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-067-14(a)

UTAH AIR QUALITY BOARD MEETING

FINAL AGENDA

Wednesday, September 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: October 1, 2014

III. Approval of the Minutes for August 6, 2014, Board Meeting.

IV. Final Adoption: Amend R307-342-3. Adhesives and Sealants. Exemptions. Presented by Mark Berger.

V. Propose for Public Comment: 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.

VI. Propose for Public Comment: 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.

VII. Propose for Public Comment: 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.

VIII. Propose for Public Comment: 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.

IX. Propose for Public Comment: Amend SIP Subsection IX.A.3. Control Measures for Area and Point Sources, Fine Particulate Matter, Utah County. Presented by Bill Reiss.

X. Propose for Public Comment: 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.

XI. Propose for Public Comment: Amend R307-121. General Requirements: Clean Air and Efficient Vehicle Tax Credit. Presented by Mark Berger.

XII. Propose for Public Comment: New Rule R307-125. Clean Air Retrofit, Replacement, and Off-Road Technology Program. Presented by Mark Berger.

XIII. 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.

XIV. Informational Items.
   A. Air Toxics. Presented by Robert Ford.
   B. Compliance. Presented by Jay Morris and Harold Burge.
   C. Monitoring. Presented by Bo Call.
   D. 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

UTAH AIR QUALITY BOARD MEETING
August 6, 2014 – 1:30 p.m.
195 North 1950 West, Room 1015
Salt Lake City, Utah 84116

DRAFT MINUTES

I. Call-to-Order

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

Board members present: Kerry Kelly, Robert Paine, Amanda Smith, Michael Smith, Karma Thomson, Erin Mendenhall, and Kathy Van Dame

Excused: Steve Sands and Tammie Lucero

Executive Secretary: Bryce Bird

II. Date of the Next Air Quality Board Meeting: September 3, 2014

III. Approval of the Minutes for July 2, 2014, Board Meeting.

- Karma Thomson moved to approve the minutes as submitted. Erin Mendenhall seconded. The Board approved favorably with Kathy Van Dame absent.

IV. Final Adoption: Amend R307-101-3. General Requirements. Version of Code of Federal Regulations Incorporated by Reference. Presented by Mark Berger.

Mark Berger, Environmental Planning Coordinator at DAQ, stated that on May 7, 2014, the Board proposed R307-101-3, General Requirements, Version of Code of Federal Regulations (CFR) Incorporated by Reference, for public comment. The proposed amendment was to incorporate the July 1, 2013, version of the CFR into the rule. A public comment period was held, during which no comments were received and no hearing was requested. There are several Air Quality Rules that incorporate the version of the CFR referenced in R307-101-3. By updating R307-101-3 every year, the rules that reference the version of the CFR referenced in the rule get updated with only one rule amendment. Staff recommends the Board adopt R307-101-3 as proposed.

In response to clarification of acronyms, staff explained that HMIWI refers to a hospital medical infectious waste incinerator and that Stericycle is currently the only facility in Utah that DAQ would regulate for this type of incinerator. Furthermore, this is a section of the CFR that applies to HMIWIs that were constructed after 1986 and so this change would not apply to Stericycle. Also, SSM refers to startup, shutdown, and malfunction periods.

- Robert Paine moved for final adoption to amend R307-101-3, General Requirements, Version of Code of Federal Regulations Incorporated by Reference. Michael Smith seconded. The Board approved favorably with Kathy Van Dame absent.

V. Final Adoption: Amend R307-214. National Emission Standards for Hazardous Air Pollutants. Presented by Mark Berger.

Mark Berger, Environmental Planning Coordinator at DAQ, stated that the Board's proposal to amend R307-214, National Emission Standards for Hazardous Air Pollutants (NESHAPs), to be updated to incorporate the July 1, 2013, version of the 40 CFR parts 61 and 63 has gone through a 30-day public comment period. This proposed amendment incorporates changes made to the NESHAPs published in the CFR since the last time the rule was updated. During the public comment period no comments were received and no hearing was requested. Staff recommends the Board adopt R307-214 as proposed.

- Karma Thomson moved for final adoption to amend R307-214, National Emission Standards for Hazardous Air Pollutants, as proposed. ErinMendenhall seconded. The Board approved favorably with Kathy Van Dame absent.

Kathy Van Dame enters the meeting.

VI. Final Adoption: Amend R307-401-12. Reduction in Air Contaminants; Amend R307-410-2. Definitions; Amend R307-410-6. Stack Heights and Dispersion Techniques. Presented by Mark Berger.

Mark Berger, Environmental Planning Coordinator at DAQ, stated that on May 7, 2014, the Board proposed for public comment amendments to these three rules to address EPA's February 4, 2014, disapproval of the three rules. The proposed rules were made available for a 30-day public comment period, during which no comments were received and no hearing was requested. Staff feels confident that the proposed changes address EPA's concerns and are approvable. Staff recommends the Board adopt R307-401-12, R307-410-2, and R307-410-6 as proposed

Staff responded that the "1.3 times the height of an adjacent building structure" requirement in R307-410-2 comes directly from the CFR and has been a long standing provision in our rules which comes directly from EPA. It is to ensure that a really tall stack was not used to prevent the installation of pollution controls. Furthermore, the only change that was made to this rule was to add language to ensure that if a good engineering practice stack height demonstration was completed, that it would go through the public comment process for the approval order. EPA's concern was that it is not explicitly required by the rule and this rule change now clarifies our process that ensures that if one of these demonstrations were completed it would be included in the engineering review and be available for public review as part of the normal public comment process.

- Kathy Van Dame moved for final adoption of R307-401-12, Reduction in Air Contaminants, R307-410-2, Definitions, and R307-410-6, Stack Heights and Dispersion Techniques. Robert Paine seconded. The Board approved unanimously.

Staff explained the purpose of these rule changes was that EPA was addressing changes that had been made to DAQ's permitting rules over a long period of time, some back as early as 1997. When the new source review reform was put in place DAQ did some restructuring of its rules over many years and EPA's action was to disapprove the restructured rules. The changes in these particular rules DAQ has viewed as not substantive and that by making the changes it will address EPA's clarifying concerns and make the rules fully approvable.

VII. Danish Flats Environmental Services Early Settlement Agreement. Presented by Jay Morris.

Jay Morris, Minor Source Compliance Section Manager at DAQ, stated that Danish Flats Environmental Services owns evaporation ponds near Cisco, Utah that are used to dispose of water processed from oil and gas wells. This facility was originally constructed as a deminimus source of emissions but quickly grew as demand for this process increased. The DAQ issued Danish Flats Environmental Services a compliance advisory on October 3, 2013, for failing to submit a notice of intent and receiving an approval order for this expanding facility. Since the compliance advisory was issued, Danish Flats Environmental Services has submitted a complete notice of intent and an approval order was issued on August 4, 2014, bringing the source back into compliance. An early settlement agreement was sent to Danish Flats Environmental Services on March 5, 2014, with a proposed civil penalty of $84,000. In response, the company stated they could not pay a penalty of that amount. Using EPA's ABEL penalty model, the company provided financial data in which the ABEL model indicated that Danish Flats Environmental Services does not currently have the ability to pay a $84,000 civil penalty. As a result, Danish Flats Environmental Services and the DAQ negotiated a reduced civil penalty of $50,000. A revised early settlement agreement with the $50,000 penalty amount was sent to the company on May 15, 2014, and signed by the company on June 13, 2014. Staff recommends the Board approve the $50,000 negotiated penalty amount and the signed early settlement offer.

In discussion, Mr. Morris responded that Danish Flats' compliance advisory was due to paperwork issues and the installation of new equipment. The source started out with two or three small ponds and they now have fourteen evaporation ponds with minor emissions. The water for the process is trucked in and they also have a flare afterburner on their facility so as they process the water any volatile organic compounds captured are incinerated. Mr. Morris also explained in more detail how the initial and negotiated reduced fines were calculated.

In further discussion, Mr. Morris responded that there are about nine other facilities in the Uinta Basin under state jurisdiction that do a similar process as Danish Flats, and one facility in San Juan County. DAQ has started an initiative where sources with evaporative ponds on state jurisdiction were identified and then were contacted that they may need a permit and were informed of the process. Some sources have already submitted self-evaluation notices, some are still in the process of sampling, and some have been issued compliance advisories. DAQ recently purchased some video cameras for compliance and there have been some difficulties with the cameras in the way emissions are calculated. Some of the challenges included getting reliable data that staff was comfortable with, an inspector had to be on-site to see the emissions, and the difficulty with quantification in that the camera does not give a number or value for how big the leak is. An inspector would have to do a determination similar to a Method 9 visible emission observation to determine how big of a leak there was.

Ms. Smith added that these ponds have been a concern and a problem for the county commissions in the Uinta Basin for a while. The Uinta Basin air study over the last two years has tried to do some more in depth research on what was coming off of the ponds but it has been difficult. In addition, the issue of the water that comes off oil and gas is a huge issue in the Basin and it touches a lot of different agencies. Even the water going into the ponds is not consistent and so there is no way to have a baseline on exactly what is in the water in the ponds, how fast it is evaporating, what happens to the salts, or the impact of the stuff that is evaporated out the water. Finally, at a future Board meeting, staff will report back on the Colorado rules that prevent this type of pond process in Colorado.

- Kathy Van Dame motioned that the Board approve the Danish Flats Environmental Services early settlement agreement. Robert Paine seconded. The Board approved unanimously.

VIII. Informational Items.

A. PM2.5 State Implementation Plan Subpart 4 Update. Presented by Bill Reiss.

Bill Reiss, Environmental Engineer at DAQ, stated that DAQ is still on schedule to bring three $PM_{2.5}$ SIPs to the Board in September. These SIPs are supplements to the SIPs that were already adopted by the Board. The control strategies that were adopted through the Board remain unchanged and remain on our books as state rules to which DAQ is enforcing them as such even though EPA has not yet taken action on them. Subpart 4 allows for showing that it is impractical for a moderate area to show attainment by the attainment date, which in our case will apply to Salt Lake City and Provo. These areas will become reclassified as serious nonattainment areas, at which time we will have to go back to the SIP drawing board and do a serious area SIP where the attainment dates will be 2019.

DAQ still has not seen a proposed implementation rule for $PM_{2.5}$ from EPA. This week EPA released its newest version of the motor vehicle emissions simulator (MOVES) model. MOVES 2014 is the tool that EPA produces and DAQ is required to use to assess emissions from mobile sources. The tool is significant because it allows us to look into EPA's new regulation, Tier 3, and to get an assessment of what that means to our fleet. MOVES 2014 will not be part of this SIP, but it's expected that we'll use it as we develop our mobile source inventories on future SIPs.

In discussion with the Board, Mr. Reiss stated that currently we have a monitored design value that is based on a data set that spans five years. Within the five years we already have a baseline inventory that was used as a fundamental model run for this SIP. To recalculate the base year inventory at this time would require a lot of work for what is essentially a stepping stone SIP.

B. Communication Strategy for the Division of Air Quality 2015 Research Projects. Presented by Payden McRoberts.

Payden McRoberts, Planning Branch Intern at DAQ, explained that the communications plan can be used to focus DAQ's public relations efforts on first educating the public and getting core messages across. There are several benefits associated with creating a communications plan such as focusing and prioritizing our communications effort and to send out a consistent message to the public, legislature, and other groups. During the research project period DAQ will produce and disseminate information on the projects that have already been funded by the legislature through this communications plan. Mr. McRoberts then explained the five goals of the plan and the strategies and tactics to be used to reach those goals. In discussion with the Board, staff indicates that future formal presentations will be presented to the Board on the progress of the research projects. Staff will also give presentations at Clean Air Caucus meetings to update those that are interested and engaged on this issue.

C. Air Toxics. Presented by Robert Ford.

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

E. Monitoring. Presented by Bo Call.

Bo Call, Air Monitoring Section Manager at DAQ, updated the Board on the monitoring data noting that although the ozone numbers have been down, there was one exceedance each at Brigham City, Harrisville, Hawthorne, and Spanish Fork and two exceedances at Bountiful. On July 4 the Ogden monitor was the only monitor that reported a $PM_{2.5}$ exceedance. Ogden's high values could be attributed to fireworks displays put on by residents taking advantage of their opportunity to light off fireworks and not by the large public fireworks displays put on by cities.

DAQ has a portable ozone monitor and will be doing temporary monitoring for six to eight weeks in Moab to get an idea of the ozone numbers. Currently the National Park Service operates a monitor at Canyonlands National Park and DAQ operates a monitor in Price. In doing the temporary monitoring in Moab, DAQ will be able to see how the data compares with the Canyonlands and Price monitors. If the levels at Moab are close to Canyonlands then we can just refer to that data. In addition, DAQ will return in January to set up a particulate matter monitor in Moab that will give an idea of how the air quality is in Moab during the winter.

F. Other Items to be Brought Before the Board.

Bryce Bird gave a brief update to the Board of his presentation to the Interim Committee on Utah's air quality program which covered the current air quality and program status, 2014 legislation report, immediate and long term strategies, and 2015 legislation priorities.

Meeting adjourned at 2:48 p.m.

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-066-14

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: August 13, 2014

SUBJECT: FINAL ADOPTION: Amend R307-342-3. Adhesives and Sealants. Exemptions.

On June 4, 2014, the Board proposed for public comment an amendment to R307-342-3 based upon a request from L-3 Communications. L-3 Communications requested that the Board amend R307-342-3 to match the existing exemptions for Department of Defense (DOD) contractors specified in R307-335 and R307-350. The proposed amendment would bring consistency across all rules where DOD military technical specifications are exempted.

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

Staff Recommendation: Staff recommends the Board adopt R307-342-3 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

R307. Environmental Quality, Air Quality.
R307-342. Adhesives and Sealants.
R307-342-3. Exemptions.

(1) The requirements of R307-342 do not apply to the following:

(a) Adhesives, sealants, adhesive primers or sealant primers being tested or evaluated in any research and development, quality assurance or analytical laboratory;

(b) Adhesives and sealants that contain less than 20 grams of VOC per liter of adhesive or sealant, less water and exempt solvents, as applied;

(c) Cyanoacrylate adhesives;

(d) Adhesives, sealants, adhesive primers or sealant primers that are sold or supplied by the manufacturer or supplier in containers with a net volume of 16 fluid ounces or less or that have a net weight of one pound or less, except plastic cement welding adhesives and contact adhesives;

(e) Contact adhesives that are sold or supplied by the manufacturer or supplier in containers with a net volume of one gallon or less;

(f) Aerosol adhesives and primers dispensed from aerosol spray cans; or

(g) Polyester bonding putties to assemble fiberglass parts at fiberglass boat manufacturing facilities and at other reinforced plastic composite manufacturing facilities.

(2) The requirements of R307-342 do not apply to the use of adhesives, sealants, adhesive primers, sealant primers, surface preparation and cleanup solvents in the following operations:

(a) Tire repair operations, provided the label of the adhesive states "for tire repair only;"

(b) In the production, rework, repair, or maintenance of aerospace vehicles and components, and undersea-based weapon systems;

(c) In the manufacture of medical equipment;

(d) Operations that are exclusively covered by Department of Defense military technical specifications and standards and performed by a Department of Defense contractor and/or on site at installations owned and/or operated by the United States Armed Forces.

(e) Plaque laminating operations in which adhesives are used to bond clear, polyester acetate laminate to wood with lamination equipment installed prior to July 1, 1992.

(3) The requirements of R307-342 do not apply to commercial and industrial operations if the total VOC emissions from all adhesives, sealants, adhesive primers and sealant primers used at the source are less than 200 pounds per calendar year.

(4) Adhesive products and sealant products shipped, supplied or sold exclusively outside of the areas specified in R307-342-2 are exempt from the requirements of this rule.

(5) R307-342 shall not apply to any adhesive, sealant, adhesive primer or sealant primer products manufactured for shipment and use outside of the counties specified R307-342-2 as long as the manufacturer or distributor can demonstrate both that the product is intended for shipment and use outside of the applicable counties

and that the manufacturer or distributor has taken reasonable prudent precautions to assure that the product is not distributed to the applicable counties.

(6) R307-342 shall not apply to the use of any adhesives, sealants, adhesive primers, sealant primers, cleanup solvents and surface preparation solvents, provided the total volume of noncomplying adhesives, sealants, primers, cleanup and surface preparation solvents applied facility-wide does not exceed 55 gallons per rolling 12-month period.

(7) Commercial and industrial operations claiming exemption pursuant to R307-342-3 shall record and maintain operational records sufficient to demonstrate compliance.

KEY: air pollution, adhesives, sealants, primers
Date of Enactment or Last Substantive Amendment: August 1, 2013
Authorizing, and Implemented or Interpreted Law: 19-2-104(1)(a)

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-072-14(a)

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: August 28, 2014 (Amended)

SUBJECT: PROPOSE FOR PUBLIC COMMENT: 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.

On December 14, 2009, EPA designated the Salt Lake City, UT $PM_{2.5}$ Nonattainment Area. Utah was required to submit a nonattainment plan for the area no later than three years from the date of nonattainment designation. The plan was to provide for the attainment of the National Ambient Air Quality Standard (NAAQS) as expeditiously as practicable.

For several years, the Utah Division of Air Quality (UDAQ), in consultation with many stakeholders along the Wasatch Front and with 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 the 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 the EPA should have implemented the $PM_{2.5}$ NAAQS based on *both* Clean Air Act (CAA) Subpart 1 *and* Subpart 4 of Part D, title 1. EPA had (incorrectly) required states to develop their SIPs based only on Subpart 1.

Utah was thus required to supplement its SIP in order to address the additional requirements of Subpart 4. The most fundamentally different feature of Subpart 4 is that it subdivides PM nonattainment areas into classes of “moderate” and “serious.”

In response to the court ruling, EPA issued a “Deadlines Rule” that: 1) classifies the Salt Lake City, UT $PM_{2.5}$ Nonattainment Area as a moderate area, 2) establishes a deadline of December 31, 2014, for Utah to

submit the necessary SIP elements, and 3) establishes the attainment date as December 31, 2015.

UDAQ is recommending that the Board propose to replace the SIP it adopted on December 4, 2013, which addresses only Subpart 1 of Part D of the CAA, with the revised SIP attached herewith. This updated SIP considers both Subparts 1 and 4, and can therefore be acted upon by EPA in light of the D.C. Court's decision.

When the Board did approve the current version of the SIP, it was noted that the moderate area planning requirements of Subpart 4 would actually be quite similar to what they are when only Subpart 1 is considered.

Looking specifically at these planning requirements:

- Nonattainment New Source Review – No difference. Utah's permitting program already meets this requirement by operating under Appendix S to 40 CFR Part 51.

- Attainment Demonstration – The attainment demonstration originally prepared under Subpart 1 shows that the area can meet the 2006, 24-hour standard for $PM_{2.5}$, but not until 2019.

    - Under Subpart 1, Utah made use of the full five years available for extending the statutory attainment date.

    - Under Subpart 4, there is no such extension available during the planning period. Instead, the attainment date will simply be December 31, 2015.

    - However, the obligation to submit a plan provision demonstrating attainment can take the form of a demonstration that attainment by that date is impracticable. This revised SIP quantitatively demonstrates that it is impracticable to attain the standard by December 31, 2015.

- RACM / RACT – Different only in the timing of its implementation. As noted above, the attainment date has advanced from 2019 to 2015. The current SIP identified RACT measures, and set dates for the implementation thereof, within a scheme of Reasonable Further Progress (RFP) that set milestones at 2014 and 2017 on the way to attainment in 2019. Thus, there are implementation targets that extend well beyond the RACT implementation date now set under Subpart 4 (December 14, 2013). UDAQ could have conceivably discarded these later measures as no longer feasible, yet elected to retain them (in SIP Section IX. Part H) to further the areas' progress toward attainment of the NAAQS.

- RFP / Quantitative Milestones – The December 4, 2013, plan used 2014 and 2017 as milestones for evaluating progress toward attainment in 2019.

    - Under the Subpart 4 planning requirements for moderate areas, the milestones come into play only after the State has submitted its SIP, and only if the plan demonstrates attainment of the standard by the attainment date.

- Contingency Measures – No difference. This requirement is the same in either case.

The revised SIP is fundamentally no different than the plan that was adopted on December 4, 2013. It has, however, been revised to address the planning requirements of Subpart 4 of Part D of the CAA, as well as the planning requirements of Subpart 1.

Staff Recommendation: Staff recommends the Board propose the repeal and replace of 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

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

RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RFP	Reasonable Further Progress
SIP	State Implementation Plan
SMOKE	Sparse Matrix Operator Kernal Emissions
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
TSD	Technical Support Document
VOC	Volatile Organic Compounds
UAC	Utah Administrative Code
WRF	Weather Research and Forecasting

TABLE OF CONTENTS

Chapter 5 - ATTAINMENT DEMONSTRATION

Chapter 6 - CONTROL MEASURES

Chapter 7 - TRANSPORTATION CONFORMITY

Chapter 8 - REASONABLE FURTHER PROGRESS

Chapter 9 - CONTINGENCY MEASURES

List of Figures

LIST OF TABLES

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 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.

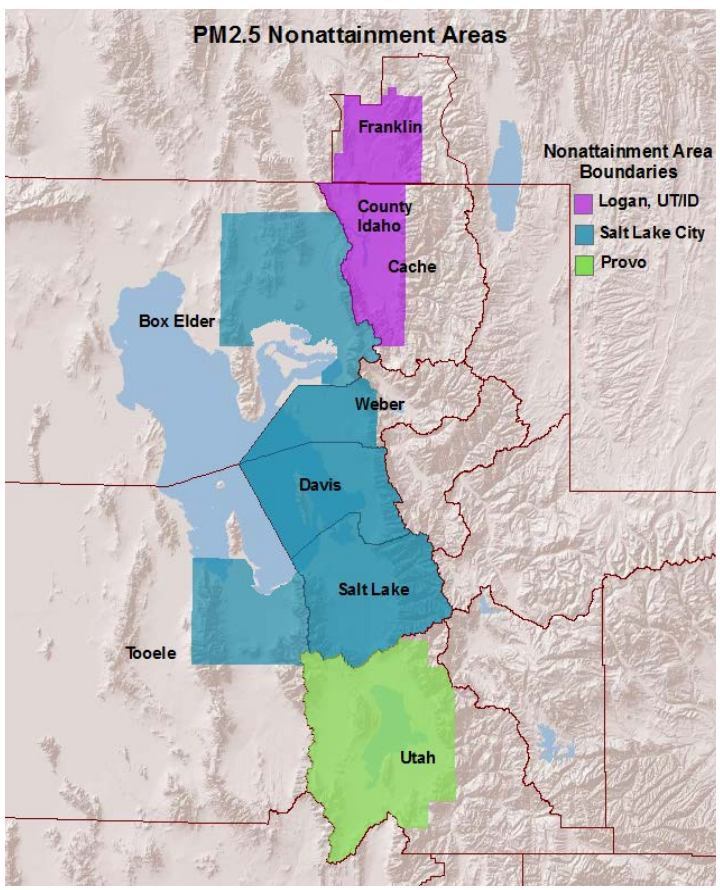


Figure 1.1, Nonattainment Areas for the 2006, $PM_{2.5}$ NAAQS

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 so 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 $\mu g/m^3$ 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.

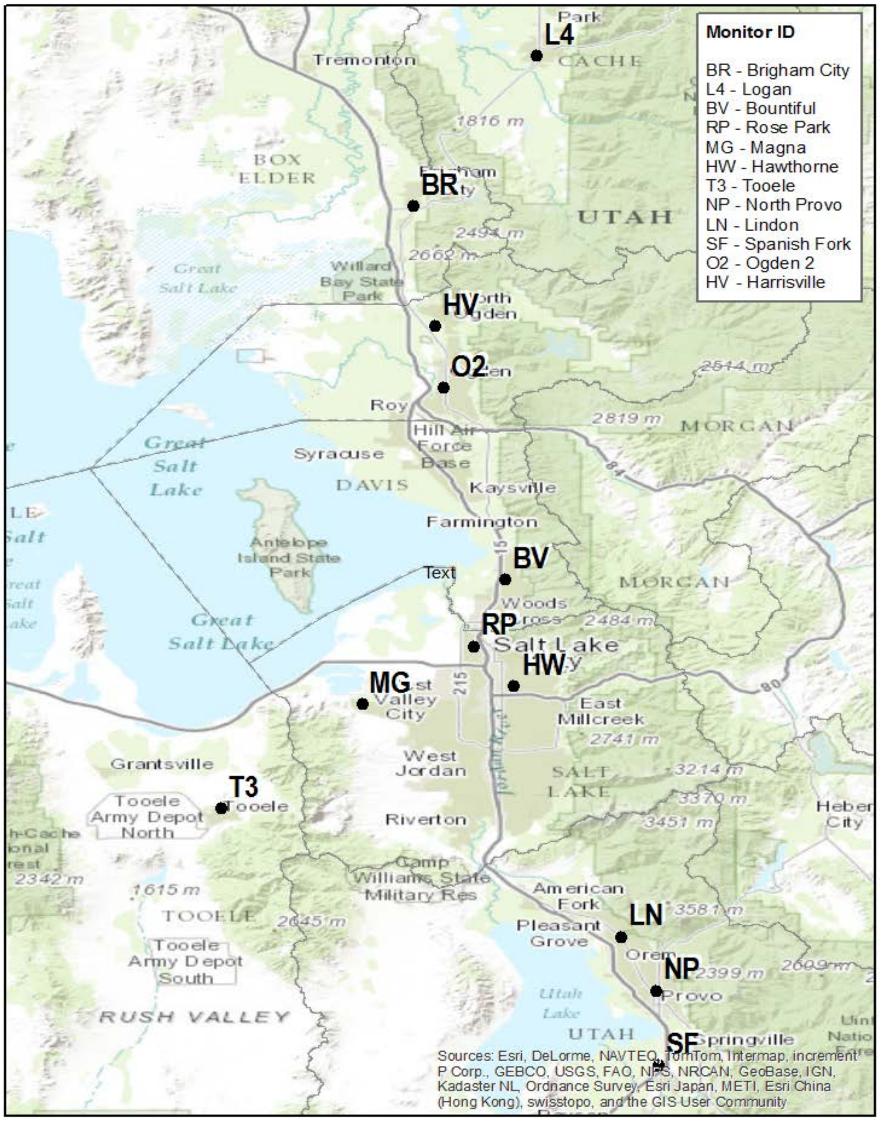


Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network

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.

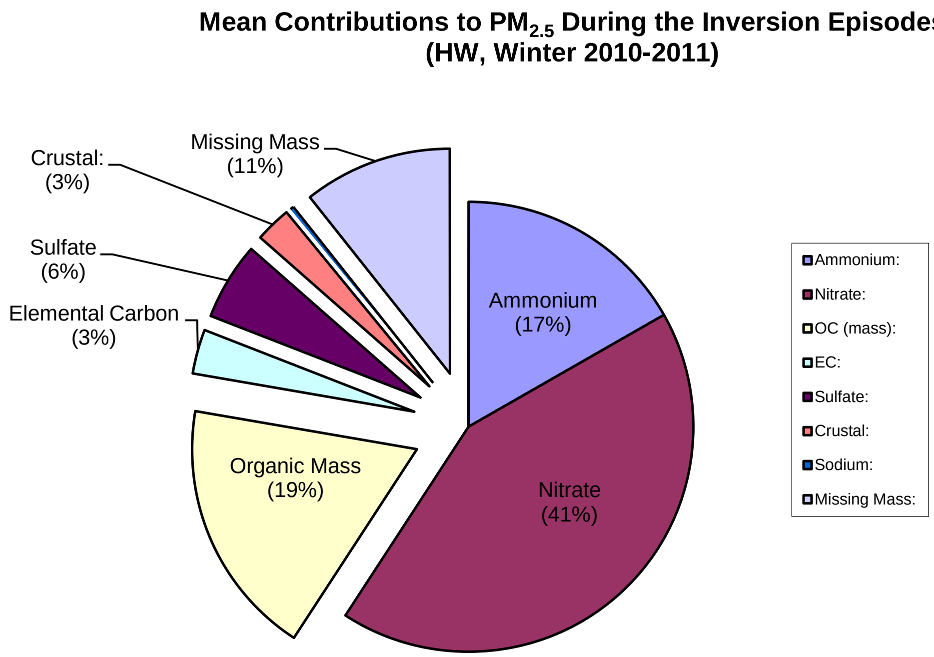
The $PM_{2.5}$ is collected on three types of filters: Teflon, nylon, and quartz. Teflon filters are used to characterize the inorganic contents of $PM_{2.5}$. Nylon filters are used to quantify the amount of ammonium nitrate, and quartz filters are used to quantify the organic and inorganic carbon content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



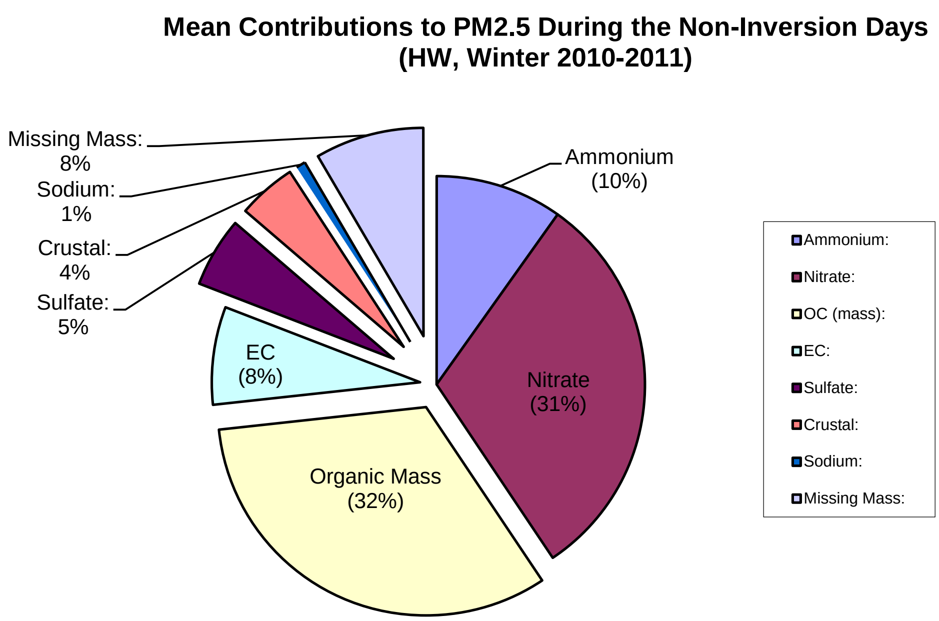


Figure 3.2, Composite Wintertime PM2.5 Speciation Profiles

3.6 PCAP Study

The Persistent Cold Air Pooling Study (PCAPS) is an ongoing 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. 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							

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

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

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.

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.

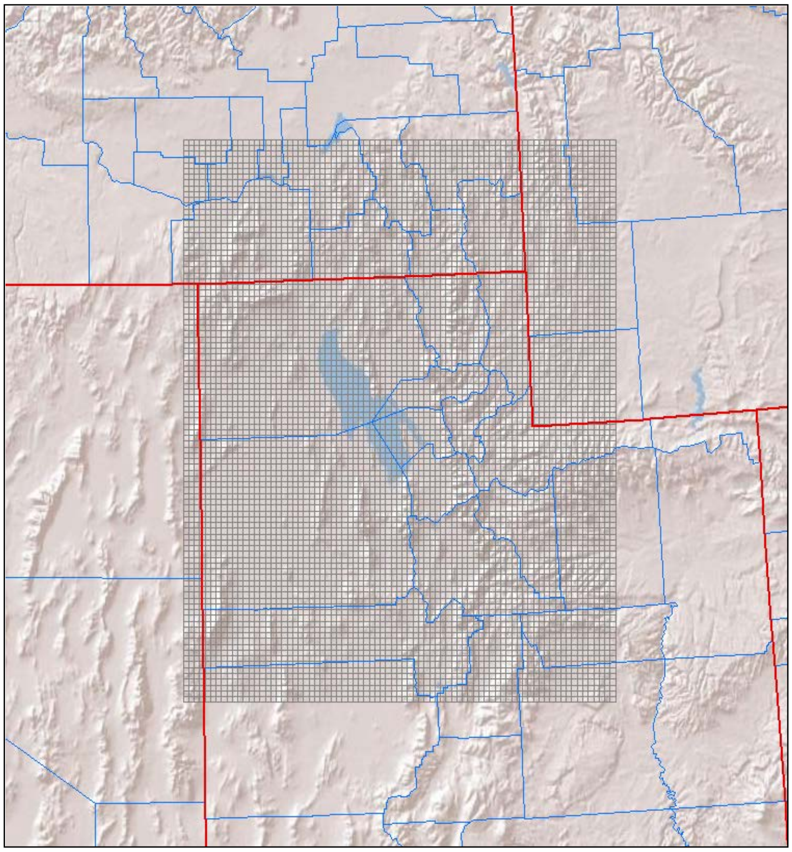


Figure 5.1: Northern Utah photochemical modeling domain.

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.

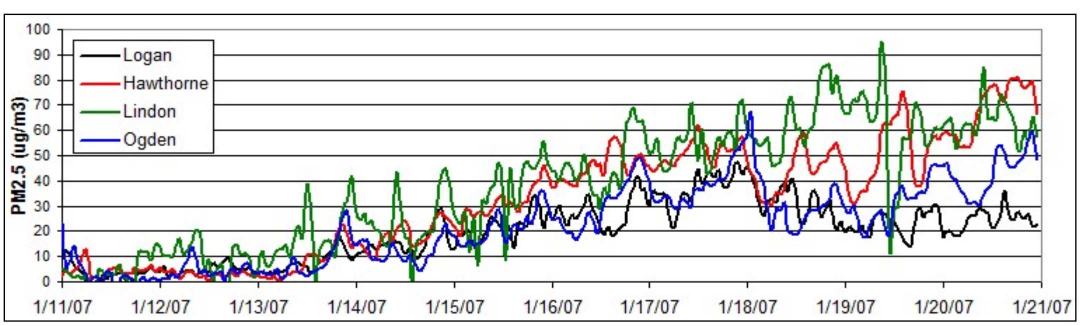


Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007

- **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.

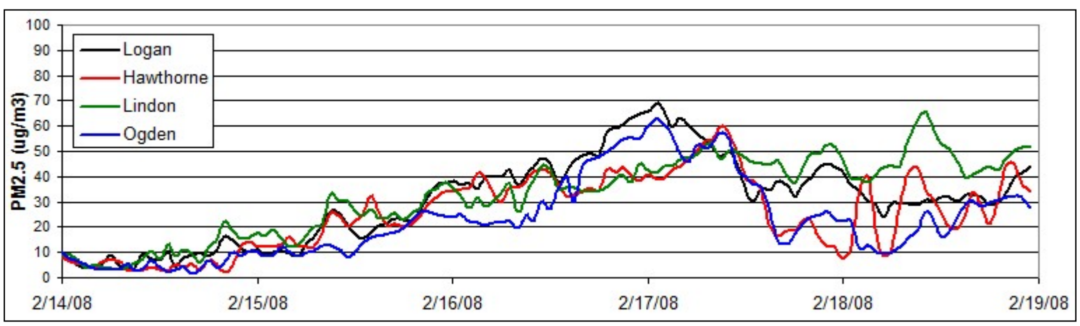


Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008

- **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.

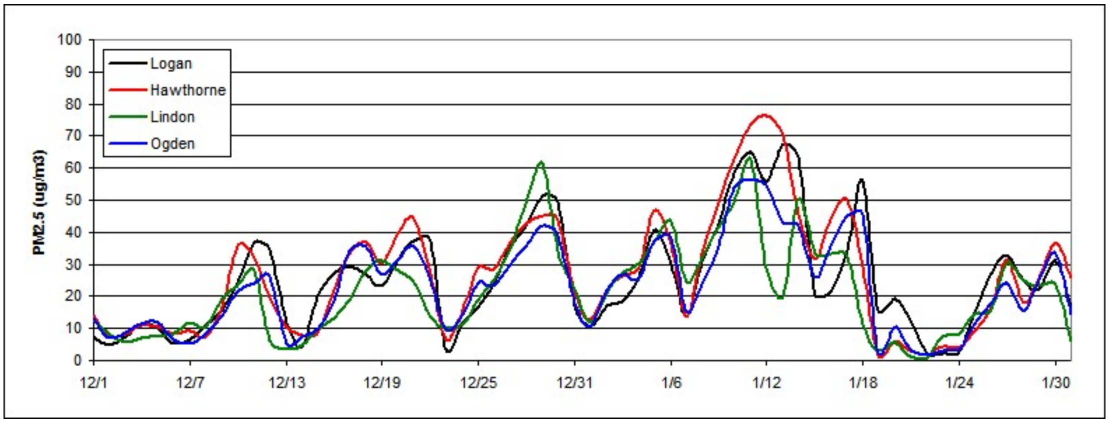


Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10.

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.

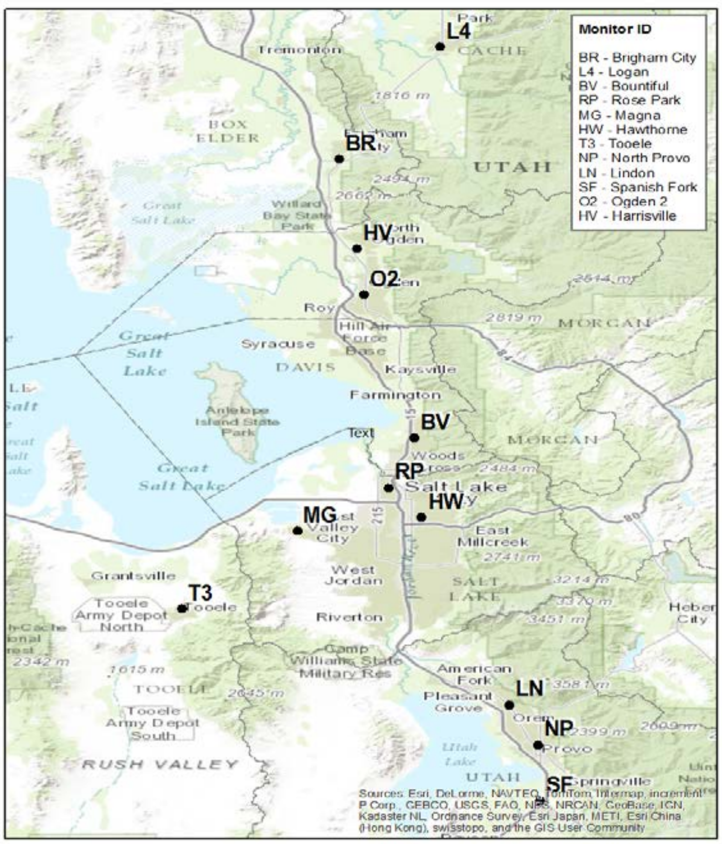


Figure 5.5: UDAQ monitoring network.

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.

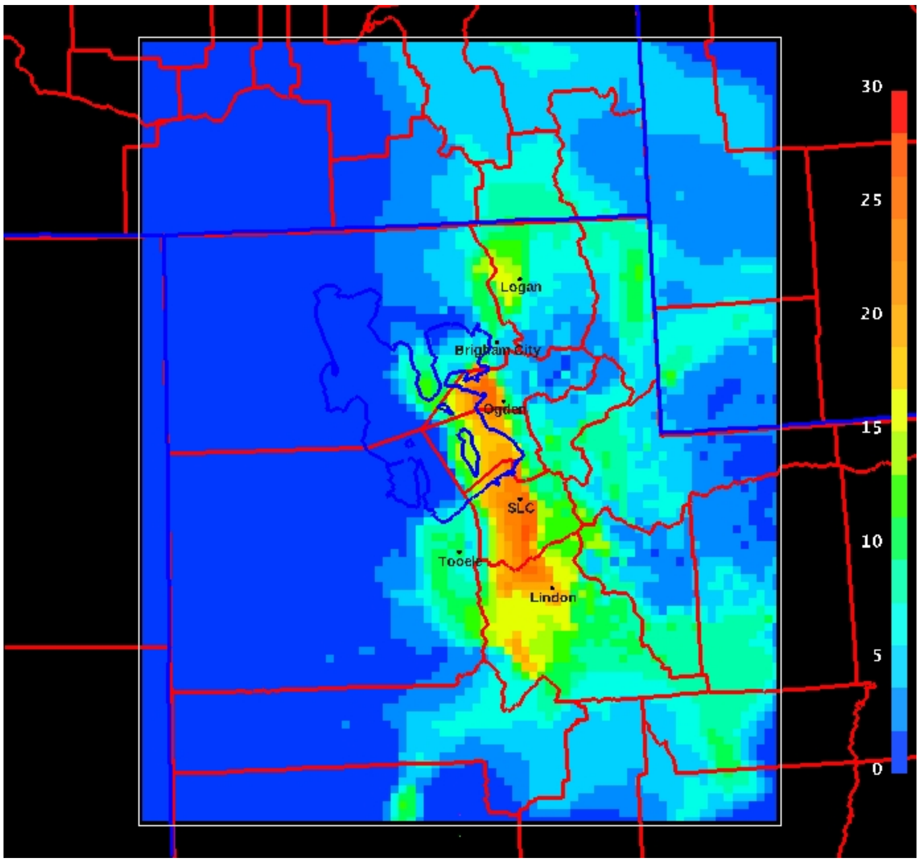


Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ ($\mu g/m^3$) for 2010 Jan. 03.

