both technically and economically feasible, and this technology was selected as RACT. If a LNB rated at 20 ppm NOx achieves reductions of at least 77% NOx from the current burner technology at each dryer, that burner meets RACT. UDAQ suggests Compass Minerals perform the calculations to determine what burner rating will achieve the NOx reduction goals identified in the RACT report and then purchase LNB that meet that rating. No change will be made to Part H.IX.11.h.iv.

Comments from Rio Tinto (Comments ES-24 through ES-27)

Comment ES-24: Subpart H requirements for the Smelter are provided on pages 31 and 32 of DAQE-075-14. The Homan boiler operating at the Smelter is not equipped with CEMs. KUC would like to propose that condition n.i.C be revised to read as following:
Startup/shutdown NOx and SO, emissions are monitored by CEMS or alternative monitoring programs during startup/shutdown operations. The pertinent additions to the conditions have been underlined.

DAQ Response: Section IX, Subpart H.12.n.i.C will be modified to read as follows:
C. NO_x and SO_2 emissions are monitored by CEMS or alternate method determined according to applicable NSPS standards during startup/shutdown operations.

Comment ES-25: Subpart H requirements for the Bingham Canyon Mine are provided on page 26 of DAQE-075-14. Consistent with these conditions, KUC will reduce combined emissions of PM2.5, NOx and SO2, by 620 tons per year by 1/1/19. These reductions are being required beyond the RACT analyses performed and approved by UDAQ. Specifically, the RACT analysis showed that current operating practices at the Bingham Canyon Mine represent RACT. UDAQ's RACT determination found that there were no additional controls that were currently available that KUC could implement to reduce emissions from the BCM. Yet, in the draft Part H Emission Limits, UDAQ requires KUC to reduce the Bingham Canyon Mine's annual emissions by 10% by 2019. KUC will, of course, work toward finding a method of meeting the requirements that UDAQ has proposed for BCM. However, UDAQ's proposed Part H emission limits will put KUC in the difficult, position of being required to cut emissions without an identified solution except curtailing operations.

DAQ Response: UDAQ acknowledges receipt of this comment. No action is required.

Comment ES-26: Emissions modeled for the Bingham Canyon Mine are listed in Table 6.3 of DAQE-075-14 (a) and reflected in the total emissions from point sources in the Salt Lake City nonattainment area. The Table 6.3 provides actual emissions for 2010 and projected emissions for 2015 for all point sources on a typical winter day. For the Bingham Canyon Mine, these emission rates are not consistent with emissions projections discussed and agreed upon with UDAQ. Table 6.3 shows a significant underestimation of emissions modeled for the Bingham Canyon Mine. KUC requests that UDAQ revise the emissions for the Bingham Canyon Mine SIP modeling consistent with the table shown below. This request is consistent with the emails received from Nando Meli and Marty Gray (attached) of UDAQ on September 13, 2013 and September 25, 2014 respectively.

DAQ Response: The spreadsheet for the BCM that was used for this demonstration contained emissions that utilized the 2008 true-up amount of 4,620.7 tpy (12.7 tpd) minus the NO_x reduction of 64.7 tpy from the haul truck upgrades. This left 4,556 tpy (12.5 tpd).
UDAQ should have used the existing PTE at the BCM where the NO_x limit is set at 5,829 tpy, reduced to 90% of the PTE (5,246.1 tpy or14.4 tpd) per our convention for newly modified sources with no actual emission data, and then reduced again by 64.7 tpy (5,181.4 tpy or14.2 tpd) to reflect the upgrade in the haul truck engines (kitchen sink).

This demonstration using kitchen sink (best) controls for 2015 emissions showed that under the most controlled scenario for all point sources, attainment was not achieved. Were UDAQ to redo the modeling using the higher emissions, attainment would still not be demonstrated.

No BCM limits in Part H of the SIP were changed due to this modeling demonstration.

Comment ES-27: New Source Review/Banked Emission Reduction Credits are discussed on Page 58 of DAQE-075-14 (a). To further clarify the language related to the use of banked emission reduction credits for the future permitting actions, KUC would like to propose the following addition, consistent with the discussion between UDAQ and the Air Quality Board on September 3, 2014, lines 10 and 11 of that page. "The PM2.5 SIP adopted by the Air Quality Board on December 4, 2013 did not include banked PM2.5 or PM2.5 precursor ERCs in the attainment demonstration and therefore under R307-403-8 any ERCs that were banked prior to December 4,2013 may not be used as PM2.5 major source or major modification emission offsets for PM2.5 nonattainment areas." The pertinent additions to the language in the SIP have been underlined. KUC believes that the proposed addition clarifies the viability of emission reduction credits for future permitting activities.

DAQ Response: The UDAQ agrees the proposed language clarifies the actual intent of the SIP language. The language will be added for clarification.

Technical Support Document Comments

Comment TSD-1 (From EPA Enclosure III, 1): In the Weight of Evidence TSD, on Page 4.e-15 Sec.1.2.2, clarification of written language is recommended.

DAQ Response: UDAQ agrees that the language should be updated and modified. The updated Weight of Evidence TSD now includes EPA's recommendation:

> *"The design value period of2008-2012 ensures that most recent 98th percentile data available when the modeling effort began was used. The year 2014 was omitted given that the 98th percentile value is a yearly value, and the 2013 calendar year had not been completed when the modeling was initiated."*
>
> *"Figure 1.5 displays 98th percentile values and five year average design value history for the Hawthorne monitor in Salt Lake City and the Lindon monitor in Utah County for the years 1999-2013."*

Comment TSD-2 (From EPA Enclosure III, 2-a): In the Weight of Evidence TSD, the statement, "1999 could not be included due to the fact that PM2.5 monitoring started in 2000" is inaccurate because PM2.5 monitoring was conducted for the full calendar year of 1999.

DAQ Response: UDAQ agrees that PM2.5 monitoring data is available for 1999 and the current statement used in the Weight of Evidence TSD is inaccurate. UDAQ has updated the language in the Weight of Evidence TSD as shown below:

> *"An analysis of inversion strength for the years 2000-2013 is shown in Figure 1.6. Time series of twenty-four-hour PM2.5 values and inversion strength for the last fourteen years are displayed during the time frame of Dec. 1 – Feb. 28. Note that 24-hr PM2.5 data was collected by Utah DAQ in 1999 but is not part of this analysis."*

Comment TSD-3 (From EPA Enclosure III, 2-b): On page 4.d-19 of the Weight of Evidence TSD, the phrase, "2013 should be excluded" is not supported by the trends analysis and EPA does not agree that 2013 data should be excluded for any regulatory purpose, now or in the future.

DAQ Response: UDAQ agrees with EPA that 2013 data should not be excluded for any regulatory purpose. UDAQ will eliminate the phrase "2013 should be excluded," as the yearly trend analysis of the Inversion Strength and 24-hr $PM_{2.5}$ should not be used to eliminate data from a regulatory analysis. UDAQ's analysis does examine the differences in snow, surface temperature, inversion strength, and 24-hr $PM_{2.5}$ between the 2012 and 2013 data, but language speaking to the "extremeness" of these two particular years has been toned down in the updated Weight of Evidence.

Transportation and I/M

Comment T-1 (From EPA Enclosure IV, 1-a): The state should provide a RACM analysis for the I/M program to show that it meets the RACM requirement.

DAQ Response: We agree and will develop a RACM analysis. This analysis will be added to the TSD.

Comment T-2 (From EPA Enclosure IV, 1-b): EPA requested verification of emission reductions from the Cache County Vehicle Inspection and Maintenance Program I\M program.

DAQ Response: Upon EPA's request DAQ has verified the emissions reductions from the Cache County Vehicle Inspection and Maintenance Program I\M program. DAQ found that the emissions credit for the Cache County I\M program in 2015 is .214 tons per day for NOx and .212 tons per day for VOC. When the credit is rounded down, both NOx and VOC receive identical credit of .21 tons per day. There is no error in how the NOx and VOC emission credits were modeled. The SIP will be updated with the tons per day out to the thousands place to avoid any confusion.

Comment T-3 (From EPA Enclosure IV, 1-c): EPA indicated that there were inconsistencies in the Logan (UT-ID) $PM_{2.5}$ Nonattainment Area SIP between SIP Identified Motor Vehicle Emissions Budgets (MVEB) and SIP Emissions Inventory Data.

DAQ Response: DAQ agrees with EPA that there were inconsistencies in the Logan (UT-ID) $PM_{2.5}$ Nonattainment Area SIP between SIP Identified Motor Vehicle Emissions Budgets (MVEB) and SIP Emissions Inventory Data.

DAQ identified summary reporting errors in SIP Emissions Inventory Data in tables 4.1 (page 27) and 4.2 (page29) in the Logan (UT-ID), Salt Lake City (UT), and Provo (UT) $PM_{2.5}$ Nonattainment Area SIPs. The summary reporting errors were the result of condensing expansive Motor Vehicle Emission Simulator (MOVES) model outputs that had been processed by the Sparse Matrix Operator Kernel Emissions Model (SMOKE) for summary tables 4.1 and 4.2. These summary tables had rounding errors for on-road mobile sources and in addition did not include on-road mobile source road dust. DAQ corrected the summary errors with on-road mobile emissions summaries directly from the AP-42 (road dust) calculation and MOVES model output. The summary emissions reporting errors were a context error and had no impact on the actual on-road mobile emissions utilized within the photochemical model. All mobile source emissions were evaluated correctly by the photochemical model.

DAQ agrees with EPA that the 2015 $PM_{2.5}$ emissions in the inventory table and Motor Vehicle Emissions Budget (MVEB) table do not match in the Logan (UT-ID) $PM_{2.5}$ Nonattainment Area SIP. The Logan, (UT-ID) Nonattainment Area SIP reported .28 tons of $PM_{2.5}$ from mobile sources in 2015. The $PM_{2.5}$ emissions summary contained a rounding error and in addition did not include road dust. The Logan, UT-ID Nonattainment Area will now reflect .67 tons per day of $PM_{2.5}$ in 2010 and .64 tons per day of

$PM_{2.5}$ in 2015. Two notes will be added to table 4.1 and 4.2. (Note 1: $PM_{2.5}$ for mobile sources includes tire and brake wear, sulfate, elemental and organic carbon, and road dust. Note 2: Mobile source emissions summaries are from the AP-42 (road dust) and MOVES model output.) Table 7.1 in the Logan, UT-ID Nonattainment Area has the correct Motor Vehicle Emission Budget for $PM_{2.5}$ at .32 tons per day. A note to Table 7.1 will be added explaining that the mobile source $PM_{2.5}$ budget only includes tire and brake wear, sulfate, elemental and organic carbon. (Note: $PM_{2.5}$ budget only includes tire and brake wear, sulfate, elemental and organic carbon and does not include road dust.)

DAQ disagrees with EPA that there is an inconsistency between the Inventory Table 4.2 and the Motor Vehicle Emission Budget (MVEB) in Table 7.1 for VOC emissions in the Logan, UT-ID Nonattainment Area SIP. The VOC emissions reported in the Inventory Table 4.1 and 4.2 in the Logan (UT-ID), Salt Lake City (UT), and Provo (UT) $PM_{2.5}$ Nonattainment Area SIPs include refueling spillage and displacement vapor loss emissions. The Logan, UT-ID Nonattainment Area MVEB table 7.1 for VOC emissions does not include refueling spillage and displacement vapor loss emissions and there is a note at the bottom of table 7.1 clarifying this in detail. The VOC emissions in the Inventory tables 4.1 and 4.2 are larger than the VOC emissions in the MVEB table 7.1. For clarification a note will be added to the Inventory tables 4.1 and 4.2 in all SIPs indicating that the VOC emissions include refueling spillage and displacement vapor loss emissions. (Note 3: VOC for mobile sources includes refueling spillage and displacement vapor loss emissions.) Refueling emissions are calculated utilizing the EPA approved Motor Vehicle Emission Simulator model (MOVES). Technically refueling emissions are an area source category. The refueling emissions were included in the mobile inventory for air modeling purposes. Refueling emissions have been included as an item within the mobile inventory since the calculation was performed within MOVES.

Comment T-4 (From Utah Division of Air Quality): While reviewing the on-road mobile source SIP summary tables DAQ found that there were errors in the 2015 mobile summary table in the Technical Support Document for On-Road Mobile Sources found on page 4. The summary table did not report the correct emissions summaries for Total PM_{10}, Total $PM_{2.5}$, or $PM_{2.5}$ road dust. Total PM_{10} had an error for all counties and included elemental and organic carbon but did not include: tire and brake wear, and sulfate. Total PM_{10} will be corrected for all counties to include elemental and organic carbon, tire and brake wear, and sulfate. PM_{10} road dust summary for all counties is correct and summarized as a separate category. The Total $PM_{2.5}$ for Cache County had an error and included elemental and organic carbon, brake wear, and sulfate but did not include tire wear so the total was .31 tons per day. The Total $PM_{2.5}$ for Cache County will be corrected to include elemental and organic carbon, tire and brake wear, and sulfates and will now total .32 tons per day. The $PM_{2.5}$ road dust for all counties erroneously reported average weekend day emissions. The $PM_{2.5}$ road dust will be corrected to report average weekday emissions. The corrected table has been attached below. The updated and correct emissions have been highlighted below.

Year	FIPS	County	NH3	NOx	Total_PM10	Total_PM25	SO2	VOC	VOC Refueling	PM10 Dust	P D
2015	49007	Carbon	0.03	1.75	0.11	0.09	0.01	0.90	0.04	0.62	(
2015	49013	Duchesne	0.02	1.47	0.10	0.08	0.01	0.77	0.03	0.42	(
2015	49015	Emery	0.03	2.26	0.11	0.09	0.01	0.55	0.04	0.46	(
2015	49023	Juab	0.04	2.26	0.10	0.09	0.01	0.52	0.04	0.25	(
2015	49027	Millard	0.04	2.75	0.13	0.11	0.01	0.67	0.05	0.44	(
2015	49029	Morgan	0.01	0.74	0.05	0.04	0.00	0.38	0.01	0.12	(
2015	49033	Rich	0.00	0.19	0.02	0.02	0.00	0.16	0.00	0.05	(
2015	49039	Sanpete	0.02	1.20	0.09	0.07	0.01	0.98	0.03	0.33	(
2015	49043	Summit	0.06	4.63	0.26	0.22	0.02	1.51	0.08	0.93	(
2015	49051	Wasatch	0.03	1.76	0.14	0.10	0.01	0.88	0.04	0.47	(
2015	49003	Box Elder	0.10	6.99	0.40	0.33	0.05	2.35	0.13	0.83	(
2015	49011	Davis	0.28	13.07	1.16	0.88	0.13	7.89	0.33	1.96	(
2015	49035	Salt Lake	0.93	40.68	3.73	2.81	0.40	25.96	1.07	6.66	1
2015	49045	Tooele	0.10	6.56	0.47	0.36	0.05	3.01	0.15	1.87	(
2015	49057	Weber	0.18	10.30	0.86	0.66	0.09	6.2	0.24	1.33	(
2015	49049	Utah	0.45	21.48	1.84	1.38	0.16	12.6	0.51	3.95	(
2015	49005	Cache	0.10	4.49	0.44	0.32	0.03	3.23	0.13	1.28	(

Comment T-5 (From EPA Enclosure IV, 2-a): With regard to an on-road mobile sources vehicle l/M program evaluation; the SIP Narrative states the following on document page 58:

> "A decentralized, test-and-repair program was evaluated for Box Elder and Tooele counties within the nonattainment area. For the evaluation, all model year 1968 and newer vehicles would be subject to a biennial test except for exempt vehicles. The program would exempt vehicles less than four years old as of January 1 on any given year from an emissions inspection. Year 1996 and newer vehicles would be subject to an On-Board Diagnostics (OBD) inspection. Year 1995 and older vehicles would be subject to a two-speed idle inspection (TSI). Based on this evaluation, this program was not included because it was determined that implementation of such a program would not affect PM2.s concentrations at the controlling monitor (Hawthorne) for the Salt Lake-Ogden-Clearfield nonattainment area." Additional information is provided in the Technical Support Document."

EPA notes there would have been emission reductions of NOx and VOCs identified with the State's evaluation. Taken only by themselves, these VM emission reductions may not have shown a modeled difference at the Hawthorne monitor. However, such an I/M program would likely produce viable PM2.5 precursor emission reductions of NOx and VOCs for the Salt Lake-Ogden-Clearfield nonattainment area. UDAQ has not provided EPA with their evaluation, and it would be helpful in our review to see UDAQ's analysis, with the estimated potential emission reductions from an I/M program, to further understand the State's conclusion. We note that Section 5.e of the TSD ("Control Strategies, On-Road Mobile Sources") only provides the following additional paragraph regarding this question:

"UDAQ also tested the inclusion of the above l/M programs in both Box Elder and Tooele counties within the Salt Lake nonattainment area. However, photochemistry model sensitivity runs revealed that the effect of these controls on PM2.s concentrations at the controlling air monitor located at Hawthorne Elementary School (1675 South 600 East in Salt Lake City, Utah at an elevation of 1306 m or 4285 ft) was negligible. Therefore, the effectiveness of an l/M program was not included in the modeling in either of these counties. However, I/M programs already exist in Salt Lake, Davis, Utah, and Weber counties and are reflected in the inventories."

EPA would appreciate being able to review the modeled I/M NOx and VOC emission reductions (as in tons per day) for Box Elder and Tooele Counties. We could then compare such I/M emission reductions from Box Elder and Tooele Counties to other Utah county I/M programs to further understand the State's position.

DAQ Response: UDAQ performed zero out emissions sensitivities for Box Elder and Tooele Counties with the CMAQ photochemical model. In these sensitivities, the emissions from these counties are eliminated or "zeroed" out. Then the CMAQ photochemical model is run and the results of the "zeroed" out sensitivity is compared to a "base" CMAQ run which contains all emissions. The results of these runs showed that the emission reduction by I/M in these counties were negligible. UDAQ will include more information in the TSD.

Comment T-6 (From EPA Enclosure IV, 2-b): Regarding the SIP for the Salt Lake City nonattainment area, the narrative in Section 7.3 "Regional Emission Analysis", indicates (as shown below) that only an interim emissions test will be required of the Metropolitan Planning Organization.

"*The satisfaction of criteria and procedures, for implementation plans submitted under Section 189(a)(1)(B)(ii) of the CAA, which demonstrate the impracticability of demonstrating attainment of the applicable NAAQS by the applicable attainment date, are addressed in paragraph 93.109(g)(4) of the conformity rule. For such implementation plan revisions, it is the interim emissions tests which must be satisfied, as specified in Section 93.119.*"

Pointing to its more general comments which assert that the SIP for the Salt Lake City nonattainment area should include quantitative milestones for 2017, the commenter states that, under CAA sections 176(c)(1) and 176(c)(2), it should set motor vehicle emission budgets for 2017. Furthermore, that the SIP narrative is inaccurate in describing the conformity rule's provisions, as 40 CFR 93.109(g)(4) only specifically addresses PM_{10} and not 2006 24-hour $PM_{2.5}$, which is the applicable NAAQS for this plan. Also, that 40 CFR 93, Subpart A does not set SIP requirements for MVEBs. Instead, it addresses how to use them in transportation conformity determinations.

DAQ Response: As discussed in the responses to comment G-2 (in response to EPA's comment in Enclosure I, 1-a) and G-4 (in response to EPA's comment in Enclosure I, 1-c) above, this Moderate Area SIP for the Salt Lake City nonattainment area does not show attainment of the 2006 NAAQS for $PM_{2.5}$. Rather, it shows the impracticability of attaining that standard by the attainment date in 2015. Therefore, the quantitative milestones described in Subpart 4, Section 189(c) are not applicable to this plan.

Since there is no milestone required for 2017, there is no corresponding need for a motor vehicle emissions budget in that year.

The SIP narrative presented in Section 7.3 points to paragraph 93.109(g) of the conformity rule for the requirements which are relevant to this plan. Section 93.109 of the conformity rule presents the "Criteria and procedures for determining conformity of transportation plans, programs, and projects: General." The criteria to be satisfied will differ depending on "the action under review…, the relevant pollutant(s), and the status of the implementation plan." Paragraphs (c) through (k) discuss criteria specific to plans addressing certain NAAQS. It is in paragraph (g) that the criteria pertinent to the NAAQS for PM_{10} nonattainment and maintenance plans are addressed.

As discussed in the response to comment G-2 (in response to EPA's comment in Enclosure I, 1-a), the Moderate Area planning requirements under paragraph 189(a)(1)(B)(ii) in Subpart 4 of the CAA are very unique in allowing for "either (i) a demonstration (including air quality modeling) that the plan will provide for attainment by the applicable attainment date; or (ii) a demonstration that attainment by such date is impracticable."

Nowhere else in the CAA is this option permissible. The general SIP requirements of Section 172(c) call for plan provisions that "…shall provide for attainment of the national primary ambient air quality standards." Even under paragraph 189(b)(1)(A) in Subpart 4, plan provisions for areas reclassified as Serious require a demonstration of attainment, either by the applicable attainment date or by the most expeditious alternative date practicable.

Thus, paragraph 93.109(g) of the conformity rule, in its attention to PM_{10} nonattainment and maintenance areas, includes (in subparagraph (4))the only discussion of what criteria apply "(ii) If the submitted implementation plan revision is a demonstration of impracticability under CAA section 189(a)(1)(B)(ii) and does not demonstrate attainment." In such case the conformity rule requires that "the interim emissions tests must be satisfied as required by Section 93.119."

To the commenter's claim that 40 CFR 93.109(g)(4) only specifically addresses PM_{10} and not 2006 24-hour $PM_{2.5}$, which is the applicable NAAQS for this plan, the same might be said of Subpart 4 of title I of the Clean Air Act itself. Nevertheless, the decision by the D.C. Circuit Court has compelled the application of these provisions to the 2006 NAAQS for $PM_{2.5}$.

It's notable that this decision by the Court was rendered only after the conformity rule and its treatment of plan revisions addressing the NAAQS for $PM_{2.5}$ was promulgated.

This highlights yet another instance where the lack of any implementation guidance for $PM_{2.5}$ has made the preparation of these plans more difficult. It would seem that EPA needs to consider the unique provisions of paragraph 189(a)(1)(B)(ii), not just in the implementation guidance, but in the conformity rule as well . Absent that, UDAQ believes that the application of paragraph 93.109(g) of the conformity rule to the circumstance of the Moderate Area $PM_{2.5}$ SIP for the Salt Lake City nonattainment area is entirely appropriate.

It's also notable that this issue was addressed by EPA Region 9 in its initial approval and promulgation of a PM_{10} SIP for the Phoenix Planning Area (PPA) (FR Vol. 60, No. 68, April 10, 1995, pp. 18010). In responding to comment, the Region writes: "EPA does not agree that the State was required to identify a

mobile source emission budget. The moderate SIP revision for the PPA demonstrates that attainment of the PM_{10} NAAQS is impracticable by December 31, 1994. Mobile source emission budgets are only required to be identified in SIP revisions which demonstrate attainment. The preamble to EPA's transportation conformity rule states:

> Some moderate PM_{10} nonattainment areas may have submitted SIPs which demonstrate that the area cannot attain the PM_{10} standard by the applicable attainment date. These areas have been or will be reclassified as serious areas under section 188(b) of the Clean Air Act. Such SIPs which do not demonstrate attainment do not have budgets and are not considered control strategy SIPs for the purposes of transportation conformity. 58 FR 62196, November 24, 1993.

Thus, EPA's transportation conformity rule explicitly contemplated and determined that PM_{10} areas demonstrating impracticability, like the PPA, would not have provided for and would not be required to identify a mobile source emission budget until an approvable attainment demonstration is submitted."

As the Serious Area SIPs are developed motor vehicle emissions budgets (MVEB) will certainly be included, as they had been under the Subpart 1 SIPs. The attainment date under the Serious Area planning requirements will be December 31, 2019. As such, MVEB will be established for 2019. Mobile source emissions in 2019 will be less than they were in 2017.

Comment T-7 (From EPA Enclosure IV, 2-c): Regarding the SIP for the Salt Lake City nonattainment area, the narrative in section 8.3 "RFP For the Salt Lake City, UT Nonattainment Area," should contain quantitative milestones for 2017. Since the first milestone year would be 2017, the SIP should identify MVEBs for $PM_{2.5}$, NOx, and VOC for 2017.

DAQ Response: See responses to G-2 (response to EPA's comment in Enclosure I, 1-a), G-4 (in response to EPA's comment in Enclosure I, 1-c), and T-6 (in response to EPA's comment in Enclosure IV, 2-b) above.

Comment T-8 (From EPA Enclosure IV, 3-a): Inclusion of Utah County 1/M Program. The last paragraph on page 51, lines 18 to 22, of the SIP Narrative discusses existing SIP controls that include the l/M programs. The l/M programs for Davis, Salt Lake, and Weber Counties are discussed, but not the l/M program for Utah County. This paragraph should delete the information on the other three counties and include and focus on the l/M program in Utah County.

DAQ Response: We agree, and the text for this paragraph will be modified as follows:

To supplement the federal motor vehicle control program, Inspection/Maintenance (I/M) Programs were implemented in [~~Salt Lake and Davis Counties in 1984~~]Utah County in 1986. [~~A program for Weber County was added in 1990.~~] Th[~~ese~~]is program[~~s~~] ha[~~ve~~]s been effective in identifying vehicles that no longer meet the emission specifications for their respective makes and models, and in ensuring that those vehicles are repaired in a timely manner.

Comment T-9 (From EPA Enclosure IV, 3-b): At the bottom of page 61 and the top of page 62 of the SIP Narrative appears the discussion regarding the State's evaluation of an l/M program for Box Elder and Tooele Counties. This is irrelevant information for the Provo $PM_{2.5}$ SIP revision and should be removed.

DAQ Response: We agree and will revise this language in the Provo $PM_{2.5}$ SIP as shown below:

On-road mobile sources:
[~~A decentralized, test-and-repair program was evaluated for Box Elder and Tooele counties within the nonattainment area. For the evaluation, all model year 1968 and newer vehicles would be subject to a biennial test except for exempt vehicles. The program would exempt vehicles less than four years old as of January 1 on any given year from an emissions inspection. Year 1996 and newer vehicles would be subject to an On-Board Diagnostics (OBD) inspection. Year 1995 and older vehicles would be subject to a two-speed idle inspection (TSI). Based on this evaluation, this program was not included because it was determined that implementation of such a program would not affect PM 2.5 concentrations at the controlling monitor (Hawthorne) for the Salt Lake-Ogden-Clearfield nonattainment area. Additional information is provided in the Technical Support Document.~~]
Beyond the existing I/M program in Utah County, there are no emission controls that were implemented for this source category.

Comment T-10 (From EPA Enclosure IV, 3-c): Regarding the SIP for the Provo nonattainment area, the narrative in section 7.3 "Regional Emission Analysis", indicates (as shown below) that only an interim emissions test will be required of the Metropolitan Planning Organization.

> "*The satisfaction of criteria and procedures, for implementation plans submitted under Section 189(a)(1)(B)(ii) of the CAA, which demonstrate the impracticability of demonstrating attainment of the applicable NAAQS by the applicable attainment date, are addressed in paragraph 93.109(g)(4) of the conformity rule. For such implementation plan revisions, it is the interim emissions tests which must be satisfied, as specified in Section 93.119.*"

Pointing to its more general comments which assert that the SIP for the Provo nonattainment area should include quantitative milestones for 2017, the commenter states that, under CAA sections 176(c)(1) and 176(c)(2), it should set motor vehicle emission budgets for 2017. Furthermore, that the SIP narrative is inaccurate in describing the conformity rule's provisions, as 40 CFR 93.109(g)(4) only specifically addresses PM_{10} and not 2006 24-hour $PM_{2.5}$, which is the applicable NAAQS for this plan. Also, that 40 CFR 93, Subpart A does not set SIP requirements for MVEBs. Instead, it addresses how to use them in transportation conformity determinations.

DAQ Response: This same comment, as it pertains to the Provo $PM_{2.5}$ nonattainment area, was made with regard to the Salt Lake City $PM_{2.5}$ nonattainment area. The comment and the response are the same. See response to comment T-6 above.

Comment T-11 (From EPA Enclosure IV, 3-d): Regarding the SIP for the Provo nonattainment area, the narrative in section 8.3 "RFP For the Provo, UT Nonattainment Area", should contain quantitative milestones for 2017. Since the first milestone year would be 2017, the SIP should identify MVEBs for $PM_{2.5}$, NOx, and VOC for 2017.

DAQ Response: This same comment, as it pertains to the Provo $PM_{2.5}$ nonattainment area, was made with regard to the Salt Lake City $PM_{2.5}$ nonattainment area. The comment and the response are the same. See responses to comments G-2 (response to EPA's comment in Enclosure I, 1-a), G-4 (in response to EPA's comment in Enclosure I, 1-c), and T-6 (in response to EPA's comment in Enclosure IV, 2-b) above.

ITEM 8

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-098-14

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Bill Reiss, Environmental Engineer

DATE: November 25, 2014

SUBJECT: FINAL ADOPTION: Add new SIP Subsection IX.A.22: Control Measures for Area and Point Sources, Fine Particulate Matter, PM2.5 SIP for the Provo, UT Nonattainment Area.

On December 14, 2009, EPA made its designations concerning areas that were not attaining the 2006 National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$. Among those areas designated was the Provo, UT $PM_{2.5}$ Nonattainment Area.

The Clean Air Act (CAA) required Utah to submit a nonattainment plan for the area. For several years, the Utah Division of Air Quality (UDAQ), in consultation with many stakeholders including EPA Region 8, worked to develop a State Implementation Plan (SIP) for the 2006 24-hour NAAQS for $PM_{2.5}$. On December 4, 2013, the Board adopted that SIP and it was subsequently submitted to EPA.

As the SIP was nearing completion, the D.C. Circuit Court of Appeals found that EPA had incorrectly interpreted the Clean Air Act when determining how to implement the NAAQS for $PM_{2.5}$. The January 4, 2013, court ruling held that EPA should have implemented the $PM_{2.5}$ NAAQS based on *both* CAA Subpart 1 *and* Subpart 4 of Part D, Title I. It also remanded the 2007 $PM_{2.5}$ Implementation Rule back to EPA so that the agency could address implementation of the $PM_{2.5}$ NAAQS under Subpart 4.

Utah was therefore required to supplement its SIP in order to address the additional requirements of Subpart 4. The most fundamental departure of Subpart 4 is that it classifies PM nonattainment areas as either Moderate or Serious and includes somewhat different planning requirements for each.

In the wake of the court ruling, EPA issued a "Deadlines Rule" that: 1) classified the Provo, UT $PM_{2.5}$ Nonattainment Area as a Moderate Area, 2) established a deadline of December 31, 2014 for Utah to submit the necessary SIP elements, and 3) established the attainment date for the area as December 31, 2015.

To meet this due-date in the Deadlines Rule, a SIP addressing the Subpart 4 planning requirements for Moderate Areas was proposed by the Board on September 3, 2014.

A 30-day public comment period was held, which included a public hearing. A summary of the comments received during the comment period along with the responses from UDAQ is attached.

One central point made throughout the responses to those comments is that there is still no new $PM_{2.5}$ implementation rule to guide states in the development of their SIPs, even as those SIPs are now coming due.

Any recommended revision to SIP Subsection IX.A.22 resulting from these comments has been identified in the amended attachment using strikeout and underline.

Staff Recommendation: Staff recommends the Board adopt SIP Subsection IX.A.22: Control Measures for Area and Point Sources, Fine Particulate Matter, $PM_{2.5}$ SIP for the Provo, UT Nonattainment Area as amended.

UTAH

State Implementation Plan

Control Measures for Area and Point Sources, Fine Particulate Matter,

$PM_{2.5}$ SIP for the Provo, UT Nonattainment Area

Section IX. Part A.22

Adopted by the Utah Air Quality Board

December 3, 2014

1 Acronyms 3

2 Table of Contents 5

3 List of Figures 8

4 List of Tables 10

Acronyms

BACT	Best Available Control Technology
CAA	Clean Air Act
CFR	Code of Federal Regulations
CMAQ	Community Multiscale Air Quality
CTG	Control Techniques Guideline Documents
DAQ	Utah Division of Air Quality (also UDAQ)
EPA	Environmental Protection Agency
FRM	Federal Reference Method
MACT	Maximum Available Control Technology
MATS	Model Attainment Test Software
MPO	Metropolitan Planning Organization
$\mu g/m^3$	Micrograms Per Cubic Meter
Micron	One Millionth of a Meter
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NH_3	Ammonia
NO_x	Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
PM	Particulate Matter
PM_{10}	Particulate Matter Smaller Than 10 Microns in Diameter
$PM_{2.5}$	Particulate Matter Smaller Than 2.5 Microns in Diameter

1	RACM	Reasonably Available Control Measures
2	RACT	Reasonably Available Control Technology
3	RFP	Reasonable Further Progress
4	SIP	State Implementation Plan
5	SMOKE	Sparse Matrix Operator Kernal Emissions
6	SO_2	Sulfur Dioxide
7	SO_x	Sulfur Oxides
8	TSD	Technical Support Document
9	VOC	Volatile Organic Compounds
10	UAC	Utah Administrative Code
11	WRF	Weather Research and Forecasting

TABLE OF CONTENTS

Chapter 1 – INTRODUCTION AND BACKGROUND

1.1 Fine Particulate Matter 11

1.2 Health and Welfare Impacts of $PM_{2.5}$ 11

1.3 Fine Particulate Matter in Utah 12

1.4 2006, NAAQS for $PM_{2.5}$ 12

1.5 $PM_{2.5}$ Nonattainment Areas in Utah 13

1.6 $PM_{2.5}$ Precursors 14

Chapter 2 - REQUIREMENTS FOR 2006, $PM_{2.5}$ PLAN REVISIONS

2.1 Requirements for Nonattainment SIPs 16

2.2 $PM_{2.5}$ SIP Guidance 17

2.3 Summary of this SIP Proposal 17

Chapter 3 - AMBIENT AIR QUALITY DATA

3.1 Measuring Fine Particle Pollution in the Atmosphere 18

3.2 Utah's Air Monitoring Network 18

3.3 Annual $PM_{2.5}$ – Mean Concentrations 19

3.4 Daily $PM_{2.5}$ – Averages of 98th Percentiles and Design Values 20

3.5 Composition of Fine Particle Pollution – Speciated Monitoring Data 21

3.6 PCAP Study 24

3.7 Ammonia (NH_3) Studies 24

Chapter 4 - EMISSION INVENTORY DATA

4.1 Introduction 25

4.2 The 2008 Emissions Inventory 26

4.3 Characterization of Utah's Airsheds 26

Chapter 5 - ATTAINMENT DEMONSTRATION

5.1 Introduction **30**
5.2 Photochemical Modeling **30**
5.3 Domain/Grid Resolution **30**
5.4 Episode Selection **31**
5.5 Meteorological Data **34**
5.6 Photochemical Model Performance Evaluation **35**
5.7 Summary of Model Performance **42**
5.8 Modeled Attainment Test **43**
5.9 Air Quality as of the Attainment Date **44**

Chapter 6 - CONTROL MEASURES

6.1 Introduction **45**
6.2 Utah Stakeholder Workgroup Efforts **45**
6.3 Identification of Measures **46**
6.4 Existing Control Measures **47**
6.5 SIP Controls **55**
6.6 Reasonably Available Control Measures (RACM/RACT) **55**

Chapter 7 - TRANSPORTATION CONFORMITY

7.1 Introduction **64**
7.2 Consultation **64**
7.3 Regional Emission Analysis **65**
7.4 Interim $PM_{2.5}$ Conformity Test **66**

Chapter 8 - REASONABLE FURTHER PROGRESS

8.1 Introduction **67**
8.2 Moderate Area Planning Requirements **67**

8.3 RFP for the Provo, UT Nonattainment Area 68

Chapter 9 - CONTINGENCY MEASURES

9.1 Background 72

9.2 Contingency Measures and Implementation Schedules for the Nonattainment Area 72

9.3 Conclusions 73

List of Figures

Figure 1.1, Nonattainment Areas for the 2006, $PM_{2.5}$ NAAQS 13

Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network 19

Figure 5.1: Northern Utah photochemical modeling domain. 31

Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007 32

Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008 33

Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10. 34

Figure 5.5: UDAQ monitoring network. 35

Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ ($\mu g/m^3$) for 2010 Jan. 03. 36

Figure 5.7: 24-hr PM2.5 time series (Hawthorne). Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace). 37

Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace). 38

Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace). 38

Figure 5.10: 24-hr $PM_{2.5}$ time series (Logan). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace). 39

Figure 5.11: An example of the Salt Lake Valley at the end of a high $PM_{2.5}$ episode. The lowest elevations of the Salt Lake Valley are still experiencing an inversion and elevated $PM_{2.5}$ concentrations while the $PM_{2.5}$ has been 'cleared out' throughout the rest of the valley. These 'end of episode' clear out periods are difficult to replicate in the photochemical model. 39

Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 $\mu g/m^3$ at the Hawthorne STN site. 40

Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Bountiful STN site. 41

Figure 5.14: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Lindon STN site. 41

Figure 5.15: The composition of model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when a modeled day had 24-hr concentrations > 35 µg/m^3 at the Logan monitoring site. No observed speciation data is available for Logan. 42

Figure 5.16, Model Results for the Provo, UT Nonattainment Area 43

LIST OF TABLES

Table 3.1, $PM_{2.5}$ Annual Mean Concentrations 20

Table 3.2, 24-hour $PM_{2.5}$ Monitored Design Values 21

Table 4.1, Emissions Summary for 2010 (SMOKE). Emissions are presented in tons per average winter day. 28

Table 4.2, Emissions Summaries for the Salt Lake City, UT Nonattainment Area; Baseline, RFP and Attainment Years (SMOKE). Emissions are presented in tons per average winter day. 29

Table 5.1, Modeled Concentrations ($\mu g/m^3$) for the Provo, UT Nonattainment Area 44

Table 6.1, Tier 1 Emission Standards 50

Table 6.2, Tier 2 Emission Standards 52

Table 6.3, Point Source Emissions; Baseline and Projections with Growth and Control 58

Table 6.4 Area Source Strategy Screening 59

Table 6.5, Emissions Reductions from Area Source SIP Controls 62

Table 8.1, Reasonable Further Progress in the Provo, UT nonattainment area 70

Chapter 1 – INTRODUCTION AND BACKGROUND

1.1 Fine Particulate Matter

According to EPA's website, particulate matter, or PM, is a complex mixture of extremely small particles and liquid droplets. Particulate matter is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles.

The size of particles is directly linked to their potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Other negative effects are reduced visibility and accelerated deterioration of buildings.

EPA groups particle pollution into two categories:

- "Inhalable coarse particles," such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter. Utah has previously addressed inhalable coarse particles as part of its PM_{10} SIPs for Salt Lake and Utah Counties, but this fraction is not measured as $PM_{2.5}$ and will not be a subject for this nonattainment SIP.

- "Fine particles," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller and thus denoted as $PM_{2.5}$. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.

PM concentration is reported in micrograms per cubic meter or $\mu g/m^3$. The particulate is collected on a filter and weighed. This weight is combined with the known amount of air that passed through the filter to determine the concentration in the air.

1.2 Health and Welfare Impacts of $PM_{2.5}$

Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:

- increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing, for example;
- decreased lung function;
- aggravated asthma;
- development of chronic bronchitis;
- irregular heartbeat;

- nonfatal heart attacks; and
- pre-mature death in people with heart or lung disease.

People with heart or lung diseases, children and older adults are the most likely to be affected by particle pollution exposure. However, even healthy people may experience temporary symptoms from exposure to elevated levels of particle pollution.

1.3 Fine Particulate Matter in Utah

Excluding wind-blown desert dust events, wild land fires, and holiday related fireworks, elevated $PM_{2.5}$ in Utah occurs when stagnant cold pools develop during the winter season.

The synoptic conditions that lead to the formation of cold pools in Utah's nonattainment areas are: synoptic scale ridging, subsidence, light winds, snow cover (often), and cool- to-cold surface temperatures. These conditions occur during winter months, generally mid-November through early March.

During a winter-time cold pool episode, emissions of $PM_{2.5}$ precursors react relatively quickly to elevate overall concentrations, and of course dispersion is very poor due to the very stable air mass. Episodes may last from a few days to tens of days when meteorological conditions change to once again allow for good mixing.

The scenario described above leads to exceedances and violations of the 24-hour health standard for $PM_{2.5}$. In other parts of the year concentrations are generally low, and even with the high peaks incurred during winter, are well within the annual health standard for $PM_{2.5}$.

1.4 2006, NAAQS for $PM_{2.5}$

In September of 2006, EPA revised the (1997) standards for $PM_{2.5}$. While the annual standard remained unchanged at 15 $\mu g/m^3$, the 24-hr standard was lowered from 65 $\mu g/m^3$ to 35 $\mu g/m^3$.

DAQ has monitored $PM_{2.5}$ since 2000, and found that all areas within the state have been in compliance with the 1997 standards. At this new 2006 level, all or parts of five counties have collected monitoring data that is not in compliance with the 24-hr standard.

In 2013, EPA lowered the annual average to 12 $\mu g/m^3$. Monitoring data shows no instances of noncompliance with this revised standard.

1.5 $PM_{2.5}$ Nonattainment Areas in Utah

There are two distinct nonattainment areas for the 2006, $PM_{2.5}$ standards residing entirely within the state of Utah. These are the Salt Lake City, UT, and Provo, UT nonattainment areas, which together encompass what is referred to as the Wasatch Front. A third nonattainment area is more or less geographically defined by the Cache Valley which straddles the border between Utah and Idaho (the Logan, UT – ID nonattainment area.) Figure 1.1 below shows the geographic extent of these areas.

None of these three areas has violated the annual NAAQS for $PM_{2.5}$. Without exception, the exceedances leading to 24-hr NAAQS violations are associated with relatively short-term meteorological occurrences.

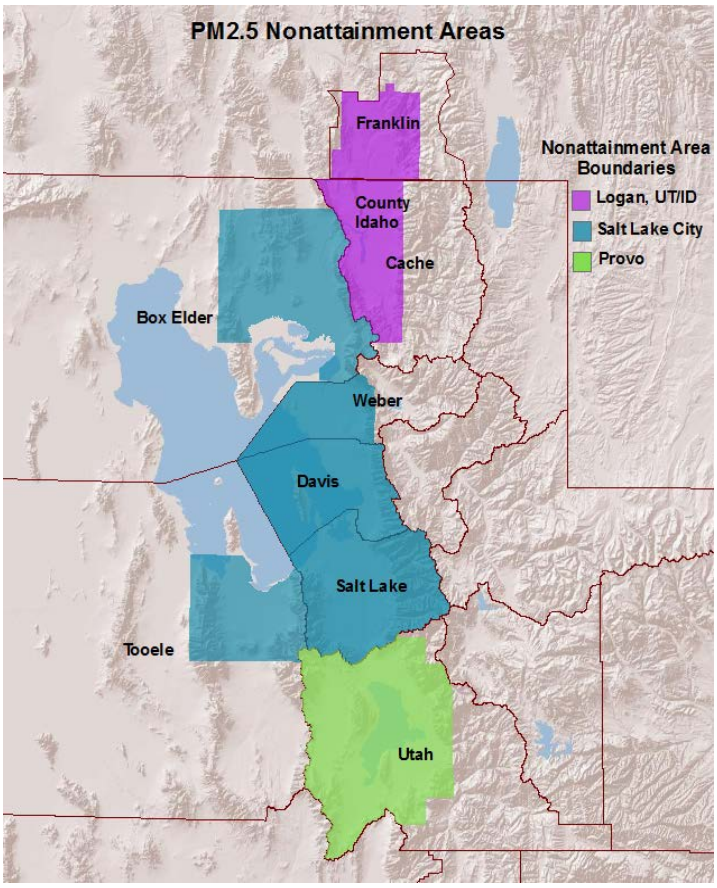


Figure 1.1, Nonattainment Areas for the 2006, $PM_{2.5}$ NAAQS

Each of these three areas was designated, by the EPA, based on the weight of evidence of the following nine factors recommended in its guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns
- growth
- meteorology
- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

EPA also used analytical tools and data such as pollution roses, fine particulate composition monitoring data, back trajectory analyses, and the contributing emission score (CES) to evaluate these areas.

While the general meteorological characteristics are identical between the Wasatch Front and Cache Valley, there are two important differences related to topography. First, the Cache Valley is a closed basin while the Wasatch Front has many large outlets that connect it to the larger Great Basin. The large outlets along the Wasatch Front provide the potential for greater advection of pollutants and for a potentially weaker cold pool. Second, the Cache Valley is a narrow (<20 km) valley bordered by extremely steep mountains. These topographical differences lead to faster forming, more intense, and more persistent cold pools in Cache Valley relative to the Wasatch Front.

Because of these differences, the two Wasatch Front areas and the Cache Valley are designated as separate nonattainment areas; however, they have all been modeled together within the same modeling domain.

1.6 $PM_{2.5}$ Precursors

The majority of ambient $PM_{2.5}$ collected during a typical cold-pool episode of elevated concentration is secondary particulate matter, born of precursor emissions. The precursor gasses associated with fine particulate matter are SO_2, NOx, volatile organic compounds (VOC), and ammonia (NH_3).

Clean Air Act Section 189(e) requires that the control requirements applicable in plans for major stationary sources of PM_{10} shall also apply to major stationary sources of PM_{10} precursors, except where the Administrator determines that such sources do not contribute significantly to PM_{10} levels which exceed the standard in the area.

As this paragraph now applies also to $PM_{2.5}$ plans the following should be said about the way this plan is structured.

CAA Section 172 does not include any specific applicability thresholds to identify the size of sources that States and EPA must consider in the plan's RACT and RACM analysis. In developing the emissions inventories underlying the SIP, the criteria of 40 CFR 51 for air emissions reporting requirements was used to establish a 100 ton per year threshold for identifying a sub-group of stationary point sources that would be evaluated individually. For the Salt Lake City, UT nonattainment area, there are 28 stationary point sources that met or meet the criteria of 100 tons per year for $PM_{2.5}$ or any $PM_{2.5}$ precursor.

The control evaluations for each of these sources included $PM_{2.5}$ as well as $PM_{2.5}$ precursors. This principle was extended to the non-stationary source categories as well.

When evaluating the cost per ton necessary to reduce emissions, consideration was given to the resulting $PM_{2.5}$ concentrations. Through this process, reasonable controls were identified affecting $PM_{2.5}$, SO_2, NOx and VOC.

No such controls were identified for ammonia. Ammonia occurs in such abundance that $PM_{2.5}$ concentrations are not sensitive to reductions in ammonia unless those reductions are very large. Within the stationary source category, there really were no significant amounts of ammonia to evaluate. The largest contributor to the ammonia inventory was the agricultural sector, and the maximum possible amount of ammonia reduction from that sector would still not be enough to affect a reduction in $PM_{2.5}$.

Additional information regarding control measures may be found in Chapter 6 as well as the Technical Support Document (TSD).

Chapter 2 – REQUIREMENTS FOR 2006, $PM_{2.5}$ PLAN REVISIONS

2.1 Requirements for Nonattainment SIPs

Section 110 of the Clean Air Act lists the requirements for implementation plans. Many of these requirements speak to the administration of an air program in general. Section 172 of the Act contains the plan requirements for nonattainment areas. Some of the more notable requirements identified in these sections of the Act that pertain to this SIP include:

- Implementation of Reasonably Available Control Measures (RACM) as expeditiously as practicable
- Reasonable Further Progress (RFP) toward attainment of the National Ambient Air Quality Standards by the applicable attainment date
- Enforceable emission limits as well as schedules for compliance
- A comprehensive inventory of actual emissions
- Contingency measures to be undertaken if the area fails to make reasonable further progress or attain the NAAQS by the applicable attainment date

On January 4, 2013, D.C. Circuit Court of Appeals found that EPA had incorrectly interpreted the Clean Air Act when determining how to implement the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$. The January 4, 2013 court ruling held that the EPA should have implemented the $PM_{2.5}$ NAAQS based on *both* Clean Air Act (CAA) Subpart 1 ("Nonattainment Areas in General" of "Part D – Plan Requirements for Nonattainment Areas") *and* Subpart 4 ("Additional Provisions for Particulate Matter Nonattainment Areas") of Part D, title 1. EPA had (incorrectly) required states to develop their SIPs based only on Subpart 1. Therefore, as of January 4, 2013, Subpart 4 also applies.

Under Subpart 4, nonattainment areas for particulate matter may carry the classification of either moderate or serious. Subpart 4 addresses the attainment dates and planning provisions for both moderate and serious PM nonattainment areas.

In the wake of the decision by the D.C. Circuit, EPA has promulgated a "Deadlines Rule" that identifies each of Utah's three $PM_{2.5}$ nonattainment areas as moderate. It specifies December 31, 2014 as the SIP submission deadline for these moderate $PM_{2.5}$ nonattainment areas, and further specifies December 31, 2015 as the attainment date for each area.

More specific requirements for the preparation, adoption, and submittal of implementation plans are specified in 40 CFR Part 51. Subpart Z of Part 51 had contained provisions for Implementation of $PM_{2.5}$ National Ambient Air Quality Standards. However, one consequence of the January 4, 2013 Court ruling was to revoke Subpart Z. This leaves only the more general requirements of Part 51.

2.2 $PM_{2.5}$ SIP Guidance

Beyond what had been codified in Subpart Z of Part 51 concerning the Implementation of the $PM_{2.5}$ NAAQS, EPA had provided additional clarification and guidance in its Clean Air Particulate Implementation Rule for the 1997, $PM_{2.5}$ NAAQS (FR 72, 20586) and its subsequent Implementation Guidance for the 2006, 24-Hour Fine Particle NAAQS (March 2, 2012). This too was revoked by the D.C. Circuit Court's decision. Until such time as a new implementation rule for $PM_{2.5}$ is promulgated, the Deadlines Rule recommends the General Preamble, EPA's longstanding general guidance that interprets the 1990 amendments to the CAA, as the applicable guidance for states to follow while preparing SIPs for $PM_{2.5}$ nonattainment areas.

2.3 Summary of this SIP Proposal

This implementation plan was developed to meet the requirements specified in the law, rule, and appropriate guidance documents identified above. Discussed in the following chapters are: air monitoring, reasonably available control measures, modeled attainment demonstration, emission inventories, reasonable further progress toward attainment, transportation conformity, and contingency measures. Additional information is provided in the technical support document (TSD).

Chapter 3 – Ambient Air Quality Data

3.1 Measuring Fine Particle Pollution in the Atmosphere

Utah has monitored $PM_{2.5}$ in its airsheds since 2000 following the promulgation of the 1997, $PM_{2.5}$ NAAQS which was set at 65 µg/m^3 for a 24-hour averaging period. $PM_{2.5}$ monitoring sites were initially located based on concentrations of PM_{10}, which historically were measured at sites located based on emissions of primary particles. $PM_{2.5}$ concentrations, especially during Utah's wintertime valley temperature inversions, tend to be distributed more homogenously within a specific airshed. Homogeneity of $PM_{2.5}$ concentrations means that one or two monitors are adequate to determine compliance with the NAAQS in specific airsheds. DAQ's monitors are appropriately located to assess concentration, trends, and changes in $PM_{2.5}$ concentrations. During Utah's wintertime cold-pool episodes, every day sampling and real time monitoring are needed for modeling and public notification.

3.2 Utah's Air Monitoring Network

The Air Monitoring Center (AMC) maintains an ambient air monitoring network in Utah that collects both air quality and meteorological data. Figure 3.1 shows the location of sites along the Wasatch Front that collect $PM_{2.5}$ data. Twelve sites collect $PM_{2.5}$ data using the Federal Reference Method (FRM); $PM_{2.5}$ is collected on filters over a 24 hour period and its mass is measured gravimetrically. Seven of those sites also measure $PM_{2.5}$ concentrations continuously in real-time. Real-time $PM_{2.5}$ data is useful both for pollution forecasting and to compare with 24-hour concentrations of $PM_{2.5}$ collected on filters. Of the twelve sites that use the FRM to measure $PM_{2.5}$, six sites collect $PM_{2.5}$ data daily and six sites collect $PM_{2.5}$ data on every third day. Three sites along the Wasatch Front collect speciated $PM_{2.5}$. Particulate matter on the speciated $PM_{2.5}$ filters is analyzed for organic and inorganic carbon and a list of 48 elements. $PM_{2.5}$ speciation data is particularly useful in helping to identify sources of particulate matter. The ambient air quality monitoring network along Utah's Wasatch Front and in the Cache Valley meets EPA requirements for monitoring networks.

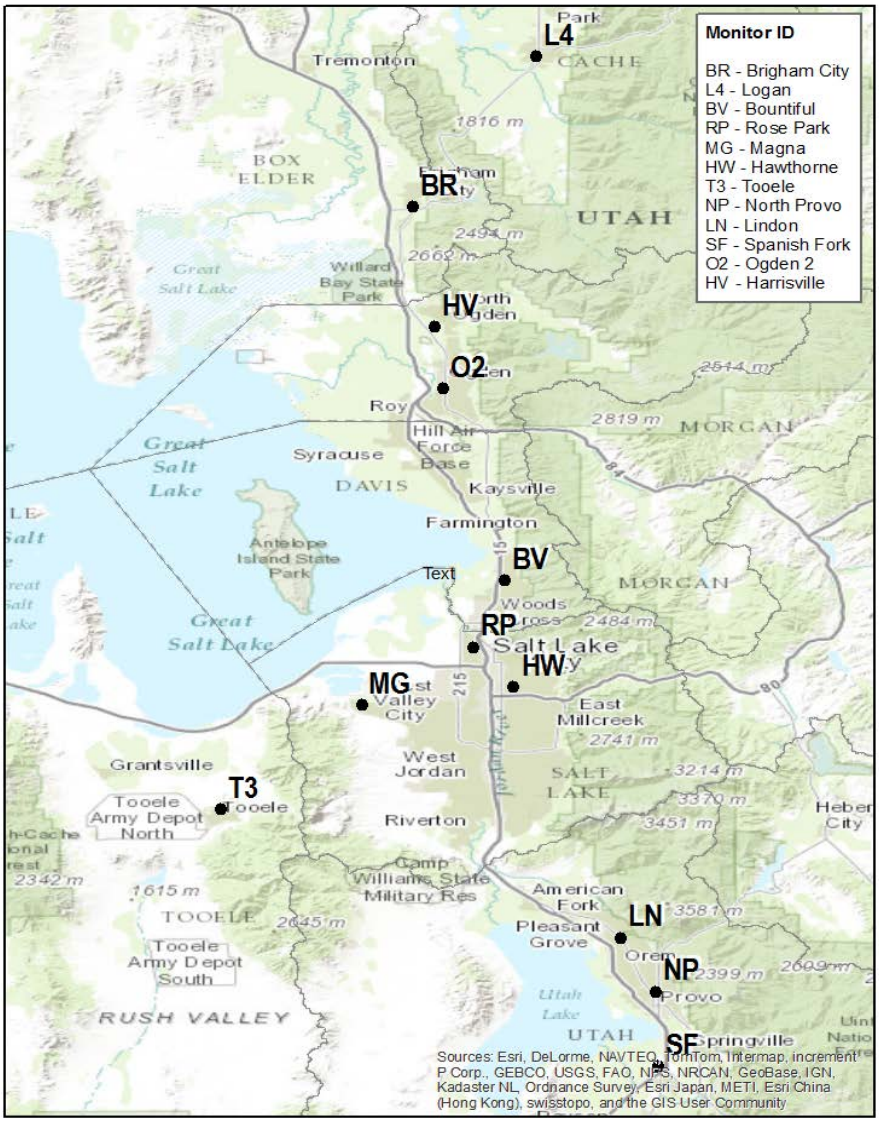


Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network

3.3 Annual $PM_{2.5}$ – Mean Concentrations

The procedure for evaluating $PM_{2.5}$ data with respect to the NAAQS is specified in Appendix N to 40 CFR Part 50. Generally speaking, the annual $PM_{2.5}$ standard is met when a three-year average of annual

mean values is less than or equal to 12.0 µg/m^3. Each annual mean is itself an average of four quarterly averages.

Table 3.1, below shows the running 3-year averages of annual mean values for each of Utah's monitoring locations. The data in the table spans the years 2008 through 2012. These are the years surrounding 2010, the year for which the baseline modeling inventory was prepared. It can be seen from the data that there are no locations at which the annual NAAQS was violated. It should be noted that the conclusion would be no different if the most recent data from 2013 were considered.

		3-Year Average of Annual Mean Concentrations		
Location	**County**	**08 - 10**	**09 - 11**	**10 - 12**
Logan (Combined POC 1 & 2)	Cache	10.0	9.7	8.7
Brigham City	Box Elder	8.3	8.2	7.7
Ogden 2 (POC 1)	Weber	9.7	9.5	9.1
Harrisville	Weber	8.6	8.3	7.6
Bountiful	Davis	9.8	9.2	8.3
Rose Park (POC 1)	Salt Lake	10.4	9.7	9.2
Magna	Salt Lake	8.5	8.4	7.7
Hawthorn (POC 1)	Salt Lake	10.4	9.7	8.8
Tooele	Tooele	6.8	6.8	6.3
Lindon (POC 1)	Utah	9.8	9.1	8.3
North Provo	Utah	9.4	8.7	8.1
Spanish Fork	Utah	8.8	8.5	7.7

Table 3.1, $PM_{2.5}$ Annual Mean Concentrations

3.4 Daily $PM_{2.5}$ – Averages of 98th Percentiles and Design Values

The procedure for evaluating $PM_{2.5}$ data with respect to the NAAQS is specified in Appendix N to 40 CFR Part 50. Generally speaking, the 24-hr. $PM_{2.5}$ standard is met when a three-year average of 98th percentile values is less than or equal to 35 µg/m^3. Each year's 98th percentile is the daily value below which 98% of all daily values fall.

Table 3.2, below shows the running 3-year averages of 98th percentile values for each of Utah's monitoring locations. Again, the data in the table spans the years 2008 through 2012 which are the years surrounding 2010, the baseline modeling inventory. It can be seen from the data that there are many locations at which the 24-hr. NAAQS has been violated, and this SIP has been structured to specifically address the 24-hr. standard.

Site-Specific Baseline Design Values:		3-Year Average of 98th Percentiles			Baseline Design Value
Location	**County**	**08 - 10**	**09 - 11**	**10 - 12**	
Logan (Combined POC 1 & 2)	Cache	42.6	42.4	37.2	**40.7**
Brigham City	Box Elder	42.5	40.1	37.2	**39.9**
Ogden 2 (POC 1)	Weber	37.0	41.1	37.4	**38.5**
Harrisville	Weber	35.6	36.6	33.2	**35.1**
Bountiful	Davis	37.7	40.3	34.4	**37.5**
Rose Park (POC 1)	Salt Lake	40.9	40.7	35.4	**39.0**
Magna	Salt Lake	32.8	34.5	30.3	**32.5**
Hawthorn (POC 1)	Salt Lake	43.6	44.5	38.1	**42.1**
Tooele	Tooele	25.9	27.1	24.4	**25.8**
Lindon (POC 1)	Utah	40.5	40.9	32.4	**37.9**
North Provo	Utah	36.4	35.1	28.6	**33.4**
Spanish Fork	Utah	39.3	41.7	34.6	**38.5**

Table 3.2, 24-hour $PM_{2.5}$ Monitored Design Values

As mentioned in the foregoing paragraph, this SIP is structured to address the 24-hr. $PM_{2.5}$ NAAQS. As such the modeled attainment test must consider monitored baseline design values from each of these locations. EPA's modeling guidance[1] recommends this be calculated using three-year averages of the 98th percentile values. To calculate the monitored baseline design value, EPA recommends an average of three such three-year averages that straddle the baseline inventory. 2010 is the year represented by the baseline inventory. Therefore, the three-year average of 98th percentile values collected from 2008-2010 would be averaged together with the three-year averages for 2009-2011 and 2010-2012 to arrive at the site-specific monitored baseline design values. These values are also shown in Table 3.2[2].

3.5 Composition of Fine Particle Pollution – Speciated Monitoring Data

DAQ operates three $PM_{2.5}$ speciation sites. The Hawthorne site in Salt Lake County is one of 54 Speciation Trends Network (STN) sites operated nationwide on an every-third-day sampling schedule. Sites at Bountiful/Viewmont in Davis County and Lindon in Utah County are State and Local Air Monitoring Stations (SLAMS) $PM_{2.5}$ speciation sites that operate on an every-sixth-day sampling schedule.

[1] Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze (EPA -454B-07-002, April 2007)

[2] Recalculating the design values by replacing the 98th percentiles from 2008 with the most recent 98th percentiles from 2013 has a mixed effect throughout the monitoring network, with some sites increasing and others decreasing. The design value for Lindon, the controlling monitor, would increase by 1.3 µg/m3. This increase only further supports the conclusion drawn in Section 5.9.

Filters are prepared by the EPA contract laboratory and shipped to Utah for sampling. Samples are collected for particulate mass, elemental analysis, identification of major cations and anions, and concentrations of elemental and organic carbon as well as crustal material present in $PM_{2.5}$. Carbon sampling and analysis changed in 2007 to match the Interagency Monitoring of Protected Visual Environments (IMPROVE) method using a modified IMPROVE sampler at all sites.

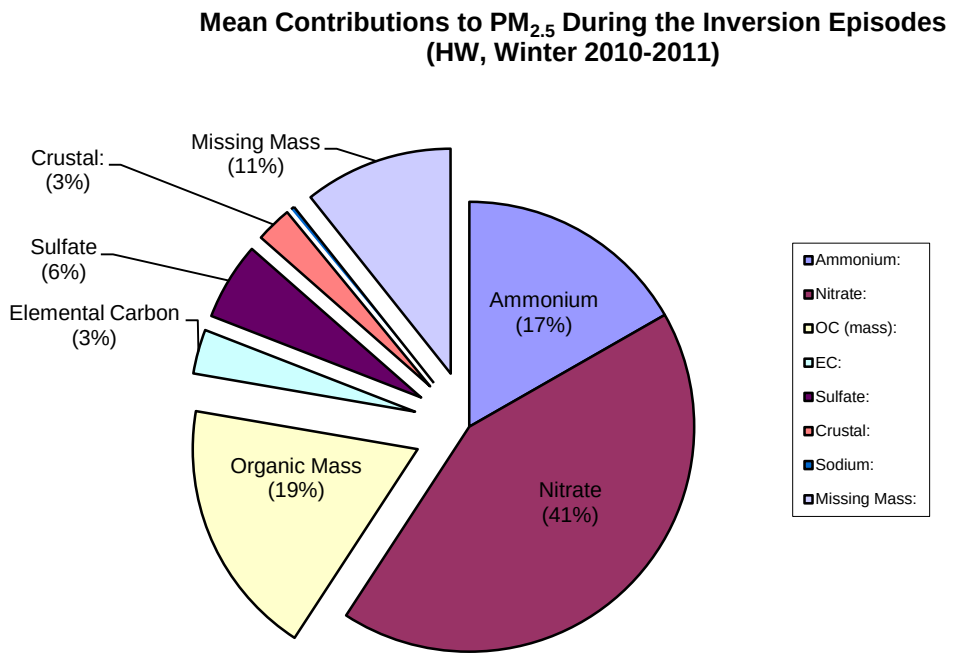
The $PM_{2.5}$ is collected on three types of filters: Teflon, nylon, and quartz. Teflon filters are used to characterize the inorganic contents of $PM_{2.5}$. Nylon filters are used to quantify the amount of ammonium nitrate, and quartz filters are used to quantify the organic and inorganic carbon content in the ambient $PM_{2.5}$.

Data from the speciation network show the importance of volatile secondary particulates during the colder months. These particles are significantly lost in FRM $PM_{2.5}$ sampling.

