State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

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

DAQ-076-13

UTAH AIR QUALITY BOARD MEETING

FINAL AGENDA

Wednesday, September 11, 2013
9:00 a.m.
195 North 1950 West, Room 1015

I. Call-to-Order

II. Date of the Next Air Quality Board Meeting: October 2, 2013

III. Approval of the Minutes for August 7, 2013, Working Lunch Session and Board Meeting.

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

V. Final Adoption: R307-361. Architectural Coatings. Presented by Mark Berger.

VI. Proposed for Public Comment with Department Fee Schedule: Operating Permit Program Fee for Fiscal Year 2015. Presented by David Beatty.

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

VIII. Propose for Public Comment: Amend R307-123. General Requirements: Clean Fuels and Vehicle Technology Grant and Loan Program. Presented by Mark Berger.

IX. Propose for Public Comment: Amend R307-403-1. Purpose and Definitions. Presented by Mark Berger.

X. Propose for Public Comment: Add a new 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.

XI. Propose for Public Comment: Add a new 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.

XII. Propose for Public Comment: Amend R307-110-10. Section IX, Control Measures for Area and Point Sources, Part A, Fine Particulate Matter. Presented by Mark Berger.

XIII. 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 Brooke Baker, Office of Human Resources at (801) 536-4412 (TDD 536-4414).

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UTAH AIR QUALITY BOARD MEETING
August 7, 2013 – 1:30 p.m.
195 North 1950 West, Room 1015
Salt Lake City, Utah 84116

DRAFT MINUTES

I. Call-to-Order

Steve Sands called the meeting to order at 1:33 p.m.

Board members present: Kathy Van Dame, Craig Petersen, Steve Sands, Kerry Kelly, Robert Paine, Michael Smith, Karma Thomson, and Tammie Lucero

Excused: Amanda Smith

Executive Secretary: Bryce Bird

II. Date of the Next Air Quality Board Meeting: September 11, 2013

Division staff requested the September Board meeting be moved to the second week in September to allow extra time to prepare a complete draft State Implementation Plan (SIP) for proposal to the Board. The Board agreed and the next meeting will be September 11, 2013, at 9:00 a.m.

III. Approval of the Minutes for July 3, 2013, Board Meeting.

- Kathy Van Dame moved to approve the minutes as submitted to the Board. Tammie Lucero seconded. The Board approved unanimously.

IV. Final Adoption: R307-210-2. Oil and Gas Sector: New Source Performance Standards; and R307-214-3. Oil and Gas Sector: National Emission Standards for Hazardous Air Pollutants. Presented by Mark Berger.

Mark Berger, Environmental Planning Consultant at DAQ, stated that on May 1, 2013, the Board proposed to incorporate by reference new source performance standards and national emission standards for hazardous air pollutants for the oil and gas sector that had been adopted by EPA on August 12, 2012. A public comment period was held from June 1 to July 1, 2013. No comments were received on the proposal and no hearing was requested. Staff recommends the Board adopt R307-210-2, Oil and Gas Sector: New Source Performance Standards, and R307-214-3, Oil and Gas Sector: National Emission Standards for Hazardous Air Pollutants, as proposed.

In response to questions, staff responded that these rules are already in effect at a federal level and the final adoption of the incorporation by reference would then make the rules enforceable at the state level. These rules have no impact on sources that are subject to these rules because the rules have been in place since August 2012 at the federal level. This will make any potential compliance actions more straightforward and enforceable by state inspectors rather than referring the action to the federal government. In addition, there would be no impact to sources on the determination of offset credits because the federal rule has been in place since August 2012.

Public comment from Uintah County Commissioner Mike McKee was introduced. Commissioner McKee had concerns for those living in areas where the economy is affected by the oil and gas industry. He commented that if these rules are adopted it would be difficult for companies to get credit for emission reductions, which may be counterproductive to the overall goal of reducing emissions. He requests that the Board postpone a vote on this item for at least a month to have more discussion with staff so the Board, industry, and the public fully understand the impacts.

In further discussion staff stated this was significant rulemaking on the federal level and adopting them on the state level is more procedural and that there would be no problem with delaying a vote at this time. It was recommended that before the Board make these rules enforceable on the state level, it would be helpful to have more information on what the impacts will be to the industry through a summary for the Board to review.

- Tammie Lucero motioned that the Board table this item pending additional summary information for Board review
  . Craig Petersen seconded. The motion carried to approve with a vote of seven in favor (K. Van Dame, S. Sands, K. Kelly, K. Thomson, T. Lucero, R. Paine, and C. Petersen) and one opposed (M. Smith).

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

Mark Berger, Environmental Planning Consultant at DAQ, stated on May 1, 2013, the Board proposed R307-101-3, General Requirements, Version of Code of Federal Regulations Incorporated by Reference, for public comment. A public comment period was held form June 1 to July 1, 2013, and no comments were received and no hearing was requested. This amendment incorporates by reference the most recent version of the Code of Federal Regulations (CFR) into the Air Quality Rules. This allows rules that reference the CFR version as incorporated in R307-101-3 to update the incorporation date with only one rule amendment. Staff recommends the Board adopt R307-101-3 as proposed.

- Craig Petersen moved that the Board adopt R307-101-3. Robert Paine seconded. The Board unanimously approved.

VI. Five-Year Reviews: R307-107. General Requirements: Breakdowns; and R307-123. General Requirements: Clean Fuels and Vehicle Technology Grant and Loan Program. Presented by Mark Berger.

Mark Berger, Environmental Planning Consultant at DAQ, stated that Utah Code Title 63G-3-305 requires that each agency review each of its rules every five years to justify that it is required and that there is statute that gives authority to the Board to have that rule. DAQ completed the five year review for rules R307-107 and R307-123. This five year review process is not a time to

revise or amend a rule but only to verify that a rule is still necessary and allowed under state and federal statute. Staff recommends the Board continue these rules by approving the five-year notice of review and statement of continuation forms.

In response to questions from the Board staff responded there have been no issues with the R307-107 since it was finalized last year. Modifying a rule does not necessarily reset the five year review clock. In the past staff has done a modification and five year review of a rule at the same time but that is not always the case. Finally, at the request of the Board, staff will add lines to the compliance activities memorandum to include the total number of breakdown reports received and breakdowns resulting in compliance actions.

- Kathy Van Dame moved that the Board approve the five-year review of R307-107 and R307-123. Tammie Lucero seconded. The Board approved unanimously.

VII. Propose for Public Comment: Amend State Implementation Plan, Control Measures for Area and Point Sources, Fine Particulate Matter, PM2.5 SIP for the Logan, UT-ID Nonattainment Area, Section IX, Part A.23. Presented by Bill Reiss.

Bill Reiss, Environmental Engineer at DAQ, stated that the state implementation plan (SIP) for Cache Valley was adopted December 2012 with a placeholder for a motor vehicle emission budget for direct $PM_{2.5}$. Budgets in that SIP were established for both nitrogen oxides (NOx) and volatile organic compounds (VOCs), each having been identified as a plan precursor to $PM_{2.5}$ and therefore warranting control. However, additional time was needed to determine as per the conformity rule whether it would be necessary to include a budget for direct $PM_{2.5}$. Direct $PM_{2.5}$ is actually a combination of tailpipe $PM_{2.5}$ plus brake-wear plus tire-wear. It doesn't include the re-entrained road dust that kicks up from the tires. Work has now been completed on this and the result is that these emissions cannot be considered insignificant. Therefore a budget is necessary and staff is recommending the SIP be amended to include a budget of 0.33 tons per day for direct $PM_{2.5}$ in 2014 and years thereafter. Staff is also proposing to include a trading mechanism for years beyond 2014 which is the last year of our air quality SIP conformity findings that identify more direct $PM_{2.5}$ than the 0.33 tons per year stated. This is similar to a trading mechanism that was adopted into the Utah Air Conservation Rules for PM_{10} years ago and it provides the Cache Metropolitan Planning Organization (MPO) the flexibility to proceed with its planning for the future. The trading mechanism in this proposal is the result of extensive work between DAQ, the EPA, and the Cache MPO. All parties are comfortable with releasing this now for public comment. The approach we have is similar to what has been approved by the EPA in California's $PM_{2.5}$ SIP for the South Coast Air Quality Management District. As it outlines the details, the underage with respect to the budgets of NOx and VOC would need to be sufficient to compensate for the overage in direct $PM_{2.5}$ exchange rates that are established by the air quality model. This mechanism basically assumes that any of these trades would be neutral with respect to the air quality and the concentrations of $PM_{2.5}$. These trading ratios are identified in the proposed SIP as 14.65 to 1 for NOx and 29.98 to 1 for VOC. Staff recommends the Board approve the proposed amendment to the SIP Section IX.A.23 for public comment.

In discussion with the Board, staff responded that the ratios for NOx and VOC are determined by the air quality model and in this case are specific to the Cache Valley/Logan nonattainment area. Also, the ratios for NOx and VOC were determined through the air quality model with regard to the chemistry occurring in the atmosphere. The budgets are the numbers DAQ used in the inventory in predicting attainment of the standard in Cache Valley for 2014. The numbers were made by the Cache MPO for that area while considering travel demand, patterns, and using the motor vehicle emissions simulator (MOVES) model to assign what those emissions would be.

- Craig Petersen moved to propose for public comment the amended 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. Kerry Kelly seconded. The Board approved unanimously.

VIII. Propose for Public Comment: Amend State Implementation Plan Section X, Vehicle Inspection and Maintenance Program, Part F, Cache County. Presented by Mat Carlile.

Mat Carlile, Environmental Planning Consultant at DAQ, stated that Cache County is required under Section X, Part F to implement an inspection and maintenance (I/M) program. This program will exempt vehicles less than six years old. The light duty vehicles, 1996 or newer, will undergo a bi-annual onboard diagnostic (OBD) inspection. Vehicles 1995 and older will be subject to an annual two-speed idle test. Staff recommends the Board propose the amendments to Section X, Vehicle Inspection and Maintenance Program, Part F, Cache County for public comment.

In discussion with the Board, it was stated that Cache County has already approved ordinance to implement an I/M program in Cache County. This item before the Board is to approve whether to include Cache's I/M program into the $PM_{2.5}$ SIP and not to approve the program requirements. Also, the minimum amount a vehicle owner must spend to qualify for a waiver, if a vehicle fails an emissions inspection, varies by county.

- Robert Paine moved that the Board propose for public comment the amended State Implementation Plan Section X, Vehicle Inspection and Maintenance Program, Part F, Cache County. Karma Thomson seconded. The Board approved unanimously.

IX. Propose for Public Comment: Amend R307-110-10. Section IX, Control Measures for Area and Point Sources, Part A, Fine Particulate Matter; and R307-110-36. Section X, Vehicle Inspection and Maintenance Program, Part F, Cache County. Presented by Mark Berger.

Mark Berger, Environmental Planning Consultant at DAQ, stated the Board proposed for public comment amendments to SIP Section X, Part F and Section IX, Part A.23. When sections of the SIP are amended by the Board, the rule that incorporates those sections of the SIP must be amended to incorporate the updated version of the SIP into the rules. Staff recommends that the Board propose for public comment R307-110-10 and R307-110-36 to incorporate the most recent versions of SIP Section X, Part F and SIP Section IX, Part A into the Air Quality Rules.

In response to questions from the Board, staff responded that these rules, upon approval, would be enforceable on the state level once they are incorporated into the rules, but they are not federally enforceable until EPA approves the SIP.

- Craig Petersen moved that the Board propose for public comment the amendments to R3078-110-10 Section IX and R307-110-36 Section X. Robert Paine seconded. The Board approved unanimously.

X. Informational Items.

A. $PM_{2.5}$ State Implementation Plan Update and Discussion. Presented by Bill Reiss.

Bill Reiss, Environmental Engineer at DAQ, updated that DAQ intends to bring draft SIPs for public review at the September meeting. Staff found a path forward regarding the 5

microgram attainment gap which involved a reassessment of the monitored design value for each of the two nonattainment areas using more current data for 2011 and 2012. Also, Subpart 4 is a Court remand to EPA to revisit the actual implementation of the $PM_{2.5}$ standards which holds us, as writers of the SIP, to a different standard as the plans are put together. What is being prepared for September is what is called a Subpart 1 SIP with the understanding that situation will need to be revisited in the context of Subpart 4 later on.

Administratively, the September meeting was moved back a week so that staff could prepare the documents for a public comment period begin date of October 1. This will allow staff to proceed in December with the SIP for final adoption and to give EPA a Subpart 1 SIP no more than one year later than the original statutory due date. In preparation, staff will have to run through final modeling results. The model results will take into consideration the new design values and some new inventories that coincide with the middle of the five year span that determines those design values. Included in the final modeling numbers will be the reasonable available control technology (RACT) analysis for large industrial sources. Finally, the results will be prepared into a SIP narrative describing the numbers and the model results that are included.

B. Air Toxics. Presented by Robert Ford.

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

D. Monitoring. Presented by Bo Call.

Bo Call updated the Board on the monitoring graphs noting there were spikes of particulate matter on July 4 due to firework activities. It was noted that in the past EPA generally agrees with exceptional events due to firework activities. There were exceedances in ozone at several monitors in July. These exceedances will affect the three-year averaging period because the year with the oldest data gets rolled off and the data for the new year is averaged in.

E. Other Items to be Brought Before the Board.

Mr. Bird updated that Stericycle was given an extension to their timeline for challenging Utah's notice of violation. Their responsibility for compliance is still in place and DAQ has also started settlement discussions with Stericycle.

Meeting adjourned at 2:48 p.m.

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UTAH AIR QUALITY BOARD
BROWN BAG LUNCH SESSION
August 7, 2013 – 11:30 a.m.
195 North 1950 West, Four Corners Conference Rooms
Salt Lake City, Utah 84116

DRAFT MINUTES

Board members present: Kathy Van Dame, Craig Petersen, Steve Sands, Kerry Kelly, Robert Paine, Michael Smith, Karma Thomson, and Tammie Lucero

Mark Berger, Environmental Planning Consultant at DAQ, explained that DAQ is developing tools to improve public notification. One such tool is a table titled "Potential Rules Being Researched and Developed" which will be posted on DAQ's web page where rules and programs that DAQ is researching and developing for potential approval by the Board will be posted online for public access. Another tool is the creation of a ListServ where interested parties can sign up and receive electronic mail after a Board meeting giving them a brief summary of everything the Board acted on and then provide a link to the table listed above which provides the information to be published in the Division of Administrative Rules Bulletin. Once these additions to the web page are made staff will inform the public of these changes through newspaper notice and social media Twitter.

Bill Reiss, Environmental Engineer at DAQ, explained that staff is preparing the $PM_{2.5}$ state implementation plans (SIPs) for each of the nonattainment areas to be presented for proposal at the September Board meeting. If approved, the SIPs will go out for a 30-day public comment period with the goal of a October 1 start date. This will allow staff time to address comments and ultimately bring the SIPs to a December Board meeting for final adoption. We are still not modeling attainment and staff is looking for additional emission reductions including reasonable available control technology (RACT) of large stationary sources. In addition, there is the Subpart 4 issue which is a Court remand for EPA to revisit the actual implementation of the $PM_{2.5}$ standards. With the Court remand in mind, DAQ is preparing what is called Subpart 1 SIPs with the understanding that the situation will need to be revisited in the context of Subpart 4 later on.

Lance Avey, Senior Modeler at DAQ, focused on explaining the new five year baseline design value window. He has been working with EPA to construct a new baseline design value for the 2008 to 2012 time frame to which he then explained in detail the four steps used for the model attainment test. For the 2008 to 2012 baseline design value, DAQ must use a 2010 emissions inventory. For future modeling the only thing that would change from the model attainment test is the emissions inventory. In addition, population growth projections, population data, and employment data are received from the Governor's Office of Management Budget. The vehicle miles traveled projections are received from the Metropolitan Planning Organizations. Currently, DAQ is using recent monitoring data which allows them to reestablish

the monitored design values for both of the nonattainment areas. Using this more recent monitored data DAQ is able to lower the assessment such that the emission reductions currently in the SIPs will get us close to the 35 microgram $PM_{2.5}$ standard.

Marty Gray, Major New Source Review Section Manager at DAQ, explained the RACT process used by DAQ. Sources and emissions units in the nonattainment areas were identified and baseline emissions were established. Then emission units too small for RACT and technology infeasible controls were eliminated. Mr. Gray then went through the process of how controls were ranked by the amount of reduction of pollutants of interest, cost per ton, as well as other factors. The RACT development process identified existing major sources in the nonattainment areas and DAQ requested these sources to submit a RACT analysis. The DAQ contracted with an independent engineering firm to research and evaluate the submissions by some of the sources. It was also noted that DAQ has been working with EPA throughout this process and EPA has also reviewed the contractor's analysis. DAQ is currently close to completing the RACT analysis. The DAQ and contractor reports will be completed by October 1 as part of the technical support document. The remainder of Mr. Gray presentation reviewed individual information on several major sources reviewed for RACT analysis.

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DAQ-070-13

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Steven Packham, Toxicologist

DATE: September 9, 2013 (amended)

SUBJECT: FINAL ADOPTION: Amend R307-214. National Emission Standards for Hazardous Air Pollutants.

On June 5, 2013, the Air Quality Board proposed for comment amendments to R307-214, *National Emission Standards for Hazardous Air Pollutants*. These amendments updated the version of 40 CFR Parts 61 and 63 incorporated by reference in R307-214 from July 1, 2011, to July 1, 2012. When we presented this amendment to the Board, we included a table of changes made to 40 CFR Part 63 that affected R307-214-2. That same table is included with this memo. There were no changes to Part 61 that affected the rule. A 30-day public comment period was held from July 1 to July 31, 2013. No comments were submitted and no public hearing was requested.

Staff Recommendation: Staff recommends the Board adopt R307-214 as proposed.

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R307. Environmental Quality, Air Quality.
R307-214. National Emission Standards for Hazardous Air Pollutants.
R307-214-1. Pollutants Subject to Part 61.

The provisions of Title 40 of the Code of Federal Regulations (40 CFR) Part 61, National Emission Standards for Hazardous Air Pollutants, effective as of July 1, 2012, are incorporated into these rules by reference. For pollutant emission standards delegated to the State, references in 40 CFR Part 61 to "the Administrator" shall refer to the director.

R307-214-2. Sources Subject to Part 63.

The provisions listed below of 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories, effective as of July 1, 2012, are incorporated into these rules by reference. References in 40 CFR Part 63 to "the Administrator" shall refer to the director, unless by federal law the authority is specific to the Administrator and cannot be delegated.

(1) 40 CFR Part 63, Subpart A, General Provisions.

(2) 40 CFR Part 63, Subpart B, Requirements for Control Technology Determinations for Major Sources in Accordance with 42 U.S.C. 7412(g) and (j).

(3) 40 CFR Part 63, Subpart F, National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry.

(4) 40 CFR Part 63, Subpart G, National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater.

(5) 40 CFR Part 63, Subpart H, National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks.

(6) 40 CFR Part 63, Subpart I, National Emission Standards for Organic Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks.

(7) 40 CFR Part 63, Subpart J, National Emission Standards for Polyvinyl Chloride and Copolymers Production.

(8) 40 CFR Part 63, Subpart L, National Emission Standards for Coke Oven Batteries.

(9) 40 CFR Part 63, Subpart M, National Perchloroethylene Air Emission Standards for Dry Cleaning Facilities.

(10) 40 CFR Part 63, Subpart N, National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks.

(11) 40 CFR Part 63, Subpart O, National Emission Standards for Hazardous Air Pollutants for Ethylene Oxide Commercial Sterilization and Fumigation Operations.

(12) 40 CFR Part 63, Subpart Q, National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers.

(13) 40 CFR Part 63, Subpart R, National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations).

(14) 40 CFR Part 63, Subpart T, National Emission Standards for Halogenated Solvent Cleaning.

(15) 40 CFR Part 63, Subpart U, National Emission Standards for Hazardous Air Pollutant Emissions: Group I Polymers and Resins.

(16) 40 CFR Part 63, Subpart AA, National Emission Standards for Hazardous Air Pollutants for Phosphoric Acid Manufacturing.

(17) 40 CFR Part 63, Subpart BB, National Emission Standards for Hazardous Air Pollutants for Phosphate Fertilizer Production.

(18) 40 CFR Part 63, Subpart CC, National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries.

(19) 40 CFR Part 63, Subpart DD, National Emission Standards for Hazardous Air Pollutants from Off-Site Waste and Recovery Operations.

(20) 40 CFR Part 63, Subpart EE, National Emission Standards for Magnetic Tape Manufacturing Operations.

(21) 40 CFR Part 63, Subpart GG, National Emission Standards for Aerospace Manufacturing and Rework Facilities.

(22) 40 CFR Part 63, Subpart HH, National Emission Standards for Hazardous Air Pollutants for Oil and Natural Gas Production.

(23) 40 CFR Part 63, Subpart JJ, National Emission Standards for Wood Furniture Manufacturing Operations.

(24) 40 CFR Part 63, Subpart KK, National Emission Standards for the Printing and Publishing Industry.

(25) 40 CFR Part 63, Subpart MM, National Emission Standards for Hazardous Air Pollutants for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills.

(26) 40 CFR Part 63, Subpart OO, National Emission Standards for Tanks - Level 1.

(27) 40 CFR Part 63, Subpart PP, National Emission Standards for Containers.

(28) 40 CFR Part 63, Subpart QQ, National Emission Standards for Surface Impoundments.

(29) 40 CFR Part 63, Subpart RR, National Emission Standards for Individual Drain Systems.

(30) 40 CFR Part 63, Subpart SS, National Emission Standards for Closed Vent Systems, Control Devices, Recovery Devices and Routing to a Fuel Gas System or a Process (Generic MACT).

(31) 40 CFR Part 63, Subpart TT, National Emission Standards for Equipment Leaks- Control Level 1 (Generic MACT).

(32) 40 CFR Part 63, Subpart UU, National Emission Standards for Equipment Leaks-Control Level 2 Standards (Generic MACT).

(33) 40 CFR Part 63, Subpart VV, National Emission Standards for Oil-Water Separators and Organic-Water Separators.

(34) 40 CFR Part 63, Subpart WW, National Emission Standards for Storage Vessels (Tanks)-Control Level 2 (Generic MACT).

(35) 40 CFR Part 63, Subpart XX, National Emission Standards for Ethylene Manufacturing Process Units: Heat Exchange Systems and Waste Operations.

(36) 40 CFR Part 63, Subpart YY, National Emission Standards for Hazardous Air Pollutants for Source Categories: Generic MACT.

(37) 40 CFR Part 63, Subpart CCC, National Emission Standards for Hazardous Air Pollutants for Steel Pickling-HCl Process Facilities and Hydrochloric Acid Regeneration Plants.

(38) 40 CFR Part 63, Subpart DDD, National Emission Standards

for Hazardous Air Pollutants for Mineral Wool Production.

(39) 40 CFR Part 63, Subpart EEE, National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors.

(40) 40 CFR Part 63, Subpart GGG, National Emission Standards for Hazardous Air Pollutants for Pharmaceuticals Production.

(41) 40 CFR Part 63, Subpart HHH, National Emission Standards for Hazardous Air Pollutants for Natural Gas Transmission and Storage.

(42) 40 CFR Part 63, Subpart III, National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production.

(43) 40 CFR Part 63, Subpart JJJ, National Emission Standards for Hazardous Air Pollutants for Group IV Polymers and Resins.

(44) 40 CFR Part 63, Subpart LLL, National Emission Standards for Hazardous Air Pollutants for Portland Cement Manufacturing Industry.

(45) 40 CFR Part 63, Subpart MMM, National Emission Standards for Hazardous Air Pollutants for Pesticide Active Ingredient Production.

(46) 40 CFR Part 63, Subpart NNN, National Emission Standards for Hazardous Air Pollutants for Wool Fiberglass Manufacturing.

(47) 40 CFR Part 63, Subpart OOO, National Emission Standards for Hazardous Air Pollutants for Amino/Phenolic Resins Production (Resin III).

(48) 40 CFR Part 63, Subpart PPP, National Emission Standards for Hazardous Air Pollutants for Polyether Polyols Production.

(49) 40 CFR Part 63, Subpart QQQ, National Emission Standards for Hazardous Air Pollutants for Primary Copper Smelters.

(50) 40 CFR Part 63, Subpart RRR, National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production.

(51) 40 CFR Part 63, Subpart TTT, National Emission Standards for Hazardous Air Pollutants for Primary Lead Smelting.

(52) 40 CFR Part 63, Subpart UUU, National Emission Standards for Hazardous Air Pollutants for Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units.

(53) 40 CFR Part 63, Subpart VVV, National Emission Standards for Hazardous Air Pollutants: Publicly Owned Treatment Works.

(54) 40 CFR Part 63, Subpart AAAA, National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills.

(55) 40 CFR Part 63, Subpart CCCC, National Emission Standards for Manufacturing of Nutritional Yeast.

(56) 40 CFR Part 63, Subpart DDDD, National Emission Standards for Hazardous Air Pollutants for Plywood and Composite Wood Products.

(57) 40 CFR Part 63, Subpart EEEE, National Emission Standards for Hazardous Air Pollutants for Organic Liquids Distribution (non-gasoline).

(58) 40 CFR Part 63, Subpart FFFF, National Emission Standards for Hazardous Air Pollutants for Miscellaneous Organic Chemical Manufacturing.

(59) 40 CFR Part 63, Subpart GGGG, National Emission Standards for Vegetable Oil Production; Solvent Extraction.

(60) 40 CFR Part 63, Subpart HHHH, National Emission Standards for Wet-Formed Fiberglass Mat Production.

(61) 40 CFR Part 63, Subpart IIII, National Emission Standards for Hazardous Air Pollutants for Surface Coating of Automobiles and Light-Duty Trucks.

(62) 40 CFR Part 63, Subpart JJJJ, National Emission Standards for Hazardous Air Pollutants for Paper and Other Web Surface Coating Operations.

(63) 40 CFR Part 63, Subpart KKKK, National Emission Standards for Hazardous Air Pollutants for Surface Coating of Metal Cans.

(64) 40 CFR Part 63, Subpart MMMM, National Emission Standards for Hazardous Air Pollutants for Surface Coating of Miscellaneous Metal Parts and Products.

(65) 40 CFR Part 63, Subpart NNNN, National Emission Standards for Large Appliances Surface Coating Operations.

(66) 40 CFR Part 63, Subpart OOOO, National Emission Standards for Hazardous Air Pollutants for Fabric Printing, Coating and Dyeing Surface Coating Operations.

(67) 40 CFR Part 63, Subpart PPPP, National Emissions Standards for Hazardous Air Pollutants for Surface Coating of Plastic Parts and Products.

(68) 40 CFR Part 63, Subpart QQQQ, National Emission Standards for Hazardous Air Pollutants for Surface Coating of Wood Building Products.

(69) 40 CFR Part 63, Subpart RRRR, National Emission Standards for Hazardous Air Pollutants for Metal Furniture Surface Coating Operations.

(70) 40 CFR Part 63, Subpart SSSS, National Emission Standards for Metal Coil Surface Coating Operations.

(71) 40 CFR Part 63, Subpart TTTT, National Emission Standards for Leather Tanning and Finishing Operations.

(72) 40 CFR Part 63, Subpart UUUU, National Emission Standards for Cellulose Product Manufacturing.

(73) 40 CFR Part 63, Subpart VVVV, National Emission Standards for Boat Manufacturing.

(74) 40 CFR Part 63, Subpart WWWW, National Emissions Standards for Hazardous Air Pollutants for Reinforced Plastic Composites Production.

(75) 40 CFR Part 63, Subpart XXXX, National Emission Standards for Tire Manufacturing.

(76) 40 CFR Part 63, Subpart YYYY, National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines.

(77) 40 CFR Part 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

(78) 40 CFR Part 63, Subpart AAAAA, National Emission Standards for Hazardous Air Pollutants for Lime Manufacturing Plants.

(79) 40 CFR Part 63, Subpart BBBBB, National Emission Standards for Hazardous Air Pollutants for Semiconductor Manufacturing.

(80) 40 CFR Part 63, Subpart CCCCC, National Emission Standards for Hazardous Air Pollutants for Coke Ovens: Pushing, Quenching, and Battery Stacks.

(81) 40 CFR Part 63, Subpart DDDDD, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and

Institutional Boilers and Process Heaters.

(82) 40 CFR Part 63, Subpart EEEEE, National Emission Standards for Hazardous Air Pollutants for Iron and Steel Foundries.

(83) 40 CFR Part 63, Subpart FFFFF, National Emission Standards for Hazardous Air Pollutants for Integrated Iron and Steel Manufacturing.

(84) 40 CFR Part 63, Subpart GGGGG, National Emission Standards for Hazardous Air Pollutants for Site Remediation.