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.

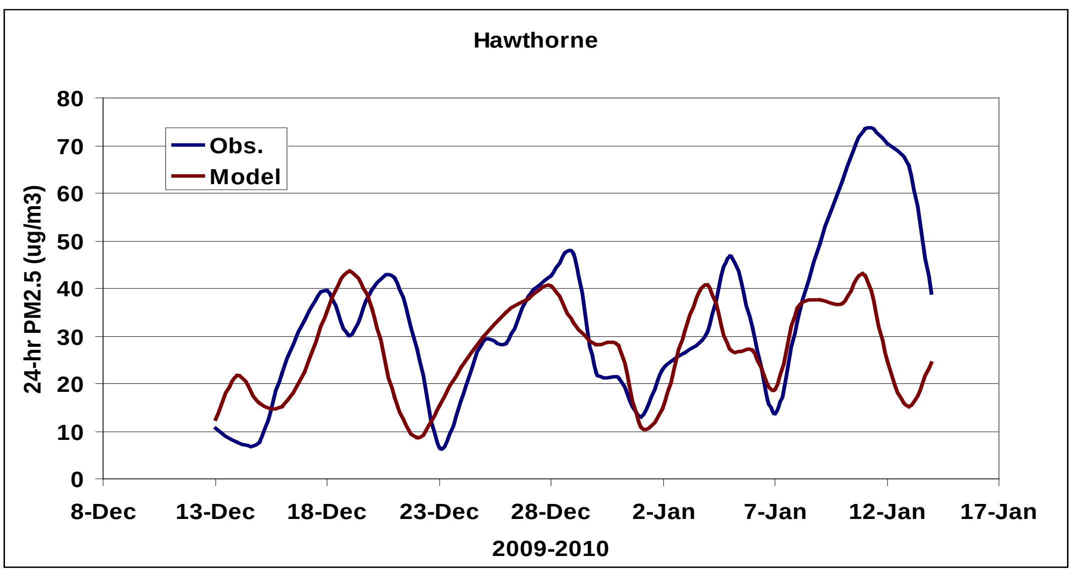


Figure 5.7: 24-hr PM2.5 time series (Hawthorne). Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

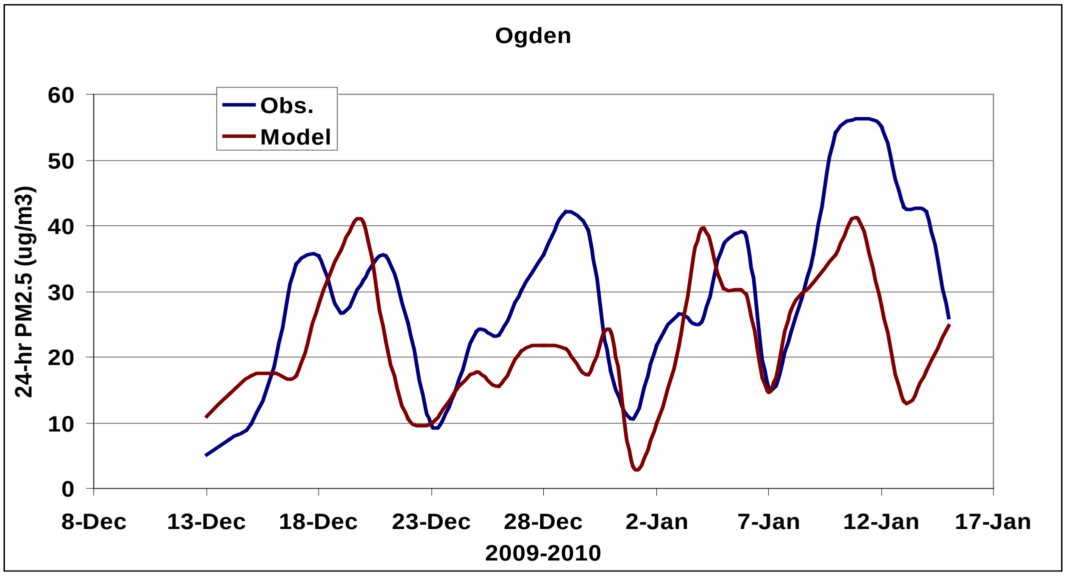


Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

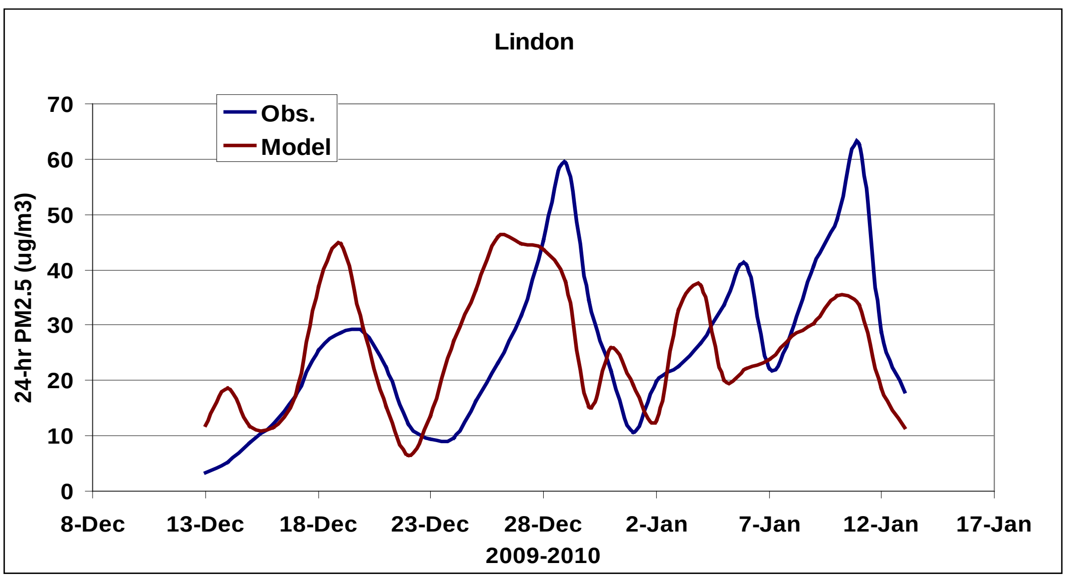


Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

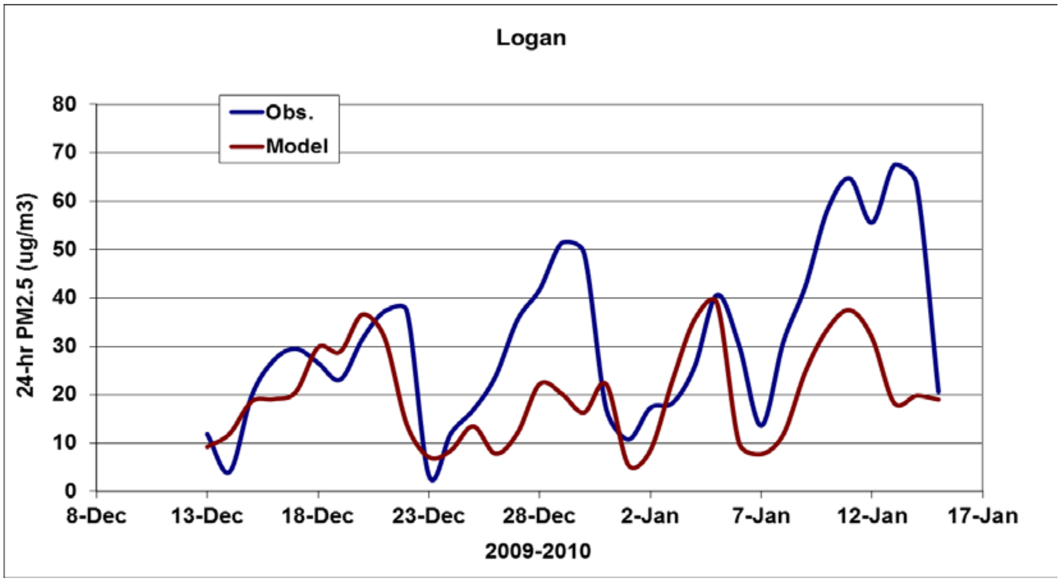


Figure 5.10: 24-hr $PM_{2.5}$ time series (Logan). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

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 $\mu g/m^3$. 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 $\mu g/m^3$. 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.

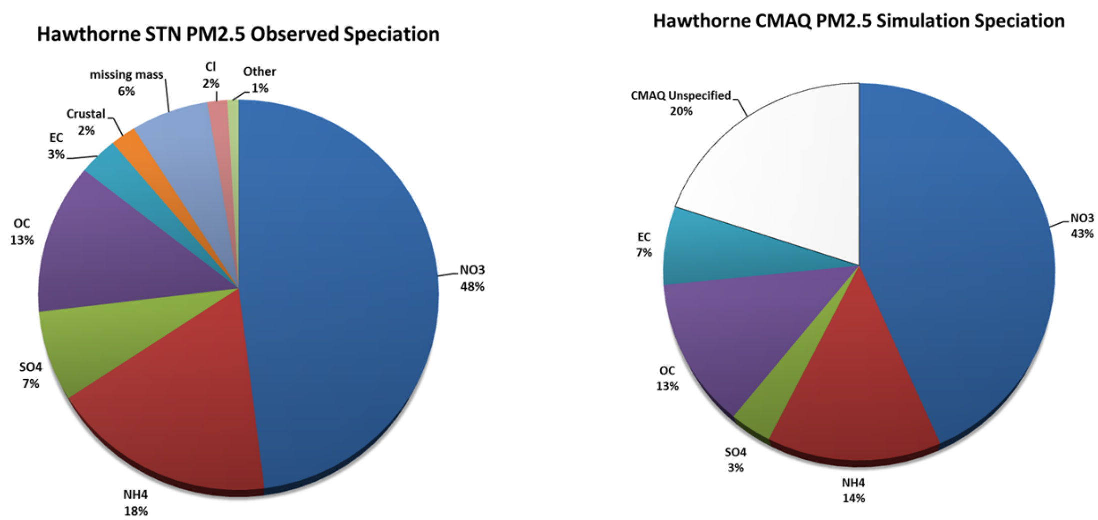


Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 $\mu g/m^3$ at the Hawthorne STN site.

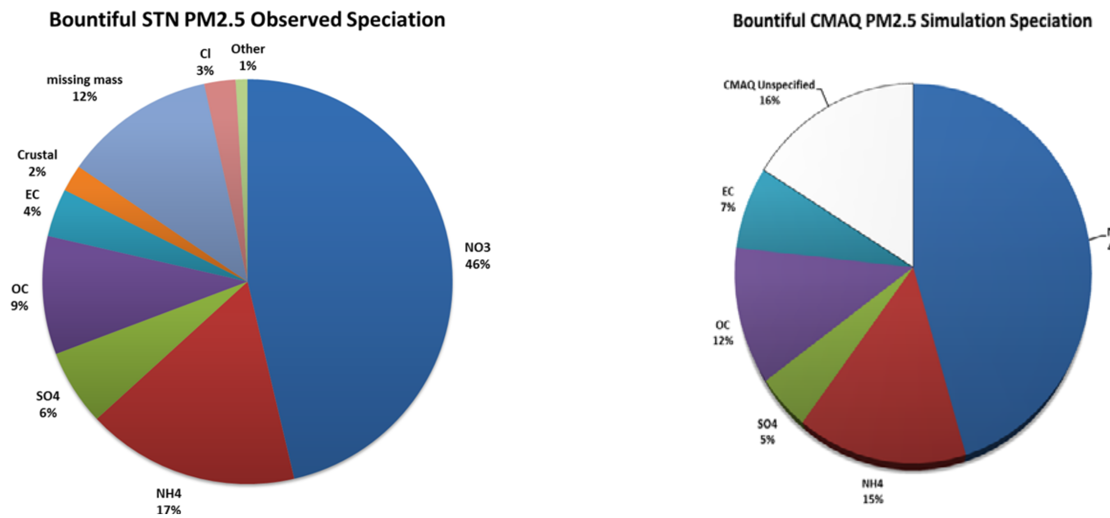


Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Bountiful STN site.

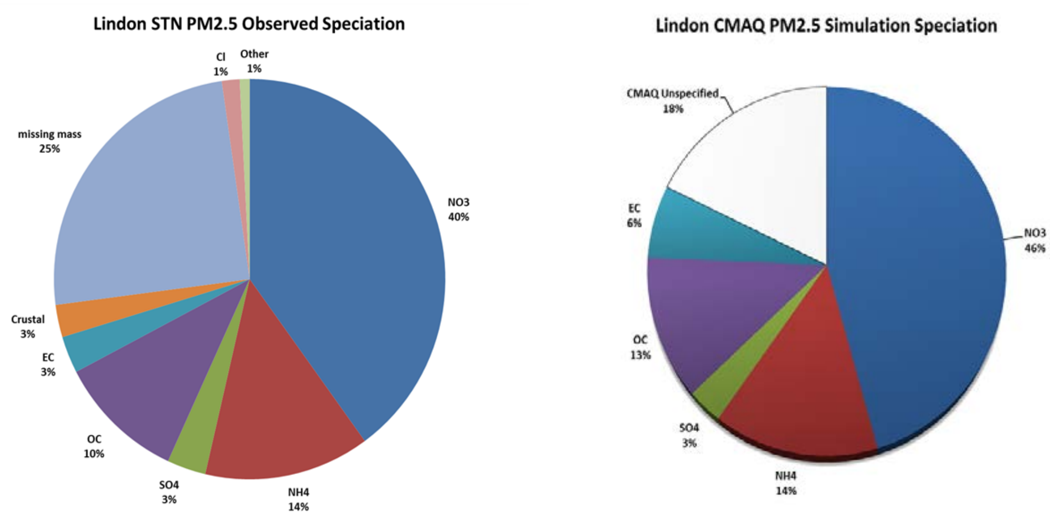


Figure 5.14: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Lindon STN site.

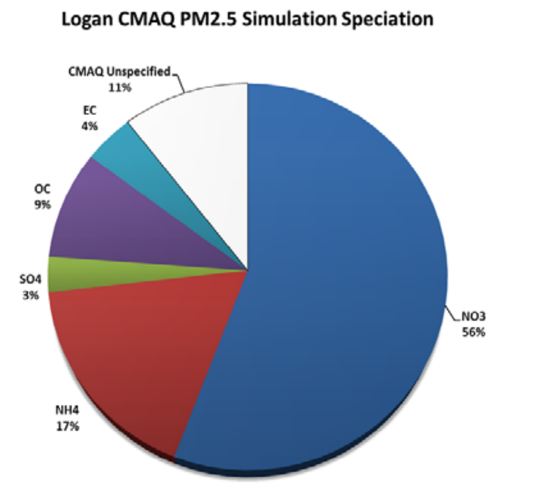


Figure 5.15: The composition of model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when a modeled day had 24-hr concentrations > 35 µg/m^3 at the Logan monitoring site. No observed speciation data is available for Logan.

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.

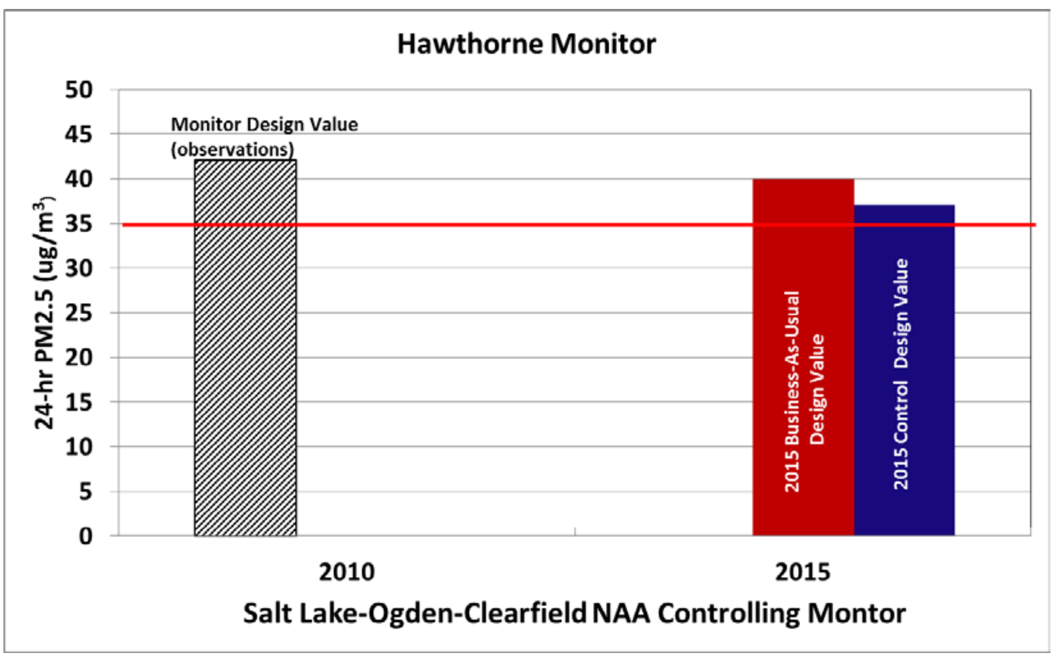


Figure 5.16, Model Results for the Salt Lake City, UT Nonattainment Area

Table 5.3 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 5.3, Modeled Concentrations (µg/m^3) for the Salt Lake City, UT Nonattainment Area

The "Control Basket" inventory that is presented in Table 5.3 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.

Stationary Point Sources:

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 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.

<u>Area sources:</u>

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.

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** projected with growth and controls	**Difference**	**RFP** 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				

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. 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 – No-burn days are presently called at 35 $\mu g/m^3$. By this time the area is already at the 24-hr health standard, and it is likely that air dispersion is very poor. As part of the control strategy for the SIP, rule R307-302 has been amended to change the no-burn call 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.

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, the most important of all the $PM_{2.5}$ precursors, 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.

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-073-14(a)

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: August 28, 2014 (Amended)

SUBJECT: PROPOSE FOR PUBLIC COMMENT: 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.

On December 14, 2009, EPA designated the Provo, UT $PM_{2.5}$ Nonattainment Area. Utah was required to submit a nonattainment plan for the area no later than three years from the date of nonattainment designation. The plan was to provide for the attainment of the National Ambient Air Quality Standard (NAAQS) as expeditiously as practicable.

For several years, the Utah Division of Air Quality (UDAQ), in consultation with many stakeholders along the Wasatch Front and with 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 the 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 the EPA should have implemented the $PM_{2.5}$ NAAQS based on *both* Clean Air Act (CAA) Subpart 1 *and* Subpart 4 of Part D, title 1. EPA had (incorrectly) required states to develop their SIPs based only on Subpart 1.

Utah was thus required to supplement its SIP in order to address the additional requirements of Subpart 4. The most fundamentally different feature of Subpart 4 is that it subdivides PM nonattainment areas into classes of "moderate" and "serious."

In response to the court ruling, EPA issued a "Deadlines Rule" that: 1) classifies the Provo, UT $PM_{2.5}$ Nonattainment Area as a moderate area, 2) establishes a deadline of December 31, 2014, for Utah to

submit the necessary SIP elements, and 3) establishes the attainment date as December 31, 2015.

UDAQ is recommending that the Board propose to replace the SIP it adopted on December 4, 2013, which addresses only Subpart 1 of Part D of the CAA, with the revised SIP attached herewith. This updated SIP considers both Subparts 1 and 4, and can therefore be acted upon by EPA in light of the D.C. Court's decision.

When the Board did approve the current version of the SIP, it was noted that the moderate area planning requirements of Subpart 4 would actually be quite similar to what they are when only Subpart 1 is considered.

Looking specifically at these planning requirements:

- Nonattainment New Source Review – No difference. Utah's permitting program already meets this requirement by operating under Appendix S to 40 CFR Part 51.

- Attainment Demonstration – The attainment demonstration originally prepared under Subpart 1 shows that the area can meet the 2006, 24-hour standard for $PM_{2.5}$, but not until 2019.

    - Under Subpart 1, Utah made use of the full five years available for extending the statutory attainment date.

    - Under Subpart 4, there is no such extension available during the planning period. Instead, the attainment date will simply be December 31, 2015.

    - However, the obligation to submit a plan provision demonstrating attainment can take the form of a demonstration that attainment by that date is impracticable. This revised SIP quantitatively demonstrates that it is impracticable to attain the standard by December 31, 2015.

- RACM / RACT – Different only in the timing of its implementation. As noted above, the attainment date has advanced from 2019 to 2015. The current SIP identified RACT measures, and set dates for the implementation thereof, within a scheme of Reasonable Further Progress (RFP) that set milestones at 2014 and 2017 on the way to attainment in 2019. Thus, there are implementation targets that extend well beyond the RACT implementation date now set under Subpart 4 (December 14, 2013). UDAQ could have conceivably discarded these later measures as no longer feasible, yet elected to retain them (in SIP Section IX. Part H) to further the areas' progress toward attainment of the NAAQS.

- RFP / Quantitative Milestones – The December 4, 2013, plan used 2014 and 2017 as milestones for evaluating progress toward attainment in 2019.

    - Under the Subpart 4 planning requirements for moderate areas, the milestones come into play only after the State has submitted its SIP, and only if the plan demonstrates attainment of the standard by the attainment date.

- Contingency Measures – No difference. This requirement is the same in either case.

The revised SIP is fundamentally no different than the plan that was adopted on December 4, 2013. It has, however, been revised to address the planning requirements of Subpart 4 of Part D of the CAA, as well as the planning requirements of Subpart 1.

Staff Recommendation: Staff recommends the Board propose the repeal and replace of 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

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 5 - ATTAINMENT DEMONSTRATION

Chapter 6 - CONTROL MEASURES

Chapter 7 - TRANSPORTATION CONFORMITY

Chapter 8 - REASONABLE FURTHER PROGRESS

List of Figures

LIST OF TABLES

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 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.

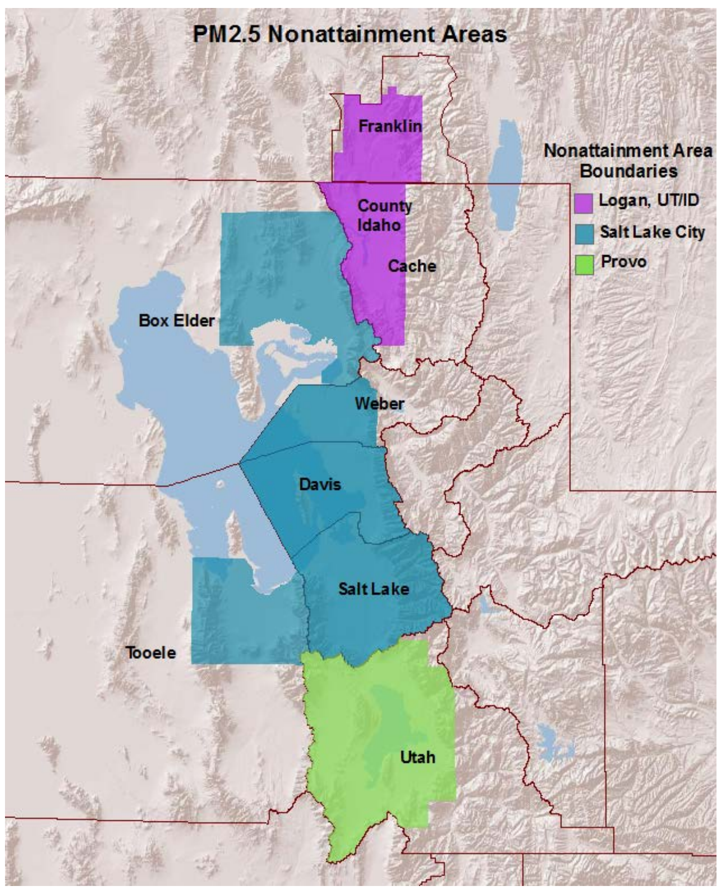


Figure 1.1, Nonattainment Areas for the 2006, $PM_{2.5}$ NAAQS

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 so 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.

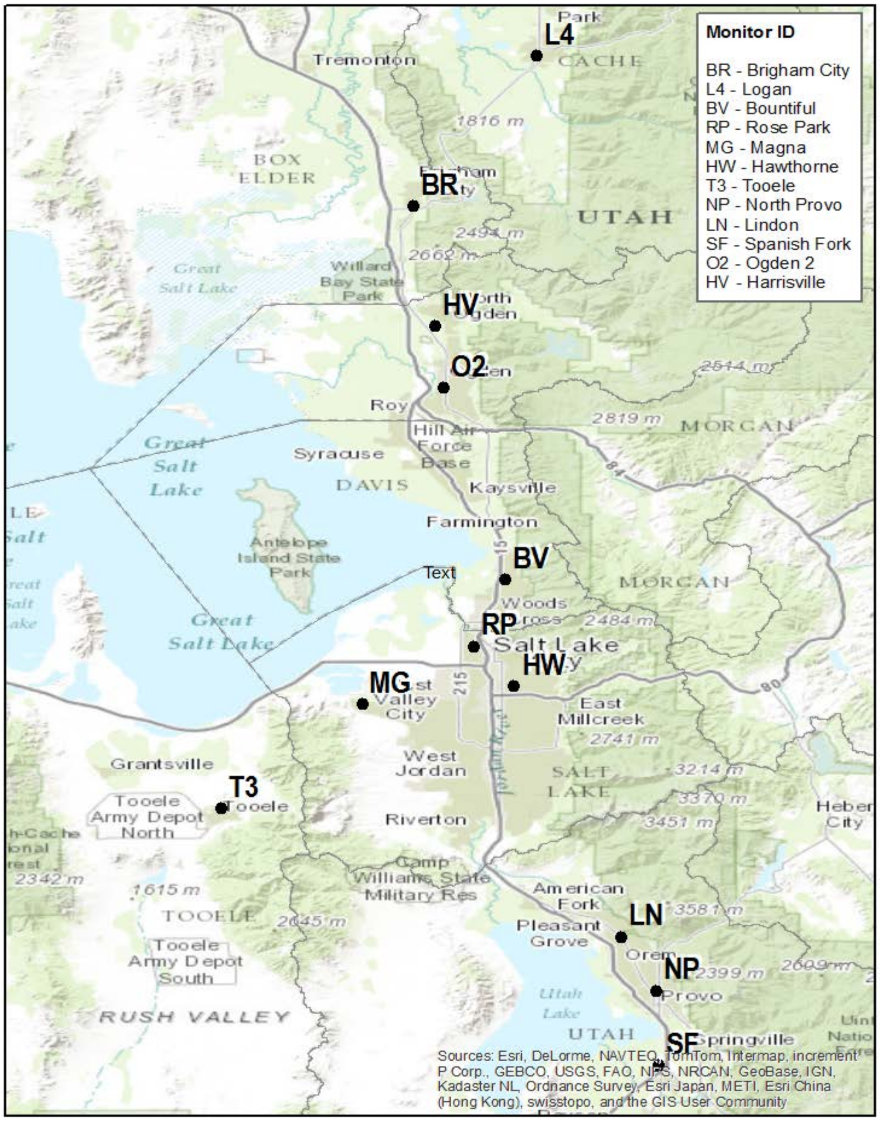


Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network

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.

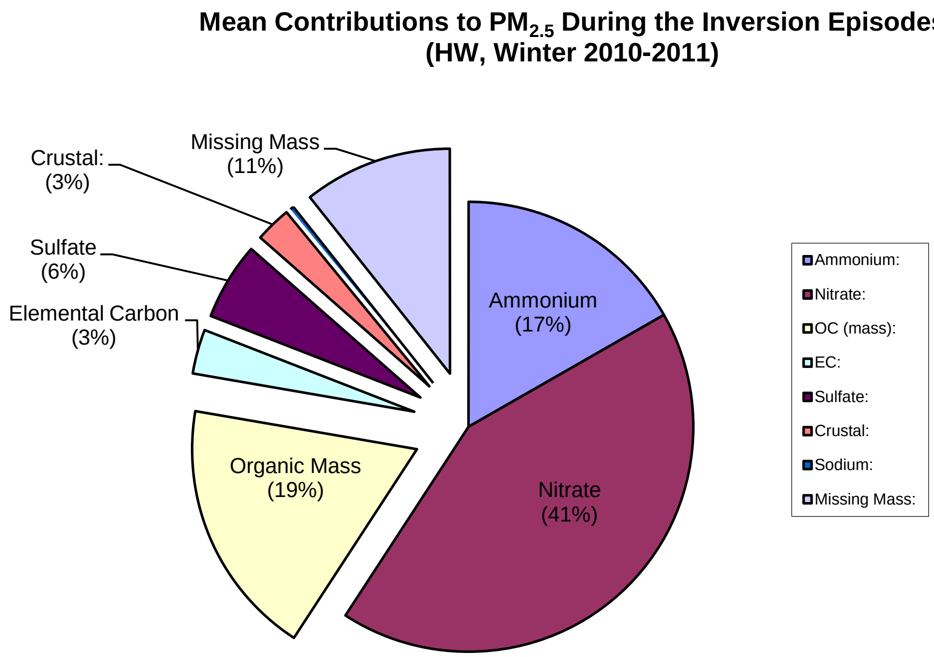
The $PM_{2.5}$ is collected on three types of filters: Teflon, nylon, and quartz. Teflon filters are used to characterize the inorganic contents of $PM_{2.5}$. Nylon filters are used to quantify the amount of ammonium nitrate, and quartz filters are used to quantify the organic and inorganic carbon content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



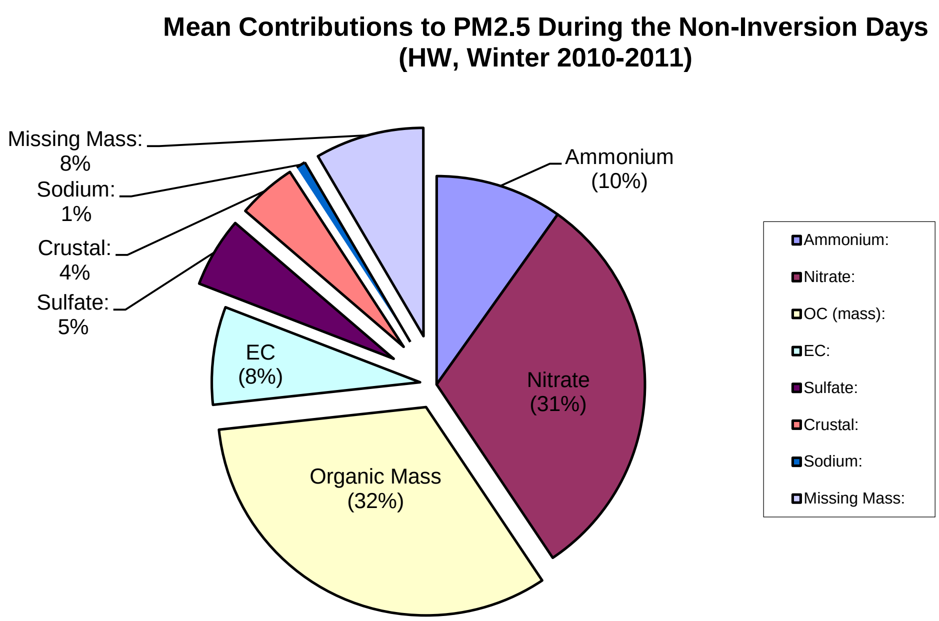


Figure 3.2, Composite Wintertime PM2.5 Speciation Profiles

3.6 PCAP Study

The Persistent Cold Air Pooling Study (PCAPS) is an ongoing 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. 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 Sum of Emissions (tpd)	Logan, UT-ID						
		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 Sum of Emissions (tpd)	Provo, UT						
		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 Sum of Emissions (tpd)	Salt Lake City, UT						
		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 Sum of Emissions (tpd)	Surrounding Areas						
		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							

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

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

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.

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.

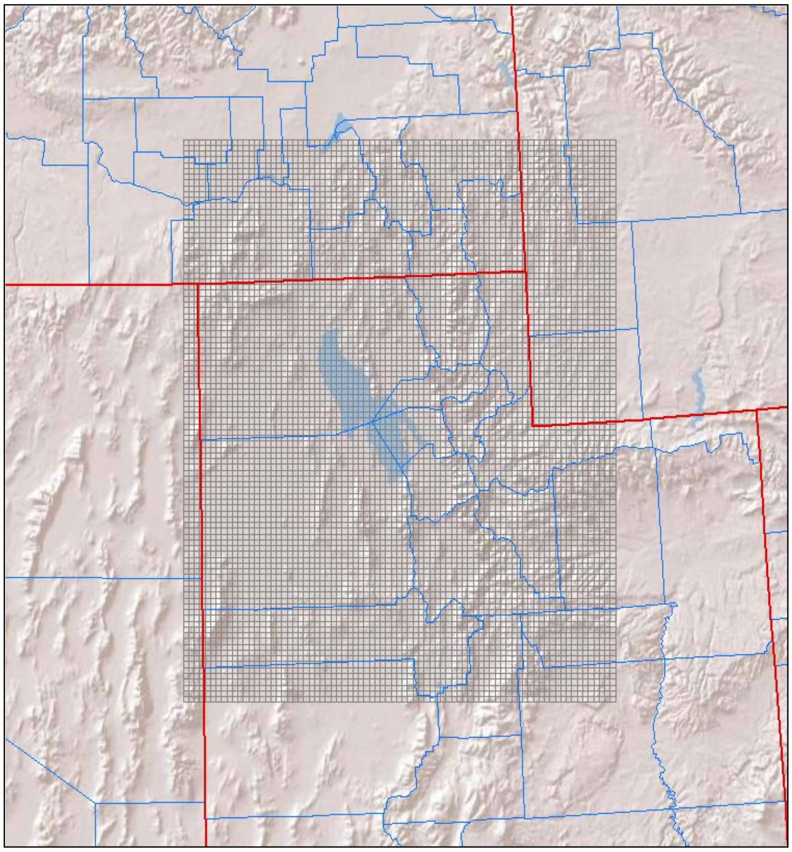


Figure 5.1: Northern Utah photochemical modeling domain.

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.

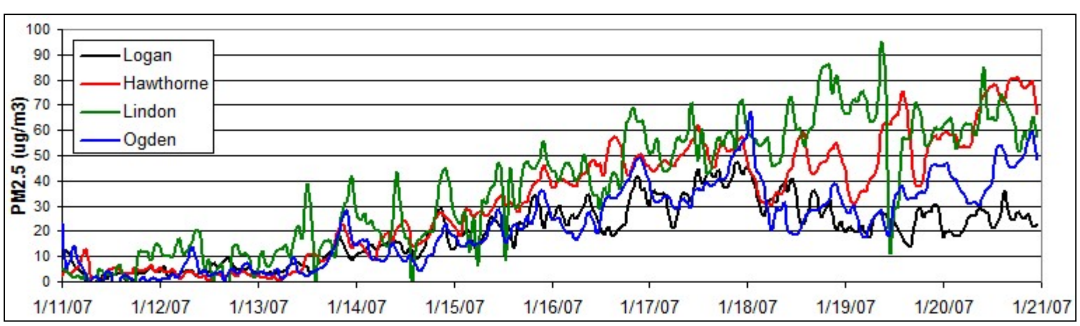


Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007

- **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.

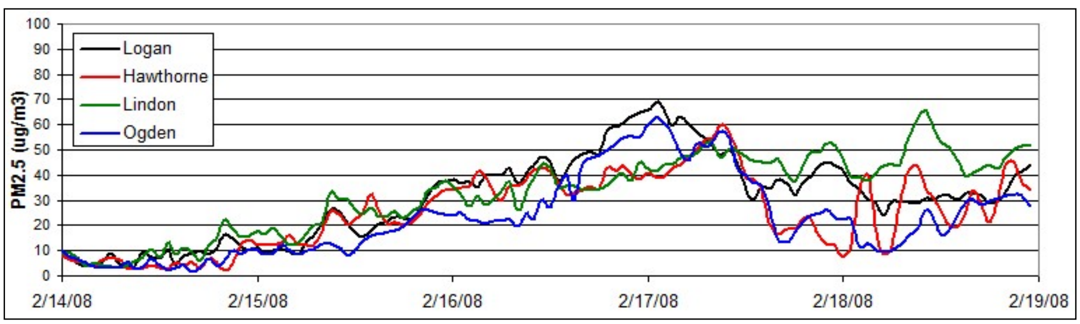


Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008

- **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.

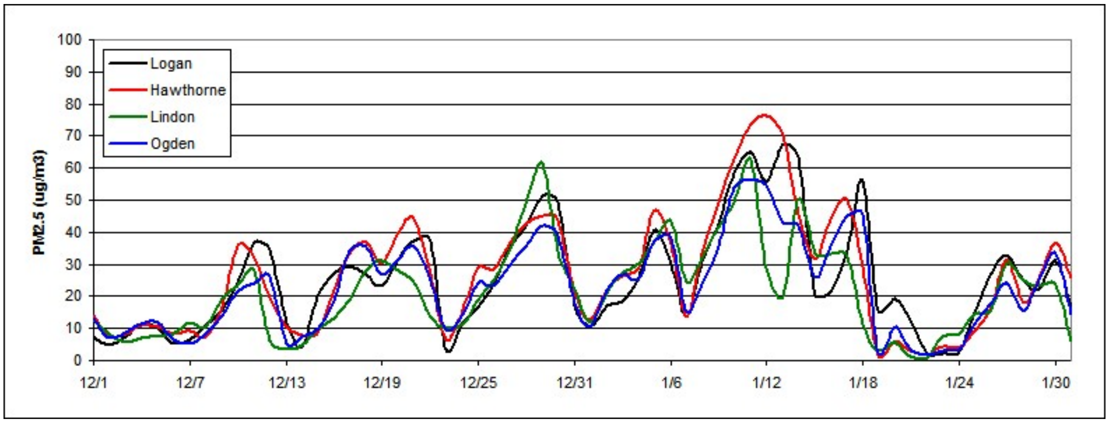


Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10.

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.

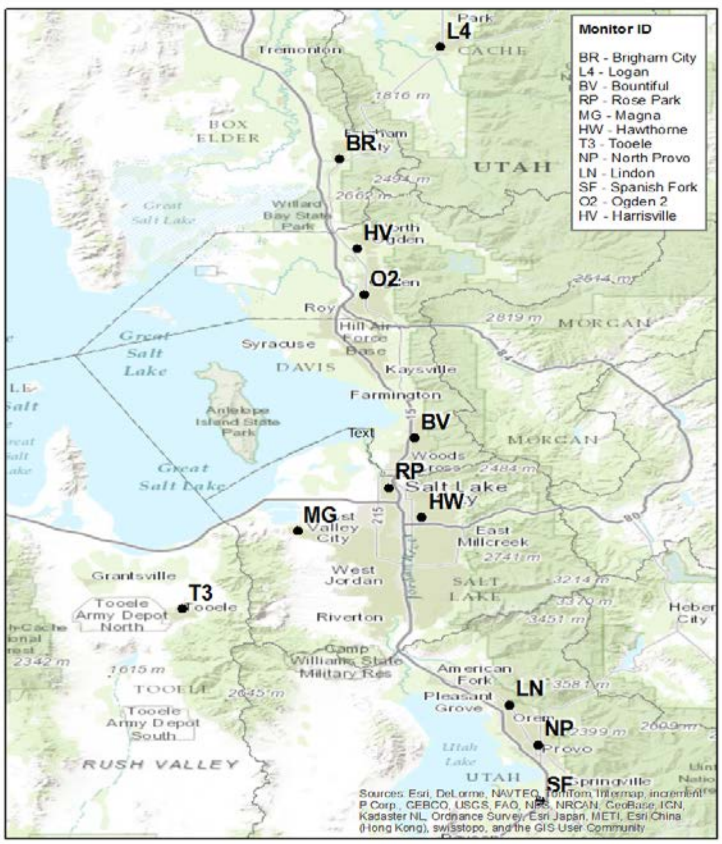


Figure 5.5: UDAQ monitoring network.