During the winter periods between 2009 and 2011, DAQ conducted special winter speciation studies aimed at better characterization of $PM_{2.5}$ during the high pollution episodes. These studies were accomplished by shifting the sampling of the Chemical Speciation Network monitors to 1-in-2-day schedule during the months of January and February. Speciation monitoring during the winter high-pollution episodes produced similar results in $PM_{2.5}$ composition each year.

The results of the speciation studies lead to the conclusion that the exceedances of the $PM_{2.5}$ NAAQS are a result of the increased portion of the secondary $PM_{2.5}$ that was chemically formed in the air and not primary $PM_{2.5}$ emitted directly into the troposphere.

Figure 3.2 below shows the contribution of the identified compounds from the speciation sampler both during a winter temperature inversion period and during a well-mixed winter period.



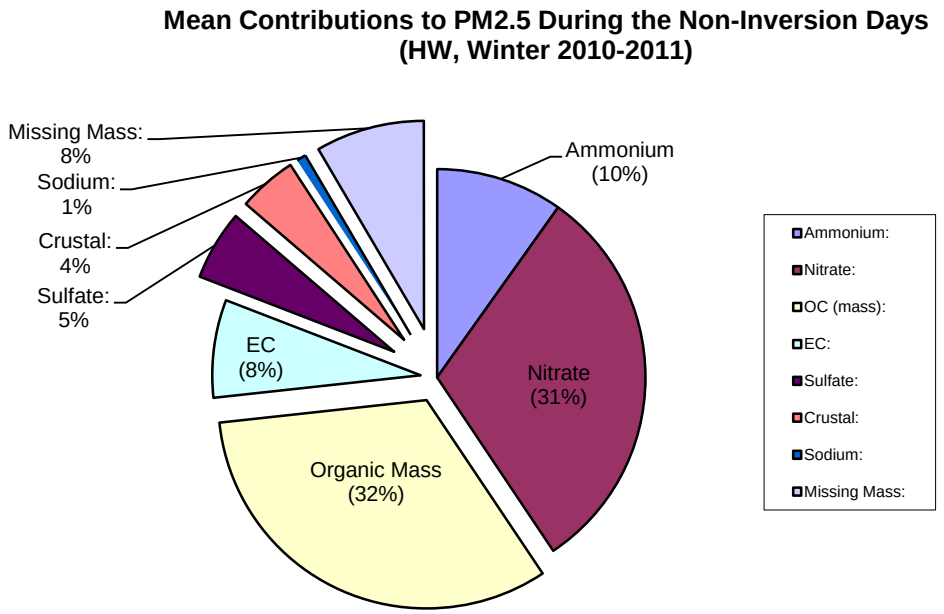


Figure 3.2, Composite Wintertime PM2.5 Speciation Profiles

3.6 PCAP Study

The Persistent Cold Air Pooling Study (PCAPS) is a National Science Foundation-funded project conducted by the University of Utah to investigate the processes leading to the formation, maintenance and destruction of persistent temperature inversions in Salt Lake Valley. The study ended in March of 2014. Field work for the project was conducted in the winter of 2010-2011 and focused on the meteorological dynamics of temperature inversions in the Salt Lake Valley and in the Bingham Canyon pit mine in the southwest corner of Salt Lake Valley. In addition to identifying key meteorological processes involved in the dynamics of temperature inversions in Salt Lake Valley, the other primary objectives of PCAPS is to determine how persistent temperature inversions affect air pollution transport and diffusion in urban basins and to develop more accurate meteorological models describing the formation, persistence and dispersion of temperature inversions in Salt Lake Valley.

Analyses of most data sets collected during the PCAPS are still underway. However, one study examining $PM_{2.5}$ concentrations along an elevation gradient north of Salt Lake City (1300-1750 meters) showed that $PM_{2.5}$ concentrations generally decreased with altitude and increased with time during a single temperature inversion event.[1] Final results from PCAPS will help DAQ understand both how persistent temperature inversions affect $PM_{2.5}$ concentrations along the Wasatch Front and will enhance DAQ's ability to accurately forecast the formation and breakup of temperature inversion that lead to poor wintertime air quality.

3.7 Ammonia (NH_3) Studies

The Division of Air Quality deployed an ammonia monitor as a part of the special winter study for 2009. A URG 9000 instrument was used to record hourly values of ambient ammonia between the months of December and February.

The resulting measurements showed that the ambient concentration of ammonia tended to be generally an order of magnitude higher than those of nitric acid: 12-17 ppbv and 1-2 ppbv, respectively.

Unfortunately, the use of the instrument proved to be excessively labor intensive due to the high frequency of calibrations and corrections for drift. The data obtained during the winter of 2009, albeit valuable for rough estimation of the ambient ammonia concentrations, contained an abnormal amount of error for accurate mechanistic analysis.

[1] Silcox, G.D., K.E. Kelly, E.T. Crosman, C.D. Whiteman, and B.L. Allen, 2012: Wintertime $PM_{2.5}$ concentrations in Utah's Salt Lake Valley during persistent multi-day cold air pools. Atmospheric Environment, 46, 17-24.

Chapter 4 – EMISSION INVENTORY DATA

4.1 Introduction

The emissions inventory is one means used by the state to assess the level of pollutants and precursors released into the air from various sources. The methods by which emissions inventories are collected and calculated are constantly improving in response to better analysis and more comprehensive rules. The inventories underlying this SIP were compiled using the best information available.

The sources of emissions that were inventoried may be discussed as belonging to four general categories: industrial point sources; on-road mobile sources; off-road mobile sources; and area sources which represent a collection of smaller, more numerous point sources, residential activities such a home heating, and in some cases biogenic emissions.

This SIP is concerned with $PM_{2.5}$, both primary in its origin and secondary, referring to its formation removed in time and space from the point of origin for certain precursor gasses. Hence, the pollutants of concern, at least for inventory development purposes, included $PM_{2.5}$, SO_2, NO_x, VOC, and NH_3.

On-road mobile sources are inventoried using EPA's MOVES2010 model, in conjunction with information generated by travel demand models such as vehicle speeds and miles traveled. The inventory information is calculated in units of tons per day, adjusted for winter conditions. Emissions from the other three categories are calculated in terms of tons per year.

Prior to use in the air quality model, the emissions are pre-processed to account for the seasonality of Utah's difficulty with secondary $PM_{2.5}$ formation during winter months. These temporal adjustments also account for daily and weekly activity patterns that affect the generation of these emissions.

To acknowledge the episodic and seasonal nature of Utah's elevated $PM_{2.5}$ concentrations, inventory information presented herein is, unless otherwise noted, a reflection of the temporal adjustments made prior to air quality modeling. This makes more appropriate the use of these inventories for such purposes as correlation with measured $PM_{2.5}$ concentrations, control strategy evaluation, establishing budgets for transportation conformity, and tracking rates of progress.

There are various time horizons that are significant to the development of this SIP. It is first necessary to look at past episodes of elevated $PM_{2.5}$ concentrations in order to develop the air quality model. The episodes studied as part of the SIP occurred in 2007, 2008, 2009, and 2010. It is then necessary to look several years into the future when developing emission control strategies. The significant time horizon for this plan relates to the statutory attainment date, December 31, 2015. A projected inventory for 2015 is prepared and compared with a baseline inventory that is contemporaneous with the monitored design values discussed in Section 3.4. This baseline is represented by the year 2010. Inventories must be prepared to evaluate all of these time horizons.

4.2 The 2008 Emissions Inventory

The forgoing paragraph identified numerous points in time for which an understanding of emissions to the air is important to plan development. The basis for each of these assessments was the 2008 tri-annual inventory. This inventory represented, at the time it was selected for use, the most recent comprehensive inventory compiled by UDAQ. In addition to the large major point sources that are required to report emissions every year, the tri-annual inventories consider emissions from many more, smaller point sources. These inventories are collected in accordance with state and federal rules that ensure proper methods and comprehensive quality assurance.

Thus, to develop other inventories for each of the years discussed above, the 2008 inventory was either back-cast and adjusted for certain episodic conditions, or forecast to represent more typical conditions.

4.3 Characterization of Utah's Airsheds

As said at the outset, an emissions inventory provides a means to assess the level of pollutants and precursors released into the air from various sources. This in turn allows for an overall assessment of a particular airshed or even a comparison of one airshed to another.

The modeling analysis used to support this SIP considers a regional domain that encompasses three distinct airsheds belonging to three distinct $PM_{2.5}$ nonattainment areas; The Cache Valley (the Logan UT/ID nonattainment area), the central Wasatch Front (Salt Lake City, UT nonattainment area), and the southern Wasatch Front (Provo, UT nonattainment area).

The inventories developed for each of these three areas illustrate many similarities but also a few notable differences. All three areas are more or less dominated by a combination of on-road mobile and area sources. However, emissions from large point sources are non-existent in the Cache Valley. These emissions are mostly situated along the Wasatch Front, and primarily exhibited in the Salt Lake City nonattainment area. Conversely, most of the agricultural emissions are located in the Cache Valley.

The tables presented below provide a broad overview of the emissions in the respective areas. They are organized to show the relative contributions of emissions by source category (e.g. point / area / mobile).

Table 4.1 shows the 2010 Baseline emissions in each area of the modeling domain.

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Logan, UT-ID						
Sum of Emissions (tpd)		Area Sources	0.54	1.63	4.16	4.31	0.26
		Mobile Sources	~~0.37~~	~~6.48~~	~~4.99~~	~~0.12~~	~~0.04~~
		NonRoad	0.13	1.15	2.28	0.00	0.02
		Point Sources	0.00	0.02	0.63	0.00	0.00
		Total	~~1.05~~	~~9.28~~	~~12.06~~	~~4.43~~	~~0.32~~
2010	Provo, UT						
Sum of Emissions (tpd)		Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	~~1.38~~	~~25.39~~	~~15.62~~	~~0.44~~	~~0.16~~
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Sources	0.26	0.93	0.67	0.29	0.03
		Total	~~3.81~~	~~36.28~~	~~30.78~~	~~7.26~~	~~0.56~~
2010	Salt Lake City, UT						
Sum of Emissions (tpd)		Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	~~5.49~~	~~99.60~~	~~62.49~~	~~1.86~~	~~0.62~~
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Sources	3.89	20.14	6.48	0.64	10.64
		Total	~~16.52~~	~~160.48~~	~~130.01~~	~~20.47~~	~~12.81~~
2010	Surrounding Areas						
Sum of Emissions (tpd)		Area Sources	1.78	3.08	13.95	34.29	1.13
		Mobile Sources	~~1.34~~	~~28.88~~	~~11.03~~	~~0.33~~	~~0.15~~
		NonRoad	0.57	7.73	10.66	0.00	0.14
		Point Sources	3.39	129.34	2.92	0.75	43.43
		Total	~~7.07~~	~~169.03~~	~~38.56~~	~~35.38~~	~~44.85~~
2010 Total							

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Logan, UT-ID						
Sum of Emissions (tpd)		Area Sources	0.54	1.63	4.16	4.31	0.26
		Mobile Sources	0.67	6.48	4.99	0.12	0.04
		NonRoad	0.13	1.15	2.28	0.00	0.02
		Point Sources	0.00	0.02	0.63	0.00	0.00
		Total	1.35	9.28	12.06	4.43	0.32
2010	Provo, UT						
Sum of Emissions (tpd)		Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	2.20	25.39	15.63	0.44	0.16
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Sources	0.26	0.93	0.67	0.29	0.03
		Total	4.63	36.29	30.78	7.26	0.56
2010	Salt Lake City, UT						
Sum of Emissions (tpd)		Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	8.59	99.63	62.51	1.86	0.63
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Sources	3.89	20.14	6.48	0.64	10.64
		Total	19.62	160.51	130.02	20.47	12.81
2010	Surrounding Areas						
Sum of Emissions (tpd)		Area Sources	1.78	3.08	13.95	34.29	1.13
		Mobile Sources	2.31	28.89	11.03	0.33	0.15
		NonRoad	0.57	7.73	10.66	0.00	0.14
		Point Sources	3.39	129.34	2.92	0.75	43.43
		Total	8.04	169.03	38.57	35.38	44.85
2010 Total							

Table 4.1, Emissions Summary for 2010 (SMOKE). Emissions are presented in tons per average winter day.
Mobile source emissions summaries are from the AP-42 (road dust) and MOVES model output. $PM_{2.5}$ for mobile sources includes tire and brake wear, sulfate, elemental and organic carbon, and road dust. VOC for mobile sources includes refueling spillage and displacement vapor loss emissions.

Table 4.2 is specific to the Provo, UT nonattainment area, and shows emissions for both the baseline year and the attainment year. These totals include projections concerning growth in population, vehicle miles traveled, and the economy. They also include the effects of emissions control strategies that are either already promulgated or were required as part of the SIP.

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Provo, UT						
Sum of Emissions (tpd)		Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	~~1.38~~	~~25.39~~	~~15.62~~	~~0.44~~	~~0.16~~
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Sources	0.26	0.93	0.67	0.29	0.03
		Total	~~3.81~~	~~36.28~~	~~30.78~~	~~7.26~~	~~0.56~~
2015	Provo, UT						
Sum of Emissions (tpd)		Area Sources	1.86	4.59	10.66	6.41	0.30
		Mobile Sources	~~1.26~~	~~21.48~~	~~13.11~~	~~0.45~~	~~0.16~~
		NonRoad	0.24	3.40	1.37	0.00	0.04
		Point Sources	1.22	2.88	1.09	0.53	0.14
		Total	~~4.58~~	~~32.34~~	~~26.23~~	~~7.39~~	~~0.64~~

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Provo, UT						
Sum of Emissions (tpd)		Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	2.20	25.39	15.63	0.44	0.16
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Sources	0.26	0.93	0.67	0.29	0.03
		Total	4.63	36.29	30.78	7.26	0.56
2015	Provo, UT						
Sum of Emissions (tpd)		Area Sources	1.86	4.59	10.66	6.41	0.30
		Mobile Sources	2.37	21.48	13.11	0.45	0.16
		NonRoad	0.24	3.40	1.37	0.00	0.04
		Point Sources	1.22	2.88	1.09	0.53	0.14
		Total	5.69	32.35	26.23	7.39	0.64

Table 4.2, Emissions Summaries for the Salt Lake City, UT Nonattainment Area; Baseline, RFP and Attainment Years (SMOKE). Emissions are presented in tons per average winter day. Mobile source emissions summaries are from the AP-42 (road dust) and MOVES model output. $PM_{2.5}$ for mobile sources includes tire and brake wear, sulfate, elemental and organic carbon, and road dust. VOC for mobile sources includes refueling spillage and displacement vapor loss emissions.

The 2010 Baseline and 2015 projected emissions estimates are calculated from the Sparse Matrix Operator Kernel Model (SMOKE). More detailed inventory information may be found in the Technical Support Document (TSD).

Chapter 5 – ATTAINMENT DEMONSTRATION

5.1 Introduction

UDAQ conducted a technical analysis to support the development of Utah's 24-hr $PM_{2.5}$ State Implementation Plan (SIP). The analyses include preparation of emissions inventories and meteorological data, and the evaluation and application of regional photochemical model. An analysis using observational datasets will be shown to detail the chemical regimes of Utah's Nonattainment areas.

5.2 Photochemical Modeling

Photochemical models are relied upon by federal and state regulatory agencies to support their planning efforts. Used properly, models can assist policy makers in deciding which control programs are most effective in improving air quality, and meeting specific goals and objectives.

The air quality analyses were conducted with the Community Multiscale Air Quality (CMAQ) Model version 4.7.1, with emissions and meteorology inputs generated using SMOKE and WRF, respectively. CMAQ was selected because it is the open source atmospheric chemistry model co-sponsored by EPA and the National Oceanic Atmospheric Administration (NOAA), thus approved by EPA for this plan.

5.3 Domain/Grid Resolution

UDAQ selected a high resolution 4-km modeling domain to cover all of northern Utah including the portion of southern Idaho extending north of Franklin County and west to the Nevada border (Figure 5.1). This 97 x 79 horizontal grid cell domain was selected to ensure that all of the major emissions sources that have the potential to impact the nonattainment areas were included. The vertical resolution in the air quality model consists of 17 layers extending up to 15 km, with higher resolution in the boundary layer.

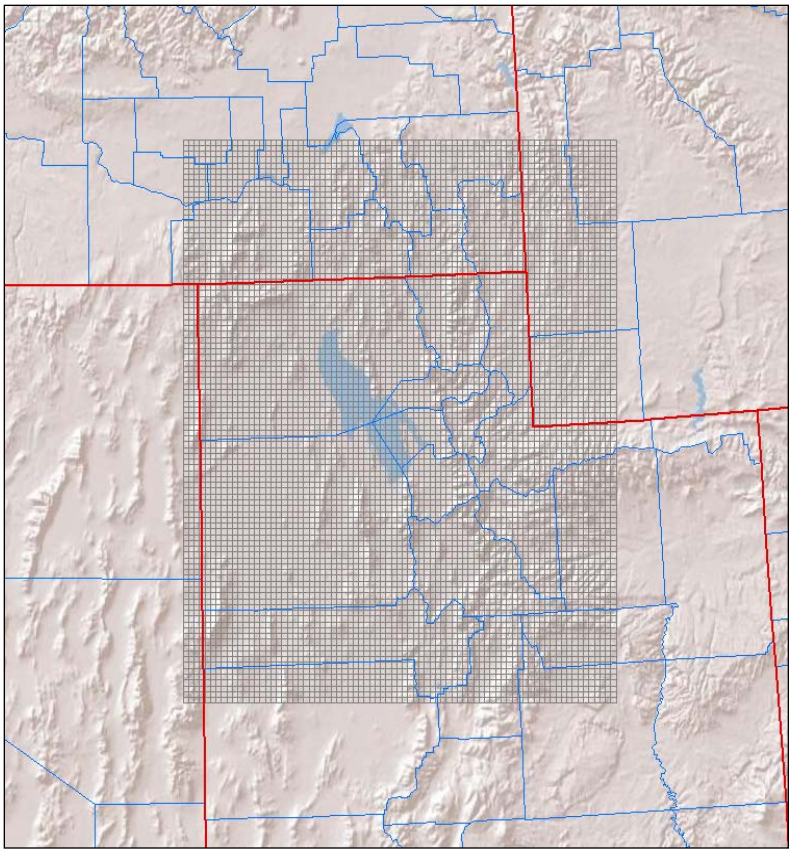


Figure 5.1: Northern Utah photochemical modeling domain.

5.4 Episode Selection

According to EPA's April 2007 "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze" the selection of SIP episodes for modeling should consider the following 4 criteria:

1. Select episodes that represent a variety of meteorological conditions that lead to elevated $PM_{2.5}$.
2. Select episodes during which observed concentrations are close to the baseline design value.
3. Select episodes that have extensive air quality data bases.
4. Select enough episodes such that the model attainment test is based on multiple days at each monitor violating NAAQS.

In general, UDAQ wanted to select episodes with hourly $PM_{2.5}$ concentrations that are reflective of conditions that lead to 24-hour NAAQS exceedances. From a synoptic meteorology point of view, each selected episode features a similar pattern. The typical pattern includes a deep trough over the eastern United States with a building and eastward moving ridge over the western United States. The episodes typically begin as the ridge begins to build eastward, near surface winds weaken, and rapid stabilization due to warm advection and subsidence dominate. As the ridge centers over Utah and subsidence peaks, the atmosphere becomes extremely stable and a subsidence inversion descends towards the surface. During this time, weak insolation, light winds, and cold temperatures promote the development of a persistent cold air pool. Not until the ridge moves eastward or breaks down from north to south is there enough mixing in the atmosphere to completely erode the persistent cold air pool.

From the most recent 5-year period of 2007-2011, UDAQ developed a long list of candidate $PM_{2.5}$ wintertime episodes. Three episodes were selected. An episode was selected from January 2007, an episode from February 2008, and an episode during the winter of 2009-2010 that features multi-event episodes of $PM_{2.5}$ buildup and washout. Further detail of the episodes is below:

- **Episode 1: January 11-20, 2007**

A cold front passed through Utah during the early portion of the episode and brought very cold temperatures and several inches of fresh snow to the Wasatch Front. The trough was quickly followed by a ridge that built north into British Columbia and began expanding east into Utah. This ridge did not fully center itself over Utah, but the associated light winds, cold temperatures, fresh snow, and subsidence inversion produced very stagnant conditions along the Wasatch Front. High temperatures in Salt Lake City throughout the episode were in the high teens to mid-20's Fahrenheit.

Figure 5.2 shows hourly $PM_{2.5}$ concentrations from Utah's 4 $PM_{2.5}$ monitors for January 11-20, 2007. The first 6 to 8 days of this episode are suited for modeling. The episode becomes less suited after January 18 because of the complexities in the meteorological conditions leading to temporary $PM_{2.5}$ reductions.

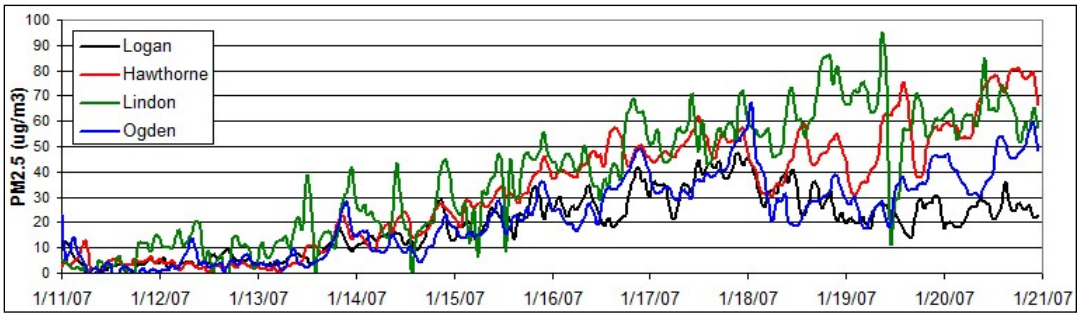


Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007

- **Episode 2: February 14-18, 2008**

The February 2008 episode features a cold front passage at the start of the episode that brought significant new snow to the Wasatch Front. A ridge began building eastward from the Pacific Coast and centered itself over Utah on Feb 20th. During this time a subsidence inversion lowered significantly from February 16 to February 19. Temperatures during this episode were mild with high temperatures at SLC in the upper 30's and lower 40's Fahrenheit.

The 24-hour average $PM_{2.5}$ exceedances observed during the proposed modeling period of February 14-19, 2008 were not exceptionally high. What makes this episode a good candidate for modeling are the high hourly values and smooth concentration build-up. The first 24-hour exceedances occurred on February 16 and were followed by a rapid increase in $PM_{2.5}$ through the first half of February 17 (Figure 5.3). During the second half of February 17, a subtle meteorological feature produced a mid-morning partial mix-out of particulate matter and forced 24-hour averages to fall. After February 18, the atmosphere began to stabilize again and resulted in even higher $PM_{2.5}$ concentrations during February 20, 21, and 22. Modeling the 14th through the 19th of this episode should successfully capture these dynamics. The smooth gradual build-up of hourly $PM_{2.5}$ is ideal for modeling.

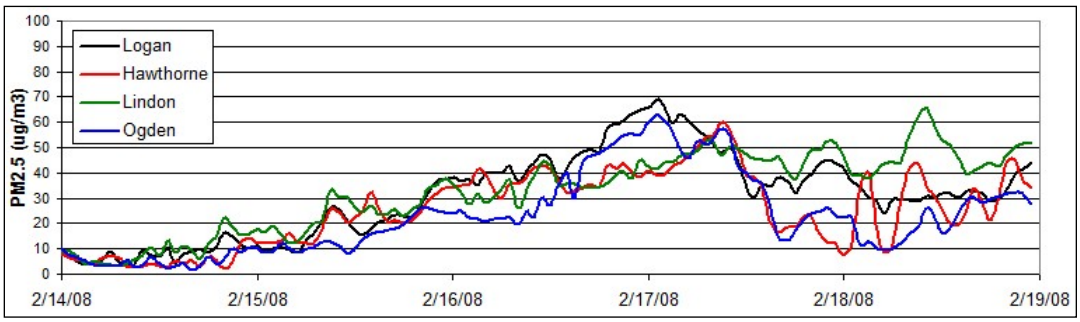


Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008

- **Episode 3: December 13, 2009 – January 18, 2010**

The third episode that was selected is more similar to a "season" than a single $PM_{2.5}$ episode (Figure 5.4). During the winter of 2009 and 2010, Utah was dominated by a semi-permanent ridge of high pressure that prevented strong storms from crossing Utah. This 35 day period was characterized by 4 to 5 individual $PM_{2.5}$ episodes each followed by a partial $PM_{2.5}$ mix out when a weak weather system passed through the ridge. The long length of the episode and repetitive $PM_{2.5}$ build-up and mix-out cycles makes it ideal for evaluating model strengths and weaknesses and $PM_{2.5}$ control strategies.

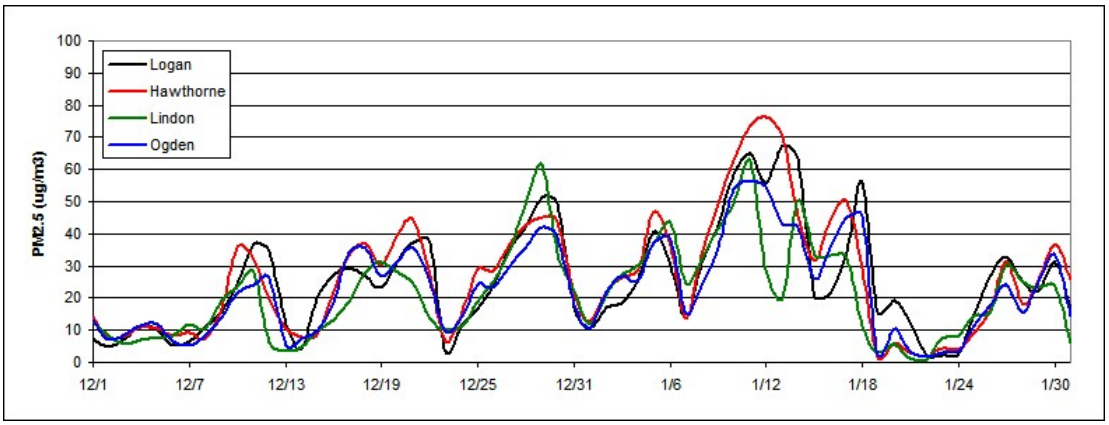


Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10.

5.5 Meteorological Data

Meteorological inputs were derived using the Weather Research and Forecasting (WRF), Advanced Research WRF (WRF-ARW) model version 3.2. WRF contains separate modules to compute different physical processes such as surface energy budgets and soil interactions, turbulence, cloud microphysics, and atmospheric radiation. Within WRF, the user has many options for selecting the different schemes for each type of physical process. There is also a WRF Preprocessing System (WPS) that generates the initial and boundary conditions used by WRF, based on topographic datasets, land use information, and larger-scale atmospheric and oceanic models.

Model performance of WRF was assessed against observations at sites maintained by the Utah Air Monitoring Center. A summary of the performance evaluation results for WRF are presented below:

- The biggest issue with meteorological performance is the existence of a warm bias in surface temperatures during high $PM_{2.5}$ episodes. This warm bias is a common trait of WRF modeling during Utah wintertime inversions.
- WRF does a good job of replicating the light wind speeds (< 5 mph) that occur during high $PM_{2.5}$ episodes.
- WRF is able to simulate the diurnal wind flows common during high $PM_{2.5}$ episodes. WRF captures the overnight downslope and daytime upslope wind flow that occurs in Utah valley basins.
- WRF has reasonable ability to replicate the vertical temperature structure of the boundary layer (i.e., the temperature inversion), although it is difficult for WRF to reproduce the inversion when the inversion is shallow and strong (i.e., an 8 degree temperature increase over 100 vertical meters).

5.6 Photochemical Model Performance Evaluation

The model performance evaluation focused on the magnitude, spatial pattern, and temporal variation of modeled and measured concentrations. This exercise was intended to assess whether, and to what degree, confidence in the model is warranted (and to assess whether model improvements are necessary).

CMAQ model performance was assessed with observed air quality datasets at UDAQ-maintained air monitoring sites (Figure 5.5). Measurements of observed $PM_{2.5}$ concentrations along with gaseous precursors of secondary particulate (e.g., NO_x, ozone) and carbon monoxide are made throughout winter at most of the locations in Figure 5.5. $PM_{2.5}$ speciation performance was assessed using the three Speciation Monitoring Network Sites (STN) located at the Hawthorne site in Salt Lake City, the Bountiful site in Davis County, and the Lindon site in Utah County.

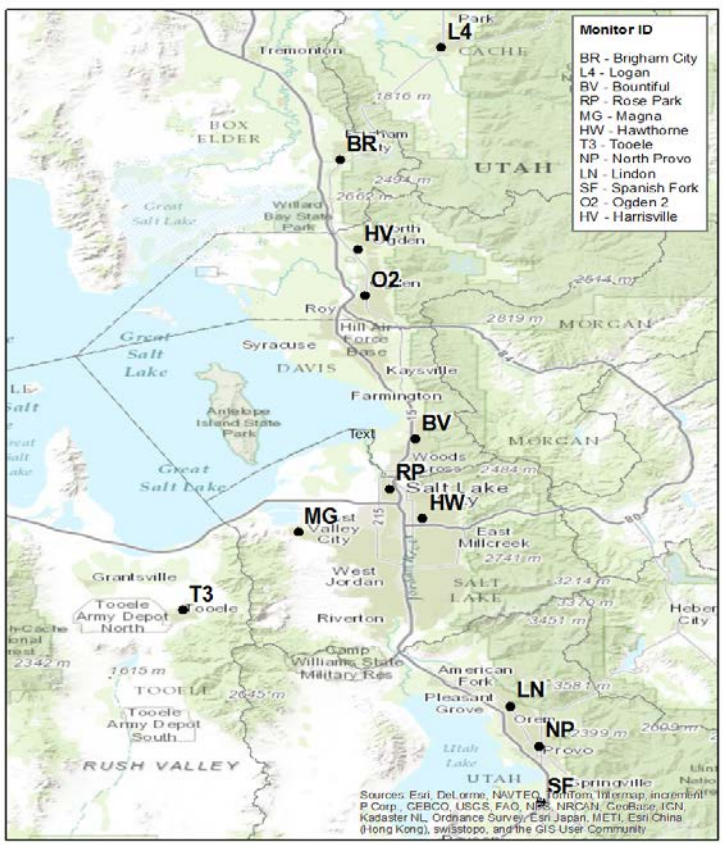


Figure 5.5: UDAQ monitoring network.

A spatial plot is provided for modeled 24-hr $PM_{2.5}$ for 2010 January 03 in Figure 5.6. The spatial plot shows the model does a reasonable job reproducing the high $PM_{2.5}$ values, and keeping those high values confined in the valley locations where emissions occur.

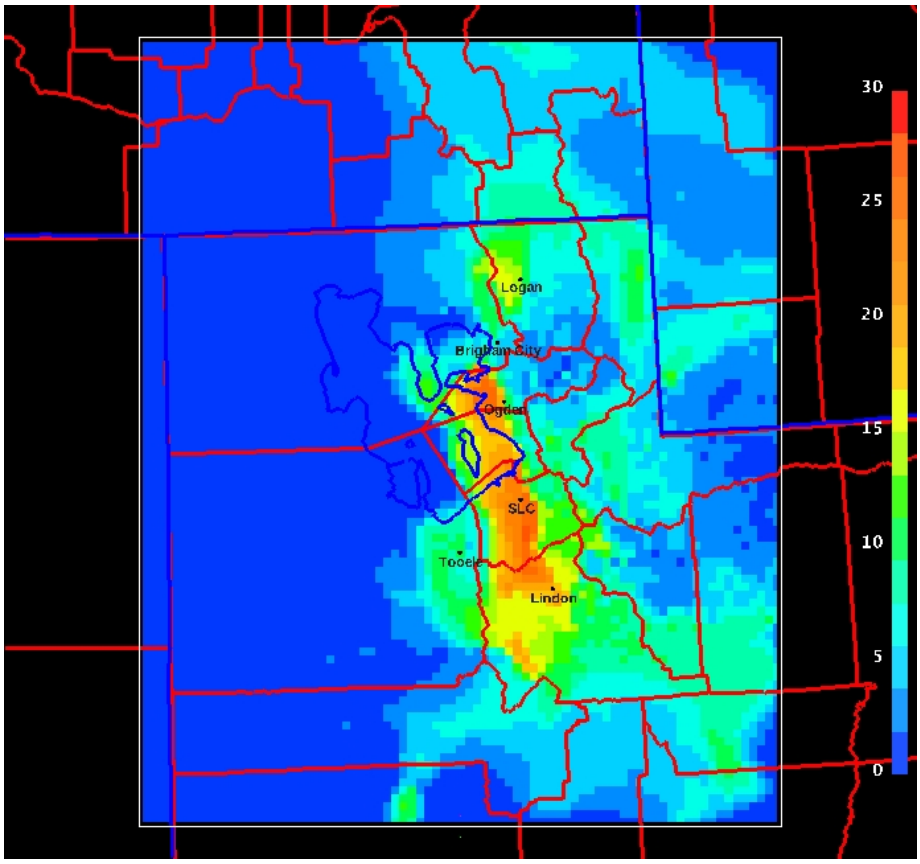


Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ (µg/m^3) for 2010 Jan. 03.

Time series of 24-hr $PM_{2.5}$ concentrations for the 13 Dec. 2009 – 15 Jan. 2010 modeling period are shown in Figs. 5.7 – 5.10 at the Hawthorne site in Salt Lake City (Fig. 5.7), the Ogden site in Weber County (Fig 5.8), the Lindon site in Utah County (Fig. 5.9), and the Logan site in Cache County (Fig. 5.10). For the most part, CMAQ replicates the buildup and washout of each individual episode. While CMAQ builds 24-hr $PM_{2.5}$ concentrations during the 08 Jan. – 14 Jan. 2010 episode, it was not able to produce the > 60 µg/m^3 concentrations observed at the monitoring locations.

It is often seen that CMAQ "washes" out the $PM_{2.5}$ episode a day or two earlier than that seen in the observations. For example, on the day 21 Dec. 2009, the concentration of $PM_{2.5}$ continues to build while CMAQ has already cleaned the valley basins of high $PM_{2.5}$ concentrations. At these times, the observed cold pool that holds the $PM_{2.5}$ is often very shallow and winds just above this cold pool are

southerly and strong before the approaching cold front. This situation is very difficult for a meteorological and photochemical model to reproduce. An example of this situation is shown in Fig. 5.11, where the lowest part of the Salt Lake Valley is still under a very shallow stable cold pool, yet higher elevations of the valley have already been cleared of the high $PM_{2.5}$ concentrations.

During the 24 – 30 Dec. 2009 episode, a weak meteorological disturbance brushes through the northernmost portion of Utah. It is noticeable in the observations at the Ogden monitor at 25 Dec. as $PM_{2.5}$ concentrations drop on this day before resuming an increase through Dec. 30. The meteorological model and thus CMAQ correctly pick up this disturbance, but completely clears out the building $PM_{2.5}$; and thus performance suffers at the most northern Utah monitors (e.g. Ogden, Logan). The monitors to the south (Hawthorne, Lindon) are not influence by this disturbance and building of $PM_{2.5}$ is replicated by CMAQ. This highlights another challenge of modeling $PM_{2.5}$ episodes in Utah. Often during cold pool events, weak disturbances will pass through Utah that will de-stabilize the valley inversion and cause a partial clear out of $PM_{2.5}$. However, the $PM_{2.5}$ is not completely cleared out, and after the disturbance exits, the valley inversion strengthens and the $PM_{2.5}$ concentrations continue to build. Typically, CMAQ completely mixes out the valley inversion during these weak disturbances.

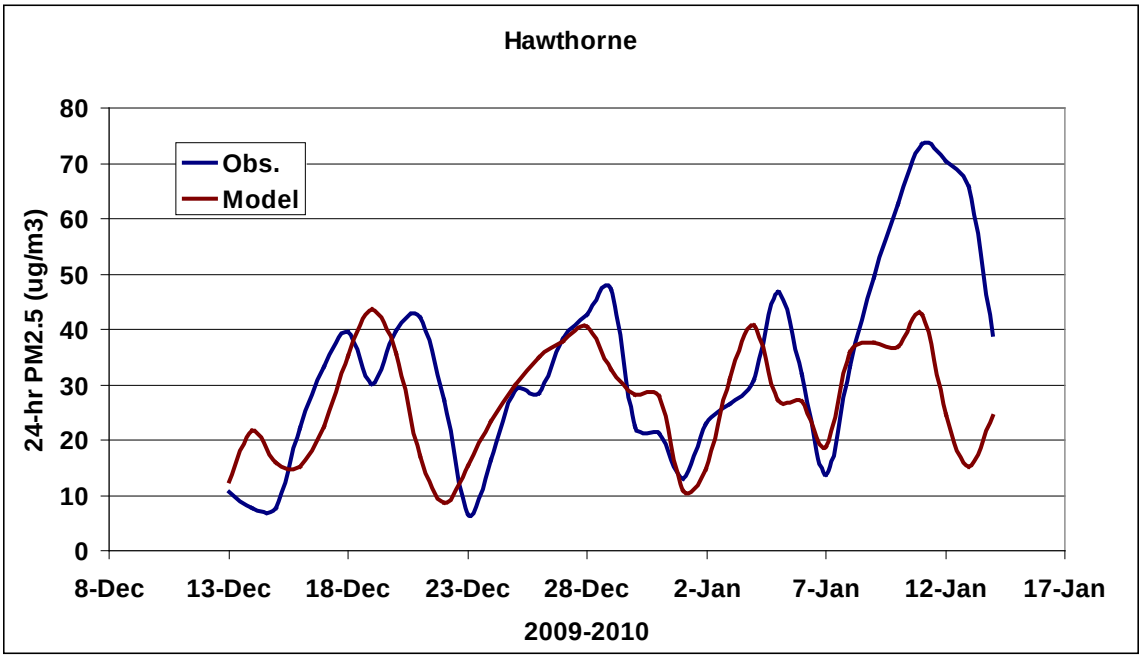


Figure 5.7: 24-hr PM2.5 time series (Hawthorne). Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

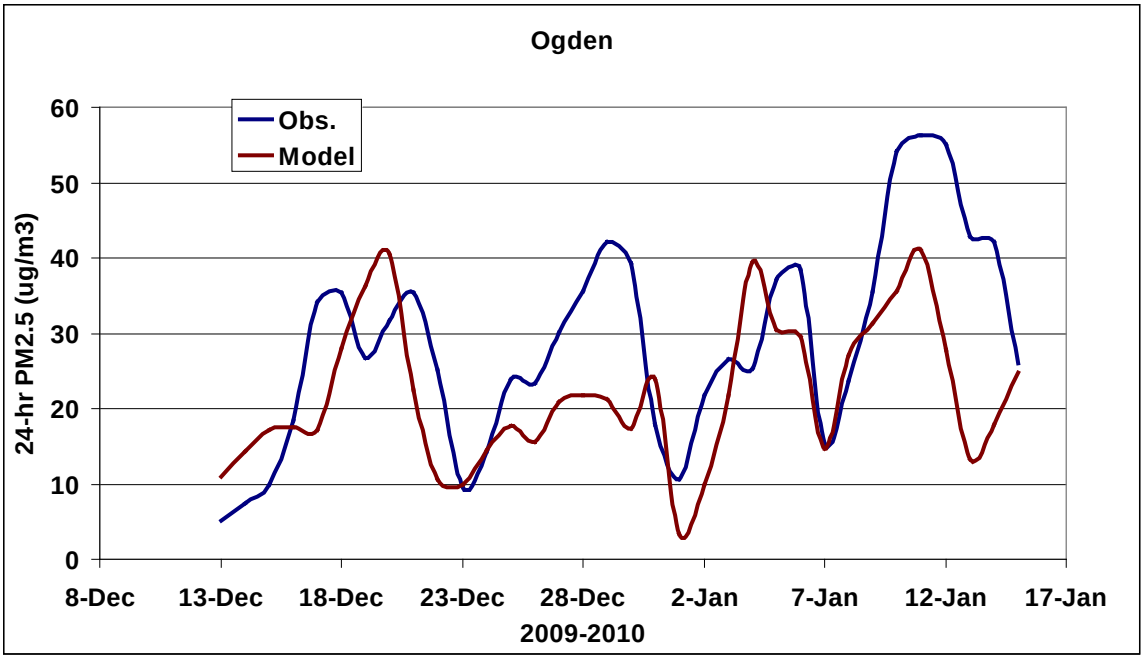


Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

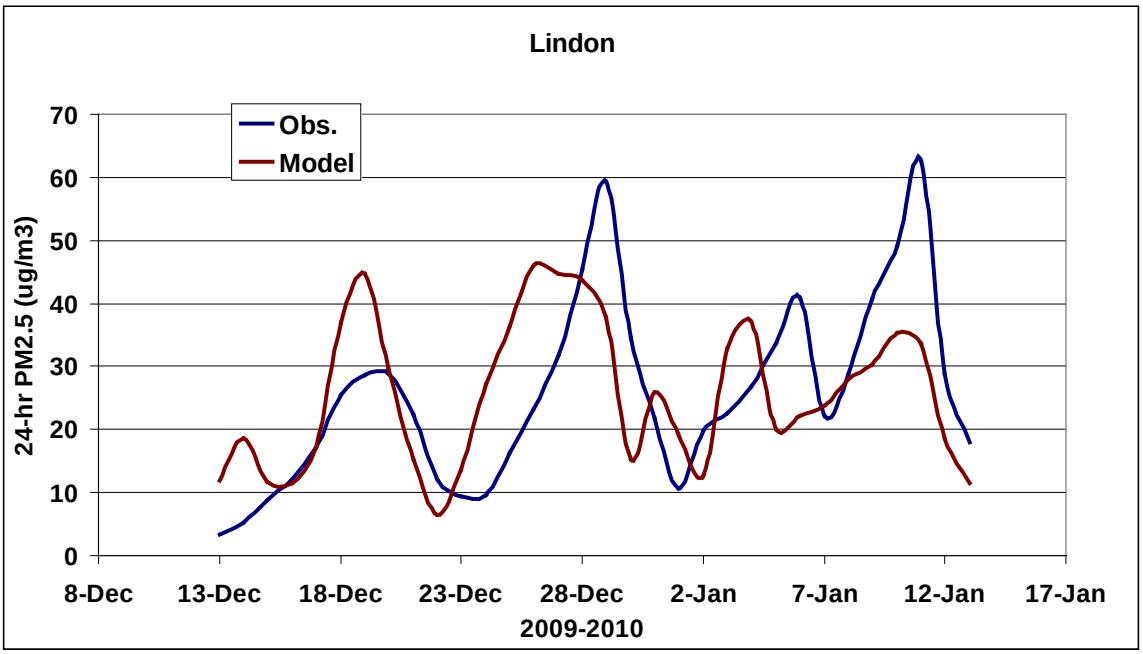


Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

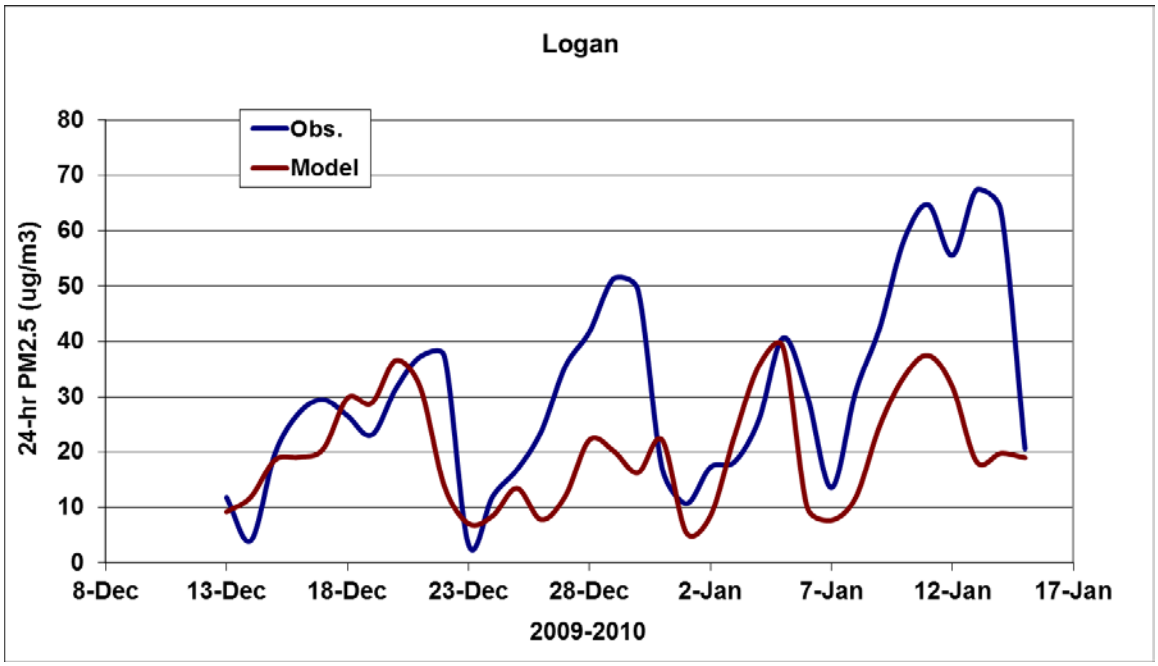


Figure 5.10: 24-hr $PM_{2.5}$ time series (Logan). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

Figure 5.11: An example of the Salt Lake Valley at the end of a high $PM_{2.5}$ episode. The lowest elevations of the Salt Lake Valley are still experiencing an inversion and elevated $PM_{2.5}$ concentrations while the $PM_{2.5}$ has been 'cleared out' throughout the rest of the valley. These 'end of episode' clear out periods are difficult to replicate in the photochemical model.

Generally, the performance of CMAQ to replicate the buildup and clear out of $PM_{2.5}$ is good. However, it is important to verify that CMAQ is replicating the components of $PM_{2.5}$ concentrations. $PM_{2.5}$ simulated and observed speciation is shown at the 3 STN sites in Figures 5.12 – 5.14. The observed speciation is constructed using days in which the STN filter 24-hr $PM_{2.5}$ concentration was > 35 µg/m^3. For the 2009-2010 modeling period, the observed speciation pie charts were created using 8 filter days at Hawthorne, 6 days at Lindon, and 4 days at Bountiful. The speciation of this small dataset appears similar to a comparison of a larger dataset of STN filter speciated data from 2005-2010 for high wintertime $PM_{2.5}$ days (see Figure 3.2 for one of these at Hawthorne).

The simulated speciation is constructed using modeling days that produced 24-hr $PM_{2.5}$ concentrations > 35 µg/m^3. Using this criterion, the simulated speciation pie chart is created from 18 modeling days for Hawthorne, 14 days at Lindon, and 14 days at Bountiful.

At all 3 STN sites, the percentage of simulated nitrate is greater than 40%, while the simulated ammonium percentage is at ~15%. This indicates that the model is able to replicate the secondarily formed particulates that typically make up the majority of the measured $PM_{2.5}$ on the STN filters during wintertime pollution events.

The percentage of model simulated organic carbon is ~13% at all STN sites, which is in agreement with the observed speciation of organic carbon at Hawthorne and slightly overestimated (by ~3%) at Lindon and Bountiful.

There is no STN site in the Logan nonattainment area, and very little speciation information available in the Cache Valley. Figure 5.15 shows the model simulated speciation at Logan. Ammonium (17%) and nitrate (56%) make up a higher percentage of the simulated $PM_{2.5}$ at Logan when compared to sites along the Wasatch Front.

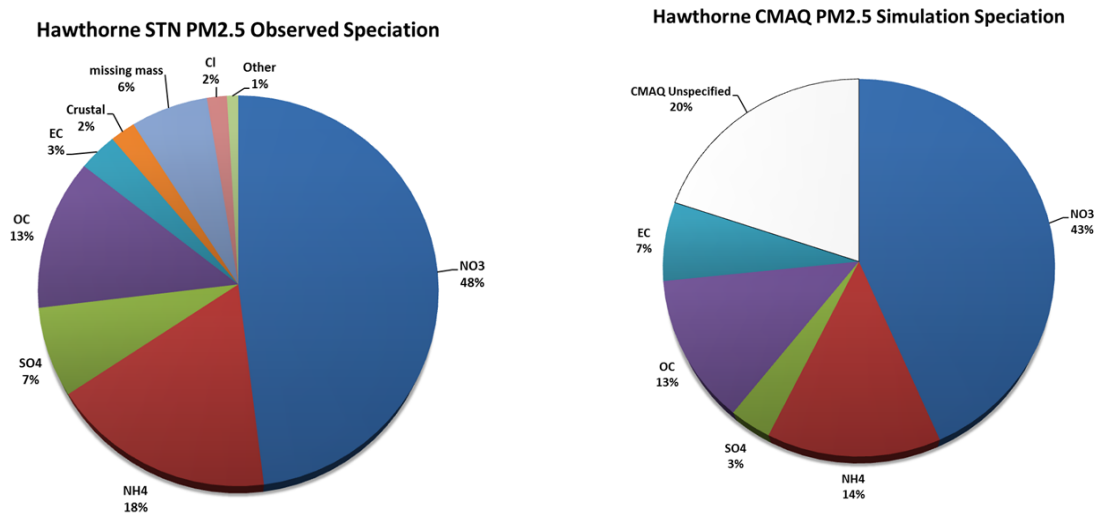


Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Hawthorne STN site.

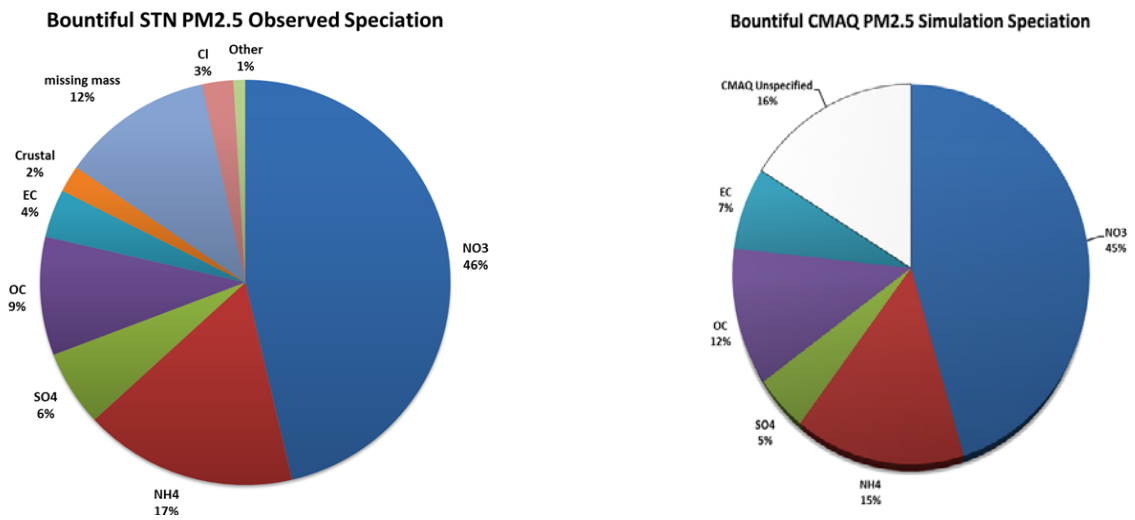


Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Bountiful STN site.

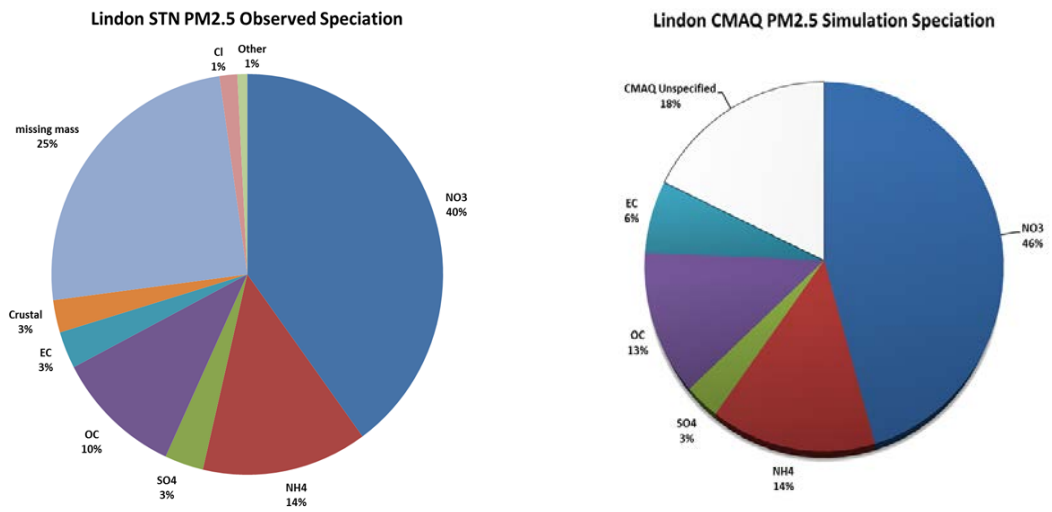


Figure 5.14: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Lindon STN site.

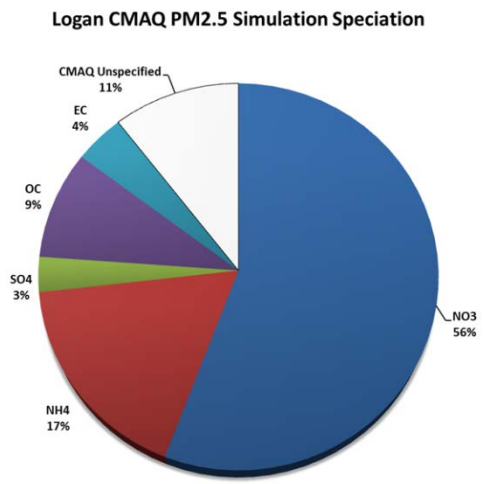


Figure 5.15: The composition of model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when a modeled day had 24-hr concentrations > 35 µg/m^3 at the Logan monitoring site. No observed speciation data is available for Logan.

5.7 Summary of Model Performance

Model performance for 24-hr $PM_{2.5}$ is good and generally acceptable and can be characterized as follows:

- Good replication of the episodic buildup and clear out of $PM_{2.5}$. Often the model will clear out the simulated $PM_{2.5}$ a day too early at the end of an episode. This clear out time period is difficult to model (i.e., Figure 5.11).
- Good agreement in the magnitude of $PM_{2.5}$, as the model can consistently produce the high concentrations of $PM_{2.5}$ that coincide with observed high concentrations.
- Spatial patterns of modeled 24-hr $PM_{2.5}$, show for the most part, that the $PM_{2.5}$ is being confined in the valley basins, consistent to what is observed.
- Speciation and composition of the modeled $PM_{2.5}$ matches the observed speciation quite well. Modeled and observed nitrate are between 40% and 50% of the $PM_{2.5}$. Ammonium is between 15% and 20% for both modeled and observed $PM_{2.5}$, while modeled and observed organic carbon falls between 10% to 13% of the total $PM_{2.5}$.

Several observations should be noted on the implications of these model performance findings on the attainment modeling presented in the following section. First, it has been demonstrated that model performance overall is acceptable and, thus, the model can be used for air quality planning purposes. Second, consistent with EPA guidance, the model is used in a relative sense to project future year values. EPA suggests that this approach "should reduce some of the uncertainty attendant with using absolute model predictions alone." Furthermore, the attainment modeling is supplemented by additional information to provide a weight of evidence determination.

5.8 Modeled Attainment Test

UDAQ employed Model Attainment Test Software (MATS) for the modeled attainment test at grid cells near monitors. MATS is designed to interpolate the species fractions of the PM mass from the Speciation Trends Network (STN) monitors to the FRM monitors. The model also calculates the relative response factor (RRF) for grid cells near each monitor and uses these to calculate a future year design value for these cells.

MATS results for future year modeling is presented in Figure 5.16. The future year design values are presented with and without SIP controls for 2015 (the attainment year). For comparison purposes, the monitored design value is also presented for the base year, 2010.

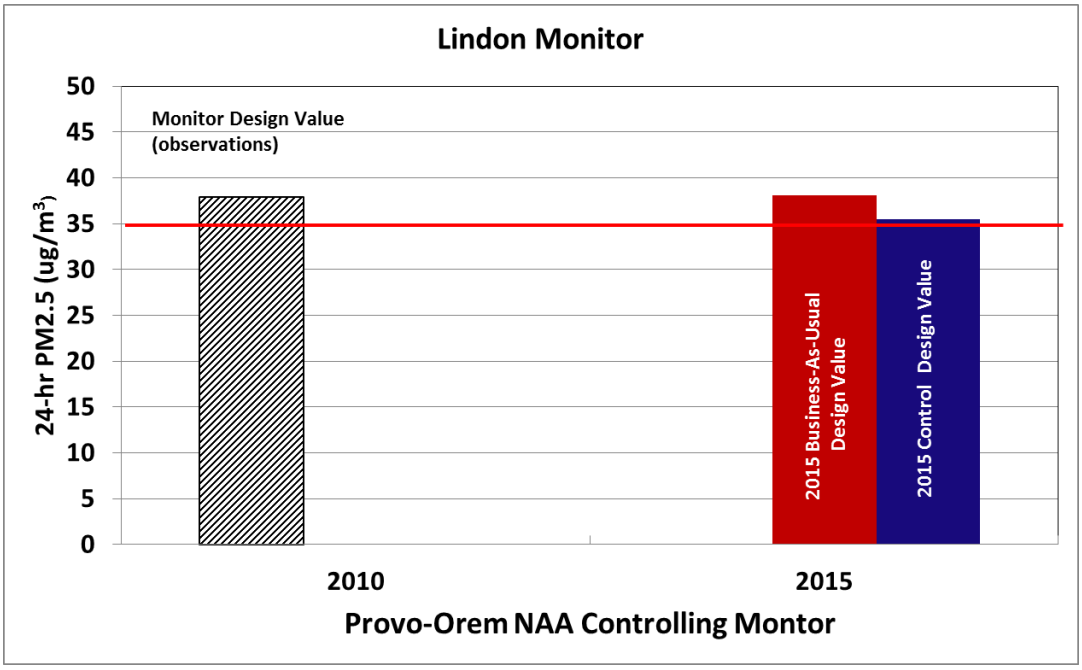


Figure 5.16, Model Results for the Provo, UT Nonattainment Area

Table 5.1 presents the same information in tabular form, and also includes any additional monitoring locations in the nonattainment area.

	2010	2015	
	Observed	**Business-As-Usual**	**Control Basket**
Lindon	*38*	*38*	*36*
N. Provo	*33*	*33*	*31*
Spanish Fork	*39*	*38*	*34*

Table 5.1, Modeled Concentrations ($\mu g/m^3$) for the Provo, UT Nonattainment Area

The "Control Basket" inventory that is presented in Table 5.1 consists of a combination of SIP reductions on point sources and new rules to be implemented that will affect smaller commercial and industrial businesses. All of these changes are detailed in Chapter 6 - Control Measures. Summary tables of the emission inventories that result from the Control Basket reductions are available in the TSD: Section 3 Baseline and Control Strategies.

5.9 Air Quality as of the Attainment Date

The attainment date for this moderate $PM_{2.5}$ nonattainment area is December 31, 2015. The plan provisions for moderate areas call, in Section 189(a)(1)(B), for either a demonstration that the plan will provide for attainment by the applicable attainment date or a demonstration that attainment by such date is impracticable.

As shown in the modeled attainment test, the emissions reductions achievable in 2015 do not allow for a demonstration that the Provo, UT nonattainment area can attain the 24-hour $PM_{2.5}$ NAAQS. Although predictions at two of the three monitors are less than 35 µg/m3, the predicted concentration at the Lindon monitor is still above the standard.

As discussed in Section 6.6, the emissions modeled in the “control basket” scenario reflect (at least) all RACM and RACT measures achievable in practice by the statutory implementation date (December 14, 2014). Therefore, what has been demonstrated is that attainment of the 24-hour standard by December 31, 2015 is impracticable.

Chapter 6 – CONTROL MEASURES

6.1 Introduction

Attaining the 2006, 24-hour NAAQS for $PM_{2.5}$ will require emission controls from directly emitted $PM_{2.5}$ as well as $PM_{2.5}$ precursors (SO_2, NO_x and VOC). It will involve emission sources from each of the four sectors identified in the discussion on emission inventories (stationary point sources, area sources, on-road mobile sources and off-road mobile sources). Furthermore, it will entail control measures of two basic types: existing measures; and measures imposed through this SIP.

This chapter summarizes the overall control strategy for the plan. Additional detail concerning individual emission control measures, including the emissions reductions to be expected, is contained in the Technical Support Document.

6.2 Utah Stakeholder Workgroup Efforts

In response to increasing interest in Utah's air quality problems and the need for greater participation in reducing air emissions, the Utah Division of Air Quality (DAQ) created a significant and meaningful role for public participation in the $PM_{2.5}$ SIP development process. The public involvement process was driven by a need for transparency and inclusivity of public health and business interests impacted by air quality issues.

DAQ's measures of success for the public involvement process were:

- Buy-in from public, stakeholders, and elected officials,
- SIP recommendations that are championed and implemented, and ;
- Close working relationship with partner organizations to deliver a unified message.

Measures of success for participants were:

- Having a say in plans that impacted their communities,
- Access to information and time to understand issues and provide input,
- Access to DAQ staff and the SIP development process,
- Meaningful participation in the process, and;
- Transparency of the process.

Public participation centered on creating workgroups with members from each county within the $PM_{2.5}$ nonattainment area—Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber. More than 100 people from agriculture, academia, environmental groups, state and local elected officials, industry, and the public volunteered to participate. Their participation ensured that the SIP development process would have grassroots-level input about strategies and their impacts on a countywide level.

Workgroup members were engaged in four rounds of meetings created to provide and gather information. After providing a baseline level of knowledge during Meeting One, draft emissions reductions were discussed during Meetings Two and Three, each followed by a survey to capture new ideas and feedback. Responses from the survey, and other feedback received during the process, were used to refine emissions inventories, in some cases significantly, refine mitigation strategies, provide new strategies, and provide ideas for implementation. Meeting Four was an opportunity for workgroup members to introduce the SIP package to the public and talk about the development process before one of several public comment hearings held in the nonattainment counties.

The public participation process was not without challenges. One of the most difficult was providing information that could get a diverse group of stakeholders to understand very complex and technical air quality and emissions reductions issues. Despite the challenges, the process was successful and contributed to a well-rounded and well-vetted SIP package.

6.3 Identification of Measures

In considering the suite of control measures that could be implemented as part of this plan several important principles were applied to expedite the analysis.

Filter data shows that secondary particulate is the portion of mass most responsible for exceedances of the standard on episode days, and specifically shows that ammonium nitrate is the single largest component of that material. In addition, it shows that organic carbon represents the bulk of primary $PM_{2.5}$.

Priority was given to those source categories or pollutants responsible for relatively larger percentages of the emissions leading to exceedances of the $PM_{2.5}$ NAAQS. The emissions inventory compiled to represent base-year conditions was useful in identifying the contributors to these emissions, particularly in their relation to the formation of ammonium nitrate.

At the same time, the air quality modeling shed light on the sensitivity of the airshed in its response to changes in different pollutants. VOC was immediately identified as a significant contributor to elevated $PM_{2.5}$ concentrations, and proved to be more limiting in the overall atmospheric chemistry than NO_x. This pointed the search for viable control strategies toward VOC emissions, and somewhat away from NO_x. It also became apparent that directly emitted $PM_{2.5}$, while a relatively small portion of the overall filter mass, is independent of the non-linear chemical transformation to particulate matter. Therefore,

any reduction in $PM_{2.5}$ emissions will directly improve future $PM_{2.5}$ concentrations, and like VOC, made these emissions an attractive target for potential control measures. Subsequent modeling revealed that, as time progressed and the relative concentrations of NO_x and VOC changed, controlling for NO_x would yield more benefit in terms of controlling $PM_{2.5}$. Ammonia is also prominent in chemical reactions that produce secondary $PM_{2.5}$, but it occurs in such abundance that $PM_{2.5}$ concentrations are sensitive only to unachievable reductions in ammonia.