(85) 40 CFR Part 63, Subpart HHHHH, National Emission Standards for Hazardous Air Pollutants for Miscellaneous Coating Manufacturing.

(86) 40 CFR Part 63, Subpart IIIII, National Emission Standards for Hazardous Air Pollutants for Mercury Emissions from Mercury Cell Chlor-Alkali Plants.

(87) 40 CFR Part 63, Subpart JJJJJ, National Emission Standards for Hazardous Air Pollutants for Brick and Structural Clay Products Manufacturing.

(88) 40 CFR Part 63, Subpart KKKKK, National Emission Standards for Hazardous Air Pollutants for Clay Ceramics Manufacturing.

(89) 40 CFR Part 63, Subpart LLLLL, National Emission Standards for Hazardous Air Pollutants for Asphalt Processing and Asphalt Roofing Manufacturing.

(90) 40 CFR Part 63, Subpart MMMMM, National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Fabrication Operations.

(91) 40 CFR Part 63, Subpart NNNNN, National Emission Standards for Hazardous Air Pollutants for Hydrochloric Acid Production.

(92) 40 CFR Part 63, Subpart PPPPP, National Emission Standards for Hazardous Air Pollutants for Engine Test Cells/Stands.

(93) 40 CFR Part 63, Subpart QQQQQ, National Emission Standards for Hazardous Air Pollutants for Friction Materials Manufacturing Facilities.

(94) 40 CFR Part 63, Subpart RRRRR, National Emission Standards for Hazardous Air Pollutants for Taconite Iron Ore Processing.

(95) 40 CFR Part 63, Subpart SSSSS, National Emission Standards for Hazardous Air Pollutants for Refractory Products Manufacturing.

(96) 40 CFR Part 63, Subpart TTTTT, National Emission Standards for Hazardous Air Pollutants for Primary Magnesium Refining.

(97) 40 CFR Part 63, Subpart WWWWW, National Emission Standards for Hospital Ethylene Oxide Sterilizers.

(98) 40 CFR Part 63, Subpart YYYYY, National Emission Standards for Hazardous Air Pollutants for Area Sources: Electric Arc Furnace Steelmaking Facilities.

(99) 40 CFR Part 63, Subpart ZZZZZ, National Emission Standards for Hazardous Air Pollutants for Iron and Steel Foundries Area Sources.

(100) 40 CFR Part 63 Subpart BBBBBB National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities

(101) 40 CFR Part 63 Subpart CCCCCC National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities.

(102) 40 CFR Part 63, Subpart DDDDDD, National Emission Standards for Hazardous Air Pollutants for Polyvinyl Chloride and Copolymers

Production Area Sources.

(103) 40 CFR Part 63, Subpart EEEEEE, National Emission Standards for Hazardous Air Pollutants for Primary Copper Smelting Area Sources.

(104) 40 CFR Part 63, Subpart FFFFFF, National Emission Standards for Hazardous Air Pollutants for Secondary Copper Smelting Area Sources.

(105) 40 CFR Part 63, Subpart GGGGGG, National Emission Standards for Hazardous Air Pollutants for Primary Nonferrous Metals Area Sources--Zinc, Cadmium, and Beryllium.

(106) 40 CFR Part 63, Subpart JJJJJJ, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources.

(107) 40 CFR Part 63, Subpart LLLLLL, National Emission Standards for Hazardous Air Pollutants for Acrylic and Modacrylic Fibers Production Area Sources.

(108) 40 CFR Part 63, Subpart MMMMMM, National Emission Standards for Hazardous Air Pollutants for Carbon Black Production Area Sources.

(109) 40 CFR Part 63, Subpart NNNNNN, National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources: Chromium Compounds.

(110) 40 CFR Part 63, Subpart OOOOOO, National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production and Fabrication Area Sources.

(111) 40 CFR Part 63, Subpart PPPPPP, National Emission Standards for Hazardous Air Pollutants for Lead Acid Battery Manufacturing Area Sources.

(112) 40 CFR Part 63, Subpart QQQQQQ, National Emission Standards for Hazardous Air Pollutants for Wood Preserving Area Sources.

(113) 40 CFR Part 63, Subpart RRRRRR, National Emission Standards for Hazardous Air Pollutants for Clay Ceramics Manufacturing Area Sources.

(114) 40 CFR Part 63, Subpart SSSSSS, National Emission Standards for Hazardous Air Pollutants for Glass Manufacturing Area Sources.

(115) 40 CFR Part 63, Subpart VVVVVV, National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources.

(116) 40 CFR Part 63, Subpart TTTTTT, National Emission Standards for Hazardous Air Pollutants for Secondary Nonferrous Metals Processing Area Sources.

(117) 40 CFR Part 63, Subpart WWWWWW, National Emission Standards for Hazardous Air Pollutants: Area Source Standards for Plating and Polishing Operations.

(118) 40 CFR Part 63, Subpart XXXXXX, National Emission Standards for Hazardous Air Pollutants Area Source Standards for Nine Metal Fabrication and Finishing Source Categories.

(119) 40 CFR Part 63, Subpart YYYYYY, National Emission Standards for Hazardous Air Pollutants for Area Sources: Ferroalloys Production Facilities.

(120) 40 CFR Part 63, Subpart ZZZZZZ, National Emission Standards for Hazardous Air Pollutants: Area Source Standards for Aluminum, Copper, and Other Nonferrous Foundries.

(121) 40 CFR Part 63, Subpart AAAAAAA, National Emission Standards for Hazardous Air Pollutants for Area Sources: Asphalt

Processing and Asphalt Roofing Manufacturing.

(122) 40 CFR Part 63, Subpart BBBBBBB, National Emission Standards for Hazardous Air Pollutants for Area Sources: Chemical Preparations Industry.

(123) 40 CFR Part 63, Subpart CCCCCCC, National Emission Standards for Hazardous Air Pollutants for Area Sources: Paints and Allied Products Manufacturing.

(124) 40 CFR Part 63, Subpart DDDDDDD, National Emission Standards for Hazardous Air Pollutants for Area Sources: Prepared Feeds Manufacturing.

(125) 40 CFR Part 63, Subpart EEEEEEE, National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category.

KEY: air pollution, hazardous air pollutant, MACT, NESHAP
Date of Enactment or Last Substantive Amendment: 2013
Notice of Continuation: November 8, 2012
Authorizing, and Implemented or Interpreted Law: 19-2-104(1)(a)

40 CFR Part 63 Changes Affecting R307-214-2 (July 1, 2011 to June 30, 2012)

CFR Section	Utah Rule Affected	Summary of Changes
40 CFR Part 63, Subpart CC – Petroleum Refineries	R307-214-18-2(18)	***Pages 42052 - 42055* [FR DOC # 2011-17901]** Final notice of the partial withdrawal of the residual risk and technology review portions of the final rule amending the National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries.
40 CFR Part 63, Subpart TTT – Primary Lead Smelting	R302-214-2(51)	***Pages 70833 - 70859* [FR DOC # 2011-29287]** This action finalized amendments to the NESHAP that include revision of the rule's title and applicability provision, revisions to the stack emission limits for lead, work practice standards to minimize fugitive dust emissions, and the modification and addition of testing and monitoring and related notification, recordkeeping, and reporting requirements. It also finalized revisions to the regulatory provisions related to emissions during periods of startup, shutdown, and malfunction.
40 CFR Part 63, Subpart YY – Generic MACT.	R307-214-2(36)	***Pages 74708 - 74709 [FR DOC # 2011-30998]*** Corrections made to several definitions.
40 CFR Part 63, Subpart J – Polyvinyl Chloride and Copolymers Production	R307-214-2(7)	***Pages 22847 - 22948* [FR DOC # 2012-6421]** This amendment established emission standards that apply at all times, including periods of startup, shutdown and malfunction, for hazardous air pollutants from polyvinyl chloride and copolymers production located at major and area sources. The rule includes requirements to demonstrate initial and continuous compliance with the emission standards, including monitoring provisions and recordkeeping and reporting requirements.
40 CFR Part 63, Subpart WWWWWW – Area Sources: Plating and Polishing.	R307-214-2(116)	***Pages 57913 - 57923 [FR DOC # 2011-23806]*** This change clarified that the emission control requirements of the plating and polishing area source NESHAP did not apply to any bench-scale activities. The amendment also made several technical corrections and clarifications that are not significant changes in the rule's requirements.
40 CFR Part 63, Subpart DDDDDDD – Area Source Standards for Prepared Feeds Manufacturing.	R307-214-2(123)	**Pages 80261 - 80266 [FR DOC # 2011-32835]** These revisions clarified the regulatory requirements for this source category and ensure that those requirements are consistent with the record. The revisions addressed the generally available control technology (GACT) requirements for pelleting processes at large, existing prepared feeds manufacturing facilities, specifically removal of the cyclone 95-percent design efficiency requirement, as well as associated requirements for compliance demonstration, monitoring, reporting, and recordkeeping; clarification of the requirement that doors be kept closed in areas where materials containing chromium and manganese are stored, used, or handled; and clarification of the requirement to install a device at the point of bulk loadout to minimize emissions.

State of Utah

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DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-068-13

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 28, 2013

SUBJECT: FINAL ADOPTION: R307-361. Architectural Coatings.

On June 5, 2013, the Board proposed for public comment R307-361, which is based on the Ozone Transport Commission (OTC) Phase II model rule. The public comment period was held from July 1 to July 31, 2013.

The purpose of this rule is to limit volatile organic compound (VOC) emissions from architectural coatings by specifying maximum VOC content limits.

The rule is applicable to any person who supplies, sells, offers for sale, applies, or solicits the application of any architectural coating or who manufactures, blends or repackages any architectural coating for use within Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber counties.

Summary of Substantive Public Comments

Air Quality Board Member Kathy Van Dame

Kathy identified typographical errors in two equations and in a few paragraphs which have been corrected.

American Coatings Association (ACA)

1. The ACA requested an extension of the implementation date to January 1, 2015, to provide industry ample time to reformulate certain coatings.

Response: Staff concurs and has made the change.

2. The sell-through date should be from the rule implementation date.

   Response: Staff concurs. R307-361-5(3) has been revised to include the implementation date and the language in that section has been simplified.

3. Conversion Varnish should be added to the "Most Restrictive Limit Exemption" because, by definition, it is a wood coating that has a lower limit.

   Response: Staff concurs and has made the change. This issue was raised to key OTC committee members to assure that OTC member states would agree.

4. The proposed language in R307-361-5(6) would restrict the use of rust preventative coatings unless the rust preventative limit was identical to the industrial maintenance limit. Since the rust preventative and industrial maintenance limits are the same (250 g/l), this restriction is unnecessary. The ACA suggests that this provision be removed.

   Response: Staff does not concur. The definition for industrial maintenance is broader and more complex than rust preventative. No change is necessary.

<u>Hill Air Force Base</u>

1. Hill Air Force Base requested an exemption for military technical data specifications identical to the exemptions the Board has approved for previous industrial-based VOC-content rules (e.g., R307-342. *Adhesives and Sealants*).

   Response: Staff concurs with this request and has modified the exemption request by recognizing that Department of Defense contractors should also be exempt when they perform contractor work that explicitly mandates the use of military technical data specifications. A definition for military data specifications and an exemption for operations that are exclusively covered by Department of Defense military technical date have been added.

<u>Staff Recommendation</u>: Staff recommends the Board adopt R307-361, Architectural Coatings, as amended.

R307. Environmental Quality, Air Quality.
R307-361. Architectural Coatings.
R307-361-1. Purpose.

(1) The purpose of R307-361 is to limit volatile organic compounds (VOC) emissions from architectural coatings.

(2) This rule specifies architectural coatings storage, cleanup, and labeling requirements.

R307-361-2. Applicability.

R307-361 applies to any person who supplies, sells, offers for sale, applies, or solicits the application of any architectural coating, or who manufactures, blends or repackages any architectural coating for use within Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber counties.

R307-361-3. Definitions.

The following additional definitions apply only to R307-361.

“Adhesive” means any chemical substance that is applied for the purpose of bonding two surfaces together other than by mechanical means.

“Aerosol coating product” means a pressurized coating product containing pigments or resins that dispenses product ingredients by means of a propellant, and is packaged in a disposable can for hand-held application or for use in specialized equipment for ground traffic/marking applications.

“Aluminum roof coating” means a coating labeled and formulated exclusively for application to roofs and containing at least 84 grams of elemental aluminum pigment per liter of coating (at least 0.7 pounds per gallon).

“Appurtenance” means any accessory to a stationary structure coated at the site of installation, whether installed or detached, including, but not limited to, bathroom and kitchen fixtures; cabinets; concrete forms; doors; elevators; fences; hand railings; heating equipment, air conditioning equipment, and other fixed mechanical equipment or stationary tools; lampposts; partitions; pipes and piping systems; rain gutters and downspouts; stairways, fixed ladders, catwalks, and fire escapes; and window screens.

“Architectural coating” means a coating to be applied to stationary structures or their appurtenances at the site of

installation, to portable buildings at the site of installation, to pavements, or to curbs.

(1) Coatings applied in shop applications or to non-stationary structures such as airplanes, ships, boats, railcars, and automobiles, and adhesives are not considered architectural coatings for the purposes of this rule.

“Basement specialty coating” means a clear or opaque coating that is labeled and formulated for application to concrete and masonary surfaces to provide a hydrostatic seal for basements and other below-grade surfaces, meeting the following criteria:

(1) Coating must be capable of withstanding at least 10 psi of hydrostatic pressure, as determined in accordance with ASTM D7088-04 and;

(2) Coating must be resistant to mold and mildew growth and must achieve a microbial growth rating of 8 or more, as determined in accordance with ASTM D3273-00 and ASTM D3274-95.

“Bitumens” means black or brown materials including, but not limited to, asphalt, tar, pitch, and asphaltite that are soluble in carbon disulfide, consist mainly of hydrocarbons, and are obtained from natural deposits or as residues from the distillation of crude petroleum or coal.

“Bituminous roof coating” means a coating that incorporates bitumens and that is labeled and formulated exclusively for roofing for the primary purpose of preventing water penetration.

“Bituminous roof primer” means a primer that incorporates bitumens and that is labeled and formulated exclusively for roofing and intended for the purpose of preparing a weathered or aged surface or improving adhesion of subsequent surface components.

“Bond breaker” means a coating labeled and formulated for application between layers of concrete to prevent a freshly poured top layer of concrete from bonding to the layer over which it is poured.

“Calcimine recoaters” means a flat solvent borne coating formulated and recommended specifically for coating calcimine-painted ceilings and other calcimine-painted substrates.

“Coating” means a material applied onto or impregnated into a substrate for protective, decorative, or functional purposes, and such materials include, but are not limited to, paints, varnishes, sealers, and stains.

“Colorant” means a concentrated pigment dispersion in water, solvent, or binder that is added to an architectural coating after packaging in sale units to produce the desired color.

“Concrete curing compound” means a coating labeled and formulated for application to freshly poured concrete to retard the evaporation of water and or harden or dustproof the surface of freshly poured concrete.

“Concrete/masonry sealer” means a clear or opaque coating that is labeled and formulated primarily for application to concrete and masonry surfaces to prevent penetration of water, provide resistance against abrasion, alkalis, acids, mildew, staining, or ultraviolet light, or harden or dustproof the surface of aged or cured concrete.

“Concrete surface retarder” means a mixture of retarding ingredients such as extender pigments, primary pigments, resin, and solvent that interact chemically with the cement to prevent hardening on the surface where the retarder is applied allowing the retarded mix of cement and sand at the surface to be washed away to create an exposed aggregate finish.

“Conjugated oil varnish” means a clear or semi-transparent wood coating, labeled as such, excluding lacquers or shellacs, based on a natural occurring conjugated vegetable oil (tung oil) and modified with other natural or synthetic resins; a minimum of 50% of the resin solids consisting of conjugated oil.

“Conversion varnish” means a clear acid coating with an alkyd or other resin blended with amino resins and supplied as a single component or two-component product.

“Department of Defense military technical data” means a specification that specifies design requirements, such as materials to be used, how a requirement is to be achieved, or how an item is to be fabricated or constructed.

“Driveway sealer” means a coating labeled and formulated for application to worn asphalt driveway surfaces to fill cracks, seal the surface to provide protection, or to restore or preserve the appearance.

“Dry fog coating” means a coating labeled and formulated only for spray application such that overspray droplets dry before subsequent contact with incidental surfaces in the vicinity of the surface coating activity.

“Faux finishing coating” means a coating labeled and formulated to meet one or more of the following criteria:

(1) A glaze or textured coating used to create artistic effects, including, but not limited to, dirt, suede, old age, smoke damage, and simulated marble and wood grain;

(2) A decorative coating used to create a metallic, iridescent, or pearlescent appearance and that contains at least 48 grams of pearlescent mica pigment or other iridescent pigment per liter of coating as applied (at least 0.4 pounds per gallon); or

(3) A decorative coating used to create a metallic appearance and that contains less than 48 grams of elemental metallic pigment per liter of coating as applied (less than 0.4 pounds per gallon); or

(4) A decorative coating used to create a metallic appearance and that contains greater than 48 grams of elemental metallic pigment per liter of coating as applied (greater than 0.4 pounds per gallon) and which requires a clear topcoat to prevent the degradation of the finish under normal use conditions; or

(5) A clear topcoat to seal and protect a faux finishing coating that meets the requirements of (1) through (4) of this definition, and these clear topcoats shall be sold and used solely as part of a faux finishing coating system.

“Fire-resistive coating” means a coating labeled and formulated to protect structural integrity by increasing the fire endurance of interior or exterior steel and other structural materials. The Fire-Resistive coating category includes sprayed fire resistive materials and intumescent fire resistive coatings that are used to bring structural materials into compliance with federal, state, and local building code requirements. The fire-resistant coatings shall be tested in accordance with ASTM E119-08.

“Flat coating” means a coating that is not defined under any other definition in this rule and that registers gloss less than 15 on an 85 degree meter or less than 5 on a 60 degree meter according to ASTM D523-89 (1999).

“Floor coating” means an opaque coating that is labeled and formulated for application to flooring, including, but not limited to, decks, porches, steps, garage floors, and other horizontal surfaces that may be subject to foot traffic.

“Form-release compound” means a coating labeled and formulated for application to a concrete form to prevent the freshly poured concrete from bonding to the form which may consist of wood, metal, or some material other than concrete.

“Graphic arts coating or sign paint” means a coating labeled and formulated for hand-application by artists using brush, airbrush, or roller techniques to indoor and outdoor signs, excluding structural components, and murals including lettering enamels, poster colors, copy blockers, and bulletin enamels.

“High-temperature coating” means a high performance coating labeled and formulated for application to substrates exposed continuously or intermittently to temperatures above 204 degrees Celsius (400 degrees Fahrenheit).

“Impacted immersion coating” means a high performance maintenance coating formulated and recommended for application to steel structures subject to immersion in turbulent, debris-laden water. These coatings are specifically resistant to high-energy impact damage by floating ice or debris.

“Industrial maintenance coating” means a high performance architectural coating, including primers, sealers, undercoaters, intermediate coats, and topcoats, formulated for application to substrates, including floors exposed to one or more of the following extreme environmental conditions:

(1) Immersion in water, wastewater, or chemical solutions (aqueous and non-aqueous solutions), or chronic exposure of interior surfaces to moisture condensation;

(2) Acute or chronic exposure to corrosive, caustic or acidic agents, or to chemicals, chemical fumes, or chemical mixtures or solutions;

(3) Frequent exposure to temperatures above 121 degrees Celsius (250 degrees Fahrenheit);

(4) Frequent heavy abrasion, including mechanical wear and frequent scrubbing with industrial solvents, cleansers, or scouring agents; or

(5) Exterior exposure of metal structures and structural components.

“Low solids coating” means a coating containing 0.12 kilogram or less of solids per liter (1 pound or less of solids per gallon) of coating material as recommended for application by the manufacturer.

“Magnesite cement coating” means a coating labeled and formulated for application to magnesite cement decking to protect the magnesite cement substrate from erosion by water.

“Manufacturer’s maximum thinning recommendation” means the maximum recommendation for thinning that is indicated on the label or lid of the coating container.

“Mastic texture coating” means a coating labeled and formulated to cover holes and minor cracks and to conceal surface irregularities, and is applied in a single coat of at least 10 mils (at least 0.010 inch) dry film thickness.

“Medium density fiberboard (MDF)” means a composite wood product, panel, molding, or other building material composed of cellulosic fibers, usually wood, made by dry forming and pressing of a resinated fiber mat.

“Metallic pigmented coating” means a coating that is labeled and formulated to provide a metallic appearance and must contain at least 48 grams of elemental metallic pigment (excluding zinc) per liter of coating as applied (at least 0.4 pounds per gallon), when tested in accordance with SCAQMD Method 318-95, but does not include coatings applied to roofs, or zinc-rich primers.

“Multi-color coating” means a coating that is packaged in a single container and that is labeled and formulated to exhibits more than one color when applied in a single coat.

“Non-flat coating” means a coating that is not defined under any other definition in this rule and that registers a gloss of 15 or greater on an 85-degree meter and five or greater on a 60-degree meter according to ASTM D523-89 (1999).

“Non-flat/high-gloss coating” means a non-flat coating that registers a gloss of 70 or greater on a 60-degree meter according to ASTM D523-89 (1999).

“Nuclear coating” means a protective coating formulated and recommended to seal porous surfaces such as steel or concrete that otherwise would be subject to intrusion by radioactive materials. These coatings must be resistant to long-term cumulative radiation exposure according to ASTM Method 4082-02, relatively easy to decontaminate, and resistant to various chemicals to which the coatings are likely to be exposed according to ASTM Method D 3912-95 ([~~2001~~]2010).

“Particleboard” means a composite wood product panel, molding, or other building material composed of cellulosic

material, usually wood, in the form of discrete particles, as distinguished from fibers, flakes, or strands, which are pressed together with resin.

“Pearlescent” means exhibiting various colors depending on the angles of illumination and viewing, as observed in mother-of-pearl.

“Plywood” means a panel product consisting of layers of wood veneers or composite core pressed together with resin and includes panel products made by either hot or cold pressing (with resin) veneers to a platform.

“Post-consumer coating” means a finished coatings generated by a business or consumer that have served their intended end uses, and are recovered from or otherwise diverted from the waste stream for the purpose of recycling.

“Pre-treatment wash primer” means a primer that contains a minimum of 0.5% acid, by weight, when tested in accordance with ASTM D1613-06, that is labeled and formulated for application directly to bare metal surfaces to provide corrosion resistance and to promote adhesion of subsequent topcoats.

“Primer, sealer, and undercoater” means a coating labeled and formulated to provide a firm bond between the substrate and the subsequent coatings, prevent subsequent coatings from being absorbed by the substrate, prevent harm to subsequent coatings by materials in the substrate, provide a smooth surface for the subsequent application of coatings, provide a clear finish coat to seal the substrate, or to block materials from penetrating into or leaching out of a substrate.

“Reactive penetrating sealer” means a clear or pigmented coating that is formulated for application to above-grade concrete and masonry substrates to provide protection from water and waterborne contaminants, including, but not limited to, alkalis, acids, and salts.

(1) Reactive penetrating sealers penetrate into concrete and masonry substrates and chemically react to form covalent bonds with naturally occurring minerals in the substrate.

(2) Reactive penetrating sealers line the pores of concrete and masonry substrates with a hydrophobic coating but do not form a surface film.

(3) Reactive penetrating sealers shall meet all of the following criteria:

(a) The reactive penetrating sealer must improve water repellency at least 80% after application on a concrete or masonry substrate, and this performance shall be verified on standardized test specimens in accordance with one or more of the following standards: ASTM C67-07, ASTM C97-02, or ASTM C140-06.

(b) The reactive penetrating sealer shall not reduce the water vapor transmission rate by more than 2% after application on a concrete or masonry substrate, and this performance must be verified on standardized test specimens, in accordance with ASTM E96/E96M-05.

(c) Products labeled and formulated for vehicular traffic surface chloride screening applications shall meet the performance criteria listed in the National Cooperative Highway Research Report 244 (1981).

“Reactive penetrating carbonate stone sealer” means a clear or pigmented coating that is labeled and formulated for application to above-grade carbonate stone substrates to provide protection from water and waterborne contaminants, including but not limited to, alkalis acids, and salts and that penetrates into carbonate stone substrates and chemically reacts to form covalent bonds with naturally occurring minerals in the substrate. They must meet all of the following criteria:

(1) Improve water repellency at least 80% after application on a carbonate stone substrate. This performance shall be verified on standardized test specimens, in accordance with one or more of the following standards: ASTM C67-07, ASTM C97-02, or ASTM C140-06; and

(2) Not reduce the water vapor transmission rate by more than 10% after application on a carbonate stone substrate. This performance shall be verified on standardized test specimens in accordance with one or more of the following standards: ASTM E96/E96M-05.

“Recycled coating” means an architectural coating formulated such that it contains a minimum of 50% by volume post-consumer coating, with a maximum of 50% by volume secondary industrial materials or virgin materials.

“Residential” means areas where people reside or lodge, including, but not limited to, single and multiple family dwellings, condominiums, mobile homes, apartment complexes, motels, and hotels.

“Roof coating” means a non-bituminous coating labeled and formulated for application to roofs for the primary purpose of preventing water penetration, reflecting ultraviolet light, or reflecting solar radiation.

“Rust preventative coating” means a coating that is for metal substrates only and is formulated to prevent the corrosion of metal surfaces for direct-to-metal coating or a coating intended for application over rusty, previously coated surfaces but does not include coatings that are required to be applied as a topcoat over a primer or coatings that are intended for use on wood or any other nonmetallic surface.

“Secondary industrial materials” means products or by-products of the paint manufacturing process that are of known composition and have economic value but can no longer be used for their intended purpose.

“Semitransparent coating” means a coating that contains binders and colored pigments and is formulated to change the color of the surface but not conceal the grain pattern or texture.

“Shellac” means a clear or opaque coating formulated solely with the resinous secretions of the lac beetle (Laciffer lacca) and formulated to dry by evaporation without a chemical reaction.

“Shop application” means an application of a coating to a product or a component of a product in or on the premises of a factory or a shop as part of a manufacturing, production, or repairing process (e.g., original equipment manufacturing coatings).

“Solicit” means to require for use or to specify by written or oral contract.

“Specialty primer, sealer, and undercoater” means a coating that is formulated for application to a substrate to block water-soluble stains resulting from fire damage, smoke damage, or water damage.

“Stain” means a semi-transparent or opaque coating labeled and formulated to change the color of a surface but not conceal the grain pattern or texture.

“Stone consolidant” means a coating that is labeled and formulated for application to stone substrates to repair historical structures that have been damaged by weathering or other decay mechanisms.

(1) Stone consolidants must penetrate into stone substrates to create bonds between particles and consolidate deteriorated material.

(2) Stone consolidants must be specified and used in accordance with ASTM E2167-01.

“Swimming pool coating” means a coating labeled and formulated to coat the interior of swimming pools and to resist swimming pool chemicals.

“Thermoplastic rubber coating and mastic” means a coating or mastic formulated and recommended for application to roofing or other structural surfaces that incorporates no less than 40% by weight of thermoplastic rubbers in the total resin solids and may also contain other ingredients, including, but not limited to, fillers, pigments, and modifying resins.

“Tint base” means an architectural coating to which colorant is added after packaging in sale units to produce a desired color.

“Traffic marking coating” means a coating labeled and formulated for marking and striping streets, highways, or other traffic surfaces, including, but not limited to, curbs, berms, driveways, parking lots, sidewalks, and airport runways.

“Tub and tile refinish coating” means a clear or opaque coating that is labeled and formulated exclusively for refinishing the surface of a bathtub, shower, sink, or countertop and that meets the following criteria:

(1) Has a scratch hardness of 3H or harder and a gouge hardness of 4H or harder, determined on bonderite 1000, in accordance with ASTM D3363-05;

(2) Has a weight loss of 20 milligrams or less after 1,000 cycles, determined with CS-17 wheels on bonderite 1000, in accordance with ASTM D4060-07;

(3) Withstands 1,000 hours or more of exposure with few or no #8 blisters, determined on unscribed bonderite in accordance with ASTM D4585-99, and ASTM D714-02e1; and

(4) Has an adhesion rating of 4B or better after 24 hours of recovery, determined on unscribed bonderite in accordance with ASTM D4585-99 and ASTM D3359-02.

“Veneer” means thin sheets of wood peeled or sliced from logs for use in the manufacture of wood products such as plywood, laminated veneer lumber, or other products.

"Virgin Materials" means materials that contain no post-consumer coatings or secondary industrial materials.