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.

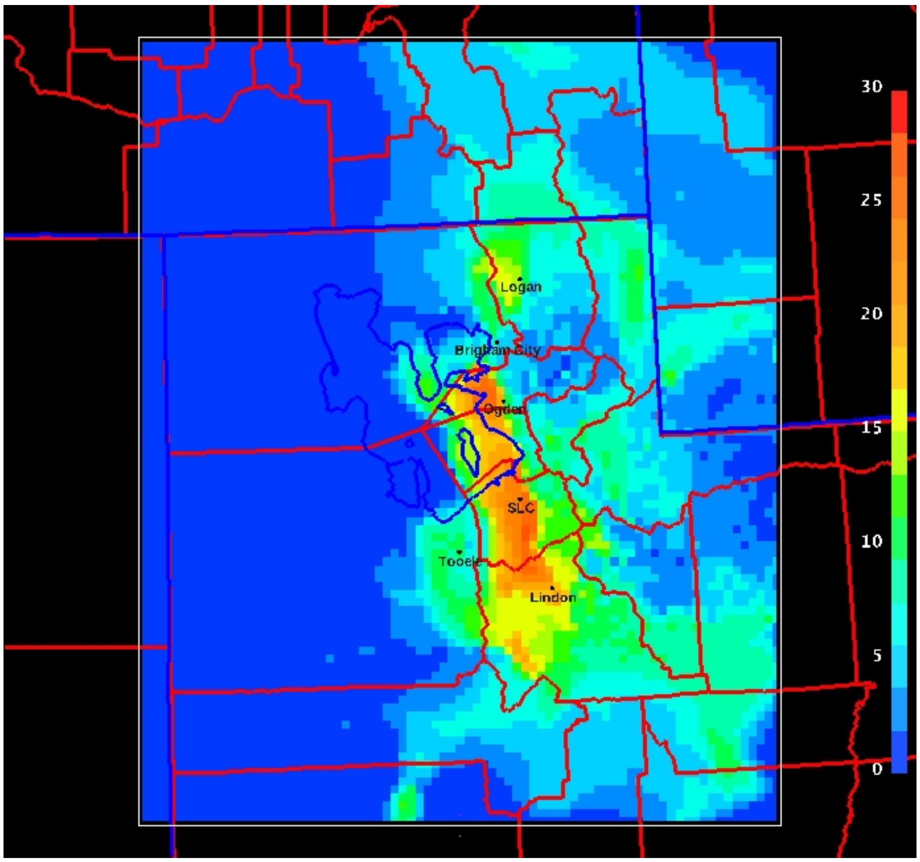


Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ ($\mu g/m^3$) for 2010 Jan. 03.

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.

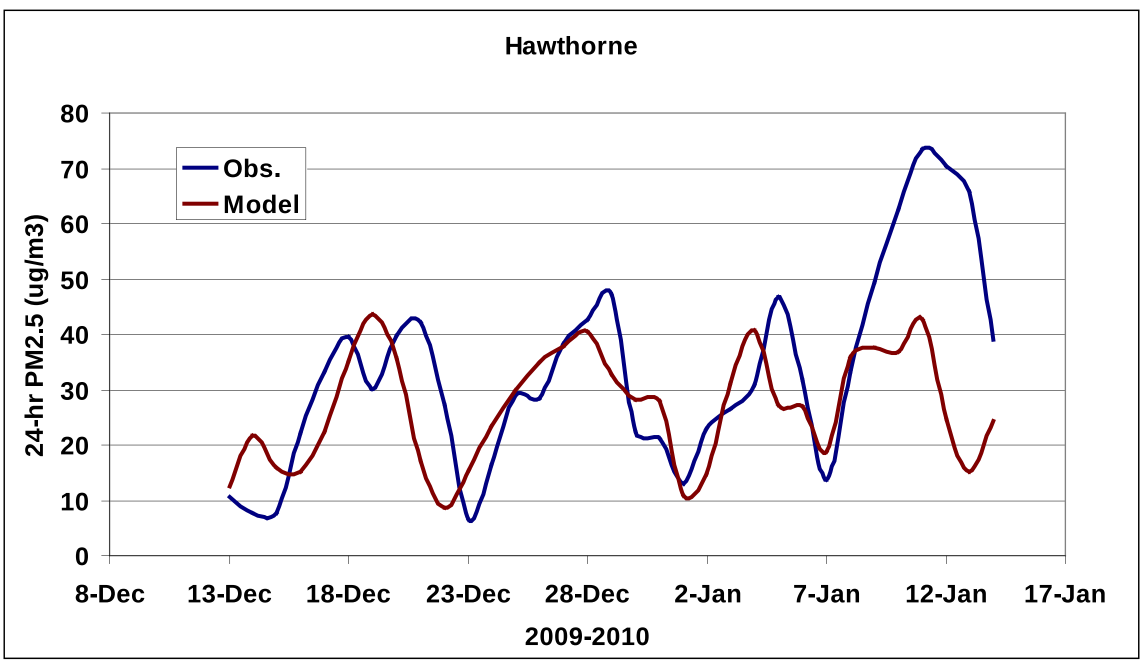


Figure 5.7: 24-hr PM2.5 time series (Hawthorne). Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

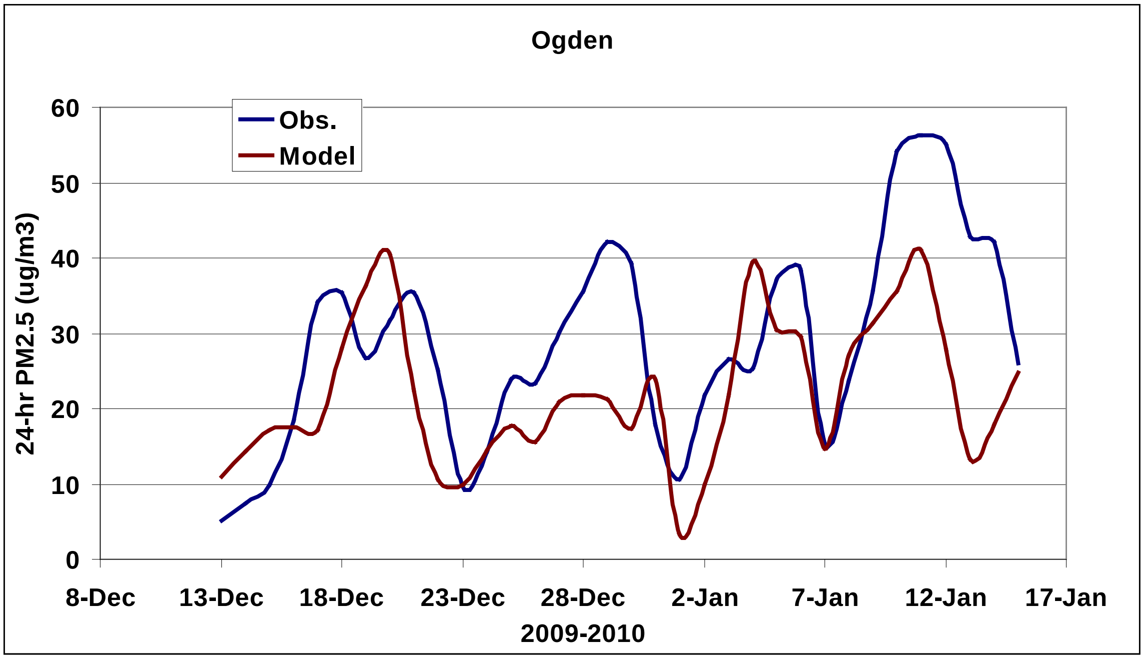


Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

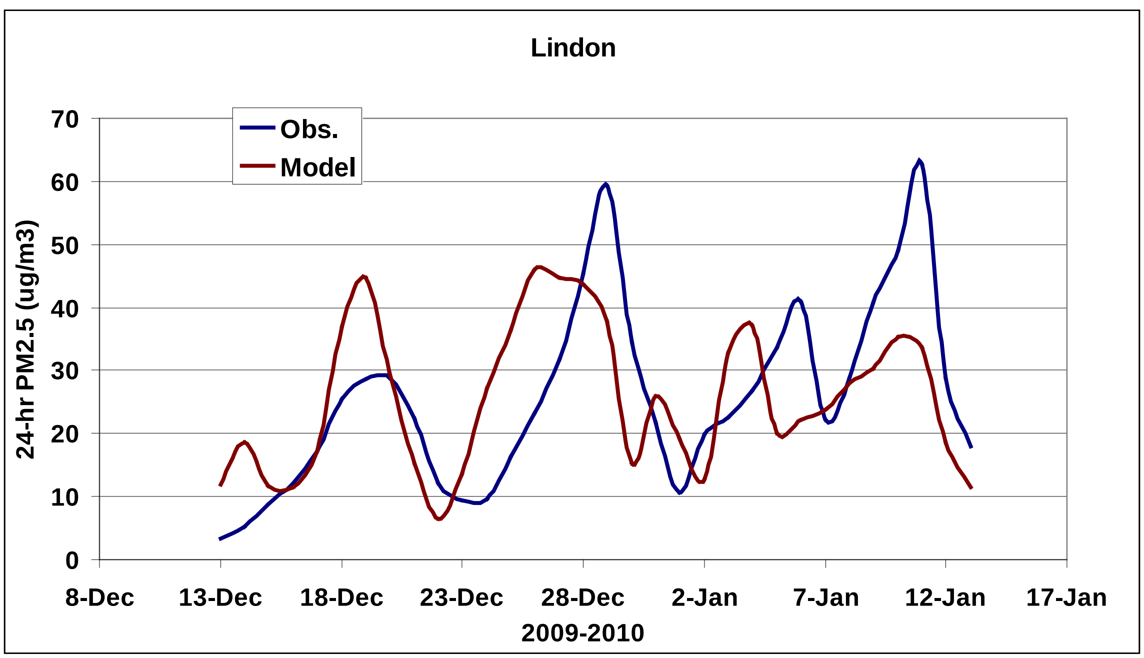


Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

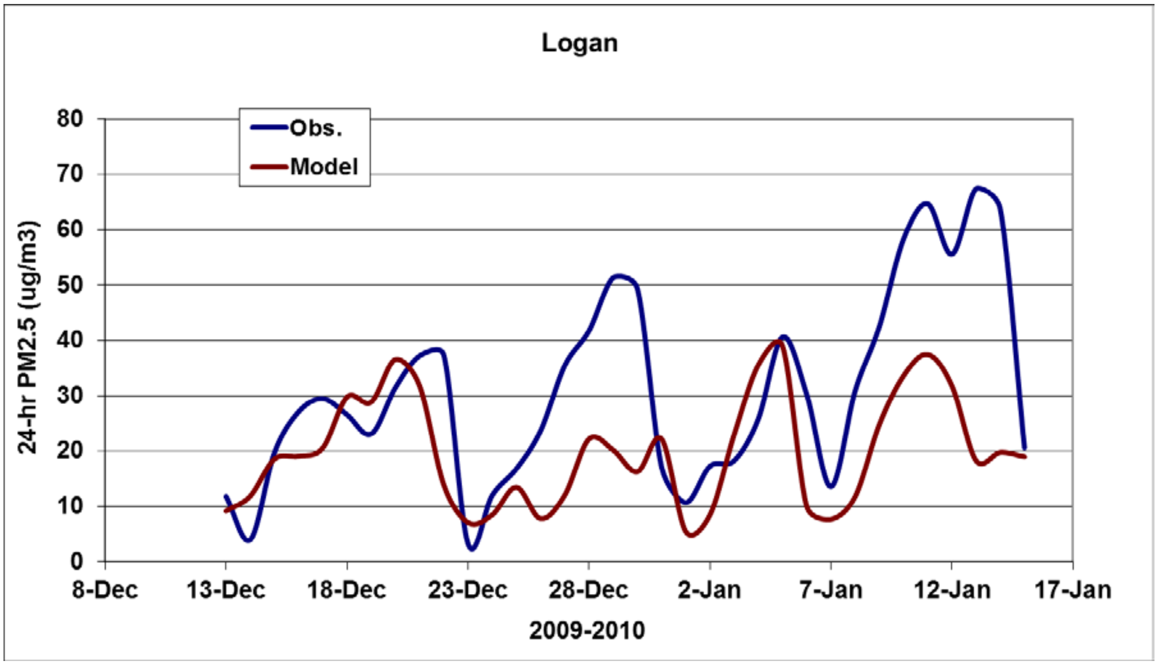


Figure 5.10: 24-hr $PM_{2.5}$ time series (Logan). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

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.

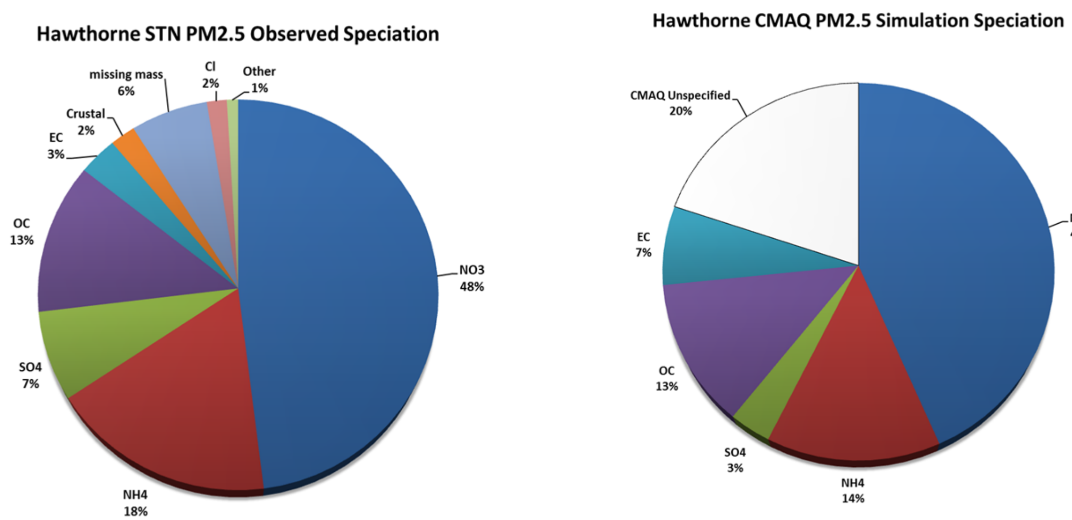


Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Hawthorne STN site.

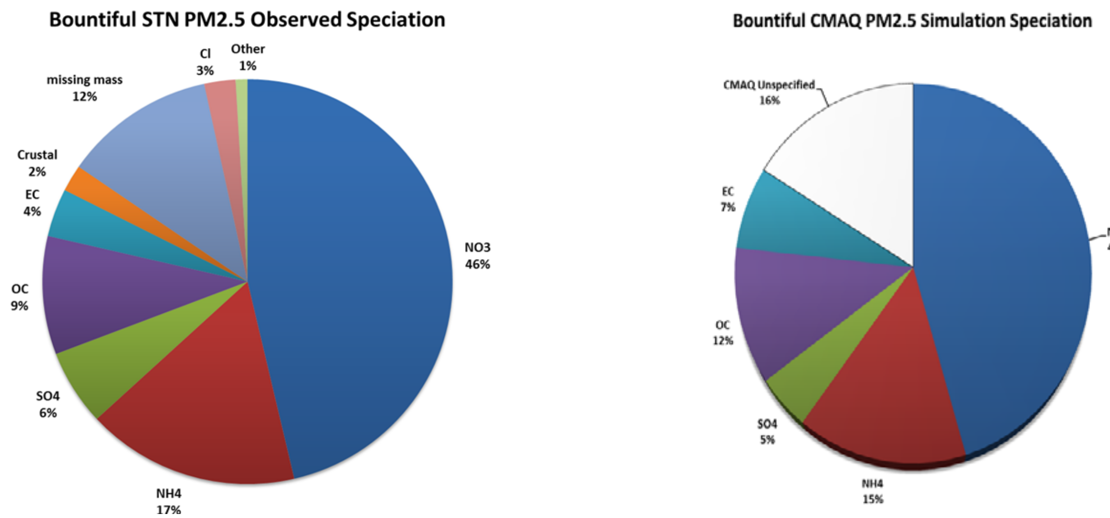


Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Bountiful STN site.

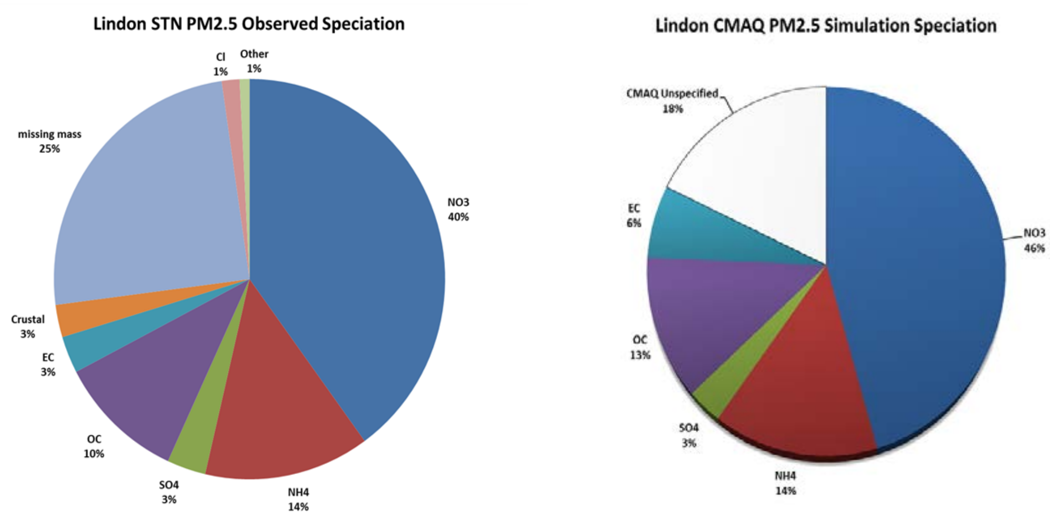


Figure 5.14: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Lindon STN site.

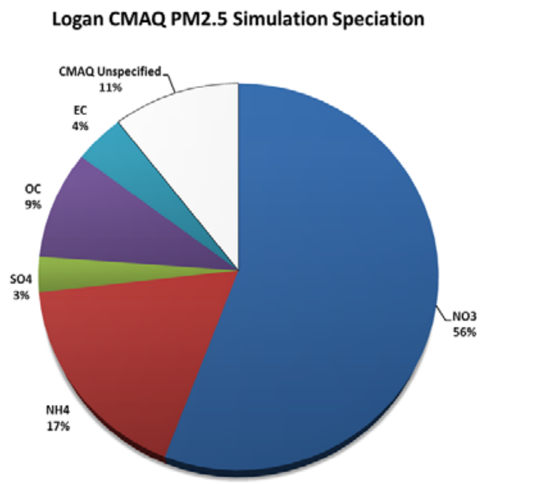


Figure 5.15: The composition of model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when a modeled day had 24-hr concentrations > 35 µg/m^3 at the Logan monitoring site. No observed speciation data is available for Logan.

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.

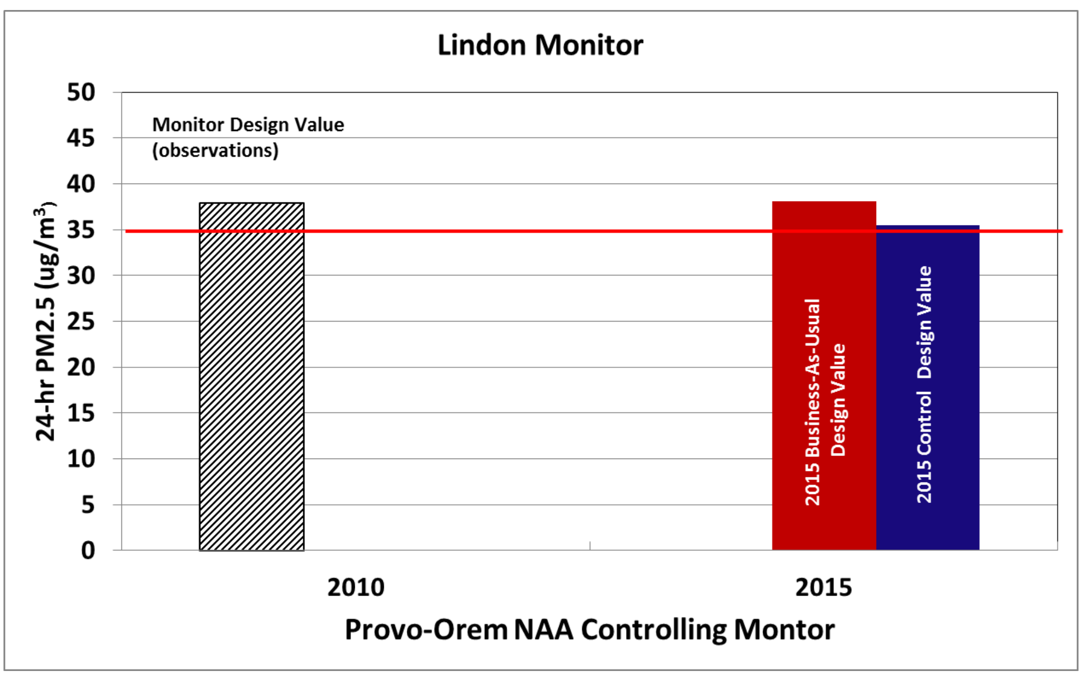


Figure 5.16, Model Results for the Provo, UT Nonattainment Area

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 (µg/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. 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.

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:

Stationary Point sources:

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 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.

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

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. 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 – No-burn days are presently called at 35 $\mu g/m^3$. By this time the area is already at the 24-hr health standard, and it is likely that air dispersion is very poor. As part of the control strategy for the SIP, rule R307-302 has been amended to change the no-burn call 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.

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, the most important of all the $PM_{2.5}$ precursors, 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.

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-074-14(a)

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: August 28, 2014 (Amended)

SUBJECT: PROPOSE FOR PUBLIC COMMENT: 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.

On December 14, 2009, EPA designated the Logan, UT $PM_{2.5}$ Nonattainment Area. Utah was required to submit a nonattainment plan for the area no later than three years from the date of nonattainment designation. The plan was to provide for the attainment of the National Ambient Air Quality Standard (NAAQS) as expeditiously as practicable.

For several years, the Utah Division of Air Quality (UDAQ), in consultation with many stakeholders along the Wasatch Front and with 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 the SIP, and it was subsequently submitted to EPA.

Subsequently, 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 the EPA should have implemented the $PM_{2.5}$ NAAQS based on *both* Clean Air Act (CAA) Subpart 1 *and* Subpart 4 of Part D, title 1. EPA had (incorrectly) required states to develop their SIPs based only on Subpart 1.

Utah was thus required to supplement its SIP in order to address the additional requirements of Subpart 4. The most fundamentally different feature of Subpart 4 is that it subdivides PM nonattainment areas into classes of “moderate” and “serious.”

In response to the court ruling, EPA issued a “Deadlines Rule” that: 1) classifies the Logan, UT-ID $PM_{2.5}$ Nonattainment Area as a moderate area, 2) establishes a deadline of December 31, 2014, for Utah to

submit the necessary SIP elements, and 3) establishes the attainment date as December 31, 2015.

UDAQ is recommending that the Board propose to replace the SIP it adopted on December 5, 2012, which addresses only Subpart 1 of Part D of the CAA, with the revised SIP attached herewith. This updated SIP considers both Subparts 1 and 4, and can therefore be acted upon by EPA in light of the D.C. Court's decision.

When the Board did approve the current version of the SIP, it was noted that the moderate area planning requirements of Subpart 4 would actually be quite similar to what they are when only Subpart 1 is considered.

Looking specifically at these planning requirements:

- Nonattainment New Source Review – No difference. Utah's permitting program already meets this requirement by operating under Appendix S to 40 CFR Part 51.

- Attainment Demonstration – The attainment demonstration originally prepared under Subpart 1 shows that the area could meet the 2006, 24-hour standard for $PM_{2.5}$ by 2014.

    - Under Subpart 4, the new attainment date is December 31, 2015. This revised SIP demonstrates that the area can attain the standard by December 31, 2015.

- RACM / RACT – Different only in the timing of its implementation. As noted above, the attainment date has changed from 2014 to 2015. The implementation date for RACM / RACT measures was adjusted accordingly.

- Reasonable Further Progress (RFP) / Quantitative Milestones – The December 5, 2012, plan demonstrated expeditious attainment in 2014. As such, the attainment demonstration had satisfied the requirement to show RFP. No intermediate milestones had been identified along the way to attainment.

    - Under the Subpart 4 planning requirements for moderate areas, RFP is again implicitly shown by a modeled demonstration of expeditious attainment in 2015.

    - A milestone is identified for 2017, at which time Utah will need to demonstrate that all measures in the approved plan have been implemented and that the milestone has been met.

- Contingency Measures – No difference. This requirement is the same in either case.

The revised SIP is fundamentally no different than the plan that was adopted on December 5, 2012. It has, however, been revised to address the planning requirements of Subpart 4 of Part D of the CAA, as well as the planning requirements of Subpart 1.

<u>Staff Recommendation</u>: Staff recommends the Board propose the repeal and replace of 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

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

List of Figures

List of Tables

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 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.

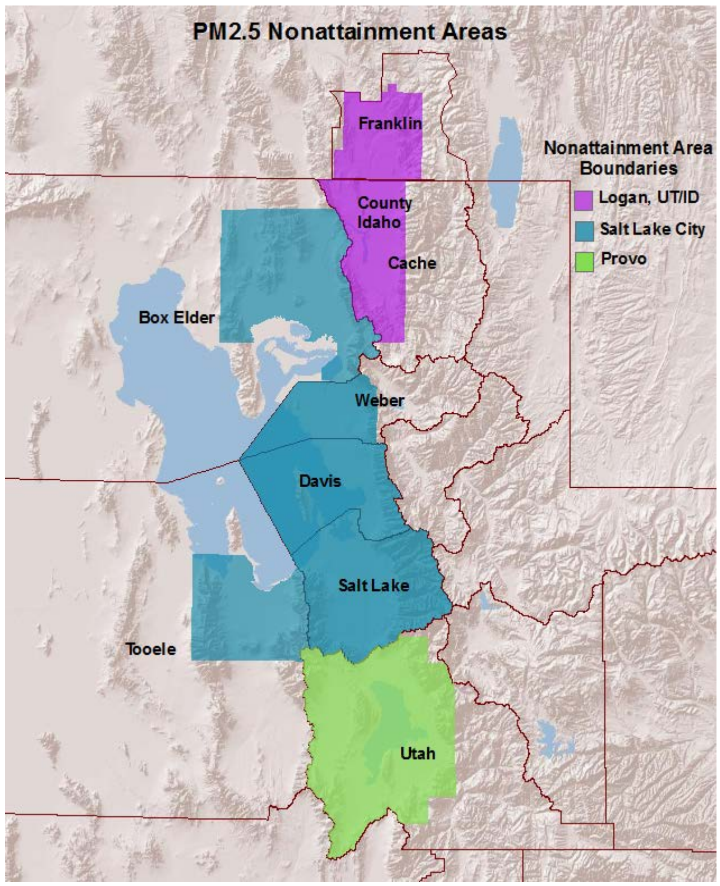


Figure 1.1, Nonattainment Areas for the 2006, $PM_{2.5}$ NAAQS

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 so 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.

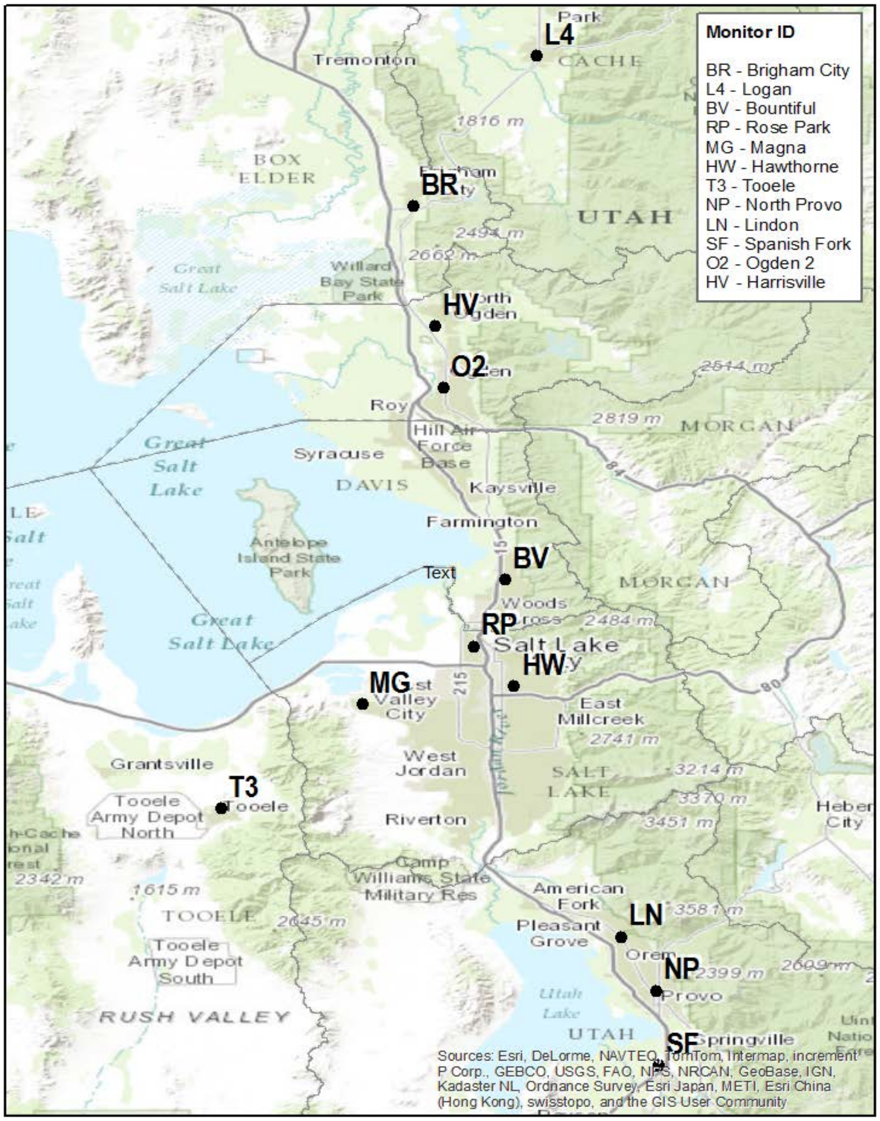


Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network

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 98^{th} percentile values is less than or equal to 35 µg/m^3. Each year's 98^{th} percentile is the daily value below which 98% of all daily values fall.

Table 3.2, below shows the running 3-year averages of 98^{th} 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.

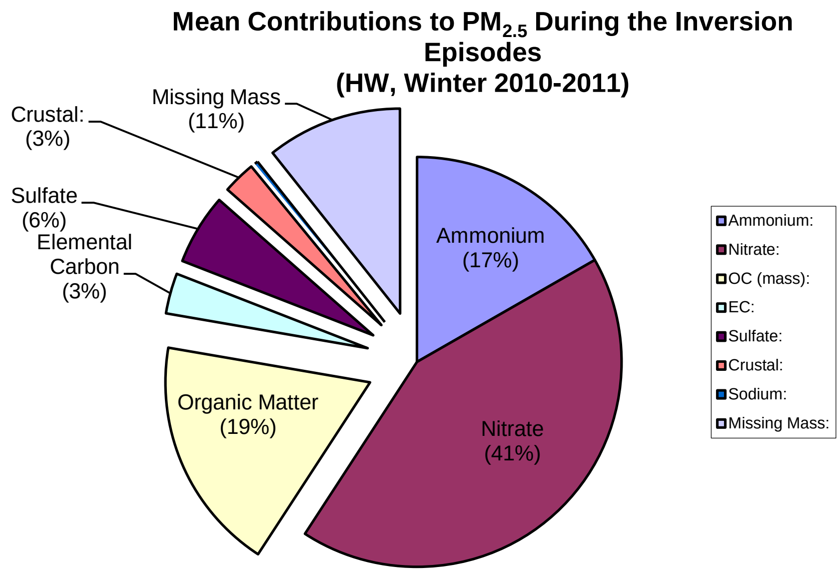
The $PM_{2.5}$ is collected on three types of filters: teflon, nylon, and quartz. Teflon filters are used to characterize the inorganic contents of $PM_{2.5}$. Nylon filters are used to quantify the amount of ammonium nitrate, and quartz filters are used to quantify the organic and inorganic carbon content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



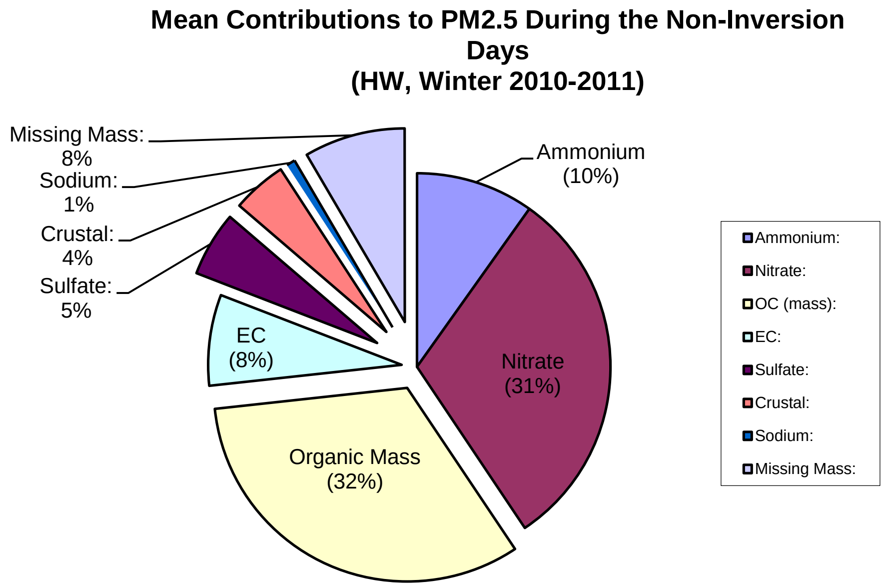


Figure 3.2, Composite Wintertime $PM_{2.5}$ Speciation Profiles

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 µg/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 µg/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 µg/m^3. On high $PM_{2.5}$ days (> 65 µg/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 an ongoing 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. 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 Sum of Emissions (tpd)	Logan, UT-ID						
		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 Sum of Emissions (tpd)	Provo, UT						
		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 Sum of Emissions (tpd)	Salt Lake City, UT						
		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 Sum of Emissions (tpd)	Surrounding Areas						
		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							

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

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

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.

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.

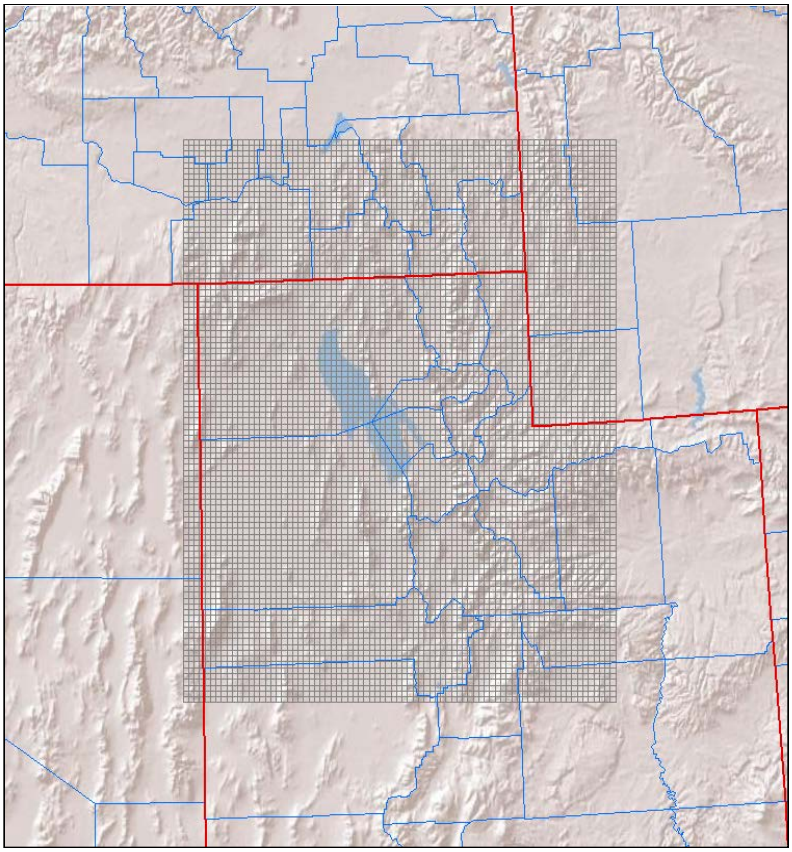


Figure 5.1: Northern Utah photochemical modeling domain.

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.

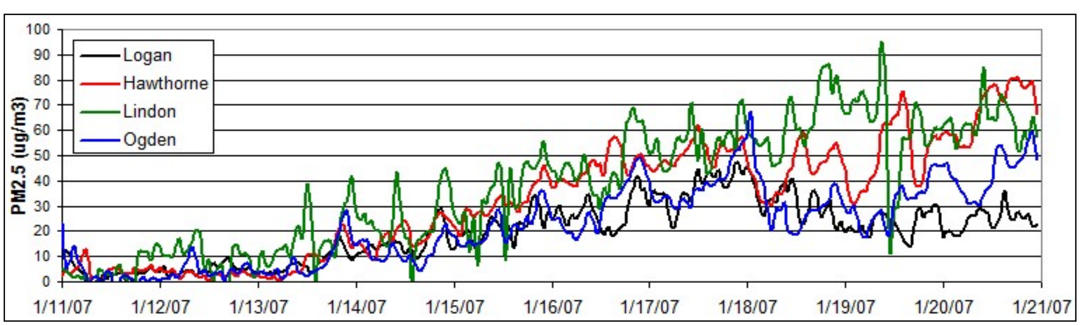


Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007

- **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.

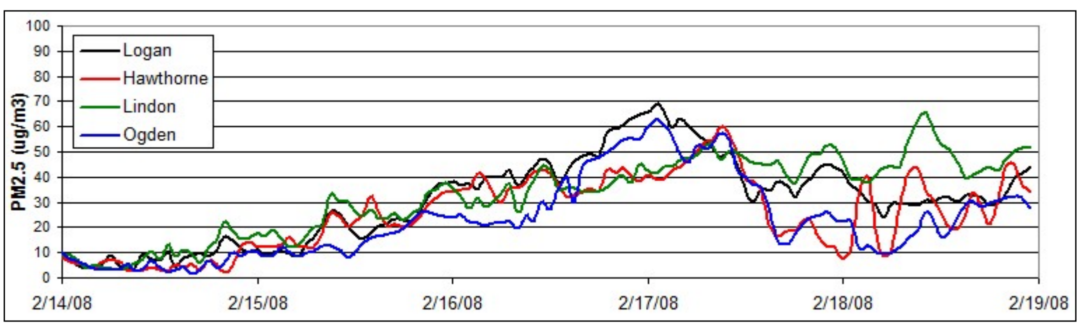


Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008

- **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.