6.4 Existing Control Measures

Since about 1970 there have been regulations at both state and federal levels to mitigate air contaminants. It follows that the estimates of emissions used in modeled attainment demonstration for this Plan take into account the effectiveness of existing control measures. These measures affect not only the levels of current emissions, but some continue to affect emissions trends as well.

An example of the former would be the effectiveness of an add-on control device at a stationary point source. It is presently effective in controlling emissions, and will continue to be that effective five years from now.

An example of the latter would be a federal rule that affects the manufacture of engines. The engines already sold into the airshed are effective in reducing emissions, but the number of these engines replacing older, higher emitting engines is increasing. Therefore, a rule such as this also affects the trend of emissions for that source category in a positive way.

The effectiveness of any control measure that was in place, and enforceable, at the time this Plan was written has been accounted for in the tabulation of baseline emissions and projected emissions.

The following paragraphs discuss some of the more important control strategies that are already in place for the four basic sectors of the emissions inventory.

<u>Stationary Point Sources:</u>

Utah's permitting rules require a review of new and modified major stationary sources in nonattainment areas, as is required by Section 173 of the Clean Air Act. Beyond that however, even minor sources and minor modifications to major sources planning to locate anywhere in the state are required to undergo a new source review analysis and receive an approval order to construct. Part of this review is an analysis to ensure the application of Best Available Control Technology (BACT). This requirement is ongoing and ensures that Utah's industry is well controlled.

In Utah County, stationary sources were required to reduce emissions in the early 1990s to address fine particulate matter, regulated as PM_{10} at that time. As with $PM_{2.5}$, much of the problem was attributed to secondary PM, and controls were applied to SO_2 and NO_x in addition to primary PM_{10}.

Any of the source-specific emission controls or operating practices that has been required as a result of the forgoing has been reflected in the baseline emissions calculated for the large stationary sources, and therefore evaluated in the modeled demonstration.

Area sources:

Stage 1 vapor control was introduced in Salt Lake and Davis Counties as part of the 1981 ozone SIP. This is a method of collecting VOC vapors, as underground gasoline storage tanks are filled at gas stations, and returning those vapors to a facility where they are collected and recycled. Since that time it has been extended to include the entire state.

Part of the PM_{10} control for Salt Lake and Davis Counties in the early 1990s was a program to curtail woodsmoke emissions during periods of atmospheric stagnation. Woodsmoke is rich in VOC emissions in addition to the particulate matter which is almost entirely within the $PM_{2.5}$ size fraction. In 2006 the woodburning program was extended to include the western half of Weber County as well.

CTGs adopted into Utah's air quality rules to control VOC emissions in Salt Lake and Davis Counties, as part of the 1981 ozone SIP, are also effective in controlling emissions from area sources.

Energy Efficiency

EPA recognizes the benefits of including energy efficiency programs in SIP's as a low cost means of reducing emissions. Two established energy efficiency programs that result in direct emission reductions within the Wasatch Front are already in place.

Questar Gas ThermWise Rebate Programs

Questar started the ThermWise Rebate Programs on January 1, 2007 as a way to promote the use of energy-efficient appliances and practices among its customers. The ThermWise Programs offer rebates to help offset the initial cost of energy-efficient appliances and weatherization. There are also rebates available for energy efficient new construction. The cost of rebates is built into the Questar gas rate. The rebates are vetted by the Utah Public Service Commission's strict "cost-effectiveness" tests. To pass these tests, Questar must prove that the energy cost savings produced by the ThermWise Programs exceeds the cost of the rebates. There is no scheduled end to the ThermWise Programs. According to the Questar program information, the program will remain in place as long as rebates remain cost-effective.

UDAQ calculates area source emissions for natural gas by multiplying emission factors against actual and projected yearly gas usage data submitted by Questar. In this way, actual realized program reductions are expressed in the past year (baseline) emission inventory. Future investment in energy efficiency is not captured in our projected future gas usage. Continuance of this program will result in future gas emissions that are lower than projected.

Weatherization Assistance Program

The Weatherization Assistance Program helps low-income individuals and families reduce energy costs. Individuals, families, the elderly and the disabled who are making no more than 200 percent of the current federal poverty income level are eligible for help. However, priority is given to the elderly and disabled, households with high-energy consumption, emergency situations and homes with preschool-age children.

The Utah Division of Housing and Community Development administer the program statewide through eight government and nonprofit agencies. Benefits are provided in the form of noncash grants to eligible households to make energy-efficiency improvements to those homes.

The energy efficiency realized from this program is also imbedded within the gas usage data UDAQ receives from Questar.

On-road mobile sources:

The federal motor vehicle control program has been one of the most significant control strategies affecting emissions that lead to $PM_{2.5}$. Since 1968, the program has required newer vehicles to meet ever more stringent emission standards for CO, NO_x, and VOC. Tier 1 standards were established in the early 1990s and were fully implemented by 1997. The Tier 1 emission standards can be found in Table 6.1. The EPA created a voluntary clean car program on January 7, 1998 (63 FR January 7, 1998), which was called the National Low Emission Vehicle (NLEV) program. This program asked auto manufacturers to commit to meet tailpipe standards for light duty vehicles that were more stringent than Tier 1 standards.

EPA Tier 1 Emission Standards for Passenger Cars and Light-Duty Trucks, FTP 75, g/mi

	100,000 miles/10 years[1]					
Category	**THC**	**NMHC**	**CO**	**NO_x[2] diesel**	***NO_x* *gasoline***	**PM[3]**
Passenger cars	-	0.31	4.2	1.25	*0.6*	0.1
LLDT, LVW <3,750 lbs	0.8	0.31	4.2	1.25	*0.6*	0.1
LLDT, LVW >3,750 lbs	0.8	0.4	5.5	0.97	*0.97*	0.1
HLDT, ALVW <5,750 lbs	0.8	0.46	6.4	0.98	*0.98*	0.1
HLDT, ALVW > 5,750 lbs	0.8	0.56	7.3	1.53	*1.53*	0.12

1 - Useful life 120,000 miles/11 years for all HLDT standards and for THC standards for LDT

2 - More relaxed NO_x limits for diesels applicable to vehicles through 2003 model year

3 - PM standards applicable to diesel vehicles only

Abbreviations:

LVW - loaded vehicle weight (curb weight + 300 lbs)

ALVW - adjusted LVW (the numerical average of the curb weight and the GVWR)

LLDT - light light-duty truck (below 6,000 lbs GVWR)

HLDT - heavy light-duty truck (above 6,000 lbs GVWR)

Table 6.1, Tier 1 Emission Standards

Shortly thereafter, EPA promulgated the Tier 2 program. This program went into effect on April 10, 2000 (65 FR 6698 February 10, 2000) and was phased in between 2004 and 2008. Tier 2 introduced more stringent numerical emission limits compared to the previous program (Tier 1). Tier 2 set a single set of standards for all light duty vehicles. The Tier 2 emission standards are structured into 8 permanent and 3 temporary certification levels of different stringency, called "certification bins," and an average fleet standard for NO_x emissions. Vehicle manufacturers have a choice to certify particular vehicles to any of the available bins. The program also required refiners to reduce gasoline sulfur levels nationwide, which was fully implemented in 2007. The sulfur levels need to be reduced so that Tier 2 vehicles could run correctly and maintain their effectiveness. The EPA estimated that the Tier 2 program will reduce oxides of nitrogen emissions by at least 2,220,000 tons per year nationwide in 2020[1]. Tier 2 has also contributed in reducing VOC and direct PM emissions from light duty vehicles. Tier 2 standards are summarized in Table 6.2 below.

Tier 2 Emission Standards, FTP 75, g/mi					
Bin#	**Full Useful Life**				
	NMOG*	**CO**	**NO_x†**	**PM**	**HCHO**
Temporary Bins					
11 MDPV[c]	0.28	7.3	0.9	0.12	0.032
10[a,b,d]	0.156 (0.230)	4.2 (6.4)	0.6	0.08	0.018 (0.027)
9[a,b,e]	0.090 (0.180)	4.2	0.3	0.06	0.018
Permanent Bins					
8[b]	0.125 (0.156)	4.2	0.2	0.02	0.018
7	0.09	4.2	0.15	0.02	0.018
6	0.09	4.2	0.1	0.01	0.018
5	0.09	4.2	0.07	0.01	0.018
4	0.07	2.1	0.04	0.01	0.011
3	0.055	2.1	0.03	0.01	0.011
2	0.01	2.1	0.02	0.01	0.004
1	0	0	0	0	0

* for diesel fueled vehicle, NMOG (non-methane organic gases) means NMHC (non-methane hydrocarbons)

† average manufacturer fleet NO_x standard is 0.07 g/mi for Tier 2 vehicles

[1] 65 FR 6698 February 10, 2000

a - Bin deleted at end of 2006 model year (2008 for HLDTs)

b - The higher temporary NMOG, CO and HCHO values apply only to HLDTs and MDPVs and expire after 2008

c - An additional temporary bin restricted to MDPVs, expires after model year 2008

d - Optional temporary NMOG standard of 0.280 g/mi (full useful life) applies for qualifying LDT4s and MDPVs only

e - Optional temporary NMOG standard of 0.130 g/mi (full useful life) applies for qualifying LDT2s only

Abbreviations:

LDT2 – light duty trucks 2 (0-6,000 lbs. GVWR, 3,751-5,750 lbs. LVW)

LDT4 – light duty trucks 4 (6,001-8,500 lbs. GVWR, 5,751 lbs. and greater ALVW)

MDPV – medium duty passenger vehicle

HLDT - heavy light duty truck (above 6,000 lbs GVWR)

Table 6.2, Tier 2 Emission Standards

In addition to the benefits from Tier 2 in the current emissions inventories, the emission projections for 2015 in this SIP continue to reflect significant improvements in both VOC and NO_x as older vehicles are replaced with Tier 2 vehicles. This trend may be seen in the inventory projections for on-road mobile sources despite the growth in vehicles and vehicle miles traveled that are factored into the same projections.

Additional on-road mobile source emissions improvement stemmed from federal regulations for heavy-duty diesel vehicles. The Highway Diesel Rule, which aimed at reducing pollution from heavy-duty diesel highway vehicles, was finalized in January 2001. Under the rule, beginning in 2007 (with a phase-in through 2010) heavy-duty diesel highway vehicle emissions were required to be reduced by as much 90 percent with a goal of complete fleet replacement by 2030. In order to enable the updated emission-reduction technologies necessitated by the rule, beginning in 2006 (with a phase-in through 2009) refiners were required to begin producing cleaner-burning ultra-low sulfur diesel fuel. Specifically, the rule required a 97 percent reduction in sulfur content from 500 parts per million (ppm) to 15 ppm. The overall nationwide effect of the rule is estimated to be equivalent to removing the pollution from over 90 percent of trucks and buses when the fleet turnover is completed in 2030.

To supplement the federal motor vehicle control program, Inspection / Maintenance (I/M) Programs were implemented in [~~Salt Lake and Davis Counties in 1984~~]Utah County in 1986. [~~A program for Weber County was added in 1990.~~] Th[~~ese~~]is program[~~s~~] ha[~~ve~~]s been effective in identifying vehicles that no longer meet the emission specifications for their respective makes and models, and in ensuring that those vehicles are repaired in a timely manner.

Off-road mobile sources:

Several significant regulatory programs enacted at the federal level will affect emissions from non-road mobile emission sources. This category of emitters includes airplanes, locomotives, hand-held engines, and larger portable engines such as generators and construction equipment. The effectiveness of these controls has been incorporated into the “NONROAD” model UDAQ uses to compile the inventory information for this source category. Thus, the controls have already been factored into the projection inventories used in the modeled attainment demonstration.

EPA rules for non-road equipment and vehicles are grouped into various "tiers" in a manner similar to the tiers established for on-road motor vehicles. To date, non-road rules have been promulgated for Tiers 0 through IV, where the oldest equipment group is designated "Tier 0" and the newest equipment, some of which has yet to be manufactured, falls into "Tier IV."

Of note are the following:

Locomotives

Locomotive engine regulation began with Tier 0 standards promulgated in 1998, which apply to model year 2001 engines.

In addition, because of the very long lifetimes of these engines, often up to forty years, Tier 0 standards include remanufacturing standards, which apply to locomotive engines of model years 1973 through 2001.

Subsequent tier standards for line-haul locomotives apply as follows:

Tier	Applicable Model Years
Tier I	2002 - 2004
Tier II	2005 - 2011
Tier III	2012 - 2014
Tier IV	2015 - newer

Yard or "switch" locomotives are regulated under different standards than line-haul locomotives.

Lastly, EPA has promulgated remanufacturing standards for Tier I and 2 locomotive engines to date.

Large Engines

Large non-road engines are usually diesel-powered but include some gasoline-powered equipment.

Large land-based diesel equipment (> 37 kw or 50 hp) used in agricultural, construction and industrial applications are regulated under Tier I rules, which apply to model years 1996 through 2000. Subsequent Tier II through IV rules apply to newer model-year equipment.

Some large non-road engines are gasoline-powered (spark-ignition). These include equipment such as forklifts, some airport ground support equipment, recreational equipment such as ATVs, motorcycles and snowmobiles. These are regulated under various tiers in a manner similar to diesel equipment.

Small Engines

Small engines are generally gasoline-powered (spark-ignition). Equipment includes handheld and larger non-handheld types. Handheld equipment includes lawn and garden power tools such as shrub trimmers, saws and dust blowers. Non-handheld equipment includes equipment such as lawnmowers and lawn tractors. From an emissions standpoint, smaller engine size is offset by the large number of pieces of equipment in use by households and commercial establishments. This equipment is regulated under a tiered structure as well.

Emissions Benefit

Each major revision of the non-road tier standards results in a large reduction of carbon monoxide, hydrocarbons, nitrogen oxides and particulate matter.

For example, the Non-road Diesel Tier II and III Rule, which regulates model-year 2001 through 2008 diesel equipment (> 37 kw or 50 hp) is estimated by EPA, in its Regulatory Announcement for this rule dated August 1998, to decrease NO_x emissions by a million tons per year by 2010, the equivalent of taking 35 million passenger cars off the road.

EPA further estimates, in its Regulatory Announcement dated May 2004, that the Tier IV non-road diesel rule is expected to decrease exhaust emissions per piece of equipment by over 90 percent compared to older equipment.

Low-Sulfur Diesel

Non-road diesel equipment is required to operate on diesel fuel with a sulfur content of no greater than 500 ppm beginning June 1, 2007.

Beginning June 1, 2010, non-road diesel equipment must operate on "ultra-low" sulfur diesel with a sulfur content of no more than 15 ppm.

Locomotives and certain marine engines must operate on ultra-low sulfur diesel by June 1, 2012.

6.5 SIP Controls

Beyond the benefits attributable to the controls already in place, there are new controls identified by this SIP that provide additional benefit toward reaching attainment. A summary of the plan strategy is presented here for each of the emission source sectors.

Overall, within the Provo – UT nonattainment area, the strategy to reduce emissions results in 7.07 tons per day of combined $PM_{2.5}$, SO_2, NO_x and VOC in 2015.

6.6 Reasonably Available Control Measures (RACM/RACT)

Section 172 of the CAA requires that each attainment plan "provide for the implementation of all reasonably available control measures (RACM) as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology (RACT)), and shall provide for attainment of the NAAQS."

Now that the Courts have determined that Subpart 4 applies to $PM_{2.5}$ nonattainment areas, it is also instructive to consider paragraph 189(a)(1)(C), which requires that "provisions to assure that reasonably available control measures … shall be implemented no later than … 4 years after designation in the case of an area classified as moderate after the date of the enactment of the Clean Air Act Amendments of 1990." All three of Utah's nonattainment areas for $PM_{2.5}$ were designated so on December 14, 2009. Hence, December 14, 2013 was the date by which all RACM was to have been implemented.

EPA interprets RACM as referring to measures of any type that may be applicable to a wide range of sources (mobile, area, or stationary), whereas RACT refers to measures applicable to stationary sources. Thus, RACT is a type of RACM specifically designed for stationary sources. For both RACT and RACM, potential control measures must be shown to be both technologically and economically feasible.

Pollutants to be addressed by States in establishing RACT and RACM limits in their $PM_{2.5}$ attainment plans will include primary $PM_{2.5}$ as well as precursors to $PM_{2.5}$. For the control strategy in this plan, those pollutants include SO_2, NO_x and VOC.

In general, the combined approach to RACT and RACM includes the following steps: 1) identification of potential measures that are reasonable, 2) modeling to test the control strategy, and 3) selection of RACT and RACM.

This basic process was applied to each of the four basic sectors of the emissions inventory:

<u>Stationary Point sources:</u>

Reasonably Available Control Technology – As stated above, RACT refers to measures applicable to stationary sources. Thus, RACT is a type of RACM specifically designed for stationary sources.

Section 172 does not include any specific applicability thresholds to identify the size of sources that States and EPA must consider in the RACT and RACM analysis. In developing the emissions inventories underlying the SIP, the criteria of 40 CFR 51 for air emissions reporting requirements was used to establish a 100 ton per year threshold for identifying a sub-group of stationary point sources that would be evaluated individually. The cut-off was applied to either a sources reported emissions for 2008 or for its potential to emit in a given year. The rest of the point sources were assumed to represent a portion of the overall area source inventory.

Sources meeting the criteria described above were individually evaluated to determine whether their operations would be consistent with RACT.

SIPs for $PM_{2.5}$ must assure that the RACT requirement is met, either through a new RACT determination or a certification that previously required RACT controls (e.g. for another pollutant such as PM_{10}) represent RACT for $PM_{2.5}$.

In conducting the analysis, UDAQ found that, as a whole, the large stationary sources were already operating with a high degree of emission control. It follows that the percentage of SIP related emissions reductions is not large relative to the overall quantity of emissions. As stated before, many of these sources were required to reduce emissions to address nonattainment issues with SO_2, ozone and PM_{10}. Routine permitting in these areas of nonattainment already includes BACT as an ongoing standard of review, even for minor sources and modifications. In order to find additional emission reductions at these sources, UDAQ identified a level of emission control that goes beyond reasonable, or RACT, and achieves the best available control.

Additional information regarding the RACT analysis for each of the sources in the nonattainment area may be found in the Technical Support Document.

For the Provo, UT nonattainment area, there are seven stationary point sources that met or meet the criteria of 100 tons per year for $PM_{2.5}$ or any attainment plan precursor. The emissions from these sources that were modeled for the 2010 baseline as well as the 2015 attainment year are shown below in Table 6.3.[1] Note that these emissions also include the growth projections that were applied. Information is provided in the TSD regarding the emissions reductions specific to reduction strategies resulting from the SIP.

[1] As noted above, the RACT implementation date given in CAA section 189(a)(1)(c), in Subpart 4, was December 14, 2013. As an editorial note, UDAQ had initially prepared this SIP under guidance pointing only to Subpart 1 of the CAA. That reading of the Act had resulted in a SIP with a different construct. It had identified an attainment date that was as expeditious as practicable, yet that date would have required all of the additional 5 years availed under section 172(a)(2)(A). Implementation of RACM and RACT, under that construct, was also to be as expeditious as practicable but in no case later that one year prior to the attainment date identified in the plan. Thus, RACT measures could have been implemented as late as December 14, 2018. Additionally, the requirement to address reasonable further progress (RFP) had identified two earlier milestones (2014 and 2017), and these presented additional targets for RACT implementation. Thus, the overall plan had incorporated a phased-in implementation schedule for measures identified as RACT.

When Subpart 4 superseded the more general planning requirements of Subpart 1, it was no longer permissible to request an extension of the attainment date. Instead, it became incumbent on the planning agency to determine either that the plan will provide for attainment by the applicable attainment date, or that attainment by such date is impracticable.

The attainment date for this moderate nonattainment area is December 31, 2015 and the RACT implementation date (having passed) was December 14, 2013. Many of the control strategies initially identified, under only Subpart 1, as RACT cannot be implemented by that prescribed date. This raises the question as to whether such measures would even be considered reasonable, either technologically or economically.

Nevertheless, UDAQ has retained this portion of the control strategy in the Emission Limits section of this State Implementation Plan. UDAQ is also demonstrating in this plan that attainment of the 2006, 24-hour NAAQS for $PM_{2.5}$ is impracticable by the attainment date. As part of that showing, the emissions reductions associated with all of the technologies and measures identified as RACT under only Subpart 1 were reflected in the emissions inventory modeled for the year 2015. This overstates the degree of control in 2015, however, from the standpoint of demonstrating that it is impracticable to attain the standard in 2015, provides a measure of conservatism to the overall conclusion.

Typical Winter Inversion Weekday Emissions (tpd)			2010_(R2) Baseline					2015_(R9) Growth & Control				
Source Category	NA-Area	Site	PM2.5	NOX	VOC	NH3	SO2	PM2_5	NOX	VOC	NH3	SO2
Point Sources	Provo, UT											
		BYU Main Campus	0.005	0.083	0.024	0.002	0.001	0.007	0.081	0.029	0.002	0.003
		Geneva Nitrogen Plant	0.055	0.331	0.000	0.008	0.000	0.062	0.420	0.000	0.010	0.000
		Pacific States	0.017	0.215	0.577	0.002	0.006	0.022	0.237	0.386	0.003	0.008
		Pacificorp Lakeside Power Plant	0.183	0.269	0.062	0.276	0.018	0.470	0.623	0.305	0.518	0.089
		Payson City	0.000	0.012	0.006	0.000	0.000	0.020	0.808	0.227	0.000	0.017
		Provo Power Plant	0.000	0.024	0.003		0.000	0.004	0.313	0.015		0.000
		Springville City Whitehead Power Plant	0.000	0.000	0.000	0.000	0.000	0.639	0.397	0.126	0.001	0.028
		Provo, UT Total	**0.261**	**0.934**	**0.673**	**0.287**	**0.026**	**1.224**	**2.880**	**1.088**	**0.535**	**0.145**

Table 6.3, Point Source Emissions; Baseline and Projections with Growth and Control

New Source Review / Banked Emission Reduction Credits – Under Utah's new source review rules in R307-403-8, banking of emission reduction credits (ERCs) is permitted to the fullest extent allowed by applicable Federal Law as identified in 40 CFR 51, Appendix S, among other documents. Under Appendix S, Section IV.C.5, a permitting authority may allow banked ERCs to be used under the preconstruction review program (R307-403) as long as the banked ERCs are identified and accounted for in the SIP control strategy. In the past, Utah has accounted for existing banked ERCs in SIP control strategies, ensuring that a pool of ERCs was available for new or modified sources in nonattainment areas. For the $PM_{2.5}$ SIP, however, it was not possible to include banked ERCs in the attainment demonstration. The $PM_{2.5}$ SIP adopted by the Air Quality Board on December 4, 2013 did not include banked $PM_{2.5}$ or $PM_{2.5}$ precursor ERCs in the attainment demonstration[1] and therefore under R307-403-8 any ERCs that were banked prior to December 4, 2013 may not be used as $PM_{2.5}$ major source or major modification emission offsets for $PM_{2.5}$ nonattainment areas. The use of these existing banked ERCs to meet the requirements of existing SIPs for PM_{10}, SO_2 and ozone are not affected by the $PM_{2.5}$ SIP and would be evaluated according to the provisions of those SIPs. Any ERCs generated after December 4, 2013 for $PM_{2.5}$ or $PM_{2.5}$ precursors would have been accounted for in the $PM_{2.5}$ attainment demonstration and are eligible to be used as emission offsets for $PM_{2.5}$ or $PM_{2.5}$ precursors. DAQ has established a new registry for $PM_{2.5}$ ERCs generated after December 4, 2013 to ensure that qualifying ERCs are tracked.

Area sources:

The area source RACM analysis consisted of a thorough review of the entire area source inventory for anthropocentrically derived direct $PM_{2.5}$ and precursors constituents. There was no emission threshold level established in the review process; instead, the analysis centered on whether reasonable control measures are available for a given source category. The following table identifies these categories as well as the pollutant(s) likely to be controlled, and provides some remarks as to whether a control

[1] The SIP revision adopted by the Utah Air Quality Board on December 4, 2013 had demonstrated attainment by December 14, 2019. This SIP revision includes a demonstration under CAA Section 189(a)(1)(B) that it impracticable to attain the NAAQS in 2015. Banked emission credits were not included in this demonstration either.

strategy was ultimately pursued. In considering what source categories might be considered, Utah made use of EPA recommendations included in Control Techniques Guideline Documents (CTG's), as well as control strategies from other states. DAQ evaluated each strategy for technical feasibility as part of the RACM analysis. The screening column in the table identifies whether or not a strategy was retained for rulemaking or screened out for impracticability.

Table 6.4 Area Source Strategy Screening

Strategy	Constituent(s)	Screening Status	Remarks
1. Repeal current surface coating rule, R307-340. Replace this rule with individual rules for each category. New rules include $PM_{2.5}$ nonattainment areas. New rules update applicability and control limits to most current CTG. Current rule includes, paper, fabric and vinyl, metal furniture, large appliance, magnet wire, flat wood, miscellaneous metal parts and graphic arts.	VOC	Retained	R307-340 previously applied to Davis and Salt Lake counties. R307-340 was withdrawn and re-enacted as separate rules for each existing category. The new rules were expanded to nonattainment areas and updated to the most current RACT based limit(s).
2. New separate surface coating rules for following sources: a. Aerospace b. High performance c. Architectural d. Marine e. Sheet, strip & coil f. Traffic markings g. Plastic parts	VOC	See Remarks Column	Aerospace – retained High performance – not retained, regulated under Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Architectural – initially nor retained, further research indicated that adopting the Ozone Transport Commission model rule is feasible. Marine – not retained, only 1.2 tpy Sheet, strip & coil – retained Traffic markings – not retained, regulated under FIFRA Plastic parts - retained
3. Agricultural practices using Natural Resources Conservation Service (NRSC) practice standards	VOC, $PM_{2.5}$, ammonia	Not Retained	The NRCS has already enrolled most farmers in the erodible regions in their program thereby negating the need for rulemaking
4. Consumer products rule regulating VOC content	VOC	Retained	
5. Adhesives and sealant rule	VOC	Retained	
6. Expand current solvent degreasing rule R307-335 to $PM_{2.5}$ nonattainment areas and add a new section on industrial solvent cleaning	VOC	Retained	
7. Automobile refinishing rule	VOC	Retained	
8. Expand wood furniture manufacturing rule to $PM_{2.5}$ nonattainment areas. Update to most current CTG.	VOC	Retained	

Strategy	Constituent(s)	Screening Status	Remarks
9. Lower the no burn cut point for residential use of solid fuel burning devices. Require new sale of EPA certified stoves/fireplaces. Prohibit the sale/resale of noncertified stoves in nonattainment areas.	VOC, $PM_{2.5}$, NO_x, SO_x, ammonia	Retained	
10. Ban new sales of stick type outdoor wood boilers in nonattainment areas.	VOC, $PM_{2.5}$, NO_x, SO_x, ammonia	Retained	
11. Industrial bakery rule	VOC	Initially Retained	Screened out after analysis of public comment, cost benefit analysis does not support rulemaking, high cost-low VOC reduction
12. Restaurant charbroiler emission control: - Chain-driven -Underfire	VOC, $PM_{2.5}$	Chain-driven Retained Underfire-Not Retained	No reasonable control measures available at this time for underfire charbroiling
13. Appliance pilot light phase out	VOC, $PM_{2.5}$, NO_x, SO_x, ammonia	Retained	
14. Expand current fugitive dust rule, R307-309 to $PM_{2.5}$ nonattainment areas. Require BMP's for dust plans.	$PM_{2.5}$	Retained	
15. Amend fugitive dust rule to include cattle feed lot	$PM_{2.5}$	Not Retained	Sizeable feed lots are not located in nonattainment areas
16. Ultra-low NO_x burners in commercial, industrial, and institutional boilers	NO_x	Tentatively Retained for Future Consideration	Developing technology not readily available at this time
17. Ultra-low NO_x burners in water heaters	NO_x	Tentatively Retained for Future Consideration	High cost and availability concerns
18. Manure management	VOC, ammonia	Not Retained	NRCS best management practices already encourages manure management. Limited viable options during winter months and treatment options are costly with low control efficiency that would not yield significant ammonia reduction in an ammonia rich inventory
19. Ban testing of back-up generators on red-alert days	VOC, $PM_{2.5}$, NO_x, SO_x	Initially Retained	Screened out after review of public comment, rule implementation was more complicated than anticipated, generators cannot be easily re-programmed
20. Prohibit use of cutback asphalt	VOC	Not Retained	Cities and highway administration personnel need stockpile for winter time road repair. Very small inventory.
21. Control limits on aggregate processing operations and asphalt manufacturing	$PM_{2.5}$, NO_x, SO_x	Retained	
22. R307-307 Road Salt and Sanding	PM	Retained	Expand current rule to nonattainment areas

EPA published CTGs and Alternative Control Techniques documents (ACTs) for VOCs for a host of emission sources. The CTGs are used to presumptively define VOC RACT. The VOC ACTs describe available control techniques and their cost effectiveness, but do not define presumptive RACT levels as the CTGs do. Therefore, CTG's are given highest priority in rule development.

Where a CTG does not exist for an emission source or where a CTG is so dated that it no longer represents current industry practice, UDAQ considered rules from other states as reference sources.

Additional reference sources include the Ozone Transport Commission (OTC) and the Northeast States for Coordinated Air Use Management.

As noted above, many CTGs were previously adopted into Utah's air quality rules to address ozone nonattainment in Salt Lake and Davis Counties. In conducting this evaluation, consideration was given to whether an expansion of applicability for an existing CTG into additional counties would provide a benefit for $PM_{2.5}$, and whether a strengthening of existing CTG requirements in Salt Lake and Davis Counties would result in an incremental benefit that was economically feasible. Furthermore, EPA has updated some of its existing CTGs and added some new ones to the list.

As part of this SIP, Utah has identified relevant source categories covered by CTGs, and promulgated rules based on the CTGs for reducing emissions from these categories. These rules apply to the following source categories:

- Control of Volatile Organic Emissions from Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks
- Control of Volatile Organic Emissions from Solvent Metal Cleaning
- Control of Volatile Organic Emissions from Surface Coating of Insulation of Magnet Wire
- Control of Volatile Organic Emissions from Graphic Arts
- Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations
- Control Techniques Guidelines for Industrial Cleaning Solvents
- Control Techniques Guidelines for Flat Wood Paneling Coatings
- Control Techniques Guidelines for Paper, Film, and Foil Coatings
- Control Techniques Guidelines for Large Appliance Coatings
- Control Techniques Guidelines for Metal Furniture Coatings
- Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings
- Control of Volatile Organic Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations

While most VOC sources are addressed by CTGs, the remaining emission sources must be evaluated by engineering analysis, including an evaluation of rulings by other states including model rules developed by the Ozone Transport Commission. These include VOCs from autobody refinishing, restaurant charbroiling, and phasing out appliance pilot lights.

CTGs for $PM_{2.5}$ emissions sources do not exist. RACT for $PM_{2.5}$ has been established through information from varied EPA and other state SIP sources. A useful source of data is the AP 42 Compilation of Air Pollutant Emission Factors, first published by the US Public Health Service in 1968. In 1972, it was revised and issued as the second edition by the EPA. The emission factor/control information was applied to fugitive dust and mining strategies.

Table 6.5 shows the effectiveness of the area source SIP control strategy for the Provo, UT nonattainment area by indicating the quantities of emissions eliminated from the inventory in 2015. Most of these rules became effective January 1, 2014.

Provo, UT Nonattainment Area				
	2015 lbs/day reduced			
	NOX	PM2.5	SOX	VOC
Area Source Rules				
R307-302, Solid fuel burning	137	1,141	22	1,432
R307-303, Commercial cooking		119		31
R307-309, Fugitive dust				
R307-312, Aggregate processing operations		3		
R307-335, Degreasing				524
R307-342, Adhesives & sealants				696
R307-343, Wood manufacturing				213
R307-344, Paper, film & foil coating				
R307-345, Fabric & vinyl coating				242
R307-346, Metal furniture coating				93
R307-347, Large appliance coating				48
R307-348, Magnet wire coating				0
R307-349, Flat wood panel coating				21
R307-350 Miscellaneous metal parts coating				255
machinery				44
other transportation				18
Special				3
R307-351, Graphic arts				370
R307-352, Metal containers				
R307-353, Plastic coating				92
R307-354, Auto body refinishing				520
R307-355, Aerospace coatings				30
R307-356, Appliance pilot light	203	1	1	12
R307-357, Consumer products				1,198
R307-361, Architectural coatings				2,647
Grand Totals	**356**	**1,398**	**26**	**8,654**

Table 6.5, Emissions Reductions from Area Source SIP Controls

On-road mobile sources:

[~~A decentralized, test-and-repair program was evaluated for Box Elder and Tooele counties within the nonattainment area. For the evaluation, all model year 1968 and newer vehicles would be subject to a biennial test except for exempt vehicles. The program would exempt vehicles less than four years old as~~

~~of January 1 on any given year from an emissions inspection. Year 1996 and newer vehicles would be subject to an On-Board Diagnostics (OBD) inspection. Year 1995 and older vehicles would be subject to a two-speed idle inspection (TSI). Based on this evaluation, this program was not included because it was determined that implementation of such a program would not affect PM 2.5 concentrations at the controlling monitor (Hawthorne) for the Salt Lake-Ogden-Clearfield nonattainment area. Additional information is provided in the Technical Support Document.~~]

Beyond the existing I/M program in Utah County, there are no emission controls that were implemented for this source category.

Off-road mobile sources:

Beyond the existing controls reflected in the projection-year inventories and the air quality modeling there are no emission controls that would apply to this source category.

Chapter 7 – TRANSPORTATION CONFORMITY

7.1 Introduction

The federal Clean Air Act (CAA) requires that transportation plans and programs within the Provo, Utah $PM_{2.5}$ nonattainment area conform to the air quality plans in the region prior to being approved by the Mountainland Association of Governments (MAG) Metropolitan Planning Organization. Demonstration of transportation conformity is a condition to receive federal funding for transportation activities that are consistent with air quality goals established in the Utah State Implementation Plan (SIP). Transportation conformity requirements are intended to ensure that transportation activities do not interfere with air quality progress. Conformity applies to on-road mobile source emissions from regional transportation plans (RTPs), transportation improvement programs (TIPs), and projects funded or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) in areas that do not meet or previously have not met the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide, particulate matter less than 10 micrometers in diameter (PM_{10}), particulate matter 2.5 micrometers in diameter or less ($PM_{2.5}$), or nitrogen dioxide.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFTEA-LU) and section 176(c)(2)(A) of the CAA require that all regionally significant highway and transit projects in air quality nonattainment areas be derived from a "conforming" transportation plan. Section 176(c) of the CAA requires that transportation plans, programs, and projects conform to applicable air quality plans before being approved by an MPO. Conformity to an implementation plan means that proposed activities must not (1) cause or contribute to any new violation of any standard in any area, (2) increase the frequency or severity of any existing violation of any standard in any area, or (3) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The plans and programs produced by the transportation planning process of the MAG are required to conform to the on-road mobile source emissions budgets established in the SIP, or absent an approved or adequate budget, required to meet the interim conformity test. Approval of conformity is determined by the FHWA and FTA.

7.2 Consultation

The Interagency Consultation Team (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 responsibilities of the participating agencies. Members of the ICT workgroup collaborated on a regular basis during the development of the $PM_{2.5}$ 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.

ICT Workgroup Agencies

- Utah Division of Air Quality (UDAQ)
- Metropolitan Planning Organizations MPOs
  - Cache MPO
  - Wasatch Front Regional Council
  - Mountainland Association of Governments
- Utah Department of Transportation (UDOT)
- Utah Local Public Transit Agencies
- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)
- U.S. Environmental Protection Agency (EPA)

During the SIP development process the MAG coordinated with the ICT workgroup and developed $PM_{2.5}$ SIP motor vehicle emissions inventories using the latest planning assumptions and tools for traffic analysis and the EPA-approved Motor Vehicle Emission Simulator (MOVES2010) emissions model. Local MOVES2010 modeling data inputs were cooperatively developed by MAG and the ICT workgroup using EPA-recommended methods where applicable.

7.3 Regional Emission Analysis

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 nonattainment area. In December 2009, EPA designated part of Utah County as the Provo, Utah $PM_{2.5}$ nonattainment area. The Deadlines Rule (signed April 25, 2014) later classified this as a moderate $PM_{2.5}$ nonattainment area. The responsible transportation planning organization for the Provo, UT nonattainment area is the Mountainland Association of Governments (MAG).

As a condition to receive federal transportation funding, transportation plans, programs, and projects are required to meet the criteria and procedures for demonstrating and assuring conformity to the applicable implementation plan developed pursuant to Section 110 and Part D of the CAA. The criteria, specified in 40 CFR 93.109, differ based on the action under review and the status of the implementation plan. The satisfaction of criteria and procedures, for implementation plans submitted

under Section 189(a)(1)(B)(ii) of the CAA, which demonstrate the impracticability of demonstrating attainment of the applicable NAAQS by the applicable attainment date, are addressed in paragraph 93.109(g)(4) of the conformity rule. For such implementation plan revisions, it is the interim emissions tests which must be satisfied, as specified in Section 93.119.

7.4 Interim $PM_{2.5}$ Conformity Test

The EPA interim conformity test, for the purposes of this plan revision, will require that NOx, VOC, and direct $PM_{2.5}$ (elemental carbon, organic carbon, SO_4, brake and tire wear) emissions from RTPs, TIPs, and projects funded or approved by the FHWA or the FTA not exceed 2008 levels.

VOC is included because UDAQ has identified volatile organic compounds (VOCs) as a $PM_{2.5}$ precursor that significantly impacts $PM_{2.5}$ concentrations.

The EPA conformity rule presumes that $PM_{2.5}$ re-entrained road dust does not need to be included in the interim conformity test unless either the State or EPA decides that re-entrained road dust emissions are a significant contributor to the $PM_{2.5}$ nonattainment problem. The UDAQ conducted a re-entrained road dust study that concluded that $PM_{2.5}$ re-entrained road dust emissions are negligible in the Provo, Utah $PM_{2.5}$ nonattainment area, and thus meet the criteria of 40 CFR 93.102(b)(3). EPA Region 8 reviewed the study and concurred with the UDAQ's findings.

Chapter 8 – REASONABLE FURTHER PROGRESS

8.1 Introduction

Clean Air Act Section 172(c)(2) requires that plans for nonattainment areas "shall require reasonable further progress (RFP)." The definition of RFP is given in Section 171 of the CAA. It means "such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date."

In general terms, the goal of these RFP requirements is for areas to achieve generally linear progress toward attainment, as opposed to deferring implementation of all measures, where possible, until the end.

The pollutants to be addressed in the RFP plan are those pollutants that are identified for purposes of control measures in the attainment plan: $PM_{2.5}$, SO_2, NOx, and VOC.

8.2 Moderate Area Planning Requirements

Within the context of the moderate area planning requirements given in Subparts 1 and 4 of the CAA, RFP must be considered in light of the attainment date as well as the date by which all RACT and RACM must be implemented. The attainment date for all three of Utah's moderate $PM_{2.5}$ nonattainment areas was established in EPA's Deadlines Rule. That date is December 31, 2015. The deadline for implementation of all RACT and RACM is described in paragraph 189(a)(1)(C) as four years from the date these areas were designated nonattainment. That date for implementation of RACM was thus December 14, 2013.

There are other moderate area planning requirements in Subpart 4 that relate to the showing of RFP. Paragraph 189(a)(1)(B) requires "either (i) a demonstration (including air quality modeling) that the plan will provide for attainment by the applicable attainment date; or (ii) a demonstration that attainment by such date is impracticable."

This plan demonstrates the latter; that despite the implementation of all reasonably available controls, the area still will not attain the 2006, 24-hour standard for $PM_{2.5}$ by December 31, 2015.

Paragraph 189(c) discusses "milestones … which demonstrate reasonable further progress … toward attainment by the applicable date", but these are to be submitted with "plan revisions demonstrating attainment." Since this plan does not demonstrate attainment, the RFP showing will instead be addressed herein, as part of this plan revision.

8.3 RFP for the Provo, UT Nonattainment Area

Past Guidance on RFP, for showing generally linear progress towards attainment by the applicable attainment date, has described a straight line with a downward trend, ending at the attainment date and representing, there, a level of emissions that is consistent with attainment of the applicable NAAQS.

Since this plan does not show attainment of the standard by the attainment date (December 31, 2015), and furthermore does not show when or how attainment might be achieved, the "reductions in emissions of the relevant air pollutant as are required by this part" are left undefined. In terms of the straight line, the drop of the line, over its length, is an unknown quantity.

Furthermore, since $PM_{2.5}$ has a secondary component born of non-linear chemical reactions involving precursor gasses, it is not practical to extrapolate what reductions in which emissions would be necessary to attain the standard at some future date.

The magnitude then, for this plan revision, of emissions reductions required for a showing of RFP, must have the meaning of those that "may reasonably be required by the Administrator."

Since RFP considers the overall magnitude of emissions reductions "for the purpose of ensuring attainment … by the applicable date," it is also necessary to define a period of time over which this determination will be made.

The starting point for evaluating RFP should be the baseline year used in the modeling analysis. This is a year (2010) selected to coincide with the period used to establish the monitored design value for the modeling analysis; a period in which the area is violating the applicable NAAQS.

Thus, the magnitude of emissions reductions should be evaluated over a period spanning from 2010 through 2015, though it should be recognized that meaningful SIP controls were not required until 2014.

Quantitatively, the following assessment of emissions and incremental emissions reductions in Table 8.1 will show that RFP is met using the criteria discussed above:

Reasonable Further Progress							
Provo, UT PM2.5 Nonattainment Area							
***Emissions / Year**	**2010**		**2015**		**Difference**		**RFP**
			projected with growth and controls				Annualized Difference
PM2.5	~~3.8~~		~~4.6~~		~~-0.8~~		~~-0.2~~
NOx	~~36.3~~		~~32.3~~		~~3.9~~		~~0.8~~
SO2	~~0.6~~		~~0.6~~		~~-0.1~~		~~0.0~~
VOC	~~30.8~~		~~26.2~~		~~4.5~~		~~0.9~~
Plan precursors	~~67.6~~		~~59.2~~		~~8.4~~		~~1.7~~
Total	~~71.4~~		~~63.8~~		~~7.6~~		~~1.5~~
****Concentration (ug/m3)**	38		36		2.4		0.5
* Emissions are presented in tons per average winter day							
**Value for 2010 is Baseline design value for the Lindon monitor							

Reasonable Further Progress						
Provo, UT PM2.5 Nonattainment Area						
*Emissions / Year	2010		2015	Difference		RFP
			projected with growth and controls			Annualized Difference
PM2.5	4.6		5.7	-1.1		-0.2
NOx	36.3		32.4	3.9		0.8
SO2	0.6		0.6	-0.1		0.0
VOC	30.8		26.2	4.5		0.9
Plan precursors	67.6		59.3	8.4		1.7
Total	72.3		64.9	7.3		1.5
**Concentration (ug/m3)	38		36	2.4		0.5
* Emissions are presented in tons per average winter day						
**Value for 2010 is Baseline design value for the Lindon monitor						

Table 8.1, Reasonable Further Progress in the Provo, UT nonattainment area

In addition to the emissions totals, the table also includes the 2010 baseline design value for the controlling monitor in the nonattainment area (Hawthorne) and the predicted $PM_{2.5}$ concentration in 2015. These concentrations are presented as another metric to establish progress toward meeting the 24-hour standard.

Control Measures

The inventory for 2015 "with growth and controls" reflects the implementation of all the reasonably available control measures and reasonably available control technologies identified in this plan (up to and beyond the attainment date[1]), as well as all pre-existing control measures. As such, this inventory takes into account all controls that "may reasonably be required by the Administrator."

[1] The RACT measures for stationary sources include controls to be implemented past the implementation date of December 14, 2013. For reasons articulated in section 6.6 of this plan, these measures were retained in transitioning from the planning requirements of only Subpart 1 to those also including Subpart 4. These additional measures are not relied upon for a showing of attainment. Rather, their inclusion in the modeling analysis underscores that attainment by December 31, 2015 is impracticable. For the purposes of RFP however, it is not appropriate to include the effectiveness of control measures with implementation dates not required until after the attainment date (December 31, 2015.) Thus, the 2015 emissions shown in Table 8.1 differ from the emissions shown in Table 4.2 by the amount of these controls. Nevertheless, from a qualitative standpoint, their inclusion in the Emission Limitations portion of this plan also underscores the fact that this plan continues to require measures to further the progress toward attainment, even beyond the applicable attainment date.

For a complete discussion of RACM & RACT, and the control measures factored into the modeled demonstration for 2015, see Chapter 6 of the Plan.

Chapter 9 – CONTINGENCY MEASURES

9.1 Background

Consistent with section 172(c)(9) of the Act, the State must submit in each attainment plan specific contingency measures to be undertaken if the area fails to make reasonable further progress, or fails to attain the $PM_{2.5}$ NAAQS by its attainment date. The contingency measures must take effect without significant further action by the State or EPA.

Nothing in the statute precludes a State from implementing such measures before they are triggered, but the credit for a contingency measure may not be used in either the attainment or reasonable further progress demonstrations.

The SIP should contain trigger mechanisms for the contingency measures, specify a schedule for implementation, and indicate that the measures will be implemented without further action by the State or by EPA.

The CAA does not include the specific level of emission reductions that must be adopted to meet the contingency measures requirement under section 172(c)(9). Nevertheless, in the preamble to the Clean Air Fine Particulate Rule (see 72 FR 20643) EPA recommends that the "emissions reductions anticipated by the contingency measures should be equal to approximately 1 year's worth of emissions reductions necessary to achieve RFP for the area."

9.2 Contingency Measures and Implementation Schedules for the Nonattainment Area

The following measures have been set aside for contingency purposes:

Woodburning Control –As part of the control strategy for the SIP, rule R307-302 has been amended to change the no-burn call from 35 $\mu g/m^3$ to 25 $\mu g/m^3$. Credit for this change is included in the modeled attainment demonstration as well as the RFP demonstration. However, R307-302 also includes a mechanism to further revise the no-burn call to only 15 $\mu g/m^3$ should a contingency situation arise. The benefit of this rule is to prevent a buildup of particulate matter due to woodsmoke during periods of poor atmospheric mixing which typically precede exceedances of the 24-hour $PM_{2.5}$ NAAQS. This rule has been adopted, and can take effect immediately if so required.

This contingency measure will be triggered by an EPA determination that: 1) the area has failed to make RFP; or 2) has failed to attain the NAAQS by the applicable attainment date.

9.3 Conclusions

Control measures developed to meet increasingly stringent ozone and fine $PM_{2.5}$ standards in Utah's urbanized areas have likewise become increasingly stringent, and still it is a challenge to attain the 2006, $PM_{2.5}$ NAAQS. This leaves little room for additional reductions that can be set aside as contingency measures.

The control strategy analysis summarized in Chapter 6 shows that stationary sources already meet or exceed RACT, and represent less than 10% of the emissions contributing to excessive $PM_{2.5}$ concentrations during winter. By contrast, area sources and on-road mobile sources contribute most of the emissions, but further emission control in these categories extends beyond the authorities of UDAQ. The most meaningful reductions in future emissions of VOC, an important $PM_{2.5}$ precursor, will likely result from additional restrictions of VOC in consumer products, and from what will likely result from Tier 3 of the federal motor vehicle control program.

FOR SUMMARY OF COMMENTS AND RESPONSES, PLEASE REFER TO THE SET OF COMMENTS AND RESPONSES AT THE END OF TAB VII, PM2.5 SIP FOR THE SALT LAKE CITY NONATTAINMENT AREA.

ITEM 9

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-099-14

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Bill Reiss, Environmental Engineer

DATE: November 25, 2014

SUBJECT: FINAL ADOPTION: Add new SIP Subsection IX.A.23: Control Measures for Area and Point Sources, Fine Particulate Matter, PM2.5 SIP for the Logan, UT-ID Nonattainment Area.

On December 14, 2009, EPA made its designations concerning areas that were not attaining the 2006 National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$. Among those areas designated was the Logan, UT-ID $PM_{2.5}$ Nonattainment Area.

The Clean Air Act (CAA) required Utah to submit a nonattainment plan for the area. For several years, the Utah Division of Air Quality (UDAQ), in consultation with many stakeholders including EPA Region 8, worked to develop a State Implementation Plan (SIP) for the 2006 24-hour NAAQS for $PM_{2.5}$. On December 5, 2012, the Board adopted that SIP and it was subsequently submitted to EPA.

On January 4, 2013, the D.C. Circuit Court of Appeals found that EPA had incorrectly interpreted the Clean Air Act when determining how to implement the NAAQS for $PM_{2.5}$. The court ruling held that EPA should have implemented the $PM_{2.5}$ NAAQS based on *both* CAA Subpart 1 *and* Subpart 4 of Part D, Title I. It also remanded the 2007 $PM_{2.5}$ Implementation Rule back to EPA so that the agency could address implementation of the $PM_{2.5}$ NAAQS under Subpart 4.

Utah was therefore required to supplement its SIP in order to address the additional requirements of Subpart 4. The most fundamental departure of Subpart 4 is that it classifies PM nonattainment areas as either Moderate or Serious and includes somewhat different planning requirements for each.

In the wake of the court ruling, EPA issued a "Deadlines Rule" that: 1) classified the Logan, UT-ID $PM_{2.5}$ Nonattainment Area as a Moderate Area, 2) established a deadline of December 31, 2014 for Utah to submit the necessary SIP elements, and 3) established the attainment date for the area as December 31, 2015.

To meet this due-date in the Deadlines Rule, a SIP addressing the Subpart 4 planning requirements for Moderate Areas was proposed by the Board on September 3, 2014.

A 30-day public comment period was held, which included a public hearing. A summary of the comments received during the comment period along with the responses from UDAQ is attached.

One central point made throughout the responses to those comments is that there is still no new $PM_{2.5}$ implementation rule to guide states in the development of their SIPs, even as those SIPs are now coming due.

Any recommended revision to SIP Subsection IX.A.23 resulting from these comments has been identified in the amended attachment using strikeout and underline.

Staff Recommendation: Staff recommends the Board adopt SIP Subsection IX.A.23: Control Measures for Area and Point Sources, Fine Particulate Matter, $PM_{2.5}$ SIP for the Logan, UT-ID Nonattainment Area as amended.

UTAH

State Implementation Plan

Control Measures for Area and Point Sources, Fine Particulate Matter,

$PM_{2.5}$ SIP for the Logan, UT-ID Nonattainment Area

Section IX. Part A.23

Adopted by the Utah Air Quality Board

December 3, 2014

Acronyms 3
Table of Contents 5
List of Figures 7
List of Tables 8

Acronyms

BACT	Best Available Control Technology
CAA	Clean Air Act
CFR	Code of Federal Regulations
CMAQ	Community Multiscale air Quality
CTG	Control Techniques Guideline documents
DAQ	Utah Division of Air Quality (also UDAQ)
EPA	Environmental Protection Agency
FRM	Federal Reference Method
MACT	Maximum Available Control Technology
MATS	Model Attainment Test Software
MPO	Metropolitan Planning Organization
$\mu g/m^3$	Micrograms Per Cubic Meter
Micron	One Millionth of a Meter
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NH_3	Ammonia
NO_x	Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
PM	Particulate Matter
PM_{10}	Particulate Matter Smaller Than 10 Microns in Diameter
$PM_{2.5}$	Particulate Matter Smaller Than 2.5 Microns in Diameter

1	RACM	Reasonably Available Control Measures
2	RACT	Reasonably Available Control Technology
3	RFP	Reasonable Further Progress
4	SIP	State Implementation Plan
5	SMOKE	Sparse Matrix Operator Kernal Emissions
6	SO_2	Sulfur Dioxide
7	SO_x	Sulfur Oxides
8	TSD	Technical Support Document
9	VOC	Volatile Organic Compounds
10	UAC	Utah Administrative Code
11	WRF	Weather Research and Forecasting

TABLE OF CONTENTS

Chapter 1 – INTRODUCTION AND BACKGROUND 10
1.1 Fine Particulate Matter 10
1.2 Health and Welfare Impacts of $PM_{2.5}$ 10
1.3 Fine Particulate Matter in Utah 11
1.4 2006, NAAQS for $PM_{2.5}$ 11
1.5 $PM_{2.5}$ Nonattainment Areas in Utah 11
1.6 $PM_{2.5}$ Precursors 13
Chapter 2 – REQUIREMENTS FOR 2006, $PM_{2.5}$ PLAN REVISIONS 15
2.1 Requirements for Nonattainment SIPs 15
2.2 $PM_{2.5}$ SIP Guidance 16
2.3 Summary of this SIP Proposal 16
Chapter 3 – Ambient Air Quality Data 17
3.1 Measuring Fine Particle Pollution in the Atmosphere 17
3.2 Utah's Air Monitoring Network 17
3.3 Annual $PM_{2.5}$ – Mean Concentrations 18
3.4 Daily PM2.5 – Averages of 98th Percentiles and Design Values 19
3.5 Composition of Fine Particle Pollution – Speciated Monitoring Data 20
3.6 $PM_{2.5}$ Saturation Studies 23
3.7 PCAP Study 23
3.8 Ammonia (NH_3) Studies 24
Chapter 4 – EMISSION INVENTORY DATA 25
4.1 Introduction 25
4.2 The 2008 Emissions Inventory 26
4.3 Characterization of Utah's Airsheds 26
Chapter 5 – ATTAINMENT DEMONSTRATION 30
5.1 Introduction 30
5.2 Photochemical Modeling 30
5.3 Domain/Grid Resolution 30
5.4 Episode Selection 31

5.5 Meteorological Data 34
5.6 Photochemical Model Performance Evaluation 35
5.7 Summary of Model Performance 42
5.8 Modeled Attainment Test 43
5.9 Air Quality as of the Attainment Date 44
Chapter 6 – CONTROL MEASURES 45
6.1 Introduction 45
6.2 Utah Stakeholder Workgroup Efforts 45
6.3 Identification of Measures 46
6.4 Existing Control Measures 47
6.5 SIP Controls 53
6.6 Reasonably Available Control Measures (RACM/RACT) 54
Chapter 7 – TRANSPORTATION CONFORMITY 61
7.1 Introduction 61
7.2 Consultation 61
7.3 Regional Emission Analysis 62
7.4 Transportation Conformity $PM_{2.5}$ Components 63
7.5 Interim $PM_{2.5}$ Conformity Test 63
7.6 Transportation Conformity $PM_{2.5}$ Budgets 64
Chapter 8 – REASONABLE FURTHER PROGRESS 65
8.1 Introduction 65
8.2 Moderate Area Planning Requirements 65
8.3 RFP for the Logan, UT-ID Nonattainment Area 66
8.4 Milestones for the Logan, UT-ID Nonattainment Area 69
Chapter 9 – CONTINGENCY MEASURES 70
9.1 Background 70
9.2 Contingency Measures and Implementation Schedules for the Nonattainment Area 70
9.3 Conclusions 71

List of Figures

Figure 1.1, Nonattainment Areas for the 2006, $PM_{2.5}$ NAAQS 12

Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network 18

Figure 3.2, Composite Wintertime $PM_{2.5}$ Speciation Profiles 22

Figure 5.1: Northern Utah photochemical modeling domain. 31

Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007 32

Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008 33

Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10. 34

Figure 5.5: UDAQ monitoring network. 35

Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ ($\mu g/m^3$) for 2010 Jan. 03. 36

Figure 5.7: 24-hr PM2.5 time series (Hawthorne). Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace). 37

Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace). 38

..... 38

Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace). 38

Figure 5.10: 24-hr $PM_{2.5}$ time series (Logan). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace). 39

Figure 5.11: An example of the Salt Lake Valley at the end of a high $PM_{2.5}$ episode. The lowest elevations of the Salt Lake Valley are still experiencing an inversion and elevated $PM_{2.5}$ concentrations while the $PM_{2.5}$ has been 'cleared out' throughout the rest of the valley. These 'end of episode' clear out periods are difficult to replicate in the photochemical model. 39

Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Hawthorne STN site. 40

Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Bountiful STN site. 41

Figure 5.14: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Lindon STN site. 41

Figure 5.15: The composition of model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when a modeled day had 24-hr concentrations > 35 µg/m^3 at the Logan monitoring site. No observed speciation data is available for Logan. 42

Figure 5.16, Model Results for the Logan, UT-ID Nonattainment Area 43

List of Tables

Table 3.1, $PM_{2.5}$ Annual Mean Concentrations 19

Table 3.2, 24-hour $PM_{2.5}$ Monitored Design Values 20

Table 4.1, Emissions Summary for 2010 (SMOKE). Emissions are presented in tons per average winter day. 28

Table 4.2, Emissions Summaries for the Logan, UT-ID Nonattainment Area; Baseline and Attainment Year (SMOKE). Emissions are presented in tons per average winter day. 29

Table 5.1, Modeled Concentrations ($\mu g/m^3$) for the Salt Lake City, UT Nonattainment Area 44

Table 6.1, Tier 1 Emission Standards 49

Table 6.2, Tier 2 Emission Standards 51

Table 6.3 Area Source Strategy Screening 56

Table 6.4, Emissions Reductions from Area Source SIP Controls 59

Table 7.1, Emissions Budgets for Transportation Conformity Purposes (EPA MOVES 2010a). Note: VOC emissions do not include refueling spillage and displacement vapor loss. Budgets are rounded to the nearest hundredth ton. 64

Table 8.1, Reasonable Further Progress in the Logan, UT-ID nonattainment area 68

Chapter 1 – INTRODUCTION AND BACKGROUND

1.1 Fine Particulate Matter

According to EPA's website, particulate matter, or PM, is a complex mixture of extremely small particles and liquid droplets. Particulate matter is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles.

The size of particles is directly linked to their potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Other negative effects are reduced visibility and accelerated deterioration of buildings.

EPA groups particle pollution into two categories:

- "Inhalable coarse particles," such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter. Utah has previously addressed inhalable coarse particles as part of its PM_{10} SIPs for Salt Lake and Utah Counties, but this fraction is not measured as $PM_{2.5}$ and will not be a subject for this nonattainment SIP.

- "Fine particles," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller and thus denoted as $PM_{2.5}$. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.

PM concentration is reported in micrograms per cubic meter or $\mu g/m^3$. The particulate is collected on a filter and weighed. This weight is combined with the known amount of air that passed through the filter to determine the concentration in the air.

1.2 Health and Welfare Impacts of $PM_{2.5}$

Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:

- increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing, for example;
- decreased lung function;
- aggravated asthma;
- development of chronic bronchitis;
- irregular heartbeat;
- nonfatal heart attacks; and
- premature death in people with heart or lung disease.

People with heart or lung diseases, children and older adults are the most likely to be affected by particle pollution exposure. However, even if you are healthy, you may experience temporary symptoms from exposure to elevated levels of particle pollution.

1.3 Fine Particulate Matter in Utah

Excluding wind-blown desert dust events, wild land fires, and holiday related fireworks, elevated $PM_{2.5}$ in Utah occurs when stagnant cold pools develop during the winter season.

The synoptic conditions that lead to the formation of cold pools in Utah's nonattainment areas are: synoptic scale ridging, subsidence, light winds, snow cover (often), and cool to cold surface temperatures. These conditions occur during winter months, generally mid-November through early March.

During a winter-time cold pool episode, emissions of $PM_{2.5}$ precursors react relatively quickly to elevate overall concentrations, and of course dispersion is very poor due to the very stable air mass. Episodes may last from a few days to tens of days when meteorological conditions change to once again allow for good mixing.

The scenario described above leads to exceedances and violations of the 24-hour health standard for $PM_{2.5}$. In other parts of the year concentrations are generally low, and even with the high peaks incurred during winter, are well within the annual health standard for $PM_{2.5}$.

1.4 2006, NAAQS for $PM_{2.5}$

In September of 2006, EPA revised the (1997) standards for $PM_{2.5}$. While the annual standard remained unchanged at 15 $\mu g/m^3$, the 24-hr standard was lowered from 65 $\mu g/m^3$ to 35 $\mu g/m^3$.

DAQ has monitored $PM_{2.5}$ since 2000, and found that all areas within the state have been in compliance with the 1997 standards. At this new 2006 level, all or parts of five counties have collected monitoring data that is not in compliance with the 24-hr standard.

In 2013, EPA lowered the annual average to 12 $\mu g/m^3$. Monitoring data shows no instances of noncompliance with this revised standard.

1.5 $PM_{2.5}$ Nonattainment Areas in Utah

There are two distinct nonattainment areas for the 2006, $PM_{2.5}$ standards residing entirely within the state of Utah. These are the Salt Lake City, UT, and Provo, UT nonattainment areas, which together encompass what is referred to as the Wasatch Front. A third nonattainment area is more or less

geographically defined by the Cache Valley which straddles the border between Utah and Idaho (the Logan, UT – ID nonattainment area.) Figure 1.1 below shows the geographic extent of these areas.

None of these three areas has violated the annual NAAQS for $PM_{2.5}$. Without exception, the exceedances leading to 24-hr NAAQS violations are associated with relatively short-term meteorological occurrences.

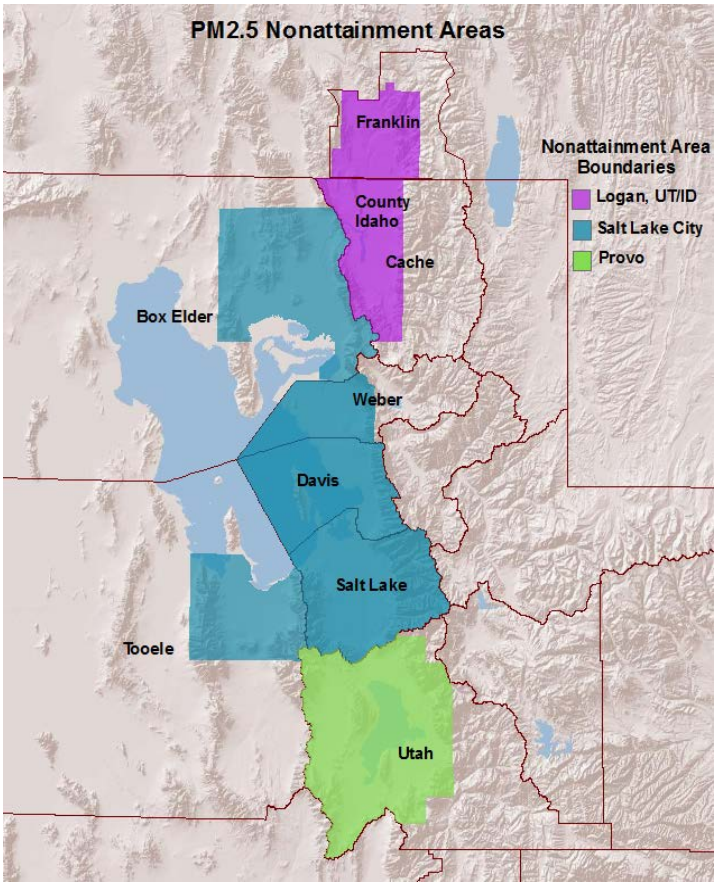


Figure 1.1, Nonattainment Areas for the 2006, $PM_{2.5}$ NAAQS

Each of these three areas was designated, by the EPA, based on the weight of evidence of the following nine factors recommended in its guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns

- growth
- meteorology
- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

EPA also used analytical tools and data such as pollution roses, fine particulate composition monitoring data, back trajectory analyses, and the contributing emission score (CES) to evaluate these areas.

While the general meteorological characteristics are identical between the Wasatch Front and Cache Valley, there are two important differences related to topography. First, the Cache Valley is a closed basin while the Wasatch Front has many large outlets that connect it to the larger Great Basin. The large outlets along the Wasatch Front provide the potential for greater advection of pollutants and for a potentially weaker cold pool. Second, the Cache Valley is a narrow (<20 km) valley bordered by extremely steep mountains. These topographical differences lead to faster forming, more intense, and more persistent cold pools in Cache Valley relative to the Wasatch Front.