"VOC actual" means the weight of VOC per volume of coating and applies to coatings in the low solids coatings category and it is calculated with the following equation:

VOC Actual = (Ws – Ww – Wec)/(Vm)

Where, VOC actual = the grams of VOC per liter of coating (also known as "Material VOC");

Ws = weight of volatiles, in grams;

Ww = weight of water, in grams;

Wec = weight of exempt compounds, in grams; and

Vm = volume of coating, in liters

"VOC content" means the weight of VOC per volume of coating and is VOC regulatory for all coatings except those in the low solids category.

(1) For coatings in the low solids category, the VOC Content is VOC actual.

(2) If the coating is a multi[~]-component product, the VOC content is VOC regulatory as mixed or catalyzed.

(3) If the coating contains silanes, siloxanes, or other ingredients that generate ethanol or other VOCs during the curing process, the VOC content must include the VOCs emitted during curing.

(4) VOC content must include maximum amount of thinning solvent recommended by the manufacturer.

"VOC regulatory" means the weight of VOC per volume of coating, less the volume of water and exempt compounds. It is calculated with the following equation:

VOC Regulatory = (Ws – Ww – Wec)/(Vm – Vw – Vec)

Where, VOC regulatory= grams of VOC per liter of coating, less water and exempt compounds (also known as "Coating VOC");

Ws = weight of volatiles, in grams;

Ww = weight of water, in grams;

Wec = weight of exempt compounds, in grams;

Vm = volume of coating, in liters;

Vw = volume of water, in liters; and

Vec = volume of exempt compounds, in liters

VOC regulatory must include maximum amount of thinning solvent recommended by the manufacturer.

“Waterproofing membrane” means a clear or opaque coating that is labeled and formulated for application to concrete and masonry surfaces to provide a seamless waterproofing membrane that prevents any penetration of liquid water into the substrate.

(1) Waterproofing membranes are intended for the following waterproofing applications: below-grade surfaces, between concrete slabs, inside tunnels, inside concrete planters, and under flooring materials.

(2) The waterproofing membrane category does not include topcoats that are included in the concrete/masonry sealer category (e.g., parking deck topcoats, pedestrian deck topcoats, etc.).

(3) Waterproofing Membranes shall:

(a) Be applied in a single coat of at least 25 mils (at least 0.025 inch) dry film thickness; and

(b) Meet or exceed the requirements contained in ASTM C836-06.

“Wood coatings” means coatings labeled and formulated for application to wood substrates only and include clear and semitransparent coatings: lacquers; varnishes; sanding sealers; penetrating oils; clear stains; wood conditioners used as undercoats; and wood sealers used as topcoats. The Wood Coatings category also includes the following opaque wood coatings: opaque lacquers, opaque sanding sealers, and opaque lacquer undercoaters but do not include clear sealers that are labeled and formulated for use on concrete/masonry surfaces or coatings intended for substrates other than wood.

“Wood preservative” means a coating labeled and formulated to protect exposed wood from decay or insect attack that is registered with the U.S. EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (7 United States Code (U.S.C.) Section 136, et seq.).

“Wood substrate” means a substrate made of wood, particleboard, plywood, medium density fiberboard, rattan, wicker, bamboo, or composite products with exposed wood grain but does not include items comprised of simulated wood.

“Zinc-rich primer” means a coating that contains at least 65% metallic zinc powder or zinc dust by weight of total solids and is formulated for application to metal substrates to provide

a firm bond between the substrate and subsequent applications of coatings and are intended for professional use only.

R307-361-4. Exemptions.

The coatings described in R307-361-4(1) through (3) are exempt from the requirements of R307-361.

(1) Any architectural coating that is supplied, sold, offered for sale, or manufactured for use outside of the counties in R307-361-2 or for shipment to other manufacturers for reformulation or repackaging.

(2) Any aerosol coating product.

(3) Any architectural coating that is sold in a container with a volume of one liter (1.057 quarts) or less, including kits containing containers of different colors, types or categories of coatings and two component products and including multiple containers of one liter or less that are packaged and shipped together with no intent or requirement to ultimately be sold as one unit.

(a) The exemption in R307-361-4(3) does not include bundling of containers one liter or less, which are sold together as a unit with the intent or requirement that they be combined into one container.

(b) The exemption in R307-361-4(3) does not include packaging from which the coating cannot be applied. This exemption does include multiple containers of one liter or less that are packaged and shipped together with no intent or requirement to ultimately sell as one unit.

(4) The requirements of R307-361-5 Table 1 do not apply to operations that are exclusively covered by Department of Defense military technical data and performed by a Department of Defense contractor and or on site at installations owned and or operated by the United States Armed Forces.

R307-361-5. Standards.

(1) Except as provided in R307-361-4[~~5(2) and (3)~~], no person shall manufacture, blend, or repackage, [~~for use within the counties in R307-361-2;~~] supply, sell, or offer for sale within the counties in R307-361-[~~5~~]2; or solicit for application or apply within those counties any architectural coating with a VOC content in excess of the corresponding limit specified in Table 1.

TABLE 1
VOC Content Limit for Architectural and Industrial Maintenance Coatings
(Limits are expressed as VOC content, thinned to the manufacturer's maximum thinning recommendation, excluding any colorant added to tint bases.)

COATING CATEGORY	VOC Content Limit (grams/liter)
Flat coatings	50
Non-flat coatings	100
Non-flat/high-gloss coatings	150
Specialty Coatings	
Aluminum roofing	450
Basement Specialty Coatings	400
Bituminous Specialty Coatings	400
Bituminous roof coatings	270
Bituminous roof primers	350
Bond beakers	350
Calcimine recoaters	475
Concrete curing compounds	350
Concrete/masonary sealer	100
Concrete surface retarders	780
Conjugated oil varnish	450
Conversion varnish	725
Driveway sealers	50
Dry fog coatings	150
Faux finishing coatings	350
Fire resistive coatings	350
Floor coatings	100
Form-release compounds	250
Graphic arts coatings (sign paints)	500
High temperature coatings	420
Impacted Immersion Coatings	780
Industrial maintenance coatings	250
Low solids coatings	120
Magnesite cement coatings	450
Mastic texture coatings	100

Metallic pigmented coatings	500
Multi-color coatings	250
Nuclear coatings	450
Pre-treatment wash primers	420
Primers, sealers, and undercoaters	100
Reactive penetrating sealer	350
Reactive penetrating carbonate stone sealer	500
Recycled coatings	250
Roof coatings	250
Rust preventative coatings	250
Shellacs:	
Clear	730
Opaque	550
Specialty primers, sealers, and undercoaters	100
Stains	250
Stone consolidant	450
Swimming pool coatings	340
Thermoplastic rubber coatings and mastic	550
Traffic marking coatings	100
Tub and tile refinish	420
Waterproofing membranes	250
Wood coating	275
Wood Preservatives	350
Zinc-Rich Primer	340

(2) If a coating is recommended for use in more than one of the specialty coating categories listed in Table 1, the most restrictive (lowest) VOC content limit shall apply.

(a) This requirement applies to usage recommendations that appear anywhere on the coating container, anywhere on any label or sticker affixed to the container, or in any sales, advertising, or technical literature supplied by a manufacturer or anyone acting on their behalf.

(b) R307-361-5(2) does not apply to the following coating categories:

(i) Aluminum roof coatings

(ii) Bituminous roof primers

(iv) High temperature coatings
(v) Industrial maintenance coatings
(vi) Low-solids coatings
(vii) Metallic pigmented coatings
(viii) Pretreatment wash primers
(ix) Shellacs
(x) Specialty primers, sealers and undercoaters
(xi) Wood Coatings
(xii) Wood preservatives
(xiii) Zinc-rich primers
(xiv) Calcimine recoaters
(xv) Impacted immersion coatings
(xvi) Nuclear coatings
(xvii) Thermoplastic rubber coatings and mastic
(xviii) Concrete surface retarders
(xix) Conversion varnish

(3) Sell-through of coatings. A coating manufactured prior to [~~the effective date specified for that coating in Table 1~~]January 1, 2015,[~~ and that complied with the standards in effect at the time the coating was manufactured,~~] may be sold, supplied, or offered for sale for up to three years after [~~the specified effective date~~]January 1, 2015.

(a) A coating manufactured before [~~the effective date specified for that coating in Table 1~~]January 1, 2015, may be applied at any time[~~, both before and after~~] [~~the specified effective date, so long as the coating complied with the standards in effect at the time the coating was manufactured~~].

(b) R307-361-5(3) does not apply to any coating that does not display the date or date code required by R307-361-6(1)(a).

(4) Painting practices. All architectural coating containers used when applying the contents therein to a surface directly from the container by pouring, siphoning, brushing, rolling, padding, ragging or other means, shall be closed when not in use. These architectural coating containers include, but are not limited to, drums, buckets, cans, pails, trays or other application containers. Containers of any VOC-containing materials used for thinning and cleanup shall also be closed when not in use.

(5) Thinning. No person who applies or solicits the application of any architectural coating shall apply a coating

that is thinned to exceed the applicable VOC limit specified in Table 1.

(6) Rust preventative coatings. No person shall apply or solicit the application of any rust preventative coating manufactured before January 1, 20[~~14~~]15 for industrial use, unless such a rust preventative coating complies with the industrial maintenance coating VOC limit specified in Table 1.

(7) Coatings not listed in Table 1. For any coating that does not meet any of the definitions for the specialty coatings categories listed in Table 1, the VOC content limit shall be determined by classifying the coating as a flat, non-flat, or non-flat/high gloss coating, based on its gloss, as defined in R307-361-3 and the corresponding flat, non-flat, or non-flat/high gloss coating VOC limit in Table 1 shall apply.

R307-361-6. Container Labeling Requirements.

(1) Each manufacturer of any architectural coating subject to R307-361 shall display the information listed in R307-361-6(1)(a) through (c) on the coating container (or label) in which the coating is sold or distributed.

(a) Date Code.

(i) The date the coating was manufactured, or a date code representing the date, shall be indicated on the label, lid or bottom of the container.

(ii) If the manufacturer uses a date code for any coating, the manufacturer shall file an explanation of each code with the director upon request.

(b) Thinning Recommendations.

(i) A statement of the manufacturer’s recommendation regarding thinning of the coating shall be indicated on the label or lid of the container.

(ii) This requirement does not apply to the thinning of architectural coatings with water.

(iii) If thinning of the coating prior to use is not necessary, the recommendation shall specify that the coating is to be applied without thinning.

(c) VOC Content.

(i) Each container of any coating subject to this rule shall display one of the following values, in grams of VOC per liter of coating:

(A) Maximum VOC content as determined from all potential product formulations;

(B) VOC content as determined from actual formulation data; or

(C) VOC content as determined using the test methods in R307-361-8.

(ii) If the manufacturer does not recommend thinning, the container shall display the VOC Content, as supplied.

(iii) If the manufacturer recommends thinning, the container shall display the VOC Content, including the maximum amount of thinning solvent recommended by the manufacturer.

(iv) If the coating is a multicomponent product, the container shall display the VOC content as mixed or catalyzed.

(v) If the coating contains silanes, siloxanes, or other ingredients that generate ethanol or other VOCs during the curing process, the VOC content shall include the VOCs emitted during curing.

(2) Faux finishing coatings. The labels of all clear topcoat faux finishing coatings shall prominently display the statement, “This product can only be sold or used as part of a faux finishing coating system.”

(3) Industrial maintenance coatings. The label of all industrial maintenance coatings shall prominently display at least one of the following statements:

(a) “for industrial use only;”

(b) “for professional use only;” or

(c) “not for residential use” or “not intended for residential use.”

(4) Rust preventative coatings. The labels of all rust preventative coatings shall prominently display the statement, “For metal substrates only.”

(5) Non-flat/high-gloss coatings. The labels of all non-flat/high-gloss coatings shall prominently display the words “high gloss.”

(6) Specialty primers, sealers and undercoaters. The labels of all specialty primers, sealers and undercoaters shall prominently display one or more of the following descriptions:

(a) “For blocking stains;”

(b) “For smoke-damaged substrates;”

(c) “For fire-damaged substrates;”

(d) “For water-damaged substrates;” or

(e) “For excessively chalky substrates.”

(7) Reactive penetrating sealers. The labels of all reactive penetrating sealers shall prominently display the statement, “Reactive penetrating sealer.”

(8) Reactive penetrating carbonate stone sealers. The labels of all reactive penetrating carbonate stone sealers shall prominently display the statement, “Reactive penetrating carbonate stone sealer.”

(9) Stone consolidants. The labels of all stone consolidants shall prominently display the statement, “Stone consolidant -For professional use only.”

(10) Wood coatings. The labels of all wood coatings shall prominently display the statement, “For wood substrates only.”

(11) Zinc rich primers. The labels of all zinc rich primers shall prominently display one or more of the following descriptions:

(a) “For professional use only;”

(b) “For industrial use only;” or

(c) “Not for residential use” or “Not intended for residential use.”

R307-361-7. Reporting Requirements.

(1) Within 180 days of written request from the director, the manufacturer shall provide the director with data concerning the distribution and sales of architectural coatings, including, but not limited to:

(a) The name and mailing address of the manufacturer;

(b) The name, address and telephone number of a contact person;

(c) The name of the coating product as it appears on the label and the applicable coating category;

(d) Whether the product is marketed for interior or exterior use or both;

(e) The number of gallons sold in counties listed in R307-361-2 in containers greater than one liter (1.057 quart) and equal to or less than one liter (1.057 quart);

(f) The VOC actual content and VOC regulatory content in grams per liter;

(i) If thinning is recommended, list the VOC actual content and VOC regulatory content after maximum recommended thinning.

(ii) If containers less than one liter have a different VOC content than containers greater than one liter, list separately.

(iii) If the coating is a multi-component product, provide the VOC content as mixed or catalyzed.

(g) The names and CAS numbers of the VOC constituents in the product;

(h) The names and CAS numbers of any compounds in the product specifically exempted from the VOC definition in R307-101;

(i) Whether the product is marketed as solvent-borne, waterborne, or 100% solids;

(j) Description of resin or binder in the product;

(k) whether the coating is a single-component or multi-component product;

(l) The density of the product in pounds per gallon;

(m) The percent by weight of: solids, all volatile materials, water, and any compounds in the product specifically exempted from the VOC definition in R307-101; and

(n) The percent by volume of: solids, water, and any compounds in the product specifically exempted from the VOC definition in R307-101.

R307-361-8. Test Methods.

(1) [~~Calculation~~]Determination of VOC content.

(a) For the purpose of determining compliance with the VOC content limits in Table 1, the VOC content of a coating shall be calculated by following the appropriate formula found in the definitions of VOC actual, VOC content, and VOC regulatory found in R307-361-3.

(b) The VOC content of a tint base shall be determined without colorant that is added after the tint base is manufactured.

(c) If the manufacturer does not recommend thinning, the VOC content shall be calculated for the product as supplied.

(d) If the manufacturer recommends thinning, the VOC content shall be calculated including the maximum amount of thinning solvent recommended by the manufacturer.

(e) If the coating is a multi-component product, the VOC content shall be calculated as mixed or catalyzed.

(f) The coating contains silanes, siloxanes, or other ingredients that generate ethanol or other VOC during the curing process, the VOC content shall include the VOCs emitted during curing.

(2) VOC content of coatings.

(a) To determine the VOC content of a coating, the manufacturer may use EPA Method 24, SCAQMD Method 304-91 (revised February1996), or an alternative method, formulation data, or any other reasonable means for predicting that the coating has been formulated as intended (e.g., quality assurance checks, recordkeeping).

(b) If there are any inconsistencies between the results of EPA Method 24 test and any other means for determining VOC content, the EPA Method 24 test results will govern.

(c) The exempt compounds content shall be determined by ASTM D 3960-05, SCAQMD Method 303-91 (Revised 1993), BAAQMD Method 43 (Revised 1996), or BAAQMD Method 41 (Revised 1995), as applicable.

(3) Methacrylate traffic marking coatings. Analysis of methacrylate multicomponent coatings used as traffic marking coatings shall be conducted according to a modification of EPA Method 24 (40 CFR 59, subpart D, Appendix A), which has not been approved for methacrylate multicomponent coatings used for purposes other than as traffic marking coatings or for other classes of multicomponent coatings.

(4) Flame spread index. The flame spread index of a fire-retardant coating shall be determined by ASTM E84-10, “Standard Test Method for Surface Burning Characteristics of Building Materials.”

(5) Fire resistance rating. The fire resistance rating of a fire-resistive coating shall be determined by ASTM E119-08, “Standard Test Methods for Fire Tests of Building Construction and Materials.”

(6) Gloss determination. The gloss of a coating shall be determined by ASTM D523-89 (1999), “Standard Test Method for Specular Gloss.”

(7) Metal content of coatings. The metallic content of a coating shall be determined by SCAQMD Method 318-95, “Determination of Weight Percent Elemental Metal in Coatings by X-Ray Diffraction, SCAQMD Laboratory Methods of Analysis for Enforcement Samples.”

(8) Acid content of coatings. The acid content of a coating shall be determined by ASTM D1613-06, “Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer and Related Products.”

(9) Drying times. The set-to-touch, dry-hard, dry-to-touch and dry-to-recoat times of a coating shall be determined by ASTM D1640-95 (1999), “Standard Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature,” and the tack-free time of a quick-dry enamel coating shall be determined by the Mechanical Test Method of ASTM D1640-95.

(10) Surface chalkiness. The chalkiness of a surface shall be determined by using ASTM D4214-07, “Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.”

(11) Exempt compounds—siloxanes. Exempt compounds that are cyclic, branched, or linear, completely methylated siloxanes, shall be analyzed as exempt compounds by methods referenced in ASTM D 3960-05, “Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings” or by BAAQMD Method 43, “Determination of Volatile Methylsiloxanes in Solvent-Based Coatings, Inks, and Related Materials,” BAAQMD Manual of Procedures, Volume III, adopted November 6, 1996.

(12) Exempt compounds—parachlorobenzotrifluoride (PCBTF). The exempt compound PCBTF, shall be analyzed as an exempt compound by methods referenced in ASTM D 3960-05 “Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings” or by BAAQMD Method 41, “Determination of Volatile Organic Compounds in Solvent Based Coatings and Related Materials Containing Parachlorobenzotriflouride,” BAAQMD Manual of Procedures, Volume III, adopted December 20, 1955.

(13) Tub and tile refinish coating adhesion. The adhesion of tub and tile coating shall be determined by ASTM D4585-99, “Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation” and ASTM D3359-02, “Standard Test Methods for Measuring Adhesion by Tape Test.”

(14) Tub and tile refinish coating hardness. The hardness of tub and tile refinish coating shall be determined by ASTM

D3363-05, “Standard Test Method for Film Hardness by Pencil Test.”

(15) Tub and tile refinish coating abrasion resistance. Abrasion resistance of tub and tile refinish coating shall be analyzed by ASTM D4060-07, “Standard Test Methods for Abrasion Resistance of Organic Coatings by the Taber Abraser.”

(16) Tub and tile refinish coating water resistance. Water resistance of tub and tile refinish coatings shall be determined by ASTM D4585-99, “Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation” and ASTM D714-02e1, “Standard Test Method for Evaluating Degree of Blistering of Paints.”

(17) Waterproofing membrane. Waterproofing membrane shall be tested by ASTM C836-06, “Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.”

(18) Reactive penetrating sealer and reactive carbonate stone sealer water repellency. Reactive penetrating sealer and reactive carbonate stone sealer water repellency shall be analyzed by ASTM C67-07, “Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile;” ASTM C97-02, “Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone;” or ASTM C140-06, “Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.”

(19) Reactive penetrating sealer and reactive penetrating carbonate stone sealer water vapor transmission. Reactive penetrating sealer and reactive penetrating carbonate stone sealer water vapor transmission shall be analyzed ASTM E96/E96M-05, “Standard Test Method for Water Vapor Transmission of Materials.”

(20) Reactive penetrating sealer -chloride screening applications. Reactive penetrating sealers shall be analyzed by National Cooperative Highway Research Report 244 (1981), “Concrete Sealers for the Protection of Bridge Structures.”

(21) Stone consolidants. Stone consolidants shall be tested by using ASTM E2167-01, “Standard Guide for Selection and Use of Stone Consolidants.”

(22) Radiation resistance -nuclear coatings. The radiation resistance of a nuclear coating shall be determined by ASTM D 4082-02, “Standard Test Method for Use in Light Water Nuclear Power Plants.”

(23) Chemical resistance –nuclear coatings. The chemical resistance of nuclear coatings shall be determined by ASTM D3912-95 (2001), “Standard Test Method for Chemical Resistance of Coatings Used in Light Water Nuclear Power Plants.”

R307-361-9. Compliance Schedule.

Persons subject to this rule shall be in compliance by [~~September 1, 2014~~]January 1, 2015.

KEY: air pollution, emission controls, architectural coatings
Date of Enactment or Last Substantive Amendment: 2013
Authorizing, and Implemented or Interpreted Law: 19-2-104(1); 19-2-101

State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-067-13

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: David Beatty, Operating Permit Section Manager

DATE: August 21, 2013

SUBJECT: Proposed for Public Comment with Department Fee Schedule: Operating Permit Program Fee for Fiscal Year 2015.

Title V of the Clean Air Act Amendments of 1990 (CAAA) requires the State of Utah to develop an Operating Permit Program (OPP), to include a fee system which is to be used solely to fund all direct and indirect costs associated with administering the OPP. Section 19-2-109.1 (4)(a) of the Utah Conservation Act authorizes the Utah Air Quality Board (the Board) to propose to the legislature an annual emission fee that conforms to Title V of the CAAA for each ton of chargeable pollutant. The fee is included as part of the Department's fee schedule each fall.

Utah began collecting an emission fee of $25 per ton of air pollution emitted, during fiscal year 1993, to fund development of the program. The fee has increased in varying increments by 0% to 12.3% (one year decreased 4.3%). The current fee charged to fund fiscal year 2014 is $53.74 per ton of emissions. Most fee increases have been the result of reduced emission tonnages by sources, or increasing salaries and benefits to staff as part of legislative approved cost of living increases. Staff size has been reduced from 39 full-time employees (FTEs) in 1995 to a current level of 29.1 FTE's; this has assisted in keeping fee increases as low as possible.

For fiscal year 2015 Air Quality staff is basing its proposal on an emissions inventory of 63,500 tons, an amount significantly lower than that of the last few years. This decrease is due to several sources reducing emissions. The fee calculation is shown in the table below and shows a fee of $59.06 for fiscal year 2015, an increase of $5.32 per ton from fiscal year 2014.

Operating Permit Emission Fee for Fiscal Year 2015

FY2015 Salary + Benefits (using FY2014 Projections)		$2,950,000	
FY2015 Projected Cost Of Living Increase 2%		$59,000	
FY2015 Projected Salary + Benefits with Projected Increase			$3,009,000
FY2015 Projected Indirect Costs	11.21%	$337,309	
FY2015 Projected Direct Costs		$404,100	
FY2015 Projected Total Expenditures			$3,750,409
FY2015 Projected Fee Tonnage		63,500	
Fee Rate Per Ton of Emissions			$59.06
FY2013 Surplus		$0	
Surplus Reduction in Fee		$0.00	
FY2015 Proposed Fee Rate Per Ton of Emissions			**$59.06**
		$5.32	Increase

Current Fee (FY2014) is $53.74.

Staff Recommendation: Staff recommends the Board submit as part of the Department's fee schedule, a proposed fee of $59.06/ton for the operating permit program for fiscal year 2015.

State of Utah

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Department of
Environmental Quality

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DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-069-13

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 28, 2013

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 2013 legislative session. House Bill 96 modified the eligibility requirements to claim the tax credit.

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

- Remove the definitions of "Fuel economy standards" and "Plug-in Electric Drive Motor Vehicle."
- Add the definition of "Qualifying electric or hybrid vehicle."
- Remove the word "compressed" throughout R307-121.
- Change the title of R307-121-4 to reflect the changes to Utah Code.
- Combine section R307-121-5 and R307-121-6 to streamline the eligibility requirements for converted vehicles.
- Add the requirement to R307-121-3, R307-121-4, and R307-121-5 that the purchase order, customer invoice or receipt, and the current Utah vehicle registration be in the name of the taxpayer.

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

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

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

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. R307-121 establishes procedures to provide proof of purchase, in accordance with 59-7-605(3) or 59-10-1009(3), 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.

[~~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 [~~which~~]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.

[~~"Fuel economy standards" means fuel economy standards as defined in Subsection 59-7-605(1)(f) and 59-10-1009(1)(f) or 31 miles per gallon equivalent for a plug-in electric drive motor vehicle.~~

~~"Miles per gallon equivalent" means the miles a vehicle can drive with the energy equivalent of one gallon of gasoline.~~]

"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)([~~i~~]g) and 59-10-1009(1)([~~i~~]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).

[~~"Plug-in Electric Drive Motor Vehicle" means plug-in electric drive motor vehicle as defined in Subsection 59-7-605(1)(a)(ii) or 59-10-1009(1)(a)(ii).~~]

"Window Sticker" means the label required by United States Code Title 15 Sections 1231 and 1232, as effective [~~February 1, 2010~~]January 3, 2012.

R307-121-3. Proof of Purchase to Demonstrate Eligibility for OEM [~~Compressed~~]Natural Gas Vehicles.

To demonstrate that an OEM [~~Compressed N~~]natural [~~G~~]gas motor vehicle is eligible for the tax credit, proof of purchase shall be made in accordance with 59-7-605(3) or 59-10-1009(3), 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 [~~Compressed N~~]natural [~~G~~]gas 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 vehicle;

(2) an original or copy of the purchase order, customer invoice, or receipt that [~~including~~]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.

R307-121-4. Proof of Purchase to Demonstrate Eligibility for [~~Motor Vehicles that meet Air Quality and Fuel Economy Standards~~]Qualifying electric or hybrid vehicles.

To demonstrate that a motor vehicle is [~~eligible for the tax credit based on air quality and fuel economy standards~~]a qualifying electric or hybrid vehicle, proof of purchase shall be made, in accordance with 59-7-605(3) or 59-10-1009(3), by submitting the following documents to the director:

[~~(1) a copy of the motor vehicle's window sticker, which includes its VIN, or equivalent manufacturer's documentation;~~]

([~~2~~]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;

([~~3~~]2) an original or copy of the purchase order, customer invoice, or receipt that [~~including~~]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;

([~~4~~]3) the underhood identification number or engine group of the motor vehicle; and

([~~5~~]4) a copy of the current Utah vehicle registration in the name of the taxpayer seeking the credit.

R307-121-5. Proof of Purchase to Demonstrate Eligibility for Motor Vehicles Converted to a clean fuel[~~Natural Gas or Propane~~].