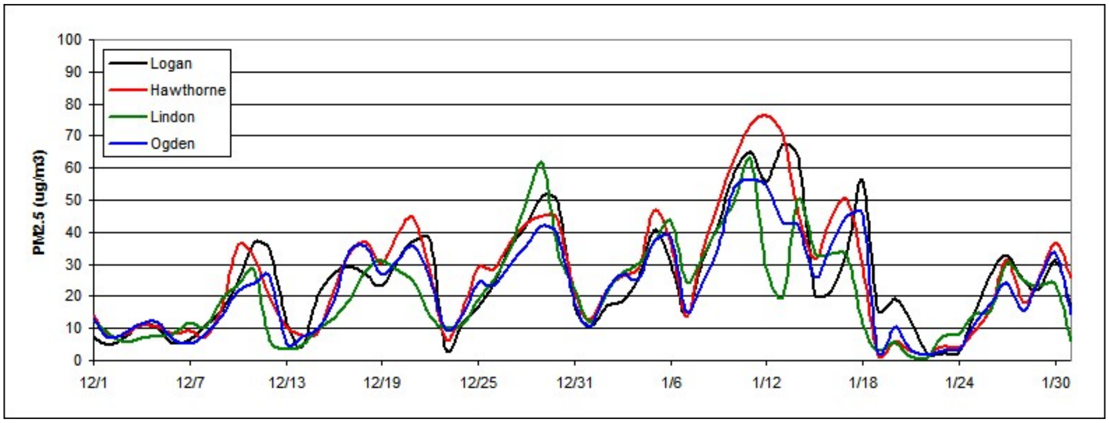


Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10.

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.

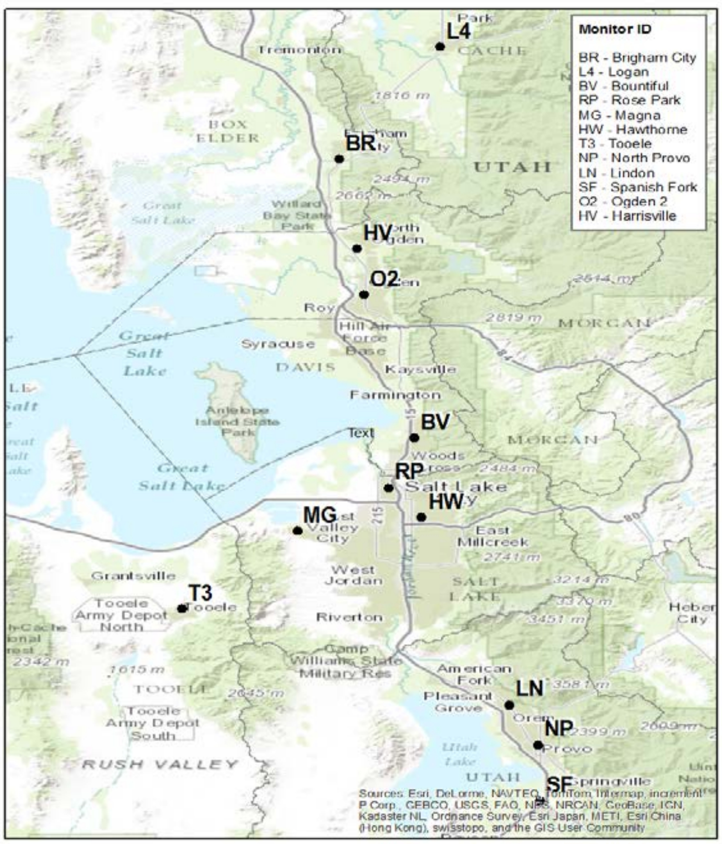


Figure 5.5: UDAQ monitoring network.

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.

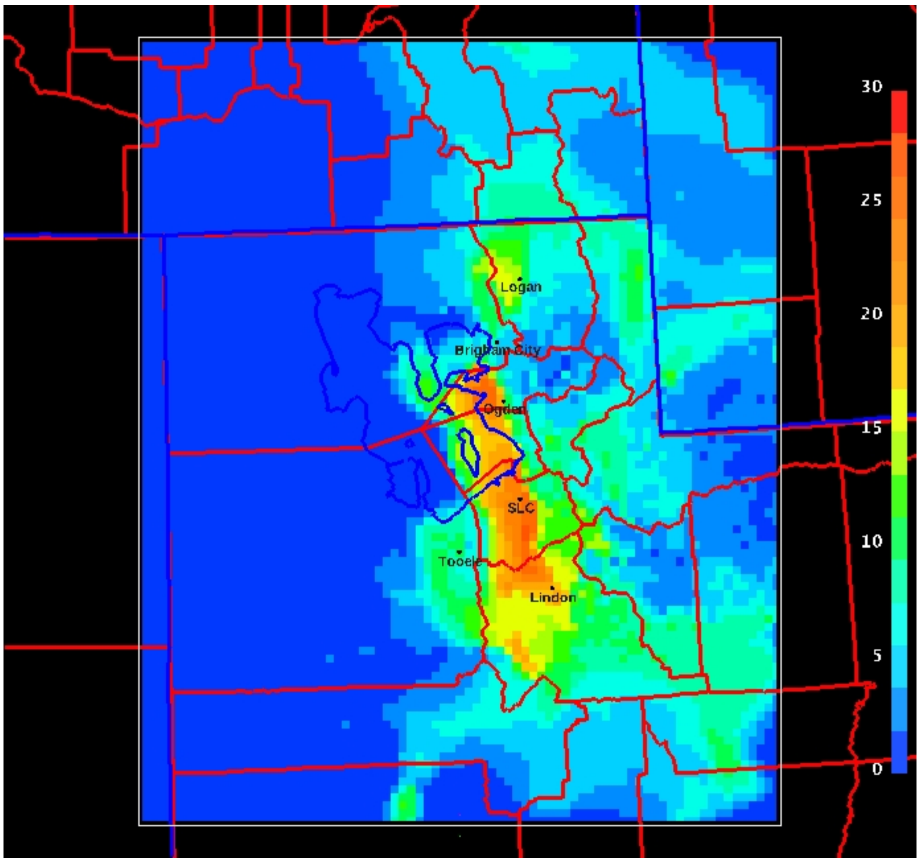


Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ ($\mu g/m^3$) for 2010 Jan. 03.

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.

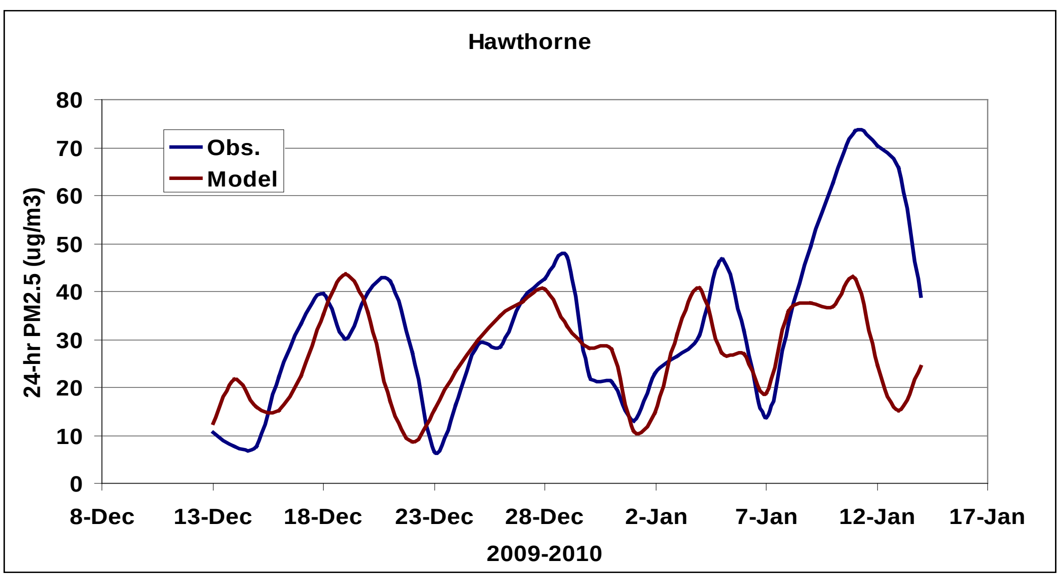


Figure 5.7: 24-hr PM2.5 time series (Hawthorne). Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

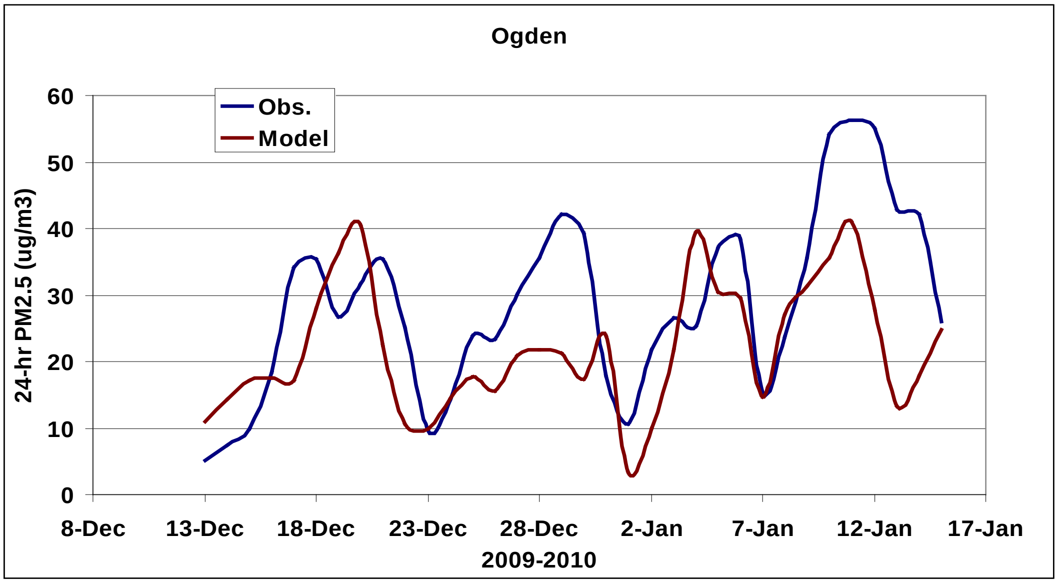


Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

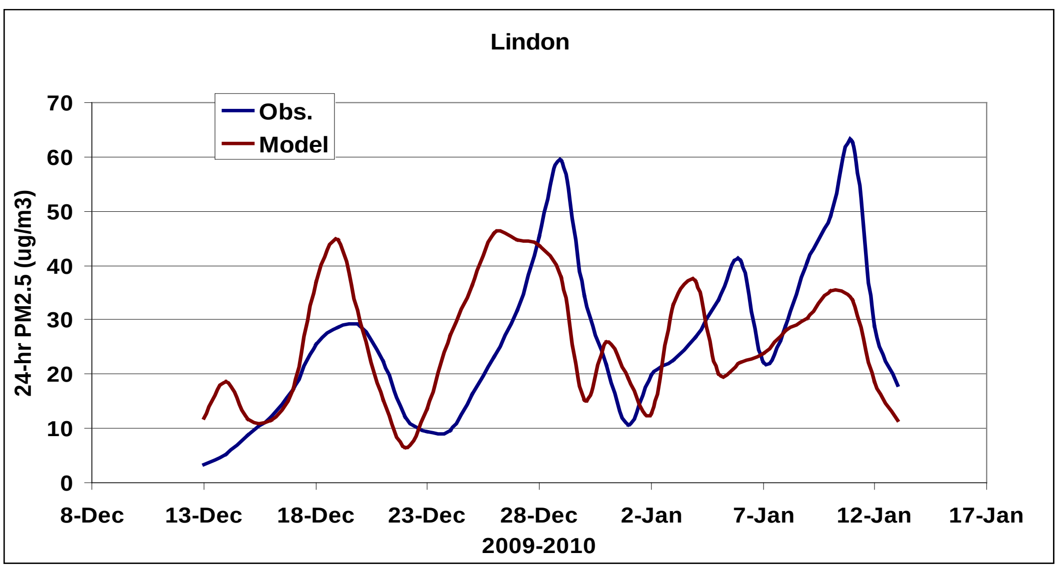


Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

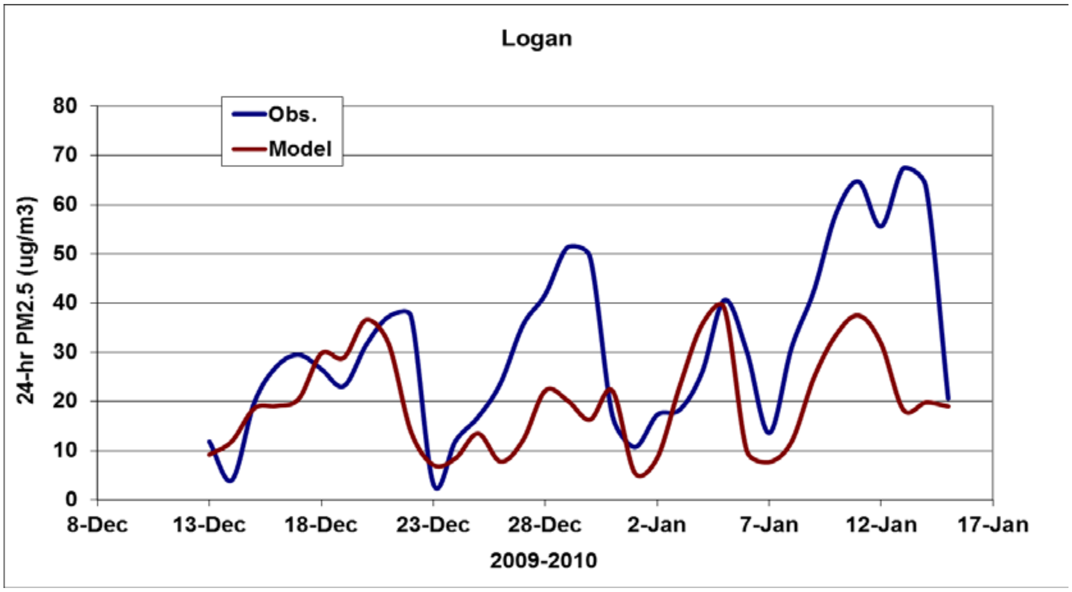


Figure 5.10: 24-hr $PM_{2.5}$ time series (Logan). Observed 24-hr $PM_{2.5}$ (blue trace) and CMAQ modeled 24-hr $PM_{2.5}$ (red trace).

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.

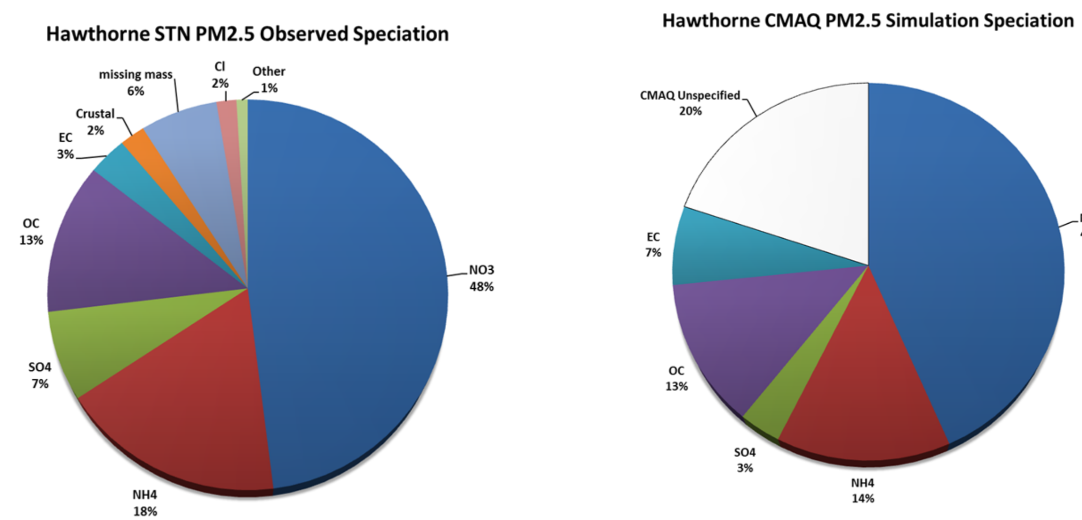


Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Hawthorne STN site.

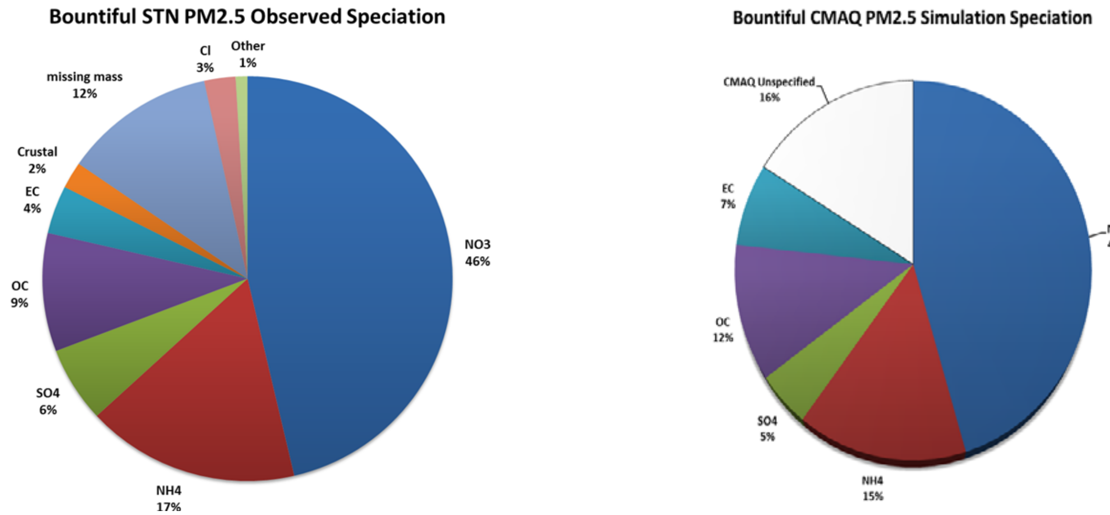


Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Bountiful STN site.

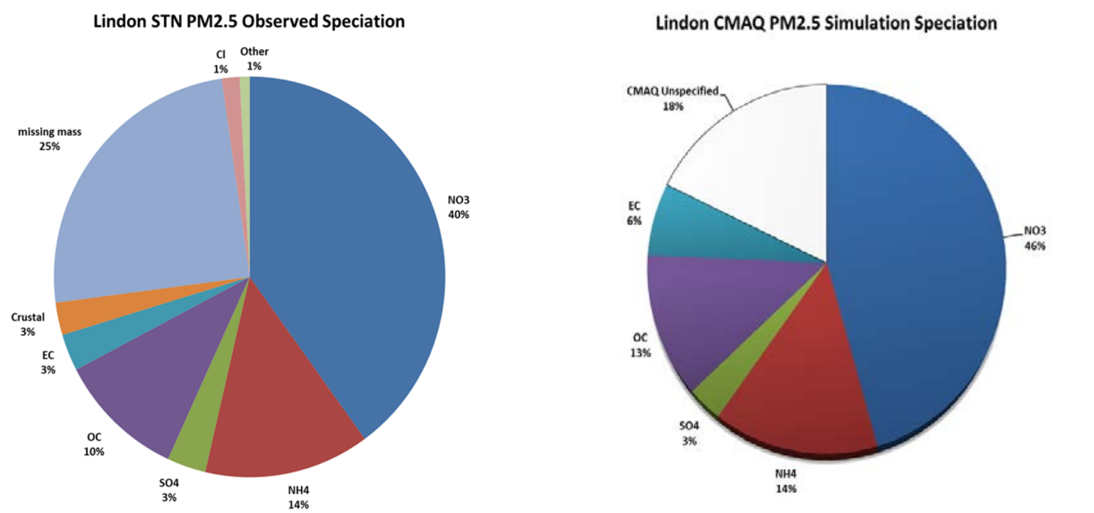


Figure 5.14: The composition of observed and model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when an observed and modeled day had 24-hr concentrations > 35 µg/m^3 at the Lindon STN site.

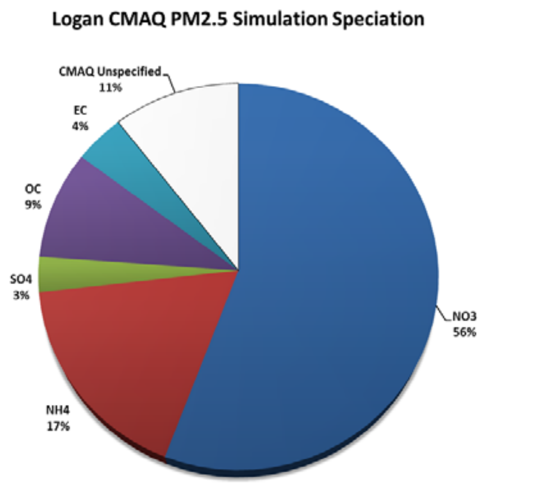


Figure 5.15: The composition of model simulated average 24-hr $PM_{2.5}$ speciation averaged over days when a modeled day had 24-hr concentrations > 35 µg/m^3 at the Logan monitoring site. No observed speciation data is available for Logan.

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.

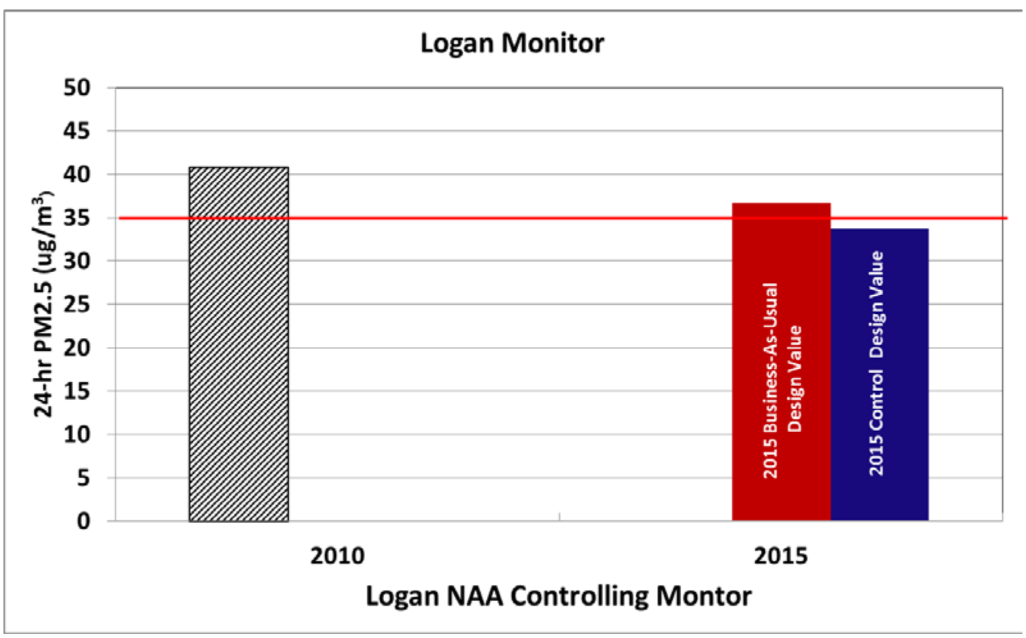


Figure 5.16, Model Results for the Logan, UT-ID Nonattainment Area

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.

Stationary Point Sources:

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.

<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.

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

Category	100,000 miles/10 years[1]					
	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 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.

<u>Area sources:</u>

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 0.21 tons per day for NO_x and 0.21 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: 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				

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 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 – No-burn days are presently called at 35 $\mu g/m^3$. By this time the area is already at the 24-hr health standard, and it is likely that air dispersion is very poor. As part of the control strategy for the SIP, rule R307-302 has been amended to change the no-burn call 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.

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, the most important of all the $PM_{2.5}$ precursors, 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.

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-075-14

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: August 25, 2014

SUBJECT: PROPOSE FOR PUBLIC COMMENT: 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.

On December 14, 2009, the Environmental Protection Agency (EPA) made its designations concerning areas that were not attaining the 2006, National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$. The Clean Air Act 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 January 8, 2014, the Board adopted SIP Subsections IX.H.11, 12, and 13, Control Measures for Area and Point Sources, Emission Limits and Operating Practices, $PM_{2.5}$ Requirements. These subsections of Part H meet the $PM_{2.5}$ plan requirements for specific stationary sources located in the Salt Lake City, UT nonattainment area and the Provo, UT nonattainment area[1]. That plan revision 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 the EPA should have implemented the $PM_{2.5}$ NAAQS based on *both* Clean Air Act (CAA) Subpart 1 *and* Subpart 4 of Part D, title 1. EPA had (incorrectly) required states to develop their SIPs based only on Subpart 1.

[1] Note that the Logan, UT-ID $PM_{2.5}$ nonattainment area was also part of EPA's December 14, 2009, area designation. Utah's SIP for that area identifies no specific RACT measures for any particular stationary sources. Therefore, these subparts of Part H do not apply to that area.

Utah was thus required to supplement its SIPs in order to address the additional requirements of Subpart 4. Sip Sections IX.A.21 and 22 (for the Salt Lake City and Provo nonattainment areas respectively) were revised accordingly, and Part H. 11, 12, and 13 have been updated as well.

When the Board did approve the current version of Part H, it was noted that the moderate area planning requirements of Subpart 4 would actually be quite similar to what they are when only Subpart 1 is considered.

Looking specifically at the planning requirements affecting enforceable emission limitations, control measures, and timetables for compliance:

The RACM / RACT requirement differs only in the timing of its implementation. The attainment date has advanced, under Subpart 4, from 2019 to 2015. The current SIP identified RACT measures, and set dates for the implementation thereof, within a scheme of Reasonable Further Progress that set milestones at 2014 and 2017 on the way to attainment in 2019. Thus, there are implementation targets that extend well beyond the RACT implementation date now set under Subpart 4 (December 14, 2013). UDAQ could have conceivably discarded these later measures as no longer feasible, yet elected to retain them (in SIP Section IX. Part H) to further progress in these areas toward attainment of the NAAQS.

The revised Part H is fundamentally no different than the plan that was adopted on January 8, 2014. It has, however, been revised to address some of the significant comments made by EPA concerning the January 8 plan. Most notably:

1. Part H had exempted the refineries from emission limits during startup and shutdown operations. The EPA commented that sources cannot be exempt from emission limits during startup or shutdown, and also asked UDAQ to evaluate the startup and shutdown requirements for all RACT sources included in the SIP. In response to this, UDAQ has evaluated the startup and shutdown conditions for all sources that underwent a RACT analysis, and revised Part H accordingly.

2. The second concern identified by the EPA concerned the timing of RACT implementation. In the SIP, many of the controls required of the stationary sources are not scheduled until 2018 or 2019. As the SIP was being developed, UDAQ determined that no matter what controls were required of the stationary sources, the attainment date could not be advanced. Therefore, UDAQ did not require sources to determine or document the most expeditious date by which the required controls could be installed. To address this shortcoming, UDAQ requested additional analysis from the stationary sources to identify the appropriate schedule for implementation. The UDAQ has reviewed this information and revised Part H appropriately. The additional documentation has been included in a supplement to the Technical Support Document.

A few additional changes were made to Part H in order to correct typographical errors and to clarify language.

Also, new language was added at Part H.11.g.vii so as to potentially not prevent refiners from producing gasoline that meets the sulfur specification of Tier 3 of the federal motor vehicle control program. EPA indicates that lower sulfur content markedly improves the emission performance of vehicles manufactured to meet, not only Tier 3, but Tier 2 as well.

Documentation summarizing the changes UDAQ has made to Part H has been added to the Technical Support Document.

Staff Recommendation: Staff recommends the Board propose 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.

Current List of Changes to Part H

On December 15, 2013, the DAQ submitted to EPA Region 8, Part H.11, 12, and 13 of the $PM_{2.5}$ State Implementation Plan (SIP) for the Salt Lake City and the Provo non-attainment areas. Upon receipt of the SIP, EPA identified two concerns with Part H of the SIP.

The first concern identified by EPA was that conditions in Part H exempted the refineries from emission limits during startup/shutdown operations. The EPA commented that sources cannot be exempt from emission limits during startup/shutdown, and also asked DAQ to evaluate startup/shutdown requirements for all reasonable available control technology (RACT) sources included in the SIP. The DAQ has removed the language from Part H that provides exemptions. The DAQ has also completed an evaluation of startup/shutdown conditions for all sources that underwent a RACT analysis and has incorporated conditions in Part H, where applicable, for startup/shutdown operations.

The second concern identified by the EPA was in regards to the RACT control implementation time frame. In the SIP, many of the controls required for major point sources to meet RACT are not required until 2018 or 2019. As the SIP was being developed, studies conducted by the DAQ to determine controls required to achieve attainment in the Salt Lake and Provo areas, showed that no matter what controls were required for point sources, the attainment date would not be advanced. Since the attainment date could not be advanced, the DAQ did not require sources to conduct a detailed analysis and determine the earliest date required controls could be installed. The EPA reported to the DAQ that RACT controls must be installed at the earliest date possible. The DAQ requested sources to provide documentation to show the earliest date controls could be installed. The DAQ has received and reviewed this documentation provided by the sources and revised RACT implementation time frames, where applicable, have been incorporated into Part H.

The DAQ has made a few additional changes to Part H to correct typographical errors and to clarify language. Also, new conditions were added to Part H.11.g.vii to allow refineries to modify plant operations to produce gasoline that meets the corporate average sulfur specification for Tier 3 of the federal motor vehicle control program.

This document summarizes the changes the DAQ has incorporated into Part H as a result of comments from EPA and the subsequent analysis of data received from affected sources.

General Refinery Requirements

Startup / Shutdown

In response to UDAQ's request for additional information regarding startup and shutdown language previously approved by the Air Quality Board on January 8, 2014, The Utah Petroleum Association submitted feedback and suggested changes to the general conditions found in Part H.11.g. for refineries. The following changes have been reviewed and found acceptable and appropriate:

- H.11.g.i.A.III – FCCU SO2 emissions: This paragraph was removed. All refineries operating a FCCU will meet the limits found in H.11.g.i.A.I whenever the FCCU is in operation as per the compliance methodology found in H.11.g.i.A.II.

- H.11.g.i.B.III – FCCU PM emissions: This paragraph was removed. All refineries operating a FCCU will meet the limits found in H.11.g.i.B.I whenever the FCCU is in operation as per the compliance methodology found in H.11.g.i.B.II. Old paragraph H.11.g.i.B.IV will be renumbered.

- H.11.g.ii.A – Refinery Fuel Gas: The words “except during periods of startup, shutdown or malfunction” have been removed. The limit now applies at all times.

- H.11.g.v.B – Hydrocarbon Flares: This section now reads as follows:

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.

These changes satisfy the comments received regarding startup and shutdown language for the refineries. No blanket startup or shutdown exemption to the limitations remains in effect. Such language does remain in effect for operation of the flares as safety/control devices when needed for control of upstream process units experiencing startup, shutdown or malfunction. As the operation of the flares under these circumstances is both appropriate and desired, retention of the language as shown above is also appropriate.

<u>Implementation Schedule</u>

Most of the implementation dates have been advanced. The refineries have already committed to implementing the changes found in this revised evaluation. Several of the less technically- and infrastructually-involved changes have already been completed or are in the final stages of being implemented at all major source refineries. Therefore, the limitations on refinery fuel gas (H.11.g.ii.A), heat exchangers (HH.11.g.iii.A), and leak detection and repair requirements (H.11.g.iv.A) have all had their implementation dates advanced. This date has advanced to January 1, 2015 (the anticipated implementation date of the moderate subpart IV SIP), for each of these requirements except the enhanced LDAR requirements found in Subpart GGGa. Each of the refineries is anticipating full implementation of Subpart GGGa during calendar year 2015, with full compliance taking approximately 9 to 12 months. An implementation date of January 1, 2016, was therefore selected, still two full years in advance of the original compliance date.

The FCCU requirements found in H.11.g.i, and the individual source-wide daily and annual SIP emission caps found in H.12.b, g, k, and r will remain with implementation dates of January 1, 2019. The changes at the FCCUs require large capital expenditures and long term construction projects on the part of the individual refineries: wet gas scrubber installation at both Holly and Tesoro, pall filter installation at Big West. These projects are not anticipated for completion until late in calendar year 2017 or early 2018. Following construction, a period of shakedown and testing will follow. Setting a static implementation date of January 1, 2019, for these requirements remains the most valid approach.

ATK Launch Systems Inc. – Promontory (ATK)

<u>Startup / Shutdown</u>

Boilers

The ATK will operate two 71 MMBTU/hr natural gas boilers to support manufacturing processes. One boiler in Building M-576 will be operated year round. The remaining boiler will provide steam for building heat, but will be shut-down during the warm weather months for maintenance. It typically takes two to three weeks for startup and about 24-hours/year for shutdown.

Operations Using VOC Compounds
These manufacturing operations include processes that utilize solvents for cleaning hardware. Solvents are applied manually by hand wiping with a rag, rinsing with a squeeze bottle or by dipping in an ambient temperature bath. Solvent containers are kept closed unless opened to add or remove material. Startup and shutdown emissions can't be distinguished separately from those emitted during normal operation.

Production Testing, Rocket Motor Testing, and OBOD
Testing is routinely performed on propellant samples for research and development or quality assurance reasons. Generally, testing is short duration; typically lasting a few seconds. The exception is when full scale flares are tested. Flare burns can last from two to seven minutes. Because of the short duration of most test events and the immediacy at which PEP reaches operating temperature, there is no way to differentiate emissions during startup and shutdown phases.

ATK periodically conducts test firings of fully assembled rocket motors. These tests typically last between one to two minutes. Due to the energetic nature of solid rocket propellant, nominal operating temperature and pressure is reached in the combustion chamber almost immediately following ignition. Therefore it is not possible to differentiate startup/shutdown emissions from normal operation.

Dust Collectors and Cyclones
The control units are required to undergo inspection prior to start-up to ensure the fidelity of pollution control equipment. Due to the nature of the processes involved, there is no increase in emissions as the control equipment starts up and shuts down. The control equipment provides the same efficient filtration for either event.

Implementation Schedule
Previously ATK was required to replace the boilers with boilers that have LNB and FGR by January 2017. ATK will now replace one boiler with ultra-low NO_x burners that will have an emission rate of 9 ppm. This boiler will be operational by January 2016. The other boiler will be limited to standby operation and shall not consume more than 100,000 MCF per rolling 12-month period unless upgraded so the NO_x emission rate is no greater than 30 ppm. This will reduce the NO_x emission rate for both boilers by 8.44 tons per year.

Big West Oil Refinery (BWO)

Startup / Shutdown
As with the other refineries, BWO elected to follow the general refinery requirements with respect to startup and shutdown considerations. However, as a part of the SIP RACT evaluation, BWO did elect to install and operate a redundant caustic scrubber system to work in conjunction with the SRU. This caustic scrubber will work as a backup unit for those periods when the SRU is out of service, effectively serving as startup and shutdown controls for the SRU. With the addition of this unit, BWO is able to most effectively meet the SRU SO_2 emission limit at all times – without additional startup or shutdown requirements.

Implementation Schedule
BWO is able to meet the accelerated implementation schedule imposed by the updates to Section IX.H.11.g – Refinery General Requirements. This includes fuel gas sulfur limits, heat exchanger monitoring, tank degassing, and the Subpart GGGa LDAR requirements. BWO is currently conducting engineering evaluations on flare gas recovery systems, and undergoing the initial construction efforts for installation of the pall Filter. As these final two components directly impact the establishment of the daily and annual emission caps found in Section IX.H.12.b for BWO, retention of the January 1, 2019, implementation dates for these items is appropriate.

Bountiful City Light and Power (BCLP)

Startup / Shutdown

In order to minimize emissions generated during startup and shutdown of the combustion turbines, BCLP has a defined emission minimization plan. The plan is similar in scope to those at all the smaller municipal power generation facilities, and consists of two main components: defining the periods which constitute startup and shutdown, and limiting the total duration of those periods on a daily basis.

As most startup and/or shutdown periods are of very short duration, standard stack testing cannot be used to obtain emission totals when operating in these modes. Similarly, requiring use of expensive, expanded operating range CEM equipment to obtain emission information is of limited use when the ultimate goal is emission reduction through limiting the total amount of time the turbines are operating in these modes.

Implementation Schedule

As an update to its original RACT submission in March of 2013, BCLP submitted new information dated April 25, 2014. In this most recent submission, BCLP demonstrated that IC #8 has been permanently retired from service at the plant, leaving only the combustion turbines as main power generators. This RACT review has been updated with respect to this information. The combustion turbines have been installed and operational since 2012, with no changes in operation or controls since installation.

CER Generation II, LLC (CER)

Startup / Shutdown

In order to minimize emissions generated during startup and shutdown of the combustion turbines, CER has a defined emission minimization plan. The plan consists of two main components: defining the periods which constitute startup and shutdown, and limiting the total duration of those periods on a daily basis.

The turbines at CER are controlled with SCR systems which require a minimum operating temperature before becoming effective. Limiting the total duration of startup insures that the turbine controls are in service promptly under the majority of operational conditions, by requiring that the turbines are brought up to temperature as expeditiously as possible.

Implementation Schedule

The turbines at CER are already installed and operational with all control systems in place. No implementation schedule is required.

Central Valley Water Reclamation Facility (CVWRF)

Startup / Shutdown

CVWRF operates the engines on a continuous basis with scheduled shutdowns for maintenance approximately every six weeks. Startup duration is less than two minutes and shutdowns are on an automatic four minute timer (manufacturer's recommendation).

Implementation Schedule

Current operations at the CVWRF have been determined to meet the requirements of RACT, there is no further implementation schedule proposed.

Chemical Lime Company (LHoist North America)

Startup / Shutdown

RACT established the installation of SNCR on the rotary kiln along with a baghouse. Kiln emissions will be exhausted through the baghouse during all startup, shutdown, and operation of the kiln. Consequently, no special startup and shutdown provisions are necessary for the baghouse technology.

SNCR technology is based upon the NO_x exhaust gas stream being injected with either ammonia or urea, to convert the NO_x gases into gaseous nitrogen and water vapor. The approximate temperature range where SNCR is effective is 1,600 - 2,100 degrees Fahrenheit. Operation at lower temperatures results in unreacted ammonia slip, and at higher temperatures, NO_x emissions can actually be increased. The limited temperature range in which SNCR is effective is reflected in Table 3 (Work Practice Standards) to 40 CFR 63 Subpart DDDDD (National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters) which prohibits use of SNCR during startup until the flue gas temperatures reach the appropriate range. Although this rule is for boilers and heaters, the basis for the requirement is due to the temperature range at which SNCR is effective. Shutdown provisions, means either a controlled reduction or a cessation of fuel combustion which reduces or ceases NO_x generation due to fuel combustion. Shutdown also reduces the temperature at which SNCR is effective.

Startup/shutdown provisions for SNCR technology will thus correspond to: (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.

Implementation Schedule

The timeline for compliance with the SNCR and baghouse control technologies for the Grantsville plant must cover the same time period and be completed concurrently, as installation of these controls during different time periods is not practical. As stated above, the timeline for the design, installation and testing of the SNCR is a 3-year time period. This includes the timeline for installation of baghouse control technology. Resumption of operations of the Grantsville plant will be dependent upon market conditions and the installation of RACT controls.

Chevron Products Company (Chevron)

Startup / Shutdown

As with the other refineries, Chevron has elected to follow the general refinery requirements with respect to startup and shutdown considerations. Chevron maintains a number of startup / shutdown and outage plan documents for the various components and process units within the refinery. These documents need to be adjusted to account for changes in feedstock, catalyst formulations, outage schedules, the effects of consent decrees, and the changes resulting from implementing RACT. Without the ability to adjust these documents to changing conditions, especially those brought about by competing regulatory requirements, the refinery would be unnecessarily burdened by a lengthy rulemaking process. Therefore, Chevron will follow the startup and shutdown requirements found in IX.H.11.g.

Implementation Schedule

Chevron is able to meet the accelerated implementation schedule imposed by the updates to Section IX.H.11.g – General Refinery Requirements. This includes fuel gas sulfur limits, heat exchanger monitoring, tank degassing, and the Subpart GGGa LDAR requirements. Chevron is currently undergoing an engineering analysis for flare gas recovery on the remaining hydrocarbon flare at the refinery. Chevron identified two additional RACT projects with multi-year schedules which prevent the refinery from undertaking an overall earlier implementation date. The projects include installation of SCR controls on the gas fired compressors in the reformer unit, and replacement of the #1, 2, and 4 boilers.