Because of these differences, the two Wasatch Front areas and the Cache Valley are designated as separate nonattainment areas; however, they have all been modeled together within the same modeling domain.

1.6 $PM_{2.5}$ Precursors

The majority of ambient $PM_{2.5}$ collected during a typical cold-pool episode of elevated concentration is secondary particulate matter, born of precursor emissions. The precursor gasses associated with fine particulate matter are SO_2, NOx, volatile organic compounds (VOC), and ammonia (NH_3).

Clean Air Act Section 189(e) requires that the control requirements applicable in plans for major stationary sources of PM_{10} shall also apply to major stationary sources of PM_{10} precursors, except where the Administrator determines that such sources do not contribute significantly to PM_{10} levels which exceed the standard in the area.

As this paragraph now applies also to $PM_{2.5}$ plans the following should be said about the way this plan is structured.

CAA Section 172 does not include any specific applicability thresholds to identify the size of sources that States and EPA must consider in the plan's RACT and RACM analysis. In developing the emissions inventories underlying the SIP, the criteria of 40 CFR 51 for air emissions reporting requirements was used to establish a 100 ton per year threshold for identifying a sub-group of stationary point sources that would be evaluated individually. The control evaluations for each of these sources included $PM_{2.5}$ as well as $PM_{2.5}$ precursors. This principle was extended to the non-stationary source categories as well.

When evaluating the cost per ton necessary to reduce emissions, consideration was given to the resulting $PM_{2.5}$ concentrations. Through this process, reasonable controls were identified affecting $PM_{2.5}$, SO_2, NOx and VOC.

No such controls were identified for ammonia. Ammonia occurs in such abundance that $PM_{2.5}$ concentrations are not sensitive to reductions in ammonia unless those reductions are very large. Within the stationary source category, there really were no significant amounts of ammonia to evaluate. The largest contributor to the ammonia inventory was the agricultural sector, and the maximum possible amount of ammonia reduction from that sector would still not be enough to affect a reduction in $PM_{2.5}$.

Additional information regarding control measures may be found in Chapter 6 as well as the Technical Support Document (TSD).

Chapter 2 – REQUIREMENTS FOR 2006, $PM_{2.5}$ PLAN REVISIONS

2.1 Requirements for Nonattainment SIPs

Section 110 of the Clean Air Act lists the requirements for implementation plans. Many of these requirements speak to the administration of an air program in general. Section 172 of the Act contains the plan requirements for nonattainment areas. Some of the more notable requirements identified in these sections of the Act that pertain to this SIP include:

- Implementation of Reasonably Available Control Measures (RACM) as expeditiously as practicable
- Reasonable Further Progress (RFP) toward attainment of the National Ambient Air Quality Standards by the applicable attainment date
- Enforceable emission limits as well as schedules for compliance
- A comprehensive inventory of actual emissions
- Contingency measures to be undertaken if the area fails to make reasonable further progress or attain the NAAQS by the applicable attainment date

On January 4, 2013, D.C. Circuit Court of Appeals found that EPA had incorrectly interpreted the Clean Air Act when determining how to implement the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$. The January 4, 2013 court ruling held that the EPA should have implemented the $PM_{2.5}$ NAAQS based on *both* Clean Air Act (CAA) Subpart 1 ("Nonattainment Areas in General" of "Part D – Plan Requirements for Nonattainment Areas") *and* Subpart 4 ("Additional Provisions for Particulate Matter Nonattainment Areas") of Part D, title 1. EPA had (incorrectly) required states to develop their SIPs based only on Subpart 1. Therefore, as of January 4, 2013, Subpart 4 also applies.

Under Subpart 4, nonattainment areas for particulate matter may carry the classification of either moderate or serious. Subpart 4 addresses the attainment dates and planning provisions for both moderate and serious PM nonattainment areas.

In the wake of the decision by the D.C. Circuit, EPA has promulgated a "Deadlines Rule" that identifies each of Utah's three $PM_{2.5}$ nonattainment areas as moderate. It specifies December 31, 2014 as the SIP submission deadline for these moderate $PM_{2.5}$ nonattainment areas, and further specifies December 31, 2015 as the attainment date for each area.

More specific requirements for the preparation, adoption, and submittal of implementation plans are specified in 40 CFR Part 51. Subpart Z of Part 51 had contained provisions for Implementation of $PM_{2.5}$ National Ambient Air Quality Standards. However, one consequence of the January 4, 2013 Court ruling was to revoke Subpart Z. This leaves only the more general requirements of Part 51.

2.2 $PM_{2.5}$ SIP Guidance

Beyond what had been codified in Subpart Z of Part 51 concerning the Implementation of the $PM_{2.5}$ NAAQS, EPA had provided additional clarification and guidance in its Clean Air Particulate Implementation Rule for the 1997, $PM_{2.5}$ NAAQS (FR 72, 20586) and its subsequent Implementation Guidance for the 2006, 24-Hour Fine Particle NAAQS (March 2, 2012). This too was revoked by the D.C. Circuit Court's decision. Until such time as a new implementation rule for $PM_{2.5}$ is promulgated, the Deadlines Rule recommends the General Preamble, EPA's longstanding general guidance that interprets the 1990 amendments to the CAA, as the applicable guidance for states to follow while preparing SIPs for $PM_{2.5}$ nonattainment areas.

2.3 Summary of this SIP Proposal

This implementation plan was developed to meet the requirements specified in the law, rule, and appropriate guidance documents identified above. Discussed in the following chapters are: air monitoring, reasonably available control measures, modeled attainment demonstration, emission inventories, reasonable further progress toward attainment, transportation conformity, and contingency measures. Additional information is provided in the technical support document (TSD).

Chapter 3 – Ambient Air Quality Data

3.1 Measuring Fine Particle Pollution in the Atmosphere

Utah has monitored $PM_{2.5}$ in its airsheds since 2000 following the promulgation of the 1997, $PM_{2.5}$ NAAQS which was set at 65 µg/m^3 for a 24-hour averaging period. $PM_{2.5}$ monitoring sites were initially located based on concentrations of PM_{10}, which historically were measured at sites located based on emissions of primary particles. $PM_{2.5}$ concentrations, especially during Utah's wintertime valley temperature inversions, tend to be distributed more homogenously within a specific airshed. Homogeneity of $PM_{2.5}$ concentrations supports that one or two monitors are adequate to determine compliance with the NAAQS in specific airsheds. DAQ's monitors are appropriately located to assess concentration, trends, and changes in $PM_{2.5}$ concentrations. During Utah's wintertime cold-pool episodes, every day sampling and real time monitoring are needed for modeling and public notification.

3.2 Utah's Air Monitoring Network

The Air Monitoring Center (AMC) maintains an ambient air monitoring network in Utah that collects both air quality and meteorological data. Figure 3.1 shows the location of sites along the Wasatch Front that collect $PM_{2.5}$ data. Twelve sites collect $PM_{2.5}$ data using the Federal Reference Method (FRM); $PM_{2.5}$ is collected on filters over a 24 hour period and its mass is measured gravimetrically. Seven of those sites also measure $PM_{2.5}$ concentrations continuously in real-time. Real-time $PM_{2.5}$ data is useful both for pollution forecasting and to compare with 24-hour concentrations of $PM_{2.5}$ collected on filters. Of the twelve sites that use the FRM to measure $PM_{2.5}$, six sites collect $PM_{2.5}$ data daily and six sites collect $PM_{2.5}$ data on every third day. Three sites along the Wasatch Front collect speciated $PM_{2.5}$. Particulate matter on the speciated $PM_{2.5}$ filters is analyzed for organic and inorganic carbon and a list of 48 elements. $PM_{2.5}$ speciation data is particularly useful in helping to identify sources of particulate matter. The ambient air quality monitoring network along Utah's Wasatch Front and in the Cache Valley meets EPA requirements for monitoring networks.

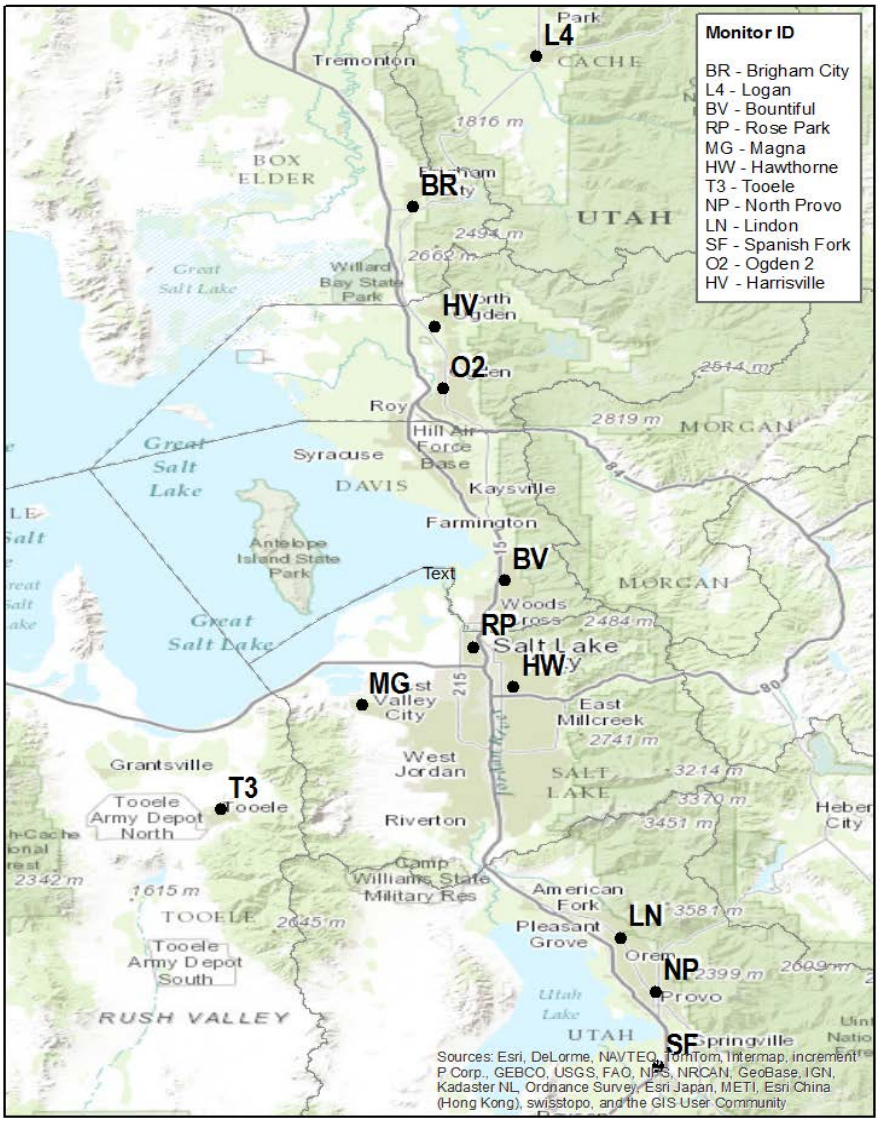


Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network

3.3 Annual $PM_{2.5}$ – Mean Concentrations

The procedure for evaluating $PM_{2.5}$ data with respect to the NAAQS is specified in Appendix N to 40 CFR Part 50. Generally speaking, the annual $PM_{2.5}$ standard is met when a three-year average of annual mean values is less than or equal to 12.0 µg/m^3. Each annual mean is itself an average of four quarterly averages.

Table 3.1, below shows the running 3-year averages of annual mean values for each of Utah's monitoring locations. The data in the table spans the years 2008 through 2012. These are the years surrounding 2010, the year for which the baseline modeling inventory was prepared. It can be seen from the data that there are no locations at which the annual NAAQS was violated. It should be noted that the conclusion would be no different if the most recent data from 2013 were considered.

		3-Year Average of Annual Mean Concentrations		
Location	**County**	**08 - 10**	**09 - 11**	**10 - 12**
Logan (Combined POC 1 & 2)	Cache	10.0	9.7	8.7
Brigham City	Box Elder	8.3	8.2	7.7
Ogden 2 (POC 1)	Weber	9.7	9.5	9.1
Harrisville	Weber	8.6	8.3	7.6
Bountiful	Davis	9.8	9.2	8.3
Rose Park (POC 1)	Salt Lake	10.4	9.7	9.2
Magna	Salt Lake	8.5	8.4	7.7
Hawthorn (POC 1)	Salt Lake	10.4	9.7	8.8
Tooele	Tooele	6.8	6.8	6.3
Lindon (POC 1)	Utah	9.8	9.1	8.3
North Provo	Utah	9.4	8.7	8.1
Spanish Fork	Utah	8.8	8.5	7.7

Table 3.1, $PM_{2.5}$ Annual Mean Concentrations

3.4 Daily PM2.5 – Averages of 98th Percentiles and Design Values

The procedure for evaluating $PM_{2.5}$ data with respect to the NAAQS is specified in Appendix N to 40 CFR Part 50. Generally speaking, the 24-hr. $PM_{2.5}$ standard is met when a three-year average of 98th percentile values is less than or equal to 35 µg/m^3. Each year's 98th percentile is the daily value below which 98% of all daily values fall.

Table 3.2, below shows the running 3-year averages of 98th percentile values for each of Utah's monitoring locations. Again, the data in the table spans the years 2008 through 2012 which are the years surrounding 2010, the baseline modeling inventory. It can be seen from the data that there are many locations at which the 24-hr. NAAQS has been violated, and this SIP has been structured to specifically address the 24-hr. standard.

Site-Specific Baseline Design Values:		3-Year Average of 98th Percentiles			Baseline Design Value
Location	**County**	**08 - 10**	**09 - 11**	**10 - 12**	
Logan (Combined POC 1 & 2)	Cache	42.6	42.4	37.2	**40.7**
Brigham City	Box Elder	42.5	40.1	37.2	**39.9**
Ogden 2 (POC 1)	Weber	37.0	41.1	37.4	**38.5**
Harrisville	Weber	35.6	36.6	33.2	**35.1**
Bountiful	Davis	37.7	40.3	34.4	**37.5**
Rose Park (POC 1)	Salt Lake	40.9	40.7	35.4	**39.0**
Magna	Salt Lake	32.8	34.5	30.3	**32.5**
Hawthorn (POC 1)	Salt Lake	43.6	44.5	38.1	**42.1**
Tooele	Tooele	25.9	27.1	24.4	**25.8**
Lindon (POC 1)	Utah	40.5	40.9	32.4	**37.9**
North Provo	Utah	36.4	35.1	28.6	**33.4**
Spanish Fork	Utah	39.3	41.7	34.6	**38.5**

Table 3.2, 24-hour $PM_{2.5}$ Monitored Design Values

As mentioned in the forgoing paragraph, this SIP is structured to address the 24-hr. $PM_{2.5}$ NAAQS. As such the modeled attainment test must consider monitored baseline design values from each of these locations. EPA's modeling guidance[1] recommends this be calculated using three-year averages of the 98th percentile values. To calculate the monitored baseline design value, EPA recommends an average of three such three-year averages that straddle the baseline inventory. 2010 is the year represented by the baseline inventory. Therefore, the three-year average of 98th percentile values collected from 2008-2010 would be averaged together with the three-year averages for 2009-2011 and 2010-2012 to arrive at the site-specific monitored baseline design values. These values are also shown in Table 3.2[2].

3.5 Composition of Fine Particle Pollution – Speciated Monitoring Data

DAQ operates three $PM_{2.5}$ speciation sites. The Hawthorne site in Salt Lake County is one of 54 Speciation Trends Network (STN) sites operated nationwide on an every-third day sampling schedule. Sites at Bountiful/Viewmont in Davis County and Lindon in Utah County are State and Local Air Monitoring Stations (SLAMS) $PM_{2.5}$ speciation sites that operate on an every-sixth-day sampling schedule.

[1] Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for ozone, PM2.5, and Regional Haze (EPA -454B-07-002, April 2007)

[2] Recalculating the design values by replacing the 98th percentiles from 2008 with the most recent 98th percentiles from 2013 has a mixed effect throughout the monitoring network, with some sites increasing and others decreasing. The design value for Logan, the controlling monitor, would increase by 1.1 µg/m3. This increase is not significant enough to change the conclusion drawn in Section 5.9.

Filters are prepared by the EPA contract laboratory and shipped to Utah for sampling. Samples are collected for particulate mass, elemental analysis, identification of major cations and anions, and concentrations of elemental and organic carbon as well as crustal material present in $PM_{2.5}$. Carbon sampling and analysis changed in 2007 to match the Interagency Monitoring of Protected Visual Environments (IMPROVE) method using a modified IMPROVE sampler at all sites.

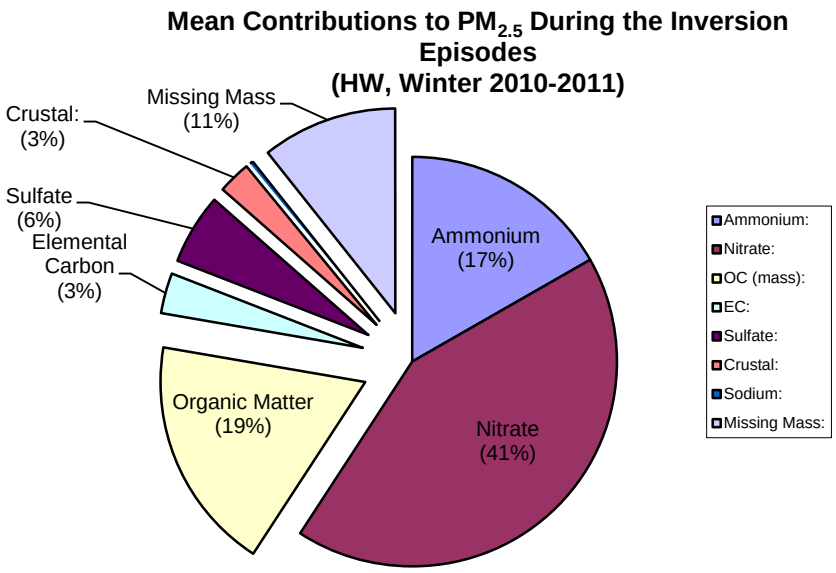
The $PM_{2.5}$ is collected on three types of filters: teflon, nylon, and quartz. Teflon filters are used to characterize the inorganic contents of $PM_{2.5}$. Nylon filters are used to quantify the amount of ammonium nitrate, and quartz filters are used to quantify the organic and inorganic carbon content in the ambient $PM_{2.5}$.

Data from the speciation network show the importance of volatile secondary particulates during the colder months. These particles are significantly lost in FRM $PM_{2.5}$ sampling.

During the winter periods between 2009 and 2011, DAQ conducted special winter speciation studies aimed at better characterization of $PM_{2.5}$ during the high pollution episodes. These studies were accomplished by shifting the sampling of the Chemical Speciation Network monitors to 1-in-2 schedule during the months of January and February. Speciation monitoring during the winter high-pollution episodes produced similar results in $PM_{2.5}$ composition each year.

The results of the speciation studies lead to the conclusion that the exceedances of the $PM_{2.5}$ NAAQS are a result of the increased portion of the secondary $PM_{2.5}$ that was chemically formed in the air and not emitted directly into the troposphere.

Figure 3.2 below shows the contribution of the identified compounds from the speciation sampler both during a winter atmospheric inversion period and during a clear winter period.



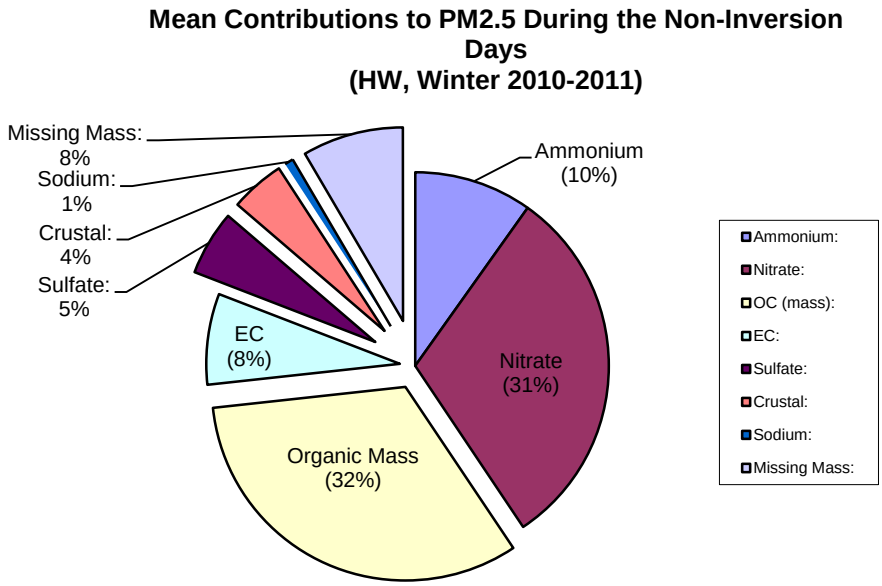


Figure 3.2, Composite Wintertime $PM_{2.5}$ Speciation Profiles

3.6 $PM_{2.5}$ Saturation Studies

Utah State University conducted a study of the homogeneity of PM_{10} in Cache Valley in 2002-2003 and a study of the homogeneity of $PM_{2.5}$ in 2003-2004. In addition to the permanent DAQ air quality monitoring site in Logan, seventeen sites measuring $PM_{2.5}$ concentrations were established in Cache Valley. Measurements of $PM_{2.5}$ concentrations were made every six days from November 2003 – February 2004. Several temperature inversions developed during the course of the study with $PM_{2.5}$ concentrations in Logan ranging from 3-128 $\mu g/m^3$. In general, the study found that $PM_{2.5}$ concentrations were homogenous throughout the entirety of Cache Valley. On days with $PM_{2.5}$ concentrations < 65 $\mu g/m^3$, mean $PM_{2.5}$ concentrations at 11 of the 17 sites had values within 20% of the mean $PM_{2.5}$ concentration for the entire valley. $PM_{2.5}$ concentrations were generally most homogenous throughout Cache Valley on days when $PM_{2.5}$ concentrations were > 65 $\mu g/m^3$. On high $PM_{2.5}$ days (> 65 $\mu g/m^3$), mean $PM_{2.5}$ concentrations at only two sites were statistically different from the mean $PM_{2.5}$ concentration for all of Cache Valley. The study concluded that $PM_{2.5}$ concentrations in Cache Valley were homogenous, within a 95% confidence interval, during the winter of 2003-2004.[1] $PM_{2.5}$ saturation studies have not been conducted in other regions of Utah.

3.7 PCAP Study

The Persistent Cold Air Pooling Study (PCAPS) is a National Science Foundation-funded project conducted by the University of Utah to investigate the processes leading to the formation, maintenance and destruction of persistent temperature inversions in Salt Lake Valley. The study ended in March of 2014. Field work for the project was conducted in the winter of 2010-2011 and focused on the meteorological dynamics of temperature inversions in the Salt Lake Valley and in the Bingham Canyon pit mine in the southwest corner of Salt Lake Valley. In addition to identifying key meteorological processes involved in the dynamics of temperature inversions in Salt Lake Valley, the other primary objectives of PCAPS is to determine how persistent temperature inversions affect air pollution transport and diffusion in urban basins and to develop more accurate meteorological models describing the formation, persistence and dispersion of temperature inversions in Salt Lake Valley.

Analyses of most data sets collected during the PCAPS are still underway. However, one study examining $PM_{2.5}$ concentrations along an elevation gradient north of Salt Lake City (1300-1750 meters) showed that $PM_{2.5}$ concentrations generally decreased with altitude and increased with time during a single temperature inversion event.[2] Final results from PCAPS will help DAQ understand both how persistent temperature inversions affect $PM_{2.5}$ concentrations along the Wasatch Front and will enhance DAQ's ability to accurately forecast the formation and breakup of temperature inversion that lead to poor wintertime air quality.

---

[1] Martin, R., and G.W. Koford, 2006: Valley-wide PM_{10} and $PM_{2.5}$ Saturation (Homogeneity) Studies, found within: Cache Valley Air Quality Studies: A Summary of Research Conducted.

[2] Silcox, G.D., K.E. Kelly, E.T. Crosman, C.D. Whiteman, and B.L. Allen, 2012: Wintertime $PM_{2.5}$ concentrations in Utah's Salt Lake Valley during persistent multi-day cold air pools. Atmospheric Environment, 46, 17-24.

3.8 Ammonia (NH_3) Studies

The Division of Air Quality deployed an ammonia monitor as a part of the special winter study for 2009. A URG 9000 instrument was used to record hourly values of ambient ammonia between the months of December and February.

The resulting measurements showed that the ambient concentration of ammonia tended to be generally an order of magnitude higher than those of nitric acid: 12-17 ppbv and 1-2 ppbv, respectively.

Unfortunately, the use of the instrument proved to be excessively labor intensive due to the high frequency of calibrations and corrections for drift. The data obtained during the winter of 2009, albeit valuable for rough estimation of the ambient ammonia concentrations, contained an abnormal amount of error for accurate mechanistic analysis.

Chapter 4 – EMISSION INVENTORY DATA

4.1 Introduction

The emissions inventory is one means used by the state to assess the level of pollutants and precursors released into the air from various sources. The methods by which emissions inventories are collected and calculated are constantly improving in response to better analysis and more comprehensive rules. The inventories underlying this SIP were compiled using the best information available.

The sources of emissions that were inventoried may be discussed as belonging to four general categories: industrial point sources, on-road mobile sources, off-road mobile sources., and area sources which represent a collection of smaller, more numerous point sources, residential activities such a home heating, and in some cases biogenic emissions.

This SIP is concerned with $PM_{2.5}$, both primary in its origin and secondary, referring to its formation removed in time and space from the point of origin for certain precursor gasses. Hence, the pollutants of concern, at least for inventory development purposes, included $PM_{2.5}$, SO_2, NO_x, VOC, and NH_3.

On-road mobile sources are inventoried using EPA's MOVES2010 model, in conjunction with information generated by travel demand models such as vehicle speeds and miles traveled. The inventory information is calculated in units of tons per day, adjusted for winter conditions. Emissions from the other three categories are calculated in terms of tons per year.

Prior to use in the air quality model, the emissions are pre-processed to account for the seasonality of Utah's difficulty with secondary $PM_{2.5}$ formation during winter months. These temporal adjustments also account for daily and weekly activity patterns that affect the generation of these emissions.

To acknowledge the episodic and seasonal nature of Utah's elevated $PM_{2.5}$ concentrations, inventory information presented herein is, unless otherwise noted, a reflection of the temporal adjustments made prior to air quality modeling. This makes more appropriate the use of these inventories for such purposes as correlation with measured $PM_{2.5}$ concentrations, control strategy evaluation, establishing budgets for transportation conformity, and tracking rates of progress.

There are various time horizons that are significant to the development of this SIP. It is first necessary to look at past episodes of elevated $PM_{2.5}$ concentrations in order to develop the air quality model. The episodes studied as part of the SIP occurred in 2007, 2008, 2009, and 2010. It is then necessary to look several years into the future when developing emission control strategies. The significant time horizon for this plan relates to the statutory attainment date, December 31, 2015. A projected inventory for 2015 is prepared and compared with a baseline inventory that is contemporaneous with the monitored design values discussed in Section 3.4. This baseline is represented by the year 2010. Inventories must be prepared to evaluate all of these time horizons.

4.2 The 2008 Emissions Inventory

The forgoing paragraph identified numerous points in time for which an understanding of emissions to the air is important to plan development. The basis for each of these assessments was the 2008 tri-annual inventory. This inventory represented, at the time it was selected for use, the most recent comprehensive inventory compiled by UDAQ. In addition to the large major point sources that are required to report emissions every year, the tri-annual inventories consider emissions from many more, smaller point sources. These inventories are collected in accordance with state and federal rules that ensure proper methods and comprehensive quality assurance.

Thus, to develop other inventories for each of the years discussed above, the 2008 inventory was either back-cast and adjusted for certain episodic conditions, or forecast to represent more typical conditions.

4.3 Characterization of Utah's Airsheds

As said at the outset, an emissions inventory provides a means to assess the level of pollutants and precursors released into the air from various sources. This in turn allows for an overall assessment of a particular airshed or even a comparison of one airshed to another.

The modeling analysis used to support this SIP considers a regional domain that encompasses three distinct airsheds belonging to three distinct $PM_{2.5}$ nonattainment areas; The Cache Valley (the Logan UT/ID nonattainment area), the central Wasatch Front (Salt Lake City, UT nonattainment area), and the southern Wasatch Front (Provo, UT nonattainment area).

The inventories developed for each of these three areas illustrate many similarities but also a few notable differences. All three areas are more or less dominated by a combination of on-road mobile and area sources. However, emissions from large point sources are non-existent in the Cache Valley. These emissions are situated along the Wasatch Front, and primarily exhibited in the Salt Lake City nonattainment area. Conversely, most of the agricultural emissions are located in the Cache Valley.

The tables presented below provide a broad overview of the emissions in the respective areas. They are organized to show the relative contributions of emissions by source category (e.g. point / area / mobile).

Table 4.1 shows the 2010 Baseline emissions in each area of the modeling domain.

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Logan, UT-ID						
Sum of Emissions (tpd)		Area Sources	0.54	1.63	4.16	4.31	0.26
		Mobile Sources	~~0.37~~	~~6.48~~	~~4.99~~	~~0.12~~	~~0.04~~
		NonRoad	0.13	1.15	2.28	0.00	0.02
		Point Sources	0.00	0.02	0.63	0.00	0.00
		Total	~~1.05~~	~~9.28~~	~~12.06~~	~~4.43~~	~~0.32~~
2010	Provo, UT						
Sum of Emissions (tpd)		Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	~~1.38~~	~~25.39~~	~~15.62~~	~~0.44~~	~~0.16~~
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Sources	0.26	0.93	0.67	0.29	0.03
		Total	~~3.81~~	~~36.28~~	~~30.78~~	~~7.26~~	~~0.56~~
2010	Salt Lake City, UT						
Sum of Emissions (tpd)		Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	~~5.49~~	~~99.60~~	~~62.49~~	~~1.86~~	~~0.62~~
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Sources	3.89	20.14	6.48	0.64	10.64
		Total	~~16.52~~	~~160.48~~	~~130.01~~	~~20.47~~	~~12.81~~
2010	Surrounding Areas						
Sum of Emissions (tpd)		Area Sources	1.78	3.08	13.95	34.29	1.13
		Mobile Sources	~~1.34~~	~~28.88~~	~~11.03~~	~~0.33~~	~~0.15~~
		NonRoad	0.57	7.73	10.66	0.00	0.14
		Point Sources	3.39	129.34	2.92	0.75	43.43
		Total	~~7.07~~	~~169.03~~	~~38.56~~	~~35.38~~	~~44.85~~
2010 Total							

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Logan, UT-ID						
Sum of Emissions (tpd)		Area Sources	0.54	1.63	4.16	4.31	0.26
		Mobile Sources	0.67	6.48	4.99	0.12	0.04
		NonRoad	0.13	1.15	2.28	0.00	0.02
		Point Sources	0.00	0.02	0.63	0.00	0.00
		Total	1.35	9.28	12.06	4.43	0.32
2010	Provo, UT						
Sum of Emissions (tpd)		Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	2.20	25.39	15.63	0.44	0.16
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Sources	0.26	0.93	0.67	0.29	0.03
		Total	4.63	36.29	30.78	7.26	0.56
2010	Salt Lake City, UT						
Sum of Emissions (tpd)		Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	8.59	99.63	62.51	1.86	0.63
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Sources	3.89	20.14	6.48	0.64	10.64
		Total	19.62	160.51	130.02	20.47	12.81
2010	Surrounding Areas						
Sum of Emissions (tpd)		Area Sources	1.78	3.08	13.95	34.29	1.13
		Mobile Sources	2.31	28.89	11.03	0.33	0.15
		NonRoad	0.57	7.73	10.66	0.00	0.14
		Point Sources	3.39	129.34	2.92	0.75	43.43
		Total	8.04	169.03	38.57	35.38	44.85
2010 Total							

Table 4.1, Emissions Summary for 2010 (SMOKE). Emissions are presented in tons per average winter day. Mobile source emissions summaries are from the AP-42 (road dust) and MOVES model output. $PM_{2.5}$ for mobile sources includes tire and brake wear, sulfate, elemental and organic carbon, and road dust. VOC for mobile sources includes refueling spillage and displacement vapor loss emissions.

Table 4.2 is specific to the Logan, UT-ID nonattainment area, and shows emissions for both the baseline year and the attainment year. These totals include projections concerning growth in population, vehicle miles traveled, and the economy. They also include the effects of emissions control strategies that are either already promulgated or were required as part of the SIP.

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Logan, UT-ID						
Sum of Emissions (tpd)		Area Sources	0.54	1.63	4.16	4.31	0.26
		Mobile Sources	~~0.37~~	~~6.48~~	~~4.99~~	~~0.12~~	~~0.04~~
		NonRoad	0.13	1.15	2.28	0.00	0.02
		Point Sources	0.00	0.02	0.63	0.00	0.00
		Total	~~1.05~~	~~9.28~~	~~12.06~~	~~4.43~~	~~0.32~~
2015	Logan, UT-ID						
Sum of Emissions (tpd)		Area Sources	0.40	1.59	3.75	4.08	0.27
		Mobile Sources	~~0.28~~	~~4.49~~	~~3.35~~	~~0.10~~	~~0.03~~
		NonRoad	0.10	0.81	1.77	0.00	0.01
		Point Sources	0.00	0.00	0.00	0.00	0.00
		Total	~~0.79~~	~~6.89~~	~~8.87~~	~~4.19~~	~~0.31~~

	NA-Area	Source Category	PM2.5	NOX	VOC	NH3	SO2
2010	Logan, UT-ID						
Sum of Emissions (tpd)		Area Sources	0.54	1.63	4.16	4.31	0.26
		Mobile Sources	0.67	6.48	4.99	0.12	0.04
		NonRoad	0.13	1.15	2.28	0.00	0.02
		Point Sources	0.00	0.02	0.63	0.00	0.00
		Total	1.35	9.28	12.06	4.43	0.32
2015	Logan, UT-ID						
Sum of Emissions (tpd)		Area Sources	0.40	1.59	3.75	4.08	0.27
		Mobile Sources	0.32	4.49	3.36	0.10	0.03
		NonRoad	0.10	0.81	1.77	0.00	0.01
		Point Sources	0.00	0.00	0.00	0.00	0.00
		Total	0.82	6.89	8.88	4.19	0.31

Table 4.2, Emissions Summaries for the Logan, UT-ID Nonattainment Area; Baseline and Attainment Year (SMOKE). Emissions are presented in tons per average winter day. Mobile source emissions summaries are from the AP-42 (road dust) and MOVES model output. $PM_{2.5}$ for mobile sources includes tire and brake wear, sulfate, elemental and organic carbon, and road dust. VOC for mobile sources includes refueling spillage and displacement vapor loss emissions.

The 2010 Baseline and 2015 projected emissions estimates are calculated from the Sparse Matrix Operator Kernel Model (SMOKE). More detailed inventory information may be found in the Technical Support Document (TSD).

Chapter 5 – ATTAINMENT DEMONSTRATION

5.1 Introduction

UDAQ conducted a technical analysis to support the development of Utah's 24-hr $PM_{2.5}$ State Implementation Plan (SIP). The analyses include preparation of emissions inventories and meteorological data, and the evaluation and application of regional photochemical model. An analysis using observational datasets will be shown to detail the chemical regimes of Utah's Nonattainment areas.

5.2 Photochemical Modeling

Photochemical models are relied upon by federal and state regulatory agencies to support their planning efforts. Used properly, models can assist policy makers in deciding which control programs are most effective in improving air quality, and meeting specific goals and objectives.

The air quality analyses were conducted with the Community Multiscale Air Quality (CMAQ) Model version 4.7.1, with emissions and meteorology inputs generated using SMOKE and WRF, respectively. CMAQ was selected because it is the open source atmospheric chemistry model co-sponsored by EPA and the National Oceanic Atmospheric Administration (NOAA), thus approved by EPA for this plan.

5.3 Domain/Grid Resolution

UDAQ selected a high resolution 4-km modeling domain to cover all of northern Utah including the portion of southern Idaho extending north of Franklin County and west to the Nevada border (Figure 5.1). This 97 x 79 horizontal grid cell domain was selected to ensure that all of the major emissions sources that have the potential to impact the nonattainment areas were included. The vertical resolution in the air quality model consists of 17 layers extending up to 15 km, with higher resolution in the boundary layer.

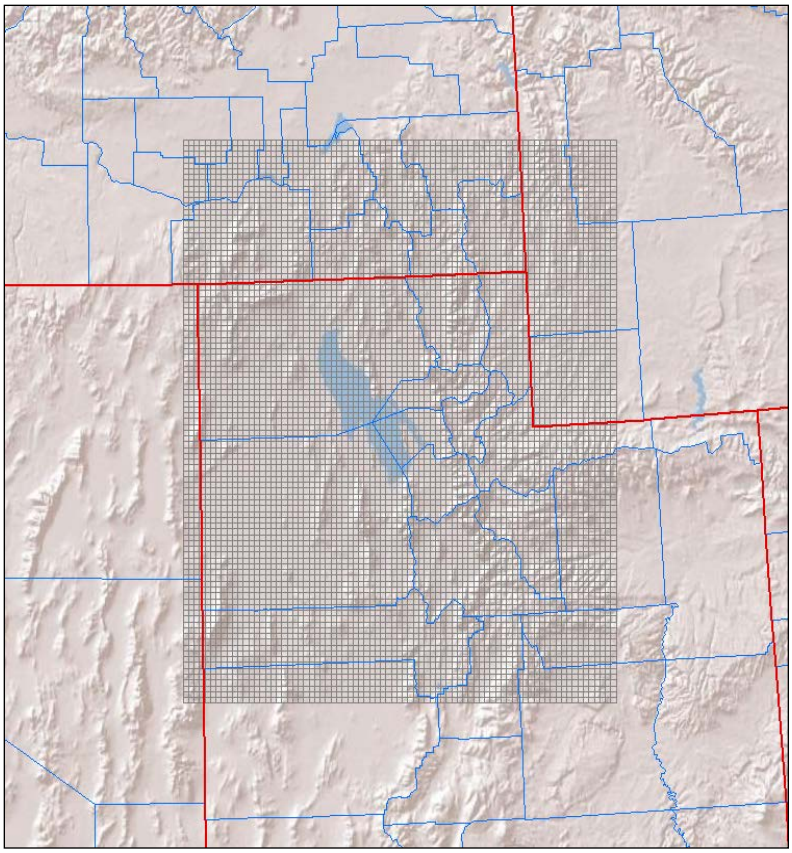


Figure 5.1: Northern Utah photochemical modeling domain.

5.4 Episode Selection

According to EPA's April 2007 "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze" the selection of SIP episodes for modeling should consider the following 4 criteria:

1. Select episodes that represent a variety of meteorological conditions that lead to elevated $PM_{2.5}$.
2. Select episodes during which observed concentrations are close to the baseline design value.
3. Select episodes that have extensive air quality data bases.
4. Select enough episodes such that the model attainment test is based on multiple days at each monitor violating NAAQS.

In general, UDAQ wanted to select episodes with hourly $PM_{2.5}$ concentrations that are reflective of conditions that lead to 24-hour NAAQS exceedances. From a synoptic meteorology point of view, each selected episode features a similar pattern. The typical pattern includes a deep trough over the eastern United States with a building and eastward moving ridge over the western United States. The episodes typically begin as the ridge begins to build eastward, near surface winds weaken, and rapid stabilization due to warm advection and subsidence dominate. As the ridge centers over Utah and subsidence peaks, the atmosphere becomes extremely stable and a subsidence inversion descends towards the surface. During this time, weak insolation, light winds, and cold temperatures promote the development of a persistent cold air pool. Not until the ridge moves eastward or breaks down from north to south is there enough mixing in the atmosphere to completely erode the persistent cold air pool.

From the most recent 5-year period of 2007-2011, UDAQ developed a long list of candidate $PM_{2.5}$ wintertime episodes. Three episodes were selected. An episode was selected from January 2007, an episode from February 2008, and an episode during the winter of 2009-2010 that features multi-event episodes of $PM_{2.5}$ buildup and washout. Further detail of the episodes is below:

- **Episode 1: January 11-20, 2007**

A cold front passed through Utah during the early portion of the episode and brought very cold temperatures and several inches of fresh snow to the Wasatch Front. The trough was quickly followed by a ridge that built north into British Columbia and began expanding east into Utah. This ridge did not fully center itself over Utah, but the associated light winds, cold temperatures, fresh snow, and subsidence inversion produced very stagnant conditions along the Wasatch Front. High temperatures in Salt Lake City throughout the episode were in the high teens to mid-20's Fahrenheit.

Figure 5.2 shows hourly $PM_{2.5}$ concentrations from Utah's 4 $PM_{2.5}$ monitors for January 11-20, 2007. The first 6 to 8 days of this episode are suited for modeling. The episode becomes less suited after January 18 because of the complexities in the meteorological conditions leading to temporary $PM_{2.5}$ reductions.

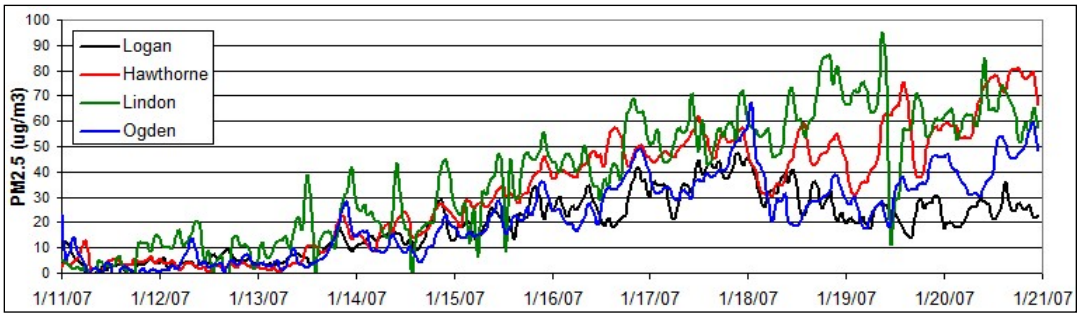


Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007

- **Episode 2: February 14-18, 2008**

The February 2008 episode features a cold front passage at the start of the episode that brought significant new snow to the Wasatch Front. A ridge began building eastward from the Pacific Coast and centered itself over Utah on Feb 20th. During this time a subsidence inversion lowered significantly from February 16 to February 19. Temperatures during this episode were mild with high temperatures at SLC in the upper 30's and lower 40's Fahrenheit.

The 24-hour average $PM_{2.5}$ exceedances observed during the proposed modeling period of February 14-19, 2008 were not exceptionally high. What makes this episode a good candidate for modeling are the high hourly values and smooth concentration build-up. The first 24-hour exceedances occurred on February 16 and were followed by a rapid increase in $PM_{2.5}$ through the first half of February 17 (Figure 5.3). During the second half of February 17, a subtle meteorological feature produced a mid-morning partial mix-out of particulate matter and forced 24-hour averages to fall. After February 18, the atmosphere began to stabilize again and resulted in even higher $PM_{2.5}$ concentrations during February 20, 21, and 22. Modeling the 14th through the 19th of this episode should successfully capture these dynamics. The smooth gradual build-up of hourly $PM_{2.5}$ is ideal for modeling.

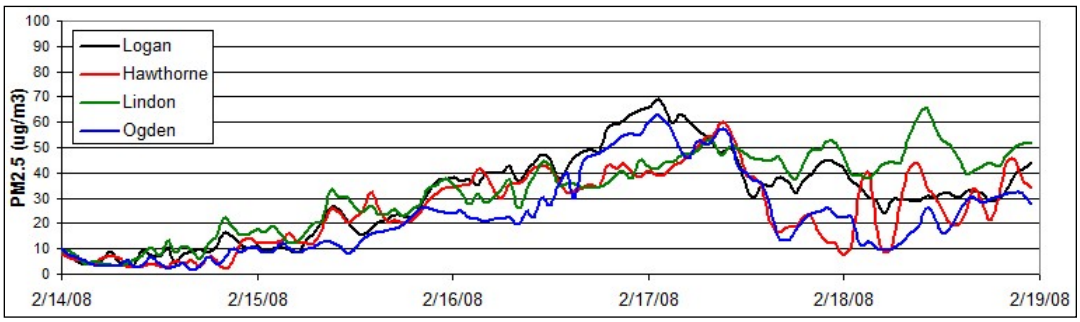


Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008

- **Episode 3: December 13, 2009 – January 18, 2010**

The third episode that was selected is more similar to a "season" than a single $PM_{2.5}$ episode (Figure 5.4). During the winter of 2009 and 2010, Utah was dominated by a semi-permanent ridge of high pressure that prevented strong storms from crossing Utah. This 35 day period was characterized by 4 to 5 individual $PM_{2.5}$ episodes each followed by a partial $PM_{2.5}$ mix out when a weak weather system passed through the ridge. The long length of the episode and repetitive $PM_{2.5}$ build-up and mix-out cycles makes it ideal for evaluating model strengths and weaknesses and $PM_{2.5}$ control strategies.

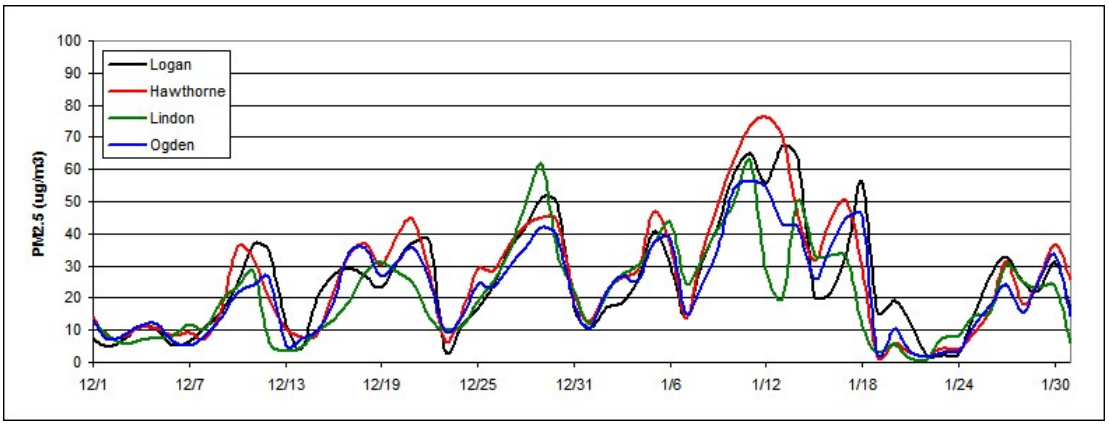


Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10.

5.5 Meteorological Data

Meteorological inputs were derived using the Weather Research and Forecasting (WRF), Advanced Research WRF (WRF-ARW) model version 3.2. WRF contains separate modules to compute different physical processes such as surface energy budgets and soil interactions, turbulence, cloud microphysics, and atmospheric radiation. Within WRF, the user has many options for selecting the different schemes for each type of physical process. There is also a WRF Preprocessing System (WPS) that generates the initial and boundary conditions used by WRF, based on topographic datasets, land use information, and larger-scale atmospheric and oceanic models.

Model performance of WRF was assessed against observations at sites maintained by the Utah Air Monitoring Center. A summary of the performance evaluation results for WRF are presented below:

- The biggest issue with meteorological performance is the existence of a warm bias in surface temperatures during high $PM_{2.5}$ episodes. This warm bias is a common trait of WRF modeling during Utah wintertime inversions.
- WRF does a good job of replicating the light wind speeds (< 5 mph) that occur during high $PM_{2.5}$ episodes.
- WRF is able to simulate the diurnal wind flows common during high $PM_{2.5}$ episodes. WRF captures the overnight downslope and daytime upslope wind flow that occurs in Utah valley basins.
- WRF has reasonable ability to replicate the vertical temperature structure of the boundary layer (i.e., the temperature inversion), although it is difficult for WRF to reproduce the inversion when the inversion is shallow and strong (i.e., an 8 degree temperature increase over 100 vertical meters).

5.6 Photochemical Model Performance Evaluation

The model performance evaluation focused on the magnitude, spatial pattern, and temporal variation of modeled and measured concentrations. This exercise was intended to assess whether, and to what degree, confidence in the model is warranted (and to assess whether model improvements are necessary).

CMAQ model performance was assessed with observed air quality datasets at UDAQ-maintained air monitoring sites (Figure 5.5). Measurements of observed $PM_{2.5}$ concentrations along with gaseous precursors of secondary particulate (e.g., NO_x, ozone) and carbon monoxide are made throughout winter at most of the locations in Figure 5.5. $PM_{2.5}$ speciation performance was assessed using the three Speciation Monitoring Network Sites (STN) located at the Hawthorne site in Salt Lake City, the Bountiful site in Davis County, and the Lindon site in Utah County.

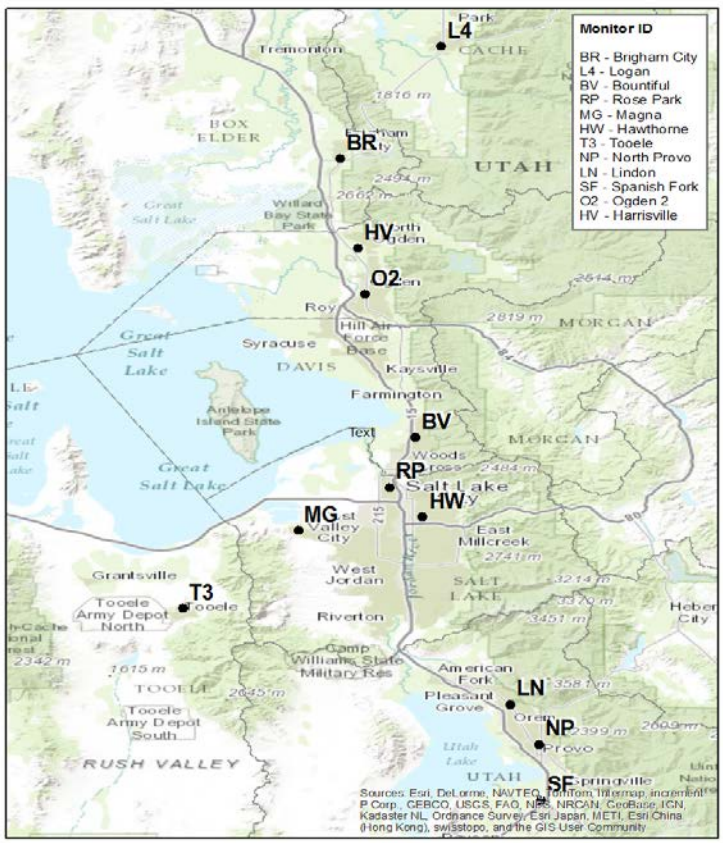


Figure 5.5: UDAQ monitoring network.

A spatial plot is provided for modeled 24-hr $PM_{2.5}$ for 2010 January 03 in Figure 5.6. The spatial plot shows the model does a reasonable job reproducing the high $PM_{2.5}$ values, and keeping those high values confined in the valley locations where emissions occur.

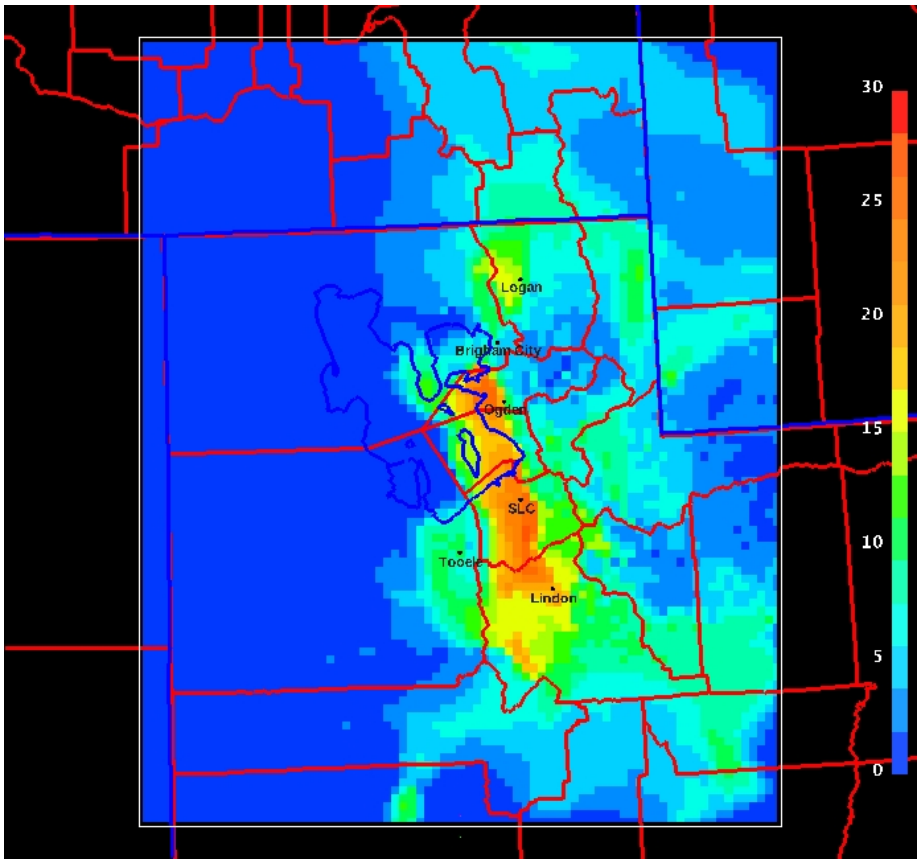


Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ ($\mu g/m^3$) for 2010 Jan. 03.

Time series of 24-hr $PM_{2.5}$ concentrations for the 13 Dec. 2009 – 15 Jan. 2010 modeling period are shown in Figs. 5.7 – 5.10 at the Hawthorne site in Salt Lake City (Fig. 5.7), the Ogden site in Weber County (Fig 5.8), the Lindon site in Utah County (Fig. 5.9), and the Logan site in Cache County (Fig. 5.10). For the most part, CMAQ replicates the buildup and washout of each individual episode. While CMAQ builds 24-hr $PM_{2.5}$ concentrations during the 08 Jan. – 14 Jan. 2010 episode, it was not able to produce the > 60 $\mu g/m^3$ concentrations observed at the monitoring locations.

It is often seen that CMAQ "washes" out the $PM_{2.5}$ episode a day or two earlier than that seen in the observations. For example, on the day 21 Dec. 2009, the concentration of $PM_{2.5}$ continues to build while CMAQ has already cleaned the valley basins of high $PM_{2.5}$ concentrations. At these times, the

observed cold pool that holds the $PM_{2.5}$ is often very shallow and winds just above this cold pool are southerly and strong before the approaching cold front. This situation is very difficult for a meteorological and photochemical model to reproduce. An example of this situation is shown in Fig. 5.11, where the lowest part of the Salt Lake Valley is still under a very shallow stable cold pool, yet higher elevations of the valley have already been cleared of the high $PM_{2.5}$ concentrations.

During the 24 – 30 Dec. 2009 episode, a weak meteorological disturbance brushes through the northernmost portion of Utah. It is noticeable in the observations at the Ogden monitor at 25 Dec. as $PM_{2.5}$ concentrations drop on this day before resuming an increase through Dec. 30. The meteorological model and thus CMAQ correctly pick up this disturbance, but completely clears out the building $PM_{2.5}$; and thus performance suffers at the most northern Utah monitors (e.g. Ogden, Logan). The monitors to the south (Hawthorne, Lindon) are not influence by this disturbance and building of $PM_{2.5}$ is replicated by CMAQ. This highlights another challenge of modeling $PM_{2.5}$ episodes in Utah. Often during cold pool events, weak disturbances will pass through Utah that will de-stabilize the valley inversion and cause a partial clear out of $PM_{2.5}$. However, the $PM_{2.5}$ is not completely cleared out, and after the disturbance exits, the valley inversion strengthens and the $PM_{2.5}$ concentrations continue to build. Typically, CMAQ completely mixes out the valley inversion during these weak disturbances.

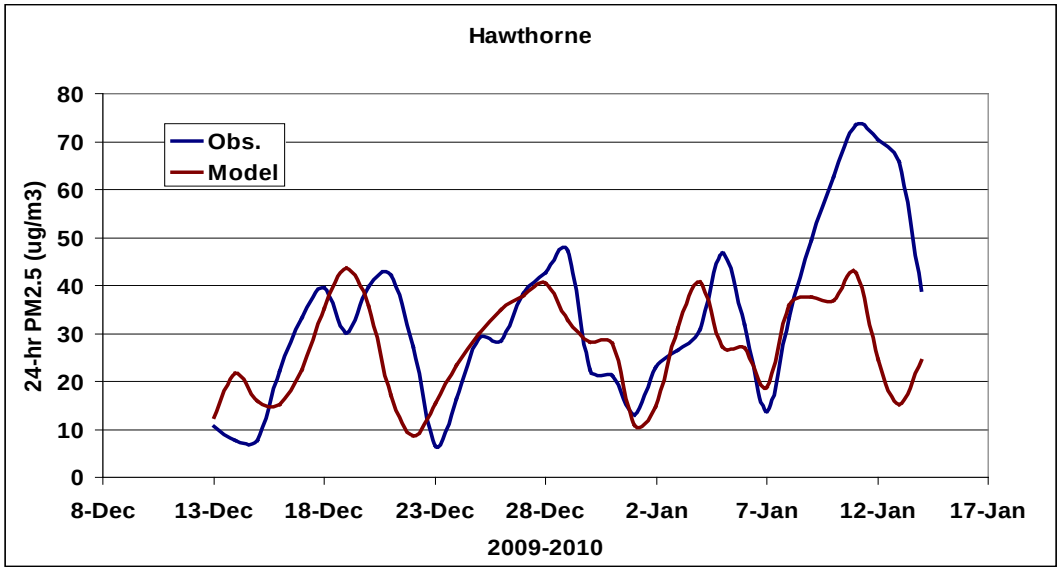


Figure 5.7: 24-hr PM2.5 time series (Hawthorne). Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

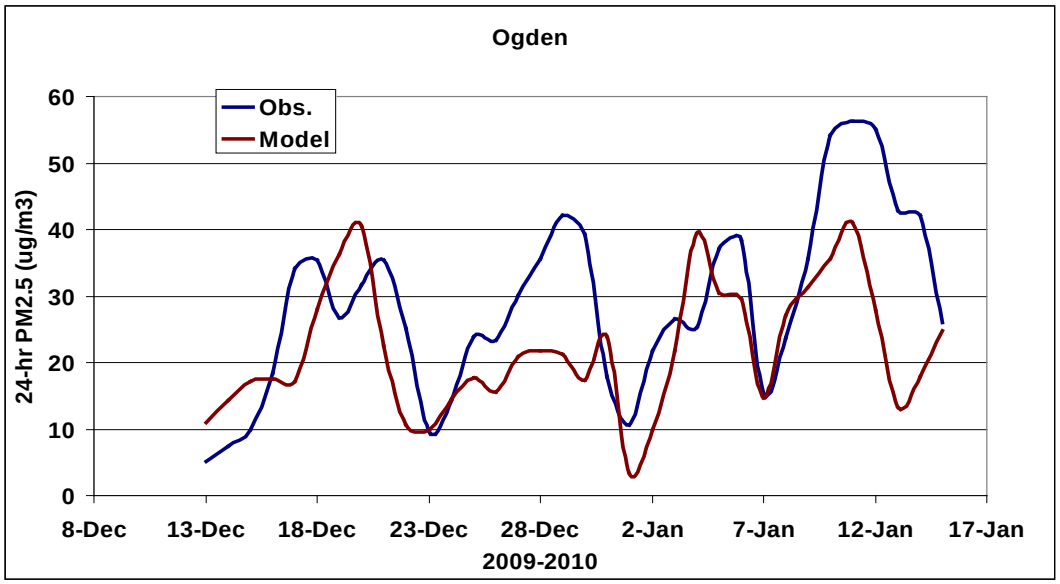


Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

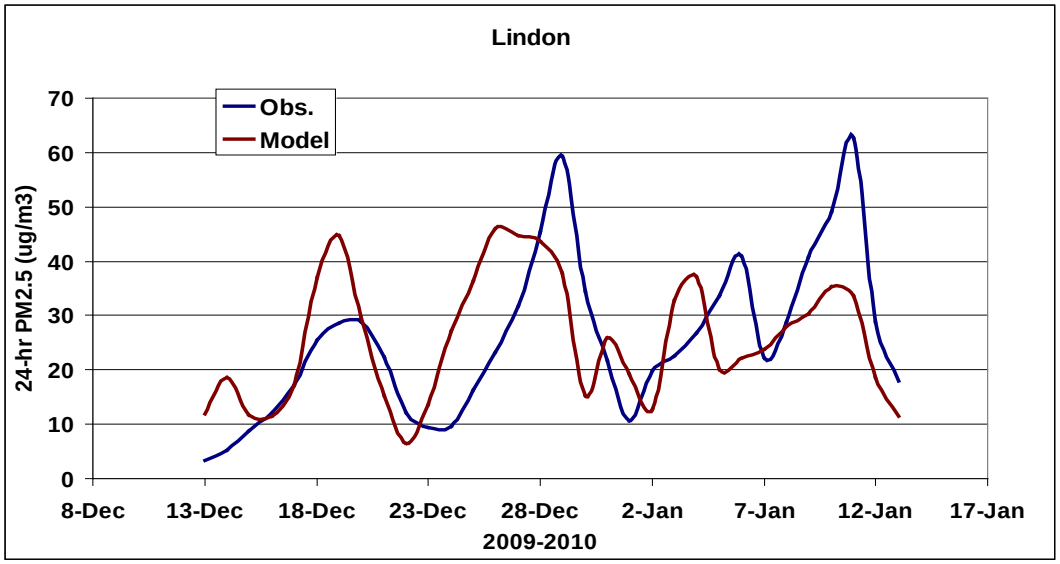


Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

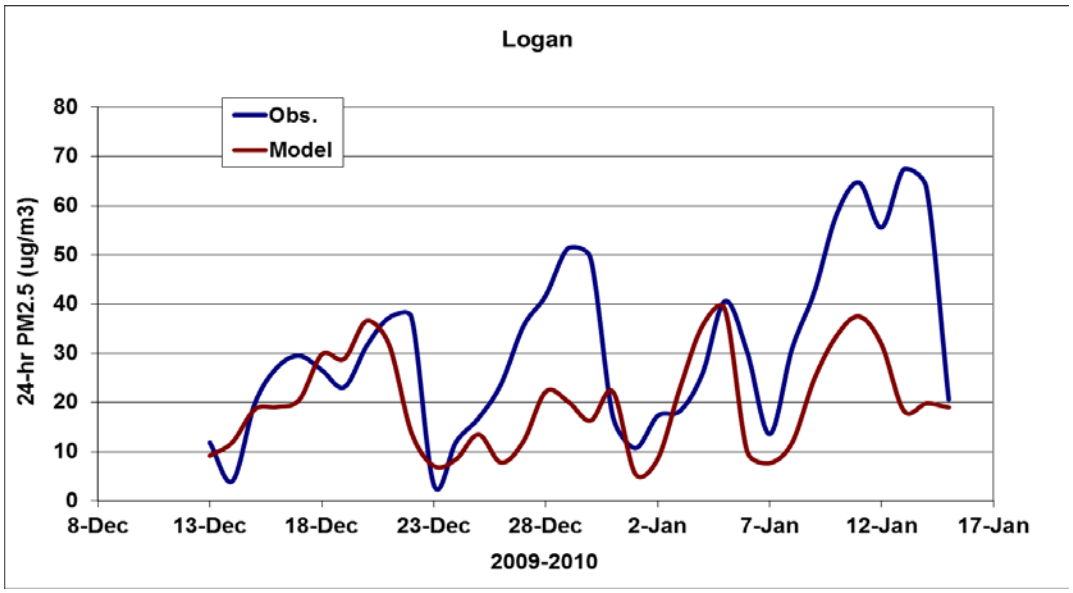


Figure 5.10: 24-hr $PM_{2.5}$ time series (Logan). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

Figure 5.11: An example of the Salt Lake Valley at the end of a high $PM_{2.5}$ episode. The lowest elevations of the Salt Lake Valley are still experiencing an inversion and elevated $PM_{2.5}$ concentrations while the $PM_{2.5}$ has been 'cleared out' throughout the rest of the valley. These 'end of episode' clear out periods are difficult to replicate in the photochemical model.