To demonstrate that a conversion of a motor vehicle to be fueled by a clean fuel[~~natural gas or propane~~]is eligible for the tax credit, proof of purchase shall be made, in accordance with 59-7-605(3) or 59-10-1009(3), by submitting the following documentation to the director:

[~~(1) the VIN;~~

~~(2) the fuel type before conversion;~~

~~(3) the fuel type after conversion;~~

~~(4)(a) a copy of the motor vehicle inspection report from an approved county inspection and maintenance station showing that the converted motor vehicle meets all county emissions requirements for~~

~~all installed fuel systems if the motor vehicle is registered within a county with an inspection and maintenance (I/M) program, or~~

~~(b) in all other areas of the State, a signed statement by an ASE-certified technician that includes the VIN, the technician's ASE certification number, and states that the conversion is functional;~~

~~(5) each of the following:~~

~~(a) the conversion equipment manufacturer,~~

~~(b) the conversion equipment model number,~~

~~(c) the date of the conversion, and~~

~~(d) the name, address, and phone number of the person that converted the motor vehicle;~~

~~(6) the EPA Certificate of Conformity, or equivalent documentation that is consistent with requirements outlined in 40 CFR Part 85 and 40 CFR Part 86, as published in Federal Register Volume 76 Page 19830 on April 8, 2011, or an Executive Order from the California Air Resources Board showing that the conversion will meet the proof of certification requirements in 59-10-1009(1)(c)(i)(C) or 59-7-605(1)(c)(i)(C);~~]

([~~7~~]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

([~~8~~]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 Motor Vehicles Converted to Electricity.**~~

~~(1) To demonstrate that a conversion of a motor vehicle to be powered by electricity is eligible for the tax credit, proof of purchase shall be made, in accordance with 59-7-605(3) or 59-10-1009(3), by submitting the following documentation to the director:~~

~~(a) the VIN;~~

~~(b) the fuel type before conversion;~~

~~(c) the fuel type after conversion;~~

~~(a) each of the following:~~

~~(i) the conversion equipment manufacturer,~~

~~(ii) the conversion equipment model number,~~

~~(iii) the date of the conversion, and~~

~~(iv) the name, address, and phone number of the person that converted the motor vehicle;~~

~~(e) an original or copy of the purchase order, customer invoice, or receipt; and~~

~~(f) a copy of the current Utah vehicle.~~

~~(2) If the converted motor vehicle does not have any auxiliary sources of combustion emissions, then the applicant shall submit a signed statement by an ASE-certified technician that includes the VIN, the technician's ASE certification number, and states that the conversion is functional, and that the converted motor vehicle does not have any auxiliary source of combustion emissions.~~

~~(3) If the converted motor vehicle has an auxiliary source of~~

~~combustion emissions, then the applicant shall submit:~~

~~(a) a copy of the vehicle inspection report from an approved county inspection and maintenance station showing that the converted motor vehicle meets all county emissions requirements for all installed fuel systems if the motor vehicle is registered within a county with an I/M program, or~~

~~(b) in all other areas of the State, a signed statement by an ASE-certified technician that includes the VIN, the technician's ASE certification number, and states that the conversion is functional, and~~

~~(c) Provide the EPA Certificate of Conformity or equivalent documentation that is consistent with requirements outlined in 76 FR 19830 April 8, 2011, or an Executive Order from the California Air Resources Board showing that the conversion will meet the proof of certification requirements in 59-10-1009(1)(c)(i)(C) or 59-7-605(1)(c)(i)(C).~~

]R307-121-[~~7~~]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) or 59-10-1009(3), 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[~~;~~

~~(2) the fuel type before conversion;~~

~~(3) the fuel type after conversion;~~

~~(4) the conversion equipment manufacturer and model number;~~

~~(5) the date of the conversion;~~

~~(6) the name, address and phone number of the person that converted the special mobile equipment~~]; and

([~~7~~]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.[~~; and~~

~~(8) the EPA Certificate of Conformity, or an Executive Order from the California Resource Board showing that the conversion will meet the proof of certification requirements in 59-10-1009(1)(c)(ii)(B) or 59-7-605(1)(c)(ii)(B).~~

~~**R307-121-8. Applicability.**~~

~~(1) The definitions of plug-in electric drive motor vehicle and fuel economy standards in R307-121-2 shall apply to all purchases as of January 1, 2011.~~

~~(2) Provisions found in sections R307-121-5(6) and R307-121-6(3)(c) shall apply to all conversions as of April 8, 2011.~~]

KEY: air pollution, alternative fuels, tax credits, motor vehicles
Date of Enactment or Last Substantive Amendment: [~~January 1, 2012~~]2013
Notice of Continuation: [January 23, 2012]
Authorizing, and Implemented or Interpreted Law: 19-2-104; 19-1-402;

59-7-605; 59-10-1009

State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-071-13

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 28, 2013

SUBJECT: PROPOSE FOR PUBLIC COMMENT: Amend R307-123. General Requirements: Clean Fuels and Vehicle Technology Grant and Loan Program.

The EPA streamlined and expanded its process to allow for intermediate and out-of-useful-life vehicles to be converted to run on alternate fuels such as compressed natural gas. EPA finalized its rulemaking on April 8, 2011. Staff requests that the Board propose to make technical changes and add language that help clarify the proof of certification requirements found in R307-123. This amendment would apply to all conversions as of April 8, 2011.

Staff also requests that the Board propose to add demonstration of eligibility requirements to R307-123 for vehicles converted to electricity, given that electricity is an eligible clean fuel under Section 19-1-402.

In addition, staff requests that the Board propose to add further criteria for demonstration of eligibility for retrofitted vehicles in order to verify that the condition of the vehicle prior to the installation of the retrofit is compliant with the retrofit's certification criteria.

Staff Recommendation: Staff recommends the Board propose the amended R307-123 for public comment.

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R307. Environmental Quality, Air Quality.
R307-123. General Requirements: Clean Fuels and Vehicle Technology Grant and Loan Program.
R307-123-1. Authorization and Purpose.

(1) This rule is authorized by Section 19-1-405, which establishes criteria and definitions used to determine eligibility for use of the Clean Fuels and Vehicle Technology Fund created in Section 19-1-403.

(2) R307-123 establishes procedures to provide proof of purchase to the Board for an OEM vehicle, or the conversion or retrofit of a vehicle for which a grant or loan made with the monies available in the Fund is allowed under Subsection 19-1-403(2)(a).

(3) Eligible technologies are required to meet the criteria and follow the procedures established in R305-4.

R307-123-2. Definitions.

Definitions. The following additional definitions apply to R307-123.

"Certified by the director" means that:

(1) A motor vehicle on which conversion equipment has been installed meets the criteria in Subsection 19-1-405(1)(a) and demonstrates a reduction in emissions as defined in Subsection 19-1-405(2); or

(2) A motor vehicle on which a retrofit has been installed meets the following criteria:

(a) the motor vehicle's emissions of regulated pollutants, when operating with the retrofit equipment, is less than the emissions were before the installation of the retrofit equipment; and

(b) a reduction in emissions under Subsection R307-123-2(2)(a)is demonstrated by:

(i) certification of the retrofit by the federal EPA or by a state whose certification standards are recognized by the Board; or

(ii) any other test or standard recognized by the Board.

"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 which 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 vehicle or equipment eligible.

"Manufacturer's Statement of Origin" means a certificate showing the original transfer of a new motor vehicle from the manufacturer to the original purchaser.

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

"Retrofit" means retrofit as defined in Subsection 19-1-402(11).

"Retrofit equipment" means a diesel oxidation catalyst, a diesel particulate filter, or a closed crankcase filtration system, that has been approved for use in engine retrofit programs by the federal EPA or by a state whose testing protocols are recognized by the Board.

R307-123-3. Demonstration of Eligibility for OEM Vehicles.

To demonstrate that a vehicle is eligible, proof of purchase shall be made by submitting the following documentation to the director:

(1)(a) A copy of the Manufacturer's Statement of Origin or equivalent manufacturer's documentation showing that the vehicle is an OEM vehicle; or

(b) a signed statement by an Automotive Service Excellence (ASE) certified technician that includes the vehicle identification number(VIN)and states that the vehicle is an OEM vehicle;

(2) An original or copy of the purchase order, customer invoice, or receipt including the VIN; and

(3) A copy of the current Utah vehicle registration.

R307-123-4. Demonstration of Eligibility for Vehicles Converted to [~~Clean Fuels~~]Natural Gas or Propane.

To demonstrate that a conversion of a motor vehicle fueled by [~~clean fuel~~]natural gas or propane is eligible, proof of purchase shall be made by submitting the following documentation to the director:

(1) the VIN;

(2) the fuel type before conversion;

(3) the fuel type after conversion;

(4)(a) [~~If the vehicle is registered within a county with an inspection and maintenance (I/M) program,~~]a copy of the vehicle inspection report from an approved county inspection and maintenance station showing that the converted [~~clean fuel~~]motor vehicle meets all county emissions requirements for all installed fuel systems if the motor vehicle is registered within a county with an inspection and maintenance (I/M) program; or

(b) in all other areas of the [~~S~~]state, a signed statement by an ASE certified technician that includes the VIN and states that the conversion is functional;

(5) each of the following:

(a) the conversion equipment manufacturer,

(b) the conversion equipment model number,

(c) the date of the conversion, and

(d) the name, address, and phone number of the person that converted the vehicle;

(6) [~~proof that the conversion is certified by the director;~~] the EPA Certificate of Conformity, or equivalent documentation that is consistent with requirements outlined in 40 CFR Part 85 and 40 CFR Part 86, as published in Federal Register Volume 76 Page 19830 on April 8, 2011, or an executive order from

the California Air Resources Board;

(7) an original or copy of the purchase order, customer invoice, or receipt; and

(8) a copy of the current Utah vehicle registration, which shows that the vehicle is registered in the applicant's name.

R307-123-5. Demonstration of Eligibility for Vehicles Converted to Electricity.

To demonstrate that a conversion of a motor vehicle to be powered by electricity is eligible, proof of purchase shall be made by submitting the following documentation to the director:

(1) the VIN;

(2) the fuel type before conversion;

(3) the fuel type after conversion;

(4) each of the following:

(a) the conversion equipment manufacturer;

(b) the conversion equipment model number;

(c) the date of the conversion; and

(d) the name, address, and phone number of the person that converted the motor vehicle;

(5) an original or copy of the purchase order, customer invoice, or receipt;

(6) a copy of the current Utah vehicle registration; and

(7) a signed statement by an ASE-certified technician that includes the VIN, the technician's ASE certification number, and states that the conversion is functional and that the converted motor vehicle does not have any auxiliary source of combustion emissions.

R307-123-6. Demonstration of Eligibility for Retrofitted Vehicles.

To demonstrate that a retrofit of a motor vehicle is eligible, proof of purchase shall be made by submitting the following documentation to the director:

(1) the VIN;

(2) each of the following:

(a) the retrofit type;

([~~a~~]b) the retrofit equipment manufacturer[~~,~~];

([~~b~~]c) the retrofit equipment model number[~~,~~];

([~~c~~]d) the date of the retrofit[~~,~~]; and

([~~d~~]e) the name, address, and phone number of the person that retrofitted the vehicle;

([~~5~~]3) proof that the retrofit is certified by the director;

(4) proof that the vehicle condition prior to retrofit is compliant with the retrofit's certification criteria;

([~~6~~]5) an original or copy of the purchase order, customer invoice, or receipt; and

([~~7~~]6) a copy of the current Utah vehicle registration.

R307-123-7. Applicability:

Provisions found in sections R307-121-5(6) and R307-121-

6(3)(c) shall apply to all conversions as of April 8, 2011.

KEY: air pollution, alternative fuels, grants and loans, motor vehicles
Date of Enactment or Last Substantive Amendment: [~~November 8, 2012~~]2014
Authorizing, and Implemented or Interpreted Law: 19-2-104; 19-1-401; 59-7-605; 59-10-1009

State of Utah

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GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-072-13

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Colleen Delaney, Environmental Scientist

DATE: August 28, 2013

SUBJECT: PROPOSE FOR PUBLIC COMMENT: Amend R307-403-1. Purpose and Definitions.

On May 1, 2013, the Air Quality Board adopted revisions to R307-403, Permits: New and Modified Sources in Nonattainment Areas and Maintenance Areas, including the establishment of volatile organic compounds as a $PM_{2.5}$ precursor in the Logan, Salt Lake City, and Provo $PM_{2.5}$ nonattainment areas. This rule change neglected to establish the significance level for volatile organic compounds that is used to determine whether a modification at a major source is a major modification. The recommended rule change would establish the significant emission rate for volatile organic compounds at 40 tons/year.

Staff Recommendation: Staff recommends the Board propose for public comment the attached revisions to R307-403-1.

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R307. Environmental Quality, Air Quality.
R307-403. Permits: New and Modified Sources in Nonattainment Areas and Maintenance Areas.
R307-403-1. Purpose and Definitions.

(1) Purpose. This rule implements the federal nonattainment area permitting program for major sources as required by 40 CFR 51.165. In addition, the rule contains new source review provisions for some non-major sources in PM10 nonattainment areas. This rule supplements, but does not replace, the permitting requirements of R307-401.

(2) Unless otherwise specified, all references to 40 CFR in R307-403 shall mean the version that is in effect on July 1, 2012.

(3) Except as provided in R307-403-1(4), the definitions in 40 CFR 51.165(a)(1)are hereby incorporated by reference.

(4)(a) “Reviewing authority" means the director.

(b) In the definition of “significant” in 40 CFR 51.165(a)(1)(x) add the following text at the end of the pollutant emission rate for PM2.5: “; and in the Logan, Salt Lake City, and Provo PM2.5 nonattainment areas as defined in the July 1, 2010 version of 40 CFR 81.345, 40 tpy of volatile organic compounds.”

(c) In the definition of “regulated NSR pollutant” in 40 CFR 51.165(a)(1)(xxxvii) the following subparagraph is added to 51.165(a)(1)(xxvii)(4): “(i) Volatile organic compounds are precursors to PM2.5 and ammonia is not a precursor to PM2.5 in the Logan, Salt Lake City, and Provo PM2.5 nonattainment areas as defined in the July 1, 2010 version of 40 CFR 81.345.”

[~~(c)~~](d) The following definitions or portions of definitions that apply to the equipment repair and replacement provisions are not incorporated because these provisions were vacated by the DC Circuit Court of Appeals on March 17, 2006:

(i) in the definition of “major modification” in 40 CFR 51.165(a)(1)(v)(C), the second sentence in subparagraph (1);

(ii) the definition of “process unit” in 40 CFR 51.165(a)(1)(xliii);

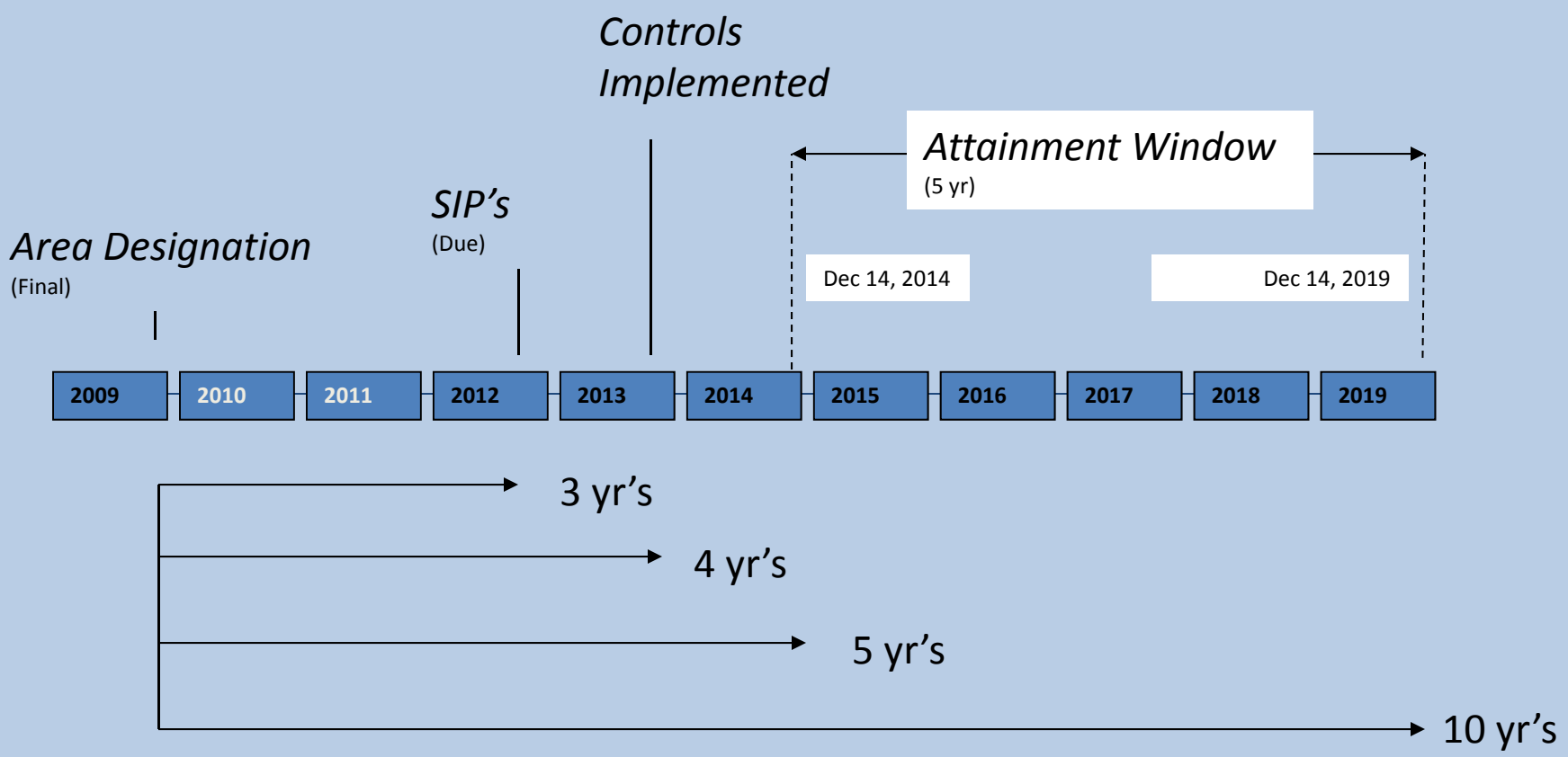
(iii) the definition of “functionally equivalent component” in 40 CFR 51.165(a)(1)(xliv);

(iv) the definition of “fixed capital cost” in 40 CFR 51.165(a)(1)(xlv); and

(v) the definition of “total capital investment” in 40 CFR 51.165(a)(1)(xlvi).

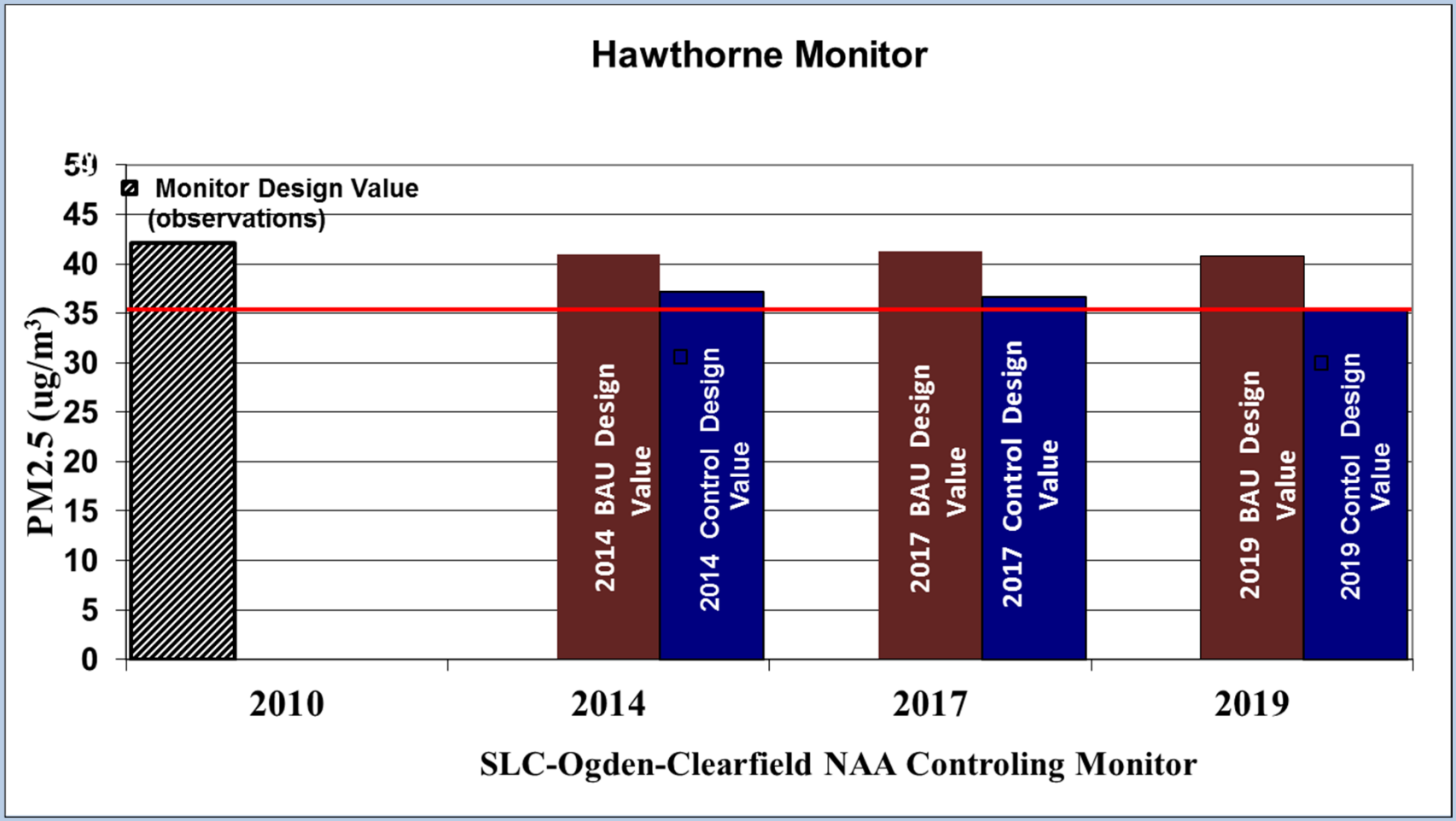
KEY: air quality, nonattainment*, offset*
Date of Enactment or Last Substantive Amendment: May 6, 1999
Notice of Continuation: June 6, 2012
Authorizing, and Implemented or Interpreted Law: 19-2-104; 19-2-108