The installation of SCR will be completed by the end of 2014, but shakedown and testing would prevent an implementation date earlier than mid-2015. The boiler replacement project will not be completed until late-2017. As the annual and daily emission caps found in Section IX.H.12.g are dependent on the completion of these projects, and to maintain consistency between the refineries, the retention of the later January 1, 2019, implementation date is appropriate.

Great Salt Lake Minerals Corporation (GSLM)

Startup / Shutdown

RACT was established as baghouse and/or wet scrubber for PM control, and ultra low NOx burner technology for NOx control. None of these control strategies result in startup shutdown emissions because they are in operation either prior to or at the same time processes are in operation. In addition, GSLM has in place procedures that also include adherence to manufacturer's recommendations for operation and complete periodic equipment inspections. PM control equipment has enforceable PM emission rate limitations in both the approval order and Title V permits to verify the PM control efficiencies.

Implementation Schedule

GSLM is already implementing the NO_x boiler requirements as they were previously established in both the approval order and Title V permits.

With the exception of wet scrubber AH-013, all other baghouses and wet scrubbers currently meet the SIP limitation requirements. Therefore, the implementation of stack test requirements for all other baghouses and wet scrubbers can be moved up to be completed by January 1, 2015. The replacement of AH-013 is under design currently but implementation to verify the emission rate can be moved up one year to January 1, 2016.

Finally, the requirement to install ULNB technology on the dryers is also under preliminary design but the implementation date shall remain as originally required for January 1, 2017, to ensure the proper design, permitting, and installation of all the burners on site.

Hexcel Corporation (Hexcel)

Startup / Shutdown

Hexcel's standard operating procedure is to not start processing product until desired operating conditions have been achieved. For the fiber line operations, the startup sequence begins prior to the input or while passing of polyacrylonitrile (PAN) through the first oxidation oven. For the pre-preg operations the desired operating condition is achieved prior to passing pre-preg through the system. Similarly, shutdown of the system is conducted at a time when no product is running through the fiber lines or pre-preg processes. The natural gas fired oxidation ovens (LNB), low and high temperature furnaces (RTO and fume incinerators), and burner boxes are brought to temperature specification prior to fiber passing through the process. Therefore, during startup and shutdown of the carbon lines, small amounts of process related emissions are expected but are accounted for as "normal process emissions" in Hexcel's facility-wide process or natural gas emission/consumption enforceable limits, not excess emissions.

Oxidation Ovens

During startup the LNB ovens are brought to temperature prior to initiating PAN to pass through the process. It is critical for optimal processing of PAN for all systems to be at normal operating conditions to result in a desired fiber product. To compress the startup time, Hexcel brings the oxidation ovens to temperature in sequence within two hours. During startup of a cold oven, NO_x emissions tend to be lower because of lower oven temperatures and excess ambient air.

Low Temperature Carbonization Furnaces
Emissions from the low temperature carbonization furnaces are controlled by a dedicated fume incinerator (fiber lines 2, 3, 4, 5, 6, 7, 8, 10, 11, and 12) or a RTO (fiber lines 13 and 14). Hexcel's internal procedures require the incinerators/oxidizer be brought on-line and at permitting temperature as well as the baghouse to be operating prior to initiating fiber line operations. There will not be any excess (startup) emissions because emissions from natural gas combustion during this time will be similar or less than normal operations.

High Temperature Carbonization Furnaces
For each fiber line, a burner box is dedicated to each high temperature carbonization furnace. Fiber lines 13 and 14 have an additional RTO and baghouse controls. Hexcel's internal procedures require igniting the burner boxes and starting the RTO and baghouse prior to fiber being passed through high temperature carbonization furnaces. There will not be any excess (startup) emissions because emissions from natural gas combustion during this time will be similar or less than normal operations.

For shutdown, Hexcel follows an internal procedure to discontinue passing fiber through the process prior to control devices being shutdown (or cooled off).

Implementation Schedule
Hexcel's SIP limits do not have an implementation date associated with them because the limits are based on throughput and consumption which include two additional fiber lines (15 and 16) not currently in operation at the facility. However, Hexcel proposes to submit an application for the modification to add fiber lines 15 and 16 in the Fall of 2014, with expected construction by mid-2015.

Hill Air Force Base: Main Base (HAFB)

Startup / Shutdown
Startup and shutdown for painting and depainting operations were reviewed and determined that there is no time limit required for painting and depainting operations as no excess emissions result during these time frames.

Implementation Schedule
HAFB already meets RACT for all of its operations so no adjustment in implementation date is required.

Holly Refining & Marketing Company (Holly)

Startup / Shutdown
Holly supplied startup and shutdown information for most process units at the refinery. In most cases, the information provided matched up with the general refinery requirements already found in section IX.H.11.g. In those areas where Holly differed from the general requirements, the procedures provided by the refinery were best contained within a set of work practices maintained by the source. Attempting to include the complete procedures for implementing an orderly refinery shutdown or restart within the limitations of section IX.H.12 is beyond the scope of this review.

Implementation Schedule
As with the other refineries, Holly is able to meet the earlier deadlines for tank degassing, fuel gas sulfur content, heat exchanger monitoring, Subpart GGGa LDAR requirements, and SRU SO_2 emission limitations. Holly is the only refinery able to meet both the FCCU particulate and SO_2 emission limitations upon SIP issuance, as it has already installed both WGS control systems. Flare gas recovery and therefore the plant-wide emission caps established in IX.H.12.k are dependent on construction of a

new flare gas recovery system. This system is scheduled for completion in mid-2018. Retention of the January 1, 2019, implementation date for these items is therefore appropriate.

Kennecott Utah Copper LLC (KUC) – Bingham Canyon Mine

Startup / Shutdown

The Bingham Canyon Mine is designed to be operated 24 hours per day, seven days per week. Operations at the mine are on-going and do not go through periods of startup and shutdown. KUC has implemented a solid maintenance, inspection, and idling program for the haul trucks to minimize emissions including during periods when the trucks would startup and shutdown, such as periods of maintenance, fueling, and shift change. KUC has implemented an idling management program to reduce emissions.

Haul trucks and support equipment used at the facility meet the required EPA standards for non-road equipment. Good operating practice, including the maintenance and inspection program control emissions during startup and shut down of the equipment. The facility uses on-road specification diesel fuel for its off-road equipment. Use of ultra-low sulfur diesel fuel in all of the facility's diesel powered equipment controls emissions during operation, including startup and shutdown.

Implementation Schedule

KUC periodically upgrades its haul truck fleet to take advantage of available higher tier level, lower-emitting engines. In recent years, KUC has replaced haul trucks with a higher capacity where possible, which has led to a decrease in the round trips and truck operating hours, thereby reducing emissions.

As trucks are replaced, KUC is required to purchase the highest tier level trucks available that meet the production requirement, from certified manufactures. This will result in a NO_x reduction of at least 92.0 tons per year for 2020, but because the attainment date is 2019, these emissions cannot be counted for attainment goals.

Kennecott Utah Copper LLC-Power Plant

Startup / Shutdown

Power Plant

Occasionally a unit will need to be taken offline to make repairs. These are generally planned outages that are scheduled during low load hours if possible. The unit will be ramped down slowly in a controlled fashion to minimize impacts to equipment.

Unscheduled outages can be triggered by events outside of operator control. These generally cause the burner management system to initiate an instantaneous safety shut down. These trips will cause the automatic power down of the electrostatic precipitators to prevent a possible secondary raw fuel ignition. Once the root cause of the trip has been determined and mitigated the unit is put back online based on manufacturer's recommended procedures based on the conditions existing at the time the unit is re-started.

Units 1-3 have not been historically operated during the winter months. These are designed to be baseload units. Because these units were not designed for frequent startup and shutdown the units are often left online during low load hours of short duration (overnight), thus reducing frequency of startups and shutdowns. Units 1-3 will be decommissioned by 2017.

Low NO_x burners generally achieve NO_x emissions reduction through staged combustion and controlling the amount of oxygen in the primary combustion zone. KUC will achieve startup and shutdown NO_x

emissions reduction through the utilization of the existing Low NO_x burners, adherence to good combustion practices, and burning of pipeline-quality natural gas.

Unit 4 has not been historically operated during the winter months. This unit was designed to be a baseload unit. It was not designed for frequent startup and shutdowns and is usually left online during low load hours of short duration (overnight), thus reducing frequency of startups and shutdowns. Emissions of NO_x will be limited with add-on controls and operational controls with good combustion practices after January 1, 2018. These controls are currently not in place and procedures will be developed using information from emissions controls manufacturers. KUC will operate Unit 4 per manufacturer's recommendations to limit emissions of NO_x during periods of startup and shutdown.

Unit 5 is currently under construction and will be operated as a baseload unit. KUC will develop procedures for both normal operation and for periods for startup and shutdown using manufacturer's information to limit emissions during periods of startup and shutdown.

Tailings
Particulate emissions will be emitted from windblown dust at the tailings site. There are no procedures for startup/shutdown at the tailings site.

Bonneville Borrow Plant (BBP)
The crusher and screening plant emissions will be controlled by a baghouse when the BBP begins operations. There are no startup/shutdown procedures for this baghouse.

A fugitive dust control plan will be developed to minimize emissions from the haul roads. Water and chemical dust suppressant will be applied on a scheduled basis to control dust.

Implementation Schedule
Power Plant
Units 1, 2, and 3 will be taken off line by January 1, 2018, or upon commencing operations of Unit 5, whichever is sooner. Unit 4 will be upgraded after Unit 5 has come on line. In order to operate Unit 4, KUC will be required to meet the emission limits set for the upgraded Unit 4 by January 1, 2018.

Tailings
There are no additional controls scheduled for the tailings site.

Bonneville Borrow Plant
There are no additional controls scheduled for the BBP site.

Kennecott Utah Copper: Smelter, Refinery & MAP

Startup / Shutdown
MAP
The Molybdenum Autoclave Processing (MAP) plant is under construction and is not scheduled to become operational until after 2016. When in operation the MAP unit is designed to be operated 24 hours per day and 365 days per year. The combined heat and power (CHP) has a turbine that is 9 ppm NO_x, and will be operated consistently, this will minimize emissions from the plant. The CHP unit may be shut down when it is scheduled for maintenance, planned plant shutdowns, and during periods of natural gas curtailments.

Low NO_x burners and good combustion practices will control emissions during startup/shutdown. Good combustion practice and proper operation of the unit include good engineering design, adherence to operation and maintenance procedures, inspections, use of clean burning fuel, and burner optimization. Standard operating procedures will be developed for the CHP unit to ensure operation in accordance with the above practices.

Refinery

The refinery boilers are designed to be operated 24 hours per day, seven days per week to meet steam demands of the facility. The boiler load is adjusted based on the facility steam demand and the combined heat and power unit operations. The boilers may undergo a shutdown for maintenance activities, planned facility shutdowns, or if affected due to a natural gas curtailment. These operating practices limit the emissions for startup/shutdown procedures.

Flue gas recirculation (FGR), low NO_x burners, and good combustion practices will control emissions during startup/shutdown. Good combustion practices and proper operation of the boiler include good engineering design, adherence to operation and maintenance procedures, inspections, use of clean burning fuel, and burner optimization.

The standard operating procedures for the boilers were developed by KUC to ensure that these units are operated in accordance to the above practices. Operation of the boilers with good combustion practices is identified as effective in minimizing emissions during periods of startup and shutdown. These practices are already in place and effective in minimizing emissions during periods of startup and shutdown.

The refinery CHP unit is designed to be operated 24 hours per day, seven days per week. CHP may be shut down for scheduled maintenance activities, planned facility shutdowns, or if affected due to a natural gas curtailment.

Low NO_x burners and good combustion practices will control emissions during startup/shutdown. Good combustion practice and proper operation of the unit include good engineering design, adherence to operation and maintenance procedures, inspections, use of clean burning fuel, and burner optimization. Standard operating procedures will be developed for the CHP unit to ensure operation in accordance with the above practices. These practices are already in place and effective in minimizing emissions during periods of startup and shutdown.

Smelter

The smelter and associated equipment is designed to operate on a consistent basis. The operations are run in shutdown or startup modes during scheduled maintenance, plant shutdowns, and during periods of natural gas curtailments

The emissions for the smelter main stack, acid plant, and Holman boiler are limited during startup/shutdown by hourly limits for NO_x and/or SO_2 that are monitored by CEMs.

Specific procedures for startup and shutdown have been developed for the smelter. These procedures are developed based on design of its operation and best management practices.

<u>Implementation Schedule</u>

MAP

There are no additional required upgrades for the MAP plant. The existing equipment and controls at the MAP are recommended to meet the requirements of RACT. Therefore, an implementation schedule has not been proposed.

Refinery
There are no additional required upgrades for the refinery. The existing equipment and controls at the refinery are recommended to meet the requirements of RACT. Therefore, an implementation schedule has not been proposed.

Smelter
Based on a RACT analysis, there are no additional required upgrades for the smelter. The existing equipment and controls at the refinery are recommended to meet the requirements of RACT. Therefore, an implementation schedule has not been proposed.

Nucor Steel

Startup / Shutdown

EAF
The EAF and associated equipment are designed to operate on a continuous basis. The operations are in shutdown or startup modes only during scheduled maintenance, plant shutdowns and during periods of natural gas curtailment. The emissions for the EAF are limited during startup/shutdown by hourly limits for NO_x and/or SO_2 that are monitored by CEMs. Specific procedures for startup and shutdown have been developed for the EAF. These procedures are developed based on design of its operations and best management practices.

Reheat Furnaces
The reheat furnaces 1 and 2 are designed to operate on a consistent basis. The operations are in shutdown or startup modes during scheduled maintenance, plant shutdowns, and during periods of natural gas curtailments

Specific procedures for startup and shutdown have been developed for the reheat furnaces. These procedures are developed based on design of its operations and best management practices.

Implementation Schedule

EAF
Based on a RACT analysis, there are no required upgrades for the EAF. The existing equipment and controls for EAF are recommended to meet the requirements of RACT. Therefore, an implementation schedule has not been proposed.

Reheat Furnaces
Based on a RACT analysis, there are no required upgrades for the reheat furnace. The existing equipment and controls for the reheat furnaces are recommended to meet the requirements of RACT. Therefore, an implementation schedule has not been proposed.

Olympia Sales Company: Cabinet Manufacturing Facility

Startup / Shutdown

Process emissions from the mill, door, and sanding areas shall be exhausted through the baghouse during all startup, shutdown, and operations of the plant.

Implementation Schedule

By January 1, 2015, a baghouse control device shall be in operation for control of the process exhaust streams from the mill, door, and sanding areas.

PacifiCorp Energy: Gadsby Power Plant (PacifiCorp)

Startup / Shutdown

The Gadsby plant's Units 1, 2, and 3 natural gas fired boilers have limits which apply at all times – whether the units are operating in steady-state mode or during periods of startup or shutdown. Therefore, no special consideration is required for these units during alternate operating periods.

On the other hand, the combustion turbines (Units 4, 5, and 6) have emission limits for NO_x which apply during steady-state operation. These emission limits do not apply during periods of startup and shutdown because the catalyst in the SCR system requires a minimum operating temperature to effectively remove NO_x.

In order to minimize emissions generated during startup and shutdown of the combustion turbines, PacifiCorp has defined an emission minimization plan. The plan consists of two main components: defining the periods which constitute startup and shutdown, and limiting the total duration of those periods on a daily basis.

Although the turbines are simple cycle, and therefore similar in design to those used at other power generation facilities, PacifiCorp desired to specifically define both startup and shutdown in order to provide operational flexibility.

Implementation Schedule

The Unit 1, 2, and 3 boilers are already operating at RACT. No implementation schedule is required for these units.

It is the determination of this document that the catalyst beds on the Units 4, 5, and 6 SCR systems be extended. PacifiCorp has determined that this can most expeditiously be accomplished during the facility's next regularly scheduled maintenance outage, which will occur in April 2015. In order to allow for possible scheduling mishaps, delays, and other unforeseen difficulties, the implementation date listed in IX.H.12.q.iv.D will be changed from January 1, 2017, to January 1, 2016. This provides PacifiCorp approximately eight (8) months to install and test the modified catalyst beds.

Tesoro Refining and Marketing (Tesoro)

Startup / Shutdown

For startup and shutdown, Tesoro elected to follow the general refinery requirements with respect to startup and shutdown considerations in section IX.H.11.g.

Implementation Schedule

The Tesoro refinery currently meets the tank degassing, fuel gas sulfur limit, FCCU PM emission limit, and heat exchanger monitoring requirements of section IX.H.11.g. The refinery is in the process of installing the remaining control systems listed in the refinery general requirements. Flare gas recovery is scheduled for installation by November 2015. NO_x controls for the ultraformer unit are scheduled for May of 2015. Subpart GGGa implementation is ongoing, with completion expected in late Spring 2015. However, the plant-wide daily and annual emission caps listed in section IX.H.12.r are dependent on installation of the WGS on the FCCU for control of NO_x and SO_2 emissions. Tesoro has not yet identified an outlet for the purge water from the WGS and will likely be forced to rely on deep well injection. Approval and construction of the full WGS system and injection well will not be completed until, at the earliest, sometime in 2018. Therefore, retention of the existing January 1, 2019, implementation date for these remaining items is appropriate.

Procter & Gamble Paper Products Company

Startup / Shutdown

Startup for the boilers and paper machines requires a 30 minute period prior to normal operation for the equipment to reach steady state. Shutdown for the boilers is instantaneous and requires no time period.

Shutdown for the paper machines requires a 30 minutes diversion of the hot air to the dryer startup stack prior to equipment shutdown.

Implementation Schedule

Proctor and Gamble Paper Products Company already meets RACT for all of its operations so an implementation schedule has not been proposed.

University of Utah (U of U)

Startup / Shutdown

Building 303 LCHWTP

Units 3, 4, and 5 are designed to be baseload units. Because these units were not designed for frequent startup and shutdown, the units are often left online during low load hours of short duration (overnight), thus reducing frequency of startups and shutdowns.

The cogeneration unit was designed to be a baseload unit. It was not designed for frequent startup and shutdown and is typically left online during low load hours of short duration (overnight), thus reducing frequency of startups and shutdowns.

Unit 5 is currently under construction and will be operated as a baseload unit. The U of U will develop procedures for both normal operation and for periods for startup and shutdown using manufacturer's information to limit emissions during periods of startup and shutdown.

Building 302 UCHWTP

Units 1, 3, and 4 are designed to be baseload units. Because these units were not designed for frequent startup and shutdown the units are often left online during low load hours of short duration (overnight), thus reducing frequency of startups and shutdowns.

Implementation Schedule

Building 303 LCHWTP

Unit 5 has been decommissioned and is being replaced with two smaller units. In order to operate Unit 5a and 5b, the U of U will be required to meet the emission limits set for the upgraded units by performing a stack test within six months of commencing operation which will be sometime in 2017.

Unit 4 is scheduled to be decommissioned in 2016 and will be upgraded with two smaller boilers after Unit 5 has come on line. In order to operate Unit 4a and 4b, the U of U will be required to meet the emission limits set for the upgraded units by performing a stack within six months of commencing operation which will be sometime in 2018.

Building 302 UCHWTP

Unit 4 was updated in 2013 with a combustion control system with automatic O2 trim. Units 1 and 3 have been updated during 2014 with a combustion control system with automatic O2 trim. Building 302 units already meet RACT and so an implementation schedule has not been proposed.

Vulcraft and Nucor Building Systems

Startup / Shutdown

Wire Line, Coil Line, and Bar Line

The filters in the baghouses are not removed during startup or shutdown activities, and they provide the same efficient filtration whether just starting the equipment, operating the shot blasters, or shutting down the equipment.

Spray Booths - Built Up Line

The filters in the spray booth are not removed during startup or shutdown activities, and they provide the same efficient filtration whether just starting the equipment, operating the spray equipment, or shutting down the equipment.

Dip Tanks at Joist and Truss Painting Equipment and the Accessory Dip Tank

The dip tanks do not have a startup/shutdown process. The tank lids are removed during the painting process and placed back on the tank at the end of shift.

Bridging Line System, Drying Ovens at Built Up Line and at Purlin Line

These are natural gas ovens that are started up for parts drying, and shutdown at the end of shift. There is not a "startup" or "shutdown" process.

Flow Coaters

Flow coaters are instantly turned on and off to coat steel with paint, and do not have a "startup" or "shutdown" process.

Implementation Schedule

Based on the RACT analysis, there are no required upgrades for the processes at Vulcraft or Nucor Building Systems. The existing equipment and controls meet the requirements of RACT. Therefore, an implementation schedule has not been proposed.

Wasatch Integrated Waste Management District (Wasatch)

Startup / Shutdown

Wasatch has implemented several changes to ensure startup/shutdown procedures are consistent with best available control for each of the emission control units.

Gas Suspension Absorber (GSA) and PAC Injection

The GSAs are semi-dry scrubbers which inject hydrated lime slurry into the hot gas stream. The water in the slurry evaporates, providing a cooling and conditioning function, leaving the now dry reagent to be removed from the flue gas, downstream of the reactor, in a cyclone. The collected dry reagent is then fed back into the reactor directly above the slurry nozzle creating a circulating fluidized bed of reagent particles.

The circulating bed and the injection of lime slurry can only be maintained above certain minimum flows and temperatures. During startup/shutdown of the units there is a point at which the gas velocity is not sufficient to entrain the circulating bed and a temperature below which the moisture is not adequately evaporated from the slurry, causing material build-up problems within the reactor. The control system for the GSA automatically shuts down or starts up the feeder screws, slurry pumps, and PAC feeder based upon minimum required gas flows and temperature.

The facility operations and maintenance manual has been reviewed and modified to ensure the GSA is operated as long as possible during startup/shutdown.

By ensuring the GSA and PAC injection systems are operating at all times possible constitutes best available control during startup/shutdown operations at the Davis Energy Recovery Facility (ERF).

Electrostatic Precipitator (ESP)

Each unit is equipped with an ESP for control of particulate emissions. The ESPs can be operated independently of flow and temperature, although they do lose efficiency as the temperatures drop.

The facility operations and maintenance manual has been reviewed and modified to ensure the ESP is operated as long as possible during startup/shutdown.

Ensuring the ESPs are operating at all times possible constitutes best available control during startup/shutdown operations at the Davis ERF.

Implementation Schedule

Wasatch will be required to install SNCR to meet applicable RACT requirements for control of NO_x emissions. Wasatch has identified and the DAQ concurs with the following milestones to bring the SNCR system on-line.

Wasatch is currently negotiating a contract with HAFB for the continued purchase of steam from the Davis ERF. It is anticipated that the contract will be effective October 1, 2014, and will provide for revenue sufficient for continued operation of the facility. Based upon this start date, the schedule for engineering, procurement, and installation is as follows:

Task	Time	Completion Date
Steam Contract Execution		October 2014
Preliminary Engineering	6 months	April 2015
Procurement and Contract Execution	12 months	April 2016
Construction and Installation	12 months	April 2017
Startup	3 months	July 2017

Brigham Young University (BYU)

Startup / Shutdown

Boilers

The BYU campus operates two natural gas boilers during the winter season to supply heat. The boilers provide steam for building heat, and are shutdown during the warm weather months for maintenance. This results in the boilers having an estimated 24 hours/year of startup operation and 24 hours/year of shutdown operation for each boiler.

The boilers are designed to be operated seven days per week to meet steam demands of the campus. The boiler load is adjusted based on the campus steam demand. The boilers may undergo a shutdown for maintenance activities, planned facility shutdowns, or if affected due to a natural gas curtailment. BYU has guidelines for the startup and shutdown of the boilers. These operating practices limit the emissions for startup/shutdown procedures.

Brewster Paint Booth
The filters in the spray booths are not removed during startup or shutdown activities and provide the same efficient filtration regardless of the mode of operation.

Implementation Schedule
Boilers
The boiler modifications to reduce NO_x are scheduled to be implemented by January 1, 2017. The selected controls and the implementation schedule will be further evaluated in future studies.

Brewster Paint Booth
Based on a RACT analysis, there are no required upgrades for the spray booths. The existing equipment and controls meet the requirements of RACT. Therefore, an implementation schedule has not been proposed.

Geneva Nitrogen Inc.: Geneva Nitrogen Plant

Startup / Shutdown
RACT was established as SCR control which is installed on each of the nitric acid plants. Typical SCR abatement catalysts have an operating temperature range of 650 degrees Fahrenheit to 720 degrees Fahrenheit while the low temperature abatement catalyst used allows for operation down to 300 degrees Fahrenheit. By using this low temperature catalyst, the abatement process can be initiated at the lowest temperature possible (earlier in the startup sequence) while avoiding ammonium nitrate and ammonium nitrite condensation temperatures. If the abatement process were allowed to start before the required condensation temperatures were reached, the process would have the potential of forming and precipitating nitrate and nitrite compounds that could become extremely unstable at operating conditions.

Geneva Nitrogen Inc. does everything possible to minimize startup emissions from the nitric acid plants by initiating the SCR abatement process as soon as temperature permits and by using pure clean water in the absorption process for maximum absorption efficiency during startup conditions.

The wet scrubbing system startup and shutdown emissions for $PM_{10}/PM_{2.5}$ from the ammonium nitrate prill tower do not differ from normal operating emissions. Therefore, the wet scrubbing system does not result in startup/shutdown emissions because it is in operation either prior to or at the same time the prill tower is in operation.

Implementation Schedule
Geneva Nitrogen Inc., is currently meeting RACT and does not require the installation/retrofit of additional equipment at this time. Therefore, an implementation schedule is not required for Geneva Nitrogen Inc.

PacifiCorp Energy: Lake Side Power Plant

Startup / Shutdown
As a combination mainline/peaking power generation station, the Lake Side facility has implemented a defined startup/shutdown emission minimization plan. This plan is fully defined through permitting, although certain specific requirements have been included in the Part H.13 limitations for the facility. The plan consists of the following:

> Defining that "steady state operation" does not include periods of "startup," "shutdown," or "short-term transient load excursions;"

Including definitions of those three terms as they apply to the facility;

Limiting the duration of those events on an annual basis, and for startup and shutdown on a daily basis; and

Providing a limit for NO_x emissions during transient load excursions.

These items are provided separately for blocks 1 and 2 as the two blocks are slightly different in power production potential; but the concept and execution of the plan is the same in both cases.

Implementation Schedule
The Lake Side facility is currently at RACT. All controls are in place and both production Blocks 1 and 2 are now in operation. No implementation schedule is required.

Pacific States Cast Iron Pipe Company (PSCIPCO)

Startup / Shutdown

Cupola
The cupola is controlled with a baghouse, afterburner and recuperative incinerator which are all interlinked electronically to the cupola such that they must be operable before blast air is first put to the coke bed for the purposes of melting iron in the cupola. In addition, the facility is subject to 40 CFR 63 Subpart EEEEE which requires operation of the cupola as to minimize emissions during startup and shutdown periods by creating a startup, shutdown, and malfunction plan (SSMP).

Desulfurization
The desulfurization process is controlled through a baghouse that is manually started prior to the release of molten iron from the cupola at the start of each day and is run continuously until the last of the molten iron has been cast for the day.

Annealing Furnace
The annealing oven utilizes LNB technology, including periods of startup and shutdown.

Special Lining Shotblast
The shotblast is controlled through a baghouse. The shotblast process is interlinked electronically to the baghouse such that it will not operate unless the baghouse is operating.

Coating Operations
The coating operation does not have startup or shutdown emissions, regardless, this operation is limited to a VOC limit at all times so any excess emissions are included in that limit.

Implementation Schedule
By January 1, 2015, all VOC shall be limited to 118.16 tons per rolling 12-month period. PSCIPCO currently is operating the annealing oven per the limitation of 63.29 MMBtu/hr.

Based on a RACT analysis, there are no additional controls required for the other equipment. Therefore, an implementation schedule has not been proposed.

Payson City Power (PCPP)

Startup / Shutdown

In order to minimize emissions generated during startup and shutdown of the IC engines, the PCPP is required to maintain a defined emission minimization plan. The plan is similar in scope to those at all the smaller municipal power generation facilities, and consists of two main components: limiting the total duration of startup and shutdown periods on an annual and daily basis, and ensuring that startups and shutdowns are summed across all of the IC engines at the facility.

As most startup and/or shutdown periods are of very short duration, standard stack testing cannot be used to obtain emission totals when operating in these modes. Similarly, requiring use of expensive, expanded operating range CEM equipment to obtain emission information is of limited use when the ultimate goal is emission reduction through limiting the total amount of time the IC engines are operating outside of steady-state.

In order to ensure a level of equity between the three municipal power generators in the Provo, Utah $PM_{2.5}$ nonattainment area the same set of assumptions were used to "scale up" existing operations. Each facility reported a similar number of total plant startups – approximately 150 to 200 per annum. This value was scaled up by calculating the following:

(Operational days/week) x (Potential Startups/day) x (Weeks/year) = startups per engine

(3) x (3) x (52) = 468 startups per year per engine at the facility. For PCPP's four engines, this value is 1872. Using a base assumption of 15 minutes as the amount of time required for startup and shutdown (or 30 minutes for both periods combined), a limit of six (6) hours per day and 936 hours per year can be assigned for total startup and shutdown events for all engines combined.

Implementation Schedule

PCPP has completed installing the oxidation catalysts on all four IC engines as of June 2014. Testing has been completed and the units are now fully operational with all required controls in place. No implementation schedule is required.

Provo City Power: Power Plant (PCP)

Startup / Shutdown

In order to minimize emissions generated during startup and shutdown of the IC engines, PCP is required to maintain a defined emission minimization plan. The plan is similar in scope to those at all the smaller municipal power generation facilities, and consists of two main components: limiting the total duration of startup and shutdown periods on an annual and daily basis, and ensuring that startups and shutdowns are summed across all of the IC engines at the facility.

As most startup and/or shutdown periods are of very short duration, standard stack testing cannot be used to obtain emission totals when operating in these modes. Similarly, requiring use of expensive, expanded operating range CEM equipment to obtain emission information is of limited use when the ultimate goal is emission reduction through limiting the total amount of time the IC engines are operating outside of steady-state.

In order to ensure a level of equity between the three municipal power generators in the Provo, Utah $PM_{2.5}$ nonattainment area the same set of assumptions were used to "scale up" existing operations. Each facility reported a similar number of total plant startups – approximately 150 to 200 per annum. This value was scaled up by calculating the following:

(Operational days/week) x (Potential Startups/day) x (Weeks/year) = startups per engine

(3) x (3) x (52) = 468 startups per year per engine at the facility. For PCP's four engines, this value is 1824. Using a base assumption of 15 minutes as the amount of time required for startup and shutdown (or 30 minutes for both periods combined), a limit of six (6) hours per day and 936 hours per year can be assigned for total startup and shutdown events for all engines combined.

Implementation Schedule

PCP completed installation of the oxidation catalysts on all four IC engines. Testing has been completed and the units are fully operational with all controls in place. No implementation schedule is required.

PCP has indicated that they are no longer operating the natural gas-fired boilers (Boilers 1, 2, and 3), and these items have been permanently removed from service. This RACT review has been updated to remove reference to these units.

Springville City Corporation (SCC)

Startup / Shutdown

In order to minimize emissions generated during startup and shutdown of the IC engines, SCC is required to maintain a defined emission minimization plan. The plan is similar in scope to those at all the smaller municipal power generation facilities, and consists of two main components: limiting the total duration of startup and shutdown periods on an annual and daily basis, and ensuring that startups and shutdowns are summed across all of the IC engines at the facility.

As most startup and/or shutdown periods are of very short duration, standard stack testing cannot be used to obtain emission totals when operating in these modes. Similarly, requiring use of expensive, expanded operating range CEM equipment to obtain emission information is of limited use when the ultimate goal is emission reduction through limiting the total amount of time the IC engines are operating outside of steady-state.

In order to ensure a level of equity between the three municipal power generators in the Provo, Utah $PM_{2.5}$ nonattainment area the same set of assumptions were used to "scale up" existing operations. Each facility reported a similar number of total plant startups – approximately 150 to 200 per annum. This value was scaled up by calculating the following:

(Operational days/week) x (Potential Startups/day) x (Weeks/year) = startups per engine

(3) x (3) x (52) = 468 startups per year per engine at the facility. For SCC's seven engines, this value is 3276. Using a base assumption of 15 minutes as the amount of time required for startup and shutdown (or 30 minutes for both periods combined), a limit of 10.5 hours per day and 1638 hours per year can be assigned for total startup and shutdown events for all engines combined.

Implementation Schedule

SCC has oxidation catalysts on three of the seven engines at the Whitehead Utility Center. No implementation deadline has been established under IX.H.13.g of the SIP for installation of oxidation catalysts due to questions about their future use. Therefore, no implementation schedule is required at this time.

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).

[~~III. SO_2 emissions during periods of Startup, Shutdown, or Malfunction shall not be used in determining compliance with the emission limits in I., II. above provided that during such periods the owner or operator implements good air pollution control practices to minimize SO_2 emissions.~~]

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. [~~PM emissions during periods of Startup, Shutdown, or Malfunction shall not be used in determining compliance with the emission limit of 1.0 pounds of PM per 1000 pounds of coke burned on a 3-hour average basis, provided that during such periods the owner or operator implements good air pollution control practices to minimize PM emissions.~~

~~IV.~~]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, [~~2018~~]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[~~, except during periods of startup, shutdown, or malfunction~~]. 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, [~~2018~~]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,[~~2018~~]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[~~of startup, shut down, or malfunction~~]. Flare gas recovery is not required for dedicated SRU [~~flares~~]flare and header systems, [~~SRU flare header systems, n~~]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^3 at 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. [~~After January 1, 2017, ATK shall either upgrade the two 71 MMBTU/hr boilers operated in Building M576 so that they have a NO_x emission rate not greater than 30 ppm or replace them with boilers that have a NO_x emission rate less than 30 ppm.~~]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 1, 201[~~7~~]5 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 1, 201[7]5. 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% O_2 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 $68^{o}F$, 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) $68^{o}F$, 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)	$PM_{2.5}$	every year
	SO_2	CEM
	NO_X	CEM
II. Acid Plant Tailgas	SO_2	CEM

III. Holman Boiler	NO_X	CEM or alternate method determined according to applicable NSPS standards

C. Startup/shutdown NO_x and SO_2 emissions are monitored by CEMS during startup/shutdown operations.

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	NO_X	9.5 lbs/hr
Combined Heat Plant	NO_X	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	NO_X	every three
years Combined Heat Plant	NO_X	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)[~~19.53 lbs/hr (24 hr. average filterable)~~]
2. 29.53 lbs/hr (condensable)[~~29.53 lbs/hr (filterable + 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, 201[~~7~~]6

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, [~~2019~~]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
<u>A.</u> Unit #1	NO_X	*	every three years
<u>B.</u> Unit #4	NO_X	January 1, 2017	every three years
<u>C.</u> 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.

<u>iv. Natural Gas-Fired Boilers</u>

<u>A. Central Heating Plant Natural Gas-Fired Boilers</u>

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 NO_x 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, 201[~~8~~]5, all VOC emissions [~~from all painting operations shall be routed through a thermal oxidizer before being discharged to the atmosphere.~~]shall be limited to 118.66 tons per rolling 12-month period.

A. [~~The thermal oxidizer shall at a minimum be 95% efficient in removing VOC emissions.~~]By the twentieth day of each month, a new 12-month total shall be calculated using data from the previous 12 months.

B. [~~After efficiency demonstration, a VOC limit shall be established by no later than January 1, 2019~~]Records shall be kept for all periods the plant is in operation.

ii. [~~By January 1, 2017, By January 1, 2017, at a minimum, low NOx burner with flue gas recirculation technology shall be in operation on the Annealing Oven~~]The Annealing Oven furnaces are limited to 63.29 MMBtu/hr.

iii. Emissions from the Annaeling Oven furnaces 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 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-076-14

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: August 25, 2014

SUBJECT: PROPOSE FOR PUBLIC COMMENT: Amend SIP Subsection IX.A.3. Control Measures for Area and Point Sources, Fine Particulate Matter, Utah County.

As last revised on July 3, 2002, the PM_{10} State Implementation Plan (SIP) for Utah County demonstrated that the area would continue to attain and maintain the 24-hour PM_{10} standard in the years 2002 and 2003. In addition, the model was run for the years 2010 and 2020 in order to redefine the motor vehicle emissions budgets in those years.

The mobile source emissions used in that demonstration were based on calculations made by MOBILE6. EPA has since revised the model used to estimate emissions from mobile sources. Motor Vehicle Emissions Simulator (MOVES) is the new tool that states will use as the basis for their SIPs. MOVES is fundamentally very different in its estimating techniques from the MOBILE model that preceded it, and indicates that there is much more NOx from motor vehicles than previously believed.

As a condition to receive federal transportation funding, the transportation conformity rules require Metropolitan Planning Organizations to demonstrate that the emissions associated with transportation plans, programs, and projects conform to emission budgets established in SIPs. These demonstrations must be made using the latest EPA-approved emissions model even if the budgets were founded on an older model; in essence, an apples to oranges comparison.

To alleviate this problem EPA has issued a “Policy Guidance on the Use of MOVES2010 and Subsequent Minor Revisions for State Implementation Plan Development, Transportation Conformity, and Other Purposes.”

This guidance addresses, among other things, instances where areas can revise their motor vehicle emissions inventories and budgets using MOVES without revising the entire SIP or completing additional modeling. This can be the case so long as:

1) The SIP continues to meet applicable requirements when the previous motor vehicle emissions inventories are replaced with MOVES base year and milestone, attainment, or maintenance year inventories; and,

2) The state can document that the growth and control strategy assumptions for non-motor vehicle sources continue to be valid and any minor updates do not change the overall conclusions of the SIP.

If both of the above criteria are met, the State can simply re-submit the original SIP with the revised MOVES motor vehicle emissions inventories.

The attainment and maintenance demonstration presented herewith revises the July 3, 2002, demonstration only by using MOVES2010 to re-calculate the motor vehicle emissions which had been based on MOBILE6.

The conclusions drawn by the demonstration remain the same, and therefore support the incorporated revision to the motor vehicle emissions budgets for the year 2020. Transportation planning requirements for the 2003 and 2010 horizons have already passed, so no revision to these budgets is necessary.

Supplement IV-14 to the Technical Support Document (TSD) has been created to contain the detailed calculations for the motor vehicle emissions inventories using MOVES2010 as well as the documentation addressing the two criteria listed above from the Policy Guidance.

All documentation related to the development of the July 3, 2002, revision to the Utah County PM_{10} SIP, including the non-motor vehicle emissions inventory, the Chemical Mass Balance model (CMB), and the control strategy effectiveness, is still presented in Supplement II-02 to the TSD.

Staff Recommendation: Staff recommends the Board propose to amend SIP Subsection IX.A.3, Control Measures for Area and Point Sources, Fine Particulate Matter, Utah County.

UTAH STATE IMPLEMENTATION PLAN

SECTION IX, PART A

FINE PARTICULATE MATTER (PM_{10})

Adopted by the Air Quality Board
December 3, 2014 [~~July 3, 2002~~]

TABLE OF CONTENTS

IX.A.3 UTAH COUNTY

This PM10 SIP for Utah County has been revised in accordance with EPA's "Policy Guidance on the Use of MOVES2010 and Subsequent Minor Revisions for State Implementation Plan Development, Transportation Conformity, and Other Purposes." This guidance addresses, among other things, instances where areas can revise their motor vehicle emissions inventories and budgets using MOVES without revising the entire SIP or completing additional modeling if:

1) The SIP continues to meet applicable requirements when the previous motor vehicle emissions inventories are replaced with MOVES base year and milestone, attainment, or maintenance year inventories; and,

2) The state can document that the growth and control strategy assumptions for non-motor vehicle sources continue to be valid and any minor updates do not change the overall conclusions of the SIP.

If both of the above criteria are met, the State can simply re-submit the original SIP with the revised MOVES motor vehicle emissions inventories.