Generally, the performance of CMAQ to replicate the buildup and clear out of $PM_{2.5}$ is good. However, it is important to verify that CMAQ is replicating the components of $PM_{2.5}$ concentrations. $PM_{2.5}$ simulated and observed speciation is shown at the 3 STN sites in Figures 5.12 – 5.14. The observed speciation is constructed using days in which the STN filter 24-hr $PM_{2.5}$ concentration was > 35 µg/m^3. For the 2009-2010 modeling period, the observed speciation pie charts were created using 8 filter days at Hawthorne, 6 days at Lindon, and 4 days at Bountiful. The speciation of this small dataset appears similar to a comparison of a larger dataset of STN filter speciated data from 2005-2010 for high wintertime $PM_{2.5}$ days (see Figure 3.2 for one of these at Hawthorne).

The simulated speciation is constructed using modeling days that produced 24-hr $PM_{2.5}$ concentrations > 35 µg/m^3. Using this criterion, the simulated speciation pie chart is created from 18 modeling days for Hawthorne, 14 days at Lindon, and 14 days at Bountiful.

At all 3 STN sites, the percentage of simulated nitrate is greater than 40%, while the simulated ammonium percentage is at ~15%. This indicates that the model is able to replicate the secondarily formed particulates that typically make up the majority of the measured $PM_{2.5}$ on the STN filters during wintertime pollution events.

The percentage of model simulated organic carbon is ~13% at all STN sites, which is in agreement with the observed speciation of organic carbon at Hawthorne and slightly overestimated (by ~3%) at Lindon and Bountiful.

There is no STN site in the Logan nonattainment area, and very little speciation information available in the Cache Valley. Figure 5.15 shows the model simulated speciation at Logan. Ammonium (17%) and nitrate (56%) make up a higher percentage of the simulated $PM_{2.5}$ at Logan when compared to sites along the Wasatch Front.

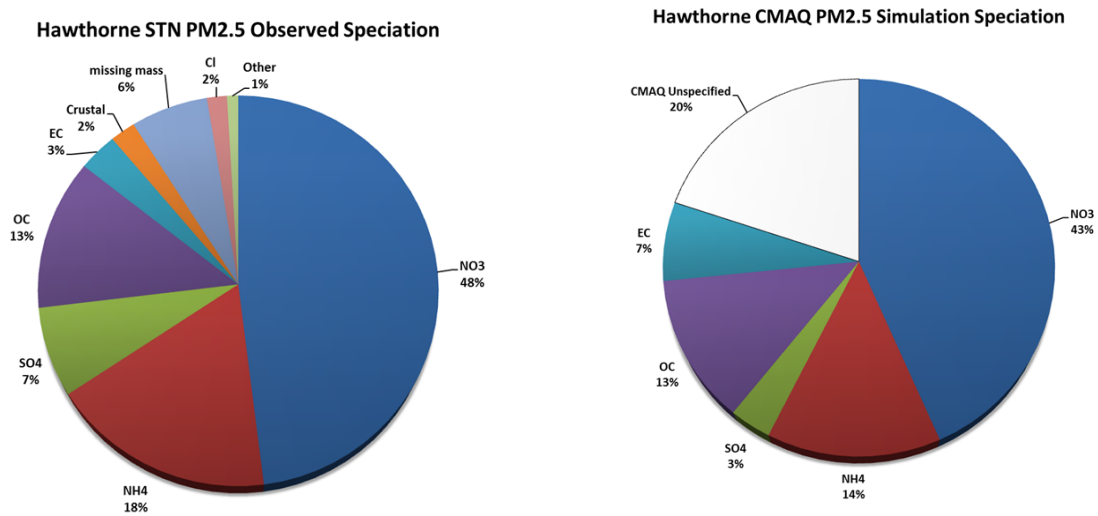


Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Hawthorne STN site.

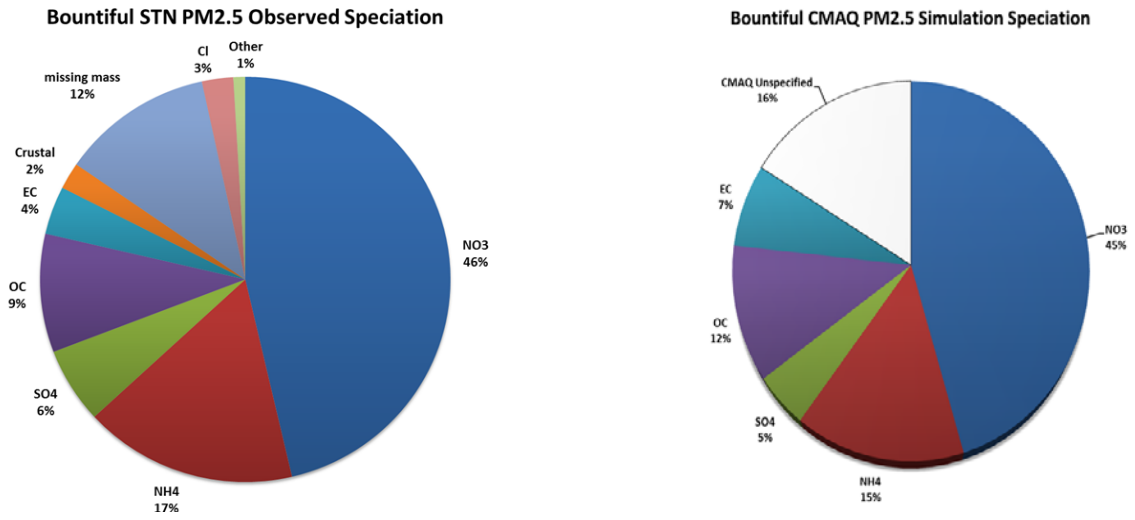


Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Bountiful STN site.

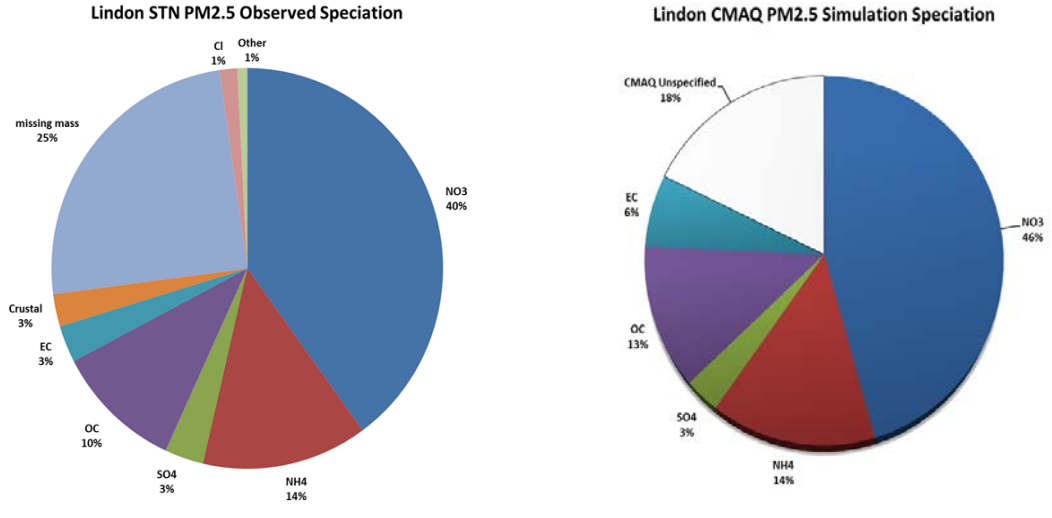


Figure 5.14: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Lindon STN site.

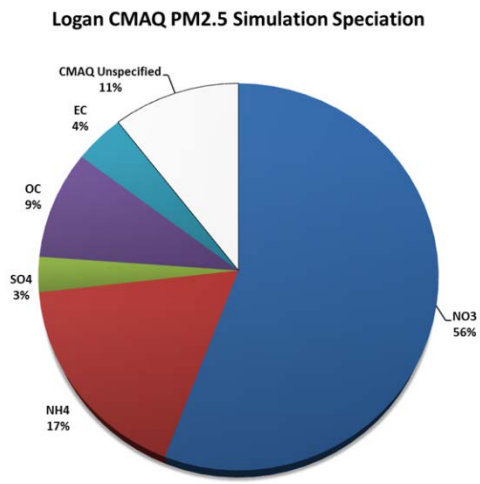


Figure 5.15: The composition of model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when a modeled day had 24-hr concentrations > 35 µg/m^3 at the Logan monitoring site. No observed speciation data is available for Logan.

5.7 Summary of Model Performance

Model performance for 24-hr $PM_{2.5}$ is good and generally acceptable and can be characterized as follows:

- Good replication of the episodic buildup and clear out of $PM_{2.5}$. Often the model will clear out the simulated $PM_{2.5}$ a day too early at the end of an episode. This clear out time period is difficult to model (i.e., Figure 5.11).
- Good agreement in the magnitude of $PM_{2.5}$, as the model can consistently produce the high concentrations of $PM_{2.5}$ that coincide with observed high concentrations.
- Spatial patterns of modeled 24-hr $PM_{2.5}$, show for the most part, that the $PM_{2.5}$ is being confined in the valley basins, consistent to what is observed.
- Speciation and composition of the modeled $PM_{2.5}$ matches the observed speciation quite well. Modeled and observed nitrate are between 40% and 50% of the $PM_{2.5}$. Ammonium is between 15% and 20% for both modeled and observed $PM_{2.5}$, while modeled and observed organic carbon falls between 10% to 13% of the total $PM_{2.5}$.

Several observations should be noted on the implications of these model performance findings on the attainment modeling presented in the following section. First, it has been demonstrated that model performance overall is acceptable and, thus, the model can be used for air quality planning purposes. Second, consistent with EPA guidance, the model is used in a relative sense to project future year values. EPA suggests that this approach "should reduce some of the uncertainty attendant with using absolute model predictions alone." Furthermore, the attainment modeling is supplemented by additional information to provide a weight of evidence determination.

5.8 Modeled Attainment Test

UDAQ employed Model Attainment Test Software (MATS) for the modeled attainment test at grid cells near monitors. MATS is designed to interpolate the species fractions of the PM mass from the Speciation Trends Network (STN) monitors to the FRM monitors. The model also calculates the relative response factor (RRF) for grid cells near each monitor and uses these to calculate a future year design value for these cells.

MATS results for future year modeling is presented in Figure 5.16. The future year design values are presented with and without SIP controls for 2015 (the attainment year). For comparison purposes, the monitored design value is also presented for the base year, 2010.

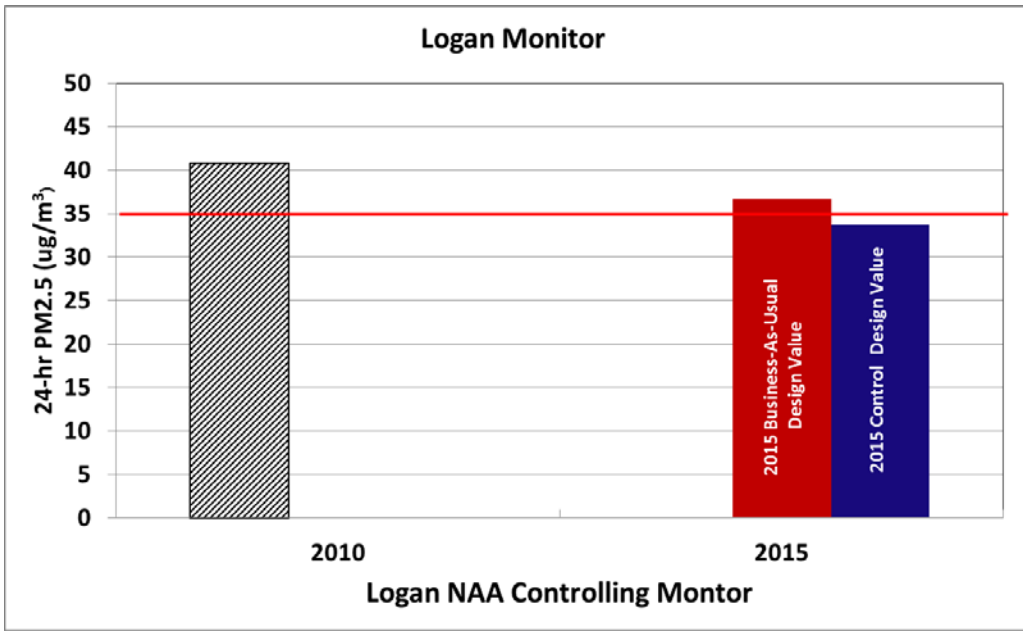


Figure 5.16, Model Results for the Logan, UT-ID Nonattainment Area

Table 5.1 presents the same information in tabular form, and also includes any additional monitoring locations in the nonattainment area.

	2010	2015	
	Observed	**Business-As-Usual**	**Control Basket**
Logan	*41*	*37*	*34*
Franklin	*39*	*34*	*32*

Table 5.1, Modeled Concentrations (µg/m^3) for the Salt Lake City, UT Nonattainment Area

The "Control Basket" inventory that is presented in Table 5.1 consists of a combination of SIP reductions on point sources and new rules to be implemented that will affect smaller commercial and industrial businesses. All of these changes are detailed in Chapter 6 - Control Measures. Summary tables of the emission inventories that result from the Control Basket reductions are available in the TSD: Section 3 Baseline and Control Strategies.

5.9 Air Quality as of the Attainment Date

The attainment date for this moderate $PM_{2.5}$ nonattainment area is December 31, 2015. The plan provisions for moderate areas call, in Section 189(a)(1)(B), for either a demonstration that the plan will provide for attainment by the applicable attainment date or a demonstration that attainment by such date is impracticable.

As shown in the modeled attainment test, the emissions reductions achievable in 2015 allow for a demonstration that the Logan, UT-ID nonattainment area can attain the 24-hour $PM_{2.5}$ NAAQS by the attainment date.

As discussed in Section 6.6, the emissions modeled in the “control basket” scenario reflect all RACM and RACT measures achievable in practice by the statutory implementation date (December 14, 2014).

Chapter 6 – CONTROL MEASURES

6.1 Introduction

Attaining the 2006, 24-hour NAAQS for $PM_{2.5}$ will require emission controls from directly emitted $PM_{2.5}$ as well as $PM_{2.5}$ precursors (SO_2, NO_x and VOC). It will involve emission sources from each of the four sectors identified in the discussion on emission inventories (stationary point sources, area sources, on-road mobile sources and off-road mobile sources). Furthermore, it will entail control measures of three basic types: existing measures, measures imposed through this SIP, and additional measures requiring additional development before they are ready for implementation.

This chapter summarizes the overall control strategy for the plan. Additional detail concerning individual emission control measures, including the emissions reductions to be expected, is contained in the Technical Support Document.

6.2 Utah Stakeholder Workgroup Efforts

In response to increasing interest in Utah's air quality problems and the need for greater participation in reducing air emissions, the Utah Division of Air Quality (DAQ) created a significant and meaningful role for public participation in the $PM_{2.5}$ SIP development process. The public involvement process was driven by a need for transparency and inclusivity of public health and business interests impacted by air quality issues.

DAQ's measures of success for the public involvement process were:

- Buy-in from public, stakeholders, and elected officials,
- SIP recommendations that are championed and implemented, and
- Close working relationship with partner organizations to deliver a unified message.

Measures of success for participants were:

- Having a say in plans that impacted their communities,
- Access to information and time to understand issues and provide input,
- Access to DAQ staff and the SIP development process,
- Meaningful participation in the process, and
- Transparency in the process.

Public participation centered on creating workgroups with members from each county within the $PM_{2.5}$ nonattainment area—Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber. More than 100 people from agriculture, academia, environmental groups, state and local elected officials, industry, and the public volunteered to participate. Their participation ensured that the SIP development process would have grassroots-level input about strategies and their impacts on a countywide level.

Workgroup members were engaged in four rounds of meetings created to provide and gather information. After providing a baseline level of knowledge during Meeting One, draft emissions reductions were discussed during Meetings Two and Three, each followed by a survey to capture new ideas and feedback. Responses from the survey, and other feedback received during the process, were used to refine emissions inventories, in some cases significantly, refine mitigation strategies, provide new strategies, and provide ideas for implementation. Meeting Four was an opportunity for workgroup members to introduce the SIP package to the public and talk about the development process before one of several public comment hearings held in the nonattainment counties.

The public participation process was not without challenges. One of the most difficult was providing information that could get a diverse group of stakeholders to understand very complex and technical air quality and emissions reductions issues. Despite the challenges, the process was successful and contributed to a well-rounded and well-vetted SIP package.

6.3 Identification of Measures

In considering the suite of control measures that could be implemented as part of this plan several important principles were applied to expedite the analysis.

Filter data shows that secondary particulate is the portion of mass most responsible for exceedances of the standard on episode days, and specifically shows that ammonium nitrate is the single largest component of that material. In addition, it shows that organic carbon represents the bulk of primary $PM_{2.5}$.

Priority was given to those source categories or pollutants responsible for relatively larger percentages of the emissions leading to exceedances of the $PM_{2.5}$ NAAQS. The emissions inventory compiled to represent base-year conditions was useful in identifying the contributors to these emissions, particularly in their relation to the formation of ammonium nitrate.

At the same time, the air quality modeling shed light on the sensitivity of the airshed in its response to changes in different pollutants. VOC was immediately identified as a significant contributor to elevated $PM_{2.5}$ concentrations, and proved to be more limiting in the overall atmospheric chemistry than NO_x. This pointed the search for viable control strategies toward VOC emissions, and somewhat away from NO_x. It also became apparent that directly emitted $PM_{2.5}$, while a relatively small portion of the overall filter mass, is independent of the non-linear chemical transformation to particulate matter. Therefore, any reduction in $PM_{2.5}$ emissions will directly improve future $PM_{2.5}$ concentrations, and like VOC, made

these emissions an attractive target for potential control measures. . Subsequent modeling revealed that, as time progressed and the relative concentrations of NO_x and VOC changed, controlling for NO_x would yield more benefit in terms of controlling $PM_{2.5}$. Ammonia is also prominent in chemical reactions that produce secondary $PM_{2.5}$, but it occurs in such abundance that $PM_{2.5}$ concentrations are sensitive only to unachievable reductions in ammonia.

6.4 Existing Control Measures

Since about 1970 there have been regulations at both state and federal levels to mitigate air contaminants. It follows that the estimates of emissions used in modeled attainment demonstration for this Plan take into account the effectiveness of existing control measures. These measures affect not only the levels of current emissions, but some continue to affect emissions trends as well.

An example of the former would be the effectiveness of an add-on control device at a stationary point source. It is presently effective in controlling emissions, and will continue to be that effective five years from now.

An example of the latter would be a federal rule that affects the manufacture of engines. The engines already sold into the airshed are effective in reducing emissions, but the number of these engines replacing older, higher emitting engines is increasing. Therefore, a rule such as this also affects the trend of emissions for that source category in a positive way.

The effectiveness of any control measure that was in place, and enforceable, at the time this Plan was written has been accounted for in the tabulation of baseline emissions and projected emissions.

The following paragraphs discuss some of the more important control strategies that are already in place for the four basic sectors of the emissions inventory.

<u>Stationary Point Sources:</u>

Utah's permitting rules require a review of new and modified major stationary sources in nonattainment areas, as is required by Section 173 of the Clean Air Act. Beyond that however, even minor sources and minor modifications to major sources planning to locate anywhere in the state are required to undergo a new source review analysis and receive an approval order to construct. Part of this review is an analysis to ensure the application of Best Available Control Technology (BACT). This requirement is ongoing and ensures that Utah's industry is well controlled.

Any of the source-specific emission controls or operating practices that has been required as a result of the forgoing has been reflected in the baseline emissions calculated for the large stationary sources, and therefore evaluated in the modeled attainment demonstration.

Area sources:

Stage 1 vapor control was introduced in Salt Lake and Davis Counties as part of the 1981 ozone SIP. This is a method of collecting VOC vapors, as underground gasoline storage tanks are filled at gas stations, and returning those vapors to a facility where they are collected and recycled. Since that time it has been extended to include the entire state.

Energy Efficiency

EPA recognizes the benefits of including energy efficiency programs in SIP's as a low cost means of reducing emissions. Two established energy efficiency programs that result in direct emission reductions within the Wasatch Front are already in place.

Questar Gas ThermWise Rebate Programs

Questar started the ThermWise Rebate Programs on January 1, 2007 as a way to promote the use of energy-efficient appliances and practices among its customers. The ThermWise Programs offer rebates to help offset the initial cost of energy-efficient appliances and weatherization. There are also rebates available for energy efficient new construction. The cost of rebates is built into the Questar gas rate. The rebates are vetted by the Utah Public Service Commission's strict "cost-effectiveness" tests. To pass these tests, Questar must prove that the energy cost savings produced by the ThermWise Programs exceeds the cost of the rebates. There is no scheduled end to the ThermWise Programs. According to the Questar program information, the program will remain in place as long as rebates remain cost-effective.

UDAQ calculates area source emissions for natural gas by multiplying emission factors against actual and projected yearly gas usage data submitted by Questar. In this way, actual realized program reductions are expressed in the past year (baseline) emission inventory. Future investment in energy efficiency is not captured in our projected future gas usage. Continuance of this program will result in future gas emissions that are lower than projected.

Weatherization Assistance Program

The Weatherization Assistance Program helps low-income individuals and families reduce energy costs. Individuals, families, the elderly and the disabled who are making no more than 200 percent of the current federal poverty income level are eligible for help. However, priority is given to the elderly and disabled, households with high-energy consumption, emergency situations and homes with preschool-age children.

The Utah Division of Housing and Community Development administer the program statewide through eight government and nonprofit agencies. Benefits are provided in the form of noncash grants to eligible households to make energy-efficiency improvements to those homes.

The energy efficiency realized from this program is also imbedded within the gas usage data UDAQ receives from Questar.

On-road mobile sources:

The federal motor vehicle control program has been one of the most significant control strategies affecting emissions that lead to $PM_{2.5}$. Since 1968, the program has required newer vehicles to meet ever more stringent emission standards for CO, NO_x, and VOC. Tier 1 standards were established in the early 1990s and were fully implemented by 1997. The Tier 1 emission standards can be found in Table 6.1. The EPA created a voluntary clean car program on January 7, 1998 (63 FR January 7, 1998), which was called the National Low Emission Vehicle (NLEV) program. This program asked auto manufacturers to commit to meet tailpipe standards for light duty vehicles that were more stringent than Tier 1 standards.

EPA Tier 1 Emission Standards for Passenger Cars and Light-Duty Trucks, FTP 75, g/mi

	100,000 miles/10 years[1]					
Category	**THC**	**NMHC**	**CO**	**NO_x[2] diesel**	***NO_x* *gasoline***	**PM[3]**
Passenger cars	-	0.31	4.2	1.25	*0.6*	0.1
LLDT, LVW <3,750 lbs	0.8	0.31	4.2	1.25	*0.6*	0.1
LLDT, LVW >3,750 lbs	0.8	0.4	5.5	0.97	*0.97*	0.1
HLDT, ALVW <5,750 lbs	0.8	0.46	6.4	0.98	*0.98*	0.1
HLDT, ALVW > 5,750 lbs	0.8	0.56	7.3	1.53	*1.53*	0.12

1 - Useful life 120,000 miles/11 years for all HLDT standards and for THC standards for LDT

2 - More relaxed NO_x limits for diesels applicable to vehicles through 2003 model year

3 - PM standards applicable to diesel vehicles only

Abbreviations:

LVW - loaded vehicle weight (curb weight + 300 lbs)

ALVW - adjusted LVW (the numerical average of the curb weight and the GVWR)

LLDT - light light-duty truck (below 6,000 lbs GVWR)

HLDT - heavy light-duty truck (above 6,000 lbs GVWR)

Table 6.1, Tier 1 Emission Standards

Shortly thereafter, EPA promulgated the Tier 2 program. This program went into effect on April 10, 2000 (65 FR 6698 February 10, 2000) and was phased in between 2004 and 2008. Tier 2 introduced more stringent numerical emission limits compared to the previous program (Tier 1). Tier 2 set a single set of standards for all light duty vehicles. The Tier 2 emission standards are structured into 8 permanent and 3 temporary certification levels of different stringency, called "certification bins", and an average fleet standard for NO_x emissions. Vehicle manufacturers have a choice to certify particular vehicles to any of the available bins. The program also required refiners to reduce gasoline sulfur levels nationwide, which was fully implemented in 2007. The sulfur levels need to be reduced so that Tier 2 vehicles could run correctly and maintain their effectiveness. The EPA estimated that the Tier 2 program will reduce oxides of nitrogen emissions by at least 2,220,000 tons per year nationwide in 2020[1]. Tier 2 has also contributed in reducing VOC and direct PM emissions from light duty vehicles. Tier 2 standards are summarized in Table 6.2 below.

Tier 2 Emission Standards, FTP 75, g/mi					
Bin#	**Full Useful Life**				
	NMOG*	**CO**	**NO_x†**	**PM**	**HCHO**
Temporary Bins					
11 MDPV[c]	0.28	7.3	0.9	0.12	0.032
10[a,b,d]	0.156 (0.230)	4.2 (6.4)	0.6	0.08	0.018 (0.027)
9[a,b,e]	0.090 (0.180)	4.2	0.3	0.06	0.018
Permanent Bins					
8[b]	0.125 (0.156)	4.2	0.2	0.02	0.018
7	0.09	4.2	0.15	0.02	0.018
6	0.09	4.2	0.1	0.01	0.018
5	0.09	4.2	0.07	0.01	0.018
4	0.07	2.1	0.04	0.01	0.011
3	0.055	2.1	0.03	0.01	0.011
2	0.01	2.1	0.02	0.01	0.004
1	0	0	0	0	0

* for diesel fueled vehicle, NMOG (non-methane organic gases) means NMHC (non-methane hydrocarbons)

† average manufacturer fleet NO_x standard is 0.07 g/mi for Tier 2 vehicles

[1] 65 FR 6698 February 10, 2000

a - Bin deleted at end of 2006 model year (2008 for HLDTs)

b - The higher temporary NMOG, CO and HCHO values apply only to HLDTs and MDPVs and expire after 2008

c - An additional temporary bin restricted to MDPVs, expires after model year 2008

d - Optional temporary NMOG standard of 0.280 g/mi (full useful life) applies for qualifying LDT4s and MDPVs only

e - Optional temporary NMOG standard of 0.130 g/mi (full useful life) applies for qualifying LDT2s only

Abbreviations:

LDT2 – light duty trucks 2 (0-6,000 lbs. GVWR, 3,751-5,750 lbs. LVW)

LDT4 – light duty trucks 4 (6,001-8,500 lbs. GVWR, 5,751 lbs. and greater ALVW)

MDPV – medium duty passenger vehicle

HLDT - heavy light duty truck (above 6,000 lbs GVWR)

Table 6.2, Tier 2 Emission Standards

In addition to the benefits from Tier 2 in the current emissions inventories, the emission projections for 2015 in this SIP continue to reflect significant improvements in both VOC and NO_x as older vehicles are replaced with Tier 2 vehicles. This trend may be seen in the inventory projections for on-road mobile sources despite the growth in vehicles and vehicle miles traveled that are factored into the same projections.

Additional on-road mobile source emissions improvement stemmed from federal regulations for heavy-duty diesel vehicles. The Highway Diesel Rule, which aimed at reducing pollution from heavy-duty diesel highway vehicles, was finalized in January 2001. Under the rule, beginning in 2007 (with a phase-in through 2010) heavy-duty diesel highway vehicle emissions were required to be reduced by as much 90 percent with a goal of complete fleet replacement by 2030. In order to enable the updated emission-reduction technologies necessitated by the rule, beginning in 2006 (with a phase-in through 2009) refiners were required to begin producing cleaner-burning ultra-low sulfur diesel fuel. Specifically, the rule required a 97 percent reduction in sulfur content from 500 parts per million (ppm) to 15 ppm. The overall nationwide effect of the rule is estimated to be equivalent to removing the pollution from over 90 percent of trucks and buses when the fleet turnover is completed in 2030.

Off-road mobile sources:

Several significant regulatory programs enacted at the federal level will affect emissions from non-road mobile emission sources. This category of emitters includes airplanes, locomotives, hand-held engines, and larger portable engines such as generators and construction equipment. The effectiveness of these controls has been incorporated into the “NONROAD” model UDAQ uses to compile the inventory information for this source category. Thus, the controls have already been factored into the projection inventories used in the modeled attainment demonstration.

EPA rules for non-road equipment and vehicles are grouped into various "tiers" in a manner similar to the tiers established for on-road motor vehicles. To date, non-road rules have been promulgated for Tiers 0 through IV, where the oldest equipment group is designated "Tier 0" and the newest equipment, some of which has yet to be manufactured, falls into "Tier IV." Of note are the following:

Locomotives

Locomotive engine regulation began with Tier 0 standards promulgated in 1998, which apply to model year 2001 engines.

In addition, because of the very long lifetimes of these engines, often up to forty years, Tier 0 standards include remanufacturing standards, which apply to locomotive engines of model years 1973 through 2001.

Subsequent tier standards for line-haul locomotives apply as follows:

Tier	Applicable Model Years
Tier I	2002 - 2004
Tier II	2005 - 2011
Tier III	2012 - 2014
Tier IV	2015 - newer

Yard or "switch" locomotives are regulated under different standards than line-haul.

Lastly, EPA has promulgated remanufacturing standards for Tier I and 2 locomotive engines to date.

Large Engines

Large non-road engines are usually diesel-powered but include some gasoline-powered equipment.

Large land-based diesel equipment (> 37 kw or 50 hp) used in agricultural, construction and industrial applications are regulated under Tier I rules, which apply to model years 1996 through 2000. Subsequent Tier II through IV rules apply to newer model-year equipment.

Some large non-road engines are gasoline-powered (spark-ignition). These include equipment such as forklifts, some airport ground support equipment, recreational equipment such as ATVs, motorcycles and snowmobiles. These are regulated under various tiers in a manner similar to diesel equipment.

Small Engines

Small engines are generally gasoline-powered (spark-ignition). Equipment includes handheld and larger non-handheld types. Handheld equipment includes lawn and garden power tools such as shrub trimmers, saws and dust blowers. Non-handheld equipment includes equipment such as lawnmowers and lawn tractors. From an emissions standpoint, smaller engine size is offset by the large number of pieces of equipment in use by households and commercial establishments. This equipment is regulated under a tiered structure as well.

Emissions Benefit

Each major revision of the non-road tier standards results in a large reduction in carbon monoxide, hydrocarbons, nitrogen oxides and particulate matter.

For example, the Non-road Diesel Tier II and III Rule, which regulates model-year 2001 through 2008 diesel equipment (> 37 kw or 50 hp) is estimated by EPA, in its Regulatory Announcement for this rule dated August 1998, to decrease NO_x emissions by a million tons per year by 2010, the equivalent of taking 35 million passenger cars off the road.

EPA further estimates, in its Regulatory Announcement dated May 2004, that the Tier IV non-road diesel rule is expected to decrease exhaust emissions per piece of equipment by over 90 percent compared to older equipment.

Low-Sulfur Diesel

Non-road diesel equipment is required to operate on diesel fuel with a sulfur content of no greater than 500 ppm beginning June 1, 2007.

Beginning June 1, 2010, non-road diesel equipment must operate on "ultra-low" sulfur diesel with a sulfur content of no more than 15 ppm.

Locomotives and certain marine engines must operate on ultra-low sulfur diesel by June 1, 2012.

6.5 SIP Controls

Beyond the benefits attributable to the controls already in place, there are new controls identified by this SIP that provide additional benefit toward reaching attainment. A summary of the plan strategy is presented here for each of the emission source sectors.

Overall, within the Logan, UT-ID nonattainment area, the strategy to reduce emissions results in 2.66 tons per day of combined $PM_{2.5}$, SO_2, NO_x and VOC in 2015.

6.6 Reasonably Available Control Measures (RACM/RACT)

Section 172 of the CAA requires that each attainment plan "provide for the implementation of all reasonably available control measures (RACM) as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology (RACT)), and shall provide for attainment of the NAAQS."

Now that the Courts have determined that Subpart 4 applies to $PM_{2.5}$ nonattainment areas, it is also instructive to consider paragraph 189(a)(1)(C), which requires that "provisions to assure that reasonably available control measures … shall be implemented no later than … 4 years after designation in the case of an area classified as moderate after the date of the enactment of the Clean Air Act Amendments of 1990." All three of Utah's nonattainment areas for $PM_{2.5}$ were designated so on December 14, 2009. Hence, December 14, 2013 was the date by which all RACM was to have been implemented.

EPA interprets RACM as referring to measures of any type that may be applicable to a wide range of sources (mobile, area, or stationary), whereas RACT refers to measures applicable to stationary sources. Thus, RACT is a type of RACM specifically designed for stationary sources. For Both RACT and RACM Potential control measures must be shown to be both technologically and economically feasible.

Pollutants to be addressed by States in establishing RACT and RACM limits in their $PM_{2.5}$ attainment plans will include primary $PM_{2.5}$ as well as precursors to $PM_{2.5}$. For the control strategy in this plan, those pollutants include SO_2, NO_x and VOC.

In general, the combined approach to RACT and RACM includes the following steps: 1) identification of potential measures that are reasonable, 2) modeling to test the control strategy, and 3) selection of RACT and RACM.

This basic process was applied to each of the four basic sectors of the emissions inventory:

<u>Stationary Point sources:</u>

Reasonably Available Control Technology – As stated above, RACT refers to measures applicable to stationary sources. Thus, RACT is a type of RACM specifically designed for stationary sources.

Section 172 does not include any specific applicability thresholds to identify the size of sources that States and EPA must consider in the RACT and RACM analysis. In developing the emissions inventories underlying the SIP, the criteria of 40 CFR 51 for air emissions reporting requirements was used to establish a 100 ton per year threshold for identifying a sub-group of stationary point sources that would be evaluated individually. The cut-off was applied to either a sources reported emissions for 2008 or for its potential to emit in a given year. The rest of the point sources were assumed to represent a portion of the overall area source inventory.

Sources meeting the criteria described above were individually evaluated to determine whether their operations would be consistent with RACT.

For the Logan, UT-ID nonattainment area, there are no point sources with the potential to emit 100 tons per year of $PM_{2.5}$ or any $PM_{2.5}$ plan precursor.

Additional information regarding the RACT analysis in the nonattainment area may be found in the Technical Support Document.

New Source Review / Banked Emission Reduction Credits – Under Utah's new source review rules in R307-403-8, banking of emission reduction credits (ERCs) is permitted to the fullest extent allowed by applicable Federal Law as identified in 40 CFR 51, Appendix S, among other documents. Under Appendix S, Section IV.C.5, a permitting authority may allow banked ERCs to be used under the preconstruction review program (R307-403) as long as the banked ERCs are identified and accounted for in the SIP control strategy. In the past, Utah has accounted for existing banked ERCs in SIP control strategies, ensuring that a pool of ERCs was available for new or modified sources in nonattainment areas. For the $PM_{2.5}$ SIP, however, it was not possible to include banked ERCs in the attainment demonstration. The $PM_{2.5}$ SIP adopted by the Air Quality Board on December 5, 2012 did not include banked $PM_{2.5}$ or $PM_{2.5}$ precursor ERCs in the attainment demonstration[1], and therefore under R307-403-8 any ERCs that were banked prior to December 5, 2012 may not be used as $PM_{2.5}$ major source or major modification emission offsets for $PM_{2.5}$ nonattainment areas. Any ERCs generated after December 5, 2012 for $PM_{2.5}$ or $PM_{2.5}$ precursors would have been accounted for in this $PM_{2.5}$ attainment demonstration and are eligible to be used as emission offsets for $PM_{2.5}$ or $PM_{2.5}$ precursors. DAQ has established a new registry for $PM_{2.5}$ ERCs generated after December 5, 2012 to ensure that qualifying ERCs are tracked.

Area sources:

The area source RACM analysis consisted of a thorough review of the entire area source inventory for anthropocentrically derived direct $PM_{2.5}$ and precursors constituents. There was no emission threshold level established in the review process; instead, the analysis centered on whether reasonable control measures are available for a given source category. The following table identifies these categories as well as the pollutant(s) likely to be controlled, and provides some remarks as to whether a control strategy was ultimately pursued. In considering what source categories might be considered, Utah made use of EPA recommendations included in Control Techniques Guideline Documents (CTG's), as well as control strategies from other states. DAQ evaluated each strategy for technical feasibility as part of the RACM analysis. The screening column in the table identifies whether or not a strategy was retained for rulemaking or screened out for impracticability.

[1] Note that, because no part of Cache County had ever before been designated as a nonattainment area for any pollutant, there were no ERCs in the registry to even be considered in the modeled demonstration belonging to the SIP revision adopted by the Utah Air Quality Board on December 5, 2012. Furthermore, no ERCs were created in the Logan, UT-ID nonattainment area between December 5, 2012 and the effective date of this plan revision (prepared to also address the requirements of Subpart 4). Hence, no banked emission credits were included in this demonstration either.

Table 6.3 Area Source Strategy Screening

Strategy	Constituent(s)	Screening Status	Remarks
1. Repeal current surface coating rule, R307-340. Replace this rule with individual rules for each category. New rules include $PM_{2.5}$ nonattainment areas. New rules update applicability and control limits to most current CTG. Current rule includes, paper, fabric and vinyl, metal furniture, large appliance, magnet wire, flat wood, miscellaneous metal parts and graphic arts.	VOC	Retained	R307-340 previously applied to Davis and Salt Lake counties. R307-340 was withdrawn and re-enacted as separate rules for each existing category. The new rules were expanded to nonattainment areas and updated to the most current RACT based limit(s).
2. New separate surface coating rules for following sources: a. Aerospace b. High performance c. Architectural d. Marine e. Sheet, strip & coil f. Traffic markings g. Plastic parts	VOC	See Remarks Column	Aerospace – retained High performance – not retained, regulated under Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Architectural – initially nor retained, further research indicated that adopting the Ozone Transport Commission model rule is feasible. Marine – not retained, only 1.2 tpy Sheet, strip & coil – retained Traffic markings – not retained, regulated under FIFRA Plastic parts - retained
3. Agricultural practices using Natural Resources Conservation Service (NRSC) practice standards	VOC, $PM_{2.5}$, ammonia	Not Retained	The NRCS has already enrolled most farmers in the erodible regions in their program thereby negating the need for rulemaking
4. Consumer products rule regulating VOC content	VOC	Retained	
5. Adhesives and sealant rule	VOC	Retained	
6. Expand current solvent degreasing rule R307-335 to $PM_{2.5}$ nonattainment areas and add a new section on industrial solvent cleaning	VOC	Retained	
7. Automobile refinishing rule	VOC	Retained	
8. Expand wood furniture manufacturing rule to $PM_{2.5}$ nonattainment areas. Update to most current CTG.	VOC	Retained	
9. Lower the no burn cut point for residential use of solid fuel burning devices. Require new sale of EPA certified stoves/fireplaces. Prohibit the sale/resale of noncertified stoves in nonattainment areas.	VOC, $PM_{2.5}$, NO_x, SO_x, ammonia	Retained	
10. Ban new sales of stick type outdoor wood boilers in nonattainment areas.	VOC, $PM_{2.5}$, NO_x, SO_x, ammonia	Retained	
11. Industrial bakery rule	VOC	Initially Retained	Screened out after analysis of public comment, cost benefit analysis does not support rulemaking, high cost-low VOC reduction
12. Restaurant charbroiler emission control: - Chain-driven -Underfire	VOC, $PM_{2.5}$	Chain-driven Retained	No reasonable control measures available at this time for underfire charbroiling

Strategy	Constituent(s)	Screening Status	Remarks
		Underfire-Not Retained	
13. Appliance pilot light phase out	VOC, $PM_{2.5}$, NO_x, SO_x, ammonia	Retained	
14. Expand current fugitive dust rule, R307-309 to $PM_{2.5}$ nonattainment areas. Require BMP's for dust plans.	$PM_{2.5}$	Retained	
15. Amend fugitive dust rule to include cattle feed lot	$PM_{2.5}$	Not Retained	Sizeable feed lots are not located in nonattainment areas
16. Ultra-low NO_x burners in commercial, industrial, and institutional boilers	NO_x	Tentatively Retained for Future Consideration	Developing technology not readily available at this time
17. Ultra-low NO_x burners in water heaters	NO_x	Tentatively Retained for Future Consideration	High cost and availability concerns
18. Manure management	VOC, ammonia	Not Retained	NRCS best management practices already encourages manure management. Limited viable options during winter months and treatment options are costly with low control efficiency that would not yield significant ammonia reduction in an ammonia rich inventory
19. Ban testing of back-up generators on red-alert days	VOC, $PM_{2.5}$, NO_x, SO_x	Initially Retained	Screened out after review of public comment, rule implementation was more complicated than anticipated, generators cannot be easily re-programmed
20. Prohibit use of cutback asphalt	VOC	Not Retained	Cities and highway administration personnel need stockpile for winter time road repair. Very small inventory.
21. Control limits on aggregate processing operations and asphalt manufacturing	$PM_{2.5}$, NO_x, SO_x	Retained	
22. R307-307 Road Salt and Sanding	PM	Retained	Expand current rule to nonattainment areas

EPA published CTGs and Alternative Control Techniques documents (ACTs) for VOCs for a host of emission sources. The CTGs are used to presumptively define VOC RACT. The VOC ACTs describe available control techniques and their cost effectiveness, but do not define presumptive RACT levels as the CTGs do. Therefore, CTG's are given highest priority in rule development.

Where a CTG does not exist for an emission source or where a CTG is so dated that it no longer represents current industry practice, UDAQ considered rules from other states as reference sources.

Additional reference sources include the Ozone Transport Commission (OTC) and the Northeast States for Coordinated Air Use Management.

As noted above, many CTGs were previously adopted into Utah's air quality rules to address ozone nonattainment in Salt Lake and Davis Counties. In conducting this evaluation, consideration was given to whether an expansion of applicability for an existing CTG into additional counties would provide a benefit for $PM_{2.5}$, and whether a strengthening of existing CTG requirements in Salt Lake and Davis

Counties would result in an incremental benefit that was economically feasible. Furthermore, EPA has updated some of its existing CTGs and added some new ones to the list.

As part of this SIP, Utah has identified relevant source categories covered by CTGs, and promulgated rules based on the CTGs for reducing emissions from these categories. These rules apply to the following source categories:

- Control of Volatile Organic Emissions from Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks
- Control of Volatile Organic Emissions from Solvent Metal Cleaning
- Control of Volatile Organic Emissions from Surface Coating of Insulation of Magnet Wire
- Control of Volatile Organic Emissions from Graphic Arts
- Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations
- Control Techniques Guidelines for Industrial Cleaning Solvents
- Control Techniques Guidelines for Flat Wood Paneling Coatings
- Control Techniques Guidelines for Paper, Film, and Foil Coatings
- Control Techniques Guidelines for Large Appliance Coatings
- Control Techniques Guidelines for Metal Furniture Coatings
- Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings
- Control of Volatile Organic Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations

While most VOC sources are addressed by CTGs, the remaining emission sources must be evaluated by engineering analysis, including an evaluation of rulings by other states including model rules developed by the Ozone Transport Commission. These include VOCs from autobody refinishing, restaurant charbroiling, and phasing out appliance pilot lights.

CTGs for $PM_{2.5}$ emissions sources do not exist. RACT for $PM_{2.5}$ has been established through information from varied EPA and other state SIP sources. A useful source of data is the AP 42 Compilation of Air Pollutant Emission Factors, first published by the US Public Health Service in 1968. In 1972, it was revised and issued as the second edition by the EPA. The emission factor/control information was applied to fugitive dust and mining strategies.

Table 6.4 shows the effectiveness of the area source SIP control strategy for the Logan, UT-ID nonattainment area by indicating the quantities of emissions eliminated from the inventory in 2015. Most of these rules became effective January 1, 2014.

Logan, UT-ID Nonattainment Area				
	2015 lbs/day reduced			
	NOX	**PM2.5**	**SOX**	**VOC**
Area Source Rules				
R307-302, Solid fuel burning	64	533	11	666
R307-303, Commercial cooking		25		7
R307-309, Fugitive dust		58		
R307-312, Aggregate processing operations		1		
R307-335, Degreasing				379
R307-342, Adhesives & sealants				148
R307-343, Wood manufacturing				64
R307-344, Paper, film & foil coating				12
R307-345, Fabric & vinyl coating				686
R307-346, Metal furniture coating				
R307-347, Large appliance coating				
R307-348, Magnet wire coating				
R307-349, Flat wood panel coating				36
R307-350 Miscellaneous metal parts coating				26
machinery				7
other transportation				15
Special				1
R307-351, Graphic arts				298
R307-352, Metal containers				
R307-353, Plastic coating				261
R307-354, Auto body refinishing				137
R307-355, Aerospace coatings				25
R307-356, Appliance pilot light	51	0	0	3
R307-357, Consumer products				255
R307-361, Architectural coatings				563
Grand Totals	**122**	**679**	**12**	**3,665**

Table 6.4, Emissions Reductions from Area Source SIP Controls

On-road mobile sources:

A motor vehicle emission inspection and maintenance (I/M) program is a necessary control strategy for Cache County to attain the $PM_{2.5}$ NAAQS based on the modeling conducted by UDAQ. This analysis can be found in the TSD.

Therefore, pursuant to Utah Code Annotated 41-6a-1642(1), Cache County officials successfully implemented an I/M program on January 1, 2014. Cache County's I/M program is comprised of a decentralized, test and repair network and requires a biennial test for all vehicles 1969 and newer. The program exempts vehicles less than six years old from an emission inspection. The details of the program can be found in Section X Part F of the Utah SIP.

The emissions reductions associated with an I/M program for the year 2015 are 0.214 tons per day for NO_x and 0.212 tons per day for VOC.

Off-road mobile sources:

Beyond the existing controls reflected in the projection-year inventories and the air quality modeling there are no emission controls that would apply to this source category.

Chapter 7 – TRANSPORTATION CONFORMITY

7.1 Introduction

The federal Clean Air Act (CAA) requires that transportation plans and programs within the Logan, UT-ID $PM_{2.5}$ nonattainment area conform to the air quality plans in the region prior to being approved by the Cache Metropolitan Planning Organization (CMPO). Demonstration of transportation conformity is a condition to receive federal funding for transportation activities that are consistent with air quality goals established in the Utah State Implementation Plan (SIP). Transportation conformity requirements are intended to ensure that transportation activities do not interfere with air quality progress. Conformity applies to on-road mobile source emissions from regional transportation plans (RTPs), transportation improvement programs (TIPs), and projects funded or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) in areas that do not meet or previously have not met the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide, particulate matter less than 10 micrometers in diameter (PM_{10}), particulate matter 2.5 micrometers in diameter or less ($PM_{2.5}$), or nitrogen dioxide.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFTEA-LU) and section 176(c)(2)(A) of the CAA require that all regionally significant highway and transit projects in air quality nonattainment areas be derived from a "conforming" transportation plan. Section 176(c) of the CAA requires that transportation plans, programs, and projects conform to applicable air quality plans before being approved by an MPO. Conformity to an implementation plan means that proposed activities must not (1) cause or contribute to any new violation of any standard in any area, (2) increase the frequency or severity of any existing violation of any standard in any area, or (3) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The plans and programs produced by the transportation planning process of the CMPO are required to conform to the on-road mobile source emissions budgets established in the SIP, or absent an approved or adequate budget, required to meet the interim conformity test. Approval of conformity is determined by the FHWA and FTA.

7.2 Consultation

The Interagency Consultation Team (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 responsibilities of the participating agencies. Members of the ICT workgroup collaborated on a regular basis during the development of the $PM_{2.5}$ 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.

ICT Workgroup Agencies

- Utah Division of Air Quality (UDAQ)
- Metropolitan Planning Organizations MPOs
  - CMPO
  - Wasatch Front Regional Council
  - Mountainland Association of Governments
- Utah Department of Transportation (UDOT)
- Utah Local Public Transit Agencies
- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)
- U.S. Environmental Protection Agency (EPA)

During the SIP development process the CMPO coordinated with the ICT workgroup and developed $PM_{2.5}$ SIP motor vehicle emissions inventories using the latest planning assumptions and tools for traffic analysis and the EPA-approved Motor Vehicle Emission Simulator (MOVES2010) emissions model. Local MOVES2010 modeling data inputs were cooperatively developed by the CMPO and the ICT workgroup using EPA-recommended methods where applicable.

7.3 Regional Emission Analysis

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 nonattainment area. On December 2009, EPA designated the only multistate nonattainment area in the State of Utah by declaring portions of Cache County, Utah and Franklin County, Idaho (Cache Valley) as a $PM_{2.5}$ nonattainment area. The Deadlines Rule (signed April 25, 2014) later classified this as a moderate $PM_{2.5}$ nonattainment area. The responsible transportation planning organization for the Utah portion of the multistate nonattainment area is the CMPO while the Idaho portion is covered by the Idaho Department of Transportation.

As a condition to receive federal transportation funding, transportation plans, programs, and projects are required to meet the criteria and procedures for demonstrating and assuring conformity to the applicable implementation plan developed pursuant to Section 110 and Part D of the CAA. The criteria, specified in 40 CFR 93.109, differ based on the action under review and the status of the

implementation plan. The satisfaction of criteria and procedures, for implementation plans submitted under Section 189(a)(1)(B)(i) of the CAA, which demonstrate attainment of the applicable NAAQS by the applicable attainment date, are addressed generally in paragraph 93.109(b) of the conformity rule. For such control strategy implementation plan revisions, the conformity test consists of either an interim emissions test or a motor vehicle emissions budgets test.

Motor vehicle emissions budgets are defined in 40 CFR 93.101 as "that 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." Transportation plans, programs, and projects are required to meet those emission budgets through strategies that increase the efficiency of the transportation system and reduce motor vehicle use.

The interim conformity test requirements apply until either EPA has declared the motor vehicle emissions budgets adequate for transportation conformity purposes or until EPA approves the budget in the Federal Register.

7.4 Transportation Conformity $PM_{2.5}$ Components

The transportation conformity requirements found in 40 CFR 93.102 require that the $PM_{2.5}$ SIP include motor vehicle emissions budgets for direct $PM_{2.5}$ (elemental carbon, organic carbon, SO_4, brake and tire wear) and emissions of nitrogen oxide (NO_x), a gaseous $PM_{2.5}$ precursor.

Because UDAQ has identified volatile organic compounds (VOCs) as a $PM_{2.5}$ precursor that significantly impact $PM_{2.5}$ concentrations, the SIP will also require a motor vehicle emissions budget for VOC.

The EPA conformity rule presumes that $PM_{2.5}$ re-entrained road dust does not need to be included in the interim conformity test or have an established motor vehicle emissions budget unless either the state or EPA decides that re-entrained road dust emissions are a significant contributor to the $PM_{2.5}$ nonattainment problem. The UDAQ conducted a re-entrained road dust study that concluded that $PM_{2.5}$ re-entrained road dust emissions are negligible in the Utah portion of the Cache Valley $PM_{2.5}$ nonattainment area. EPA Region 8 reviewed the study and concurred with the UDAQ's findings.

7.5 Interim $PM_{2.5}$ Conformity Test

The EPA interim conformity test, for the purposes of this plan revision, will require that NOx, VOC, and direct $PM_{2.5}$ (elemental carbon, organic carbon, SO_4, brake and tire wear) emissions from RTPs, TIPs, and projects funded or approved by the FHWA or the FTA not exceed 2008 levels.

Interim emissions budget tests performed by the CMPO must include the whole multistate $PM_{2.5}$ nonattainment area of Cache Valley, including emissions estimates from Franklin County, Idaho.

The Interim conformity test requirements apply until EPA has declared the motor vehicle emissions budgets adequate for transportation conformity purposes or until EPA approves the budget in the Federal Register.

7.6 Transportation Conformity $PM_{2.5}$ Budgets

Cache County, Utah and Franklin County, Idaho have requested separate motor vehicle emissions budgets for their respective areas; therefore, the budgets listed below only apply to the Cache MPO.

In this SIP, the State is establishing transportation conformity motor vehicle emission budgets (MVEB) in the nonattainment portions of Cache County, Utah for 2015. Separate budgets are established for NO_x, VOC, and $PM_{2.5}$ (elemental carbon, organic carbon, SO_4, brake and tire wear).

The Transportation Conformity $PM_{2.5}$ budgets emissions estimates for the mobile sources are calculated from the EPA approved Motor Vehicle Emission Simulator Model (EPA MOVES 2010a).

Cache MPO Transportation Conformity Budgets

	Direct $PM_{2.5}$ (tpd)	NO_x (tpd)	VOC (tpd)
2015	0.32	4.49	3.23

Table 7.1, Emissions Budgets for Transportation Conformity Purposes (EPA MOVES 2010a). Note: $PM_{2.5}$ budget only includes tire and brake wear, sulfate, elemental and organic carbon and does not include road dust. VOC emissions do not include refueling spillage and displacement vapor loss. Budgets are rounded to the nearest hundredth ton.

Per section 93.124 of the conformity regulations, for transportation conformity analyses using these budgets in analysis years beyond 2015, a trading mechanism is established to allow future increases in on-road direct $PM_{2.5}$ emissions to be offset by future decreases in plan precursor emissions from on-road mobile sources at appropriate ratios established by the air quality model. Future increases in on-road direct $PM_{2.5}$ emissions may be offset with future decreases in NOx emissions from on-road mobile sources at a NOx to $PM_{2.5}$ ratio of 13.66 to 1 and/or future decreases in VOC emissions from on-road mobile sources at a VOC to $PM_{2.5}$ ratio of 22.84 to 1. This trading mechanism will only be used if needed for conformity analyses for years after 2015. To ensure that the trading mechanism does not impact the ability to meet the NOx or VOC budgets, the NOx emission reductions available to supplement the direct $PM_{2.5}$ budget shall only be those remaining after the 2015 NOx budget has been met, and the VOC emissions reductions available to supplement the direct $PM_{2.5}$ budget shall only be those remaining after the 2015 VOC budget has been met. Clear documentation of the calculations used in the trading should be included in the conformity analysis.

Chapter 8 – REASONABLE FURTHER PROGRESS

8.1 Introduction

Clean Air Act Section 172(c)(2) requires that plans for nonattainment areas "shall require reasonable further progress (RFP)." The definition of RFP is given in Section 171 of the CAA. It means "such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date."

In general terms, the goal of these RFP requirements is for areas to achieve generally linear progress toward attainment, as opposed to deferring implementation of all measures, where possible, until the end.

The pollutants to be addressed in the RFP plan are those pollutants that are identified for purposes of control measures in the attainment plan: $PM_{2.5}$, SO_2, NOx, and VOC.

8.2 Moderate Area Planning Requirements

Within the context of the moderate area planning requirements given in Subparts 1 and 4 of the CAA, RFP must be considered in light of the attainment date as well as the date by which all RACT and RACM must be implemented. The attainment date for all three of Utah's moderate $PM_{2.5}$ nonattainment areas was established in EPA's Deadlines Rule. That date is December 31, 2015. The deadline for implementation of all RACT and RACM is described in paragraph 189(a)(1)(C) as four years from the date these areas were designated nonattainment. That date for implementation of RACM was thus December 14, 2013.

There are other moderate area planning requirements in Subpart 4 that relate to the showing of RFP. Paragraph 189(a)(1)(B) requires "either (i) a demonstration (including air quality modeling) that the plan will provide for attainment by the applicable attainment date; or (ii) a demonstration that attainment by such date is impracticable."

This plan demonstrates the former; that with the implementation of all reasonably available controls, the area will attain the 2006, 24-hour standard for $PM_{2.5}$ by December 31, 2015.

For plan revisions showing attainment, paragraph 189(c) requires the inclusion of "quantitative milestones which are to be achieved every three years until the area is redesignated attainment and which demonstrate reasonable further progress … toward attainment by the applicable date."

8.3 RFP for the Logan, UT-ID Nonattainment Area

The attainment demonstration for the Logan, UT-ID $PM_{2.5}$ nonattainment area shows that the 2006, 24-hr NAAQS can be achieved by the attainment date of December 31, 2015. Essentially, the attainment demonstration in the SIP may also be considered to demonstrate that the area is achieving RFP

Past Guidance on RFP, for showing generally linear progress towards attainment by the applicable attainment date, has described a straight line with a downward trend, ending at the attainment date and representing, there, a level of emissions that is consistent with attainment of the applicable NAAQS.

In this plan, the "reductions in emissions of the relevant air pollutant as are required by this part" have been determined through the application of all RACM and RACT measures. The emissions reductions associated with these control measures were factored into an inventory for 2015 that was assessed using air quality modeling. The air quality modeling demonstrated that these reductions in emissions would be sufficient to demonstrate attainment of the applicable standard by the applicable attainment date.

It is also necessary to define a period of time over which the RFP determination will be made.

The starting point for evaluating RFP should be the baseline year used in the modeling analysis. This is a year (2010) selected to coincide with the period used to establish the monitored design value for the modeling analysis; a period in which the area is violating the applicable NAAQS.

Thus, the magnitude of emissions reductions should be evaluated over a period spanning from 2010 through 2015.

Quantitatively, the following assessment of emissions and incremental emissions reductions in Table 8.1 will show that RFP is met using the criteria discussed above:

Reasonable Further Progress							
Logan, UT-ID PM2.5 Nonattainment Area							
***Emissions / Year**	**2010**		**2015**		**Difference**		**RFP**
		projected with growth and controls					Annualized Difference
PM2.5	~~1.0~~		~~0.8~~		~~0.3~~		~~0.1~~
NOx	~~9.3~~		~~6.9~~		~~2.4~~		~~0.5~~
SO2	~~0.3~~		~~0.3~~		~~0.0~~		~~0.0~~
VOC	~~12.1~~		~~8.9~~		~~3.2~~		~~0.6~~
Plan precursors	~~21.7~~		~~16.1~~		~~5.6~~		~~1.1~~
Total	~~22.7~~		~~16.9~~		~~5.8~~		~~1.2~~
****Concentration (ug/m3)**	41		34		7.1		1.4
* Emissions are presented in tons per average winter day							
**Value for 2010 is Baseline design value for the Logan monitor							

Reasonable Further Progress							
Logan, UT-ID PM2.5 Nonattainment Area							
*Emissions / Year	2010		2015		Difference		RFP
			projected with growth and controls				Annualized Difference
PM2.5	1.3		0.8		0.5		0.1
NOx	9.3		6.9		2.4		0.5
SO2	0.3		0.3		0.0		0.0
VOC	12.1		8.9		3.2		0.6
Plan precursors	21.7		16.1		5.6		1.1
Total	23.0		16.9		6.1		1.2
**Concentration (ug/m3)	41		34		7.1		1.4
* Emissions are presented in tons per average winter day							
**Value for 2010 is Baseline design value for the Logan monitor							

Table 8.1, Reasonable Further Progress in the Logan, UT-ID nonattainment area

In addition to the emissions totals, the table also includes the 2010 baseline design value for the controlling monitor in the nonattainment area (Logan) and the predicted $PM_{2.5}$ concentration in 2015. These concentrations are presented as another metric to establish progress toward meeting the 24-hour standard.

Control Measures

The inventory for 2015 "with growth and controls" reflects the implementation of all the reasonably available control measures and reasonably available control technologies identified in this plan, as well as all pre-existing control measures. As such, this inventory takes into account all controls that "may reasonably be required by the Administrator."

For a complete discussion of RACM & RACT, and the control measures factored into the modeled demonstration for 2015, see Chapter 6 of the Plan.

8.4 Milestones for the Logan, UT-ID Nonattainment Area

For plan revisions showing attainment, the Act requires quantitative milestones, to be achieved every three years, which demonstrate reasonable further progress toward attainment by the applicable date.

Under section 189(c), the State is required to submit a SIP revision if it fails to submit the quantitative milestone demonstration or if EPA determines that the milestone was not met.

These milestones are addressed in EPA's General Preamble (see Section 2.2 of this plan), which says that under the milestone requirement, the States must demonstrate to EPA that the SIP measures are being implemented and the milestones have been met.

The preamble notes that section 189(c) does not articulate the starting point for counting the 3-year period, and offers that it is reasonable to begin counting from the due date for the applicable plan revision containing the control measures that will give rise to the emission reductions.

Thus, the first quantitative milestone date is December 31, 2017.

The emission levels at the milestone must demonstrate reasonable further progress toward attainment by the applicable date. As noted in the introduction to this section, RFP is defined so as to consider the reductions in emissions required to ensure attainment of the NAAQS by the attainment date or which may reasonably be required by the Administrator. Since the applicable attainment date (December 31, 2015) precedes the milestone date, the quantification of the emissions reductions to be achieved must be taken to mean the level of emissions in 2015 used to demonstrate attainment.

From the date of the milestone, the State shall have 90 days to submit to the Administrator "a demonstration that all measures in the plan approved under this section have been implemented and that the milestone has been met."

UDAQ herein commits to prepare and submit a milestone report no later than 90 days from the milestone.

Chapter 9 – CONTINGENCY MEASURES

9.1 Background

Consistent with section 172(c)(9) of the Act, the State must submit in each attainment plan specific contingency measures to be undertaken if the area fails to make reasonable further progress, or fails to attain the $PM_{2.5}$ NAAQS by its attainment date. The contingency measures must take effect without significant further action by the State or EPA.

Nothing in the statute precludes a State from implementing such measures before they are triggered, but the credit for a contingency measure may not be used in either the attainment or reasonable further progress demonstrations.

The SIP should contain trigger mechanisms for the contingency measures, specify a schedule for implementation, and indicate that the measures will be implemented without further action by the State or by EPA.

The CAA does not include the specific level of emission reductions that must be adopted to meet the contingency measures requirement under section 172(c)(9). Nevertheless, in the preamble to the Clean Air Fine Particulate Rule (see 72 FR 20643) EPA recommends that the "emissions reductions anticipated by the contingency measures should be equal to approximately 1 year's worth of emissions reductions necessary to achieve RFP for the area."

9.2 Contingency Measures and Implementation Schedules for the Nonattainment Area

The following measures have been set aside for contingency purposes:

Woodburning Control –As part of the control strategy for the SIP, rule R307-302 has been amended to change the no-burn call from 35 $\mu g/m^3$ to 25 $\mu g/m^3$. Credit for this change is included in the modeled attainment demonstration as well as the RFP demonstration. However, R307-302 also includes a mechanism to further revise the no-burn call to only 15 $\mu g/m^3$ should a contingency situation arise. The benefit of this rule is to prevent a buildup of particulate matter due to woodsmoke during periods of poor atmospheric mixing which typically precede exceedances of the 24-hour $PM_{2.5}$ NAAQS. This rule has been adopted, and can take effect immediately if so required.

This contingency measure will be triggered by an EPA determination that: 1) the area has, based on the state's milestone report under 189(c), failed to make RFP; or 2) has failed to attain the NAAQS by the applicable attainment date.

9.3 Conclusions

Control measures developed to meet increasingly stringent ozone and fine $PM_{2.5}$ standards in Utah's urbanized areas have likewise become increasingly stringent, and still it is a challenge to attain the 2006, $PM_{2.5}$ NAAQS. This leaves little room for additional reductions that can be set aside as contingency measures.