Attainment Dates

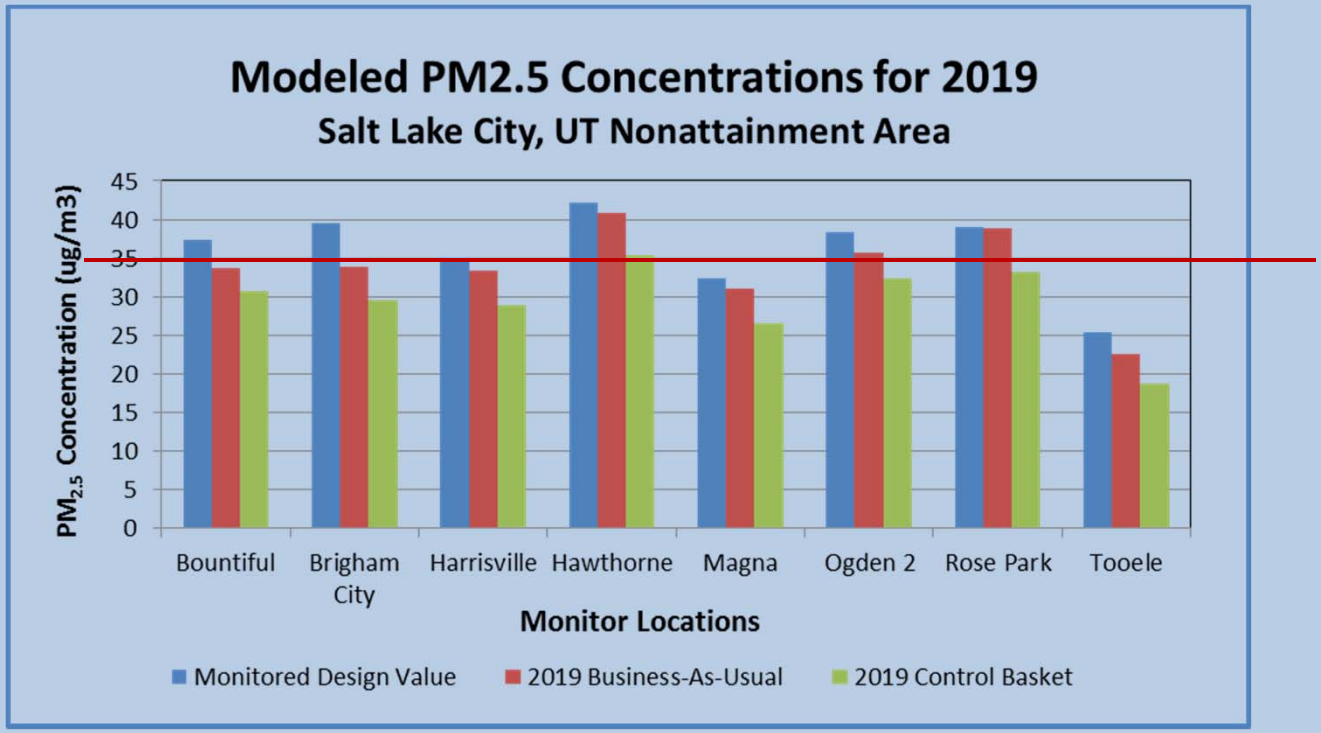


PM2.5 Attainment Demonstration

Salt Lake City Nonattainment Area

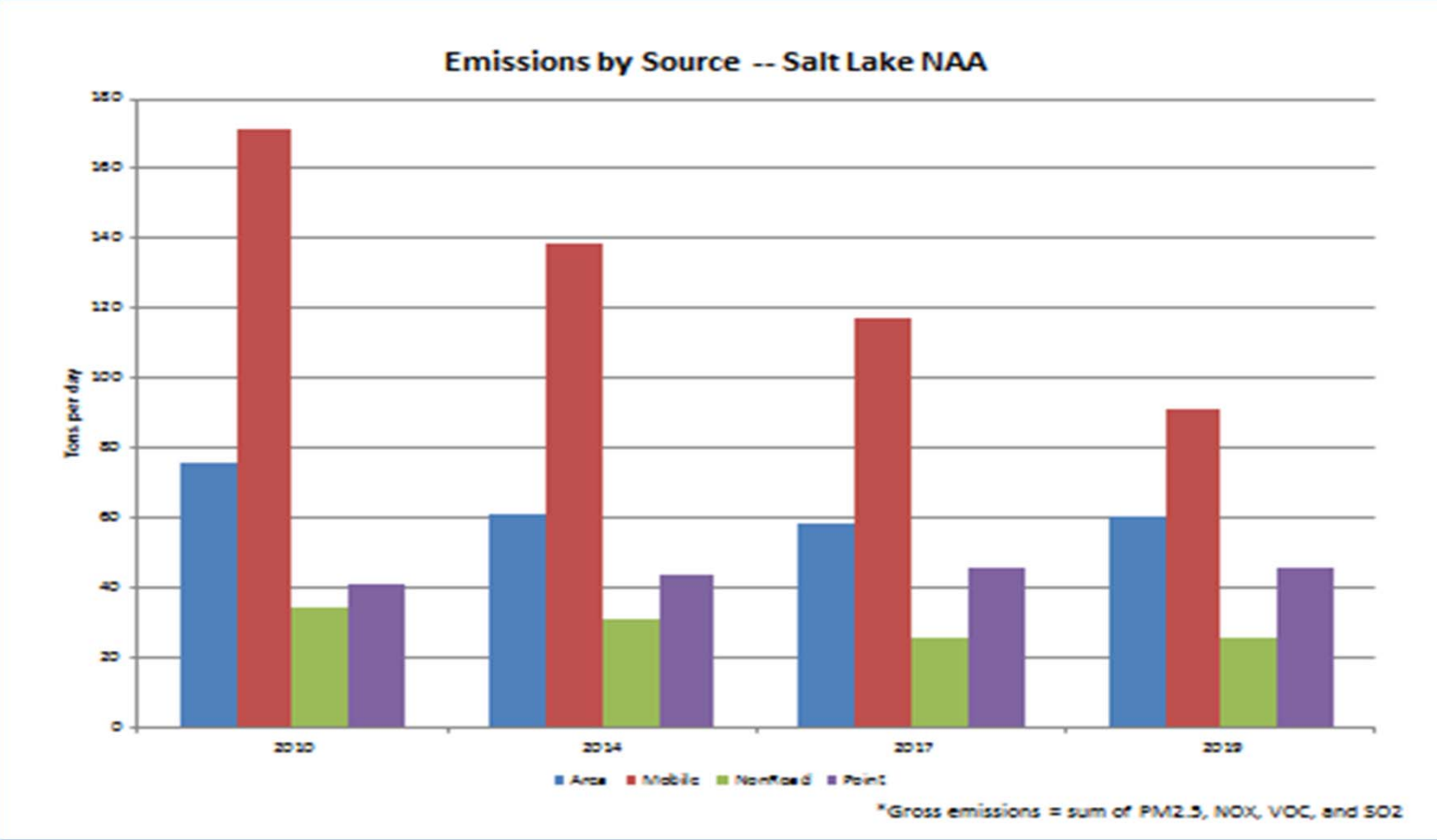


Modeled $PM_{2.5}$ Concentrations for 2019



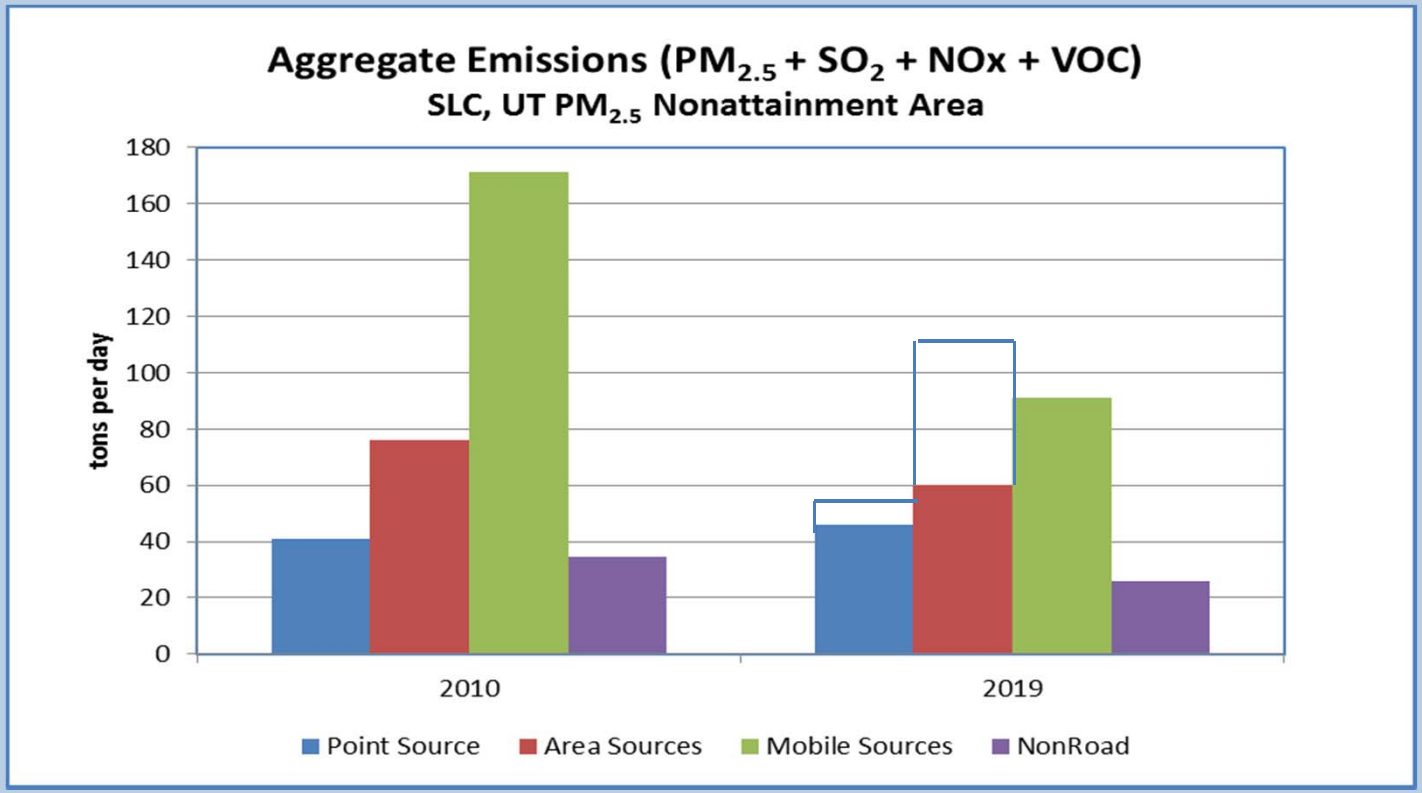
Emission Trends by Source Category

Through the SIP Planning Window

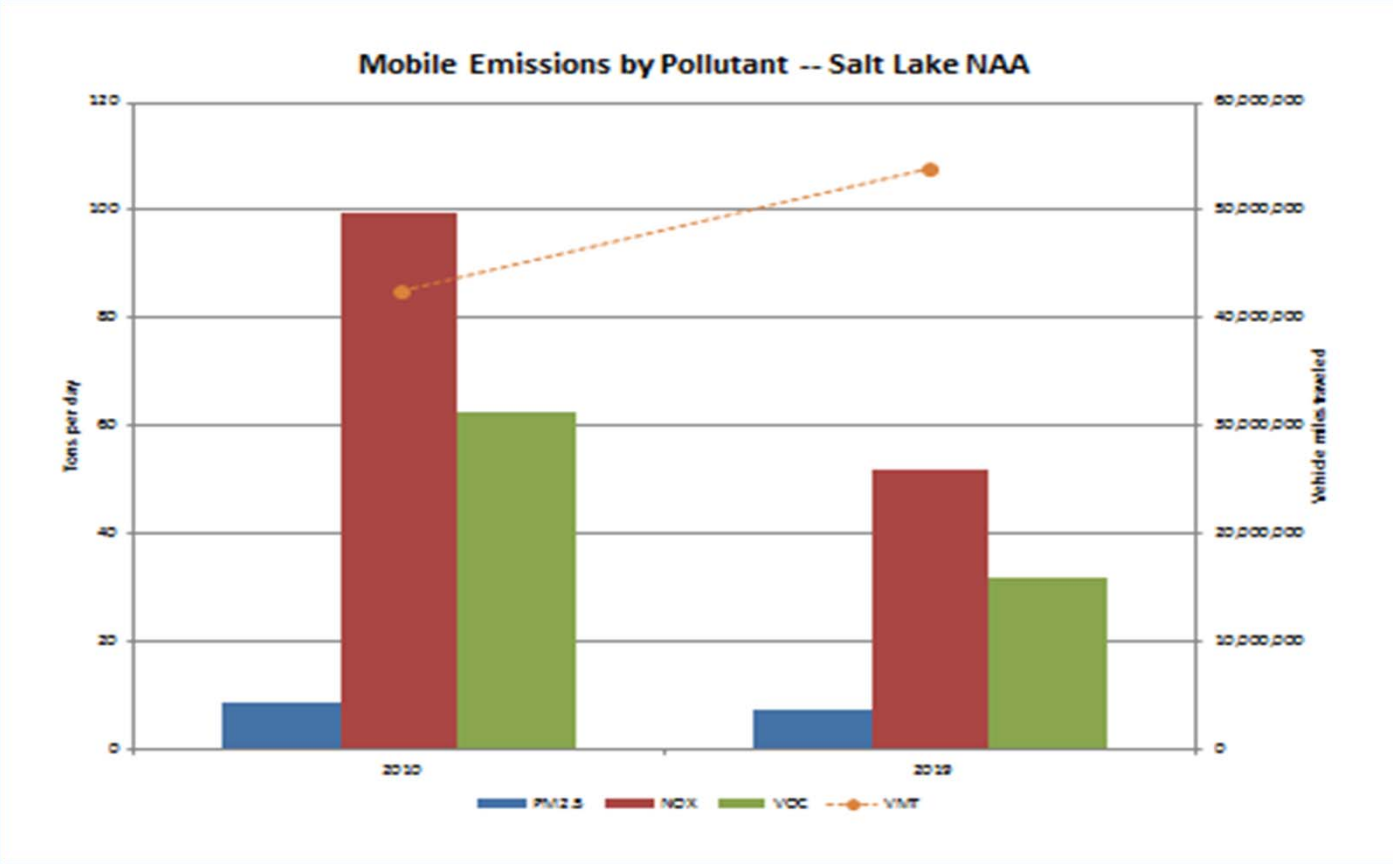


Emission Reductions by Source Category

SLC, UT $PM_{2.5}$ SIP Control Strategy



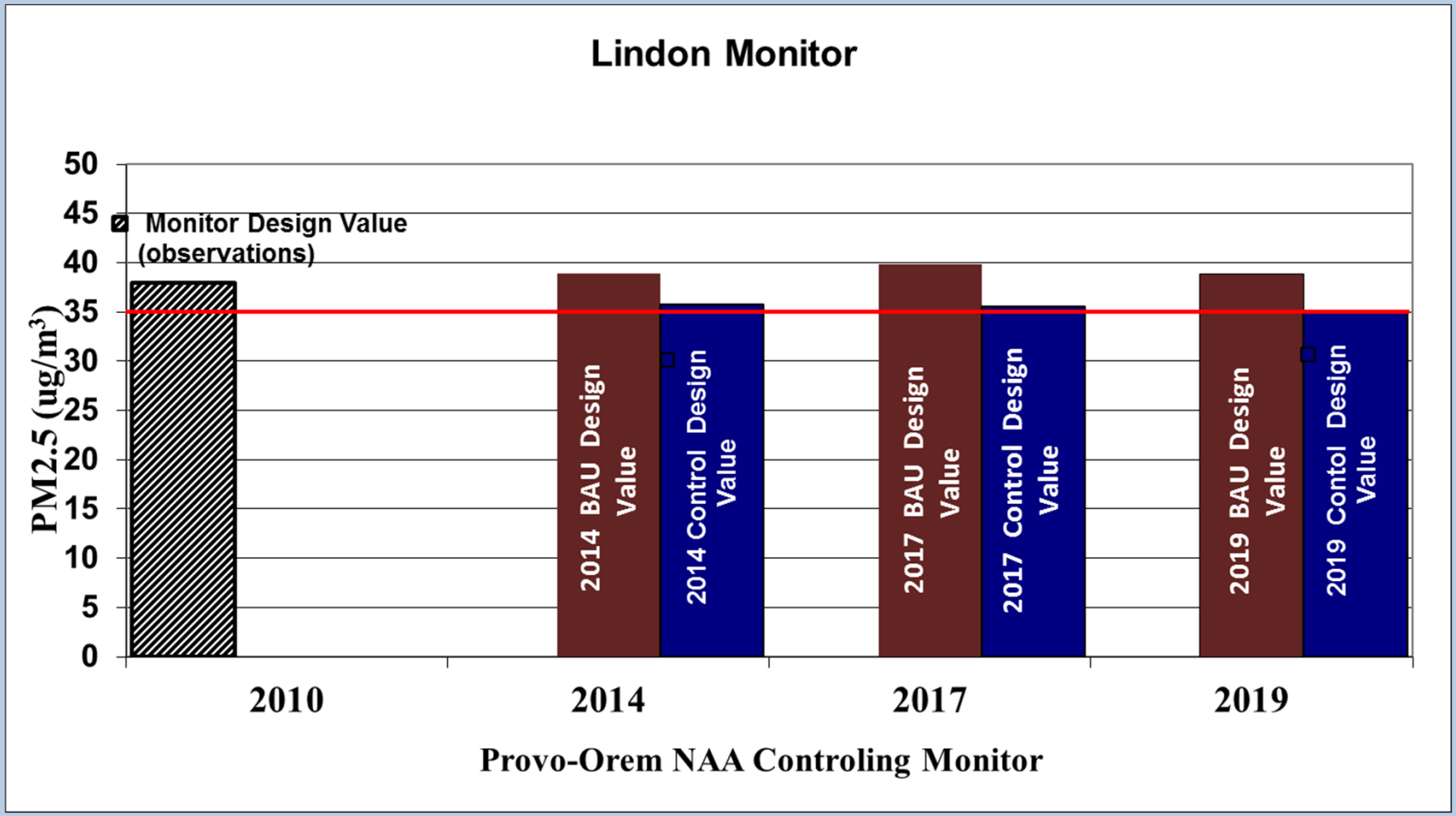
Mobile Source Emissions vs. VMT



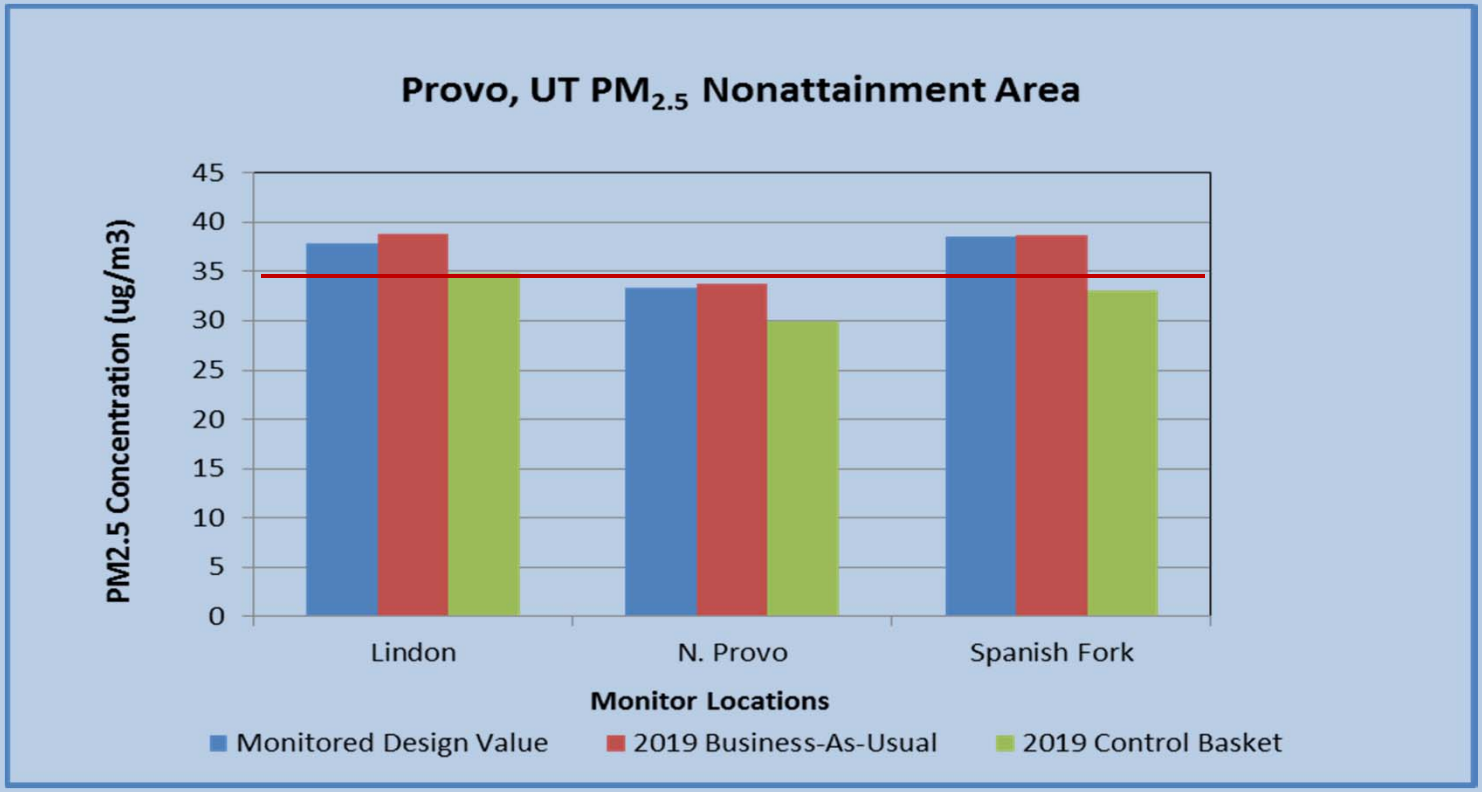
Although the Federal Tier II motor vehicle emissions program is not part of the SIP Control Strategy, it is still responsible for large reductions in emissions throughout the SIP planning period.

PM2.5 Attainment Demonstration

Provo Nonattainment Area

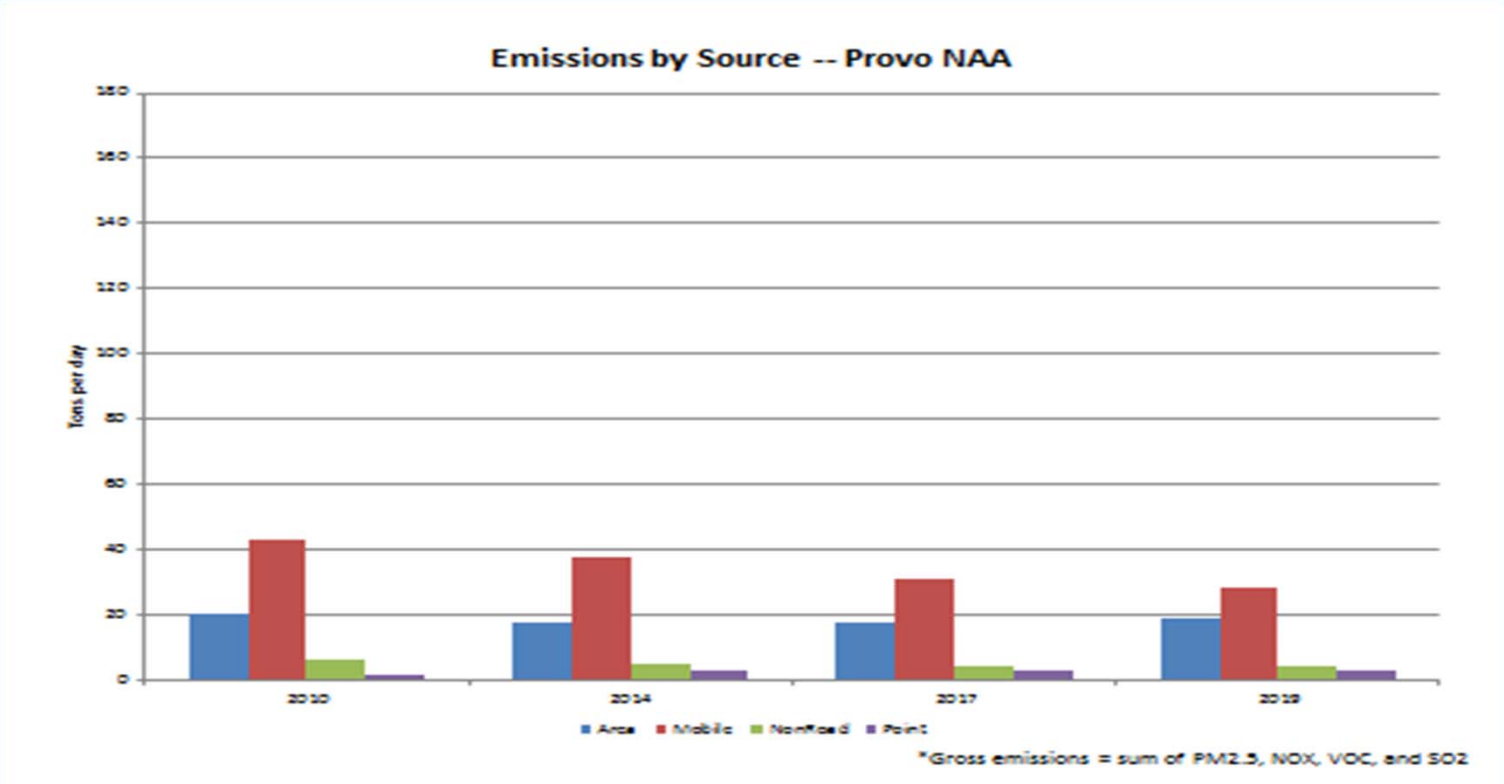


Modeled $PM_{2.5}$ Concentrations for 2019



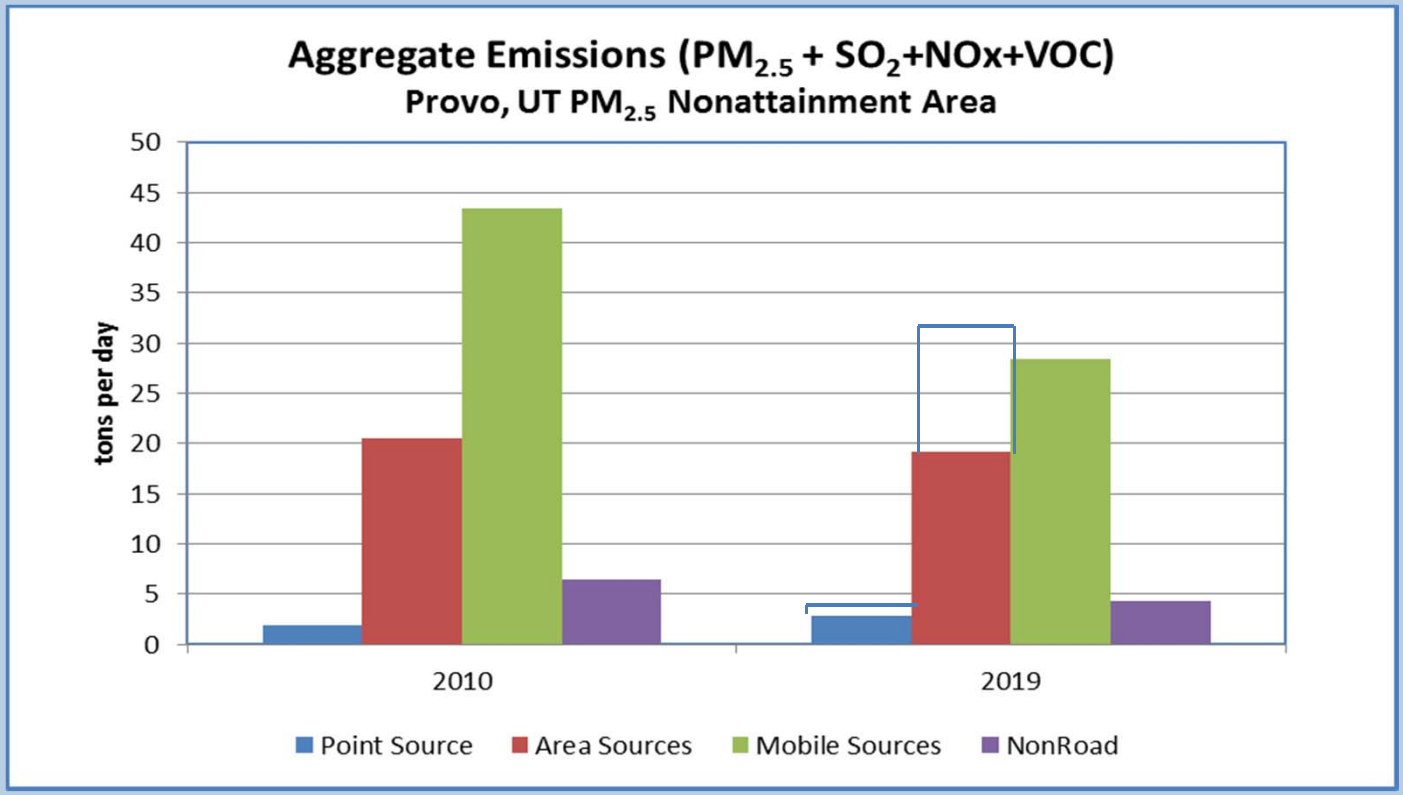
Emission Trends by Source Category

Through the SIP Planning Window

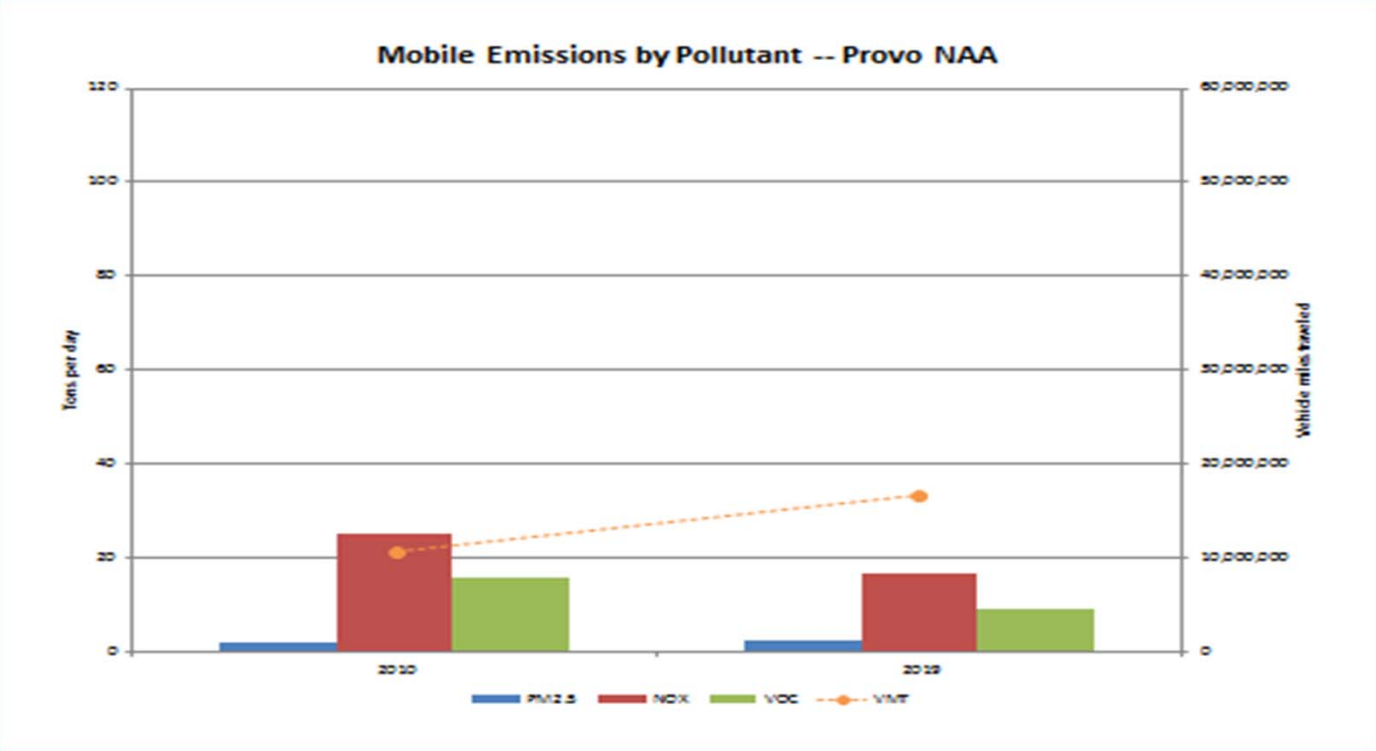


Emission Reductions by Source Category

Provo, UT $PM_{2.5}$ SIP Control Strategy



Mobile Source Emissions vs. VMT



Although the Federal Tier II motor vehicle emissions program is not part of the SIP Control Strategy, it is still responsible for large reductions in emissions throughout the SIP planning period.

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 XX 2013

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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

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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.

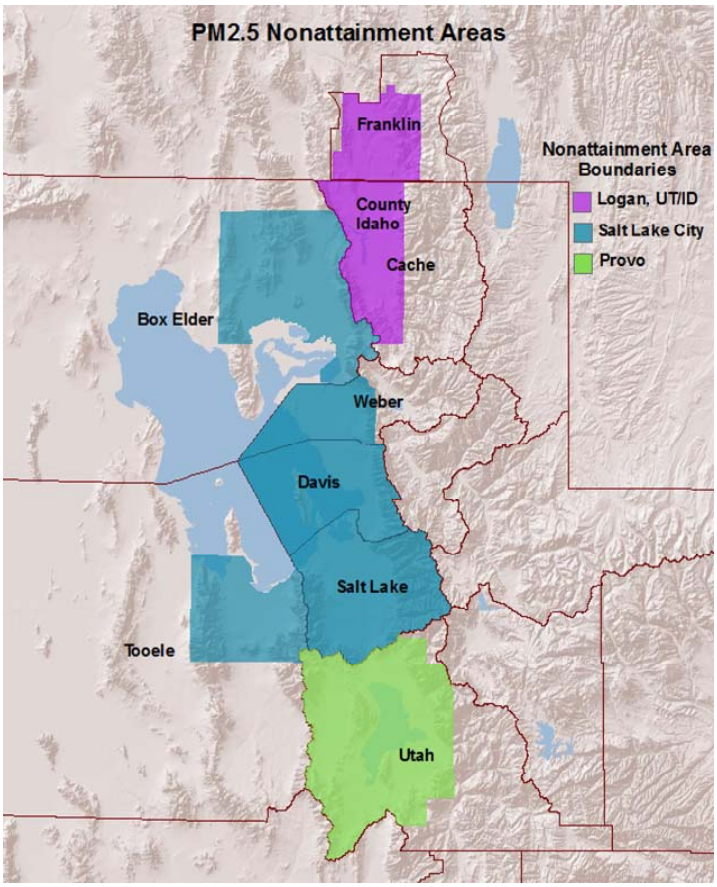


Figure 1.1, Nonattainment Areas for the 2006 $PM_{2.5}$ NAAQS

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 will all be modeled together within the same modeling domain.

1.6 $PM_{2.5}$ Attainment Plan 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 main precursor gasses associated with fine particulate matter are discussed in EPA's Clean Air Particulate Implementation Rule (FR 72, 20586), and there are certain presumptions about each of these concerning how they are to be treated in a given attainment plan. It is important that this plan identify which of these will be evaluated for the purpose of developing control measures.

- Sulfur Dioxide (SO_2) is to be evaluated for control measures in all nonattainment areas. SO_2 is therefore to be considered as a $PM_{2.5}$ attainment plan precursor.

- Oxides of Nitrogen (NO_x) are presumed to be evaluated for control measures in any given nonattainment area, unless it can be demonstrated that it is not a significant contributor to $PM_{2.5}$ concentrations. No such demonstration will be made as part of this plan. Therefore, NO_x will be considered as a $PM_{2.5}$ attainment plan precursor.

- Volatile Organic Compounds (VOC) are presumed not to be evaluated for control measures in any given nonattainment area, unless it can be demonstrated that it is in fact a significant contributor to $PM_{2.5}$ concentrations. The air modeling that underlies this SIP demonstration does in fact indicate that $PM_{2.5}$ concentrations are very sensitive to VOC concentrations. As

such, VOC is to be considered a significant contributor to $PM_{2.5}$ concentrations and will be considered as a $PM_{2.5}$ attainment plan precursor. Additional information concerning a demonstration to this effect is included in the Technical Support Document.