The July 3, 2002 PM10 SIP for Utah County demonstrated that the area would continue to attain and maintain the 24-hour PM10 standard in 2002 and 2003. In addition, the model was run for the years 2010 and 2020 in order to redefine the motor vehicle emissions budgets in those years. These were the applicable requirements and they were based on motor vehicle emissions inventories calculated using MOBILE6.

The attainment and maintenance demonstration presented herein revises the July 3, 2002 demonstration only by using MOVES2010 to re-calculate the motor vehicle emissions that had been based on MOBILE6. The conclusions drawn by the demonstration remain the same, and therefore support the incorporated revision to the motor vehicle emissions budgets for the year 2020. The transportation planning requirements for the 2003 and 2010 horizons have already passed, so no revision to these budgets is necessary.

Supplement IV-14 to the Technical Support Document (TSD) has been created to contain the detailed calculations for the motor vehicle emissions inventories using MOVES2010 as well as the documentation addressing the two criteria listed above from the "Policy Guidance on the Use of MOVES2010 and Subsequent Minor Revisions for State Implementation Plan Development, Transportation Conformity, and Other Purposes."

All documentation related to the development of the July 3, 2002 revision to the Utah County PM10 SIP, including the non-motor vehicle emissions inventory, the Chemical Mass Balance model (CMB), and the control strategy effectiveness, is still presented in Supplement II-02 to the TSD.

[The documentation for the development of the emissions inventory, the Chemical Mass Balance model (CMB), MOBILE6 and other mobile emissions, and control strategy effectiveness for the July 3, 2002 revision to the Utah County portion of the PM_{10} SIP are contained in Supplement II-02 of the Technical Support Document. Detailed calculations for each sector of the emissions inventory for 2002, 2003 (and, for purposes of conformity, 2010 and 2020) are contained in Supplement II-02 of the TSD. These calculations document current planning assumptions about growth, current and projected controls, banked emissions relied upon in the attainment demonstration, etc. used in the projections. The Table of Contents of Supplement II-02 identifies where each sector is documented.]

IX.A.3.c. Source Apportionment Methodology

INVENTORY

Table IX.A.3 on the following two pages contains a base year and 2003 attainment inventory for Utah County. To obtain the vehicular emissions, MOVES2010[MOBILE6] was run in order to obtain a fleet emission factor for both the base year of 1989, and for future years as the fleet turns over with newer "low NO_x" vehicles replacing older "high NO_x" vehicles. NO_x control applied to the control strategy reflects the percentage of decrease in the emission factor relative to the base year factor of 1989 as well as any concurrent changes in vmt or vehicle speed. A detailed mobile source emissions inventory is contained in Supplement IV-14[II-02] to the Technical Support Document for this PM_{10} SIP.[The calculations to establish these inventories are contained in Supplement II-02 of the Technical Support Document.]

UTAH STATE DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
PM10 SIP
Winter of 88/89 Emissions Inventory

Site: **Utah County**
Period: Highest Days 1988/89
Date: 7/18/2014

---

(1) Area Source Emissions: **In Tons per Day (for January 1989)**

Vehicular	**PM10**	**SO2**	**NOx**	**Total**
Unleaded	1.153	0.243	12.620	14.0
Leaded	1.889	0.392	20.416	22.7
Diesel	0.187	0.035	1.591	1.8
Road Dust - baseline	3.004	0.0	0.0	3.0
Road Salting	0.3	0.0	0.0	0.3
Break Wear	0.0	0.0	0.0	0.0
Subtotal:	6.53	0.67	34.63	41.83
Area Sources:				
Wood Burning	2.70	0.04	0.22	2.96
Coal Burning	0.05	0.07	0.07	0.19
Natural Gas	0.24	0.02	3.00	3.26
Oil, LPG, and Other	0.02	0.18	0.08	0.28
planes, trains, & off-rd.	0.06	0.08	1.13	1.27
Subtotal:	3.07	0.39	4.50	7.96

Composite Automobile Profile Breakout:

Fuel Type	Conditions	% in Profile
Leaded	cold start	5.5
Leaded	hot, normal	25.3
Unleaded	cold start	3.4
Unleaded	hot, normal	15.6
Diesel	cold start	9.0
Diesel	hot, normal	41.2
Total		100.0

(2) Point Source Inventory:

Conversion Factor... annual to monthly found in this collumn

Annual Inventory for 1988

In Tons per Year

Company Name	PM10	SO2	NOx	Total	Conversion Factor	**PM10** (Tons per Year)	**SO2** (Tons per Year)	**NOx** (Tons per Year)	**Total** (Tons per Year)
BYU	0.3600	1.7500	1.0500	3.1600					
Consolidated Redi Mix	0.0400	0.0090	0.0820	0.1310					
General Refractories	0.3578	0.2503	0.6350	1.2431					
Geneva Rock	0.0250	0.0101	0.0965	0.1316					
Heckett	0.5128	0.0178	0.1811	0.7117					
Geneva Nitrogen (LaRoche)	0.2800	0.0000	3.2080	3.4880					
Lehi Cogen	0.0000	0.0000	0.0000	0.0000					
Pacific States Cast Iron Pipe	0.0850	0.0452	0.1299	0.2601					
Provo City Power	0.0093	0.0025	0.2540	0.2658					
Reilly Tar	0.0016	0.0001	0.0202	0.0219					
Springville City Power	0.0009	0.0023	0.1720	0.1752					
UP&L, Hale	0.0000	0.0000	0.0000	0.0000					
Westroc, Highland	0.0000	0.0000	0.0000	0.0000					
Westroc, Pleasent Grove	0.0138	0.0022	0.0227	0.0387					
Geneva Other	0.8655	0.0000	0.0000	0.8655	365	316			
Subtotal:	2.5517	2.0895	5.8514	10.4926					
Geneva Steel Processes:									
Coke Plant	2.0107	21.5973		23.6079	365	734	7,883		8,617
Open Hearth (Q-BOP)	0.6932			0.6932	365	253			253
Blast Furnace	0.9447			0.9447	365	345			345
Sinter Plant	0.3781			0.3781	365	138			138
Secondary Sulfate		3.1616		3.1616	365		1,154		1,154
Secondary Nitrate			12.5945	12.5945	365			4,597	4,597
Geneva Subtotal:	4.0266	24.7589	12.5945	41.3800		1,470	9,037	4,597	15,104
				42.2455					
Point Source Total:	6.5783	26.8484	18.4459	51.8726					
(3) Grand Totals (all sources):	16.1814	27.9092	57.5729	101.6636					

(4) Percent Breakout:

	PM10	SO2	NOx	Total
Vehicular	40.4%	2.4%	60.1%	41.1%
Area Sources	19.0%	1.4%	7.8%	7.8%
Geneva Steel	30.2%	88.7%	21.9%	41.6%
Other Point Sources	10.4%	7.5%	10.2%	9.5%
Sum	100.0%	100.0%	100.0%	100.0%

TABLE IX.A.3 (page 1 of 2)

UTAH STATE DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
PM10 SIP
Control Strategy Worksheet

Site: **Utah County**
Period: Highest Days 1988/89
Date: 7/18/2014
Projection: 2003

Note: Any name changes to industrial sources since 1989 are reflected here on this page, but not in the baseline (Winter 88/89) inventory on the previous page

Inventory Data to Demonstrate Control

	Post - SIP Allowable Inventory In Tons per Day				Baseline Inventory for 1989 In Tons per Day			
	PM10	**SO2**	**NOx**	**Total**	**PM10**	**SO2**	**NOx**	**Total**
BYU	0.0434	0.0019	1.0386	1.0840	0.3600	1.7500	1.0500	3.1600
Fifteen Fifty Associates	0.0345	0.0071	0.0671	0.1088	0.0400	0.0090	0.0820	0.1310
Utah Refractories	0.1564	0.0778	0.3689	0.6030	0.3578	0.2503	0.6350	1.2431
Geneva Rock	0.6035	0.5181	0.7365	1.8581	0.0250	0.0101	0.0965	0.1316
Heckett	0.3733	0.0162	0.1679	0.5574	0.5128	0.0178	0.1811	0.7117
Geneva Nitrogen (LaRoche	0.3154	0.0000	0.6475	0.9629	0.2800	0.0000	3.2080	3.4880
Lehi Cogen	0.0053	0.0176	0.8123	0.8352	0.0000	0.0000	0.0000	0.0000
Pacific States Cast Iron Pip	0.1582	0.0604	0.2953	0.5139	0.0850	0.0452	0.1299	0.2601
Provo City Pow er	0.0837	0.0182	2.4480	2.5499	0.0093	0.0025	0.2540	0.2658
Reilly Industries	0.0333	0.6300	0.3360	0.9993	0.0016	0.0001	0.0202	0.0219
Springville City Pow er	0.0209	0.0497	1.6875	1.7581	0.0009	0.0023	0.1720	0.1752
Pacificorp, Hale	0.0326	0.0038	2.1570	2.1934	0.0000	0.0000	0.0000	0.0000
Westroc, Highland	0.1757	0.0080	0.0844	0.2681	0.0000	0.0000	0.0000	0.0000
Westroc, Pleasent Grove	0.0564	0.0134	0.1321	0.2019	0.0138	0.0022	0.0227	0.0387
Geneva Other	1.1507			1.1507	0.8655	0.0000	0.0000	0.8655
Subtotal:	3.2432	1.4225	10.9790	15.6447	2.5517	2.0895	5.8514	10.4926
Geneva Steel Processes:								
Coke Gas Combustion	1.3463	1.2463		2.5926	2.0107	21.5973	0.0000	23.6079
Open Hearth (Q-BOP)	0.5627			0.5627	0.6932	0.0000	0.0000	0.6932
Blast Furnace	1.4616			1.4616	0.9447	0.0000	0.0000	0.9447
Sinter Plant	0.2767			0.2767	0.3781	0.0000	0.0000	0.3781
Secondary Sulfate		2.7244		2.7244	0.0000	3.1616	0.0000	3.1616
Secondary Nitrate			11.6005	11.6005	0.0000	0.0000	12.5945	12.5945
Geneva Subtotal:	3.6473	3.9707	11.6005	19.2186	4.0266	24.7589	12.5945	41.3800
				20.3693				42.2455
Area Sources:								
Wood Burning	3.87	0.06	0.32	4.25	2.70	0.04	0.22	2.96
Coal Burning	0.07	0.10	0.10	0.27	0.05	0.07	0.07	0.19
Natural Gas	0.34	0.02	4.31	4.67	0.24	0.02	3.00	3.26
Oil, LPG, and Other	0.02	0.26	0.12	0.40	0.02	0.18	0.08	0.28
planes, trains, & off-rd.	0.08	0.08	1.07	1.23	0.06	0.08	1.13	1.27
Subtotal:	4.38	0.52	5.92	10.82	3.07	0.39	4.50	7.96
Mobile Sources:								
Tailpipe PM10	1.79			1.79	3.23			3.23
Tire Wear	0.06			0.06	0.03			0.03
Re-entrained Road Dust	6.15			6.15	3.27			3.27
SO2		0.72		0.72		0.67		0.67
NOx			35.05	35.05			34.63	34.63
Subtotal:	8.00	0.72	35.05	43.77	6.53	0.67	34.63	41.83

TABLE IX.A.3 (Page 2 of 2)

IX.A.3.d. Monitoring Site Source Apportionment and Attainment Demonstration

LINDON

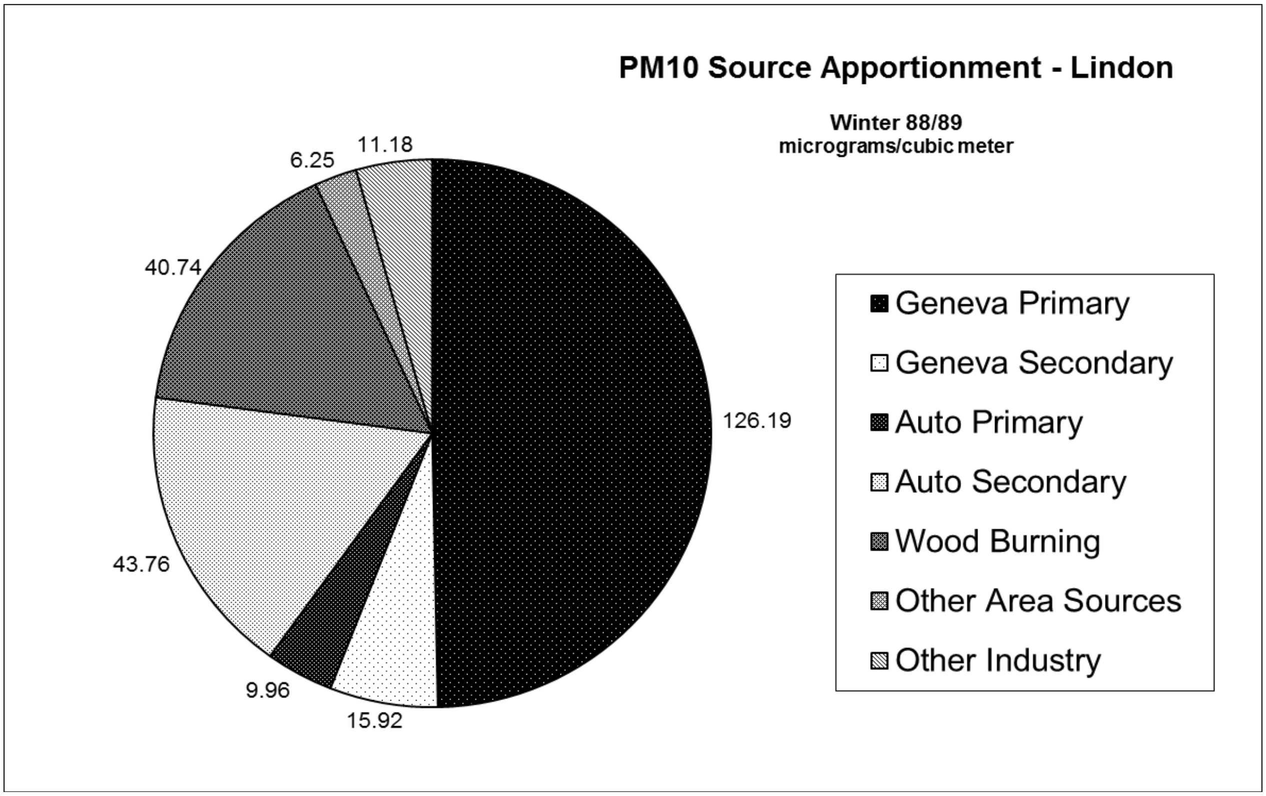


FIGURE IX.A.12

Source Apportionment

Figure IX.A.12 graphically demonstrates the source apportionment data contained on Table IX.A.4 on the following page and shows the contribution which the summarized components made to the overall concentration of PM_{10} at the Lindon monitoring site on February 18, 1989, which is the design day for the Lindon site.

Attainment Demonstration

Tables IX.A.4 and IX.A.5a and b show how the control strategies will reduce the PM_{10} concentrations at the Lindon site to no greater than 140.0[~~142.9~~] $\mu g/m^3$ in 2002 and 2003. MOVES2010[~~MOBILE6~~] projections using projected new motor vehicle control program NO_x emission factors indicate there will be ample reduction from the new program to maintain ambient levels below the standard. Table IX.A.5.a demonstrates that the control strategies are effective in keeping the projected concentrations below 150 $\mu g/m^3$ for the design day, and Table IX.A.5.b demonstrates that the control strategies are effective in keeping the projected concentrations below 150 $\mu g/m^3$ for every episode day that was used in the analysis. This is the attainment demonstration for the Lindon site.

UTAH STATE DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
PM10 SIP
Control Strategy Worksheet
Demonstration of Attainment (2003)

Site: **Lindon**
Period: Highest Days 1988/89
Date: **7/18/2014**
Projection: 2003

Source Category:	Percent Design Day Contribution:	Design Day Impact:	Additional Control:	Additional Growth:	Projected (2003) Attainment Impact:
(1) Geneva Steel Subtotal	55.95	142.11	67.3%	0.0%	46.43
Coke Stack	44.48	112.97	81.3%	0.0%	21.10
Open Hearth (Q-BOP)	4.83	12.28	18.8%	0.0%	9.97
Blast Furnace	0.00	0.00	-54.7%	0.0%	0.00
Sinter Plant	0.37	0.95	26.8%	0.0%	0.69
Secondary Sulfate	0.00	0.00	84.0%	0.0%	0.00
Secondary Nitrate	6.27	15.92	7.9%	0.0%	14.66
(2) Vehicle Subtotal	21.15	53.72			54.08
Composite Mobile Source:	1.92	4.88	44.5%	0.0%	2.71
Re-entrained Road Dust	1.01	2.57	0.0%	88.0%	4.82
Road Salting	0.99	2.51	20.0%	11.9%	2.25
Secondary Sulfate	0.00	0.00	-6.6%	0.0%	0.00
Secondary Nitrate	17.23	43.76	-1.2%	0.0%	44.29
(3) Space Heating Sub-Total	18.50	46.99			15.08
Wood Burning	16.04	40.74	83.0%	0.0%	6.93
Coal Burning	0.03	0.08	83.0%	0.0%	0.01
Other Area Sources	0.19	0.48	0.0%	37.5%	0.66
Secondary Sulfate	0.00	0.00	0.0%	33.3%	0.00
Secondary Nitrate	2.24	5.69	0.0%	31.6%	7.48
(4) Other Point Sources Subt	4.40	11.18			18.69
B.Y.U. Power	0.21	0.53	87.9%	0.0%	0.06
Heckett	0.30	0.76	27.2%	0.0%	0.55
Geneva Nitrogen (LaRoche)	0.16	0.42	-12.6%	0.0%	0.47
U.P.& L. Hale	0.00	0.00	Included in "Other Pt.Sources" Category		
Other Point Sources	0.82	2.08	-79.5%	0.0%	3.73
Secondary Sulfate	0.00	0.00	31.9%	0.0%	0.00
Secondary Nitrate	2.91	7.39	-87.6%	0.0%	13.87
TOTAL	100.00	254			134.28

Design Day Value: 254 ug/m^3 18-Feb-89

Max. Concentration Value: 134.3 ug/m^3

Projection Year: 2003

Point Source scaling factor: 0.5

Home Heat scaling factor: 0.1

TABLE IX.A.4

Lindon Monitoring Site
Demonstration of Attainment
Design Day / All Years
micrograms/cubic meter

Source Category:	2002	2003	Conformity 2010	2020
(1) Geneva Steel Subtotal	46.43	46.43	46.43	46.43
Coke Stack	21.10	21.10	21.10	21.10
Open Hearth (Q-BOP)	9.97	9.97	9.97	9.97
Blast Furnace	0.00	0.00	0.00	0.00
Sinter Plant	0.69	0.69	0.69	0.69
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	14.66	14.66	14.66	14.66
(2) Vehicle Subtotal	54.56	54.08	41.98	31.15
Composite Mobile Sources	2.73	2.71	1.89	1.37
Re-entrained Road Dust	4.68	4.82	5.76	7.25
Road Salting	2.23	2.25	2.37	2.54
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	44.91	44.29	31.95	19.99
(3) Other Area Sources	14.92	15.08	16.83	18.90
Wood Burning	6.93	6.93	6.93	6.93
Coal Burning	0.01	0.01	0.01	0.01
Other Area Sources	0.65	0.66	0.81	1.00
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	7.33	7.48	9.07	10.97
(4) Other Point Sources Subtotal	18.69	18.69	18.69	18.69
B.Y.U. Power	0.06	0.06	0.06	0.06
Heckett	0.55	0.55	0.55	0.55
Geneva Nitrogen (LaRoche)	0.47	0.47	0.47	0.47
U.P.& L. Hale				
Other Point Sources	3.73	3.73	3.73	3.73
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	13.87	13.87	13.87	13.87
Total	134.59	134.28	123.92	115.17

TABLE IX.A.5.a

LINDON MONITORING SITE
DEMONSTRATION OF ATTAINMENT
ALL DAYS / ALL YEARS
micrograms / cubic meter

Day	2-Dec-88	3-Dec-88	4-Dec-88	5-Dec-88	6-Dec-88	18-Dec-88	3-Jan-89
Year							
2002	96.14	114.58	131.82	102.24	83.14	92.01	103.31
2003	96.68	114.69	131.77	102.03	82.93	91.91	104.12
Conformity Only							
2010	96.29	110.28	124.13	96.67	77.49	86.62	105.90
2020	99.33	108.01	118.73	91.87	72.76	82.62	112.01

Day	17-Jan-89	18-Jan-89	19-Jan-89	20-Jan-89	21-Jan-89	27-Jan-89	28-Jan-89	29-Jan-89
Year								
2002	100.88	126.04	125.96	139.99	109.92	130.88	120.68	120.06
2003	101.54	126.82	126.14	139.55	109.58	131.77	120.64	119.95
Conformity Only								
2010	102.19	127.02	121.41	129.08	101.23	132.10	113.10	111.85
2020	106.61	131.89	119.34	119.44	93.61	137.69	107.85	105.82

Day	30-Jan-89	15-Feb-89	16-Feb-89	17-Feb-89	18-Feb-89	27-Dec-89	28-Dec-89
Year							
2002	127.02	88.73	90.97	130.39	134.59	97.54	121.67
2003	127.43	89.50	91.48	130.24	134.28	98.09	122.39
Conformity Only							
2010	124.15	91.54	91.60	122.42	123.92	97.52	121.45
2020	124.49	97.61	94.82	116.30	115.17	100.49	125.30

TABLE IX.A.5.b

WEST OREM

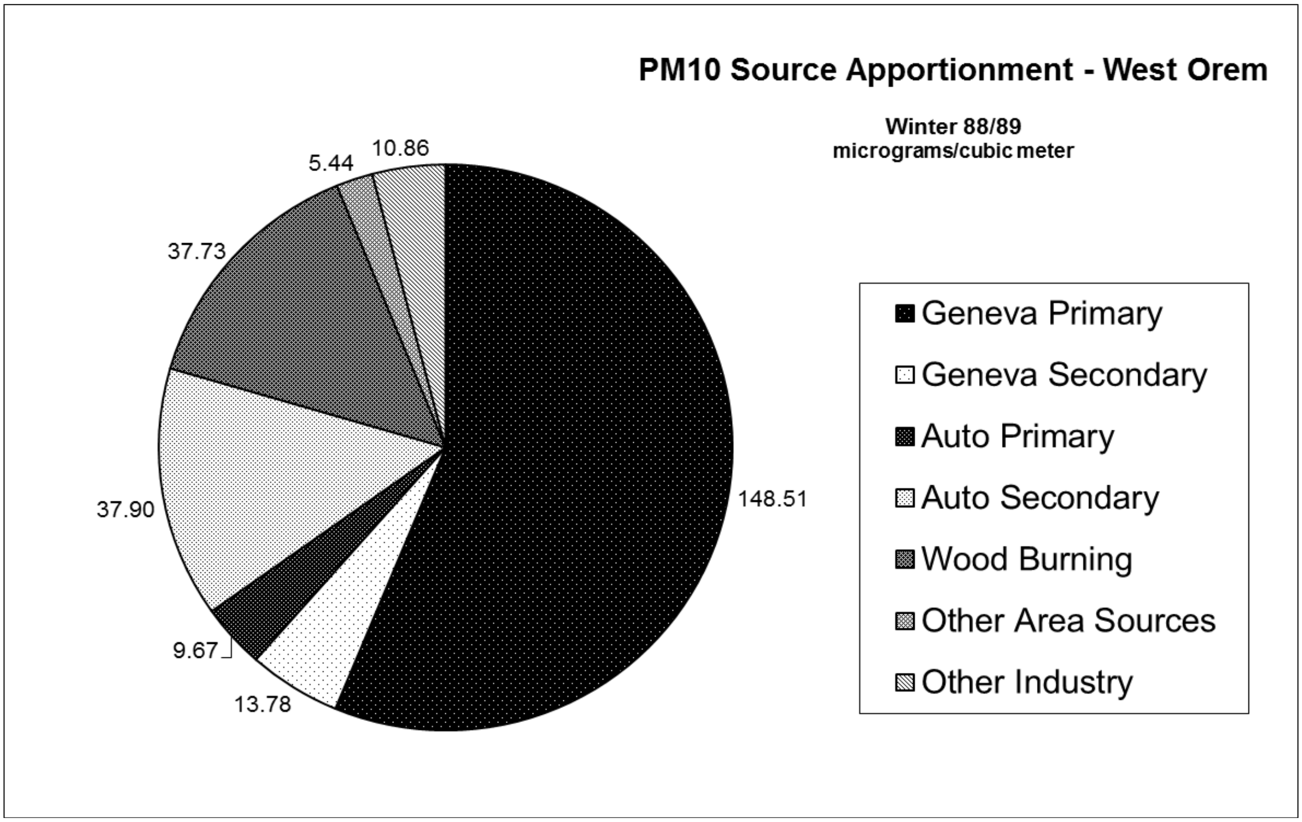


FIGURE IX.A.13

Source Apportionment

Figure IX.A.13 graphically demonstrates the source apportionment data detailed in Table IX.A.6 on the following page and shows the contribution which the summarized components made to the overall concentration of PM_{10} at the West Orem site.

Attainment Demonstration

Tables IX.A.6 and IX.A.7a and b show how the control strategies will reduce the PM_{10} concentrations at the West Orem monitoring station to no greater than 141.2[~~146.5~~] $\mu g/m^3$ in 2002 and 2003. MOVES2010[~~MOBILE6~~] projections using projected new motor vehicle control program NO_x emission factors indicate there will be ample reduction from the new program to maintain ambient levels below the standard. Table IX.A.7.a demonstrates that the control strategies are effective in keeping the projected concentrations below 150 $\mu g/m^3$ for the design day, and Table IX.A.7.b demonstrates that the control strategies are effective in keeping the projected concentrations below 150 $\mu g/m^3$ for every episode day that was used in the analysis. This is the attainment demonstration for the West Orem monitoring site.

UTAH STATE DEPT. ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
PM10 SIP
Control Strategy Worksheet

Site: **West Orem**
Period: Highest Days 1988/89
Date: **7/18/2014**
Projection: 2003

Source Category:	Percent Design Day Contribution:	Design Day Impact:	Additional Control:	Additional Growth:	Projected Attainment Impact:
(1) Geneva Steel Subtotal	61.50	162.3	64.7%	0.0%	57.28
Coke Stack	46.03	121.5	81.3%	0.0%	22.69
Open Hearth (Q-BOP)	10.01	26.4	18.8%	0.0%	21.44
Blast Furnace	0.00	0.0	-54.7%	0.0%	0.00
Sinter Plant	0.23	0.6	26.8%	0.0%	0.45
Secondary Sulfate	0.00	0.0	84.0%	0.0%	0.00
Secondary Nitrate	5.22	13.8	7.9%	0.0%	12.70
(2) Vehicle Subtotal	18.03	47.57			45.71
Composite Mobile Sources	1.46	3.9	44.5%	0.0%	2.15
Re-entrained Road Dust	0.00	0.0	0.0%	88.0%	0.00
Road Salting	2.20	5.8	20.0%	11.9%	5.20
Secondary Sulfate	0.00	0.0	-6.6%	0.0%	0.00
Secondary Nitrate	14.36	37.9	-1.2%	0.0%	38.36
(3) Space Heating Subtotal	16.36	43.2			13.52
Wood Burning	14.30	37.7	83.0%	0.0%	6.41
Coal Burning	0.03	0.1	83.0%	0.0%	0.01
Other Area Sources	0.17	0.4	0.0%	37.5%	0.61
Secondary Sulfate	0.00	0.0	0.0%	33.3%	0.00
Secondary Nitrate	1.87	4.9	0.0%	31.6%	6.48
(4) Other Point Sources Subtotal	4.12	10.9			17.68
B.Y.U. Power	0.24	0.6	87.9%	0.0%	0.08
Heckett	0.34	0.9	27.2%	0.0%	0.65
Geneva Nitrogen (LaRoche)	0.19	0.5	-12.6%	0.0%	0.55
U.P.& L. Hale	0.00	0.0	Included in "Other Pt.Sources" Category		
Other Point Sources	0.93	2.4	-79.5%	0.0%	4.39
Secondary Sulfate	0.00	0.0	31.9%	0.0%	0.00
Secondary Nitrate	2.43	6.4	-87.6%	0.0%	12.02
TOTAL	100.00	263.9			134.19

Design Day Value:	263.9	ug/m^3	17-Feb-89
Max. Concentration Value:	140.8	ug/m^3	
Projection Year:	2003		

Point Source scaling factor: 0.5

Home Heat scaling factor: 0.1

TABLE IX.A.6

West Orem Monitoring Site
Demonstration of Attainment
Design Day / All Years
micrograms/cubic meter

Source Category:	2002	2003	Conformity 2010	2020
(1) Geneva Steel Subtotal	57.28	57.28	57.28	57.28
Coke Stack	22.69	22.69	22.69	22.69
Open Hearth (Q-BOP)	21.44	21.44	21.44	21.44
Blast Furnace	0.00	0.00	0.00	0.00
Sinter Plant	0.45	0.45	0.45	0.45
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	12.70	12.70	12.70	12.70
(2) Vehicle Subtotal	46.22	45.71	34.65	24.27
Composite Mobile Sources	2.16	2.15	1.50	1.08
Re-entrained Road Dust	0.00	0.00	0.00	0.00
Road Salting	5.16	5.20	5.48	5.87
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	38.90	38.36	27.67	17.31
(3) Other Area Sources	13.38	13.52	15.04	16.85
Wood Burning	6.41	6.41	6.41	6.41
Coal Burning	0.01	0.01	0.01	0.01
Other Area Sources	0.60	0.61	0.75	0.92
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	6.35	6.48	7.86	9.50
(4) Other Point Sources Subtotal	17.68	17.68	17.68	17.68
B.Y.U. Power	0.08	0.08	0.08	0.08
Heckett	0.65	0.65	0.65	0.65
Geneva Nitrogen (LaRoche)	0.55	0.55	0.55	0.55
U.P.& L. Hale				
Other Point Sources	4.39	4.39	4.39	4.39
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	12.02	12.02	12.02	12.02
Total	134.56	134.19	124.65	116.08

TABLE IX.A.7.a

WEST OREM MONITORING SITE
DEMONSTRATION OF ATTAINMENT
ALL DAYS / ALL YEARS
micrograms/cubic meter

Day	19-Jan-89	21-Jan-89	27-Jan-89	28-Jan-89	29-Jan-89	30-Jan-89	10-Feb-89	15-Feb-89
Year								
2002	112.13	121.55	103.37	98.80	95.21	108.66	78.55	77.11
2003	112.35	121.17	103.62	98.61	95.15	109.14	78.38	77.80
Conformity Only								
2010	108.38	111.82	100.24	90.78	89.06	106.96	74.14	80.37
2020	107.11	103.36	99.55	84.47	84.68	108.49	70.29	86.31

Day	16-Feb-89	17-Feb-89	18-Feb-89	19-Feb-89	5-Dec-88	27-Dec-89	28-Dec-89
Year							
2002	98.55	134.56	141.22	106.87	106.60	131.73	113.34
2003	98.37	134.19	140.78	106.46	106.49	132.64	113.83
Conformity Only							
2010	93.96	124.65	125.73	96.41	98.70	132.72	111.50
2020	90.01	116.08	113.29	87.28	93.17	138.30	112.96

TABLE IX.A.7.b

NORTH PROVO

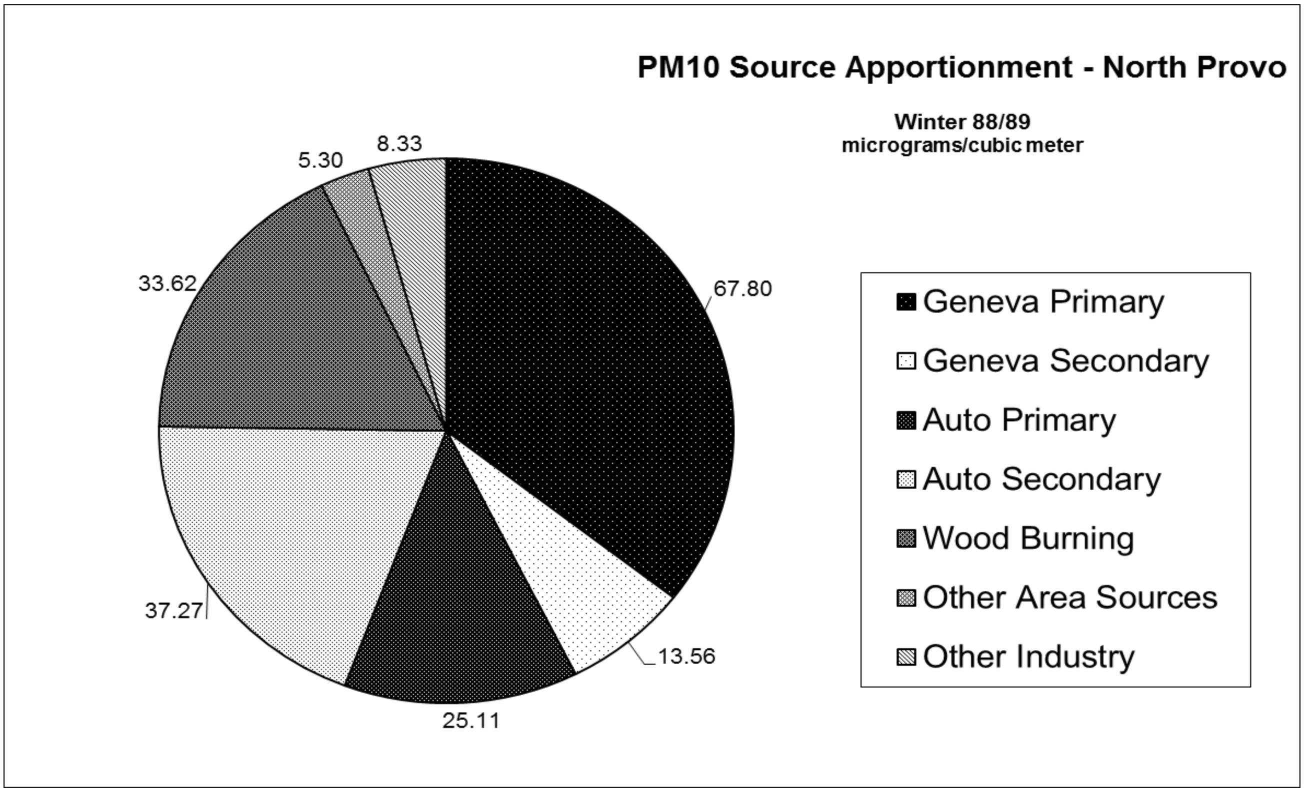


FIGURE IX.A.14

Source Apportionment

Figure IX.A.14 graphically demonstrates the source apportionment data detailed in Table IX.A.8 on the following page and shows the contribution which the summarized components made to the overall concentrations of PM_{10} at the North Provo monitoring site.

Attainment Demonstration

Tables IX.A.8 and IX.A.9a and b show how the control strategies will reduce the PM_{10} concentrations at the North Provo monitoring station to no greater than 130.7[~~135.1~~] $\mu g/m^3$ in 2002 and 2003. MOVES2010 projections using projected new motor vehicle control program NO_x emission factors indicate there will be ample reduction from the new program to maintain ambient levels below the standard. Table IX.A.9.a demonstrates that the control strategies are effective in keeping the projected concentrations below 150 $\mu g/m^3$ for the design day, and Table IX.A.9.b demonstrates that the control strategies are effective in keeping the projected concentrations below 150 $\mu g/m^3$ for every episode day that was used in the analysis. This is the attainment demonstration for the North Provo monitoring site.

UTAH STATE DEPT. ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
PM10 SIP
Control Strategy Worksheet

Site: **North Provo**
Period: Highest Days 1988/89
Date: **7/18/2014**
Projection: 2003

Source Category:	**Percent Design Day Contribution:**	**Design Day Impact:**	**Additional Control:**	**Additional Growth:**	**Projected Attainment Impact:**
(1) Geneva Steel Subtotal	42.59	81.4	57.7%	0.0%	34.39
Coke Stack	27.61	52.7	81.3%	0.0%	9.85
Open Hearth (Q-BOP)	6.73	12.9	18.8%	0.0%	10.44
Blast Furnace	0.00	0.0	-54.7%	0.0%	0.00
Sinter Plant	1.16	2.2	26.8%	0.0%	1.62
Secondary Sulfate	0.00	0.0	84.0%	0.0%	0.00
Secondary Nitrate	7.10	13.6	7.9%	0.0%	12.49
(2) Vehicle Subtotal	32.66	62.38			69.27
Composite Mobile Sources	3.62	6.9	44.5%	0.0%	3.84
Re-entrained Road Dust	6.07	11.6	0.0%	88.0%	21.79
Road Salting	3.46	6.6	20.0%	11.9%	5.92
Secondary Sulfate	0.00	0.0	-6.6%	0.0%	0.00
Secondary Nitrate	19.51	37.3	-1.2%	0.0%	37.72
(3) Space Heating Subtotal	20.38	38.9			12.65
Wood Burning	17.60	33.6	83.0%	0.0%	5.72
Coal Burning	0.03	0.1	83.0%	0.0%	0.01
Other Area Sources	0.21	0.4	0.0%	37.5%	0.55
Secondary Sulfate	0.00	0.0	0.0%	33.3%	0.00
Secondary Nitrate	2.54	4.8	0.0%	31.6%	6.37
(4) Other Point Sources Subtotal	4.36	8.3			14.40
B.Y.U. Power	0.15	0.3	87.9%	0.0%	0.03
Heckett	0.21	0.4	27.2%	0.0%	0.30
Geneva Nitrogen (LaRoche)	0.12	0.2	-12.6%	0.0%	0.25
U.P.& L. Hale	0.00	0.0	Included in "Other Pt.Sources" Category		
Other Point Sources	0.58	1.1	-79.5%	0.0%	2.00
Secondary Sulfate	0.00	0.0	31.9%	0.0%	0.00
Secondary Nitrate	3.30	6.3	-87.6%	0.0%	11.82
TOTAL	100.00	191.0			130.71

Design Day Value:	191	ug/m^3	28-Jan-88
Max. Concentration Value:	130.7	ug/m^3	
Projection Year:	2003		

Point Source scaling factor: 0.5

Home Heat scaling factor: 0.1

TABLE IX.A.8

North Provo Monitoring Station
Demonstration of Attainment
Design Day / All Years
micrograms/cubic meter

Source Category:	2002	2003	Conformity 2010	2020
(1) Geneva Steel Subtotal	34.39	34.39	34.39	34.39
Coke Stack	9.85	9.85	9.85	9.85
Open Hearth (Q-BOP)	10.44	10.44	10.44	10.44
Blast Furnace	0.00	0.00	0.00	0.00
Sinter Plant	1.62	1.62	1.62	1.62
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	12.49	12.49	12.49	12.49
(2) Vehicle Subtotal	69.14	69.27	62.17	58.40
Composite Mobile Sources	3.87	3.84	2.68	1.93
Re-entrained Road Dust	21.15	21.79	26.04	32.75
Road Salting	5.87	5.92	6.24	6.69
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	38.25	37.72	27.21	17.03
(3) Other Area Sources	12.50	12.65	14.13	15.89
Wood Burning	5.72	5.72	5.72	5.72
Coal Burning	0.01	0.01	0.01	0.01
Other Area Sources	0.54	0.55	0.67	0.82
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	6.24	6.37	7.73	9.34
(4) Other Point Sources Subtotal	14.40	14.40	14.40	14.40
B.Y.U. Power	0.03	0.03	0.03	0.03
Heckett	0.30	0.30	0.30	0.30
Geneva Nitrogen (LaRoche)	0.25	0.25	0.25	0.25
U.P.& L. Hale				
Other Point Sources	2.00	2.00	2.00	2.00
Secondary Sulfate	0.00	0.00	0.00	0.00
Secondary Nitrate	11.82	11.82	11.82	11.82
Total	130.44	130.71	125.09	123.08

TABLE IX.A.9.a

North Provo Monitoring Site

Demonstration of Attainment

All Days / All Years

micrograms / cubic meter

Day	4-Jan-88	28-Jan-88	6-Feb-88	27-Dec-89	28-Dec-89
Year					
2002	79.83	130.44	112.98	85.61	114.88
2003	79.61	130.71	113.96	86.27	115.38
Conformity Only					
2010	72.37	125.09	115.44	86.34	111.97
2020	66.35	123.08	122.39	90.44	112.85

TABLE IX.A.9.b

IX.A.6 CONTROL STRATEGIES

IX.A.6.b. The following industrial control strategies will be implemented to control PM_{10} emissions in the Utah County nonattainment area:

a) All industrial sources of PM_{10} in Utah County comprise 60.4[~~63.5%~~] of the PM_{10} impact at the Lindon monitoring site, 65.6[~~68.2%~~] at the West Orem monitoring site, and 47.0[~~50.5%~~] at the North Provo monitoring site. New operating parameters and emissions limitations for PM_{10}, SO_2, and NO_x for the most significant existing stationary sources of primary and secondary PM_{10} impacting the ambient concentrations at the monitor site are detailed in Section IX, Part H of the Utah State Implementation Plan.