In the Cache Valley, there are no major stationary point sources. Area sources and on-road mobile sources contribute the emissions that result in elevated $PM_{2.5}$ concentrations. For the most part, further emission controls in these categories extend beyond the authorities of UDAQ. The most meaningful reductions in future emissions of VOC, an important $PM_{2.5}$ precursor, will likely result from national programs that apply additional restrictions of VOC in consumer products, and from what will likely result from Tier III of the federal motor vehicle control program.

FOR SUMMARY OF COMMENTS AND RESPONSES, PLEASE REFER TO THE SET OF COMMENTS AND RESPONSES AT THE END OF TAB VII, PM2.5 SIP FOR THE SALT LAKE CITY NONATTAINMENT AREA.

ITEM 10

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-100-14

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Bill Reiss, Environmental Engineer

DATE: November 25, 2014

SUBJECT: FINAL ADOPTION: Amend SIP Subsections IX.H.11, 12, and 13: Control Measures for Area and Point Sources, Emission Limits and Operating Practices, PM2.5 Requirements.

On December 14, 2009, EPA made its designations concerning areas that were not attaining the 2006 National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$. Among those areas designated were the Salt Lake City, UT $PM_{2.5}$ Nonattainment Area, and the Provo, UT $PM_{2.5}$ Nonattainment Area.

The Clean Air Act (CAA) requires Utah to submit a nonattainment plan for each of these areas. Those plans must provide for the implementation of all reasonable control measures and include enforceable emission limitations and other control measures as well as schedules and timetables for compliance.

On September 3, 2014, the Board proposed for public comment SIP Subsections IX.H.11, 12, and 13, which address the requirement to include emission limitations, control measures, and schedules for certain large stationary sources. Subsection 11 includes general provisions that apply to sources listed in either nonattainment area, while subsections 12 and 13 apply to specific sources located in the Salt Lake City and Provo nonattainment areas, respectively.

A 30-day public comment period was held, which included a public hearing. A summary of the comments received during the comment period along with the responses from UDAQ is attached.

Any recommended revision to SIP Subsection IX.H.11, 12, or 13 resulting from these comments has been identified in the amended attachment using strikeout and underline.

Staff Recommendation: Staff recommends the Board adopt SIP Subsections IX.H.11, 12, and 13: Control Measures for Area and Point Sources, Emission Limits and Operating Practices, $PM_{2.5}$ Requirements as amended.

H.11. General Requirements: Control Measures for Area and Point Sources, Emission Limits and Operating Practices, PM2.5 Requirements

a. Except as otherwise outlined in individual conditions of this Subsection IX.H.11 listed below, the terms and conditions of this Subsection IX.H.11 shall apply to all sources subsequently addressed in Subsection IX.H.12 and 13. Should any inconsistencies exist between these two subsections, the source specific conditions listed in IX.H.12 and 13 shall take precedence.

b. The definitions contained in R307-101-2, Definitions, apply to Section IX, Part H.

c. Any information used to determine compliance shall be recorded for all periods when the source is in operation, and such records shall be kept for a minimum of five years. Any or all of these records shall be made available to the Director upon request.

d. All emission limitations listed in Subsections IX.H.12 and IX.H.13 apply during steady-state operation, unless otherwise specified in the source specific conditions listed in IX.H.12 and 13.

e. Stack Testing:

i. As applicable, stack testing to show compliance with the emission limitations for the sources in Subsection IX.H.12 and 13 shall be performed in accordance with the following:

A. Sample Location: The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, or other EPA-approved methods acceptable to the Director.

B. Volumetric Flow Rate: 40 CFR 60, Appendix A, Method 2 or other EPA-approved testing methods acceptable to the Director.

C. PM_{10}: 40 CFR 51, Appendix M, Methods 201a and 202, or other EPA approved testing methods acceptable to the Director. If a method other than 201a is used, the portion of the front half of the catch considered PM_{10} shall be based on information in Appendix B of the fifth edition of the EPA document, AP-42, or other data acceptable to the Director.

D. $PM_{2.5}$: 40 CFR 51, Appendix M, 201a and 202, or other EPA approved testing methods acceptable to the Director. The back half condensables shall be used for compliance demonstration as well as for inventory purposes. If a method other than 201a is used, the portion of the front half of the catch considered $PM_{2.5}$ shall be based on information in Appendix B of the fifth edition of the EPA document, AP-42, or other data acceptable to the Director.

E. SO_2: 40 CFR 60 Appendix A, Method 6C or other EPA-approved testing methods acceptable to the Director.

F. NO_X: 40 CFR 60 Appendix A, Method 7E or other EPA-approved testing methods acceptable to the Director.

G. VOC: 40 CFR 60 Appendix A, Method 25A or EPA-approved testing methods acceptable to the Director.

H. Calculations: To determine mass emission rates (lb/hr, etc.) the pollutant concentration as determined by the appropriate methods above shall be multiplied by the volumetric

flow rate and any necessary conversion factors to give the results in the specified units of the emission limitation.

I. A stack test protocol shall be provided at least 30 days prior to the test. A pretest conference shall be held if directed by the Director. The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, and Occupational

Safety and Health Administration (OSHA) approvable access shall be provided to the test location. The production rate during all compliance testing shall be no less than 90% of the maximum production rate achieved in the previous three (3) years. If the desired production rate is not achieved at the time of the test, the maximum production rate shall be 110% of the tested achieved rate, but not more than the maximum allowable production rate. This new allowable maximum production rate shall remain in effect until successfully tested at a higher rate. The owner/operator shall request a higher production rate when necessary. Testing at no less than 90% of the higher rate shall be conducted. A new maximum production rate (110% of the new rate) will then be allowed if the test is successful. This process may be repeated until the maximum allowable production rate is achieved.

f. Continuous Emission and Opacity Monitoring.

i. For all continuous monitoring devices, the following shall apply:

A. Except for system breakdown, repairs, calibration checks, and zero and span adjustments required under paragraph (d) 40 CFR 60.13, the owner/operator of an affected source shall continuously operate all required continuous monitoring systems and shall meet minimum frequency of operation requirements as outlined in R307-170 and 40 CFR 60.13.

B. The monitoring system shall comply with all applicable sections of R307-170; 40 CFR 13; and 40 CFR 60, Appendix B – Performance Specifications.

g. Petroleum Refineries.

i. Limits at Fluid Catalytic Cracking Units

A. FCCU SO_2 Emissions

I. By no later than January 1, 2018, each owner or operator of an FCCU shall comply with an SO_2 emission limit of 25 ppmvd @ 0% excess air on a 365-day rolling average basis and 50 ppmvd @ 0% excess air on a 7-day rolling average basis.

II. Compliance with this limit shall be determined by following 40 C.F.R. §60.105a(g).

B. FCCU PM Emissions

I. By no later than January 1, 2018, each owner or operator of an FCCU shall comply with an emission limit of 1.0 pounds PM per 1000 pounds coke burned on a 3-hour average basis.

II. Compliance with this limit shall be determined by following the stack test protocol specified in 40 C.F.R. §60.106(b) to measure PM emissions on the FCCU. Each owner operator shall conduct stack tests once every five years at each FCCU.

III. By no later than January 1, 2019, each owner or operator of an FCCU shall install,

operate and maintain a continuous parameter monitor system (CPMS) to measure and record operating parameters for determination of source-wide $PM_{2.5}$ emissions as appropriate.

ii. Limits on Refinery Fuel Gas.

A. By no later than January 1, 2015, all petroleum refineries in or affecting the $PM_{2.5}$ nonattainment area shall reduce the H_2S content of the refinery plant gas to 60 ppm or less as described in 40 CFR 60.102a. Compliance shall be based on a rolling average of 365 days. The owner/operator shall comply with the fuel gas monitoring requirements of 40 CFR 60.107a and the related recordkeeping and reporting requirements of 40 CR 60.108a. As used herein, refinery "plant gas" shall have the meaning of "fuel gas" as defined in 40 CFR 60.101a, and may be used interchangeably.

B. For natural gas, compliance is assumed while the fuel comes from a public utility.

iii. Limits on Heat Exchangers.

A. Each owner or operator shall comply with the requirements of 40 CFR 63.654 for heat exchange systems in VOC service no later than January 1, 2015. The owner or operator may elect to use another EPA-approved method other than the Modified El Paso Method if approved by the Director.

I. The following applies in lieu of 40 CFR 63.654(b): A heat exchange system is exempt from the requirements in paragraphs 63.654(c) through (g) of this section if it meets any one of the criteria in the following paragraphs (1) through (2) of this section.

1. All heat exchangers that are in VOC service within the heat exchange system that either:

a. Operate with the minimum pressure on the cooling water side at least 35 kilopascals greater than the maximum pressure on the process side; or

b. Employ an intervening cooling fluid, containing less than 10 percent by weight of VOCs, between the process and the cooling water. This intervening fluid must serve to isolate the cooling water from the process fluid and must not be sent through a cooling tower or discharged. For purposes of this section, discharge does not include emptying for maintenance purposes.

2. The heat exchange system cools process fluids that contain less than 10 percent by weight VOCs (i.e., the heat exchange system does not contain any heat exchangers that are in VOC service).

iv. Leak Detection and Repair Requirements.

A. Each owner or operator shall comply with the requirements of 40 CFR 60.590a to 60.593a no later than January 1, 2016.

B. For units complying with the Sustainable Skip Period, previous process unit monitoring results may be used to determine the initial skip period interval provided that each valve has been monitored using the 500 ppm leak definition.

v. Requirements on Hydrocarbon Flares.

A. Beginning January 1, 2018, all hydrocarbon flares at petroleum refineries located in

or affecting a designated $PM_{2.5}$ non-attainment area within the State shall be subject to the flaring requirements of NSPS Subpart Ja (40 CFR 60.100a–109a), if not already subject under the flare applicability provisions of Subpart Ja.

B. By no later than January 1, 2019, all major source petroleum refineries in or affecting a designated $PM_{2.5}$ non-attainment area within the State shall install and operate a flare gas recovery system or equivalent flare gas minimization process(es) designed to limit hydrocarbon flaring from each affected flare to levels below the values listed in 40 CFR 60.103a(c), except during periods when one or more process units, connected to the affected flare, are undergoing startup, shutdown or experiencing malfunction. Flare gas recovery is not required for dedicated SRU flare and header systems, or HF flare and header systems.

vi. Requirements on Tank Degassing.

A. Beginning January 1, 2017, the owner or operator of any stationary tank of 40,000-gallon or greater capacity and containing or last containing any organic liquid, with a true vapor pressure equal or greater than 10.5 kPa (1.52 psia) at storage temperature (see R307-324- 4(1)) shall not allow it to be opened to the atmosphere unless the emissions are controlled by exhausting VOCs contained in the tank vapor-space to a vapor control device until the organic vapor concentration is 10 percent or less of the lower explosion limit (LEL).

B. These degassing provisions shall not apply while connecting or disconnecting degassing equipment.

C. The Director shall be notified of the intent to degas any tank subject to the rule. Except in an emergency situation, initial notification shall be submitted at least three (3) days prior to degassing operations. The initial notification shall include:

I. Start date and time;

II. Tank owner, address, tank location, and applicable tank permit numbers;

III. Degassing operator's name, contact person, telephone number;

IV. Tank capacity, volume of space to be degassed, and materials stored;

V. Description of vapor control device.

vii. The requirements set forth in Parts IX.H.11 and IX.H.12 shall apply unless and until the following occur:

A. A Notice of Intent is submitted to the Executive Secretary, pursuant to the procedures of R307-401, that describes the specific technologies that will be used to produce gasoline that meets the corporate average sulfur specification for Tier 3 of the federal motor vehicle control program, as specified in 40 CFR 80.

B. An Approval Order is issued that authorizes implementation of the approach set forth in the Notice of Intent. *(editorial note: The intent of this language was to prevent the SIP limits from becoming an impediment to the production of Tier 3 fuel in the event that an Approval Order could otherwise be issued in accordance with R307-401. Underlying that purpose is the assumption that, because the offsetting requirement for a would-be major modification in this nonattainment area can no longer be met until such time as sufficient emission reduction credits can be created (post- Dec. 4, 2013), only minor modifications could be permitted. Net emission increases in such a permit could only reach levels defined as "significant" for such purposes. These levels of significance are*

15 tons per year (tpy) for PM10, 10 tpy for PM2.5, 40 tpy for SO2 or NOx, and 40 tpy for VOC in the enveloped ozone maintenance area. In the context of a modeled SIP demonstration, it would ordinarily be necessary to incorporate such increases in emissions, at their maximum levels and at every refinery, in the modeled demonstration. However, since this plan revision demonstrates instead that it is impracticable to attain the 2006 24-hour NAAQS for PM2.5 (in accordance with CAA Section 189(a)(1)(B(ii)), the additional emissions would, if modeled, only serve to underscore the conclusion that attainment of this standard, by the applicable attainment date, is in fact impracticable. For this reason, it is unnecessary to re-specify herein each limit so as to also include the additional (significant) emissions.)

C. Notwithstanding the requirements specified in R307-401, the Notice of Intent must demonstrate that the technologies specified in the Approval Order would represent Reasonably Available Control Measures (RACM), as required by Section 172(c)(1) of the Clean Air Act.

D. To the extent that the current SIP requirements outlined in Parts IX.H.11 and IX.H.12 have been relied upon by the Utah SIP to satisfy Section 172(c) or Section 189(a)(1) of the Clean Air Act, demonstrate that the technologies specified in the Approval Order would also be consistent with the achievement of reasonable further progress and would not interfere with attainment or maintenance of the National Ambient Air Quality Standards for particulate matter. The demonstration required in this paragraph may incorporate modeling previously conducted by the State for the purposes of Sections 172(c)(1) or 189(a)(1)(B) of the Clean Air Act.

E. The technologies specified in the Approval Order have been installed and tested in accordance with the Approval Order.

F. As of the effective date of the Approval Order the affected PM2.5, SO2, VOC and NOx emissions limits, including applicable monitoring requirements, set forth in that permit as most recently amended, shall become incorporated by reference into the Utah SIP. Henceforth, those terms and conditions specified and identified in the Approval Order shall supersede the affected conditions in Parts IX.H.11 and IX.H.12.

H.12 Source-Specific Emission Limitations in Salt Lake City – UT PM2.5 Nonattainment Area

a. ATK Launch Systems Inc. – Promontory

i. During the period November 1 to February 28/29 on days when the 24-hour average $PM_{2.5}$ levels exceed 35 ug/m^3at the nearest real-time monitoring station, the open burning of reactive wastes with properties identified in 40 CFR 261.23 (a) (6) (7) (8) will be limited to 50 percent of the treatment facility's Department of Solid and Hazardous Waste permitted
daily limit. During this period, on days when open burning occurs, records will be maintained identifying the quantity burned and the $PM_{2.5}$ level at the nearest real-time monitoring station.

ii. During the period November 1 to February 28/29, on days when the 24-hour average $PM_{2.5}$ levels exceed 35 ug/m3 at the nearest real-time monitoring station, the following shall not be tested:

A. Propellant, energetics, pyrotechnics, flares and other reactive compounds greater than 2,400 lbs. per day; or

B. Rocket motors less than 1,000,000 lbs. of propellant per motor subject to the following exception:

I. A single test of rocket motors less than 1,000,000 lbs. of propellant per motor is allowed on a day when the 24-hour average $PM_{2.5}$ level exceeds 35 ug/m^3 at the nearest real-time monitoring station provided notice is given to the Director of the Utah Air Quality Division. No additional tests of rocket motors less than 1,000,000 lbs. of propellant may be conducted during the inversion period until the 24-hour average $PM_{2.5}$ level has returned to a concentration below 35 ug/m^3 at the nearest real-time monitoring station.

C. During this period, records will be maintained identifying the size of the rocket motors tested and the 24-hour average $PM_{2.5}$ level at the nearest real-time monitoring station on days when motor testing occur

iv. Natural Gas-Fired Boilers

A. Building M-576

I. Startup and shutdown events shall not exceed 124 hours per boiler per 12-month rolling period.

II. One 71 MMBTU/hr boiler shall be upgraded with low NOx burners and flue gas

recirculation by January 2016. The boiler shall be rated at a maximum of 9 ppm. The remaining boiler shall not consume more than 100,000 MCF of natural gas per rolling 12-month period unless upgraded so the NO_x emission rate is no greater than 30 ppm.

III. Emissions will be controlled during startup and shutdown operations by following manufacture procedures based on best management practices.

b. Big West Oil Refinery

i. Source-wide $PM_{2.5}$:

Following installation of the Flue Gas Blow Back Filter (FGF), but no later than January 1, 2019, combined emissions of filterable $PM_{2.5}$ shall not exceed 0.18 tons per day and 45 tons per rolling 12-month period. By no later than January 1, 2019, Big West Oil shall conduct stack testing to establish the ratio of condensable $PM_{2.5}$ from the Catalyst Regeneration System. At that time the condensable fraction will be added and a new source-wide limitation shall be established in the AO.

$PM_{2.5}$ emissions shall be determined daily by applying the listed emission factors or emission factors determined from the most current performance test to the relevant quantities of fuel combusted. Unless adjusted by performance testing as discussed above, the default emission factors to be used are as follows:

Natural gas – 1.9 lb/MMscf (filterable), 5.7 lb/MMscf (condensable)
Plant gas – 1.9 lb/MMscf (filterable), 5.7 lb/MMscf (condensable)

Daily gas consumption by all boilers and furnaces shall be measured by meters that can delineate the flow of gas to the indicated emission points.

The equations used to determine emissions for the boilers and furnaces shall be as follows:

Emission Factor (lb/MMscf)*Gas Consumption (MMscf/24 hrs)/(2,000 lb/ton)

The daily filterable $PM_{2.5}$ emissions from the Catalyst Regeneration System shall be calculated using the following equation:

$$E = FR * EF$$

Where:
E = Emitted $PM_{2.5}$
FR = Feed Rate to Unit (kbbls/day)
EF = emission factor (lbs/kbbl), established by most recent stack test

Total 24-hour filterable $PM_{2.5}$ emissions shall be calculated by adding the results of the above filterable $PM_{2.5}$ equations for natural gas and plant gas combustion to the estimate for the Catalyst Regeneration System. Results shall be tabulated every day, and records shall be kept which include the meter readings (in the appropriate units) and the calculated emissions.

ii. Source-wide NO_X

By no later than January 1, 2019, combined emissions of NO_X shall not exceed 0.80 tons per day (tpd) and 195 tons per rolling 12-month period.

NO_X emissions shall be determined daily by applying the listed emission factors or emission factors determined from the most current performance test to the relevant quantities of fuel

combusted. Unless adjusted by performance testing as discussed above, the default emission factors to be used are as follows:

Natural gas – latest version of AP-42 (currently see AP-42, Table 1.4-1)
Plant gas – assumed equal to natural gas (use values from AP-42, Table 1.4-1)

Since the emission factors are considered to be the same for either gas, this factor shall be applied to the metered quantity of blended gas. Should future information reveal that there is a difference in the emission factors for natural gas and plant gas, then the respective quantities shall be delineated in the AO.

Daily plant gas consumption at the furnaces and boilers shall be measured by flow meters. The equations used to determine emissions for the boilers and furnaces shall be as follows: Emission Factor (lb/MMscf)*Gas Consumption (MMscf/24 hrs)/(2,000 lb/ton)

The daily NO_X emissions from the Catalyst Regeneration System shall be calculated using the following equation:

NO_X = (Flue Gas, moles/hr) x (ADV ppm /10^6) x (30.006 lb/mole) x (operating hr/day)/(2000 lb/ton)

Where ADV = average daily value from NO_X CEM

Total daily NO_X emissions shall be calculated by adding the results of the above NO_X equations for natural gas and plant gas combustion to the estimate for the Catalyst Regeneration System. Results shall be tabulated every day, and records shall be kept which include the meter readings (in the appropriate units) and the calculated emissions.

iii. Source-wide SO_2

By no later than January 1, 2019, combined emissions of shall not exceed 0.60 tons per day and 140 tons per rolling 12-month period.

SO_2 emissions shall be determined daily by applying the listed emission factors or emission factors determined from the most current performance test to the relevant quantities of fuel combusted. Unless adjusted by performance testing as discussed above, the default emission factors to be used are as follows:

Natural Gas - 0.60 lb SO_2/MMscf gas

Plant Gas - The emission factor to be used in conjunction with plant gas combustion shall be determined through the use of a continuous emissions monitor, which shall measure the H_2S content of the fuel gas in ppmv. Daily emission factors shall be calculated using average daily H_2S content data from the CEM. The emission factor shall be calculated as follows:

Emission Factor (lb SO_2/MMscf gas) = [(24 hr avg. ppmv H_2S)/10^6]*(64 lb SO_2/lb mole)*[(10^6 scf/MMscf)/(379 scf/lb mole)]

Daily natural gas consumption shall be measured by the two meters that supply the refinery.

Daily plant gas consumption at the furnaces and boilers shall be measured by flow meters.

The equations used to determine emissions for the boilers and furnaces shall be as follows:

Emission Factor (lb/MMscf)*Natural Gas Consumption (MMscf/24 hrs)/(2,000 lb/ton)

Emission Factor (lb/MMscf)*Plant Gas Consumption (MMscf/24 hrs)/(2,000 lb/ton)

The daily SO_2 emission from the Catalyst Regeneration System shall be calculated using the following equation:

SO_2 = FG * (ADV/1,000,000) * (64 lb/mole) * (operating hours/day) / (2000 lb/ton)

Where:
FG = Flue Gas in moles/hour
ADV = average daily value from SO_2 CEM

Total daily SO_2 emissions shall be calculated by adding the daily results of the above SO_2 emissions equations for natural gas and plant gas combustion to the estimate for the Catalyst Regeneration System. Results shall be tabulated every day, and records shall be kept which include the CEM readings for H_2S (averaged for each day), all meter readings (in the appropriate units), and the calculated emissions.

c. Bountiful City Light and Power: Power Plant

i. Emissions to the atmosphere shall not exceed the following rates and concentrations:

A. GT #1 (5.3 MW Turbine) Exhaust
Stack: NO_X 0.6 g/kW-hr

B. GT #2 and GT #3 (each TITAN Turbine) Exhaust Stack:
NO_X 15 ppm

ii. Compliance to the above emission limitations shall be determined by stack testing as outlined in Section IX Part H.11.e of this SIP. Each turbine shall be tested at least once per year.

iii. Combustion Turbine Startup / Shutdown Emission Minimization Plan

A. Startup begins when natural gas is supplied to the combustion turbine(s) with the intent of combusting the fuel to generate electricity. Startup conditions end within sixty (60) minutes of natural gas being supplied to the turbine(s).

B. Shutdown begins with the initiation of the stop sequence of a turbine until the cessation of natural gas flow to the turbine.

C. Periods of startup or shutdown shall not exceed two (2) hours per combustion turbine per day.

d. CER Generation II, LLC (Exelon Generation): West Valley Power Plant.

i. Emissions of NO_X from each individual turbine shall be no greater than 5 ppmdv (15% O_2, dry) based on a 30-day rolling average.

ii. Total emissions of NO_X from all five turbines shall be no greater than 37 lbs/hour (15% O_2, dry) based on a 30-day rolling average.

iii. The NO_X emission rate (lb/hr) shall be calculated by multiplying the NO_X concentration (ppmdv) generated from CEMs and the volumetric flow rate. The 30-day rolling average shall be calculated by adding previous 30 days data on a daily basis.

iv. Combustion Turbine Startup / Shutdown Emission Minimization Plan

A. Startup begins when natural gas is supplied to the combustion turbine(s) with the intent of combusting the fuel to generate electricity. Startup conditions end within sixty (60) minutes of natural gas being supplied to the turbine(s).

B. Shutdown begins with the initiation of the stop sequence of a turbine until the cessation of natural gas flow to the turbine.

C. Periods of startup or shutdown shall not exceed two (2) hours per combustion turbine per day.

e. Central Valley Water Reclamation Facility: Wastewater Treatment Plant

i NO_X emissions from the operation of all engines at the plant shall not exceed 0.648 tons per day.

Compliance with the daily mass emission limits shall be demonstrated by multiplying emission factors (in units of mass per kw-hr) determined for each engine by the most recent stack test results, by the respective kilowatt hours generated each day. Power production shall be determined by examination of electrical meters which shall record the electricity production. Continuous recording is required. The records shall be kept on a daily basis.

NO_X emission from the operation of all engines at the plant shall not exceed 205.6 tons per calendar year.

Stack testing to determine the emission factors necessary to show compliance with the emission limitations stated in this condition shall be performed at least once every five (5) years.

ii. Emissions to the atmosphere from each of the 1150 kw engine generators shall not exceed the following rates and concentrations:

Pollutant	lb/hr	gm/(hp-hr)
NO_X	5.95	1.75

iii. Emissions to the atmosphere from each of the 1340 kw engine generators shall not exceed the following rates and concentrations:

Pollutant	lb/hr	gm/(hp-hr)
NO_X	7.13	1.8

iv. Compliance to the above emission limits shall be determined by stack test as outlined in Section IX Part H.11.e of this SIP.

vii. Emissions will be controlled during startup and shutdown operations by following the manufacture procedures based on best management practices.

f. Chemical Lime Company (LHoist North America).

i. Lime Production Kiln:

A. Upon plant start-up SNCR technology shall be installed on the Lime Production Kiln for reduction of NO_X emissions.

B. Upon plant start-up a baghouse control technology shall be installed and operating on the Lime Production Kiln for reduction of PM emissions.

I. PM emissions shall not exceed 0.12 pounds per ton (lb/ton) of stone feed

II. Compliance with the above emission limit shall be determined by stack testing as outlined in Section IX Part H.11.e of this SIP and in accordance with 40 CFR 63 Subpart AAAAA.

C. An initial compliance test is required within 180 days of source start-up.

D. Subsequent to initial compliance testing, stack testing is required at a minimum of every five years.

E. Startup/shutdown provisions for SNCR technology be as follows: (a) no ammonia or urea injection during startup until the combustion gases exiting the kiln reach the temperature when NO_x reduction is effective, and (b) no ammonia or urea injection during shutdown.

g. Chevron Products Company - Salt Lake Refinery

i. Source-wide $PM_{2.5}$

By no later than January 1, 2019, combined emissions of filterable $PM_{2.5}$ shall not exceed 0.18 tons per day (tpd) and 65 tons per rolling 12-month period.

Compliance with the daily $PM_{2.5}$ limit shall be determined daily by multiplying the quantity of each fuel burned at the affected units by the associated emission factor for that fuel, and summing the results.

$PM_{2.5}$ emissions shall be determined daily by applying the listed emission factors or emission factors determined from the most current performance test to the relevant quantities of fuel combusted. Unless adjusted by performance testing as discussed above, the default emission factors to be used are as follows:

Natural gas – 1.9 lb/MMscf (filterable), 5.7 lb/MMscf (condensable)
Plant gas – 1.9 lb/MMscf (filterable), 5.7 lb/MMscf (condensable)

Fuel Oil/ HF alkylation polymer: The filterable $PM_{2.5}$ emission factor shall be determined based on the sulfur content of the fuel (S) according to the equation:

EF (lb/1000 gal) = (Wt. % S * 10) + 3.22

The condensable $PM_{2.5}$ emission factor for fuel oil combustion shall be determined from the latest edition of AP-42.

Daily plant gas consumption at the furnaces and boilers shall be measured by flow meters.

Daily fuel oil consumption shall be monitored with tank gauges. Fuel oil consumption shall be allowed only during periods of natural gas curtailment.

The filterable $PM_{2.5}$ emission factor for the FCC Catalyst Regenerator shall be determined based on the results of the most recent stack test.

By no later than January 1, 2017, Chevron shall conduct stack testing to establish the ratio of condensable $PM_{2.5}$ from the FCC Catalyst Regenerator and SRUs. At that time the condensable fraction will be added and a new source-wide limitation shall be established in the AO.

ii. Source-wide NO_X

By no later than January 1, 2019, combined emissions of NO_X shall not exceed 2.1 tons per day (tpd) and 766.5 tons per rolling 12-month period.

Compliance with the daily limit shall be determined daily by multiplying the quantity of each

fuel burned at each affected unit by the associated emission factor for that fuel at that unit, and summing the results.

Chevron shall maintain a record of fuel meter identifiers and locations, conversion factors, and other information required to demonstrate the required calculations. Records shall be kept showing the daily fuel usage, fuel meter readings, required fuel properties, hours of equipment operation, and calculated daily emissions.

The emission factors to be used for the above limitations are as

follows: Natural Gas/Plant Gas: by individual furnace/boiler*

*the most recent listing of these emission factors is maintained in Chevron's AO.

FCC Regenerator: The emission rate shall be determined by the FCC Regenerator NO_X CEM

All other emission units shall be stack-tested if directed by the Director. Chevron may also perform a stack test to provide information for updating the emission factors.

iii. Source-wide SO_2

By no later than January 1, 2019, combined emissions of SO_2 shall not exceed 1.05 tons per day (tpd) and 383.3 tons per rolling 12-month period.

Daily SO_2 emissions from affected units shall be determined by multiplying the quantity of each fuel used daily (24 hr usage) at each affected unit by the appropriate emission factor below. The values shall be summed to show the total daily sulfur dioxide emission.

Emission factors (EF) for the various fuels and emission points shall be as follows:

FCC Regenerator: The emission rate shall be determined by the FCC Regenerator SO_2 CEM

SRUs: The emission rate shall be determined by multiplying the sulfur dioxide concentration in the flue gas by the mass flow of the flue gas. The sulfur dioxide concentration in the flue gas shall be determined by CEM.

Natural gas: EF = 0.60 lb/MMscf

Fuel oil & HF Alkylation polymer: The emission factor to be used for combustion shall be calculated based on the weight percent of sulfur, as determined by ASTM Method D-4294-89 or EPA-approved equivalent acceptable to the Director, and the density of the fuel oil, as follows:

EF (lb SO_2/k gal) = density (lb/gal) * (1000 gal/k gal) * wt.% S/100 * (64 lb SO_2/32 lb S)

Plant gas: the emission factor shall be calculated from the H_2S measurement obtained from the H_2S CEM. The emission factor shall be calculated as follows:

EF (lb SO_2/MMscf gas) = (24 hr avg. ppmdv H_2S) /10^6 * (64 lb SO_2/lb mole) * (10^6 scf/MMscf)/(379 scf/lb mole)

Chevron shall maintain a record of fuel meter identifiers and locations, conversion factors, and other information required to demonstrate the required calculations. Records shall be kept showing the daily fuel usage, fuel meter readings, required fuel properties, hours of equipment operation, and calculated daily emissions.

h. Great Salt Lake Minerals Corporation: Production Plant

i. NO_X emissions to the atmosphere from the indicated emission point shall not exceed the following concentrations:

Emission Points	Concentration (ppm)
Boiler #1	9.0
Boiler #2	9.0

a. Compliance to the above emission limits shall be determined by stack test as outlined in Section IX Part H.11.e of this SIP. A compliance test shall be performed at least once every three years subsequent to the initial compliance test.

ii. PM_{10} emissions to the atmosphere from the indicated emission point shall not exceed the following rates and concentrations:

Source	Concentration (grains/dscf) (@ 68 degrees F 29.92 in Hg)
SOP Plant Compaction/Loadout	0.01
Salt Plant Screening	0.01
SOP Plant Dryer D-001	0.01
SOP Plant Dryer D-002	0.01
SOP Plant Dryer D-003	0.01
SOP Plant Dryer D-004	0.01
SOP Plant Drying Circuit Fluid Bed Heater D-005	0.01
Salt Plant Dryer D-501	0.01

a. Compliance to the above emission limits shall be determined by stack test as outlined in Section IX Part H.11a of this SIP. The stack test date shall be performed as soon as possible and in no case later than [~~January~~]June 1, 2015 except for SOP Plant Dryer D-003 when a stack test shall be performed no later than January 1, 2016. A compliance test shall be done at least once every three years subsequent to the initial compliance test.

b. Within one hundred and twenty (120) days after the initial compliance test date required above for each baghouse/scrubber, GSLM shall submit a Notice of Intent to DAQ in which a $PM_{2.5}$ emission limit in grains/dscf and pounds/hour is proposed.

c. Process emissions shall be routed through operating controls prior to being emitted into the atmosphere.

iii. PM_{10} emissions to the atmosphere from the indicated emission point shall not exceed the following rates and concentrations:

Source	Concentration (grains/dscf) (@ 68 degrees F 29.92 in Hg)
SOP Loadout	0.01
SOP Silo Dust Collection	0.01
SOP Plant Compaction	0.020
Salt Plant Dust Collection	0.01
Bulk Truck Salt Loadout	0.0053
Mag Chloride Plant	0.01

a. Compliance to the above emission limits shall be determined by stack test as outlined in Section IX Part H.11a of this SIP. The stack test date shall be performed as soon as possible and in no case later than [~~January~~]June 1, 2015. A compliance test shall be done at least once every five years subsequent to the initial compliance test.

b. Within one hundred and twenty (120) days after the initial compliance test date required above for each baghouse/scrubber, GSLM shall submit a Notice of Intent to DAQ in which a $PM_{2.5}$ emission limit in grains/dscf and pounds/hour is proposed.

iv. By January 1, 2017, Low NOx burner technology with a minimum manufacturer guarantee of 77% NOx removal efficiency shall be in operation on all dryers.

i. Hexcel Corporation: Salt Lake Operations

i. The following limits shall not be exceeded for Fiber Lines 2-8, 10-16, the Pilot Plant, and Matrix Operations:

A. 4.42 MMscf of natural gas consumed per day.

B. 0.061 MM pounds of carbon fiber produced per day.

C. Compliance with each limit shall be determined by the following methods:

I. Natural gas consumption shall be determined by examination of natural gas billing records for the plant.

II. Fiber production shall be determined by examination of plant production records.

III. Records of consumption and production shall be kept on a daily basis for all periods when the plant is in operation.

ii. All control equipment shall be in operation prior to initiating fiber line operations.

j. Hill Air Force Base: Main Base

i. VOC emissions from painting and depainting operations shall not exceed 0.5 tons per day.

ii. Compliance with this daily average shall be determined monthly.

k. HollyFrontier Corporation: Holly Refining and Marketing Company – Woods Cross L.L.C. (Holly Refinery)

i. Source-wide $PM_{2.5}$

By no later than January 1, 2019, $PM_{2.5}$ emissions (filterable + condensable) from all combustion sources shall not exceed 47.6 tons per rolling 12-month period and 0.134 tons per day (tpd).

$PM_{2.5}$ emissions shall be determined daily by applying the listed emission factors or emission factors determined from the most current performance test to the relevant quantities of fuel combusted. Unless adjusted by performance testing as discussed above, the default emission factors to be used are as follows:

Natural gas or Plant gas for all non-NSPS combustion equipment: 7.65 lb $PM_{2.5}$/MMscf
Natural gas or Plant gas for all NSPS combustion equipment: 0.52 lb $PM_{2.5}$/MMscf

Fuel oil: The filterable $PM_{2.5}$ emission factor for fuel oil combustion shall be determined based on the sulfur content of the oil as follows:

$PM_{2.5}$ (lb/1000 gal) = (10 * wt. % S) + 3.22

The condensable $PM_{2.5}$ emission factor for fuel oil combustion shall be determined from the latest edition of AP-42.

Daily natural gas and plant gas consumption shall be determined through the use of flow meters on all gas-fueled combustion equipment.

Daily fuel oil consumption shall be monitored by means of leveling gauges on all tanks that supply fuel oil to combustion sources. Fuel oil consumption shall be allowed only during periods of natural gas curtailment.

The equations used to determine emissions for the boilers and furnaces shall be as follows:

Emissions (tons/day) = Emission Factor (lb/MMscf) * Natural/Plant Gas Consumption (MMscf/day)/(2,000 lb/ton)

Emissions (tons/day) = Emission Factor (lb/kgal) * Fuel Oil Consumption (kgal/day)/(2,000 lb/ton)

Total 24-hour $PM_{2.5}$ emissions for the emission points shall be calculated by adding the daily results of the above $PM_{2.5}$ emissions equations for natural gas, plant gas, and fuel oil combustion. Results shall be tabulated for every day, and records shall be kept which include all meter readings (in the appropriate units), fuel oil parameters (wt. %S), and the calculated emissions.

ii. Source-wide NO_X

By no later than January 1, 2019, NO_X emissions into the atmosphere from all emission points shall not exceed 347.1 tons per rolling 12-month period and 2.09 tons per day (tpd).

NO_X emissions shall be determined by applying the following emission factors or emission factors determined from the most current performance testing to the relevant quantities of fuel combusted.

Natural gas/refinery fuel gas combustion using Low NO_X burners (LNB): 41 lbs/MMscf Natural gas/refinery fuel gas combusted using Ultra-Low NO_X burners: 0.04 lbs/MMbtu Natural gas/refinery fuel gas combusted using Next Generation Ultra Low NO_X burners:
0.10 lbs/MMbtu
Natural gas/refinery fuel gas combusted burners using selective catalytic reduction (SCR): 0.02 lbs/MMbtu
All other natural gas/refinery fuel gas combustion burners: 100 lb/MMscf
All fuel oil combustion: 120 lbs/Kgal

Where:
"Natural gas/refinery fuel gas" shall represent any combustion of natural gas, refinery fuel gas, or combination of the two in the associated burner.

Daily natural gas and plant gas consumption shall be determined through the use of flow meters.

Daily fuel oil consumption shall be monitored by means of leveling gauges on all tanks that supply combustion sources. Fuel oil consumption shall be allowed only during periods of natural gas curtailment.

The equations used to determine emissions for the boilers and furnaces shall be as follows:

Emissions (tons/day) = Emission Factor (lb/MMscf) * Natural Gas Consumption (MMscf/day)/(2,000 lb/ton)

Emissions (tons/day) = Emission Factor (lb/MMscf) * Plant Gas Consumption (MMscf/day)/(2,000 lb/ton)

Emissions (tons/day) = Emission Factor (lb/MMBTU) * Burner Heat Rating (BTU/hr) * 24 hours per day /(2,000 lb/ton)

Emissions (tons/day) = Emission Factor (lb/kgal) * Fuel Oil Consumption (kgal/day)/(2,000 lb/ton)

Total daily NO_X emissions for emission points shall be calculated by adding the results of the

above NO_X equations for plant gas, fuel oil, and natural gas combustion. Results shall be tabulated for every day; and records shall be kept which include the meter readings (in the appropriate units), emission factors, and the calculated emissions.

iii. Source-wide SO_2

By no later than January 1, 2019, the emission of SO_2 from all emission points (excluding routine SRU turnaround maintenance emissions) shall not exceed 110.3 tons per rolling 12-month period and 0.31 tons per day (tpd).

The routine turnaround maintenance period (a maximum of once every three years for a maximum of a 15 day period) for the SRU (Unit 17) shall only be scheduled during the period of April 1 through October 31. The projected SRU turnaround period shall be submitted to the Director by April 1 of each year in which a turnaround is planned. Notice shall also be provided to the Director 30 days prior to the planned turnaround.

SO_2 emissions into the atmosphere shall be determined by applying the following emission factors or emission factors determined from the most current performance testing to the relevant quantities of fuel burned. SO_2 emission factors for the various fuels shall be as follows:

Natural gas - 0.60 lb SO_2/MMscf

Plant gas - The emission factor to be used in conjunction with plant gas combustion shall be determined through the use of a CEM which will measure the H_2S content of the fuel gas in parts per million by volume (ppmv). Daily emission factors shall be calculated using average daily H_2S content data from the CEM. The emission factor shall be calculated as follows:

(lb SO_2/MMscf gas) = (24 hr avg. ppmv H_2S)/10^6 * (64 lb SO_2/lb mole) * (10^6 scf/MMscf)/(379 scf / lb mole)

Fuel oil - The emission factor to be used in conjunction with fuel oil combustion (during natural gas curtailments) shall be calculated based on the weight percent of sulfur, as determined by ASTM Method 0-4294-89 or EPA-approved equivalent, and the density of the fuel oil, as follows:

(lb of SO_2/kgal) = (density lb/gal) * (1000 gal/kgal) * (wt. %S)/100 * (64 g SO_2/32 g S)

The weight percent sulfur and the fuel oil density shall be recorded for each day any fuel oil is combusted. Fuel oil may be combusted only during periods of natural gas curtailment.

Fuel Consumption shall be measured as follows:

Natural gas and plant gas consumption shall be determined through the use of flow meters.

Fuel oil consumption shall be measured each day by means of leveling gauges on all tanks that supply oil to combustion sources.

The equations used to determine emissions shall be as follows:

Emissions (tons/day) = Emission Factor (lb/MMscf) * Natural Gas Consumption (MMscf/day)/(2,000 lb/ton)

Emissions (tons/day) = Emission Factor (lb/MMscf) * Plant Gas Consumption (MMscf/day)/(2,000 lb/ton)

Emissions (tons/day) = Emission Factor (lb/kgal) * Fuel Oil Consumption (kgal/24 hrs)/(2,000 lb/ton)

Total daily SO_2 emissions shall be calculated by adding daily results of the above SO_2 emissions equations for natural gas, plant gas, and fuel oil combustion. Results shall be tabulated for every day; and records shall be kept which include the CEM readings for H_2S (averaged for each one-hour period), all meter readings (in the appropriate units), fuel oil parameters (density and wt. %S, recorded for each day any fuel oil is burned), and the calculated emissions.

l. Kennecott Utah Copper (KUC): Mine

i. Bingham Canyon Mine (BCM)

A. Maximum total mileage per calendar day for ore and waste haul trucks shall not exceed 30,000 miles.

B. The following source-wide emission limits at the BCM shall not be exceeded:

I. 6,205 tons of NO_X, $PM_{2.5}$ and SO_2 combined per rolling 12-month period until January 1, 2019.

II. After January 1, 2019, combined emissions of NO_X, $PM_{2.5}$, and SO_2 shall not exceed 5,585 tons per rolling 12 month period.

Compliance with the 12-month period limits shall be determined on a rolling 12-month total based on the previous 12 months per methodology outlined in Emissions Inventory. KUC shall calculate a new 12-month total by the 20th day of each month using data from the previous 12 months. [R307-401-8]

C. To minimize fugitive dust on roads at the mine, the owner/operator shall perform the following measures:

I. Apply water to all active haul roads as conditions warrant, and shall

1. ensure the surface of the active haul roads located within the pit influence boundary consists of road base material, blasted waste rock, crushed rock, or chemical dust suppressant, and

2. apply a chemical dust suppressant to active haul roads located outside of the pit influence boundary no less than twice per year.

II. Ore conveyors shall be the primary means for transport of crushed ore from the mine to the concentrator.

III. Chemical dust suppressant shall be applied as conditions warrant on unpaved access roads that receive haul truck traffic and light vehicle traffic.

D. Implementation Schedule

I. KUC shall reduce emissions of combined $PM_{2.5}$, SO_x and NO_x on a 12-month rolling period by 10% to 5,585 tons by 2019. In doing so, KUC is required to purchase the highest tier level trucks available that meet the production requirement, from certified manufactures.

m. Kennecott Utah Copper: Power Plant

i. UTAH POWER PLANT

A. Boilers #1, #2, and #3 shall not be operated after January 1, 2018, or upon commencing operations of Unit #5 (combined-cycle, natural gas-fired combustion turbine), whichever is sooner.

B. Unit #5 shall not exceed the following emission rates to the

atmosphere: POLLUTANT	lb/hr	ppmdv (15% O2 dry)
I. NO_x:		2.0*
II. VOC:		2.0*
III. $PM_{2.5}$ with duct firing:		
Filterable + condensable	18.8	

* Under steady state operation.

C. Stack testing to show compliance with the above Unit #5 emission limitations shall be performed as follows:

	POLLUTANT	TEST FREQUENCY
I.	$PM_{2.5}$	3 years
II.	NO_X	3 years
III.	VOC	3 years

The heat input during all compliance testing shall be no less than 90% of the design rate.

D. The following requirements are applicable to Unit #4 during the period November 1 to February 28/29 inclusive:

I. During the period from November 1, to the last day in February inclusive, only natural gas shall only be used as a fuel, unless the supplier or transporter of natural gas imposes a curtailment. The power plant may then burn coal, only for the duration of the curtailment plus sufficient time to empty the coal bins following the curtailment.

II. Except during a curtailment of natural gas supply, emissions to the atmosphere from the indicated emission point shall not exceed the following rates and concentrations:

POLLUTANT	grains/dscf 68°F, 29.92 in. Hg	ppmdv (3% O^2)
1. Before January 1, 2018		
a. $PM_{2.5}$		
filterable	0.004	
filterable + condensable	0.03	
b. NO_X:		336
3. After January 1, 2018		
a. $PM_{2.5}$		
filterable	0.004	
filterable + condensable	0.03	
b. NO_X:		60

III. When using coal during a curtailment of the natural gas supply, emissions to the atmosphere from the indicated emission point shall not exceed the following rates and concentrations:

POLLUTANT	grains/dscf	lb/hr	ppmdv (3% O_2) 68°F, 29.92 in Hg
1. $PM_{2.5}$			
filterable	0.029	33.5	
filterable + condensable	0.29	382	
2. NO_X			384

IV. Stack testing to show compliance with the emission limitations in H.12.m.i.D.II and III shall be performed as follows for the following air contaminants:

POLLUTANT	TEST FREQUENCY
1. $PM_{2.5}$	every year
2. NO_x	every year

The heat input during all compliance testing shall be no less than 90% of the design rate.

The limited use of natural gas during startup, for maintenance firings and break-in firings does not constitute operation and does not require stack testing.

V. KUC shall operate Units 4 & 5 in accordance with best management practices to limit emissions of NOx during periods of startup and shutdown.

ii. BONNEVILLE BORROW AREA PLANT

A. Maximum total mileage per day for haul trucks shall not exceed 12,500 miles.

n. Kennecott Utah Copper: Smelter and Refinery.

i. SMELTER:

A. Emissions to the atmosphere from the indicated emission points shall not exceed the following rates and concentrations:

I. Main Stack (Stack No. 11)

1. $PM_{2.5}$
   a. 85 lbs/hr (filterable)
   b. 434 lbs/hr (filterable + condensable)

2. SO_2
   a. 552 lbs/hr (3 hr. rolling average)
   b. 422 lbs/hr (daily average)

3. NO_X 35 lbs/hr (annual average)

II. Acid Plant Tail Gas

1. SO_2
   a. 1,050 ppmdv (3 hr. rolling average)
   b. 650 ppmdv (6 hr. rolling average)

III. Holman Boiler

1. NO_X
   a. 9.34 lbs/hr, 30-day average
   b. 0.05 lbs. MMBTU, 30-day average

B. Stack testing to show compliance with the emissions limitations of Condition (A) above shall be performed as specified below:

EMISSION POINT	POLLUTANT	TEST FREQUENCY
I. Main Stack (Stack No. 11)	PM2.5	Every Year
	SO2	CEM
	NOx	CEM
II. Acid Plant Tailgas	SO2	CEM

III. Holman Boiler	NOx	CEM or alternate method determined according to applicable NSPS standards

C. During startup/shutdown operations, NO_x and SO_2 emissions are monitored by CEMS or alternate methods in accordance with applicable NSPS standards.

ii. REFINERY:

A. Emissions to the atmosphere from the indicated emission point shall not exceed the following rate:

EMISSION POINT	POLLUTANT	MAXIMUM EMISSION RATE
The sum of two (Tankhouse) Boilers	NOx	9.5 lbs/hr
Combined Heat Plant	NOx	5.96 lbs/hr

B. Stack testing to show compliance with the above emission limitations shall be performed as follows:

EMISSION POINT	POLLUTANT	TESTING FREQUENCY
Tankhouse Boilers	NOx	every three years
Combined Heat Plant	NOx	every year

To determine mass emission rate, the pollutant concentration as determined by the appropriate methods above, shall be multiplied by the volumetric flow rate and any necessary conversion factors to give the results in the specified units of the emission limitation. Provided that the two boilers installed are identical in make, model, and pollution control equipment, compliance with the emission limitation by the second boiler shall be determined by the stack test of the first boiler.

C. The owner/operator shall use only natural gas or landfill gas as a primary fuel in the boilers. The boilers may be equipped to operate on #2 fuel oil; however, operation of the boilers on #2 fuel oil shall only occur during periods of natural gas curtailment and during testing and maintenance periods. Operation of the boilers on #2 fuel oil shall be reported to the Director within one working day of start-up. Emissions resulting from operation of the boiler on #2 fuel oil shall be reported to the Director within 30 days following the use of #2 fuel oil in the boilers.

D. Standard operating procedures shall be followed during startup and shutdown operations to minimize emissions.

iii. MAP:

A. Emissions to the atmosphere from the Natural Gas Turbine combined with Duct Burner and with TEG Firing shall not exceed the following rate:

EMISSION POINT	POLLUTANT	MAXIMUM EMISSION RATE
Combined Heat Plant	NO_X	5.01 lbs/hr

B. Stack testing to show compliance with the above emission limitations shall be performed as follows:

EMISSION POINT	POLLUTANT	TESTING FREQUENCY
Combined Heat Plant	NO_X	every year

To determine mass emission rates (lbs/hr, etc.), the pollutant concentration as determined by the appropriate methods above, shall be multiplied by the volumetric flow rate and any necessary conversion factors to give the results in the specified units of the emission limitation.

C. Standard operating procedures shall be followed during startup and shutdown operations to minimize emissions.

o. Nucor Steel Mills

i. Emissions to the atmosphere from the indicated emission points shall not exceed the following rates:

A. Electric Arc Furnace Baghouse

I. $PM_{2.5}$
1. 17.4 lbs/hr (24 hr. average filterable)
2. 29.53 lbs/hr (condensable)

II. SO_2
1. 93.98 lbs/hr (3 hr. rolling average)
2. 89.0 lbs/hr (daily average)

III. NO_X 59.75 lbs/hr (12-month rolling average)

IV. VOC 22.20 lbs/hr

B. Reheat Furnace

#1 NO_X 15.0

lb/hr

C. Reheat Furnace #2

NO_X 8.0 lb/hr

ii. Stack testing to show compliance with the emissions limitations of Condition (i) above shall be performed as specified below:

	EMISSION POINT	POLLUTANT	TEST FREQUENCY
A.	Electric Arc Furnace Baghouse	$PM_{2.5}$	every year
		SO_2	CEM
		NO	CEM
		VOC	every 5 years
B.	Reheat Furnace #1	NO_X	every 3 years
C.	Reheat Furnace #2	NO_X	every 3 years

iii. Testing Status (To be applied to (i) and (ii) above)

A. To demonstrate compliance with the Electric Arc Furnace stack mass emissions limits for SO_2 and NO_x of Condition (i)(A) above, Nucor shall calibrate, maintain and operate the measurement systems for continuously monitoring for SO_2 and NO_x concentrations and stack gas volumetric flow rates in the Electric Arc Furnace stack. Such measurement systems shall meet the requirements of R307-170.

B. For $PM_{2.5}$ testing, 40 CFR 60, Appendix A, Method 5D, or another EPA approved method acceptable to the Director, shall be used to determine total TSP emissions. If TSP emissions are below the $PM_{2.5}$ limit, that will constitute compliance with the $PM_{2.5}$ limit. If TSP emissions are not below the $PM_{2.5}$ limit, the owner/operator shall retest using EPA approved methods specified for $PM_{2.5}$ testing, within 120 days.

C. Startup/shutdown NO_x and SO_2 emissions are monitored by CEMS.

p. Olympia Sales Company: Cabinet Manufacturing Facility

i. By January 1, 2015, a baghouse control device shall be installed and operating for control of PM from the process exhaust streams from the mill, door, and sanding areas.

ii. Process emissions from the mill, door, and sanding areas shall be exhausted through the baghouse during startup, shutdown, and normal operations of the plant.

q. PacifiCorp Energy: Gadsby Power Plant

i. Steam Generating Unit #1:

A. Emissions of NO_X shall be no greater than 336 ppmdv (3% O_2, dry).

B. The owner/operator shall install, certify, maintain, operate, and quality-assure a continuous emission monitoring system (CEMS) consisting of NO_X and O_2 monitors to determine compliance with the NO_X limitation.

ii. Steam Generating Unit #2:

A. Emissions of NO_X shall be no greater than 336 ppmdv (3% O_2, dry).

B. The owner/operator shall install, certify, maintain, operate, and quality-assure a continuous emission monitoring system (CEMS) consisting of NO_X and O_2 monitors to determine compliance with the NO_X limitation.

iii. Steam Generating Unit #3:

A. Emissions of NO_X shall be no greater than 336 ppmdv (3% O_2, dry).

B. The owner/operator shall install, certify, maintain, operate, and quality-assure a continuous emission monitoring system (CEMS) consisting of NO_X and O_2 monitors to determine compliance with the NO_X limitation.

iv. Natural Gas-fired Simple Cycle Turbine Units:

A. Total emissions of NO_X from all three turbines shall be no greater than 22.2 lbs/hour (15% O_2, dry) based on a 30-day rolling average.

B. Emission of NO_X from each individual turbine shall be no greater than 5 ppmdv (15% O_2, dry) based on 30 day rolling average.

C. The owner/operator shall install, certify, maintain, operate, and quality-assure a continuous emission monitoring system (CEMS) consisting of NO_X and O_2 monitors to determine compliance with the applicable NO_X limitations. The NO_X emission rate (lb/hr) shall be calculated by multiplying the NO_X concentration (ppmdv) generated from CEMs and the volumetric flow rate.

D. The owner/operator shall expand the catalyst beds to achieve additional NOx control on Natural Gas-fired Simple Cycle Turbine Units (Units #4, #5 and #6) by no later than January 1, 2016

v. Combustion Turbine Startup / Shutdown Emission Minimization Plan

A. Startup begins when the fuel values open and natural gas is supplied to the combustion turbines

B. Startup ends when either of the following conditions is met:

I. The NOx water injection pump is operational, the dilution air temperature is greater than 600 oF, the stack inlet temperature reaches 570 oF, the ammonia block value has opened and ammonia is being injected into the SCR and the unit has reached an output of ten (10) gross MW; or

II. The unit has been in startup for two (2) hours.

C. Unit shutdown begins when the unit load or output is reduced below ten (10) gross MW with the intent of removing the unit from service.

D. Shutdown ends at the cessation of fuel input to the turbine combustor.

E. Periods of startup or shutdown shall not exceed two (2) hours per combustion turbine per day.

r. Tesoro Refining and Marketing Company: Salt Lake City Refinery

i. Source-wide $PM_{2.5}$

By no later than January 1, 2019, combined emissions of filterable PM2.5 shall not exceed 0.42 tons per day (tpd) and 110 tons per rolling 12-month period.

$PM_{2.5}$ emissions shall be determined daily by applying the listed emission factors or emission factors determined from the most current performance test to the relevant quantities of fuel combusted. Unless adjusted by performance testing as discussed above, the default emission factors to be used are as follows:

Natural gas – 1.9 lb/MMscf (filterable), 5.7 lb/MMscf (condensable)
Plant gas – 1.9 lb/MMscf (filterable), 5.7 lb/MMscf (condensable)

Daily gas consumption by all boilers and furnaces shall be measured by meters that can delineate the flow of gas to the indicated emission points.

The equations used to determine emissions for the boilers and furnaces shall be as follows:

Emission Factor (lb/MMscf) * Gas Consumption (MMscf/24 hrs)/(2,000 lb/ton)

By no later than January 1, 2019, Tesoro shall conduct stack testing to establish the ratio of condensable $PM_{2.5}$ from the FCCU wet gas scrubber stack. At that time the condensable fraction will be added and a new source-wide limitation shall be established in the AO.

Total 24-hour $PM_{2.5}$ (filterable + condensable) emissions shall be calculated by adding the results of the above filterable $PM_{2.5}$ equations for natural gas and plant gas combustion to the values for the FCCU wet gas scrubber stack and to the estimate for the SRU/TGTU/TGI. Results shall be tabulated every day, and records shall be kept which include the meter readings (in the appropriate units) and the calculated emissions.

ii. Source-wide NO_X

By no later than January 1, 2019, combined emissions of NO_X shall not exceed 1.988 tons per day (tpd) and 475 tons per rolling 12-month period.

Compliance shall be determined daily by multiplying the hours of operation of a unit, feed rate to a unit, or quantity of each fuel combusted at each affected unit by the associated emission factor, and summing the results.

A NO_X CEM shall be used to calculate daily NO_X emissions from the FCCU wet gas scrubber stack. Emissions shall be determined by multiplying the nitrogen dioxide concentration in the flue gas by the mass flow of the flue gas. The NO_X concentration in the flue gas shall be determined by a CEM.

The emission factors for all other emission units are based on the results of the most recent stack test for that unit.

Total daily NO_X emissions shall be calculated by adding the emissions for each emitting unit. Results shall be tabulated every day, and records shall be kept which include the meter readings (in the appropriate units) and the calculated emissions.

iii. Source-wide SO_2

By no later than January 1, 2019, combined emissions of SO_2 shall not exceed 3.1 tons per day (tpd) and 300 tons per rolling 12-month period.

Daily SO_2 emissions from the FCCU wet gas scrubber stack shall be determined by multiplying the SO_2 concentration in the flue gas by the mass flow of the flue gas. The SO_2 concentration in the flue gas shall be determined by a CEM.

Daily SO_2 emissions from other affected units shall be determined by multiplying the quantity of each fuel used daily (24 hour usage) at each affected unit by the appropriate emission factor below.

Emission factors (EF) for the various fuels shall be as follows:

Natural gas: EF = 0.60 lb/MMscf
Propane: EF = 0.60 lb/MMscf
Plant fuel gas: the emission factor shall be calculated from the H_2S measurement or from the SO_2 measurement obtained by direct testing/monitoring.

The emission factor, where appropriate, shall be calculated as follows:

EF (lb SO_2/MMscf gas) = [(24 hr avg. ppmdv H_2S) /10^6] [(64 lb SO_2/lb mole)] [(10^6 scf/MMscf)/(379 scf/lb mole)]

Where mixtures of fuel are used in a Unit, the above factors shall be weighted according to the use of each fuel.

Total daily SO_2 emissions shall be calculated by adding the daily results of the above SO_2 emissions equations for natural gas, plant fuel gas, and propane combustion to the wet gas scrubber stack. Results shall be tabulated every day, and records shall be kept which include the CEM readings for H_2S (averaged for each one-hour period), all meter readings (in the appropriate units), and the calculated emissions.

s. The Procter & Gamble Paper Products Company

i. Emissions to the atmosphere at all times from the indicated emission points shall not exceed the following rates:

Source: Boilers (Each)

Pollutant	Oxygen Ref.	lb/hr
NO_X	3%	3.3

Source: Paper Machines Process Stacks (Each)

Pollutant	lb/hr
PM_{10}	6.65
$PM_{2.5}$	to be determined

A. Compliance with the above emission limits shall be determined by stack test as outlined in Section IX Part H.11.e of this SIP.

B. By no later than January 1, 2015, stack testing shall be completed to establish the ratio of condensable $PM_{2.5}$. At that time the condensable fraction will be added and a $PM_{2.5}$ limit established in the AO.

C. Subsequent to initial compliance testing, stack testing is required at a minimum of every five years.

ii. Boiler Startup/Shutdown Emissions Minimization Plan

A. Startup begins when natural gas is supplied to the Boiler(s) with the intent of combusting the fuel to generate steam. Startup conditions end within thirty (30) minutes of natural gas being supplied to the boilers(s).

B. Shutdown begins with the initiation of the stop sequence of the boiler until the cessation of natural gas flow to the boiler.

iii. Paper Machine Startup/Shutdown Emissions Minimization Plan

A. Startup begins when natural gas is supplied to the dryer combustion equipment with the intent of combusting the fuel to heat the air to a desired temperature for the paper machine. Startup conditions end within thirty (30) minutes of natural gas being supplied to the dryer combustion equipment.

B. Shutdown begins with the diversion of the hot air to the dryer startup stack and then the cessation of natural gas flow to the dryer combustion equipment. Shutdown conditions end within thirty (30) minutes of hot air being diverted to the dryer startup stack.

t. University of Utah: University of Utah Facilities

i. Emissions to the atmosphere from the listed emission points in Building 303 shall not exceed the following concentrations:

EMISSION POINT	POLLUTANT	ppmdv (3% O_2 dry)
A. Boilers #3	NO_X	187
B. Boilers #4a & 4b	NO_X	9
C. Boilers #5a & 5b	NO_X	9
D. Turbine	NO_X	9
E. Turbine and WHRU Duct burner	NO_X	15

ii. Stack testing to show compliance with the emissions limitations of Condition i above shall be performed as specified below:

EMISSION POINT	POLLUTANT	INITIAL TEST	TEST FREQUENCY
A. Boilers #3	NO_X	*	every 3 years
B. Boilers #4a & #4b	NO_X	2018	every 3 years
C. Boilers #5a & #5b	NO_X	2017	every 3 years
D. Turbine	NO_X	2014	every year
E. Turbine and WHRU Duct Burner	NO_X	2014	every year

* Initial test already performed

iii. Testing Status (To be applied to A, B, C, D, and E in i and ii above)

A. After January 1, 2019, Boiler #3 shall only be used as a back-up/peaking boiler. Unit #3 may be operated on a continuous basis with a boiler(s) that is equipped with low NO_X burners.

B. To be applied to boilers #4a, #4b, #5a, and #5b, initial test shall be performed by February 28th of the year specified.

C. To be applied to boilers #4a, #4b, #5a, and #5b , testing will be performed at least every 3 years, between November 1 and February 28/29.

D. To be applied to turbine, and turbine and WHRU Duct Burner, testing will be performed at least every year between November 1 through February 28/29.

iv. Standard operating procedures shall be followed during startup and shutdown operations to minimize emissions

v. Units 1 & 3 of Building 302 shall have a combustion control system with automatic O2 trim installed by December 2014.

u. Vulcraft / Nucor Building Systems

i. R307-350 Miscellaneous Metal Parts and Products Coatings applies to the painting operations at Vulcraft and Nucor Building Systems.

ii. The combined source-wide emissions of VOCs from the joist dip tanks, paint booths, spray painting, degreasers, parts cleaners, and associated operations from the Vulcraft Joist plant and the Nucor Building Systems plant shall not exceed 305.07 tons per rolling 12-month period after January 1, 2014. VOCs emissions shall be calculated from paint and solvent usage based on inventory records.

v. Wasatch Integrated Waste Management District

i. By January 1, 2018, SNCR technology shall be installed and operating on each of the two Municipal Waste Combustors for the reduction of NO_X emissions.

ii. Emissions of NO_X from the Municipal Waste Combustors shall not exceed 350 ppmdv (7% O_2, dry), based on a daily arithmetic average concentration.

iii. Compliance shall be determined by CEMs.

iv. Gas Suspension Absorber (GSA) and PAC Injection

A. The control system for the GSA shall automatically shut-down or start-up the feeder screws, slurry pumps, and PAC feeder based upon minimum required gas flows and temperature.

B. The facility shall follow the Operations and Maintenance Manual shall ensure the GSA is operated as long as possible during startup/shutdown:

I. Cold Light Off

The GSA is placed into startup sequence during final heating when the ESP inlet temperature reaches 285 degrees Fahrenheit and coincident to introducing MSW to the unit.

II. Hot Light Off

The GSA is placed into startup sequence during final heating when the ESP inlet temperature reaches 285 degrees Fahrenheit and coincident to introducing MSW to the unit.

III. Secure to Hot

Continue operations of the GSA after stopping feeding of refuse until ESP inlet temperature drops below 285 degrees Fahrenheit.

IV. Secure to Cold

Continue operations of the GSA after stopping feeding of refuse until ESP inlet temperature drops below 285 degrees Fahrenheit.

V. Malfunction Shut Down

Continue operations of the GSA after stopping feeding of refuse until ESP inlet temperature drops below 285 degrees Fahrenheit.

v. Electrostatic Precipitator (ESP)

A. Each unit is equipped with an ESP for control of particulate emissions. The ESPs shall be operated in accordance with the facility Operations and Maintenance Manual. The facility Operations and Maintenance Manual shall ensure the ESP is operated as long as possible during start-up/shut-down:

I. Cold Light Off

The ESP is lined up and placed into operation prior to lighting burners and well before introducing MSW to the unit.