1.7 Other $PM_{2.5}$ Precursors – Ammonia

Ammonia (NH_3) is another precursor gas associated with fine particulate matter. Like VOC, the Clean Air Particulate Implementation Rule presumes that ammonia would not be evaluated for control measures in any given nonattainment area, unless it can be demonstrated that it is in fact a significant contributor to $PM_{2.5}$ concentrations. Most of the secondary particulate matter collected during cold-pool conditions is ammonium nitrate. Still, there is every indication that in each of the airsheds evaluated with the air model there is a large surplus of ammonia relative to what would be required to produce the observed ammonium nitrate. Sensitivity runs with the model indicate that significant reductions in the inventories of ammonia have little to no effect on predicted $PM_{2.5}$ concentrations. Because the modeled cuts in ammonia emissions were well beyond what might be considered as reasonable or even best controls, ammonia will not be identified as a $PM_{2.5}$ attainment plan precursor.

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

More specific requirements for the preparation, adoption, and submittal of implementation plans are specified in 40 CFR Part 51. Subpart Z of Part 51 contains provisions for Implementation of $PM_{2.5}$ National Ambient Air Quality Standards.

2.2 $PM_{2.5}$ Implementation Rule

Beyond what has been codified in Subpart Z of Part 51 concerning the Implementation of the $PM_{2.5}$ NAAQS, EPA provides 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).

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, and contingency measures. Additional information is provided in the technical support document.

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 $\mu g/m^3$. $PM_{2.5}$ 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 $PM_{2.5}$; the 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 meets EPA requirements for monitoring networks.

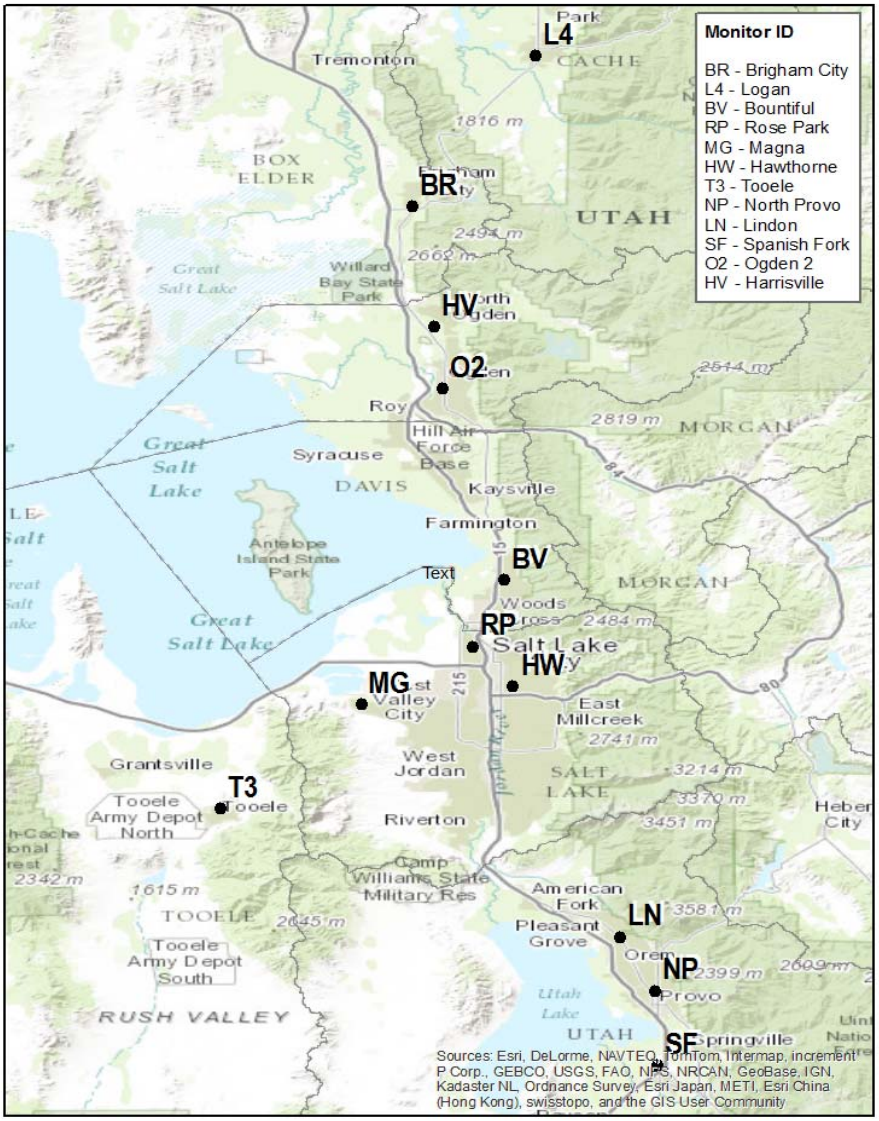


Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network

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 the monitoring locations along the Wasatch Front. It can be seen from the data that there are no locations at which the annual NAAQS has been violated.

		3-Year Average of Annual Mean Concentrations		
Location	**County**	**08 - 10**	**09 - 11**	**10 - 12**
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 the monitoring locations along the Wasatch Front. 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**	
Brigham City	Box Elder	42	40	37	**39.9**
Ogden 2 (POC 1)	Weber	37	41	37	**38.5**
Harrisville	Weber	36	37	33	**35.1**
Bountiful	Davis	38	40	34	**37.5**
Rose Park (POC 1)	Salt Lake	41	41	35	**39.0**
Magna	Salt Lake	33	35	30	**32.5**
Hawthorn (POC 1)	Salt Lake	44	45	38	**42.1**
Tooele	Tooele	26	27	24	**25.8**
Lindon (POC 1)	Utah	41	41	32	**37.9**
North Provo	Utah	36	35	29	**33.4**
Spanish Fork	Utah	39	42	35	**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.

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.

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.

[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)

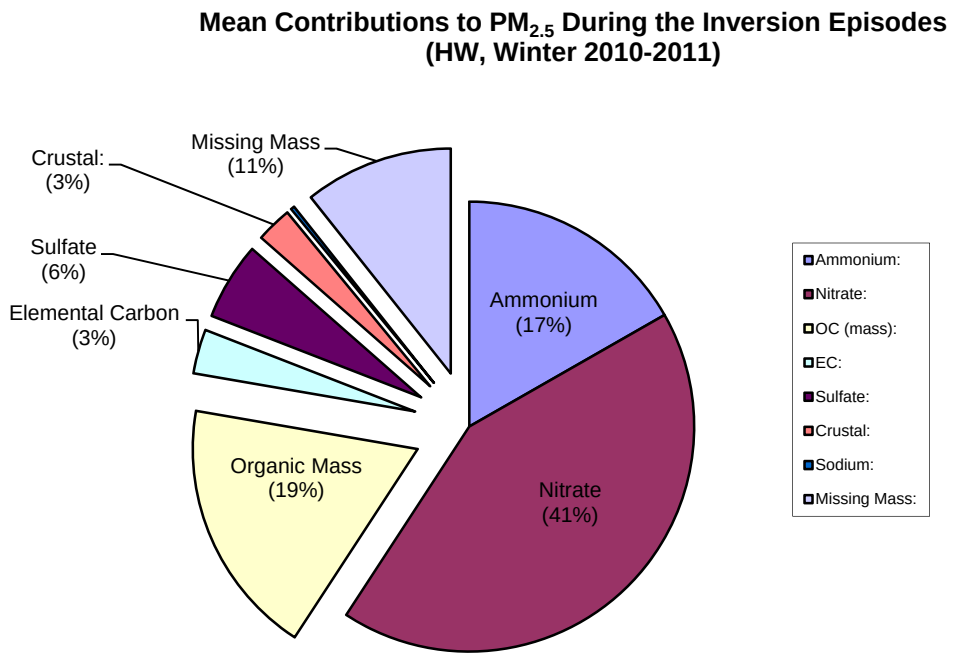
The $PM_{2.5}$ is collected on three types of filters: Teflon, nylon, and quartz. Teflon filters are used to characterize the inorganic contents of $PM_{2.5}$. Nylon filters are used to quantify the amount of ammonium nitrate, and quartz filters are used to quantify the organic and inorganic carbon content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



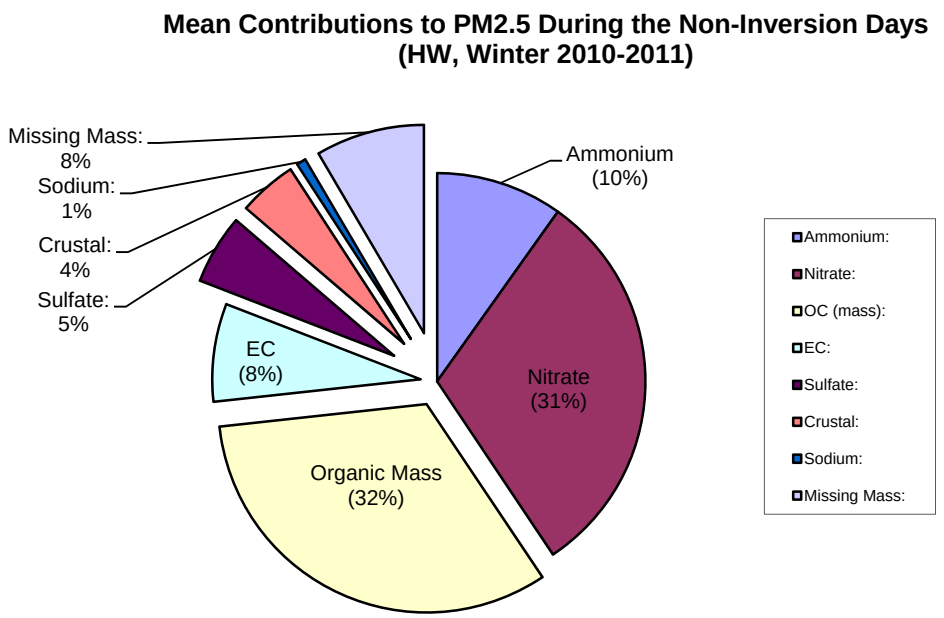


Figure 3.2, Composite Wintertime $PM_{2.5}$ Speciation Profiles

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 MOVES 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 horizons relate to the statutory attainment dates associated with the 2006 $PM_{2.5}$ NAAQS. These dates may range from 2014 to 2019. Such projections are made as comparisons to 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 two distinct airsheds defining the nonattainment areas along the Wasatch Front: 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 areas illustrate many similarities but also a few notable differences. They are both more or less dominated by a combination of on-road mobile and area sources. However, emissions from large point sources are more prominent in the Salt Lake City nonattainment area, where they are clustered in Salt Lake and Davis counties.

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.

2010 Baseline	NA-Area	Source Category	PM2_5	NOX	VOC	NH3	SO2
2010 Baseline Sum of Emissions (tpd)	Provo NA	Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	2.20	25.39	15.63	0.44	0.16
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Source	0.26	0.93	0.67	0.29	0.03
		Provo NA Total	**4.64**	**36.28**	**30.79**	**7.26**	**0.56**
	Salt Lake City NA	Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	8.59	99.63	62.51	1.86	0.63
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Source	3.89	20.14	6.48	0.64	10.64
		Salt Lake City NA Total	**19.62**	**160.51**	**130.02**	**20.47**	**12.81**
	Surrounding Areas	Area Sources	2.32	4.73	18.75	38.60	1.40
		Mobile Sources	2.98	35.37	16.02	0.45	0.17
		NonRoad	0.70	8.89	12.94	0.00	0.16
		Point Source	3.35	129.31	3.55	0.75	43.40
		Surrounding Areas Total	**9.35**	**178.30**	**51.25**	**39.81**	**45.13**
		2010 Total	**33.60**	**375.09**	**212.06**	**67.54**	**58.49**

Table 4.1, Emissions Summary for 2010 (SMOKE)

Table 4.2 is specific to the Salt Lake, UT nonattainment area, and shows emissions for the attainment year as well as any other significant milestone year. These subsequent 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.

Year	NA-Area	Source Category	PM2_5	NOX	VOC	NH3	SO2
2010 Baseline	Salt Lake City NA	Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	8.59	99.63	62.51	1.86	0.63
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Source	3.89	20.14	6.48	0.64	10.64
		2010 Total	**19.62**	**160.51**	**130.02**	**20.47**	**12.81**
2014	Salt Lake City NA	Area Sources	4.74	18.18	37.33	17.68	0.89
		Mobile Sources	8.51	80.00	49.62	1.75	0.58
		NonRoad	1.02	19.70	10.05	0.01	0.56
		Point Source	4.31	22.52	7.93	0.87	8.83
		2014 Total	**18.58**	**140.41**	**104.93**	**20.31**	**10.86**
2017	Salt Lake City NA	Area Sources	4.66	16.97	36.02	17.57	0.89
		Mobile Sources	8.22	66.98	41.80	1.64	0.58
		NonRoad	0.82	17.13	7.55	0.01	0.25
		Point Source	4.68	23.12	8.22	0.90	9.45
		2017 Total	**18.38**	**124.20**	**93.60**	**20.12**	**11.18**
2019	Salt Lake City NA	Area Sources	4.49	17.76	37.09	17.15	0.90
		Mobile Sources	7.25	51.68	31.86	1.45	0.53
		NonRoad	0.82	17.28	7.10	0.01	0.62
		Point Source	4.76	24.02	8.32	0.92	8.85
		2019 Total	**17.33**	**110.74**	**84.37**	**19.52**	**10.91**

Table 4.2, Emissions Summaries for the Salt Lake City, UT Nonattainment Area; Baseline, RFP and Attainment Years (SMOKE)

The 2010 Baseline and projections to 2014, 2017 and 2019 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.

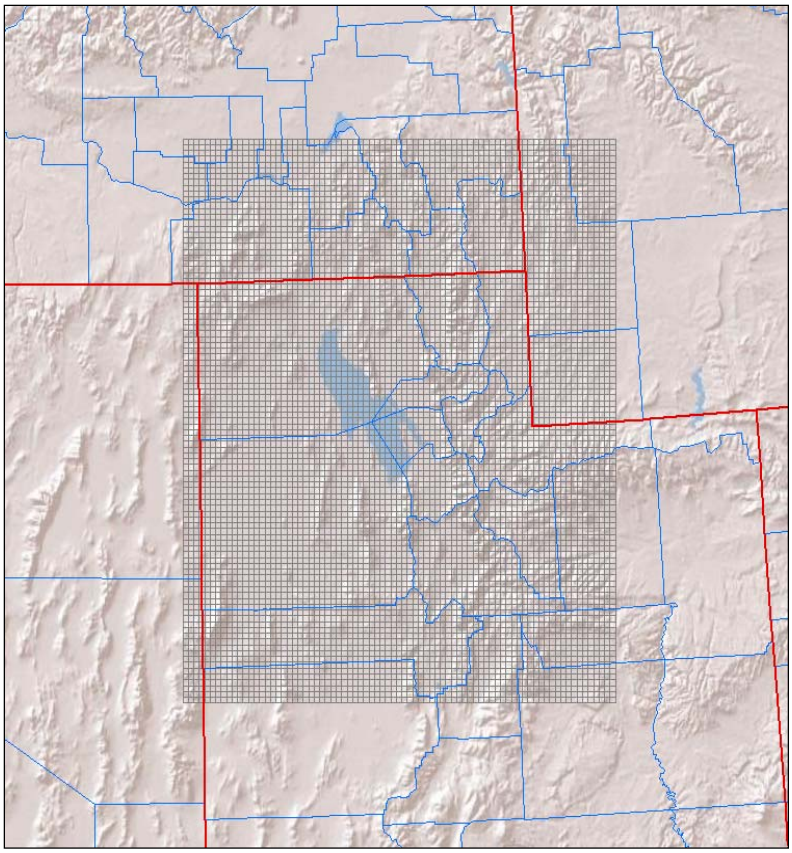


Figure 5.1: Northern Utah photochemical modeling domain.

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.

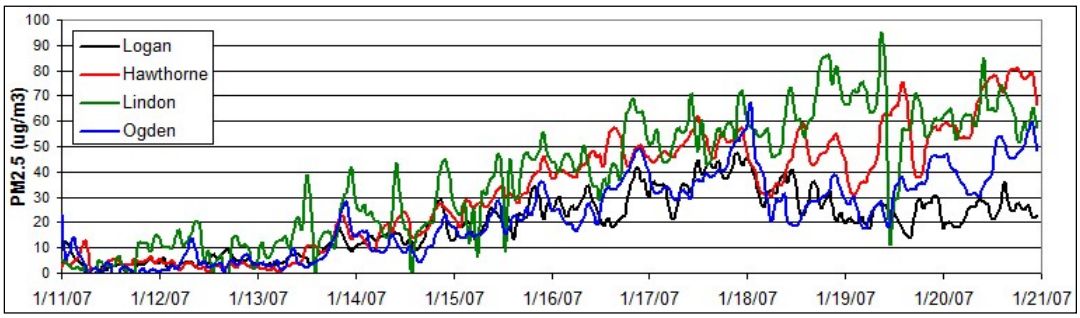


Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007

- **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.

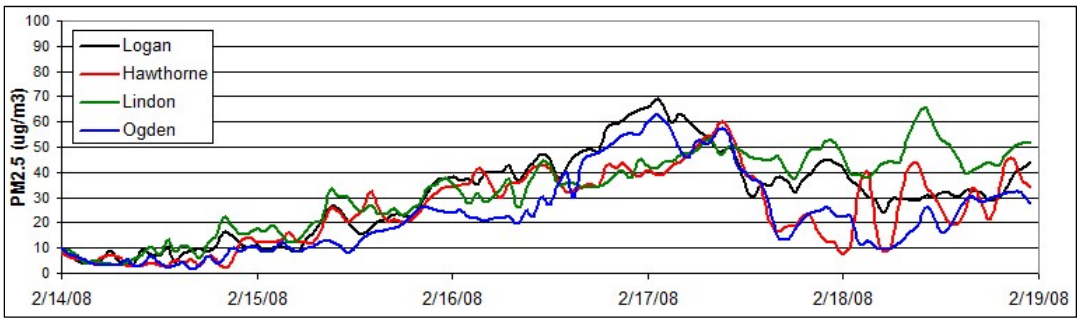


Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008

- **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.

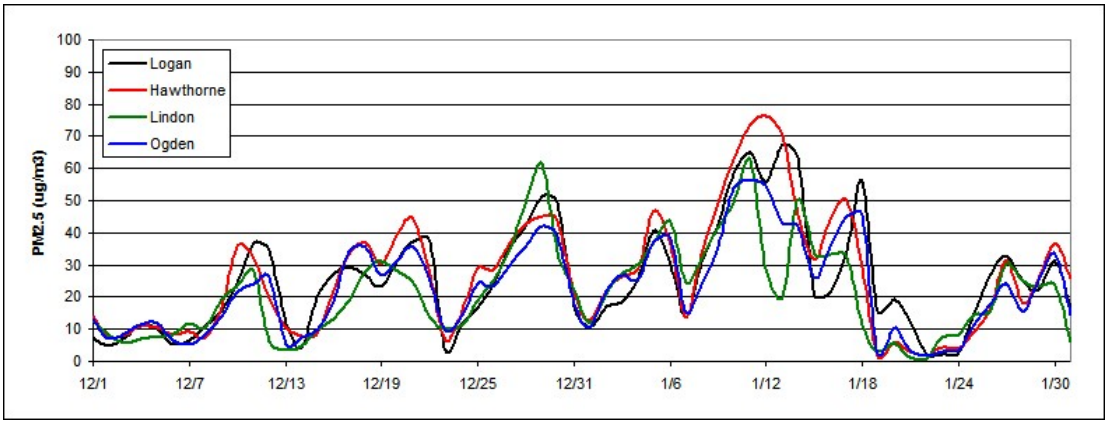


Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10.

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.

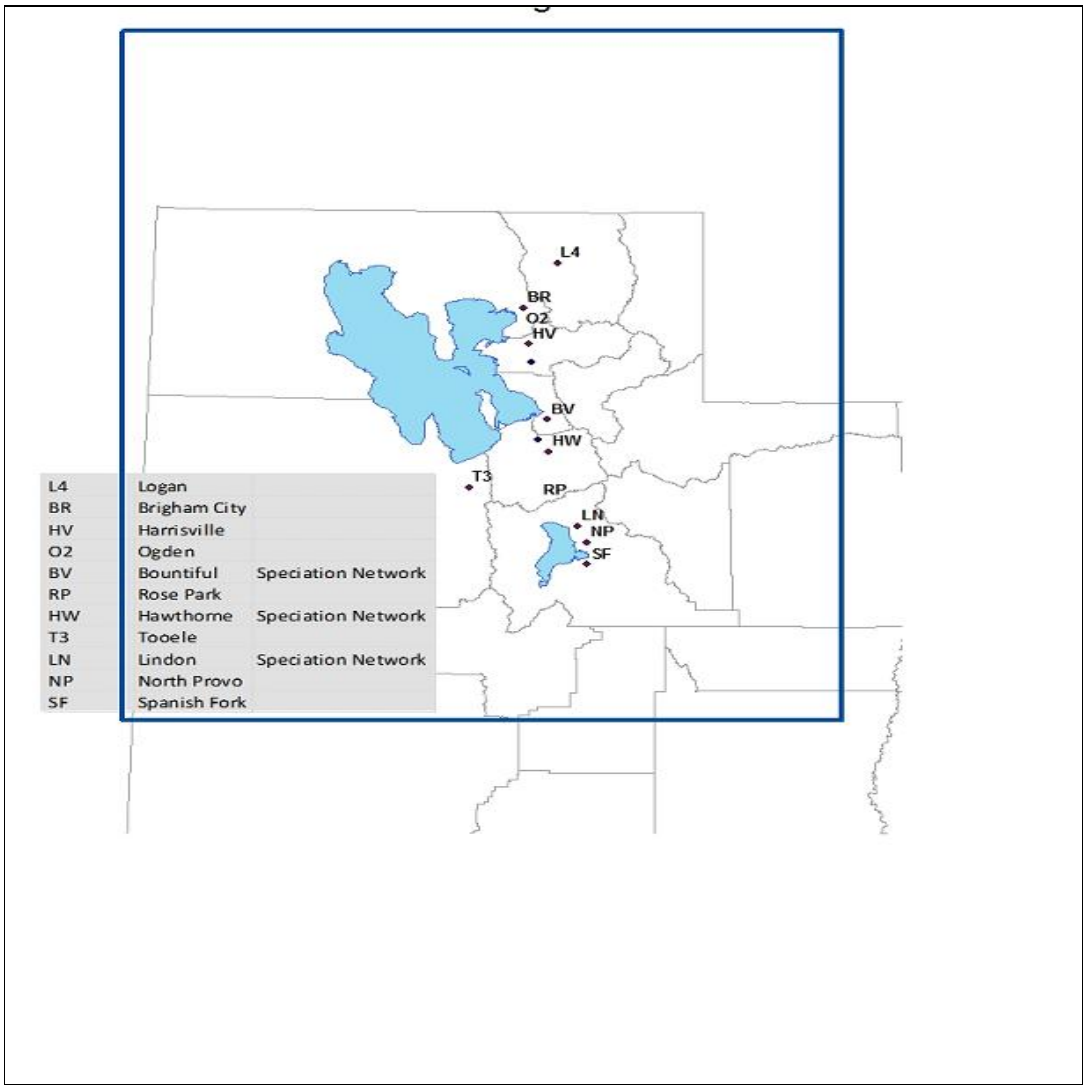


Figure 5.5: UDAQ monitoring network and model domain extent.

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.

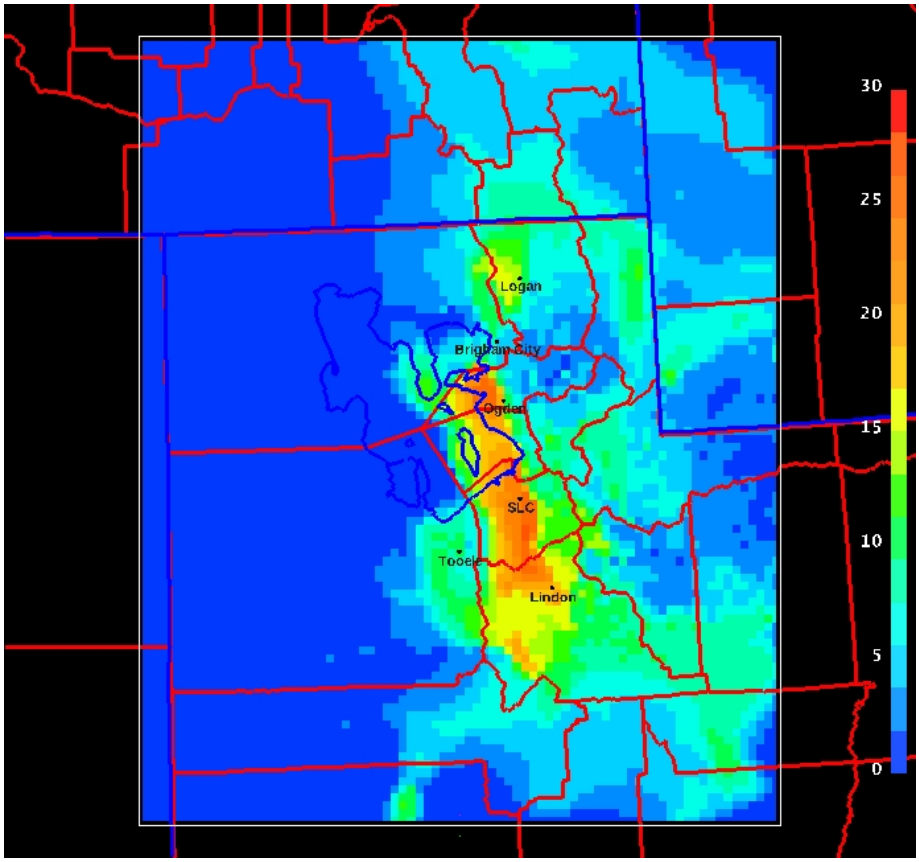


Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ ($\mu g/m^3$) for 2010 Jan. 03.

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 – 5.9 at the Hawthorne site in Salt Lake City (Fig. 5.7), the Ogden site in Weber County (Fig 5.8), and the Lindon site in Utah County (Fig. 5.9). 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. 5.10, 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). 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.