Table IX.A.24.a lists the annual emissions caps for the significant sources (i.e., those whose emissions exceed 100 tons/year of primary PM_{10}, 200 tons/year of NO_x or 250 tons/year of SO_2) except for Geneva Steel.

Summary of Tons/Year Emission Caps			
Company	**Primary PM_{10}**	**NO_x**	**SO_2**
Geneva Nitrogen, Inc.	86.	223.8	
Provo City Power		254	
Springville City Power		248	

TABLE IX.A.24.a

Due to shutting down or reducing operations at the coke plant, sinter plant, foundry and rolling mill scarfer facility, and fuel switching, Geneva Steel is in the process of banking a significant amount of their emissions. Table IX.A.24.b lists the allowable annual emissions limits at Geneva Steel before the emissions mentioned above are banked, Table IX.A.24.c lists the banked emissions from Geneva Steel used in the attainment demonstration for this revision of the PM_{10} SIP, and Table IX.A.24.d lists the annual emissions limits at Geneva after those emissions are banked (i.e., subtracting Table IX.A.24.c from Table IX.A.24.b results in Table IX.A.24.d).

Annual Emissions - Geneva Steel (Before Banking) - Tons/Year			
Geneva Steel Process	**PM_{10}**	**SO_2**	**NO_x**
Coke Plant	491.4	454.9	
Sinter Plant	101.0		
Blast Furnace	454.4		
Q-BOP	205.4		
Geneva Other	499.1		
Secondary Sulfate		994.4	
Secondary Nitrate			4234.2

TABLE IX.A.24.b

Banked Emissions - Geneva Steel (Tons/Year)			
Geneva Steel Process	**PM_{10}**	**SO_2**	**NO_x**
Coke Plant	461.8	454.9	557.2
Sinter Plant	101.0	434.2	705.2
Q-BOP	27.2		
Geneva Other	51.0		
Totals	641	889.1	1262.4

TABLE IX.A.24.c

Annual Emissions - Geneva Steel (After Banking) - Tons/Year			
Geneva Steel Process	**PM_{10}**	**SO_2**	**NO_x**
Coke Plant	29.6	0.0	(see footnote 1)
Sinter Plant	(see footnote 2)	(see footnote 2)	(see footnote 2)
Blast Furnace	454.4		
Q-BOP	178.2		
Geneva Other	448.1		
Secondary Sulfate		560.2	
Secondary Nitrate			2971.8

TABLE IX.A.24.d

Table IX.A.25.a lists the 24-hr emission limits for the significant sources (i.e., those whose emissions exceed 100 tons/year of primary PM_{10}, 200 tons/year of NO_x, or 250 tons/year of SO_2) except Geneva Steel.

Summary of Tons/Day Emission Limits			
Company	**Primary PM_{10}**	**NO_x**	**SO_2**
Geneva Nitrogen, Inc.	0.24	0.622	
Provo City Power		2.45	
Springville City Power		1.68	
Geneva Rock Products Asphalt Plant Baghouse Stack	0.103	0.568	0.484

TABLE IX.A.25.a

Table IX.A.25.b lists the allowable daily emissions at Geneva Steel for September through May after the banking mentioned above and Table IX.A.25.c lists the allowable daily emissions at Geneva Steel for June through August after the banking mentioned above.

Daily Emissions - Geneva Steel (September - May) - Tons/Day			
Geneva Steel Process	**PM_{10}**	**SO_2**	**NO_x**
Coke Plant	0.1	0.0	(see footnote 1)
Sinter Plant	(see footnote 2)	(see footnote 2)	(see footnote 2)
Blast Furnace	1.3		
Q-BOP	0.5		
Geneva Other	1.2		
Secondary Sulfate		1.0	
Secondary Nitrate			7.7

TABLE IX.A.25.b

Daily Emissions - Geneva Steel (June - August) - Tons/Day			
Geneva Steel Process	**PM_{10}**	**SO_2**	**NO_x**
Coke Plant	0.1	0.0	(see footnote 1)
Sinter Plant	(see footnote 2)	(see footnote 2)	(see footnote 2)
Blast Furnace	1.3		
Q-BOP	0.5		
Geneva Other	1.4		
Secondary Sulfate		3.4	
Secondary Nitrate			9.6

TABLE IX.A.25.c

Footnote 1: All NOx emissions from coke plant ovens have been banked. Emissions of NOx associated with continuing operations in the vicinity of the coke plant (coke pile handling) are accounted for in the secondary nitrate item.

Footnote 2: All emissions of PM10, SO2, and NOx from the sinter plant have been banked.

The methods used to establish both the 24-hour emission limits and annual caps are documented in Supplement II-02 of the Technical Support Document and relevant permits.

In Tables IX.A.24.b, c, and d and Tables IX.A.25.b and c, the “Geneva Other” category includes the power house, rolling mill, and fugitives. In Tables IX.A.25.b and c, the “Secondary Sulfate” category includes SO_2 emissions from the sinter plant, blast furnace, Q-BOP, and sources included in the “Geneva Other” category and the “Secondary Nitrate” category includes NO_x emissions from the coke plant, sinter plant, blast furnace, Q-BOP, and sources included in the “Geneva Other” category.

Notwithstanding any other provision in the Utah SIP, no change to this SIP revision shall be effective to change the federal enforceability of the emission limits or other requirements of the Utah County PM_{10} SIP revision without EPA approval of such change as a SIP revision.

IX.A.6.d. Solid Fuel Burning Devices:

(1) Emissions from wood burning devices account for 37.7 $\mu g/m^3$, which is equivalent to 14.3% of the PM_{10} concentrations at West Orem in Utah County. The following control strategies will be used to reduce emissions from wood burning devices in Utah County:

> (v) All of the above strategies (a)-(d) are used as support for the adoption of the solid fuel burning device control strategy, and are used to justify the target 83% emission reduction credit claimed in this SIP.
>
> (vi) In 2001, the actual effectiveness of the woodburning control program was evaluated by comparing PM_{10} filter data used in the original SIP to filter data collected during a 1996 episode of elevated PM_{10} concentrations. The 1996 filter data was run through an updated CMB modeling analysis to determine what portion of mass was attributable to woodsmoke. The 1996 apportionment was compared to the original apportionment analysis, and the observed decline in woodsmoke contribution was 83%. Thus, the program has been far more effective in reducing PM_{10} concentrations during episodes of elevated concentrations than was originally envisioned. This analysis is documented in Supplement II-02 of the Technical Support Document.

(4) Emissions from coal burning stoves can be significant. For example, they account for 0.03% or 0.08 $\mu g/m^3$ of the PM_{10} impact at the Lindon monitoring station. The mandatory no burn period will also preclude the use of coal burning stoves unless they are the sole source of heat, and after 1993, the use of coal stoves will be precluded unless they are able to operate with no visible emissions. The mandatory no burn will result in an 83% reduction of the emissions from coal burning stoves, or 0.07 $\mu g/m^3$.

IX.A.6.g. ROAD SALTING AND SANDING (Utah County, 2002)

Road salting and sanding and re-entrained road dust account for up to 18.2 $\mu g/m^3$ of the observed PM_{10} concentrations in Utah County on the design day. On February 3, 1995, Utah submitted amendments to the PM_{10} SIP to add specifics of the road salting and sanding program promised as a control measure in the PM_{10} SIP. EPA published approval of the road salting and sanding provisions on December 6, 1999 (64 FR 68031), thus acknowledging that the rule had achieved the 20% target.

IX.A.7 MAINTENANCE

With this revision to the PM_{10} SIP, the Utah Air Quality Board commits to developing a PM_{10} maintenance plan or SIP revision, as appropriate, based on dispersion modeling.

IX.A.8 CONTINGENCY MEASURES

IX.A.8.a. Attainment Date

On 18 June 2001, EPA published a finding (66 FR 32752) that Salt Lake County had attained the NAAQS by 31 December 1995 and Utah County had attained the NAAQS by 31 December 1996. That notice also stated that both areas had demonstrated Reasonable Further Progress as required in the Act (66 FR 32752-754). A letter from EPA Region VIII to the Division of Air Quality dated October 6, 2000 stated that, “In an October 6, 1995 memorandum from Joe Paisie of OAQPS to the EPA regional offices, it was explained that if a PM_{10} nonattainment area has attained the standard with at least 3 years of clean air quality data, and as long as that area continues to attain the standard, the section 172(c)(9) contingency measure requirement will not apply.” Therefore, with eight years of clean air quality data, Utah is not required to submit contingency measures in this SIP. Copies of the Joe Paisie memorandum and the October 6, 2000 letter from EPA to UDAQ are contained in Supplement II-02 of the TSD.

IX.A.9 ANNUAL AVERAGE

DEMONSTRATION OF ATTAINMENT OF THE ANNUAL AVERAGE

The application of many of the control strategies that are being implemented to reduce the 24-hour PM_{10} concentrations will also result in a reduction of the annual PM_{10} concentrations even though they are designed to reduce winter time 24-hour concentrations. Table 9.A.26 shows that the winter season is the period that has the greatest impact on the annual average and controlling PM_{10} concentrations during the winter will have the greatest impact on the annual average.

Design values in Utah County ranged from 191 $\mu g/m^3$ to 264 $\mu g/m^3$. Thus, the control strategy necessary to achieve the 24-hr NAAQS at all stations effectively ranges from 27% to 43%. Even the minimum of this range is well in excess of the 7.4% necessary to bring the maximum observed annual concentration back down to the level of the annual standard. The annual NAAQS for PM_{10} was never violated in Utah County.

1988 (NON-WINTER)	LINDON	WEST OREM	NORTH PROVO
MAR	31		22
APRIL	35		24
MAY	32		31
JUNE	41		25
JULY	47		46
AUG	39		35
SEPT	49		36
OCT	47	34	30
AVG NON-WINTER	40.1		31.1

1988 (WINTER)	LINDON	WEST OREM	NORTH PROVO
JAN	103		75
FEB	98		80
NOV	32	31	23
DEC	96	81	89
AVG WINTER	82.3	56.0	66.8
ANNUAL AVG	54	54	50

1989 (NON-WINTER)			
MAR	39	40	40
APRIL	31	34	29
MAY	32	34	30
JUNE	27	28	29
JULY	39	35	28
AUG	35	29	28
SEPT	35	31	34
OCT	31	29	27
AVG NON-WINTER	33.6	32.5	30.6

1989 (WINTER)			
JAN	119	117	109
FEB	116	122	62
NOV	52	51	42
DEC	75	73	61
AVG WINTER	90.5	90.8	68.5
ANNUAL AVG	52	49	44

TABLE IX.A.26

IX.A.10 TRANSPORTATION CONFORMITY

For purposes of Transportation Conformity as established by Section 176(c)(2)(A) of the Clean Air Act, Table IX.A.28 identifies the mobile source budget for 2003 and the two horizon years used in transportation planning, 2010 and 2020 for Utah County:

Year	Tons/Winter Day	
	Primary PM	**NO_x**
2003	6.57	20.35
2010	7.74	12.75
2020	10.24[10.34]	15.82[5.12]

TABLE IX.A.28

The values for 2003 reflect the inventory values for mobile sources that were used in the CMB modeling. The CMB modeling, based on these inventory values, and inventory values for other source categories, demonstrates attainment in 2003.

The inventory values for both the base year and 2003, the final attainment year, are shown in Table IX.A.3. The CMB modeling results are shown in Tables IX.A.5.a and b, IX.A.7.a and b, and IX.A.9.a and b.

For 2010 and 2020, inventory values for all source categories were projected forward, based on appropriate growth assumptions. The 2010 and 2020 mobile source emissions budgets reflect the mobile source inventory values in 2010 and 2020, except that, in the July 3, 2002 SIP revision, "road dust" and "brake wear" portions of the 2020 mobile source inventory were expanded by 7% to take advantage of part of the available safety margin in that year. For this latest SIP revision, this adjustment was removed from the 2020 inventory. This action will satisfy the requirements of the "Policy Guidance on the use of MOVES2010 and the Subsequent Minor Revisions for State Implementation Plan Development, Transportation Conformity and Other Purposes" and truly represents a minor technical adjustment that does not need a full SIP revision action.

[More specifically, even using these expanded mobile source emissions, the CMB projections for 2020 show a maximum concentration of 147.2 ug/m3. Documentation for the assumptions used to establish these budgets and for the modeling used to make this demonstration of attainment is all contained in Supplement II-02 of the Technical Support Document (TSD).]

The motor vehicle inventory values were developed by the Mountainland Association of Governments (MAG) based on MOVES2010[MOBILE6], PART5, and current projections of the Vehicle Miles Traveled (VMT) in Utah County. The modeling analysis included the most recent planning assumptions concerning point, area, and mobile sources.

MAG is required to develop Long Range Plans that go out well beyond 2020, and to demonstrate conformity to the 2020 budget for all years beyond 2020. Also contained in Supplement II-02 of the TSD is a discussion of possible control strategies that might be employed by MAG to meet these budgets after 2020.

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-071-14

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: August 25, 2014

SUBJECT: PROPOSE FOR PUBLIC COMMENT: 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.

The new State Implementation Plans (SIPs) for $PM_{2.5}$ and PM_{10}, along with the new emission limits added to Part H, will have to be incorporated into the Air Quality Rules. R307-110-10 is the rule that presently does this for the $PM_{2.5}$ and PM_{10} SIPs, while R307-110-17 is the rule that incorporates the new Part H emission limits. The proposed rules will update the latest versions of these SIPs that could be adopted by the Air Quality Board in December.

Staff Recommendation: Staff recommends the Board propose R307-110-10 and R307-110-17 for public comment. A copy of the proposals is attached.

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 [~~4, 2013~~]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 [~~January 8~~]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: [~~January 9~~]December 4, 2014
Notice of Continuation: February 1, 2012
Authorizing, and Implemented or Interpreted Law: 19-2-104(3)(e)

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-063-14

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: August 11, 2014

SUBJECT: PROPOSE FOR PUBLIC COMMENT: Amend R307-121. General Requirements: Clean Air and Efficient Vehicle Tax Credit.

The Utah Legislature revised the statute governing the state's Clean Fuel Tax Credit during the 2014 legislative session. House Bill 74 (HB 74) modified the eligibility requirements to claim the tax credit.

As a result of these modifications, we are proposing the following amendments to R307-121:

- Because "qualifying plug-in hybrids" are now eligible for the tax credit while traditional hybrids are no longer eligible, we are proposing to remove references to traditional hybrid vehicles and to add a definition for "qualifying plug-in hybrid."
- Consolidate requirements for qualifying vehicles that are purchased under R307-121-3.
- Add requirements for qualifying vehicles that are leased under R307-121-4.

In addition, other technical changes were made throughout the rule to clarify requirements and help administer the Clean Fuel Tax Credit.

Staff Recommendation: Staff recommends the Board propose R307-121 for public comment.

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

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 [~~or hybrid~~]vehicle" means qualifying electric [~~or hybrid~~]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 [~~vehicle identification number (~~]VIN[~~)~~], the technician's ASE or CSA America certification number, and states that the motor vehicle is an [~~eligible~~]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;[~~ and~~]

(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 [~~Purchase~~]Lease to Demonstrate Eligibility for [~~Qualifying~~]New OEM Natural Gas, Propane, Qualifying Electric or Qualifying Plug-in Hybrid Vehicles.

To demonstrate that an [~~motor vehicle is a qualifying~~]OEM natural gas, propane, qualifying electric or qualifying plug-in hybrid vehicle is eligible for the tax credit, proof of [~~purchase~~]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) 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;~~

~~(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 qualifying electric or hybrid vehicle, the VIN, purchase date, and price of the motor vehicle;~~

~~(3) the underhood identification number or engine group of the motor vehicle; and~~

~~(4) a copy of the current Utah vehicle registration in the name of the taxpayer seeking the credit.~~]

(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, 201[4]5
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 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-069-14

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: August 22, 2014

SUBJECT: PROPOSE FOR PUBLIC COMMENT: New Rule R307-125. Clean Air Retrofit, Replacement, and Off-Road Technology Program.

The Utah Legislature enacted the Clean Air Retrofit, Replacement, and Off-Road Technology (CARROT) Program during the 2014 legislative session through House Bill 61 (HB 61). CARROT allows grants or other programs such as exchange, rebate, or low-cost purchase programs for activities that reduce emissions from non-road or heavy-duty diesel, on-road engines.

HB 61 gives authority to the Air Quality Board to make rules specifying the requirements and procedures of the CARROT Program. This proposed new rule, R307-125, is the air quality rule that would do this.

Staff Recommendation: Staff recommends the Board propose new rule R307-125 for public comment.

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.

R307-125-4. 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 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-065-14

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: August 13, 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.

Recognizing the significance of wood smoke during the winter time inversion, the Board requested that DAQ conduct a wood smoke workshop to gather suggestions from the community on ways to reduce wood smoke emissions. Workshop members indicated an interest in prohibiting solid fuel burning by industrial and commercial sources during mandatory no-burn periods. The Board discussed this option during the May 2014 Board meeting and directed staff 1) to draft an amendment to R307-302, Solid Fuel Burning Devices in Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber Counties, that would add commercial, industrial, and institutional sources to the rule applicability and 2) to determine the impact of this proposal upon commercial, institutional, and industrial sources.

The proposed amendments to R307-302 include:

- Expanding the rule to include all solid fuel burning sources.
- Exempting all commercial and industrial food preparation using solid fuels.
- Exempting commercial and industrial boilers and electrical generating facilities existing prior to the effective date of the rule. DAQ is particularly interested in gaining public comment on this provision, as it will affect future biomass and waste-to-energy projects within the $PM_{2.5}$ nonattainment area.
- Re-opening the sole source registry until June 1, 2015.
- 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). DAQ is interested in the public's opinion on the possibility of including such a provision for businesses and institutions in this rule, and will specifically ask for public comments regarding it in the published public notice.

The Board requested that staff assess the number of food services facilities that may be exempted by this proposal. The following information was made available by county health departments.

County	Total food service facilities	School food service	Institutional food service	Food service facilities that burn wood	Food service that use chain-driven charbroiling	Other
Box Elder				-	2	
Cache				1	5	
Davis	642	113	75	5	9	
Salt Lake	4,285	307	13	11	62	19 Charcoal (Tandoori), 17 other BBQ's wood and smokers
Tooele		24		3	3	
Utah	1635	172	162	~5-10	~15	
Weber				4	8	9 BBQ smokers, 3 smokehouse operations

Impact upon Commercial, Institutional and Industrial Sources

A public information meeting was held on June 2, 2014, to discuss this proposal. A media release invited those with commercial/industrial interests to the meeting; unfortunately, no sources attended. The Town of Alta City administrator submitted written information on commercial sources because he was unable to attend the workshop. Fireplaces exist within rental condos, the police station, and within the five major hotel and lodges in Alta. Upon subsequent discussions with the town administrator, he advised us that the town supports air quality initiatives.

The media reported on this meeting and we did receive a few inquiries from the general public. Most of those were interested to learn more about the proposed cooking exemption and offered no opinions.

Staff followed up with contacts to all of the chambers of commerce within the nonattainment area during June 2014. Requests were made to notify their membership of this proposal and our interest to hear from them. The Cache, Salt Lake, Utah, and Davis county chambers agreed to include our notice in their newsletters, and they all indicated that they did not believe that it would impact their membership. We have not received any responses to these inquires.

At this juncture, it would appear that limited (if any) commercial, institutional and industrial sources would be adversely affected. Solid fuel uses in Alta are predominately for aesthetic reasons.

Staff Recommendation**:** Staff recommends the Board propose R307-302 as amended for a 30 day public comment period.

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.

(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 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 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.

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

(1) By [~~June 1, 2013~~]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[~~of~~] 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 ~~Residential~~ 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 [the rule effective date] 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, [residential]solid fuel burning
Date of Enactment or Last Substantive Amendment: [March 6, 2014]2014
Notice of Continuation: June 2, 2010
Authorizing, and Implemented or Interpreted Law: 19-2-101; 19-2-104

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

DAQA-641-14

M E M O R A N D U M

TO: Air Quality Board

FROM: Bryce C. Bird, Executive Secretary

DATE: August 5, 2014

SUBJECT: Air Toxics, Lead-Based Paint, and Asbestos (ATLAS) Section Compliance Activities – July 2014

MACT Compliance Inspections	0
Asbestos Demolition/Renovation NESHAP Inspections	52
Asbestos AHERA Inspections	45
Asbestos State Rules Only Inspections	14
Asbestos Notifications Accepted	187
Asbestos Telephone Calls Answered	578
Asbestos Individuals Certifications Approved/Disapproved	80/7
Asbestos Company Certifications/Re-certifications	1/4
Asbestos Alternate Work Practices Approved/Disapproved	8/0
Lead-Based Paint (LBP) Inspections	2
LBP Notifications Approved	3
LBP Telephone Calls Answered	79
LBP Letters Prepared and Mailed	62
LBP Courses Reviewed/Approved	0/0
LBP Course Audits	1
LBP Individual Certifications Approved/Disapproved	11/2

LBP Firm Certifications	10
Notices of Violation Issued	0
Compliance Advisories Issued	15
Warning Letters Issued	7
Settlement Agreements Finalized	1
Penalties Agreed to:	
Lyle Heyborne/Kane County School District	$62.50

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

DAQC-961-14

M E M O R A N D U M

TO: Air Quality Board

FROM: Bryce C. Bird, Executive Secretary

DATE: August 13, 2014

SUBJECT: Compliance Activities – July 2014

Annual Inspections Conducted:

Major... 14
Synthetic Minor 6
Minor 29

On-Site Stack Test Audits Conducted: 6

Stack Test Report Reviews:... 16

On-Site CEM Audits Conducted: 6

Emission Reports Reviewed:.. 13

Temporary Relocation Requests Reviewed & Approved:................................ 6

Fugitive Dust Control Plans Reviewed & Accepted:.................................. 104

Soil Remediation Report Reviews:.. 14

[1]Miscellaneous Inspections Conducted:... 28

Complaints Received: 25

Breakdown Reports Received:... 0

Compliance Actions Resulting From a Breakdown.. 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

Warning Letters Issued: 1

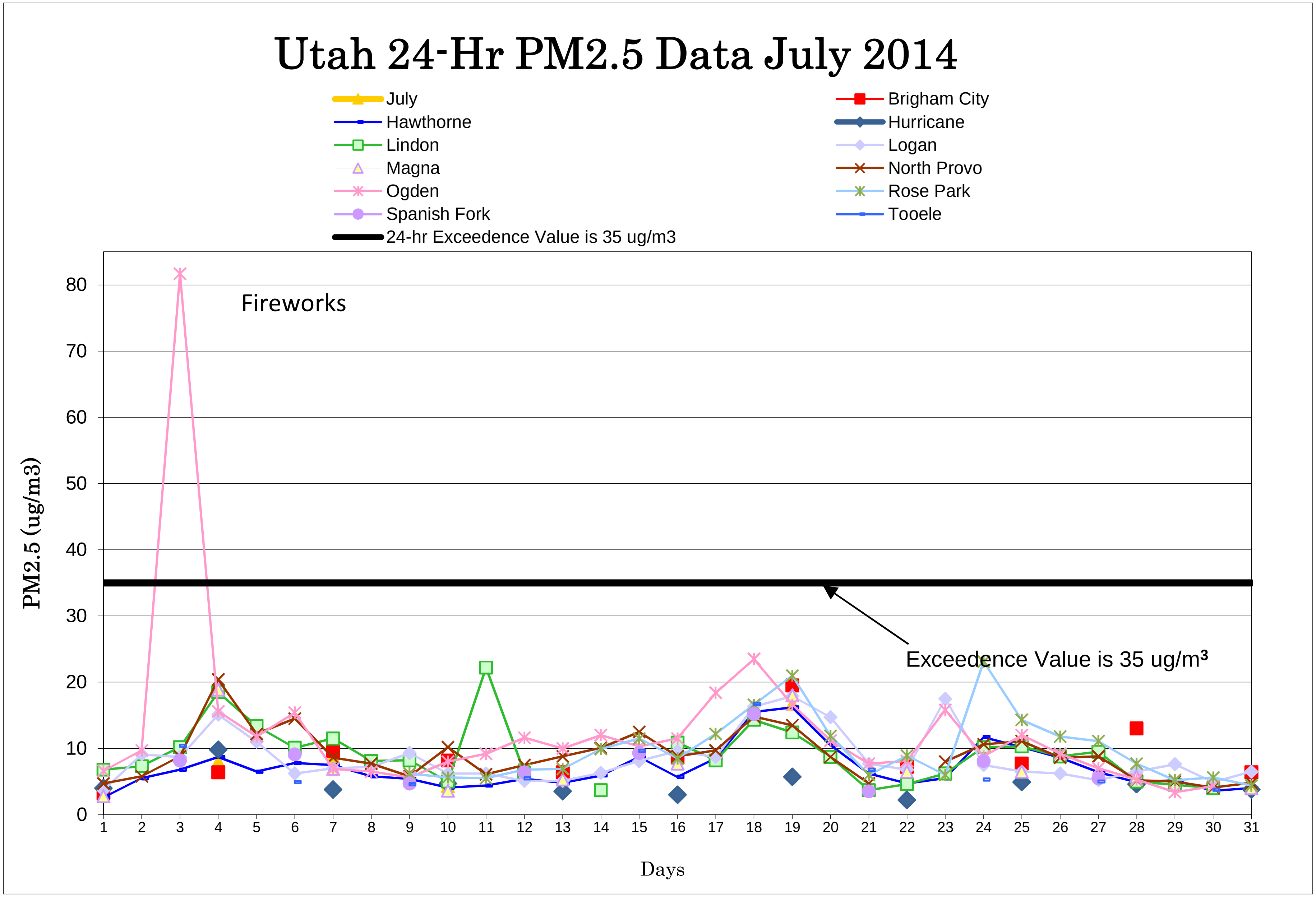
Notices of Violation Issued: 1

Compliance Advisories Issued: 3

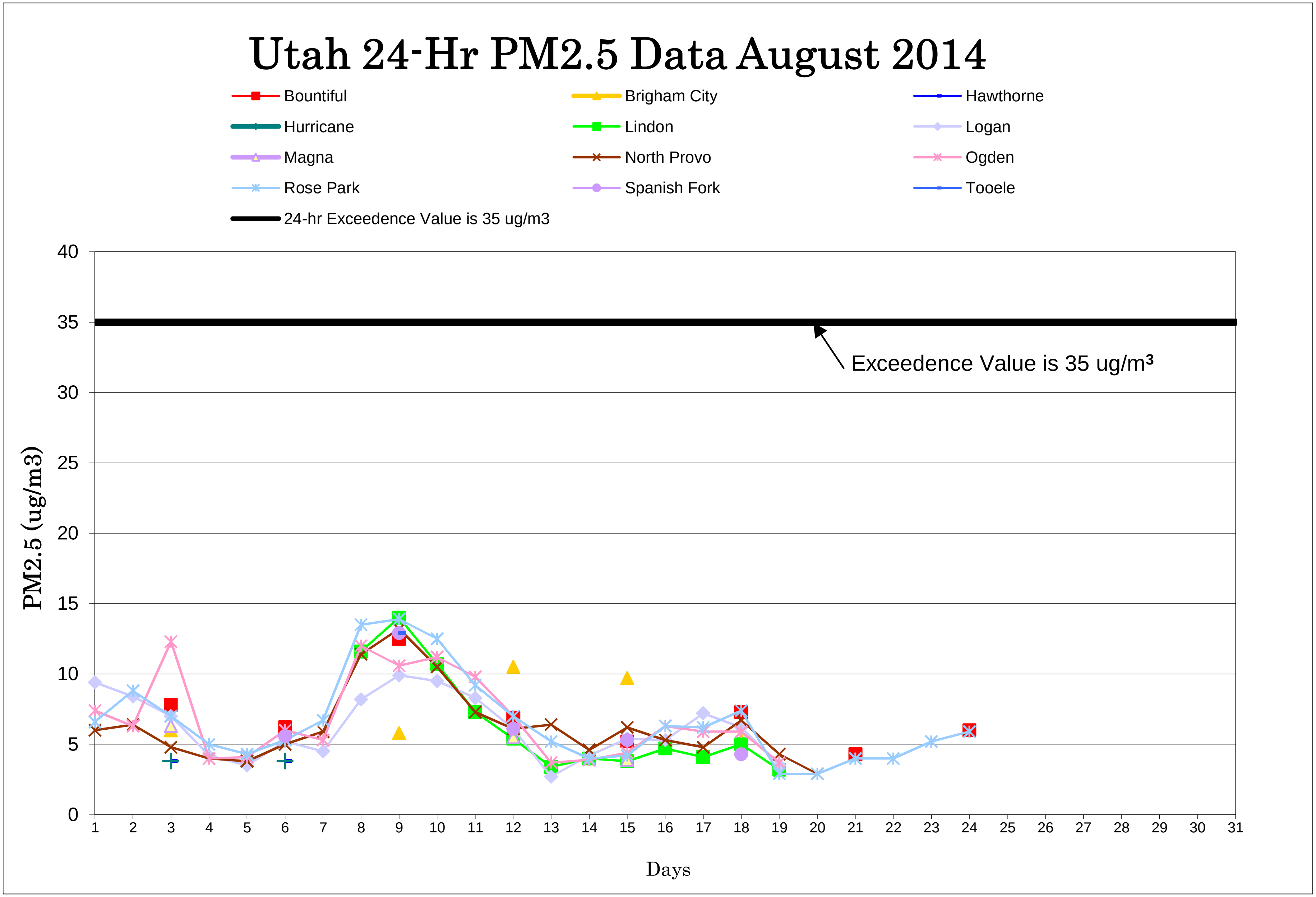
Settlement Agreements Reached: 3

Kinder Morgan (2 sites) $5,600.00
Kinder Morgan - Altamont $11,200.00
Papa Pita Bakery $1,400.00

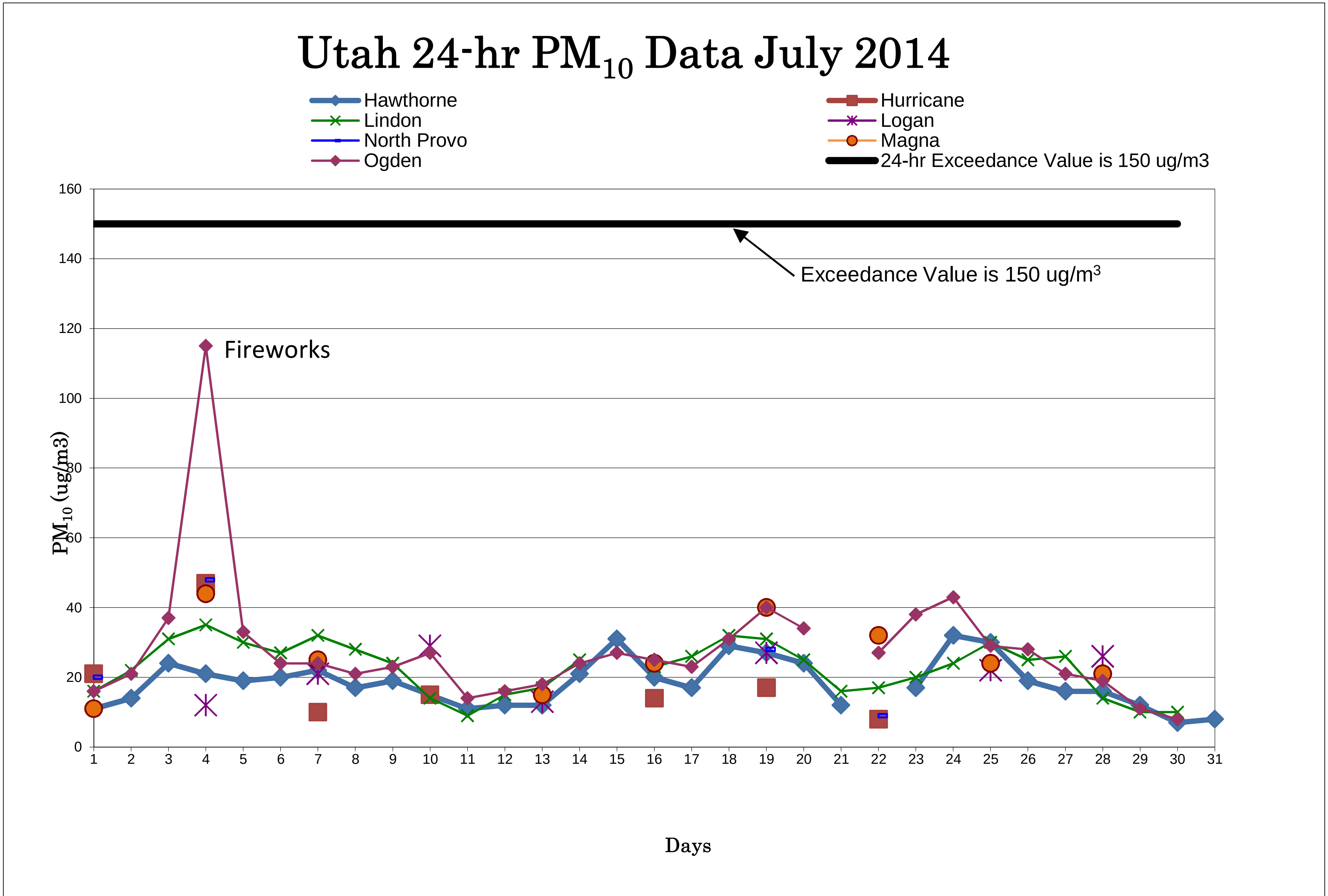
[1]Miscellaneous inspections include, e.g., surveillance, level I inspections, VOC inspections, complaints, on-site training, dust patrol, smoke patrol, open burning, etc.