II. Hot Light Off

The ESP is lined up and placed into operation prior to lighting burners and well before introducing MSW to the unit.

III. Secure to Hot

Continue operations of the ESP throughout shutdown period as possible.

IV. Secure to Cold

Continue operations of the ESP throughout shutdown period as possible.

V. Malfunction Shut Down

Continue operations of the ESP throughout shutdown period as possible.

H.13 Source-Specific Emission Limitations in Provo – UT $PM_{2.5}$ Nonattainment Area

a. Brigham Young University: Main Campus

i. All central heating plant units shall operate on natural gas from November 1 to February 28 each season beginning in the winter season of 2013-2014. Fuel oil may be used as backup fuel during periods of natural gas curtailment. The sulfur content of the fuel oil shall not exceed 0.0015 % by weight.

ii. Emissions to the atmosphere from the indicated emission point shall not exceed the following concentrations:

EMISSION POINT	POLLUTANT	ppmdv (3% O_2 dry)
A. Unit #1	NO_X	36 ppm
B. Unit #4	NO_X	36 ppm
C. Unit #6	NO_X	36 ppm

iii. Stack testing to show compliance with the above emission limitations shall be performed as follows:

EMISSION POINT	POLLUTANT	INITIAL TEST	TEST FREQUENCY
A. Unit #1	NO_X	*	every three years
B. Unit #4	NO_X	January 1, 2017	every three years
C. Unit #6	NO_X	January 1, 2017	every three years

* Unit #1 shall only be operated as a back-up boiler to Units #4 and #6 and shall not be operated more than 300 hours per rolling 12-month period. If Unit #1 operates more than 300 hours per rolling 12-month period, then low NO_X burners with Flue Gas Recirculation shall be installed and tested within 18 months of exceeding 300 hours of operation.

iv. Natural Gas-Fired Boilers

A. Central Heating Plant Natural Gas-Fired Boilers

I. Startup and shutdown events shall not exceed 216 hours per boiler per 12-month rolling period.

II. The owner/operator of Unit #4 and Unit #6 shall replace the burner spud tips with low NOx tips and add a minimum of 18% Flue Gas Recirculation. Other modifications include installing combustion controls fully metered with oxygen trim. The modifications shall be completed by January 1, 2017.

b. Geneva Nitrogen Inc.: Geneva Nitrogen Plant

i. Prill Tower:

PM_{10} emissions shall not exceed 0.22 ton/day and 79 ton/yr

ii. Testing

A. Stack testing shall be performed as specified below:

I. Frequency. Emissions shall be tested every three years. The source shall also be tested at any time as required by the Director.

B. The daily and rolling 12-month mass emissions shall be calculated by multiplying the most recent stack test results by the appropriate hours of operation for each day and for each rolling 12-month period.

iii. Montecatini Plant:

NO_X emissions shall not exceed 30.8 lb/hr

iv. Weatherly Plant:

NO_X emissions shall not exceed 18.4 lb/hr

v. Testing

Compliance testing is required on the Prill tower, Montecatini Plant, and Weatherly Plants. The test shall be performed as soon as possible and in no case later than January 1, 2019.

A. Stack testing to show compliance with the NO_X emission limitations shall be performed as specified below:

I. Testing and Frequency. Emissions shall be tested every three years. The source may also be tested at any time as required by the Director.

B. NO_X concentration (ppmdv) shall be used as an indicator to provide a reasonable assurance of compliance with the NO_X emission limitation as specified below:

I. Measurement Approach: NO_X concentration (ppmdv) shall be determined by using a NO_X CEM.

II. Indicator Range: An excursion is defined as a one-hour average NO_X concentration in excess of 200 ppmdv as measured by the NOx CEM. Excursions trigger an inspection, corrective action, and a reporting requirement.

III. Performance Criteria:

1. Data Representativeness: Measurements made by a continuous monitoring system shall provide a direct indicator of SCR performance. The low detectable limit is 0.01 ppmdv (in 0.5 ppmdv full scale range) and the precision is 1% of the full scale.

2. QA/QC Practices and Criteria: The continuous monitoring system shall be operated, calibrated, and maintained in accordance with manufacture's recommendations. Zero and span drift tests shall be conducted on a daily basis.

3. Monitoring Frequency: Emission shall be monitored continuously and a data point recorded every 15 seconds.

4. Data Collection Procedure: NOx concentration (ppmdv) shall be recorded and stored electronically.

5. Averaging Period: Use 15-second NOx concentration (ppmdv) to calculate hourly average NOx concentration (ppmdv).

vi. Start-up/Shut-down

A. A low temperature catalyst shall be utilized in the abatement process so that the catalyst can be initiated at the lowest temperature possible while avoiding ammonium nitrate and ammonium nitrite condensation temperatures. Geneva Nitrogen shall initiate the SCR abatement process as soon as temperature permits and by using pure clean water in the absorption process for maximum absorption efficiency during start-up conditions.

B. The wet scrubbing system used for the reduction of PM10/PM2.5 in the Ammonium Nitrate Prill Tower shall be in operation either prior to or at the same time the scrubber initiates operation.

c. PacifiCorp Energy: Lake Side Power Plant

i. Block #1 Turbine/HRSG Stacks:

Emissions of NO_X shall not exceed 2.0 ppmvd (15% O_2) on a 3-hour average basis.

ii. Block #2 Turbine/HRSG Stacks:

Emissions of NO_X shall not exceed 2.0 ppmvd (15% O_2) on a 3-hour average basis.

iii. The owner/operator shall install, certify, maintain, operate, and quality-assure a continuous emission monitoring system (CEMS) consisting of NO_X and O_2 monitors to determine compliance with the applicable NO_X limitations.

iv. Startup / Shutdown Limitations:

A. Block #1:

I. Startup and shutdown events shall not exceed 613.5 hours per turbine per 12-month rolling period.

II. Total startup and shutdown events shall not exceed 14 hours per turbine in any one calendar day.

III. Cumulative short-term transient load excursions shall not exceed 160 hours per 12-month rolling period.

IV. During periods of transient load conditions, NOx emissions from the Block #1 Turbine/HRSG Stacks shall not exceed 25 ppmvd at 15% O2.

B. Block #2:

I. Startup and shutdown events shall not exceed 553.6 hours per turbine per 12-month rolling period.

II. Total startup and shutdown events shall not exceed 8 hours per turbine in any one calendar day.

III. Cumulative short-term transient load excursions shall not exceed 160 hours per 12-month rolling period.

IV. During periods of transient load conditions, NOx emissions from the Block #1 Turbine/HRSG Stacks shall not exceed 25 ppmvd at 15% O2.

C. Definitions:

I. Startup is defined as the period beginning with turbine initial firing until the unit meets the ppmvd emission limits listed in IX.H.13.c.i and ii above.

II. Shutdown is defined as the period beginning with the initiation of turbine shutdown sequence and ending with the cessation of firing of the gas turbine engine.

III. Transient load conditions are those periods, not to exceed four consecutive 15-minute periods, when the 15-minute average NOx concentration exceeds 2.0 ppmv dry @ 15% O2. Transient load conditions include the following:

1. Initiation/shutdown of combustion turbine inlet air-cooling.
2. Rapid combustion turbine load changes.
3. Initiation/shutdown of HRSG duct burners.
4. Provision of Ancillary Services and Automatic Generation Control.

d. Pacific States Cast Iron Pipe Company: Pipe Casting Plant

i. By January 1, 2015, all VOC emissions shall be limited to [~~118.66~~]140.85 tons per rolling 12-month period.

A. By the twentieth day of each month, a new 12-month total shall be calculated using data from the previous 12 months.

B. Records shall be kept for all periods the plant is in operation.

ii. The Annealing Oven furnaces are limited to 63.29 MMBtu/hr.

iii. Emissions from the [~~Annaeling Oven furnaces~~]desulfurization and ductile treatment system shall be routed through the operating baghouse prior to be emitted into the atmosphere.

iv. Emissions from the Special Lining Shotblast operations shall be routed through the operating baghouse prior to being emitted into the atmosphere.

e. Payson City Corporation: Payson City Power

i. Emissions of NO_X shall be no greater than 1.54 ton per day and 268 tons per rolling 12-month period for all engines combined.

ii. Compliance with the emission limitation shall be determined by the following equation:

Emissions (tons/day) = (Power production in kW-hrs/day) x (Emission factor in grams/kW-hr) x (1 lb/453.59 g) x (1 ton/2000 lbs)

iii. The emission factor shall be derived from the most recent emission test results. The source shall be tested every three years based on the date of the last stack test. Emissions for NOx shall be the sum of emissions from each engine and shall be calculated on a daily basis.

iv. The number of kilowatt hours generated by each engine shall be recorded on a daily basis.

v. Startup / Shutdown Limitations:

A. Startup and shutdown events shall not exceed 936 hours per rolling 12-month period.

B. Total startup and shutdown events shall not exceed six (6) hours in any one calendar day.

C. The daily startup and shutdown totals shall be summed across all four dual fuel engines.

f. Provo City Power: Power Plant

i. Emissions of NO_X shall be no greater than 2.45 tons per day and 254 tons per rolling 12-month period for all engines and boilers combined.

ii. Compliance with the emission limitations shall be determined by the following equations:

Emissions (tons/rolling 12-month period) = (Power production in kW-hrs/day) x (Emission factor in grams/kW-hr) x (1 lb/453.59 g) x (1ton/2000 lbs)

Emissions (tons/rolling 12-month period) = (Power production in kW-hrs/rolling 12-month period) x (Emission factor in grams/kW-hr) x (1 lb/453.59 g) x (1ton/2000 lbs)

The emission factors for NO_X shall be derived from the most recent emission test results.

iii. Each engine and boiler shall be tested every 8,760 hours of operation and/or at least every five years based on the date of the last stack test, whichever occurs sooner.

iv. NO_X emissions shall be the sum of emissions from each engine and boiler. The number of kilowatt hours generated by each engine and boiler shall be recorded on a daily basis.

v. Startup / Shutdown Limitations:

A. Startup and shutdown events shall not exceed 936 hours per rolling 12-month period.

B. Total startup and shutdown events shall not exceed six (6) hours in any one calendar day.

C. The daily startup and shutdown totals shall be summed across all four dual fuel engines.

g. Springville City Corporation: Whitehead Power Plant

i. Emissions of NO_X shall be no greater than 1.68 ton per day and 248 tons per rolling 12-month period for all Unit Engines combined.

ii. Internal combustion engine emissions shall be calculated from the operating data recorded by the CEM. Emissions shall be calculated for NO_X for each individual engine in the following manner:

Daily Rate Calculation:

X = grams/kW-hr rate for each generator (recorded by CEM)
K = total kW-hr generated by the generator each day (recorded by output meter)
D = daily output of pollutant in lbs/day

$$D = (X * K)/453.6$$

The daily outputs are summed into a monthly output.
The monthly outputs are summed into an annual rolling 12-month total of pollutant in tons/year.

iii. Startup / Shutdown Limitations:

A. Startup and shutdown events shall not exceed 1638 hours per rolling 12-month period.

B. Total startup and shutdown events shall not exceed 10.5 hours in any one calendar day.

C. The daily startup and shutdown totals shall be summed across all seven (7) dual fuel engines.

ITEM 11

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-091-014

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Mark Berger, Environmental Planning Consultant

DATE: November 19, 2014

SUBJECT: FINAL ADOPTION: Amend R307-110-10. Section IX, Control Measures for Area and Point Sources, Part A, Fine Particulate Matter; and Amend R307-110-17. Section IX, Control Measures for Area and Point Sources, Part H, Emissions Limits.

On September 3, 2014, the Board proposed for public comment amendments to R307-110-10 and R307-110-17 to incorporate the latest version of Section IX, Part A of the State Implementation Plan and the new emission limits added to Section IX, Part H into the Air Quality Rules. A 30-day public comment period was held, during which a public hearing was also held. There were no comments received regarding incorporating the new State Implementation Plan sections into the rules.

Staff Recommendation: Staff recommends the Board adopt R307-110-10 and R307-110-17 as proposed.

195 North 1950 West • Salt Lake City, Utah
Mailing Address: P.O. Box 144820 • Salt Lake City, Utah 84114-4820
Telephone (801) 536-4000 • Fax (801) 536-4099 • T.D.D. (801) 536-4414
www.deq.utah.gov
Printed on 100% recycled paper

R307. Environmental Quality, Air Quality.
R307-110. General Requirements: State Implementation Plan.
R307-110-10. Section IX, Control Measures for Area and Point Sources, Part A, Fine Particulate Matter.

The Utah State Implementation Plan, Section IX, Control Measures for Area and Point Sources, Part A, Fine Particulate Matter, as most recently amended by the Utah Air Quality Board on December 3, 2014, pursuant to Section 19-2-104, is hereby incorporated by reference and made a part of these rules.

. . . . . .

R307-110-17. Section IX, Control Measures for Area and Point Sources, Part H, Emissions Limits.

The Utah State Implementation Plan, Section IX, Control Measures for Area and Point Sources, Part H, Emissions Limits, as most recently amended by the Utah Air Quality Board on December 3, 2014, pursuant to Section 19-2-104, is hereby incorporated by reference and made a part of these rules.

KEY: air pollution, PM10, PM2.5, ozone
Date of Enactment or Last Substantive Amendment: December 4, 2014
Notice of Continuation: February 1, 2012
Authorizing, and Implemented or Interpreted Law: 19-2-104(3)(e)

ITEM 12

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-101-14

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Harold Burge, Major Source Compliance Section Manager

DATE: November 25, 2014

SUBJECT: Stericycle, Incorporated Administrative Settlement Order No. 2013051501

Stericycle, Incorporated (Stericycle) operates a hospital/medical/infectious waste incinerator (HMIWI) located at 90 North Foxboro Drive, North Salt Lake, Davis County, Utah. On May 28, 2013, the Division of Air Quality (DAQ) issued a Notice of Violation and Order to Comply (NOV). On August 28, 2013, DAQ issued an Amended NOV that superseded the original NOV. By April 10, 2013, Stericycle had demonstrated compliance with all of their emission limits through stack testing.

Stericycle filed a request for Agency Action (RFAA) on September 27, 2013, which requested an evidentiary hearing to challenge the Amended NOV. On April 24, 2014, the Executive Director of the Utah Department of Environmental Quality (DEQ) appointed an Administrative Law Judge (ALJ) to conduct an administrative hearing to adjudicate the merits of the Amended NOV and RFAA. DAQ and Stericycle have engaged in a series of settlement negotiations starting before and continuing after the issuance of the NOV and Amended NOV. The attached Administrative Settlement Order is a result of those negotiations. The major provisions of the Administrative Settlement Order are:

1. A total penalty amount is $2,322,536.

2. Stericycle will pay half of the total penalty ($1,161,268) within 30 days of the effective date of the Administrative Settlement Order.

3. In lieu of paying the remaining half of the total penalty ($1,161,268), Stericycle will relocate to Tooele County and permanently cease operations at its North Salt Lake Facility within 3 years of obtaining all necessary permits and approvals for the new facility and Stericycle's Title V Permits and Approval Orders for the North Salt Lake Facility will be voided. The new facility will have better control technology and will be sited away from population centers.

In accordance with Utah Code Ann. 19-2-104(3)(b)(i), this memorandum is provided to the Utah Air Quality Board (UAQB) for review since the penalty exceeds $25,000. The signed Administrative Settlement Order has been provided in the packet. DAQ is seeking approval to enter into this Administrative Settlement Order to avoid further legal delays in resolving the Amended NOV and to ensure that operations at the North Salt Lake Facility cease as quickly as possible. The DAQ will withhold any further action on this case until the UAQB approves or disapproves the settlement.

Staff Recommendation: Staff recommends the UAQB approve the penalty amount and Administrative Settlement Order No. 2013051501.

BEFORE THE UTAH DIVISION OF AIR QUALITY

In The Matter of	:	Administrative Settlement Order
Stericycle, Incorporated	:	
No. 2013051501	:	

RECITALS

This Administrative Settlement Order ("Agreement") is entered into between Stericycle, Incorporated ("Stericycle") and the Director of the Utah Division of Air Quality ("DAQ," "Director," or "Division") pursuant to the Utah Air Conservation Act, Utah Code Ann. § 19-2-101 et seq. ("Act") and Utah Administrative Code ("UAC") Rule 305-7-320. For purposes of this Agreement, DAQ and Stericycle shall be referred to collectively as the "Parties."

1. **Utah Air Quality Board's and DAQ's Authority.**
The DAQ has authority to administer the Act, and to issue notices of violation and orders and to exercise all incidental powers necessary to carry out the purposes of the Act. Utah Code Ann. § 19-2-107. The Parties may agree to settle an action pursuant to Rule 305-7-320. The Utah Air Quality Board ("Board") has the authority to review and approve a settlement negotiated by the DAQ that requires a civil penalty of $25,000 or more. Utah Code Ann. § 19-2-104(3)(b)(i).

2. **Stericycle.**
Stericycle operates a hospital/medical/infectious waste incinerator located at 90 North Foxboro Drive, North Salt Lake, Davis County, Utah ("Facility").

3. **NOV and Amended NOV.**
DAQ issued a Notice of Violation and Order to Comply to Stericycle on May 28, 2013 ("NOV") and DAQ issued an Amended Notice of Violation and Order to Comply ("Amended NOV") to Stericycle on August 28, 2013. The Amended NOV superseded the NOV. The Amended NOV alleges that Stericycle violated several conditions of the Title V Operating Permit 1100055002 dated February 19, 2009.

4. **Request for Agency Action.**
Stericycle filed a Request for Agency Action ("RFAA") on September 27, 2013, which requested an evidentiary hearing to challenge the Amended NOV.

5. **Appointment of Administrative Law Judge.**

On April 24, 2014, the Executive Director of the Utah Department of Environmental Quality appointed an Administrative Law Judge ("ALJ") to conduct an administrative hearing to adjudicate the merits of the Amended NOV and RFAA.

6. **Settlement Discussions.**

The Parties have engaged in a series of settlement discussions starting before and continuing after the filing of the NOV and Amended NOV. As part of those discussions, it was suggested that one aspect of a resolution could involve moving Stericycle's incinerator operations at the Facility to another location, if a suitable, remote location could be found for a new incinerator in Utah, that would be built with better air pollution control technology than is currently required at the Facility but that would also be buffered from population centers and sited in compliance with setbacks within its property boundaries consistent with applicable land use regulations. Stericycle has found what it believes to be a suitable location, has entered into an agreement to purchase property at that location, and has begun the process to obtain the necessary approvals to construct and operate a new incinerator at this new location. In order to provide further incentive to Stericycle to complete this process, the Parties have agreed to the penalty payment structure outlined in Paragraph 11 below.

7. **Purpose.**

The purpose of this Agreement is to settle the violations alleged in the NOV dated May 28, 2013 and the Amended NOV dated August 28, 2013. This settlement shall not in any way relieve Stericycle of any obligation to comply with applicable, federal, state or local laws, rules or regulations, and nothing in this settlement shall preclude DAQ from taking appropriate action to abate a threat to public health or the environment should such a situation arise.

8. **No Admissions.**

The Parties now wish to resolve this matter fully without admissions of: any factual allegations or findings in the NOV or Amended NOV, any violations of law, rule, regulation or permit, any liability, wrongdoing, failure or omissions whatsoever; and without further administrative or judicial proceedings.

9. **Payments.**

Without any admission of liability, wrongdoing, or negligence, Stericycle has agreed to undertake the actions and make the payments identified in Paragraph 11 below.

10. **Mutual Interest.**

The Parties believe that it is in their mutual best interest to execute this Agreement and to settle the NOV and Amended NOV.

AGREEMENT AND ORDER

NOW THEREFORE, without adjudication of any issue of fact or law and without admission of any liability, and subject to the approval of the Board, the Parties hereby agree and DAQ orders as follows:

11. In settlement of the alleged violations referenced in Paragraphs 3 and 7 of this Agreement, Stericycle, agrees to a total stipulated penalty of $2,322,536.00, one half of which will be paid to the State of Utah upon execution of this Agreement as provided below, and the other half of which will be credited as provided below.

    a. Civil Penalty paid to the State. Stericycle agrees to pay one-half of the penalty amount within thirty (30) days of the effective date of this Agreement, by wire transfer of funds in the amount of $1,161,268 payable to the State of Utah.

    b. Supplemental Environmental Project (SEP) Credit for Remaining Civil Penalty. The remaining one-half of the penalty amount ($1,161,268) shall be credited as a Supplemental Environmental Project at the time Stericycle permanently stops operating the North Salt Lake Facility which will occur no later than three years from the date Stericycle obtains the final, non-appealable permits from the Utah Department of Environmental Quality (DEQ), all non-appealable local governmental approvals necessary to commence construction of the new incinerator and the Governor's approval referenced in Utah Code Ann. Section 19-6-108 (3)(c)(i) (hereinafter "All Necessary Approvals to Construct").

12. If the $1,161,268 payment referenced in Paragraph 11.a. is not made within 30 days, additional penalties shall accrue at the rate of $10,000 a day and DAQ may enforce payment through a civil action in Second District Court.

13. In order to ensure prompt and diligent efforts to relocate the Facility from its current location in North Salt Lake, Stericycle agrees to comply with the following:

    a. Within 90 days of the date that DAQ signs this Agreement, Stericycle shall submit to the Utah Department of Environmental Quality ("DEQ") all permit applications (over which DEQ has jurisdiction) necessary to relocate the Facility to a new location.

    b. 60 days from the date Stericycle obtains All Necessary Approvals to Construct, Stericycle will provide DAQ with a schedule for the construction of the incinerator in the new location in Tooele County, Utah.

c. Every 90 days thereafter, Stericycle shall provide DAQ with a report describing in detail Stericycle's good faith efforts to complete the construction referred to in Paragraph 13.b.

14. Within three years after the date that Stericycle obtains All Necessary Approvals to Construct, Stericycle's Title V Operating Permit 1100055002 (issued February 19, 2009) or any subsequent Title V Operating Permit renewal and Approval Order DAQE-AN101420011-14 (issued August 12, 2014) for the North Salt Lake Facility shall become null and void and Stericycle shall permanently cease operation at the North Salt Lake Facility.

15. None of the provisions of this Agreement shall be considered admissions by Stericycle and shall not be used by any third party related or unrelated to this Agreement for purposes other than determining the basis of this Agreement. This Agreement resolves any and all liability and claims under the authority of the DAQ arising from the NOVs listed in Paragraphs 3 and 7 of this Agreement against Stericycle, its officers, employees and agents and against any other unnamed owners and/or operators of the North Salt Lake Facility at the time of the alleged violations.

16. Nothing in this Agreement shall preclude the DAQ from seeking civil penalties for violations of this Agreement, future violations of the Act or Rules, or to issue future Notices or Orders. Nothing in this Agreement shall constitute a waiver by Stericycle of any defense or the ability to raise any factual or legal contention for future alleged violations, or in response to future Notices or Orders.

17. All notices, requests, demands, and other communications hereunder shall be in writing and shall be given by (i) established express delivery service which maintains delivery records, (ii) hand delivery, or (iii) certified or registered mail, postage prepaid, return receipt requested, to the Parties at the following addresses, or at such other address as the Parties may designate by written notice in the following manner:

Director

Bryce C. Bird
Utah Division of Air Quality
P.O. Box 144870
Salt Lake City, UT 84114-4870

Stericycle

Attn: Richard Kogler
Stericycle, Inc.
28161 N. Keith Drive
Lake Forest, IL 60045

With a copy to:

Christian C. Stephens
Office of Utah Attorney General
P.O. Box 140873
Salt Lake City, UT 84114-0873

Raymond J. Etcheverry
Parsons Behle & Latimer
201 South Main Street, Suite 1800
Salt Lake City, UT 84111

18. Successors and Assigns. All of the rights and obligations of the Parties under this Agreement shall be binding upon and inure to the benefit of their permitted successors. Stericycle shall not assign this Agreement without the written permission of DAQ.

19. Authority to Execute. Each person executing this Agreement individually and personally represents and warrants that he or she is duly authorized to execute and deliver the same on behalf of the entity for which he or she is signing, and that all corporate and/or legislative authority and approvals, as the case may be, have been obtained, and that this Agreement is a binding obligation on such entity.

20. Entire Agreement. This Agreement, which includes all recitals and terms hereto, constitutes the entire agreement between the Parties relating to the subject matter of this Agreement, and incorporates all prior correspondence, communications or agreements between the Parties relating to the subject matter of this Agreement, and cannot be altered except in writing signed by all Parties.

21. This Agreement shall be executed as follows: Stericycle shall execute this Agreement first. The Parties shall then present the Agreement to the Board for approval. If the Board approves the Agreement without change, DAQ will execute the Agreement.

Agreed:

Stericycle, Incorporated

_____ Date: 11/25/14
Richard Kogler
Chief Operating Officer

Agreed and Ordered:

_____ Date: _____
Bryce C. Bird, Director
Utah Division of Air Quality

ITEM 13

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-092-14

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Alan Humpherys, Minor New Source Review Section Manager

DATE: November 21, 2014

SUBJECT: PROPOSE FOR PUBLIC COMMENT: Amend R307-120. General Requirements: Tax Exemption for Air Pollution Control Equipment.

During the 2014 legislative session, the Utah Legislature revised the statute governing the state's certification for sales tax exemption for pollution control equipment. House Bill 31 repealed the old statute and enacted a new statute. The old and new statutes are similar but do contain differences.

We are proposing changes to R307-120 to be consistent with House Bill 31.

- A section will be added for rule applicability and rule definitions.
- The requirements for an application will be expanded to be consistent with the statute.
- The sections of "Review Period" and "Duty to Issue Certification" will be combined under a new section "Issuance of Certification."
- The old sections of "Eligibility for Certification," "Conditions of Eligibility," and "Limitations on Certification" will be removed from the rule.
- The language of the sections on "Exemptions from Certifications" and "Appeal and Revocation" will be updated to be consistent with the statute.

Staff Recommendation: Staff recommends the Board propose R307-120 for public comment.

R307. Environmental Quality, Air Quality.
R307-120. General Requirements: Tax Exemption for Air Pollution Control Equipment.
R307-120-1. Applicability.

This rule shall apply to purchases described in Section 19-12-201.

R307-120-2. Definitions.

The following definitions apply to R307-120:

"Freestanding pollution control property" means freestanding pollution control property as defined in Section 19-12-102.

"Pollution control facility" means pollution control facility as defined in Section 19-12-102.

R307-120-[~~1~~]3. Application for Certification.

(1) An [~~A~~]application for certification shall be made on the form provided by the director.[~~ Division of Air Quality, and~~]

(2) The application shall include all information requested thereon and such additional [~~reasonably necessary~~]information as is requested by the director[~~executive secretary of the Air Quality Board~~]. At a minimum, the application shall contain:

(a) a description of the pollution control facility or the freestanding pollution control property;

(b) a description of the property, part, product, or service for a purchase or lease of property, a part, a product or a service for which a person seeks to claim a sales and use tax exemption under Section 19-12-201;

(c) the existing or proposed operation procedure for the pollution control facility or freestanding pollution control property; and

(d) a statement of the purpose served or to be served by the pollution control facility or freestanding pollution control property.

(3) Applications for certification shall include:

(a) a reference to the approval order issued under R307-401-8 that requires the pollution control facility or the freestanding pollution control property; or

(b) a reference to the section of the State Implementation Plan that requires the pollution control facility or the freestanding pollution control property; or

(c) an estimate of emission reductions (in tons per year) resulting from the use of the pollution control facility or the freestanding pollution control property.

(4) The director may require an application to contain additional information that the director finds necessary to determine whether to grant certification under Section 19-12-303.

[~~**R307-120-2. Eligibility for Certification.**~~

~~Certification shall be made only for taxpayers who are owners, operators (under a lease) or contract purchasers of a trade or business that utilizes Utah property with a pollution control facility to~~

~~prevent or minimize air pollution.~~]

R307-120-[~~3~~]4. [~~Review Period~~]Issuance of Certification.

(1) [~~Date of filing shall be date of receipt of the final item of information requested and this filing date shall initiate the 120-day review period.~~]The filing date of the application shall be the date the director receives a complete application with all of the information as described in R307-120-3. Within 120 days of the filing date of the application, the director will:

(a) issue a written certification of the pollution control facility or the freestanding pollution control property; or

(b) provide a written statement of the reason for the denial of certification.

(2) The director shall issue a certification of a pollution control facility or a freestanding pollution control property to the applicant if the director determines that:

(a) the application meets the requirements of Section 19-12-301(3) or 19-12-302(2);

(b) the facility or property that is the subject of the application is a pollution control facility or a freestanding pollution control property.

(c) the person who files the application is a person described in Section 19-12-301(1) or 19-12-302(1); and

(d) the purchases or leases for which the person seeks to claim a sales and use tax exemption are exempt under Section 19-12-201.

(3) The director may issue one certification for one or more pollution control facilities or freestanding pollution control properties that constitute an operational unit.

(4) If the director does not issue or deny a certification within 120 days after the date a person files an application, the director shall issue a certification to the person at the person's request.

[~~**R307-120-4. Conditions for Eligibility.**~~

~~(1) All materials, equipment and structures (or part thereof) purchased, leased or otherwise procured and services utilized for construction or installation in an air pollution control facility shall be eligible for certification, provided:~~

~~(a) such materials, equipment, structures (or part thereof), and services installed, constructed, or acquired result in a demonstrated reduction of pollutant discharges or emission pollutant levels, and~~

~~(b) the primary purpose of such materials, equipment, structures (or part thereof), and services is preventing, controlling, reducing, or disposing of air pollution.~~

~~(2) The above includes expenditures that reduce the amount of pollutants produced as well as expenditures that result in removal of pollutants from waste streams. The materials, equipment, structures (or part thereof), and services that are necessary for the proper functioning of air pollution control facilities meeting the requirements of (1)(a) and (b) above, including equipment required for compliance monitoring, shall be eligible for certification.~~

~~**R307-120-5. Limitations on Certification.**~~

~~Applications for certification shall be certified by the executive secretary of the Board after consultation with the State Tax Commission and only if:~~

~~(1) the air pollution control facility in question has been reviewed and approved by the executive secretary of the Board for those air pollution sources needing review in accordance with R307-401, or~~

~~(2) the air pollution control facilities installed, constructed, or acquired are the result of the requirements of these rules (permits by rule) or the State Implementation Plan.~~]

R307-120-[~~6~~]5. Exemptions from Certification.

The director shall not issue a certification for the following:

(1) a replacement of freestanding pollution control property; or

(2) property, a part, a product, or a service described in Sections 19-12-201(1)(b) through (e) used or performed in a repair or replacement related to:

(a) a pollution control facility; or

(b) a freestanding pollution control property.

(3) a pollution control facility or a freestanding pollution control property that has already received a certification under R307-120-5.

[~~The following items are specifically not eligible for certification:~~

~~(1) materials and supplies used in the normal operation or maintenance of the air pollution control facilities;~~

~~(2) materials, equipment, and services used to monitor ambient air, unless required for a permit or approval from the Board;~~

~~(3) air conditioners.~~

~~**R307-120-7. Duty to Issue Certification.**~~

~~Upon determination that facilities described in any application under R307-120-1 satisfy the requirements of these rules and Sections 19-2-123 through 19-2-127 the executive secretary of the Board shall issue a certification of pollution control facility to the applicant.~~]

R307-120-[~~8~~]6. Appeal and Revocation.

(1) A decision of the [~~executive secretary of the Board~~]director may be reviewed by filing a Request for Agency Action as provided in [~~R307-103~~]R305-7.

(2) [~~Revocation of prior certification shall be made for any of the circumstances prescribed in Section 19-2-126, after consultation with the State Tax Commission.~~]The director may revoke a certification issued under Section 19-12-303 if the director makes a determination as contained in Section 19-12-304.

KEY: air pollution, tax exemptions, equipment
Date of Enactment or Last Substantive Amendment: August 29, 2011
Notice of Continuation: February 1, 2012

Authorizing, and Implemented or Interpreted Law: [~~19-2-123; 19-2-124; 19-2-125; 19-2-126; 19-2-127~~]19-12-101; 19-12-102; 19-12-201; 19-12-202; 19-12-203; 19-12-301; 19-12-302; 19-12-303; 19-12-304; 19-12-305

ITEM 14

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-095-14

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Joel Karmazyn, Environmental Scientist

DATE: November 24, 2014

SUBJECT: PROPOSE FOR PUBLIC COMMENT: Amend R307-302. Solid Fuel Burning Devices in Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber Counties.

As mentioned in the Governor's State of the State address earlier this year, his office has requested that DAQ seek the Board's approval to obtain public comment on a proposal to implement a wintertime seasonal solid fuel burning ban within the $PM_{2.5}$ nonattainment areas to help bring this area into attainment of the $PM_{2.5}$ air quality standard.

Based on comments received during earlier stakeholder interactions and past rulemaking, we have identified some issues that should be considered in conjunction with proposing an inversion season total solid fuel burning ban for all sources.

Total Solid Fuel Ban Ramification	**Resolution and Option(s)**
Sole source households	1) The legislature has provided $500,000 for conversion. Encourage voluntary participation of sole source households 2) Re-opening the sole source registry to allow for additional conversions 3) Request assistance from political subdivisions to widely advertise registry opening through direct mail, email and web pages
Sources above the inversion layer – ski resorts, condo rental units and residential homes would be impacted	Exempt high elevation sources from the rule. DAQ has engaged EPA in this discussion.
Commercial, industrial and institutional food preparations that use solid fuels (pizza ovens, industrial meat smoking etc.) would shut down	Exempt these sources

Total Solid Fuel Ban Ramification	Resolution and Option(s)
Industrial solid fuel boilers and incinerators would be prohibited from operating	1) We are currently aware of only one operating solid fuel boiler. Existing units could be exempted. 2) A ban would be a disincentive to build waste-energy recovery systems because they could only operate during non-restricted periods. Permitted units could be exempted because they must meet BACT. May also have to meet MACT.
A seasonal ban would adversely impact the hearth industry. Consumers may stop purchasing appliances that could not be used.	1) There is no resolution for this consequence
Wood heat would not be a backup option during a power outage	1) The Director may use enforcement discretion during emergency conditions. 2) The rule may include a waiver for emergency conditions
Low income households may not be able to afford 100% use of gas or electricity for heating	The State may aggressively advertise the Low Income Home Energy Assistance Program. Some may adversely perceive the assistant program as charity and avoid it. Others may be challenged by the administrative process, for example undocumented immigrants are not eligible for heating assistance.
Wood shops, mills etc. would have to dispose of saw dust and scrap wood or store it until it could be burned	We do not have inventory knowledge for saw dust and scarp wood to determine if this is a consequential issue

The community multi-scaled air quality (CMAQ) air quality model was used to assess the potential improvement for the Hawthorne monitor by implementing this proposal for year 2015, the first year this proposal could effectively be implemented. Two scenarios were modeled; the first is the current area source controls with an 85% wood smoke compliance rate as presented in the SIP, and the second is where the wood smoke compliance is increased to 100% (wood smoke ban). The results of that modeling show that for 2015 at the Hawthorne monitoring site, the design value would be:

Current SIP modeling with current program (85% compliance): 37.2 $\mu g/m^3$

Current SIP modeling with complete ban (100% compliance): 35.5 $\mu g/m^3$

Meteorology (including temperature inversions) is the key to whether or not we exceed the air quality standard. During years when there are no inversions, we do not generally exceed the standard; and during years when there are multiple prolonged inversions, we routinely exceed the standard. By reviewing thirteen years of meteorological data, we are able to identify potential ban periods which could result in the most benefit and least risk of exceeding the standard (see two attached graphs).

Based on our review of the available monitoring, it appears that having such a ban from November 1 through March 15 would be the most conservative approach. However, it also appears that it might be appropriate to have different ban periods for different areas (i.e., beginning November 1 in Salt Lake County and November 15 in all other areas; or ending March 15 only in Cache County, and March 1 in all other areas) or exclude certain counties where the data does not support a ban.

It should also be noted that if a total ban is put in place, the current DAQ practice of calling Action Days from October 1 through the last inversion in early spring will continue in all areas. Action Days are not solely to prevent the use of solid fuel burning devices, but they are also used to alert the public to impending / existing poor air quality and encourage other actions that can be taken that have been shown to have a positive impact on air quality.

If proposed by the Board, besides the normal notice in the Utah State Bulletin, the following public notice seeking public comments on this proposal would be published in local newspapers and through social media as follows.

PUBLIC NOTICE
Proposed Seasonal Solid Fuel Burning Ban

As requested by Governor Gary Herbert, the Air Quality Board is seeking public comment on a proposal to ban solid fuel burning in fireplaces and wood/coal stoves from November 1 to March 15, beginning in November of 2015. The ban is being considered as one means of improving wintertime air quality along the Wasatch Front and in the Cache Valley.

The seasonal wood burning ban is being proposed because the Wasatch Front and the Cache Valley routinely violate the federal health-based standard for particulate matter, and solid fuel burning has been found to be a significant contributor to that problem. Additionally, these areas are well served with natural gas and electricity, both of which are significantly cleaner sources of energy for home heating.

The wood burning ban would apply to:

> Box Elder County: From the Wasatch Mountain range west to the Promontory Mountain range and south of Portage, with a possible exemption for sources above 7,000 ft. elevation.
>
> Cache County: Cache Valley
>
> Salt Lake and Davis counties: All areas, with a possible exemption for sources above 7,000 ft. elevation.
>
> Tooele County: From the northernmost part of the Oquirrh Mountain range to the northern most part of the Stansbury Mountain range and north of Route 199, with a possible exemption for sources above 7,000 ft. elevation.
>
> Weber and Utah counties: West of the Wasatch mountain range, with a possible exemption for sources above 7,000 ft. elevation.

Homeowners whose homes are heated solely by wood and are registered with the Division of Air Quality as a sole source residence would be permitted to continue heating with wood.

The Air Quality Board is specifically seeking comment on the appropriateness of having a single ban period applicable in all areas, or if each area (county or nonattainment area) could have a different ban period that could have the same air quality impact. It is also seeking comment on the possibility of exempting counties where data may not support such a ban.

The 40-day public comment period will be from January 1 to February 9, 2015. Public hearings will be held at:

Salt Lake location
Provo location
Davis County location
Ogden location
Logan location
Tooele location

Brigham City location
[DATES, TIMES AND LOCATIONS WILL BE INCLUDED IN THE NOTICE]

Oral and written comments will be considered equally. You may submit written comments via electronic mail to mberger@utah.gov, DAQ Rules Coordinator, or mailed to:

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

R307. Environmental Quality, Air Quality.
R307-302. Solid Fuel Burning Devices in Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber Counties.
R307-302-1. Purpose and Definitions.

(1) R307-302 establishes emission standards for fireplaces and solid fuel burning devices used in residential, commercial, institutional and industrial facilities and associated outbuildings used to provide comfort heating.

(2) The following additional definitions apply to R307-302:

"Sole source of heat" means the solid fuel burning device is the only available source of heat for the entire residence, except for small portable heaters.

"Solid fuel burning device" means fireplaces, wood stoves and boilers used for burning wood, coal, or any other nongaseous and non-liquid fuel, both indoors and outdoors, but excluding outdoor wood boilers, which are regulated under R307-208.

R307-302-2. Applicability.

(1) R307-302-3 and R307-302-6 shall apply to any solid fuel burning device in PM10 and PM2.5 nonattainment and maintenance areas as defined in 40 CFR 81.345 (July 1, 2011) and geographically described as all regions of Salt Lake and Davis counties; all portions of the Cache Valley; all regions in Weber and Utah counties west of the Wasatch mountain range; in Box Elder County, from the Wasatch mountain range west to the Promontory mountain range and south of Portage; and in Tooele County, from the northernmost part of the Oquirrh mountain range to the northern most part of the Stansbury mountain range and north of Route 199.

(2) R307-302-4 shall apply only within the city limits of Provo in Utah County.

(3) R307-302-5 shall apply in all portions of Box Elder, Cache, Davis, Salt Lake, Tooele, Utah and Weber counties.

(4) The following exemptions apply to R307-302:

(a) R307-302 does not apply to restaurant and institutional food preparation.

(b) R307-302 does not apply to commercial and industrial boilers subject to an approval order issued under R307-401.

(c) R307-302-3 and R307-302-6 do [~~does~~]not apply to sources located above 7000 feet in elevation within Box Elder, Davis, Salt Lake, Tooele, Utah and Weber counties.

(d) R307-302 does not apply to firefighting training devices that meet the definition of a solid fuel burning device.

R307-302-3. No-Burn Periods for Fine Particulate.

(1) By June 1, 2015, sole sources of residential heating using solid fuel burning devices must be registered with the director in order to be exempt during mandatory no-burn periods.

(2) When the ambient concentration of PM10 measured by the monitors in Salt Lake, Davis, Weber, or Utah counties reaches the level of 120 micrograms per cubic meter and the forecasted weather for the specific area includes a temperature inversion which is predicted to continue for at least 24 hours, the director will issue

a public announcement and will distribute such announcement to the local media notifying the public that a mandatory no-burn period for solid fuel burning devices and fireplaces is in effect. The mandatory no-burn periods will only apply to those areas or counties impacting the real-time monitoring site registering the 120 micrograms per cubic meter concentration. Residents, commercial, institutional and industrial facilities of the affected areas shall not use solid fuel burning devices or fireplaces except those that are the sole source of heat for the entire residence and registered with the director.

(3) PM10 Contingency Plan. If the PM10 Contingency Plan described in Section IX, Part A, of the State Implementation Plan has been implemented, the trigger level for no-burn periods as specified in R307-302-3(2) will be 110 micrograms per cubic meter for that area where the PM10 Contingency Plan has been implemented.

(4) Except when the seasonal burn ban in R307-302-6(3) is in effect, [~~W~~]when the ambient concentration of PM2.5 measured by monitors in Box Elder, Cache, Davis, Salt Lake, Tooele, Utah or Weber counties are forecasted to reach or exceed 25 micrograms per cubic meter, the director will issue a public announcement to provide broad notification that a mandatory no-burn period for solid fuel burning devices and fireplaces is in effect. The mandatory no-burn periods will only apply to those counties identified by the director. Residents, commercial, institutional and industrial facilities within the geographical boundaries described in R307-302-2(1) shall not use solid fuel burning devices or fireplaces except those that are the sole source of heat for the entire residence and registered with the director.

(5) PM2.5 Contingency Plan. Except when the seasonal burn ban in R307-302-6(3) is in effect, [~~I~~]if the PM2.5 contingency plan of the State Implementation Plan has been implemented, the trigger level for no-burn periods as specified in R307-302-3(4) shall be 15 micrograms per cubic meter for the area where the PM2.5 contingency plan has been implemented.

R307-302-4. No-Burn Periods for Carbon Monoxide.

(1) Beginning on November 1 and through March 1, the director will issue a public announcement and will distribute such announcement to the local media notifying the public that a mandatory no-burn period for solid fuel burning devices and fireplaces is in effect when the running eight-hour average carbon monoxide concentration as monitored by the state at 4:00 PM reaches a value of 6.0 ppm or more.

(2) In addition to the conditions contained in R307-302-4(1), the director may use meteorological conditions to initiate a no-burn period. These conditions are:

(a) A national weather service forecasted clearing index value of 250 or less;

(b) Forecasted wind speeds of three miles per hour or less;

(c) Passage of a vigorous cold front through the Wasatch Front; or

(d) Arrival of a strong high pressure system into the area.

(3) During the no-burn periods specified in R307-302-4(1) and (2), residents, commercial, institutional and industrial facilities

in Provo City shall not use solid fuel burning devices or fireplaces except those that are the sole source of heat for the entire residence and are registered with the director or the local health district office.

R307-302-5. Opacity for Heating Appliances.

Except during no-burn periods as required by R307-302-3 and 4, visible emissions from solid fuel burning devices and fireplaces shall be limited to a shade or density no darker than 20% opacity as measured by EPA Method 9, except for the following:

(1) An initial fifteen minute start-up period, and

(2) A period of fifteen minutes in any three-hour period in which emissions may exceed the 20% opacity limitation for refueling.

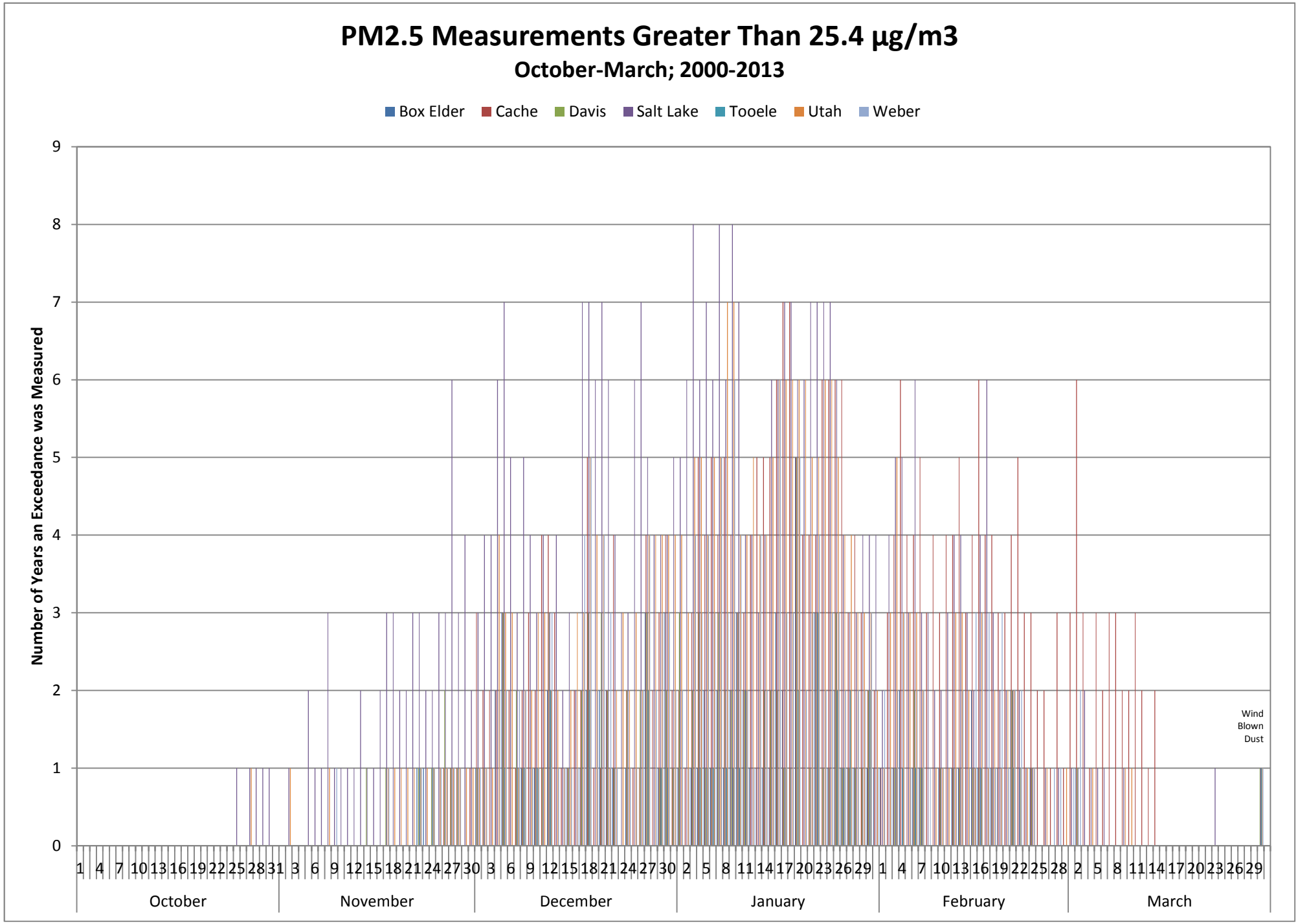
R307-302-6. Prohibition.

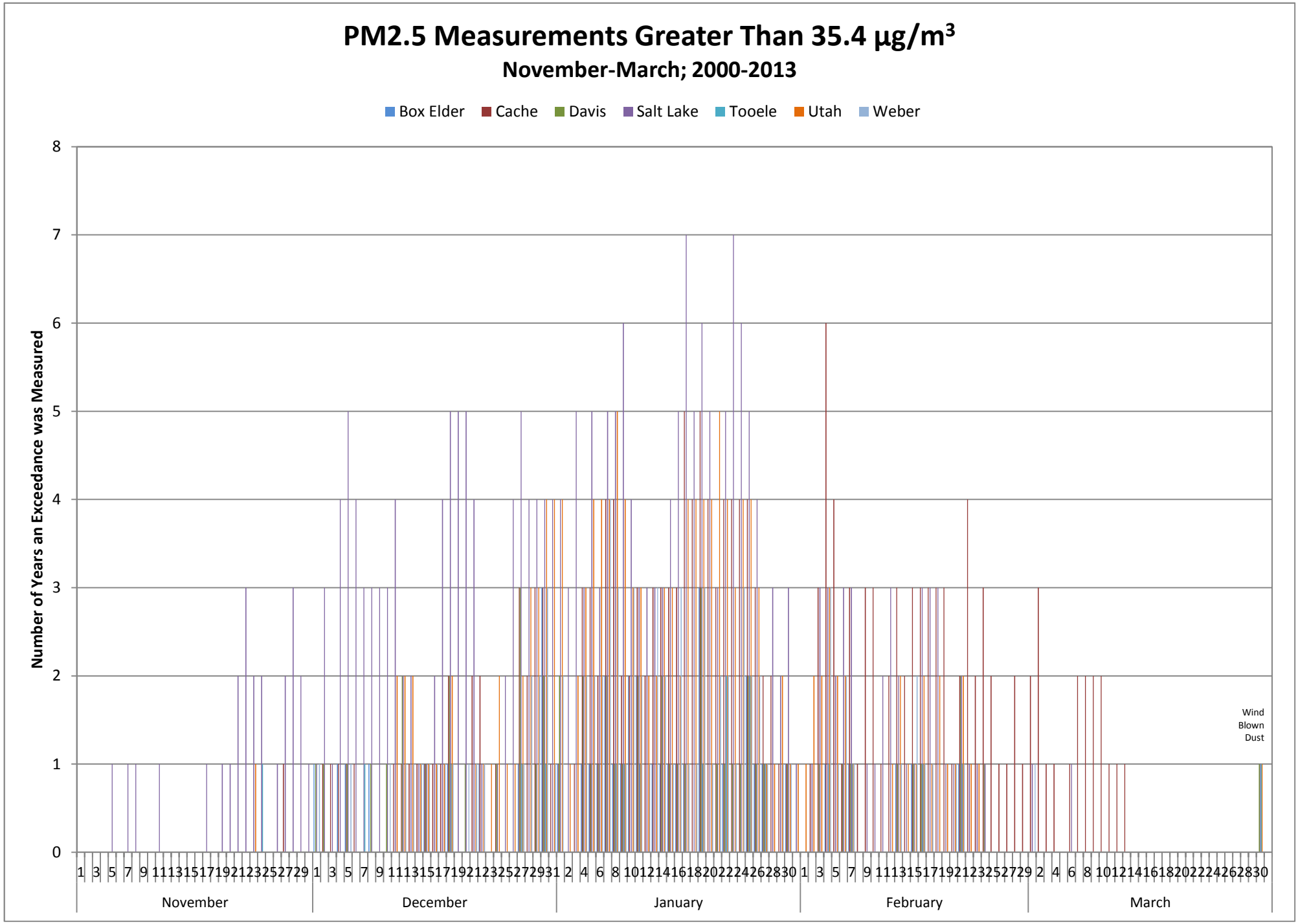
(1) Beginning September 1, 2013, no person shall sell, offer for sale, supply, install, or transfer a wood burning stove that is not EPA Phase 2 certified or a fireplace that is not EPA qualified.

(2) Ownership of a non EPA Phase 2 certified stove within a residential dwelling installed prior to March 6, 2014 may be transferred as part of a real estate transaction, so long as the unit remains intact within the real property of sale.

(3) Seasonal Burn Ban. From November 1 through March 15 of each year, residents, commercial, institutional and industrial facilities within the geographical boundaries described in R307-302-2 shall not use solid fuel burning devices or fireplaces except those that are the sole source of heat for the entire residence and registered with the director.

KEY: air pollution, fireplaces, stoves, solid fuel burning
Date of Enactment or Last Substantive Amendment: 2014
Notice of Continuation: June 2, 2010
Authorizing, and Implemented or Interpreted Law: 19-2-101; 19-2-104


PM2.5 Measurements Greater Than 25.4 µg/m3
October-March; 2000-2013
Box Elder
Cache
Davis
Salt Lake
Tooele
Utah
Weber
Number of Years an Exceedance was Measured
0
1
2
3
4
5
6
7
8
9
Wind Blown Dust
October
November
December
January
February
March


PM2.5 Measurements Greater Than 35.4 µg/m3
November-March; 2000-2013
Box Elder
Cache
Davis
Salt Lake
Tooele
Utah
Weber
Number of Years an Exceedance was Measured
0
1
2
3
4
5
6
7
8
Wind Blown Dust
November
December
January
February
March

Proposed Seasonal Burn Ban (R307-302) Hearings Schedule

Location	Date	Time	Hearing Officer
Tooele Tooele County Health Department, 151 N Main St., #181, Tooele	1/14/15 (Wed)	4:00PM	
Salt Lake City DEQ Board Room, 195 N 1950 W #1015, SLC	1/15/15 (Thu)	6:00PM	
Brigham City Bear River Health Department, 991 S 800 w, Conference Room B, Brigham City.	1/20/15 (Tue)	11:30AM	
Ogden Morgan Weber Health Dept., 477 23rd St, Auditorium, Ogden	1/20/15 (Tue)	5:00PM	
Logan Historic Court House, 199 N Main St, Cache County Council Chambers, Logan	1/21/15 (Wed)	4:00PM	
Farmington Davis County Administration Building, 61 S Main St, Farmington	1/28/15 (Wed)	10:00AM	
Provo Utah County Health Department, 151 S University Avenue, #1600, Provo	1/29/15 (Thu)	11:00AM	

ITEM 15

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-094-14

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Bill Reiss, Environmental Engineer

DATE: November 21, 2014

SUBJECT: PROPOSE FOR PUBLIC COMMENT: New Rule R307-311. Utah County: Trading of Emission Budgets for Transportation Conformity.

New rule R307-311 would affect the way the metropolitan planning organization (MPO) for Utah County is able to demonstrate that the emissions associated with transportation plans, programs, and projects conform to emission budgets established in the PM_{10} State Implementation Plan (SIP) for Utah County.

It would alleviate a problem demonstrating conformity to the NOx budget brought on by EPA's release of a new motor vehicle emissions simulator (MOVES) model. The new MOVES model replaces the older MOLBILE6 model which was used to develop the NOx budget in the 2002 PM_{10} SIP, and must be used by the MPO as it prepares its conformity demonstration. The new MOVES model predicts much more NOx from tailpipes than the old MOBILE6 model.

The proposed rule would allow the MPO to apply a potential surplus from its budget for direct PM_{10} to a commensurate shortfall in its budget for NOx, at a ratio of 1 to 1.

It would not, however, allow such trading in the opposite direction (e.g. to apply a surplus of NOx to a shortfall in direct PM_{10}).

The proposed rule would be essentially a duplication of R307-310 which allows the same type of trading when demonstrating transportation conformity to the PM_{10} SIP for Salt Lake County.

It's important to note that the problem brought on by the release of the new model is the same problem that staff had attempted to resolve at the September 3, 2014, Board meeting with a proposal to revise the 2002 PM_{10} SIP for Utah County. That revision had been prepared using mobile source emissions from MOVES,

and relied on EPA's "Policy Guidance on the Use of MOVES2010 and Subsequent Minor Revisions for State Implementation Plan Development, Transportation Conformity, and Other Purposes."

Comment was taken on that proposal and based on preliminary comments from EPA, as well as further discussions with Region 8, staff believes that the trading rule is a better solution to the problem at hand. A copy of the proposal is attached, as is documentation describing the technical basis for the proposed rule.

Staff Recommendation: Staff recommends the Board propose R307-311, Utah County: Trading of Emission Budgets for Transportation Conformity, for public comment.

R307. Environmental Quality, Air Quality.
R307-311. Utah County: Trading of Emission Budgets for Transportation Conformity.
R307-311-1. Purpose.

This rule establishes the procedures that may be used to trade a portion of the primary PM10 budget when demonstrating that a transportation plan, transportation improvement program, or project conforms with the motor vehicle emission budgets in the Utah County portion of Section IX, Part A of the State Implementation Plan, "Fine Particulate Matter (PM10)"

R307-311-2. Definitions.

The definitions contained in 40 CFR 93.101, effective as of the date referenced in R307-101-3, are incorporated into this rule by reference. The following additional definitions apply to this rule.

"Budget" means the motor vehicle emission projections used in the attainment demonstration in the Utah County portion of Section IX, Part A of the State Implementation Plan, "Fine Particulate Matter (PM10)."

"NOx" means oxides of nitrogen.

"Primary PM10" means PM10 that is emitted directly by a source. Primary PM10 does not include particulate matter that is formed when gaseous emissions undergo chemical reactions in the ambient air.

"Transportation Conformity" means a demonstration that a transportation plan, transportation improvement program, or project conforms with the emissions budgets in a state implementation plan, as outlined in 40 CFR, Chapter 1, Part 93, "Determining Conformity of Federal Actions to State or Federal Implementation Plans."

R307-311-3. Applicability.

(1) This rule applies to agencies responsible for demonstrating transportation conformity with the Utah County portion of Section IX, Part A of the State Implementation Plan, "Fine Particulate Matter (PM10)."

(2) This rule does not apply to emission budgets from Section IX, Part C.6 of the State Implementation Plan, "Carbon Monoxide Maintenance Plan."

R307-311-4. Trading Between Emission Budgets.

(1) The agencies responsible for demonstrating transportation conformity are authorized to supplement the budget for NOx with a portion of the budget for primary PM10 for the purpose of demonstrating transportation conformity for NOx. The NOx budget shall be supplemented using the following procedures.

(a) The metropolitan planning organization shall include the following information in the transportation conformity demonstration:

(i) The budget for primary PM10 and NOx for each required year of the conformity demonstration, before trading allowed by this rule has been applied;

(ii) The portion of the primary PM10 budget that will be used to supplement the NOx budget, specified in tons per day using a 1:1 ratio of primary PM10 to NOx, for each required year of the conformity

demonstration;

(iii) The remainder of the primary PM10 budget that will be used in the conformity demonstration for primary PM10, specified in tons per day for each required year of the conformity demonstration; and

(iv) The budget for primary PM10 and NOx for each required year of the conformity demonstration after the trading allowed by this rule has been applied.

(b) Transportation conformity for NOx shall be demonstrated using the NOx budget supplemented by a portion of the primary PM10 budget as described in (a)(ii). Transportation conformity for primary PM10 shall be demonstrated using the remainder of the primary PM10 budget described in (a)(iii).

(c) The primary PM10 budget shall not be supplemented by using a portion of the NOx budget.

KEY: air pollution, transportation conformity, PM10
Authorizing, and Implemented or Interpreted Law: 19-2-104

ITEM 16

Environmental Protection Agency Clean Power Plan Briefing

EPA Clean Power Plan (111(d))

Utah Air Quality Board

December 3, 2014

111(b) vs. 111(d)

- The Clean Air Act lays out distinct approaches for new and existing sources under Section 111:
  - Section 111 (b) is the federal program to address *new* sources by establishing standards.
  - Section 111 (d) is a state-based program for *existing* sources.
    - The EPA establishes guidelines
    - The states then design programs that fit in those guidelines and get the needed reductions

Previous proposals: New sources (111(b))

- Proposed Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units
  - Initially proposed April 13, 2012
  - Received 2.5 million comments
  - New proposal on September 20, 2013
  - Sets separate standards for coal and natural gas power plants in lbs CO_2/MWh:
    - Fossil fuel-fired utility boilers and integrated gasification combined cycle (IGCC) units:
      - 1,100 lb CO2/MWh gross over a 12-operating month period, or
      - 1,000-1,050 lb CO2/MWh gross over an 84-operating month period
    - Natural gas-fired stationary combustion units:
      - 1,000 lb CO2/MWh gross for larger units (>850 mmBtu/hr)
      - 1,100 lb CO2/MWh gross for smaller units (≤850 mmBtu/hr)

This year's proposal: Existing sources (111(d))

- Proposed Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (aka Clean Power Plan)
  - Proposed June 2, 2014
    - Issued a supplemental proposal to address power plants located in Indian Country and U.S. Territories on October 28, 2014 (includes Bonanza plant in Utah)
  - Projected to be finalized in June 2015

111(d): Best System of Emissions Reduction (BSER)

- Section 111 of the CAA requires that EPA identify the "best system of emission reduction… adequately demonstrated"
- States then make plans under 111(d) to achieve the reductions that result from the BSER
- For the Clean Power Plan, EPA identified a BSER based on four building blocks:
  - Block 1: average heat rate improvement of 6% for coal steam electric generating units (EGUs)
  - Block 2: dispatch to natural gas combined cycle (NGCC) units to get them to operate at a 70% capacity factor
  - Block 3: dispatch to renewable energy and existing and under construction nuclear generation
  - Block 4: increase demand-side energy efficiency to 1.5% annually

111(d): State Goals

- Using this BSER approach and a 2012 base year, EPA established interim (2020-2029) and final (2030) goals for each state in lbs CO2/MWh
- For Utah:
  - 2012 base year: 1,813 lbs/MWh
  - 2020-2029 interim goal: 1,378 lbs/MWh
  - 2030 final: 1,322 lbs/MWh
    - Current 2030 projected rate is 1,713 lbs/MWh for a compliance gap of 391 lbs/MWh (Source: Energy Strategies)
- Washington, DC, and Vermont do not have fossil plants and have no target
- Other state goals range from 214 lbs/MWh (Washington) to 1,783 lbs/MWh (North Dakota)

111(d): State Plans

- States can develop state-only or multi-state plans to meet their goals
  - Due one year after final rule for state-only plans
  - Due two years after final rule for multi-state plans
- States have the option to convert the rate-based goal to a mass-based goal
  - Useful for states contemplating a cap-and-trade program for compliance
- States don't have to use EPA's BSER building blocks if they can identify other ways meet the goals

111(d): Comment Development

- Comments were originally due October 16, 2014
  - Extended to December 1, 2014
- Office of Energy Development coordinated comments from Utah State with input from:
  - Office of the Governor
  - Department of Environmental Quality
  - Division of Public Utilities
  - Public Service Commission
  - Affected entities (e.g., utilities, generators, ratepayers, etc.)

111(d): Key Utah Comments

- 6% coal plant efficiency goal (Block 1) was based on a nationwide assessment; Utah's coal plants among the more efficient in the nation
- Lake Side 2 plant was erroneously categorized as "existing," but was "under construction"
  - Had the effect of overstating Block 2 redispatch potential
- Block 3 goal includes all Utah non-hydro renewable electricity (RE), but the proposal envisions RE to be credited where consumed
  - Since 60% of Utah RE generation is sold to California, this tightened Utah's Block 3 target without allowing that electricity to be counted towards compliance
  - State is seeking consistency in goal setting and flexible accounting for compliance purposes
    - PacifiCorp recently reported to the Public Utilities Technology Interim Committee (PUTIC) of the Legislature that it could meet its portion of Utah's 2030 goal through its current resource development plans so long as the final proposal allows flexibility in accounting for RE

111(d): Key Utah Comments (cont.)

- Interim goal creates unnecessary hurdles to reach 2030 goal
- Creates a new state plan development burden without explicitly providing resources to support DEQ
  - Comments seek a commitment from EPA to provide adequate resources without impacting existing core air quality programs
- Potentially places compliance tools like RE development and utility demand-side management (DSM) energy efficiency measures in a federally-enforceable "SIP-like" plan
  - Creates potential legal challenges
  - Impinges on Utah Public Service Commission (PSC) regulatory arena
  - State would prefer a "state commitment approach" under which "outside-the-fence" compliance measures like RE and energy efficiency would not be federally enforceable; State would commit to meet the goals associated with these measures
- Plan development and submittal timeframe is unrealistic (1-2 years)

111(d): Next Steps?