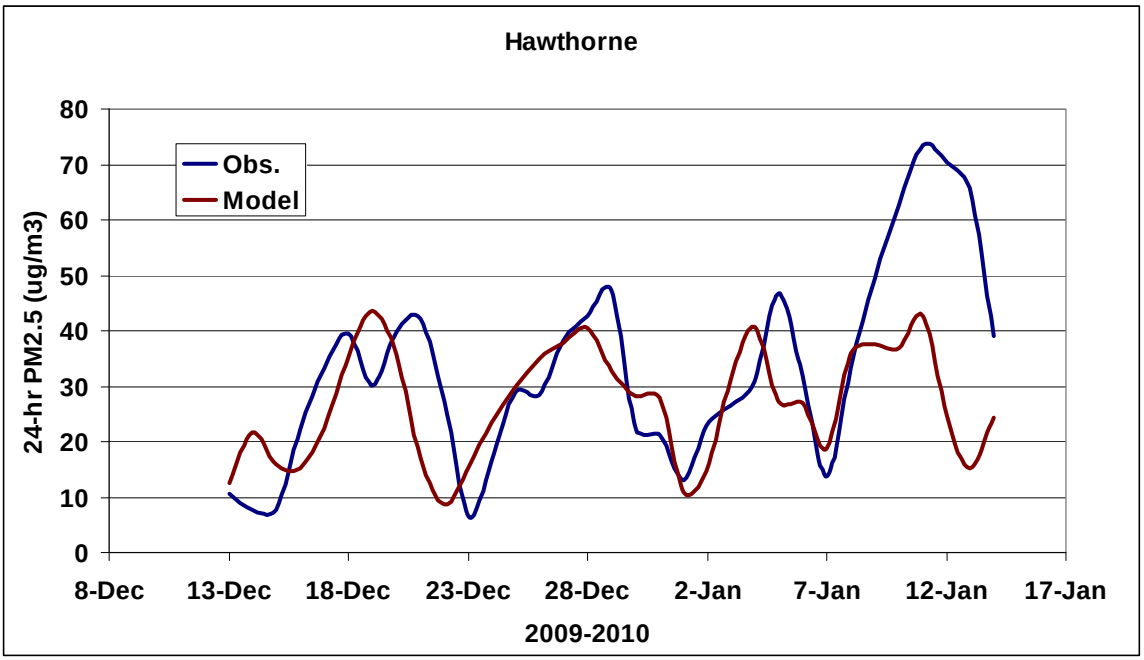


Figure 5.7: 24-hr $PM_{2.5}$ time series (Hawthorne). 24-hr PM2.5 time series. Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

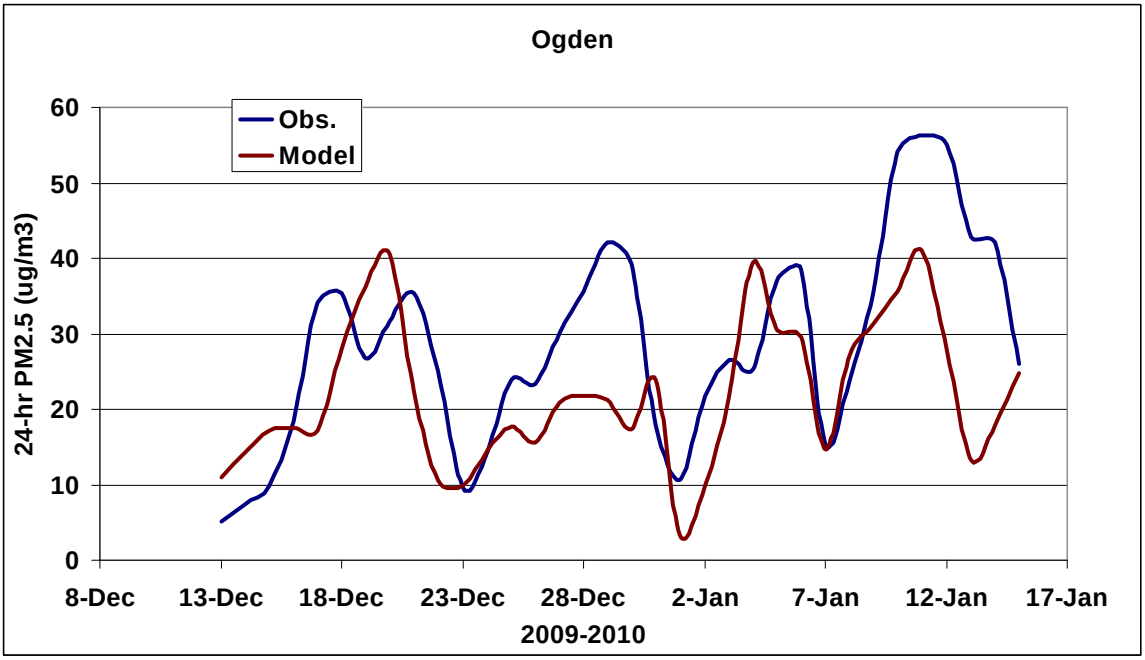


Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). 24-hr PM2.5 time series. Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

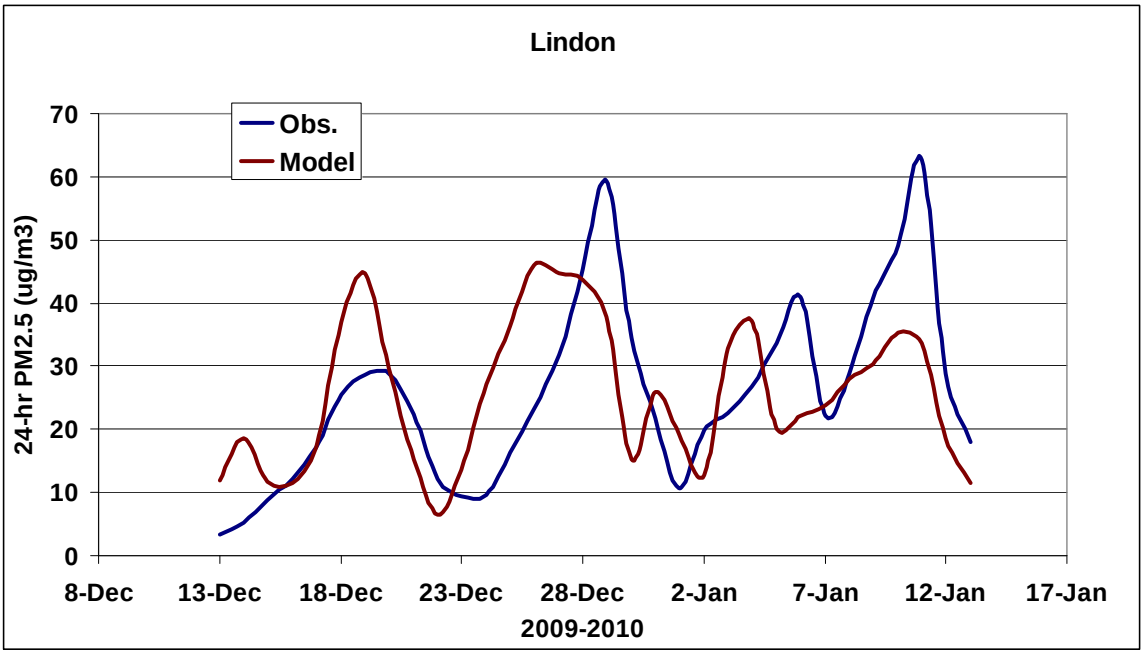


Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). 24-hr PM2.5 time series. Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

Figure 5.10: 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 5.11 – 5.13. The observed speciation is constructed using days in which the STN filter 24-hr $PM_{2.5}$ concentration was > 25 µg/m^3. For the 2009-2010 modeling period, the observed speciation pie charts were created using 10 filter days at Hawthorne, 9 days at Lindon, and 8 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 > 25 µg/m^3. Using this criterion, the simulated speciation pie chart is created from 18 modeling days for Hawthorne, 16 days at Lindon, and 16 days at Bountiful. At all 3 STN sites, the percentage of simulated nitrate is over-predicted by 5 to 7%. The simulated ammonium percentage is nearly identical to the observed STN speciation. At the Hawthorne site, organic carbon looks to be under-predicted by CMAQ with a percentage of $PM_{2.5}$ at 12% and an observed organic carbon at 21%. This discrepancy in organic carbon is not apparent at the Bountiful and Lindon site.

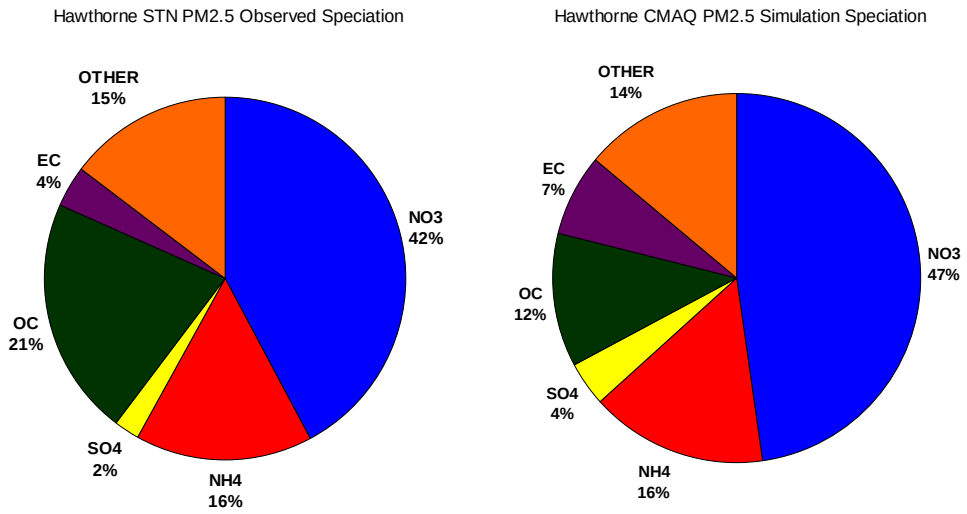


Figure 5.11: The composition of observed and model simulated average 24-hr $PM_{2.5}$ concentrations averaged over days when an observed and modeled day had 24-hr concentrations > 25 µg/m^3 at the Hawthorne STN site.

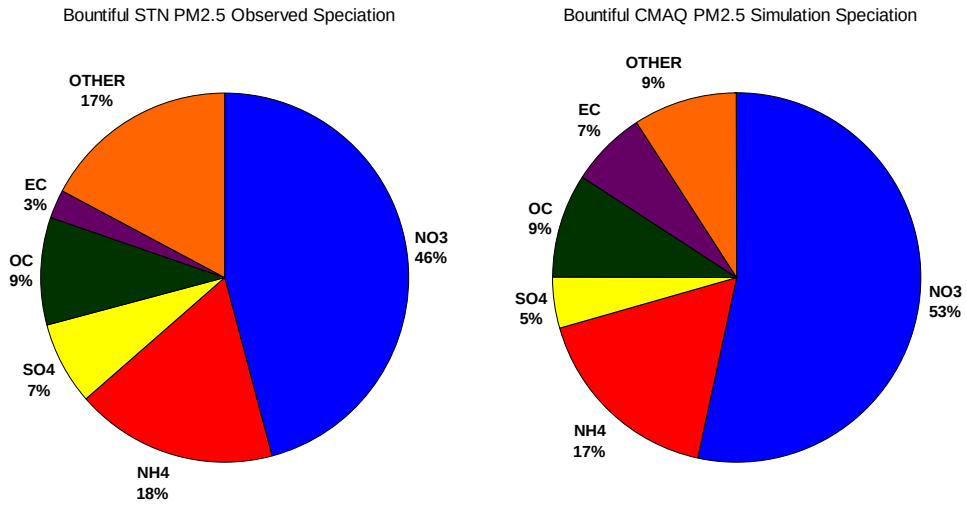


Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ concentrations averaged over days when an observed and modeled day had 24-hr concentrations > 25 µg/m^3 at the Bountiful STN site.

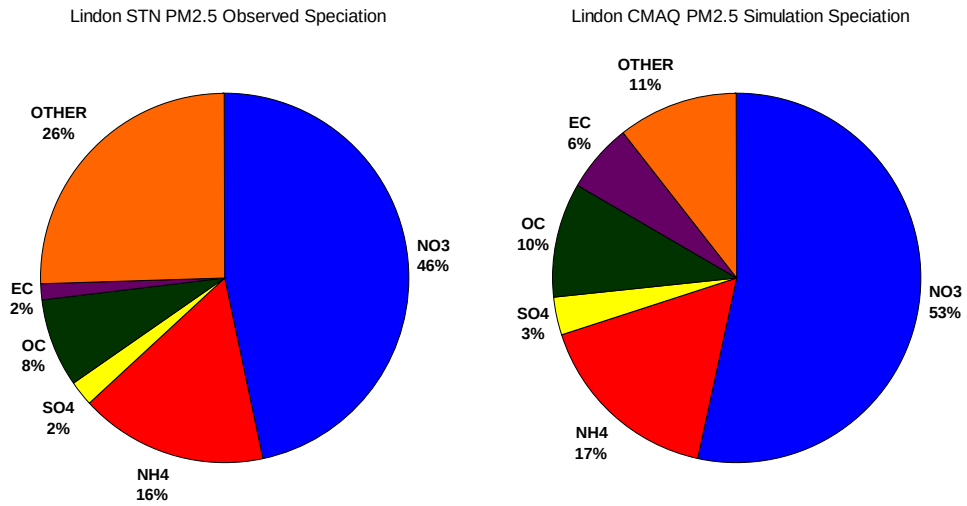


Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ concentrations averaged over days when an observed and modeled day had 24-hr concentrations > 25 µg/m^3 at the Lindon STN site.

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 1.11).
- 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 $PM_{2.5}$. Organic carbon is underestimated at the Hawthorne location, but is reasonably estimated at the other locations (Bountiful, Lindon).

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 will use 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 2014, 2017, and 2019 (the attainment year). For comparison purposes, the monitored design value is also presented for the base year, 2010.

~~*[Editorial Note: Future year design values which assume no SIP control are not yet included in either this figure (5.16) or in Table 5.3 that follows. As of this writing, the model is still being run to determine these values, and they will be inserted when they become available.]*~~

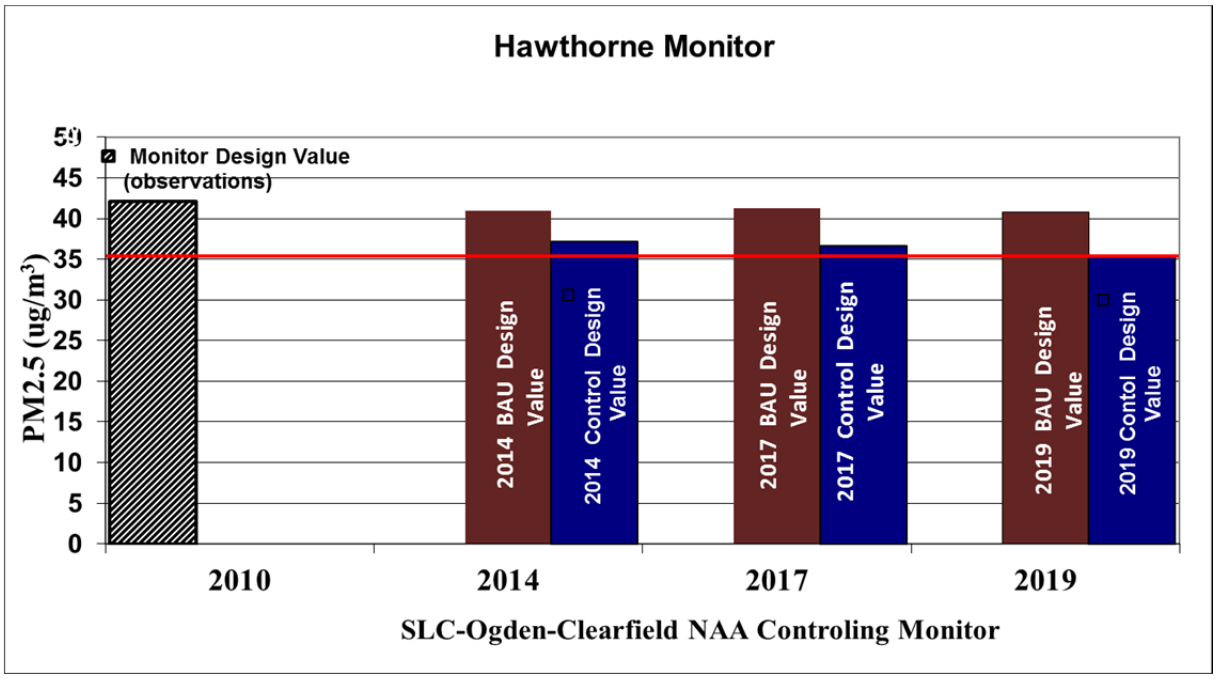


Figure 5.16, Model Results for the Salt Lake City, UT Nonattainment Area

Table 5.3 presents the same information in tabular form, and also includes any additional monitoring locations in the nonattainment area.

	2010	2014		2017		2019	
	Observed	Business-As-Usual	Control Basket	Business-As-Usual	Control Basket	Business-As-Usual	Control Basket
Bountiful	*37*	*34*	*32*	*34*	*32*	*34*	*31*
Brigham City	*40*	*35*	*31*	*35*	*31*	*34*	*30*
Harrisville	*35*	*33*	*30*	*33*	*30*	*33*	*29*
Hawthorne	*42*	*41*	*37*	*41*	*37*	*41*	*35*
Magna	*32*	*31*	*28*	*31*	*27*	*31*	*27*
Ogden 2	*38*	*36*	*34*	*36*	*33*	*36*	*32*
Rose Park	*39*	*39*	*34*	*39*	*34*	*39*	*33*
Tooele	*25*	*23*	*20*	*23*	*19*	*23*	*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 Attainment Date

As shown in the modeled attainment test, the emissions reductions achievable in 2014 do not allow for a demonstration that the Salt Lake City, UT nonattainment area can attain the 24-hour $PM_{2.5}$ NAAQS. Rather, additional reductions will be necessary in the time period between 2014 and 2019 in order to attain. Therefore, this plan identifies an attainment date of December 14, 2019, and requests that the Administrator extend the attainment date the full 5 years permissible under Section 172(a)(2) of the Act.

Chapter 6 – CONTROL MEASURES

6.1 Introduction

Attaining the 24-hour NAAQS for $PM_{2.5}$ will require emission controls from directly emitted $PM_{2.5}$ as well as $PM_{2.5}$ plan 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 $PM_{2.5}$.

6.4 Existing Control Measures

The idea of controlling emissions to the airshed is not a new one. Since about 1970 there have been regulations at both the state and federal level 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. Other controls that are anticipated but not yet in place do not factor into the attainment demonstration underlying this Plan.

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

<u>Stationary Point Sources:</u>

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

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

SIPs for ozone and SO_2 in 1981 affected all of the 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 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.

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 year 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 this SIP from 2014 through 2019 (and beyond) 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 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 22.3 tons per day of combined $PM_{2.5}$, SO_2, NO_x and VOC in 2014, 43.1 tons per day in 2017, and 64.5 tons per day in 2019.

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."

EPA has interpreted these requirements in the April 25, 2007 Clean Air Fine Particulate Implementation Rule, at 72 FR 20586-20667, and supplemental guidance issued March 2, 2012 (memorandum from Stephen D. Page to Regional Air Directors).

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 any pollutant identified in the plan as a significant contributor to $PM_{2.5}$ formation. For 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 identify the attainment date that is as expeditious as practicable, and 3) selection of RACT and RACM.

EPA's final rule requires States to conduct an analysis to identify RACT for all affected stationary sources. States can thereafter determine that RACT does not include controls that would not otherwise be necessary to meet Reasonable Further Progress (RFP) requirements or to attain the NAAQS as expeditiously as practicable. Any measures that, collectively, would not advance attainment by at least one year are not required for $PM_{2.5}$ RACT/RACM, even if those measures are individually reasonable. RACT may vary in different nonattainment areas based on the reductions needed for attainment as expeditiously as practicable.

Implementation of RACT measures should be as expeditiously as practicable, but in no case should it start later than the beginning of the year before the nominal attainment date. Furthermore, if the attainment date has been extended, it will be necessary to demonstrate RFP. This means that RACT measures need to be phased in to meet certain milestone goals and cannot all be delayed until the final deadline.

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

Stationary Point sources:

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 $PM_{2.5}$.

With respect to prior technology determinations other than RACT, the rule provides that prior BACT and LAER determinations, in many cases but not all, would assure at least RACT level controls. Where a State has determined VOC to be a significant contributor to $PM_{2.5}$, compliance with MACT standards may be considered in VOC RACT determinations. EPA anticipates it will be unlikely that States can do much better than what the MACT controls currently require.

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 attainment plan precursor. Emissions from these sources, for the 2010 baseline as well as the projection years 2014, 2017 and 2019 are shown below in Table 6.3. 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.

Typical Winter Incversion Weekday Emissions (tons/day)											
		2010 Baseline (R2)					2014 (R43)				
NA Area	Site Name	PM2_5	NOX	VOC	NH3	SO2	PM2_5	NOX	VOC	NH3	SO2
Salt Lake City - UT Nonattainment Area	ATK Thiokol Promontory	0.13	0.36	0.14	0.00	0.04	0.14	0.39	0.15	0.00	0.04
	Big West Refinery	0.17	0.70	1.28	0.31	1.07	0.17	0.69	1.28	0.31	1.05
	Bountiful City Power	0.00	0.00	0.00		0.00	0.08	0.21	0.05		0.00
	Central Valley Water	0.00	0.03	0.14	0.00	0.00	0.00	0.04	0.03	0.00	0.00
	CER Generation II LLC - WVC	0.02	0.04	0.00		0.00	0.02	0.04	0.00		0.00
	Chemical Lime Company	0.04	0.04	0.00	0.00	0.03	0.05	0.05	0.00	0.00	0.04
	Chevron Refinery	0.50	2.99	0.66	0.03	1.77	0.10	0.95	1.23	0.02	0.07
	Geneva Rock Point of Mountain	0.07	0.27	0.05		0.04	0.08	0.32	0.06		0.04
	Great Salt Lake Minerals - Production Plant	0.13	0.25	0.02	0.00	0.02	0.12	0.37	0.06	0.00	0.02
	Hexcel Corporation Salt Lake Operations	0.05	0.22	0.18	0.08	0.02	0.16	0.32	0.39	0.07	0.09
	Hill Air Force Base Main	0.04	0.52	0.83	0.01	0.01	0.04	0.57	0.83	0.01	0.01
	Holly Refining Marketing	0.15	0.85	0.66	0.06	1.32	0.22	1.09	0.67	0.30	0.31
	Interstate Brick Brick	0.18	0.11	0.01		0.04					
	Kennecott Mine Concentrator	0.65	8.49	0.50	0.00	0.01	0.85	12.13	0.65	0.00	0.01
	Kennecott NC-UPP-Lab-Tailings	0.01	0.02	0.01	0.00	0.00	0.12	0.02	0.01	0.00	0.00
	Kennecott Smelter & Refinery	0.61	0.47	0.03	0.02	3.02	0.80	0.73	0.06	0.02	3.69
	Murray City Power	0.00	0.00	0.00		0.00					
	Nucor Steel	0.16	0.50	0.20	0.01	0.12	0.35	0.93	0.35	0.00	0.81
	Olympia Sales Co.	0.01	0.00	0.07	0.00	0.00	0.00	0.00	0.09	0.00	0.00
	Pacificorp Gadsby	0.07	0.44	0.03	0.07	0.01	0.07	0.44	0.03	0.07	0.01
	Pacificorp Little Mountain	0.02	1.01	0.01		0.01					
	Proctor & Gamble Paper Products Co.	0.10	0.04	0.07		0.00	0.56	0.64	0.63		0.01
	Silver Eagle Refining	0.01	0.25	0.36	0.01	0.00					
	Tesoro Refinery	0.71	1.16	0.81	0.01	2.81	0.28	1.17	1.08	0.01	2.24
	University of Utah	0.02	0.31	0.02	0.01	0.00	0.03	0.25	0.02	0.01	0.00
	Utility Trailer	0.00	0.12	0.22		0.00					
	Vulcraft	0.02	0.02	0.15	0.00	0.00	0.04	0.03	0.20	0.00	0.00
	Wasatch Integrated IE	0.02	0.90	0.03	0.04	0.29	0.02	1.12	0.04	0.05	0.36
	Salt Lake City NA Total	**3.89**	**20.14**	**6.48**	**0.64**	**10.64**	**4.31**	**22.52**	**7.93**	**0.87**	**8.83**

Typical Winter Incversion Weekday Emissions (tons/day)											
		2017 (R2)					2019 (R49)				
NA Area	Site Name	PM2_5	NOX	VOC	NH3	SO2	PM2_5	NOX	VOC	NH3	SO2
Salt Lake City - UT	ATK Thiokol Promontory	0.15	0.36	0.15	0.00	0.05	0.15	0.37	0.16	0.003	0.05
	Big West Refinery	0.17	0.69	1.28	0.31	1.05	0.09	0.62	1.26	0.31	0.39
	Bountiful City Power	0.08	0.21	0.05		0.00	0.08	0.21	0.05		0.00
	Central Valley Water	0.00	0.04	0.03	0.00	0.00	0.00	0.04	0.03	0.0001	0.00
	CER Generation II LLC - WVC	0.02	0.04	0.00		0.00	0.02	0.04	0.00		0.00
	Chemical Lime Company	0.05	0.06	0.00	0.00	0.05	0.05	0.05	0.00	0.0004	0.05
	Chevron Refinery	0.10	0.95	1.23	0.02	0.07	0.10	2.27	1.23	0.02	1.09
	Geneva Rock Point of Mountain	0.08	0.34	0.06		0.05	0.08	0.34	0.06		0.05
	Great Salt Lake Minerals - Production Plant	0.13	0.33	0.06	0.00	0.03	0.14	0.35	0.07	0.00	0.03
	Hexcel Corporation Salt Lake Operations	0.16	0.48	0.42	0.08	0.16	0.16	0.58	0.44	0.10	0.22
	Hill Air Force Base Main	0.04	0.61	0.88	0.01	0.01	0.04	0.63	0.92	0.01	0.01
	Holly Refining Marketing	0.22	1.09	0.67	0.30	0.31	0.22	1.07	0.66	0.30	0.24
	Interstate Brick Brick										
	Kennecott Mine Concentrator	0.85	12.13	0.65	0.00	0.01	0.85	12.13	0.65	0.004	0.01
	Kennecott NC-UPP-Lab-Tailings	0.30	0.20	0.07	0.00	0.03	0.30	0.20	0.07	0.001	0.03
	Kennecott Smelter & Refinery	0.89	0.82	0.07	0.03	4.09	0.96	0.88	0.08	0.03	4.47
	Murray City Power										
	Nucor Steel	0.37	1.01	0.37	0.00	0.87	0.40	1.08	0.40	0.005	0.94
	Olympia Sales Co.	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.11	0.00001	0.00
	Pacificorp Gadsby	0.07	0.40	0.03	0.07	0.01	0.07	0.40	0.03	0.07	0.01
	Pacificorp Little Mountain										
	Proctor & Gamble Paper Products Co.	0.61	0.71	0.69		0.01	0.66	0.76	0.75		0.01
	Silver Eagle Refining										
	Tesoro Refinery	0.28	1.17	1.08	0.01	2.24	0.27	0.82	1.01	0.01	0.82
	University of Utah	0.03	0.21	0.02	0.01	0.00	0.03	0.17	0.02	0.01	0.00
	Utility Trailer										
	Vulcraft	0.05	0.03	0.25	0.00	0.00	0.05	0.04	0.27	0.00004	0.00
	Wasatch Integrated IE	0.03	1.23	0.05	0.05	0.40	0.03	0.96	0.05	0.06	0.43
	Salt Lake City NA Total	**4.68**	**23.12**	**8.22**	**0.90**	**9.45**	**4.76**	**24.02**	**8.32**	**0.92**	**8.85**

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

Area sources:

As part of the RACT analysis for area sources, consideration was given to a broad list of source categories. Table 6.4 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 as well as control strategies from other states. DAQ evaluated each strategy for technical feasibility as part of the RACT analysis. The screening column in table 6.4 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 PM2.5 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 – screened, regulated under Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Architectural – initially screened, further research indicated that adopting the Ozone Transport Commission model rule is feasible. Marine – screened, only 1.2 tpy Sheet, strip & coil – retained Traffic markings - screened, regulated under FIFRA Plastic parts - retained
3. Agricultural practices using Natural Resources Conservation Service (NRSC) practice standards	VOC, $PM_{2.5}$, ammonia	Screened	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. Chain-driven charbroiler restaurant emission control	VOC, $PM_{2.5}$	Retained	
13. Appliance pilot light phase out	VOC, $PM_{2.5}$, NO_x, SO_x, ammonia	Retained	

Strategy	Constituent(s)	SCREENING STATUS	REMARKS
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	$PM_{2.5}$	Screened	Sizeable feed lots are not located in nonattainment areas
16. Low NO_x burners in commercial, industrial, and institutional boilers	VOC, NO_x	Retained	
17. Chemical additives to manure	VOC, ammonia	Screened	Costly with limited control efficiency. Excess ammonia in inventory that would not be sufficient to be effective
18. 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 reprogrammed
19. Prohibit use of cutback asphalt	VOC	Screened	Cities and highway administration personnel need stockpile for winter time road repair. Very small inventory.
20. Control limits on aggregate processing operations and asphalt manufacturing	$PM_{2.5,}$ NO_x, SO_x	Retained	
21. R307-307 Road Salt and Sanding	PM	Retained	Expand current rule to nonattainment areas

EPA has developed control measure guidance documents called, control techniques guidelines (CTGs) for volatile organic compounds (VOCs). CTGs are used as presumptive RACT for VOCs and are guidance in SIP rulemaking. DAQ has evaluated all VOC CTGs for area sources as part of the SIP process.

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 assembled draft rules, based on these CTGs, for reducing emissions from these categories. These rules will 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. Most of these rules become effective by January 1, 2014.