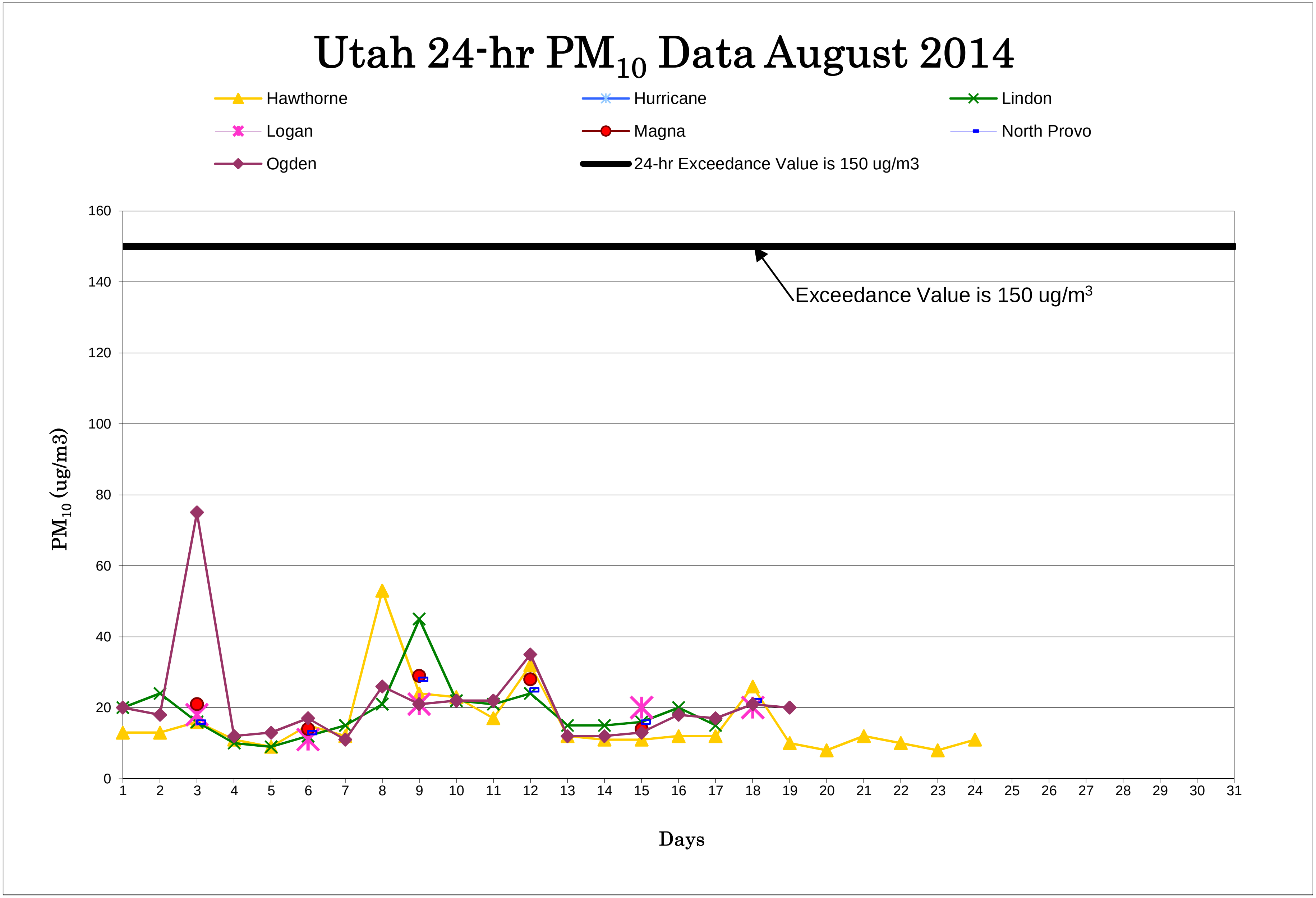


Utah Division of Air Quality

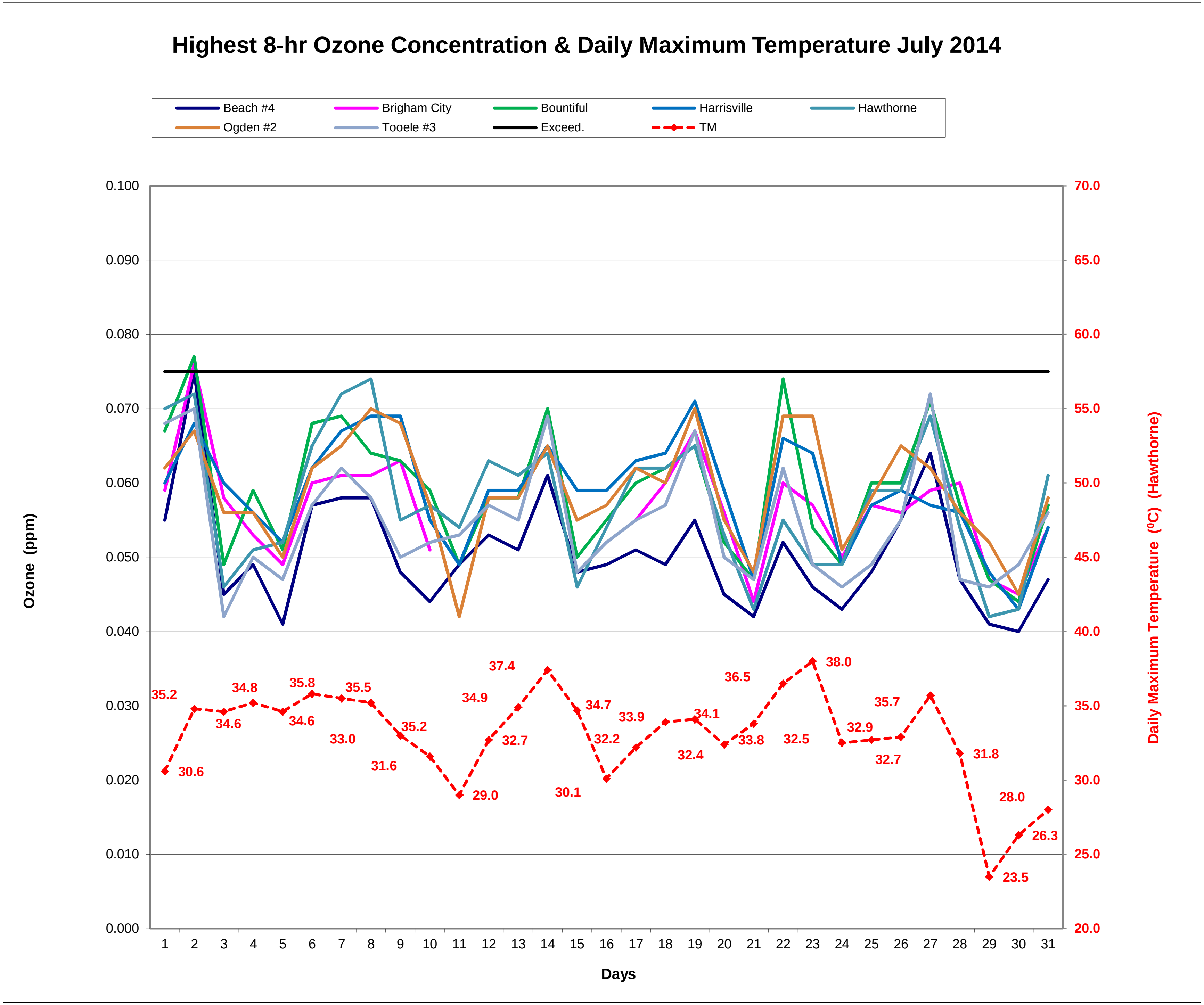


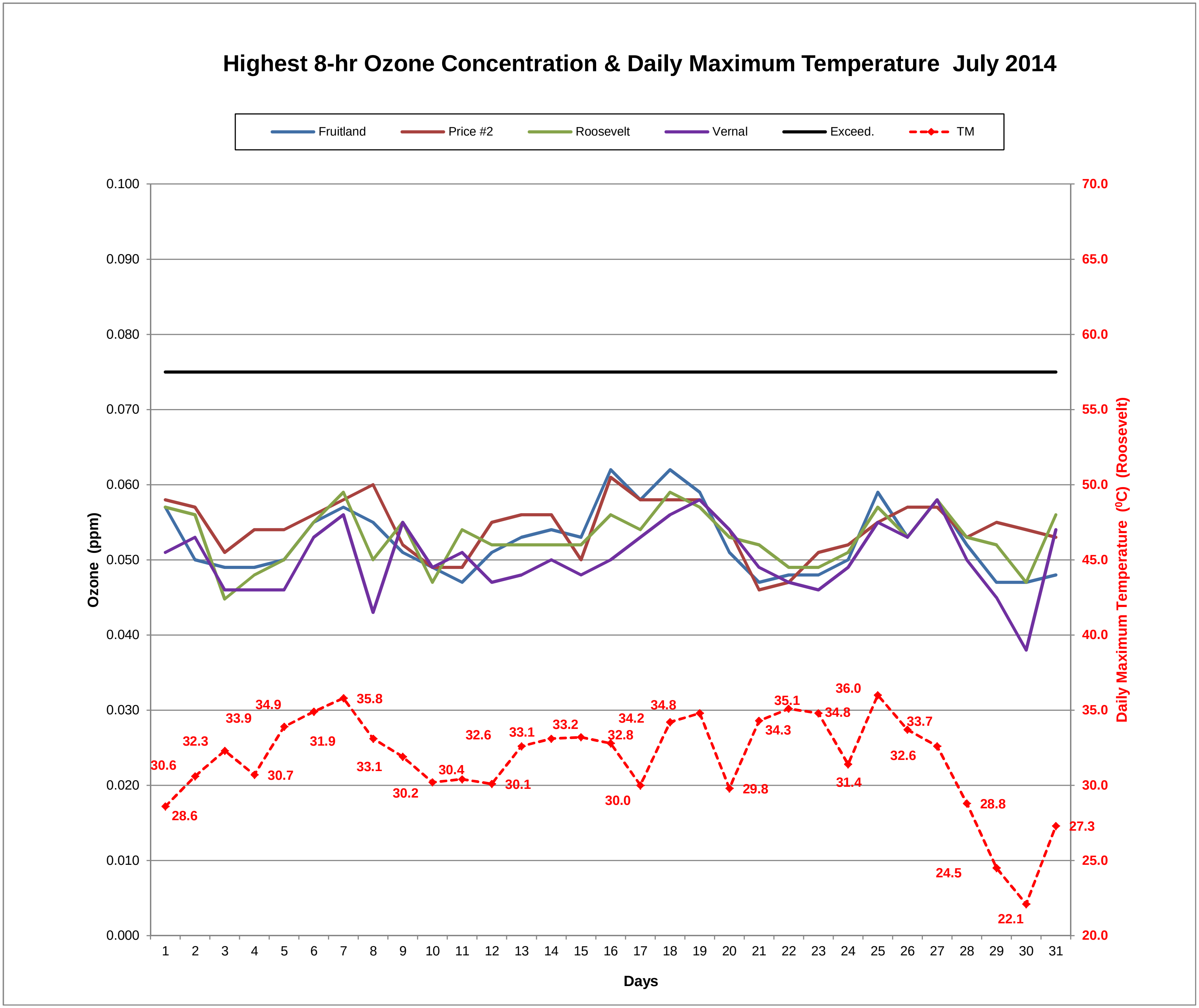
Utah Division of Air Quality


Utah 24-hr PM_{10} Data July 2014
Hawthorne
Hurricane
Lindon
Logan
North Provo
Magna
Ogden
24-hr Exceedance Value is 150 ug/m3
Exceedance Value is 150 ug/m3
Fireworks
PM_{10} (ug/m3)
Days
0
20
40
60
80
100
120
140
160
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

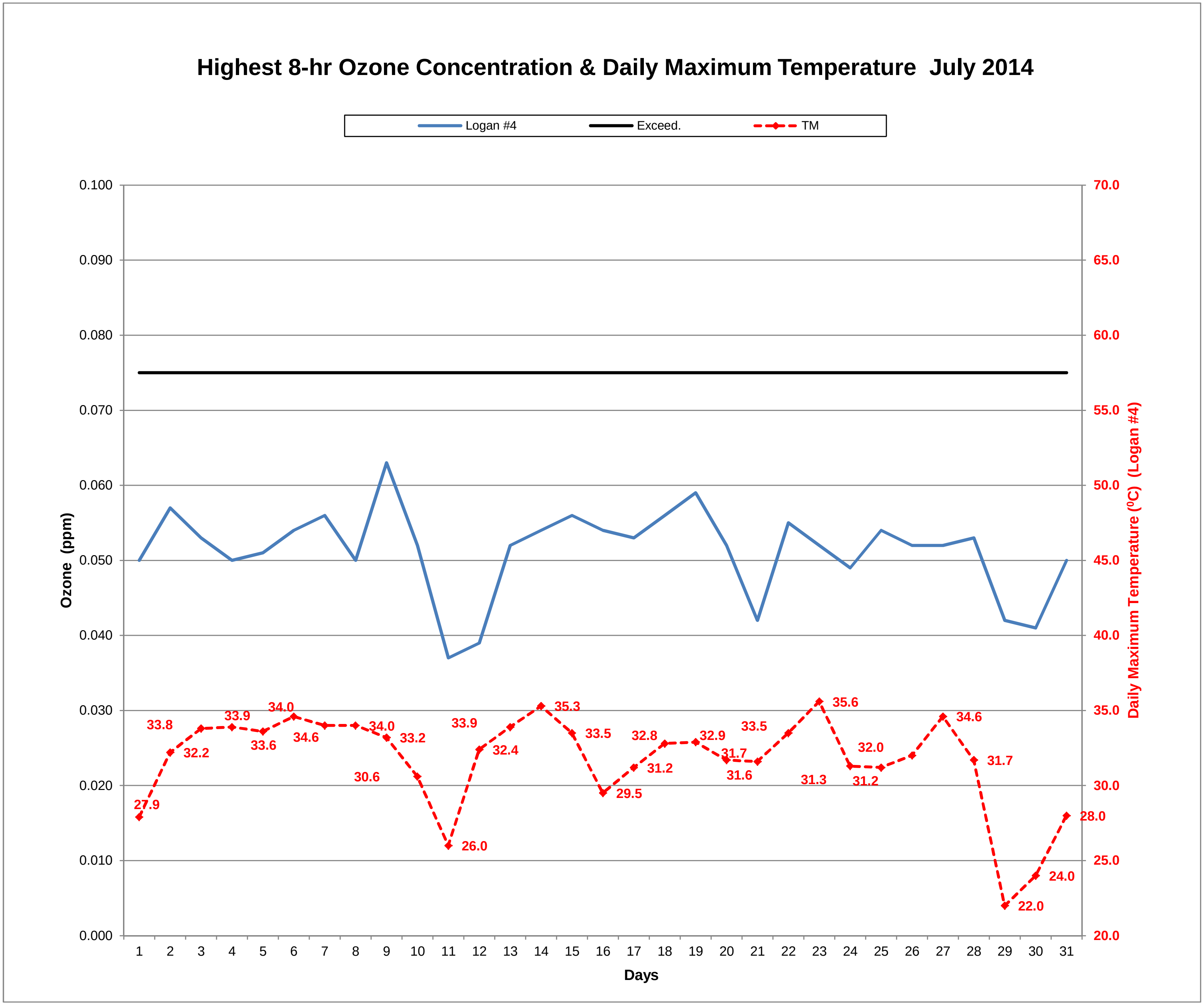


Utah Division of Air Quality

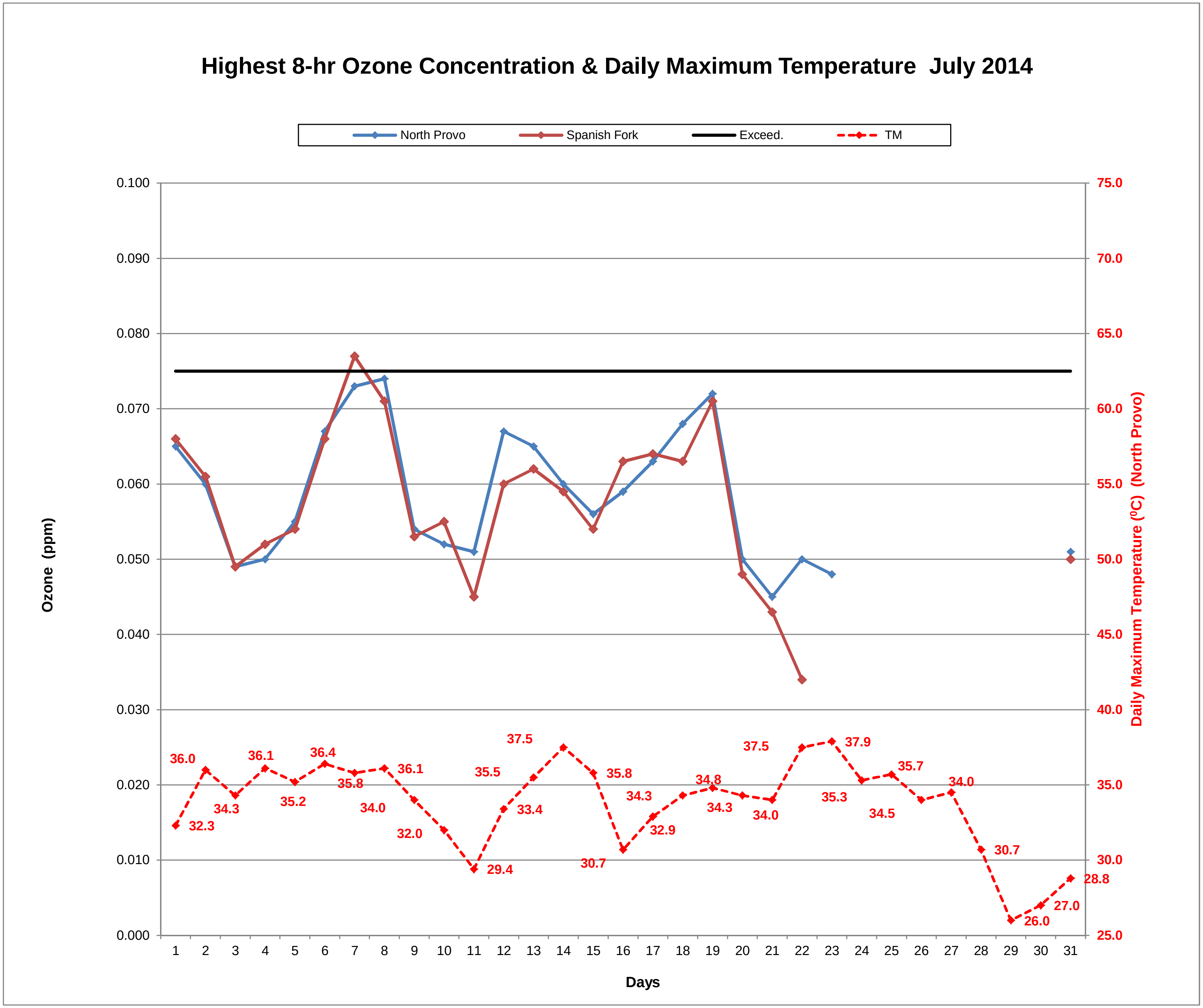

Highest 8-hr Ozone Concentration & Daily Maximum Temperature July 2014
Beach #4
Brigham City
Bountiful
Harrisville
Hawthorne
Ogden #2
Tooele #3
Exceed.
TM
Ozone (ppm)
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
Daily Maximum Temperature (ºC) (Hawthorne)
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
Days
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
30.6
35.2
34.6
34.8
34.6
35.8
35.5
33.0
35.2
31.6
29.0
34.9
32.7
37.4
34.7
30.1
32.2
33.9
32.4
34.1
36.5
33.8
32.5
38.0
32.9
32.7
35.7
31.8
28.0
23.5
26.3



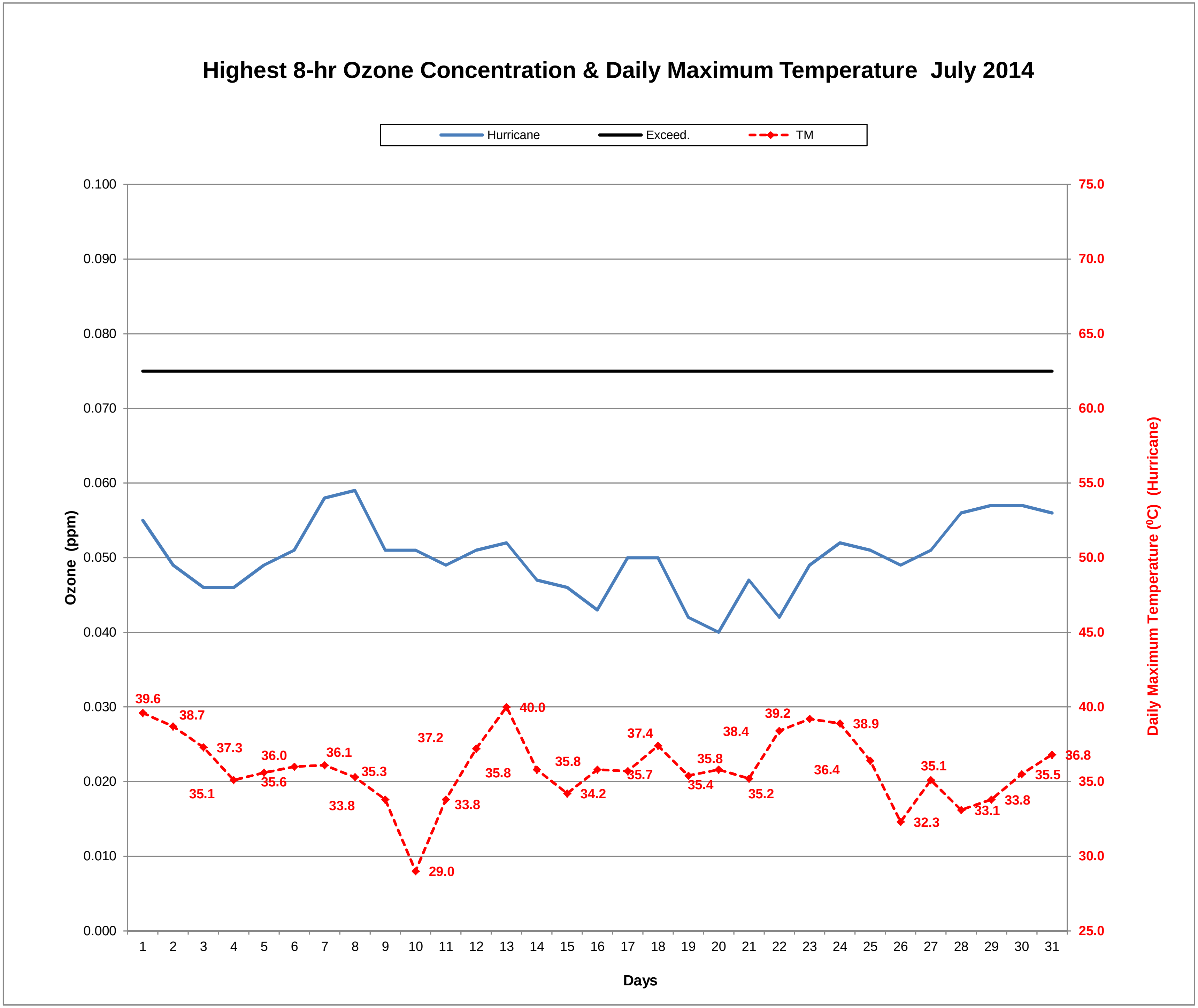
Highest 8-hr Ozone Concentration & Daily Maximum Temperature July 2014
Fruitland
Price #2
Roosevelt
Vernal
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (ºC) (Roosevelt)
Days



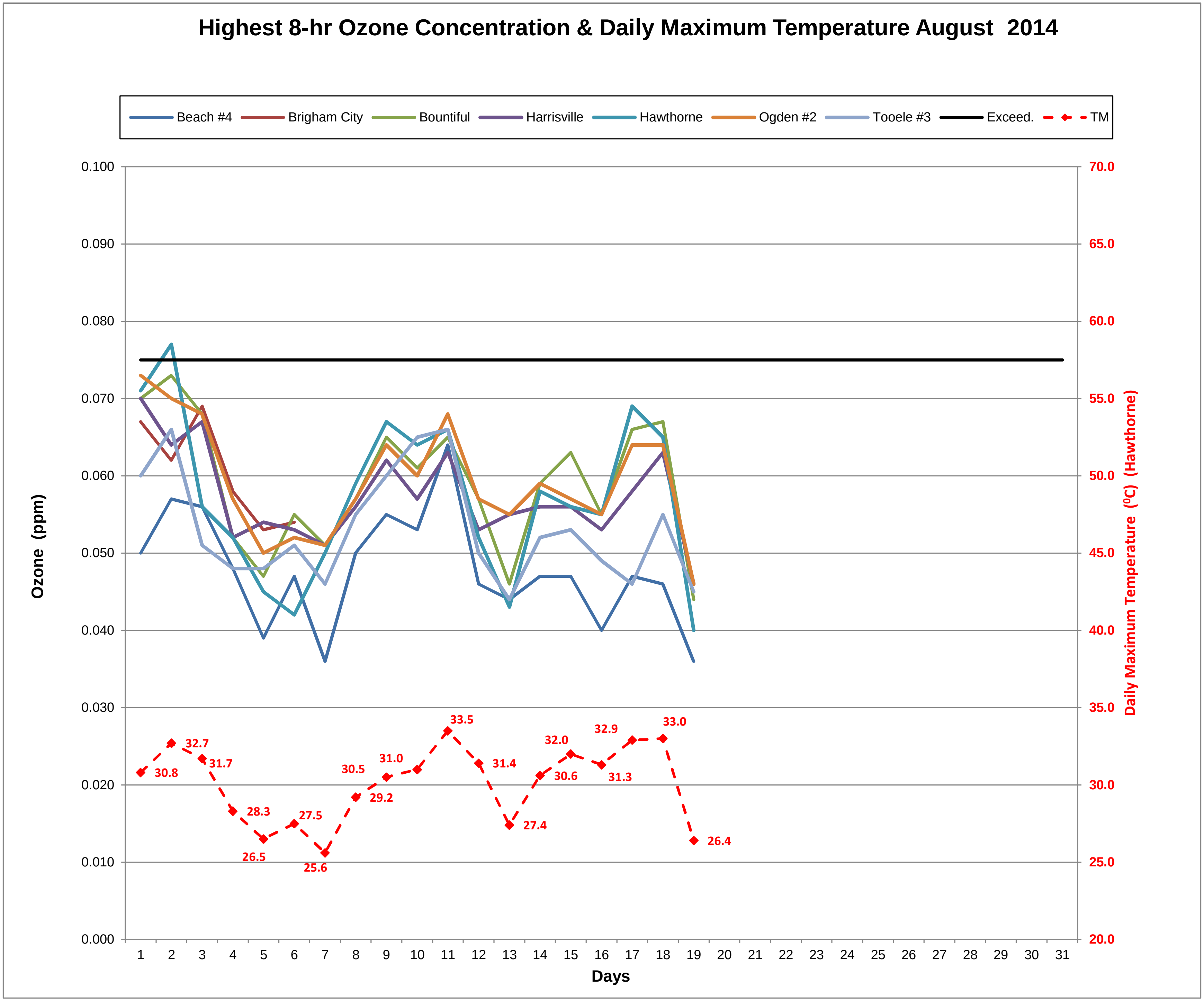
Highest 8-hr Ozone Concentration & Daily Maximum Temperature July 2014
Logan #4
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (ºC) (Logan #4)
Days
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
27.9
33.8
32.2
33.9
33.6
34.0
34.6
34.0
30.6
33.2
26.0
33.9
32.4
35.3
33.5
29.5
31.2
32.8
32.9
31.7
31.6
33.5
31.3
35.6
31.2
32.0
34.6
31.7
22.0
24.0
28.0



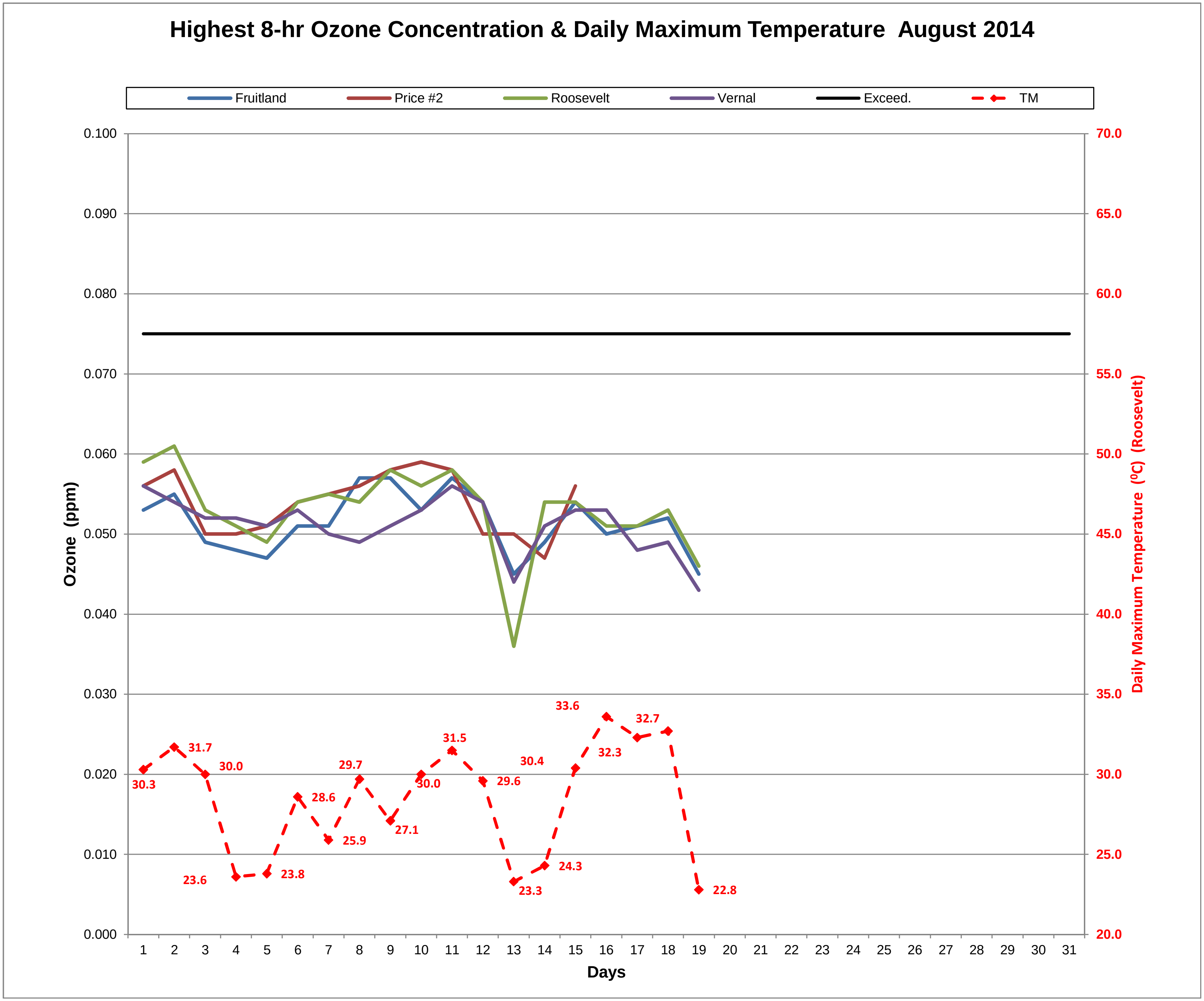
Highest 8-hr Ozone Concentration & Daily Maximum Temperature July 2014
North Provo
Spanish Fork
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (⁰C) (North Provo)
Days
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
32.3 36.0 34.3 36.1 35.2 36.4 35.8 36.1 34.0 32.0 29.4 33.4 35.5 37.5 35.8 30.7 32.9 34.3 34.8 34.3 34.0 37.5 37.9 35.3 35.7 34.5 34.0 30.7 26.0 27.0 28.8



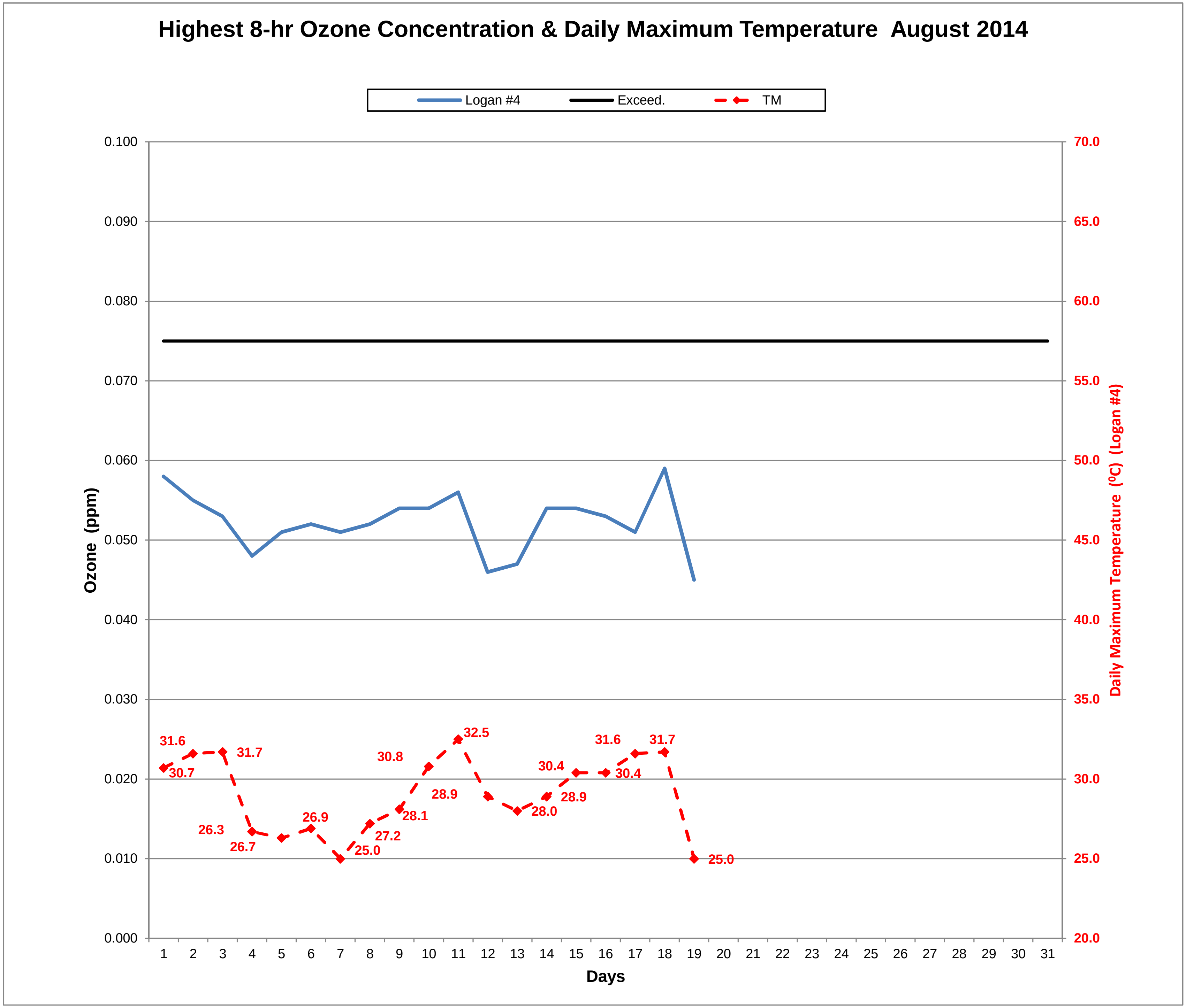
Highest 8-hr Ozone Concentration & Daily Maximum Temperature July 2014
Hurricane
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (ºC) (Hurricane)
Days
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
39.6
38.7
37.3
35.1
36.0
35.6
36.1
35.3
33.8
29.0
33.8
37.2
40.0
35.8
34.2
35.8
35.7
37.4
35.4
35.8
35.2
38.4
39.2
36.4
38.9
32.3
35.1
33.1
33.8
35.5
36.8



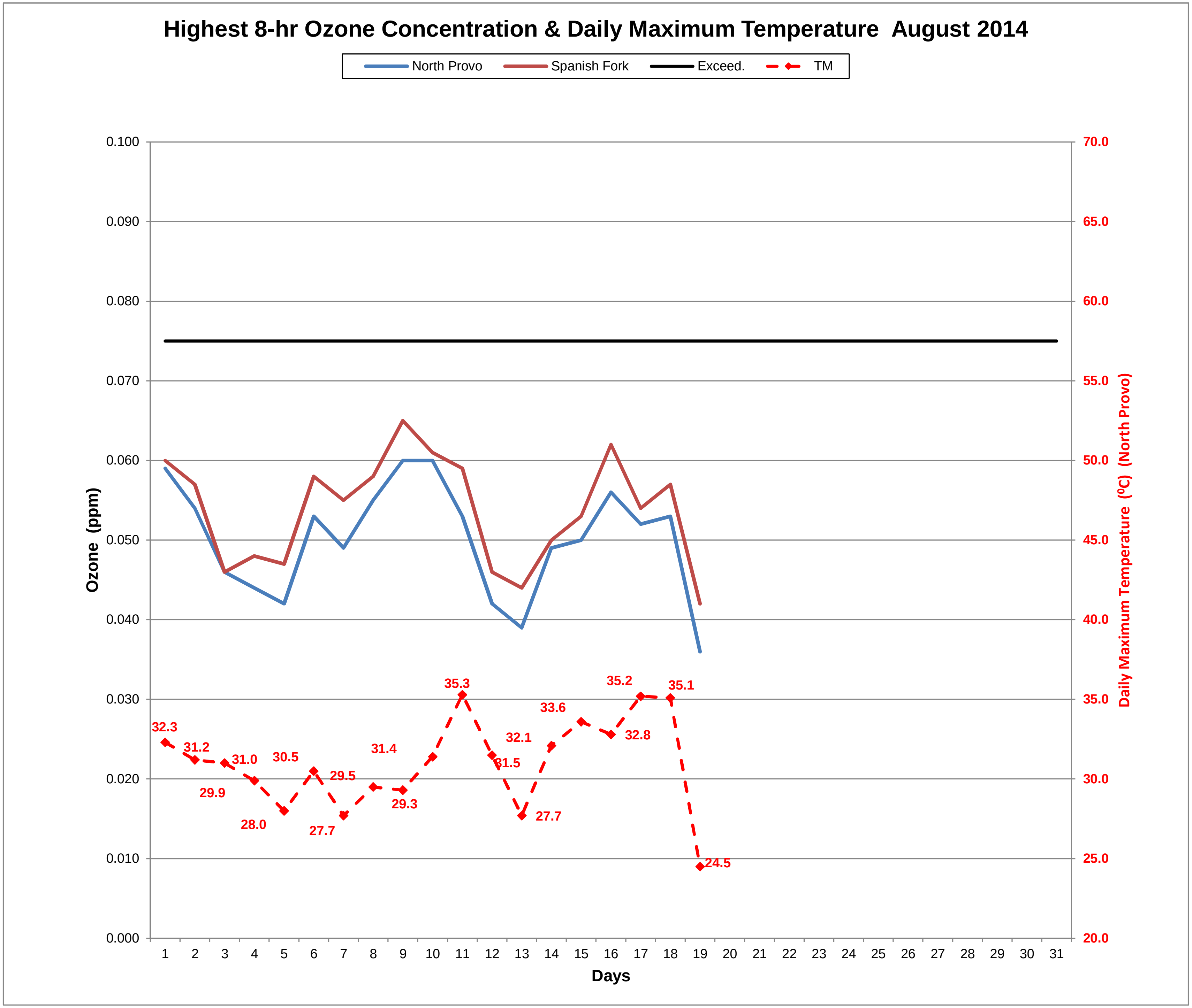
Highest 8-hr Ozone Concentration & Daily Maximum Temperature August 2014
Beach #4
Brigham City
Bountiful
Harrisville
Hawthorne
Ogden #2
Tooele #3
Exceed.
TM
Ozone (ppm)
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
Daily Maximum Temperature (°C) (Hawthorne)
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
30.8
32.7
31.7
28.3
26.5
27.5
25.6
29.2
30.5
31.0
33.5
31.4
27.4
30.6
32.0
31.3
32.9
33.0
26.4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Days

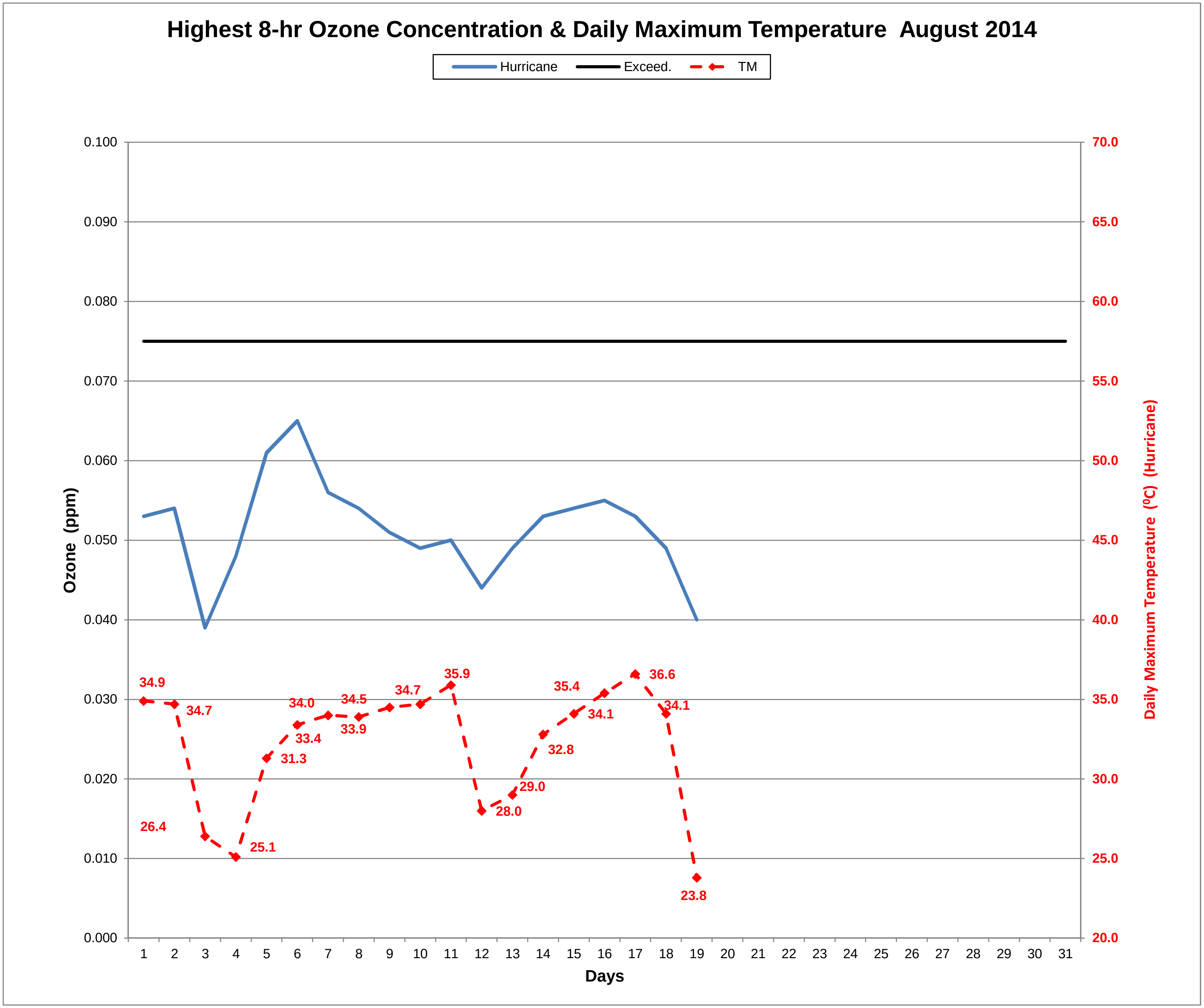


Highest 8-hr Ozone Concentration & Daily Maximum Temperature August 2014
Fruitland
Price #2
Roosevelt
Vernal
Exceed.
TM
Ozone (ppm)
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
Daily Maximum Temperature (^{0}C) (Roosevelt)
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
30.3
31.7
30.0
23.6
23.8
28.6
25.9
29.7
27.1
30.0
31.5
29.6
23.3
30.4
24.3
33.6
32.3
32.7
22.8
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Days



Highest 8-hr Ozone Concentration & Daily Maximum Temperature August 2014
Logan #4
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (0C) (Logan #4)
Days
0.000
0.010
0.020
0.030
0.040
0.050
0.060
0.070
0.080
0.090
0.100
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
30.7
31.6
31.7
26.7
26.3
26.9
25.0
27.2
28.1
30.8
32.5
28.9
28.0
28.9
30.4
30.4
31.6
31.7
25.0


Highest 8-hr Ozone Concentration & Daily Maximum Temperature August 2014
North Provo
Spanish Fork
Exceed.
TM
Ozone (ppm)
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
Daily Maximum Temperature (0C) (North Provo)
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
32.3
31.2
29.9
31.0
28.0
30.5
27.7
29.5
31.4
29.3
35.3
31.5
32.1
27.7
33.6
35.2
32.8
35.1
24.5
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Days



Highest 8-hr Ozone Concentration & Daily Maximum Temperature August 2014
Hurricane
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (⁰C) (Hurricane)
Days
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
34.9
34.7
26.4
25.1
31.3
34.0
33.4
34.5
33.9
34.7
35.9
28.0
29.0
32.8
35.4
34.1
36.6
34.1
23.8