- Continue to communicate with EPA, other western states, and stakeholders
  - Colorado State University Center for the New Energy Economy (CNEE) hosting a series of state meetings to evaluate the proposal and potential compliance options
- Stakeholder process to assist in plan development

Questions?

STATE OF UTAH

GARY R. HERBERT
GOVERNOR

OFFICE OF THE GOVERNOR
SALT LAKE CITY, UTAH
84114-2220

SPENCER J. COX
LIEUTENANT GOVERNOR

December 1, 2014

Gina McCarthy
Administrator
U.S. Environmental Protection Agency
EPA Docket Center
William Jefferson Clinton Building West, Room 3334
1301 Constitution Avenue, N.W.
Washington, D.C. 20004

Dear Ms. McCarthy:

I am grateful for the opportunity to provide you with feedback regarding the proposed Clean Power Plan and the proposed carbon dioxide regulations for existing electricity generating units. As you are aware, regulation of the vast and complex electricity generating system for carbon dioxide raises serious legal, economic, and reliability concerns. The scope of this proposed regulation is unprecedented, affecting institutions and regulatory processes that have not previously been subject to the Environmental Protection Agency (EPA) under the Clean Air Act (CAA). Such a dramatic expansion of CAA authority warrants clear direction and clear legal authorization from Congress, which has not yet been granted. Understandably, the state of Utah has deep concerns about the legal basis for this proposal.

As you may know, coal is the dominant source of generating electricity in Utah, and has been so for decades. This is an industry, which supports thousands of well-paying jobs throughout the state, particularly in rural areas. Any transition away from this historically low-cost electricity source will have economic repercussions not just for the communities of those employed in the industry but throughout the state in the form of higher electricity prices.

It is also worth noting that Utah has concerns that the proposed rule unfairly penalizes the state because it does not recognize the efficiencies already reflected in its resource mix, or Utah's on-going efforts to advance portfolio diversification and energy efficiency. For example, Utah's coal fleet is among the most efficiently operated in the nation. Additionally, continued development of energy efficiency programs is well established in Utah, and we have realized much success through collaborative planning and deployment of new energy efficiency measures. On June 2, 2014, my Office of Energy Development released the "Utah Energy Efficiency and Conservation Plan," further reflecting the state's ability to collaboratively plan and implement successful energy efficiency opportunities to support deployment of new clean energy resources. Utah is deeply concerned that the

proposed rule will adversely interfere with the most effective and efficient opportunities for meeting its energy and environmental goals.

Aside from the legal and administrative concerns, the time frame allowed for this proposed regulation is extremely limited and will further exacerbate economic and logistic impacts of implementation. The proposed changes to the energy portfolio warrant a time frame that allows for adequate planning, development and deployment of new energy options that insulate the system from reliability shocks and provide for an affordable power supply.

While representatives of the EPA have made themselves available to discuss this proposal, those meetings have not resolved deep questions about fundamental aspects of the proposal. Unresolved questions about the implications of the proposal further impede the ability of the state to anticipate and prepare for the profound changes to the nation's electrical system apparently envisioned by the EPA. In light of the expansive scope, insufficient time frame, and the opacity of this proposal, the state of Utah requests that the EPA withdraw this proposal in preparation for Congressional action or a future proposal that would be more legally and practically sound.

In order to respond more extensively to your request for comments, I have asked Dr. Laura Nelson, director of the Utah Office of Energy Development, to provide a more detailed response on behalf of Utah. Her comments are attached.

Thank you for your receptivity to our concerns. We appreciate your outreach on the Clean Power Plan and any other issues that have a substantial impact on Utah.

Sincerely,

Gary R. Herbert
Governor

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Office of the Governor

CODY B. STEWART
Energy Advisor

DR. LAURA NELSON
Director, Office of Energy Development

December 1, 2014

Gina McCarthy
Administrator
U.S. Environmental Protection Agency
EPA Docket Center
1200 Pennsylvania Avenue Northwest
Washington D.C. 20460

RE: Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, Docket ID No. EPA-HQ-OAR-2013-0602

The State of Utah appreciates the opportunity to comment on the U.S. Environmental Protection Agency's (EPA) proposed Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units. Utah holds the position that state leadership and congressional action, rather than administrative rule, is required to properly address the complex and impactful issue of limiting greenhouse gas emissions. The EPA's proposal for regulating carbon dioxide emissions from existing electric generating units (EGU) is problematic and threatens the affordability, reliability and security of our state's and nation's power supply.

Utah has made extensive efforts to respond effectively to the proposed rule

Utah has expended significant time and resources to respond effectively to the EPA's proposed rule for regulating carbon dioxide emissions from existing power plants. Utah's Office of Energy Development, Department of Environmental Quality, and Division of Public Utilities have worked together to coordinate state efforts to address this extremely

broad proposal. Utah has held eight formal stakeholder meetings focused on Utah's power generation assets that would be covered by this rule. Utah has gathered input from technical, economic and legal experts to understand and analyze the far-reaching proposal. Potentially impacted locations have been toured, and local officials and economic developers consulted. Over forty meetings and teleconferences with affected groups have been held. Utah is working with consultants to develop state-specific modeling to better understand the numerous economic and technical challenges presented by the EPA's proposal.

The legality of the proposed rule is tenuous

The U.S. Environmental Protection Agency is not the appropriate body to develop new greenhouse gas laws of this scope. The unique qualities and widespread impact of new carbon rules require state leadership and congressional action. It is improper and legally defective for the EPA to drive energy policy and wide-spread changes to the U.S. power system. Given that the EPA possesses only the authority given to it by Congress, it is concerning that the EPA has ignored Supreme Court guidance to narrowly interpret its authority under the Clean Air Act (CAA) in developing this rule.[1]

The EPA's proposal is an unprecedented application of the Clean Air Act (CAA). The EPA has generally only applied the CAA Section 111 standards to direct power-plant emissions or "inside-the-fence" measures. These cost-effective actions, such as installing pollution controls, can be implemented directly by the regulated facility. The proposal mandates aggressive targets, which would almost certainly require "outside-the-fence" measures to achieve. These "outside-the-fence" measures include significant redispatch of power from coal to natural gas generation, renewable portfolio standards, and stringent energy efficiency. EPA has not established its legal authority to enforce "outside-the-fence" provisions. EPA also fails to justify its assignment of unequal carbon reduction targets to different states and does not adequately address the implications of this unequal treatment.

[1] Utility Air Regulatory Group v. Environmental Protection Agency, 573 U.S., U.S. Supreme Court Case, 2014.

This broad and complex proposal is inconsistent with many Federal Energy Regulatory Commission (FERC) and state utility rules, and its passage would create significant legal uncertainties. The proposed rule interferes with the prime responsibility of FERC and the North American Electric Reliability Corporation (NERC) to protect the reliability of the power system. Recent NERC analysis has questioned the proposal's assumptions and raised numerous concerns regarding the potential rule's impact on grid reliability.[2]

The EPA's broad interpretation of its authority to regulate carbon under the CAA unfairly shifts the cost of designing, implementing and enforcing this proposed federal rule to the states. Since the EPA has no existing carbon dioxide emission program for electricity generating units, the EPA is also shifting to the states the cost, uncertainty and risk of developing a new program. *Any proposal that shifts such burdens to the states must be accompanied by adequate resources for planning and implementation, and these resources should not come at the expense of a state's existing air quality programs.*

The EPA proposes to implement this rule through state implementation plans that would address such far-reaching topics as redispatch of power from coal to natural gas generation facilities, new renewable and nuclear generation, and energy efficiency programs. These state implementation plans, once approved by the EPA, would become federally enforceable. These federally enforceable implementation plans would conflict with the state's ability to pass timely and responsive legislation to protect and enhance its power system.

The enormous time and resources required to get a state implementation plan approved and amended by the EPA, as well as the administrative uncertainty, makes this interference with lawmaking authority all the more problematic. The EPA's proposed regulation of carbon dioxide emissions from EGU's through federally enforceable state implementation plans should be abandoned. *At the very least, the EPA should favor the so-called "state commitment approach" under which "state requirements for entities other than affected*

[2]http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/Potential_Reliability_Impacts_of_EPA_Proposed_CPP_Final.pdf

EGUs would not be components of the state plan and therefore would not be federally enforceable." [3]

States' rights over their resources should be protected

A state's authority to determine how it uses its natural resources is a central component of state sovereignty. The CAA recognizes states' primary authority over state resources. It is the appropriate and lawful precedent for the EPA to defer to states on resource decisions. The EPA should not make any unlawful assertions of authority regarding the allocation of resource attributes located within a state. While a state may choose under certain circumstances to agree to allocate an attribute of its resources to other states, this prerogative belongs to the states and not the EPA. Many factors lead to the development of a state's natural resources, including state tax credits, state infrastructure investment, and other state incentives. *Whenever state resources are involved, the EPA should defer to state authority to develop state agreements and plans that cooperatively address any reallocation of these resources or resource attributes.*

The process for developing the proposed rule has been insufficient

The EPA has not engaged states and Congress sufficiently in developing these proposed rules. Although the EPA has convened many meetings, it has not adequately addressed state concerns regarding this onerously complex, ambiguous and inconsistent proposal. The EPA proposal has officially requested feedback on nearly 150 substantive and interrelated issues. The broad impact and potential conflicts with existing law presented by each of these issues makes effective response difficult. Exacerbating this challenge, all of these issues are connected in such a way as to render adequate analysis of any one issue impossible unless it is known how the EPA will address related issues. While the EPA has made itself available to listen to concerns, it has been unable or unwilling to answer basic questions regarding the proposed rule and its intended meaning. The EPA's stated timetable for finalizing this rule

[3] https://www.federalregister.gov/articles/2014/06/18/2014-13726/carbon-pollution-emission-guidelines-for-existing-stationary-sources-electric-utility-generating#h-146

and the vagueness of the EPA's responses to state inquiries makes meaningful comment on the proposal challenging.

Under existing law, including the Administrative Procedure Act, a proposed rule should be sufficiently clear and consistent to enable a potentially affected entity to reasonably understand how it might be impacted. EPA's proposal fails to meet this requirement. *The State of Utah requests that this proposal be withdrawn and treated instead as a request for information from states and other affected parties.*

The proposed rule would cause significant economic harm without adequately demonstrating a meaningful reduction in targeted emissions

This proposed rulemaking unnecessarily and abruptly undermines the crucial role coal plays in our state's and nation's energy system. Coal is the workhorse of our power system. As the most significant, affordable and reliable source of base-load power, coal supports and enables the development of other energy resources and transportation alternatives such as electric vehicles. Coal became the foundation of our nation's power system because of its many benefits, including availability, affordability, and delivery advantages across a diverse energy system. This resource diversification provides a robust and flexible system for managing energy and environmental considerations. A significant reduction in coal utilization – the combined result of the proposal and several other regulations – in the absence of a viable, complementary and timely replacement, will adversely impact the deployment of energy alternatives, including those specifically identified in the proposal. The EPA has not adequately addressed how these essential advantages of coal power will be replaced.

The U.S. Energy Information Administration (EIA) estimated that coal provided 81 percent of 2013 electricity generation in Utah.[4] As an abundant domestic resource, coal sustains numerous communities through high-paying mining and energy jobs. Coal mining and fossil fuel electric power generation directly accounted for 2,737 jobs and 238 million dollars in wages in Utah in 2013, which were on average 211 percent of the state average.[5] (These

[4] U.S. Energy Information Administration, Electric Power Monthly, February 2014.
[5] Utah Department of Workforce Services data for NAICS categories 212112, 213113, and 221112 analyzed by the Utah Office of Energy Development

statistics reflect only direct employment in coal mining and fossil fuel electric power generation. They do not include employment created indirectly, or induced in other industries as a result of the direct employment.) According to the National Mining Association, coal is responsible for 14,570 direct and indirect jobs in Utah.[6] Fossil-fueled power generation facilities also account for a significant portion of the property tax base in several rural Utah counties.[7] As generally the most affordable power generation resource, coal-fired power supports a vibrant economy, including high-paying industrial and manufacturing jobs. Additionally, coal provides a higher quality of life to everyone through lower energy costs. Utah's average price of electricity over all sectors in 2013 was 8.2 cents per kWh, 19 percent lower than the national average.[8] This proposed rule underestimates and undervalues the critical role coal plays in our power system and economy.

By discouraging the further development and continued utilization of one of our nation's most abundant and affordable energy resources, this proposed rule would reduce the affordability and security of our fuel supply. The proposal has the potential to significantly increase electricity rates, which will negatively impact Utah's industrial, commercial, and residential consumers. National Economic Research Associates (NERA) has estimated that this regulation will cost between forty one and seventy three billion dollars a year.[9] Fourteen states, including Utah, are estimated to incur peak electricity price increases of more than twenty percent.[10] Impacts will be especially severe for economically disadvantaged and rural consumers. Considering these enormous costs, the federal government should consider as an alternative to this proposed regulation investing more heavily in cleaner coal technologies that would enable the further development of this critical national resource. Such investment would also enable the U.S. to become an exporter of advanced coal technology that would further reduce global carbon dioxide emissions.

By significantly reducing coal utilization at existing power plants, this proposed regulation will likely result in more volatile and expensive electricity prices. The EPA does not show,

---

[6] National Mining Association, http://www.countoncoal.org/states/
[7] Power generation and coal mines accounted for 16 & 79% of the property tax base of Carbon and Emery Counties in 2013, Utah State Tax Commission, Property Tax Division, 2013 Annual Statistical Report
[8] Utah Office of Energy Development, Dr. Peter Ashcroft, 2014.
[9] NERA Economic Consulting, *Potential Impacts of the EPA Clean Power Plan*, October 2014
[10] NERA Economic Consulting, *Potential Impacts of the EPA Clean Power Plan*, October 2014

however, that these regulations will significantly reduce global greenhouse gas emissions. While U.S. coal-fired power plants are generally cleaner and more efficient than foreign alternatives, the EPA's proposal would likely make these foreign power producers more attractive to some industries, encouraging greater utilization of unregulated coal power plants abroad. This would shift the economic advantages of coal to foreign markets rather than achieve the EPA's stated goal of reducing global greenhouse gas emissions. Currently in the U.S., 60,104 megawatts of electricity from 381 coal units in 36 states are scheduled for retirement.[11]

The EPA's proposed rate-based target for Utah carbon dioxide emissions contains significant errors

Utah's rate-based target contains serious errors. The Lake Side 2 natural gas power plant should not have been included as an existing unit in the state's building block two calculation because it was still under construction in 2012. *Instead, Lake Side 2 should be classified as "under construction" in calculating Utah's carbon dioxide emissions target.* Preliminary analysis suggests that correctly classifying the Lake Side 2 facility would change Utah's compliance target by 46 lbs CO_2/MWh.[12]

The EPA's proposed rate-based target for Utah carbon dioxide emissions places Utah's coal fleet at significant risk

The EPA's proposed rate-based 2030 carbon dioxide emissions target (1,322 lbs CO_2/MWh) for Utah, based on problematic and, in some instances, incorrect assumptions about Utah's 2012 power generation portfolio, could place enormous costs on Utah's power system, and greatly increases the risk of premature and costly decommissioning of Utah's coal-fired power plants. *EPA should allow the full value of existing coal plants to be realized before retirement.*[13] Utah's coal-fired power plants are among the most efficient and lowest emitting in the country. The EPA's approach of assigning different carbon dioxide emission targets to states could lead to the absurd result of preserving less clean, less efficient power plants at

[11] American Coalition for Clean Coal Electricity, Coal Unit Shutdowns as of Oct 23, 2014. Retirements and conversions are based on public announcements by the coal unit owners.
[12] Energy Strategies Utah 111(d) Compliance Modeling Analysis
[13] 79 Comments requested Federal Register 34926, (June 18, 2014)

the expense of cleaner, more efficient power plants based solely on the state in which the power plants operate. Utah rejects any scheme that would sideline a newer, more efficient Utah coal-fired power plant, while allowing more polluting plants in other states to continue operating.

The EPA must treat renewables consistently in state carbon emission baselines and targets

The EPA's treatment of renewable electricity further complicates the target calculation. The EPA used a state jurisdiction method to include renewable resources located in Utah in the state's rate-based target, but has since suggested allocating credit for Utah's renewables to out-of-state renewable power purchasers. Sixty percent of Utah's renewable electricity generation in 2012 was exported, inflating Utah's building block three target proportionally. Excluding exported renewable electricity from Utah's goal computation would reduce Utah's 2030 compliance gap by 56 lbs CO_2/MWh.[14] Utah is very concerned about this potentially inconsistent approach in allocating credits for renewables. *Consistency is required between how the EPA sets state carbon dioxide emission targets, and how states are allowed to meet those targets.* The EPA's inconsistent and unclear method for calculating the state's carbon dioxide emissions target impedes the State of Utah's ability to provide substantive feedback on the EPA's proposed rate-based target.

Many factors lead to construction of renewable electricity resources. Projects often receive numerous tax credits and other incentives in the state in which they are located. Additionally, renewable electricity generation represents the use of the state's natural resources that are then not available for other purposes. The EPA should be receptive to state plans that cooperatively allocate credit for such resources through mutual agreement between states that generate and use renewable electricity.

[14] Energy Strategies Utah 111(d) Compliance Modeling Analysis

The EPA determined baselines and available compliance options are unclear

The EPA does not provide adequate justification for using a single year of data, 2012, as the baseline for state carbon dioxide emissions. In the recently released EPA Notice of Data Availability, the EPA suggests other years, including 2010 and 2011, as potential baseline years. A single year will almost never be truly representative of a state's electric generating operations being subject to annual variations due to weather, outages, and other factors. *If the EPA is going to establish a representative baseline, states should be given the opportunity to choose representative baselines established from averaging various years, including three to five year averages.*

The EPA's compliance options are unclear

Although the EPA has provided examples of how a rate- or mass-based target might be calculated, the agency has not provided sufficient guidance on how it would implement either approach. *Despite the considerable legal and technical issues raised by a rate-based approach, states should be allowed the option of including new natural gas power plants as part of meeting rate-based requirements.*[15] *The EPA should clarify and justify how power generation facilities permitted under its proposed carbon dioxide emission rule for new power plants would be treated for purposes of complying with its proposed rule for existing power plants.* The EPA provides little guidance on this crucial issue, creating confusion about how its proposals for regulating carbon dioxide emissions from new, modified and reconstructed, and existing fossil fuel power plants will jointly operate.

The EPA's plan development and submittal timelines are unrealistic

The EPA's requirement that states submit a compliance plan one year after the rule is finalized is unrealistic. Traditional state implementation plans (SIPs) – analogous planning exercises with which states have considerable experience – have historically taken several

[15] Comments requested 79 Federal Register 34923-34924, (June 18, 2014)

years to develop. In addition, the proposed one-year planning horizon puts states in the position of including potential compliance measures in their plans that have not been approved by utility regulators. Furthermore, some potential compliance measures could require additional state legislative actions that would extend beyond the one year submittal deadline. *For these reasons, in the event that the EPA moves forward with the proposal, the agency should provide a more realistic timeframe for state plan development and submittal. The EPA should also allow states to establish their own path to achieving the 2030 goal. In addition, the EPA should allow states flexibility in establishing and reporting on milestones along this path. Finally, the EPA should allow states the flexibility to amend plans as needed to reflect new developments and changing conditions in the electricity market*.

The EPA's proposed compliance timelines are unreasonable

The implementation of the EPA's compliance tools, including heat-rate improvements and redispatch, is unrealistic and requires more time than is allowed under the proposed rule. This problem is particularly acute with respect to the interim compliance period (2020-2029), which may begin within a year of an approved plan. The proposed rule does not adequately address the time needed to facilitate new power generation, including natural gas, nuclear, and/or renewable power generation, nor does it address additional costs necessitated by the abrupt implementation schedule. The proposal also does not comport with the time required for state legislative and regulatory processes, in addition to the time required to comply with other federal regulations. Taken together these constraints make the time allowed for installing new technology, equipment and infrastructure unrealistic.

The EPA has not addressed the particular challenges in the West of developing new infrastructure such as transmission lines. Compared to other parts of the country, utilities in the West have large service territories with unique geographical challenges. Federal lands cover vast portions of Utah and other Western states, triggering additional planning and permitting requirements under the National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and other laws. The EPA's proposal does not appropriately consider these issues.

The EPA's assumptions in building Utah's rate-based target are problematic and inadequately supported

The EPA has built Utah's carbon dioxide emissions target using problematic assumptions that do not take into account the unique attributes of Utah's power generation system. These unsupported assumptions are included in the EPA's proposed building blocks. Taken as a whole, the EPA contends that these proposed building blocks constitute the best system of emissions reduction (BSER). The EPA does not justify this unprecedented expansion of the definition of a BSER under the Clean Air Act.

Building Block One issues

The EPA incorrectly assumes that coal plants can operate six percent more efficiently although they already have every reason to operate as efficiently as possible. The EPA has not sufficiently supported its assumption that a fleet-wide six percent heat rate improvement is possible.[16] The EPA's application of a six percent improvement to Utah is not based on any specific analysis of potential heat-rate improvements at Utah coal plants. Utah's coal plants have little, if any, room for significant additional improvements in efficiency. Consistent with a recent EPRI study, six percent efficiency improvements at Utah coal plants are not attainable.[17][18] Conducting their own unit-by-unit assessment of potential efficiency gains, Utah's plant operators concluded that potential improvements would be minimal at best.[19] Preliminary modeling suggests that a heat rate improvement of 1 percent across the Utah coal fleet will result in an overall reduction of the state's carbon dioxide emission rate of only 15 lbs CO_2/MWh, rather than the 100 lbs CO2/MWh projected by EPA.[20] In addition, many heat-rate improvement measures are simply recovering efficiency lost due to degradation from the original operating condition. According to Utah's plant operators,

[16] In its comments on EPA's Clean Power Plan, Edison Electric Institute (EEI) disagrees with EPA's estimate that a six-percent across the board heat-rate improvement is achievable. EEI represents all U.S. investor-owned electric companies.
[17] Comments requested 79 Federal Register 34860, (June 18, 2014)
[18] Comments requested 79 Federal Register 34862, (June 18, 2014)
[19] The 2014 PacifiCorp *Fossil Fuel Heat Rate Improvement Plan*, filed with the Public Service Commission, finds that a heat rate improvement of 1.3 percent is achievable between 2014 and 2023.
[20] Energy Strategies Utah 111(d) Compliance Modeling Analysis

achieving additional heat-rate improvements will be very costly and subject to the law of diminishing returns.

The proposed rule does not give credit for existing plant efficiencies. This approach penalizes power plants that have already made significant investments in cleaner, more efficient processes and technologies. Utah's coal-fired power plants are among the most efficient in the nation. Utah has the third best coal fleet in the country for emissions rate and should be rewarded for its investment in plant efficiencies.[21] Even after making the efficiency improvements proposed in block one, (improvements that are not feasible), twenty nine states would still have higher emission rates than Utah does today.[22] This result is patently unfair, resulting in less efficient power plants receiving unfair preference over Utah's more efficient power plants. The EPA's one-size fits all efficiency assumptions, and its assignment of different carbon reduction targets to each state will result in less efficient coal-fired power plants being preferred over Utah's more efficient coal-fired power plants. Along with the inherent unfairness of this approach, it is inconsistent with the EPA's stated goal of reducing overall greenhouse gas emissions.

There is not sufficient time to make the efficiency improvements envisioned under block one. Turbine upgrades are major undertakings requiring significant lead time. Based on the current time needed to site, permit and modify power plants, the EPA's timelines for heat-rate improvements are unreasonable.

Environmental controls such as selective catalytic reduction (SCR) actually reduce plant efficiency by creating additional parasitic load. Utah's affected EGUs already have environmental controls that reduce their efficiency, and face additional controls under current and future environmental requirements, including PM 2.5, mercury and ozone rules. It is important that proposed power plant improvements for carbon dioxide emissions do not conflict with or penalize power plants for compliance with other environmental regulations. *EPA should recognize that existing and pending environmental controls can decrease coal unit efficiency and should adjust targets to reflect this reality.*

[21] 20140602tsd-plant-level-data-unit-level-inventory, EPA
[22] 20140602tsd-plant-level-data-unit-level-inventory, EPA

The redispatch of natural gas plants ahead of coal plants envisioned under block two will negatively impact coal plant efficiency by requiring them to run at less than optimal capacity.[23] Coal-fired power plants heat-rate efficiency would be undermined by intermittently running at lower capacity factors and/or shutting down to comply with the proposed rule. For example, the net unit heat rate curve of one Utah EGU indicates that reducing the output of the unit by 20 percent as a result of redispatch will increase the heat rate (and reduce the unit efficiency) by almost 2 percent. *EPA should recognize that the redispatch of NGCC plants ahead of coal plants can negatively impact coal plant efficiency and should adjust the block 1 target accordingly.*

Heat rates will vary over time depending on capacity factors, maintenance, season, temperature and other factors, including dispatch. Dispatch may also be driven by out-of-state demand that is outside of Utah's control. *The EPA should determine appropriate heat rates based on unit-specific calculations that allow for reasonable adjustments over time to recognize and reward power plants that have already invested in efficiency upgrades.*

Building Block Two issues

The EPA's assumptions for redispatching power from coal to natural gas power plants are problematic. The EPA assumes that every natural gas combined-cycle power plant could operate at seventy percent capacity although only ten percent of these power plants operated at that level in 2012 during a time of historically low natural gas prices. Utilities add new resources as needed to meet load. The EPA's redispatch assumptions fail to properly account for the fact that recently-added NGCC facilities were constructed to meet projected load growth, rather than to serve as additional available capacity. There is little surplus capacity to reduce coal generation when growth projections are taken into account. *The EPA should use a lower targeted capacity factor (i.e., <70%) in developing block two targets to account for anticipated load growth.*

[23] Comments requested 79 Federal Register 34862, (June 18, 2014)

The EPA's use of nameplate capacity when developing block two targets is inappropriate, overstating the potential for redispatch to natural gas power plants. A power plant's actual operating capacity can be significantly lower than its name plate rating, especially at higher elevations or during high ambient temperatures. *The EPA should use the operating capacity of Utah NGCC units rather than nameplate capacity in evaluating the potential for redispatching NGCC ahead of coal.*

Redispatching power from coal to natural gas will create heat-rate inefficiencies at coal-fired power plants, thus reversing other heat-rate improvements. "Moving" units between operating points leads to additional heat rate penalties. In its assumptions on the carbon reductions possible from redispatch, the EPA has not accounted for the heat rate penalties created by moving to more natural gas generation. *The EPA should accurately account for heat rate penalties associated with the redispatch of NGCC ahead of coal.*

The EPA's plan for increasing the utilization of natural gas may place a significant strain on system reliability, including reserve requirements. Coal serves a crucial role in meeting system reserve requirements. Moreover, significant amounts of coal reserves can be stored on-site to ensure a dependable fuel supply. Increased reliance on natural gas will subject the power system to increased risk of fuel interruptions and pricing volatility because of the technical and economic challenges of storing natural gas.

The EPA has not addressed what additional natural gas infrastructure will be needed to supply the natural gas required for dramatic increases in natural gas power generation. Redispatch of natural gas for base load will likely require construction of new natural gas facilities and infrastructure in order to track demand and maintain system reserve requirements. As noted above, in the West this likely means significant additional environmental reviews to permit infrastructure projects on public lands.

The EPA has suggested that the Northern Tier Transmission Group (NTTG) could manage the regional redispatch of power envisioned under block two. However, NTTG has written

to the EPA to explain that NTTG has no authority or capability to implement building block two requirements.[24]

The EPA's assumptions regarding natural gas utilization may inhibit Utah's ability to effectively manage its air sheds. The EPA's assumptions for redispatching power from coal to natural gas generation may conflict with Utah's ability to comply with other CAA requirements. Utah's four NGCC plants are located in and adjacent to urban areas, including some currently designated nonattainment areas. While these plants are permitted – and not constrained by existing SIPs – to operate at the levels envisioned by the EPA under block two, they nonetheless contribute NOx emissions that are an important precursor to PM2.5. Moreover, the EPA is considering a more stringent ozone standard, creating additional uncertainty and constraints on meeting the EPA's assumptions regarding NGCC capacity factors. The EPA also fails to properly account for the efficiency penalties caused by NGCC emission reducing technologies. For example, some of Utah's NGCC plants include selective catalytic reduction (SCR) for NOx emissions control, which can further reduce plant efficiency. *The EPA must ensure that block two targets do not interfere with the ability of Utah to protect its air sheds and address existing and future air quality regulations.*

Redispatching to natural gas from coal will create winners and losers since not all utilities and/or generators in Utah own both types of plants. For example, one Utah utility operates the three largest NGCC plants in the state. Thus, redispatching to NGCC would require a large shift in generation from coal plants owned by several stakeholders to NGCC plants operated by a relative few. *The EPA should favor compliance mechanisms that don't create "winners and losers."*

The proposed rule assumes that most of the reductions in carbon dioxide emissions from redispatch can be realized by 2020. Recognizing that the EPA's assumptions regarding the gains achievable through redispatch are questionable, this timeline for redispatch is unrealistic. Specifically, the EPA has not adequately analyzed the technical or legal requirements of large-scale redispatch, nor has it addressed the infrastructure required to

[24] Comments requested 79 Federal Register 34910, (June 18, 2014)

support the increased fuel requirements. The time needed to site, permit and build the infrastructure and power plant projects suggested by the proposed rule far exceeds the EPA's proposed timelines. Furthermore, many generation resources provide support for system reliability by their very location. Reducing their operations or eliminating them altogether could cause significant reliability concerns to the grid, particularly in the West's sparsely populated areas.

The enormous challenge of meeting the EPA's timeline is further complicated by compliance with other federal requirements, including the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA). The EPA has not presented any plan or solution to address these issues.

Dispatch on a basis other than reliability and economics, as proposed by the EPA, is likely incompatible with current Utah law. Reconciling legal inconsistencies and responding to a variety of potential legal actions will further increase timelines.

Building Block Three issues

The assumed contribution of renewables to Utah's final carbon dioxide emission target is based on policy decisions, including renewable portfolio standards, made in other states that are outside Utah's control. These assumptions do not reflect the technical potential of renewable generation in Utah, and are not appropriate for Utah[25].

The proposed rule includes renewables located in Utah in setting Utah's 2030 target, but opens the possibility of allowing other states the ability to claim credit for Utah's renewable resources for compliance purposes. Inconsistency in how the EPA treats renewable resources results in a significant divergence between goal development and state compliance. *The EPA should adopt an approach that is consistent with regard to goal setting and compliance, while allowing states flexibility to establish agreements to utilize out-of-state renewable generation for compliance purposes.*

[25] Comments requested 79 Federal Register 34869, (June 18, 2014)

Most of Utah's customers are served by PacifiCorp, an investor-owned utility that operates in several Western states. Accounting for renewable credit based upon where the electricity is consumed is a very complex issue with many stakeholders and regulatory layers in multiple states. The EPA has been inconsistent in the proposed rule and subsequent guidance regarding how renewable energy will be credited, impeding Utah's ability to address options for different utility systems operating within the state. *In consultation with states, the EPA must adopt an approach that consistently and adequately addresses the legal, economic and technical implications of the renewable energy compliance option and preserves states' authority over the resources located within the states.*

The EPA has also been unclear on how other types of generation, including hydro and nuclear will be credited to states in meeting carbon dioxide emission targets. The EPA should provide clear standards for how each type of generation resource will be credited, and ensure that credit is consistent with goal setting.

Along with not providing sufficient clarity, the EPA has failed to justify allocating credit differently for various types of power generation. Uncertainty around this unequal and legally suspect treatment of different generation sources makes effective state regulation of an interconnected power system extremely challenging.

Building Block Four issues

The EPA's approach for calculating achievable efficiency savings is problematic.[26] The EPA's calculation of achievable efficiency savings are based on EIA-861 data, which include values reported by many different entities that may not be using consistent definitions of baselines or efficiency savings. EIA-861 historical data provides an unreliable basis for forecasts of future energy efficiency savings potential. *If energy efficiency savings are to be incorporated into the calculation of rate-based performance, the EPA must provide clear guidelines of acceptable evaluation, measurement and verification protocols.*[27] *In considering qualifying energy efficiency resources, the EPA should justify excluding any effective and commercially viable technology, such as combined heat and power.*

[26] Comments requested 79 Federal Register 34875, (June 18, 2014)
[27] Comments requested 79 Federal Register 34909, (June 18, 2014)

Although the persistence of energy savings will vary dramatically among different efficiency measures, the EPA assumes all measures will depreciate linearly over 20 years. This uniform rate is not representative of all efficiency measures. The proposal does not clearly recognize efficiency savings between 2012 and 2017,[28] which could create a disincentive for efficiency investments during these years. The proposal also effectively penalizes early actions taken before 2012. In many cases, these actions represent the most cost-effective efficiency savings opportunities. *The EPA should clearly recognize and reward energy efficiency savings between 2012 and 2017, and should recognize early actions on energy efficiency taken before 2012.*

The EPA's position on allocating credit for energy efficiency lacks clarity. Building block four is based on electricity generation within the state, rather than electricity use, despite the fact that state programs can only affect electricity use within the state. The EPA's approach would make states' ability to achieve efficiency targets dependent on efficiency measures implemented in other states. It would also impose higher efficiency savings requirements on electricity-exporting states as compared to electricity-importing states.[29] *The EPA should base efficiency goals on electricity use, not generation, to avoid penalizing electricity-exporting states.*

Energy efficiency measures are ultimately voluntary and cannot be used to specify future savings with the same certainty as other building blocks. The EPA should not interfere with a state's ability to encourage energy efficiency measures through state-led programs. Energy efficiency does not belong in federally enforceable state plans, which create significant legal conflicts and are, ironically, a very inefficient vehicle for delivering successful efficiency programs.

[28] Comments requested 79 Federal Register 34918, (June 18, 2014)
[29] Comments requested 79 Federal Register 34897, (June 18, 2014)

Utah asks the EPA to withdraw or reconsider its proposed rules for regulating carbon dioxide emissions from existing EGUs

The EPA does not have sufficient authority to drive transformative changes to the power system through administrative rule. The complex and far-reaching issue of reducing green-house gas emissions is best addressed by Congress and the states. The proposal is legally and technically problematic. The EPA's carbon reduction assumptions are thinly supported and inappropriate for Utah. The proposals unprecedented application of the CAA to the power sector is inadequately justified, and unfairly seeks to shift the enormous burden and risk of the proposal to the states.

The proposal undermines the crucial role coal plays in ensuring an affordable, reliable and secure power supply. It would cause significant harm without adequately showing a meaningful reduction in global green-house gas emissions. The proposal could significantly raise power costs harming the competitiveness of Utah's industry and economy. Consumers will face higher utility costs, disproportionately affecting lower-income and rural families. The State of Utah requests that this proposal be withdrawn or considered a request for information from states and other affected parties. Utah invites the EPA to engage in a more constructive process led by states and Congress to find legally sound, affordable, practical and effective approaches to reducing green-house gas emissions.

Sincerely,

Cody Stewart

Cody B. Stewart
Energy Advisor
Governor Gary R. Herbert
State of Utah

Summary of Key Recommendations

1. EPA should provide states resources for planning and implementation, and these resources should not come at the expense of states' existing air quality programs.
2. EPA should favor the so-called "state commitment approach" under which "state requirements for entities other than affected EGUs would not be components of the state plan and therefore would not be federally enforceable."
3. Whenever state resources are involved, the EPA should defer to state authority to develop state agreements and plans that cooperatively address any reallocation of these resources or resource attributes.
4. Lake Side 2 should be classified as "under construction" in calculating Utah's carbon dioxide emissions target.
5. EPA should allow the full value of existing coal plants to be realized before retirement.
6. Consistency is required between how the EPA sets state carbon dioxide emission targets and how states are allowed to comply with the targets.
7. If the EPA is going to establish a representative baseline, states should be given the opportunity to choose representative baselines established from averaging various years, including three to five year averages.
8. States should be allowed the option of including new natural gas power plants as part of meeting rate-based requirements.
9. EPA should clarify and justify how power generation facilities permitted under its proposed carbon dioxide emission rule for new power plants would be treated for purposes of complying with the proposed rule for existing power plants.
10. EPA should provide a realistic timeframe for state plan development and submittal.
11. EPA should modify the interim goal timeframe to allow a smooth glide path to achieving the 2030 goal.
12. EPA should allow states flexibility in establishing and reporting on milestones for the interim goal period.
13. EPA should allow states the flexibility to amend plans as needed to reflect new developments and changing conditions in the electricity market.
14. EPA should recognize that existing and pending environmental controls can decrease coal unit efficiency and should adjust targets to reflect this reality.
15. EPA should recognize that the redispatch of NGCC plants ahead of coal plants can negatively impact coal plant efficiency and should adjust the Block 1 target accordingly.
16. EPA should determine heat rate improvement potential based on unit-specific evaluation to recognize and reward plants that have already invested in efficiency upgrades.
17. EPA should use a lower targeted capacity factor (i.e., <70%) in developing Block 2 targets to account for anticipated load growth.
18. EPA should use the operating capacity of Utah NGCC units rather than nameplate capacity in evaluating the potential for redispatching NGCC ahead of coal.
19. EPA should accurately account for heat rate penalties associated with the redispatch of NGCC ahead of coal.
20. EPA must ensure that Block 2 targets do not interfere with the ability of Utah to address existing and future air quality regulations.
21. EPA should favor compliance mechanisms that don't create "winners and losers."

22. EPA should adopt an approach that is consistent with regard to goal setting and compliance, while allowing states flexibility in utilizing out-of-state renewable generation for compliance purposes.
23. EPA must adopt an approach that consistently and adequately addresses legal, economic and technical implications of renewable energy compliance options.
24. EPA should provide clarification on how renewables will be credited among states.
25. EPA should provide clarification on how new nuclear will be credited among states.
26. If energy efficiency savings are to be incorporated into calculation of rate-based performance, EPA should provide clear guidelines on acceptable evaluation, measurement, and verification protocols.
27. In considering qualifying energy efficiency resources, EPA should justify excluding any effective and commercially viable technology, such as combined heat and power.
28. EPA should clearly recognize and reward energy efficiency savings between 2012 and 2017 and should recognize early actions on energy efficiency taken before 2012.
29. EPA should base efficiency goals on electricity use, not generation, to avoid penalizing electricity-exporting states.

Air Toxics Compliance Monitoring

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQA-877-14

M E M O R A N D U M

TO: Air Quality Board

FROM: Bryce C. Bird, Executive Secretary

DATE: October 7, 2014

SUBJECT: Air Toxics, Lead-Based Paint, and Asbestos (ATLAS) Section Compliance Activities – September 2014

MACT Compliance Inspections	0
Asbestos Demolition/Renovation NESHAP Inspections	49
Asbestos AHERA Inspections	36
Asbestos State Rules Only Inspections	2
Asbestos Notifications Accepted	182
Asbestos Telephone Calls Answered	494
Asbestos Individuals Certifications Approved/Disapproved	34/1
Asbestos Company Certifications/Re-Certifications	0/2
Asbestos Alternate Work Practices Approved/Disapproved	14/0
Lead-Based Paint (LBP) Inspections	23
LBP Notifications Approved	1
LBP Telephone Calls Answered	112
LBP Letters Prepared and Mailed	66
LBP Courses Reviewed/Approved	0/0
LBP Course Audits	2
LBP Individual Certifications Approved/Disapproved	12/0

195 North 1950 West • Salt Lake City, Utah
Mailing Address: P.O. Box 144820 • Salt Lake City, Utah 84114-4820
Telephone (801) 536-4000 • Fax (801) 536-4099 • T.D.D (801) 536-4414
www.deq.utah.gov
Printed on 100% recycled paper

LBP Firm Certifications	6
Notices of Violation Issued	0
Compliance Advisories Issued	13
Warning Letters Issued	14
Settlement Agreements Finalized	2
Penalties Agreed to:	
Utah Correctional Industries	$2,700.00
D. C. Restoration, LLC	$ 937.50
	$3,637.50

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQA-1014-14

M E M O R A N D U M

TO: Air Quality Board

FROM: Bryce C. Bird, Executive Secretary

DATE: November 5, 2014

SUBJECT: Air Toxics, Lead-Based Paint, and Asbestos (ATLAS) Section Compliance Activities – October 2014

MACT Compliance Inspections	6
Asbestos Demolition/Renovation NESHAP Inspections	61
Asbestos AHERA Inspections	42
Asbestos State Rules Only Inspections	8
Asbestos Notifications Accepted	194
Asbestos Telephone Calls Answered	528
Asbestos Individuals Certifications Approved/Disapproved	92/4
Asbestos Company Certifications/Re-Certifications	1/2
Asbestos Alternate Work Practices Approved/Disapproved	17/0
Lead-Based Paint (LBP) Inspections	22
LBP Notifications Approved	4
LBP Telephone Calls Answered	98
LBP Letters Prepared and Mailed	134
LBP Courses Reviewed/Approved	1/1
LBP Course Audits	0
LBP Individual Certifications Approved/Disapproved	25/0

195 North 1950 West • Salt Lake City, Utah
Mailing Address: P.O. Box 144820 • Salt Lake City, Utah 84114-4820
Telephone (801) 536-4000 • Fax (801) 536-4099 • T.D.D (801) 536-4414
www.deq.utah.gov
Printed on 100% recycled paper

LBP Firm Certifications	10
Notices of Violation Issued	0
Compliance Advisories Issued	3
Warning Letters Issued	4
Settlement Agreements Finalized	1
Penalties Agreed to:	
Wind River Excavation	$900.00

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQC-1212-14

M E M O R A N D U M

TO: Air Quality Board

FROM: Bryce C. Bird, Executive Secretary

DATE: October 8, 2014

SUBJECT: Compliance Activities – September 2014

Annual Inspections Conducted:

Major..... 15
Synthetic Minor 2
Minor 27

On-Site Stack Test Audits Conducted: 7

Stack Test Report Reviews:..... 39

On-Site CEM Audits Conducted: 3

Emission Reports Reviewed: 0

Temporary Relocation Requests Reviewed & Approved:..... 4

Fugitive Dust Control Plans Reviewed & Accepted:..... 103

Soil Remediation Report Reviews:..... 1

[1]Miscellaneous Inspections Conducted:..... 46

Complaints Received: 21

Breakdown Reports Received:..... 0

195 North 1950 West • Salt Lake City, Utah
Mailing Address: P.O. Box 144820 • Salt Lake City, Utah 84114-4820
Telephone (801) 536-4000 • Fax (801)536-4099 • T.D.D. (801) 536-4414
www.deq.utah.gov
Printed on 100% recycled paper

Compliance Actions Resulting From a Breakdown..... 0
Warning Letters Issued: 1

Notices of Violation Issued:..... 0

Compliance Advisories Issued:..... 4

Settlement Agreements Reached: 2

Utah Metal Works..... $4,009
Hoyt Archery $3,863

[1]Miscellaneous inspections include, e.g., surveillance, level I inspections, VOC inspections, complaints, on-site training, dust patrol, smoke patrol, open burning, etc.

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQC-1368-14

M E M O R A N D U M

TO: Air Quality Board

FROM: Bryce C. Bird, Executive Secretary

DATE: November 13, 2014

SUBJECT: Compliance Activities – October 2014

Annual Inspections Conducted:

Major..... 4
Synthetic Minor 1
Minor 8

On-Site Stack Test Audits Conducted: 10

Stack Test Report Reviews:..... 43

On-Site CEM Audits Conducted: 6

Emission Reports Reviewed: 22

Temporary Relocation Requests Reviewed & Approved:..... 9

Fugitive Dust Control Plans Reviewed & Accepted:..... 64

Open Burn Permits Issued During Fall 2014..... 1,618

Soil Remediation Report Reviews:..... 3

[1]Miscellaneous Inspections Conducted:..... 35

Complaints Received:..... 22

195 North 1950 West • Salt Lake City, Utah
Mailing Address: P.O. Box 144820 • Salt Lake City, Utah 84114-4820
Telephone (801) 536-4000 • Fax (801)536-4099 • T.D.D. (801) 536-4414
www.deq.utah.gov
Printed on 100% recycled paper

Breakdown Reports Received:..... 0

Compliance Actions Resulting From a Breakdown..... 0

Warning Letters Issued: 0

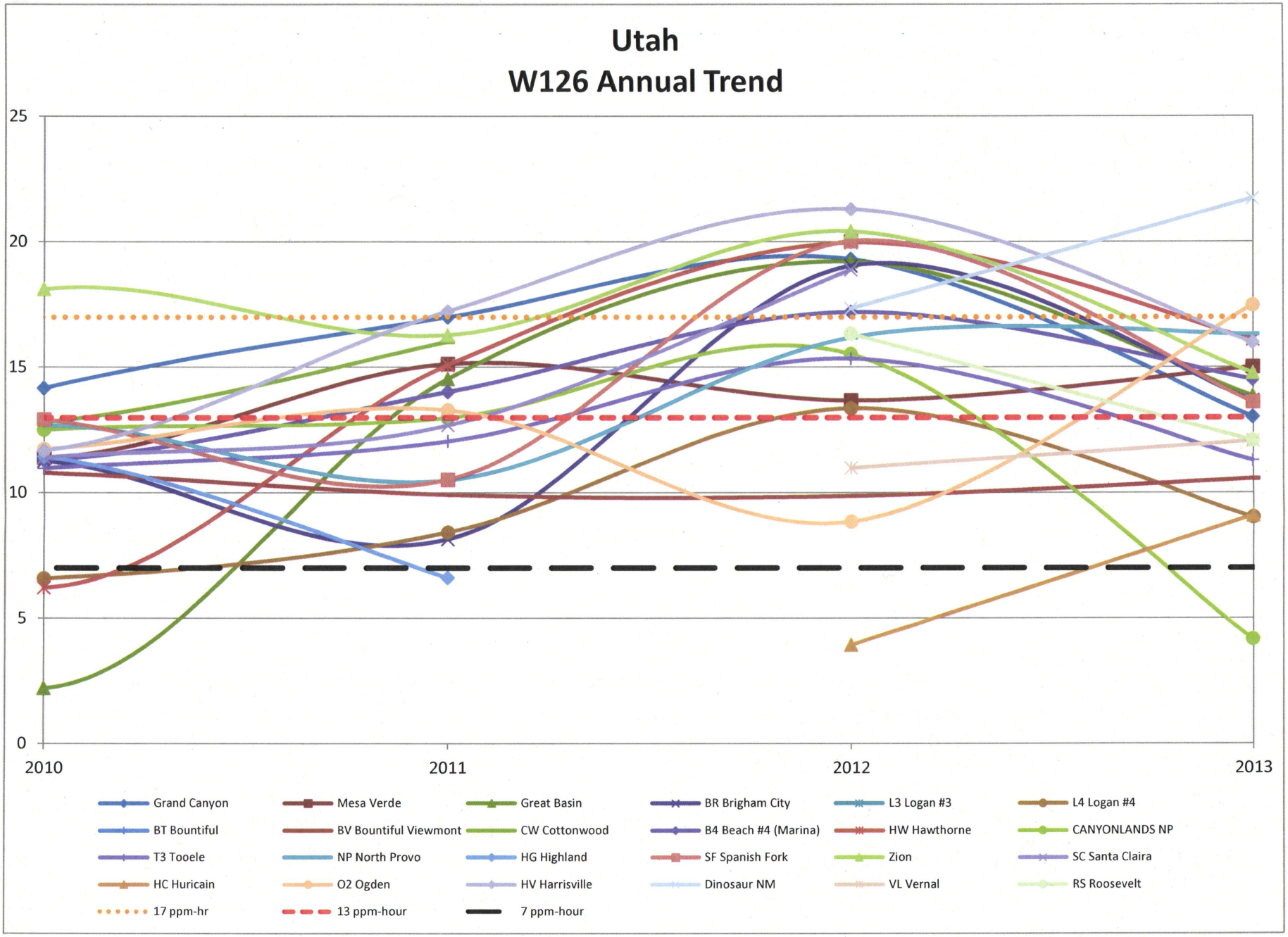
Notices of Violation Issued:..... 0

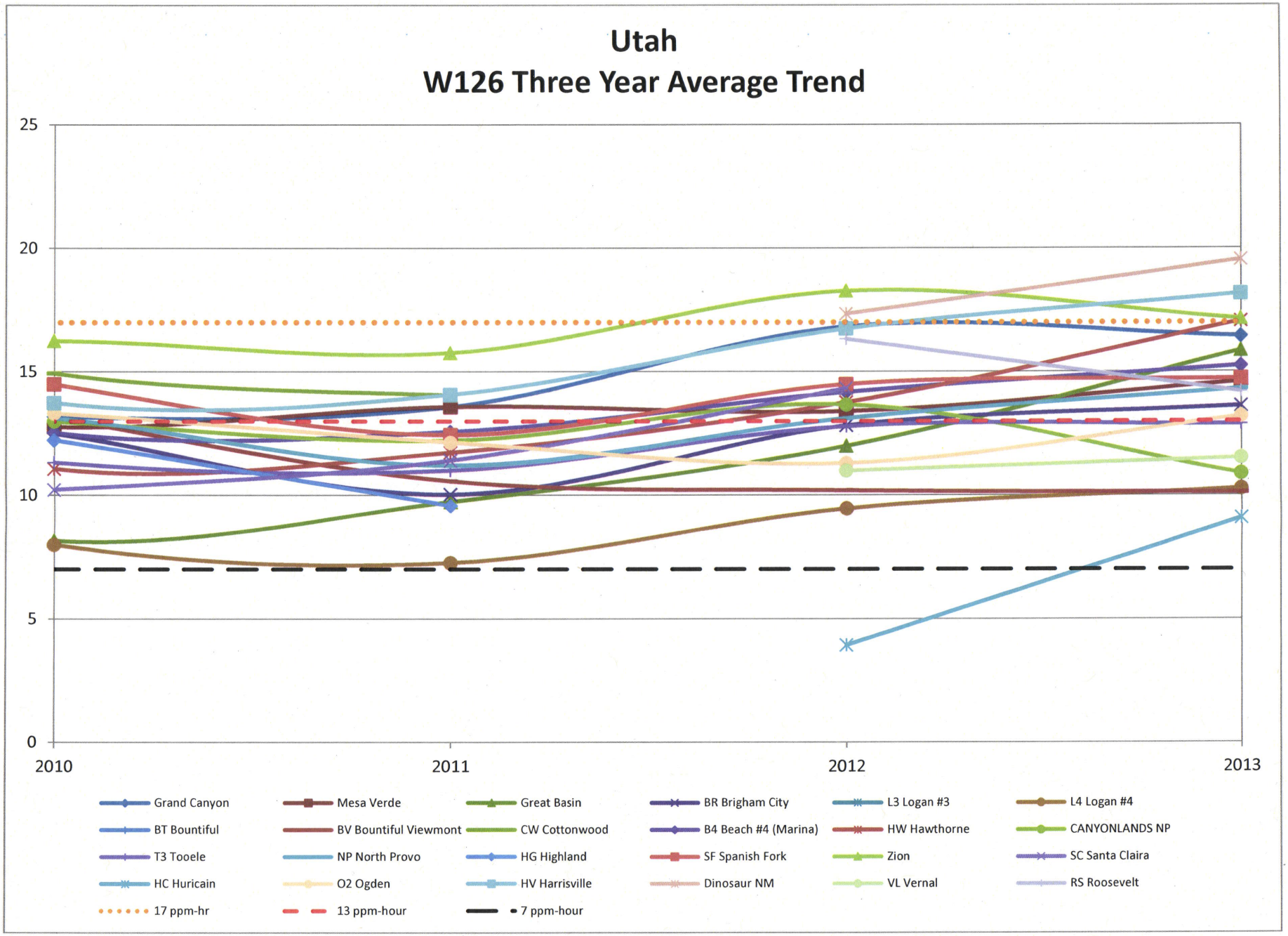
Compliance Advisories Issued:..... 7

Settlement Agreements Reached: 1

Geary Construction $2,160

[1]Miscellaneous inspections include, e.g., surveillance, level I inspections, VOC inspections, complaints, on-site training, dust patrol, smoke patrol, open burning, etc.


Utah
W126 Annual Trend
25
20
15
10
5
0
2010
2011
2012
2013
Grand Canyon
Mesa Verde
Great Basin
BR Brigham City
L3 Logan #3
L4 Logan #4
BT Bountiful
BV Bountiful Viewmont
CW Cottonwood
B4 Beach #4 (Marina)
HW Hawthorne
CANYONLANDS NP
T3 Tooele
NP North Provo
HG Highland
SF Spanish Fork
Zion
SC Santa Claira
HC Huricain
O2 Ogden
HV Harrisville
Dinosaur NM
VL Vernal
RS Roosevelt
17 ppm-hr
13 ppm-hour
7 ppm-hour


Utah
W126 Three Year Average Trend
25
20
15
10
5
0
2010
2011
2012
2013
Grand Canyon
Mesa Verde
Great Basin
BR Brigham City
L3 Logan #3
L4 Logan #4
BT Bountiful
BV Bountiful Viewmont
CW Cottonwood
B4 Beach #4 (Marina)
HW Hawthorne
CANYONLANDS NP
T3 Tooele
NP North Provo
HG Highland
SF Spanish Fork
Zion
SC Santa Claira
HC Huricain
O2 Ogden
HV Harrisville
Dinosaur NM
VL Vernal
RS Roosevelt
17 ppm-hr
13 ppm-hour
7 ppm-hour

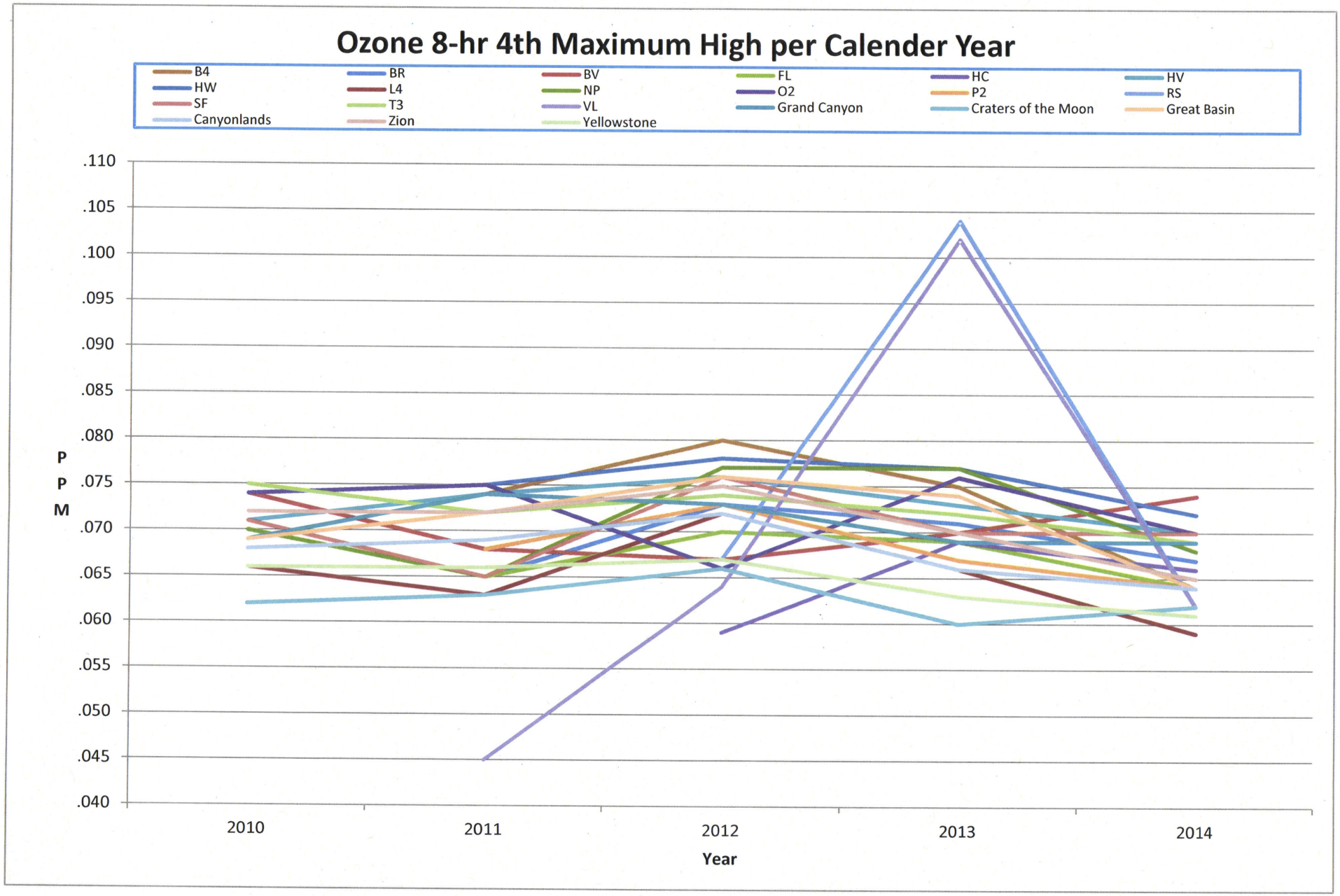
Ozone 8-hr Average Summary

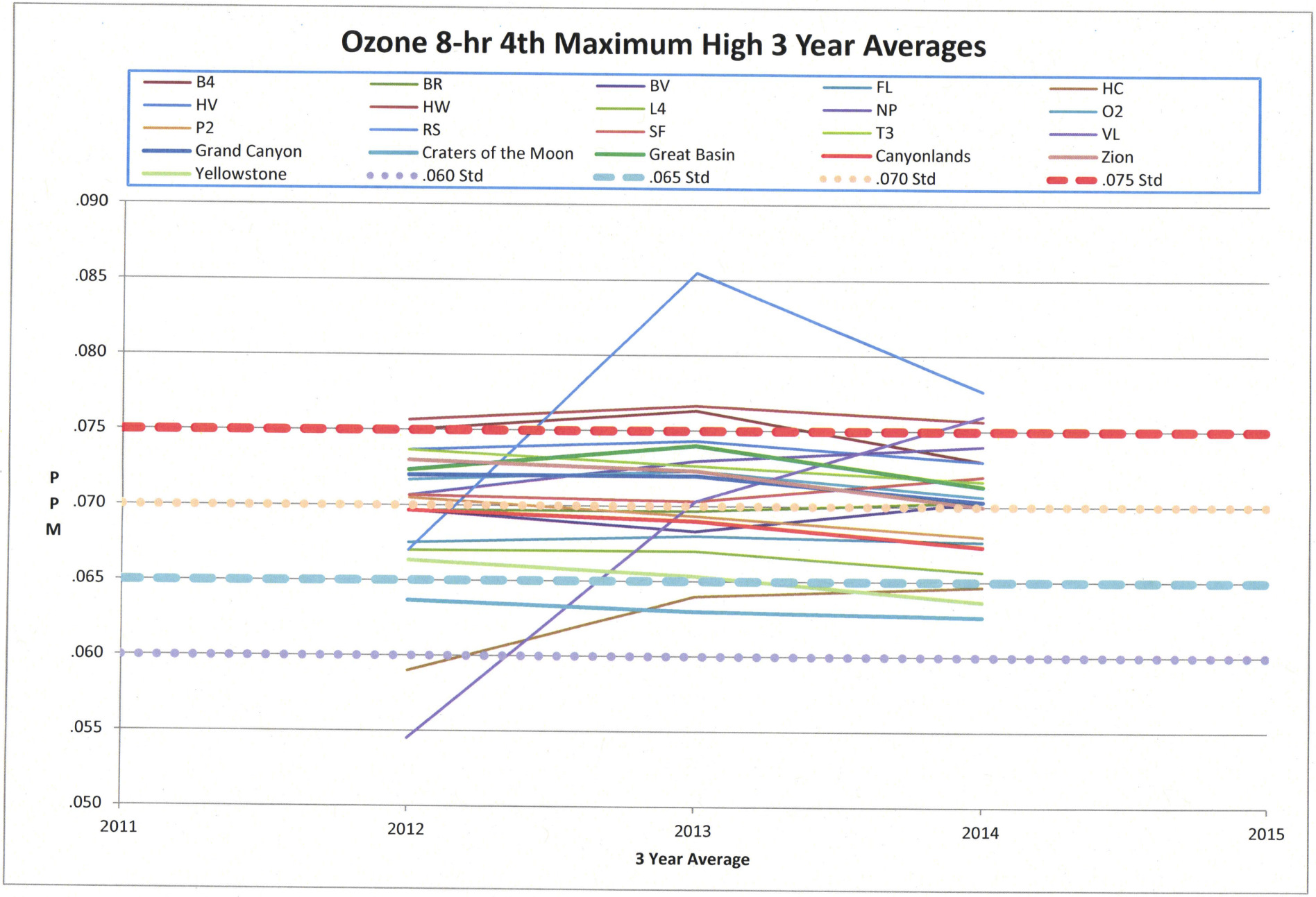
4th maximum per calender year

	B4	BR	BV	FL	HC	HV	HW	L4	NP	O2	P2	RS	SF	T3	VL	Grand Canyon	Craters of the Moon	Great Basin	Canyonl ands	Zion	Yellowst one
																National Parks					
2010	.071	.071	.074			.071	.074	.066	.070	.074			.071	.075		.069	.062	.069	.068	.072	.066
2011	.074	.065	.068	.065		.074	.075	.063	.065	.075	.068		.065	.072	.045	.074	.063	.072	.069	.072	.066
2012	**.080**	.073	.067	.070	.059	**.076**	**.078**	.072	**.077**	.066	.073	.067	**.076**	.074	.064	.073	.066	**.076**	.072	.075	.067
2013	.075	.071	.070	.069	.069	.073	**.077**	.066	**.077**	**.076**	.067	**.104**	.070	.072	**.102**	.069	.060	.074	.066	.070	.063
2014	.064	.067	.074	.064	.066	.070	.072	.059	.068	.070	.064	.062	.070	.069	.062	.069	.062	.064	.064	.065	.061

3 Year average Ozone 8-hr Summary

Year Av	Station																					Proposed			Current
Ending	B4	BR	BV	FL	HC	HV	HW	L4	NP	O2	P2	RS	SF	T3	VL	Grand Canyon	Craters of the Moon	Great Basin	Canyonl ands	Zion	Yellowst one	.060 Std	.065 Std	.070 Std	.075 Std
2011																						.060	.065	.070	.075
2012	.075	.070	.070	.068	.059	.074	**.076**	.067	.071	.072	.071	.067	.071	.074	.055	.072	.064	.072	.070	.073	.066	.060	.065	.070	.075
2013	**.076**	.070	.068	.068	.064	.074	**.077**	.067	.073	.072	.069	**.086**	.070	.073	.070	.072	.063	.074	.069	.072	.065	.060	.065	.070	.075
2014	.073	.070	.070	.068	.065	.073	**.076**	.066	.074	.071	.068	**.078**	.072	.072	**.076**	.070	.063	.071	.067	.070	.064	.060	.065	.070	.075
2015																						.060	.065	.070	.075


Ozone 8-hr 4th Maximum High per Calender Year
B4
BR
BV
FL
HC
HV
HW
L4
NP
O2
P2
RS
SF
T3
VL
Grand Canyon
Craters of the Moon
Great Basin
Canyonlands
Zion
Yellowstone
.110
.105
.100
.095
.090
.085
.080
.075
.070
.065
.060
.055
.050
.045
.040
PPM
2010
2011
2012
2013
2014
Year


Ozone 8-hr 4th Maximum High 3 Year Averages
B4
BR
BV
FL
HC
HV
HW
L4
NP
O2
P2
RS
SF
T3
VL
Grand Canyon
Craters of the Moon
Great Basin
Canyonlands
Zion
Yellowstone
.060 Std
.065 Std
.070 Std
.075 Std
.090
.085
.080
.075
.070
.065
.060
.055
.050
PPM
2011
2012
2013
2014
2015
3 Year Average