Salt Lake City - UT Nonattainment Area												
	2014 lb/day				2017 lb/day				2019 lb/day			
	NOX	PM2_5	SO2	VOC	NOX	PM2_5	SO2	VOC	NOX	PM2_5	SO2	VOC
Area Source Rules												
R307-302, Solid fuel burning	1,633.5	13,188.8	273.1	16,501.5	2,041.8	16,485.9	341.3	20,627.1	3,480.8	28,162.2	581.3	35,234.9
R307-303, Commercial cooking		380.1		98.1		370.4		95.6		407.0		105.0
R307-309, Fugitive dust		196.0				191.8				255.0		
R307-312, Aggregate processing operations		5.0				4.7				5.0		
R307-335, Degreasing				4,079.0				986.7				4,325.0
R307-342, Adhesives & sealants				2,227.0				2,169.6				2,387.0
R307-343, Wood manufacturing				1,206.0				1,175.9				1,276.0
R307-344, Paper, film & foil coating				1,315.0				1,279.2				1,328.0
R307-345, Fabric & vinyl coating				37.0				1,462.4				1,871.0
R307-346, Metal furniture coating				100.0				97.6				100.0
R307-347, Large appliance coating				3.0				3.4				3.0
R307-348, Magnet wire coating				9.0				9.3				9.0
R307-349, Flat wood panel coating				77.0				74.9				116.0
R307-350 Miscellaneous metal parts coating				2,653.0				2,587.7				2,681.0
machinery				151.0				147.0				159.0
other transportation				234.0				229.3				242.0
Special				4.0				4.1				5.0
R307-351, Graphic arts				1,917.0				1,917.2				2,215.0
R307-352, Metal containers				185.0				182.4				185.0
R307-353, Plastic coating				412.0				304.7				390.0
R307-354, Auto body refinishing				2,618.0				2,553.1				2,766.0
R307-355, Aerospace coatings				463.0				454.4				480.0
R307-356, Appliance pilot light	663.8	3.0	4.2	38.8	3,002.5	13.7	19.2	175.7	2,918.5	13.4	18.6	170.8
R307-357, Consumer products				3,840.0				3,735.6				4,116.0
R307-361, Architectural coatings				8,473.0				18,244.0				9,082.0
TOTAL	**2,297.3**	**13,773.0**	**277.3**	**46,641.5**	**5,044.3**	**17,066.6**	**360.5**	**58,516.9**	**6,399.3**	**28,842.5**	**600.0**	**69,246.6**

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). The CAA regulates air pollutant emissions from mobile sources by establishing motor vehicle emissions budgets in the 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. 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 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)

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 responsible transportation planning organization for the Utah Salt Lake City nonattainment area is covered the Wasatch Front Regional Council (WFRC).

The motor vehicle emissions budget serves as a regulatory limit for on-road mobile source emissions. Motor vehicle emissions limits 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." As a condition to receive federal transportation funding, 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 conformity test consists of either an interim emissions test or a motor vehicle emissions budgets test. 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 $PM_{2.5}$ SIP.

7.4 Interim $PM_{2.5}$ Conformity Test

The EPA interim conformity test for $PM_{2.5}$ emissions requires that future nitrogen oxides (NO_x) and directly emitted $PM_{2.5}$ emissions from RTPs, TIPs, and projects funded or approved by the FHWA or the FTA not exceed 2008 levels. NO_x emissions are a gaseous $PM_{2.5}$ precursor emissions emitted from vehicle exhaust related emissions. Primary particulate emissions consist of particles emitted from vehicle exhaust (elemental carbon, organic carbon, and SO_4) and brake and tire wear. The interim conformity test requirements apply until EPA has declared the motor vehicle emissions budgets adequate for transportation conformity purposes or until it approves the $PM_{2.5}$ SIP.

7.5 Transportation $PM_{2.5}$ Budget Test Requirements

The WFRC collaborated with the ICT workgroup on interim conformity and SIP related issues prior to receiving the official EPA designation status of nonattainment for $PM_{2.5}$. During the SIP development process the WFRC coordinated with the ICT workgroup and developed $PM_{2.5}$ SIP motor vehicle emissions budgets using the latest planning assumptions and tools for traffic analysis and the EPA approved Motor Vehicle Emission Simulator (MOVES) emissions model. Local MOVES modeling data inputs were cooperatively developed by WFRC and the ICT workgroup using EPA recommended methods where applicable.

7.6 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 directly emitted $PM_{2.5}$; motor vehicle emissions from tailpipe, 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 need a VOC motor vehicle emissions budget for transportation conformity purposes. 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 Salt Lake City, Utah $PM_{2.5}$ nonattainment area and meet the criteria of 40 CFR 93.102(b)(3). EPA Region 8 reviewed the study and concurred with the UDAQ's findings. A similar analysis was undertaken to address direct $PM_{2.5}$ emissions, but in this

case the conclusion was otherwise. Therefore, a motor vehicle emissions budget for direct $PM_{2.5}$ is established in this SIP.

7.7 Transportation Conformity $PM_{2.5}$ Budgets

This plan includes reasonable further progress demonstrations for 2014 and 2017 and attainment of the $PM_{2.5}$ standard is projected by 2019.

In this SIP, the state is establishing transportation conformity motor vehicle emission budgets (MVEB) for NO_x, VOC , and direct $PM_{2.5}$ (elemental carbon, organic carbon, SO_4, brake and tire wear) for 2014, 2017, and 2019. 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).

WFRC Transportation Conformity Budgets
(tons per average winter week day)

	Direct $PM_{2.5}$	NO_x	VOC
2014	5.01	80.00	47.50
2017	4.55	66.98	40.11
2019	3.71	51.68	30.55

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.

Table 7.2 shows subtotals for VOC refueling and fugitive dust emissions. These emissions are not included in the transportation conformity MVEBs for the Salt Lake Non-attainment Area. Emissions from Table 7.1 and 7.2 can be summed to equal total VOC and $PM_{2.5}$ emissions that were modeled and reported in Table 4.2.

VOC Refueling and Fugitive Dust Emissions for the Salt Lake City – UT Non-attainment Area
(tons per average winter week day)

	VOC Refueling	Fugitive Dust
2014	2.12	3.50
2017	1.69	3.67
2019	1.31	3.54

Table 7.2. VOC Refueling and Fugitive Dust Emissions for the Salt Lake City - UT Non-attainment Area.

Per section 93.124 of the conformity regulations, for transportation conformity analyses using these budgets in analysis years beyond 2019, 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:$PM_{2.5}$ ratio of 11.44:1 and/or future decreases in VOC emissions from on-road mobile sources at a VOC:$PM_{2.5}$ ratio of 4.72:1. This trading mechanism will only be used if needed for conformity analyses for years after 2019. 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 2019 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 2019 VOC budget has been met. Clear documentation of the calculations used in the trading should be included in the conformity analysis.

~~***[Editorial Note: As of this writing, the model is still being run to determine these ratios, and they will be inserted when they become available.]***~~

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)." 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 until the end, one year prior to the attainment date identified in the SIP.

For areas with an attainment date of 2014 or earlier the attainment demonstration would also be considered to demonstrate that the area is achieving RFP, and there would be no requirement to submit a separate reasonable further progress plan.

For areas with an attainment date beyond 2014, a State is required to submit an RFP plan along with its attainment demonstration and SIP. These plans must demonstrate that generally linear reductions in emissions will occur by 2014, i.e. that emissions in 2014 will be reduced to the extent represented by a generally linear progression from base year emissions (2010) to attainment-level emissions. For any area that needs an extension of the attainment deadline to 2018 or 2019, the State's RFP plan would also need to demonstrate that generally linear reductions will be achieved in the 2017 emissions year as well. The pollutants to be addressed in the RFP plan are those pollutants that are identified as significant for purposes of control measures in the attainment plan.

8.2 RFP for the Salt Lake City, UT Nonattainment Area

The attainment demonstration for the Salt Lake City, UT $PM_{2.5}$ nonattainment area shows that the 24-hr NAAQS will be achieved, but not until 2019. Therefore, this SIP identifies and proposes an attainment date of December 14, 2019.

As stated above, a State is required to submit an RFP plan along with its attainment demonstration and SIP for areas with an attainment date beyond 2014. Furthermore, the State's RFP plan would also need to include a demonstration for the 2017 emissions year.

The representation of generally linear progress is based on the notion that reductions in emissions will result in commensurate reductions in $PM_{2.5}$ concentrations. Hence, as described in the regulations, the RFP showing is based on emissions. Nevertheless, EPA acknowledges that $PM_{2.5}$ mitigation also involves a number of attainment plan precursors and that the associated chemistry is non-linear. Thus, States are given some flexibility to adopt any combination of controls involving the various pollutants that can be shown to provide equivalent benefits using procedures that EPA is recommending (or, at the State's option, air quality modeling).

The RFP plan must demonstrate that in each applicable milestone year, emissions will be at a level consistent with generally linear progress in reducing emissions between the base year and the attainment year.

The base year for the attainment demonstration underlying this plan is 2010. Therefore, the baseline year inventory for the RFP plan will also be 2010.

In keeping with the notion of linear progress, Subpart Z of 40 CFR 51 (at 51.1009) specifies four quantities to be calculated in the RFP plan. These quantities are:

- Full Implementation Reduction, equals: (baseline inventory) – (attainment inventory)
- Milestone Date Fraction, equals: (milestone year – 2010) / (2019 – 2010)
- Benchmark Emission Reduction, and equals: (Full Imp. Reduction) * (Milestone Date Fraction)
- Benchmark Emission Level equals: (baseline inv.) – (Benchmark Reduction)

Together, these four quantities result in the familiar mathematical equation for a straight line: y = mx + b. Without reporting the intermediate results of each of these quantities, Table 8.1 presents this information for emission levels of $PM_{2.5}$ and each of the attainment plan precursors: NO_x, SO_2, and VOC. For milestone years 2014 and 2017, the values representing straight linear progress are reported under the column heading "rfp". The other column for that year represents the projected emissions modeled in the attainment demonstration (labeled "projected").

For the attainment year 2019, the end point to the straight line, there is only one column.

The RFP plan must describe the control measures that provide for meeting the reasonable further progress milestones for the area, the timing of implementation of those measures, and the expected reductions in emissions of direct $PM_{2.5}$ and $PM_{2.5}$ attainment plan precursors. For a discussion of the control measures factored into the attainment demonstration, and hence reflected in the modeled emissions totals (in the "projected" column), see Chapter 6 of the Plan.

Reasonable Further Progress Salt Lake City, UT PM2.5 Nonattainment Area						
***Emissions / Year**	**2010**	**2014**		**2017**		**2019**
		projected	rfp	projected	rfp	
PM2.5	19.6	18.6	18.6	18.4	17.8	17.3
NOx	160.5	140.4	138.4	124.2	121.8	110.7
SO2	12.8	10.9	12.0	11.2	11.3	10.9
VOC	130.0	104.9	109.7	93.6	94.5	84.4
Plan precursors	303.3	256.2	260.1	229.0	227.6	206.0
Total	323.0	274.8	278.7	247.3	245.5	223.3
****Concentration**	42	37	39	37	37	35
* 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 Benchmarks for the Salt Lake City, UT Nonattainment Area

The RFP plan must demonstrate that emissions for the milestone year are at levels roughly equivalent to the benchmark emission levels for direct $PM_{2.5}$ emissions and each $PM_{2.5}$ attainment plan precursor to be addressed in the plan. Table 8.1 shows this to be the case for $PM_{2.5}$, each of the plan precursors, all of the plan precursors, and the total for all of the pollutants.

In addition to the emissions totals, the table also includes the 2010 baseline design value for the controlling monitor (Hawthorne) in the nonattainment area and the predicted $PM_{2.5}$ concentrations for each of the milestones. These concentrations are presented as another metric to establish how much improvement is necessary to meet the 24-hour standard. The RFP rule allows for a generally equivalent improvement in air quality by the milestone year as would be achieved under the benchmark RFP plan, where "equivalence" would make use of the information developed for the attainment plan to assess the relationship between emissions reductions and predicted reductions in $PM_{2.5}$ concentrations. Table 8.1 also shows the predicted $PM_{2.5}$ concentrations to be at or better than linear progress.

Motor Vehicle Emissions: 40 CFR 51.1009 also requires that State shall include in its RFP submittal an inventory of on-road mobile source emissions in the nonattainment area. This requirement is for the purposes of establishing motor vehicle emissions budgets for transportation conformity purposes (as required in 40 CFR Part 93).

Table 8.2 presents emissions totals for on-road mobile sources. These are the same totals that factor into the overall emissions reported in the preceding RFP table. For a more specific discussion of motor vehicle emissions budgets for transportation conformity purposes, see Chapter 7 of this Plan.

Mobile Source Emissions							
Salt Lake City, UT PM2.5 Nonattainment Area							
***Emissions / Year**	**2010**		**2014**		**2017**		**2019**
****PM2.5**	8.6		8.5		8.2		7.3
NOx	99.6		80.0		67.0		51.7
*****VOC**	62.5		49.6		41.8		31.9
* Emissions are presented in tons per average winter day							
** PM2.5 emissions include: tailpipe PM2.5, SO4, brakewear, tire-wear, and re-entrained road dust							
*** VOC totals include refueling emissions							

Table 8.2, Motor Vehicle Emissions for Purposes of RFP

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:

<u>Woodburning Control</u> – 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 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 attainment plan precursors, will likely result from additional restrictions of VOC in consumer products, and from what will likely result from Tier III of the federal motor vehicle control program.

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 XX 2013

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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

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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.

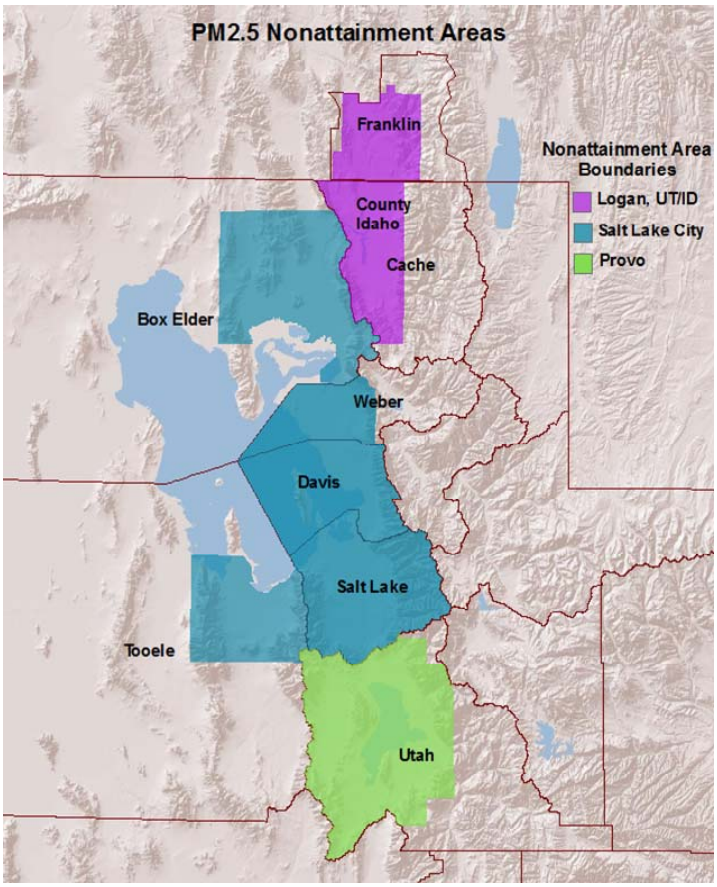


Figure 1.1, Nonattainment Areas for the 2006 $PM_{2.5}$ NAAQS

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 will all be modeled together within the same modeling domain.

1.6 $PM_{2.5}$ Attainment Plan 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 main precursor gasses associated with fine particulate matter are discussed in EPA's Clean Air Particulate Implementation Rule (FR 72, 20586), and there are certain presumptions about each of these concerning how they are to be treated in a given attainment plan. It is important that this plan identify which of these will be evaluated for the purpose of developing control measures.

- Sulfur Dioxide (SO_2) is to be evaluated for control measures in all nonattainment areas. SO_2 is therefore to be considered as a $PM_{2.5}$ attainment plan precursor.

- Oxides of Nitrogen (NO_x) are presumed to be evaluated for control measures in any given nonattainment area, unless it can be demonstrated that it is not a significant contributor to $PM_{2.5}$ concentrations. No such demonstration will be made as part of this plan. Therefore, NO_x will be considered as a $PM_{2.5}$ attainment plan precursor.

- Volatile Organic Compounds (VOC) are presumed not to be evaluated for control measures in any given nonattainment area, unless it can be demonstrated that it is in fact a significant contributor to $PM_{2.5}$ concentrations. The air modeling that underlies this SIP demonstration does in fact indicate that $PM_{2.5}$ concentrations are very sensitive to VOC concentrations. As

such, VOC is to be considered a significant contributor to $PM_{2.5}$ concentrations and will be considered as a $PM_{2.5}$ attainment plan precursor. Additional information concerning a demonstration to this effect is included in the Technical Support Document.

1.7 Other $PM_{2.5}$ Precursors – Ammonia

Ammonia (NH_3) is another precursor gas associated with fine particulate matter. Like VOC, the Clean Air Particulate Implementation Rule presumes that ammonia would not be evaluated for control measures in any given nonattainment area, unless it can be demonstrated that it is in fact a significant contributor to $PM_{2.5}$ concentrations. Most of the secondary particulate matter collected during cold-pool conditions is ammonium nitrate. Still, there is every indication that in each of the airsheds evaluated with the air model there is a large surplus of ammonia relative to what would be required to produce the observed ammonium nitrate. Sensitivity runs with the model indicate that significant reductions in the inventories of ammonia have little to no effect on predicted $PM_{2.5}$ concentrations. Because the modeled cuts in ammonia emissions were well beyond what might be considered as reasonable or even best controls, ammonia will not be identified as a $PM_{2.5}$ attainment plan precursor.

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

More specific requirements for the preparation, adoption, and submittal of implementation plans are specified in 40 CFR Part 51. Subpart Z of Part 51 contains provisions for Implementation of $PM_{2.5}$ National Ambient Air Quality Standards.

2.2 $PM_{2.5}$ Implementation Rule

Beyond what has been codified in Subpart Z of Part 51 concerning the Implementation of the $PM_{2.5}$ NAAQS, EPA provides 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).

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, and contingency measures. Additional information is provided in the technical support document.

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 $\mu g/m^3$. $PM_{2.5}$ 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 $PM_{2.5}$; the 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 meets EPA requirements for monitoring networks.

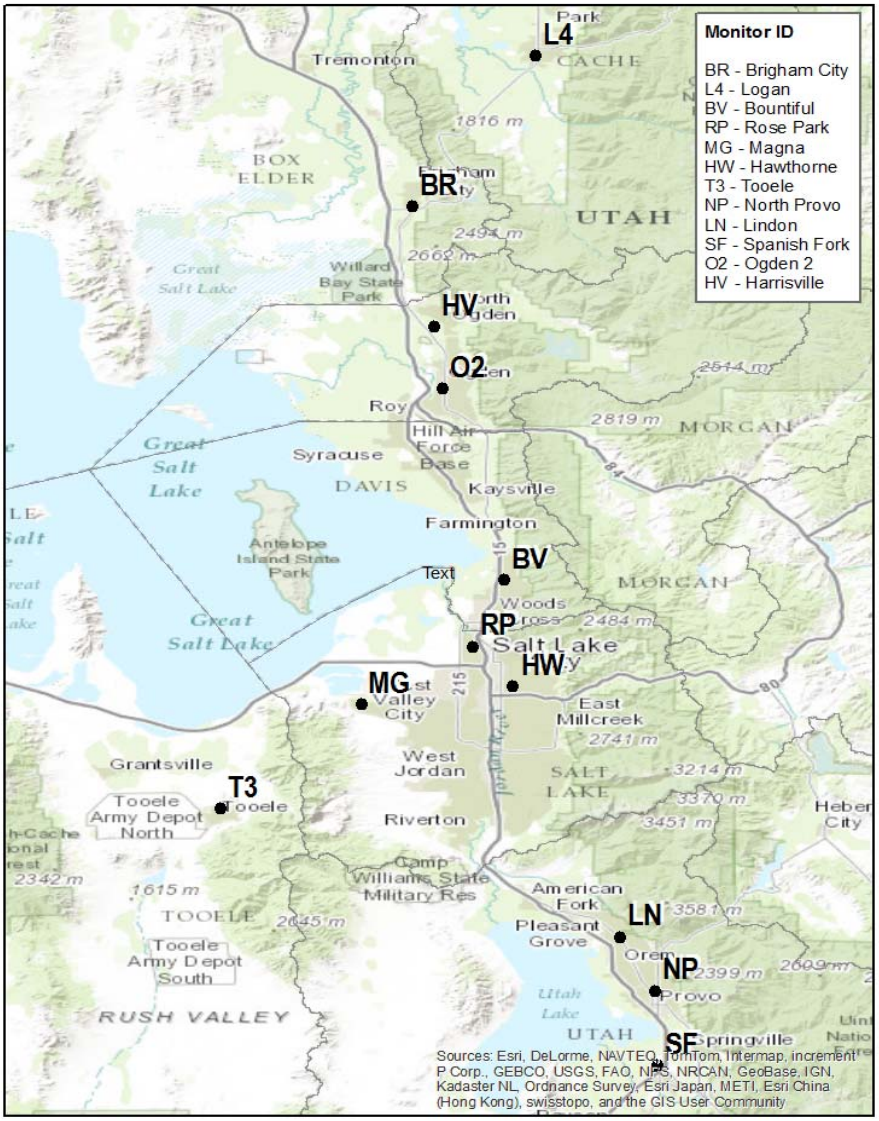


Figure 3.1, Utah's $PM_{2.5}$ Air Monitoring Network

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 the monitoring locations along the Wasatch Front. It can be seen from the data that there are no locations at which the annual NAAQS has been violated.

		3-Year Average of Annual Mean Concentrations		
Location	**County**	**08 - 10**	**09 - 11**	**10 - 12**
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 the monitoring locations along the Wasatch Front. 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**	
Brigham City	Box Elder	42	40	37	**39.9**
Ogden 2 (POC 1)	Weber	37	41	37	**38.5**
Harrisville	Weber	36	37	33	**35.1**
Bountiful	Davis	38	40	34	**37.5**
Rose Park (POC 1)	Salt Lake	41	41	35	**39.0**
Magna	Salt Lake	33	35	30	**32.5**
Hawthorn (POC 1)	Salt Lake	44	45	38	**42.1**
Tooele	Tooele	26	27	24	**25.8**
Lindon (POC 1)	Utah	41	41	32	**37.9**
North Provo	Utah	36	35	29	**33.4**
Spanish Fork	Utah	39	42	35	**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.

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.

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.

[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)

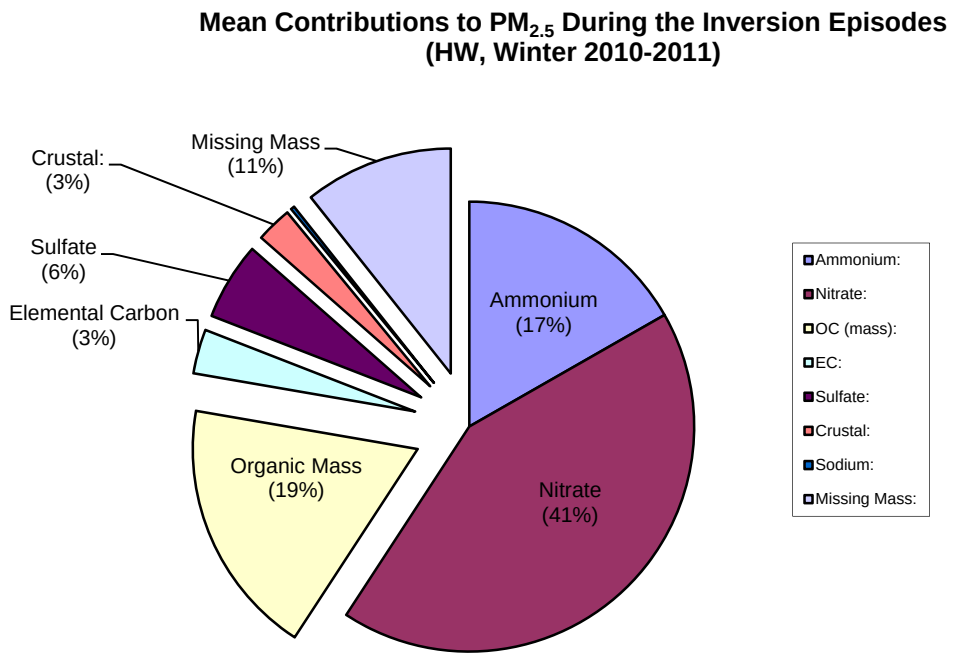
The $PM_{2.5}$ is collected on three types of filters: Teflon, nylon, and quartz. Teflon filters are used to characterize the inorganic contents of $PM_{2.5}$. Nylon filters are used to quantify the amount of ammonium nitrate, and quartz filters are used to quantify the organic and inorganic carbon content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



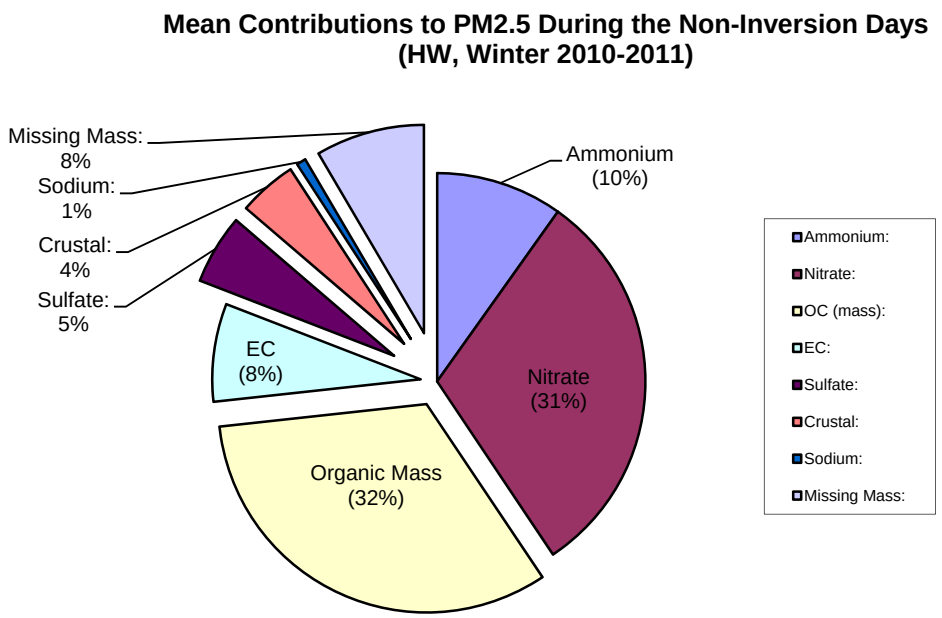


Figure 3.2, Composite Wintertime $PM_{2.5}$ Speciation Profiles

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 MOVES 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 horizons relate to the statutory attainment dates associated with the 2006 $PM_{2.5}$ NAAQS. These dates may range from 2014 to 2019. Such projections are made as comparisons to 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 two distinct airsheds defining the nonattainment areas along the Wasatch Front: 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 areas illustrate many similarities but also a few notable differences. They are both more or less dominated by a combination of on-road mobile and area sources. However, emissions from large point sources are more prominent in the Salt Lake City nonattainment area, where they are clustered in Salt Lake and Davis counties.

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.

2010 Baseline	NA-Area	Source Category	PM2_5	NOX	VOC	NH3	SO2
2010 Baseline Sum of Emissions (tpd)	Provo NA	Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	2.20	25.39	15.63	0.44	0.16
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Source	0.26	0.93	0.67	0.29	0.03
		Provo NA Total	**4.64**	**36.28**	**30.79**	**7.26**	**0.56**
	Salt Lake City NA	Area Sources	5.87	17.71	51.53	17.96	0.88
		Mobile Sources	8.59	99.63	62.51	1.86	0.63
		NonRoad	1.27	23.04	9.50	0.01	0.66
		Point Source	3.89	20.14	6.48	0.64	10.64
		Salt Lake City NA Total	**19.62**	**160.51**	**130.02**	**20.47**	**12.81**
	Surrounding Areas	Area Sources	2.32	4.73	18.75	38.60	1.40
		Mobile Sources	2.98	35.37	16.02	0.45	0.17
		NonRoad	0.70	8.89	12.94	0.00	0.16
		Point Source	3.35	129.31	3.55	0.75	43.40
		Surrounding Areas Total	**9.35**	**178.30**	**51.25**	**39.81**	**45.13**
		2010 Total	**33.60**	**375.09**	**212.06**	**67.54**	**58.49**

Table 4.1, Emissions Summary for 2010 (SMOKE)

Table 4.2 is specific to the Provo, UT nonattainment area, and shows emissions for the attainment year as well as any other significant milestone year. These subsequent 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.

Year	NA-Area	Source Category	PM2_5	NOX	VOC	NH3	SO2
2010	2010 Provo NA	Area Sources	1.86	5.56	12.77	6.53	0.28
		Mobile Sources	2.20	25.39	15.63	0.44	0.16
		NonRoad	0.31	4.40	1.71	0.00	0.09
		Point Source ID	0.26	0.93	0.67	0.29	0.03
		2010 Total	**4.64**	**36.28**	**30.79**	**7.26**	**0.56**
2014	2014 Provo NA	Area Sources	1.75	5.66	10.11	6.42	0.30
		Mobile Sources	2.36	22.07	13.51	0.45	0.15
		NonRoad	0.24	3.55	1.39	0.00	0.03
		Point Source ID	0.57	1.45	1.05	0.53	0.10
		2014 Total	**4.92**	**32.73**	**26.06**	**7.41**	**0.59**
2017	2014 Provo NA	Area Sources	1.78	5.43	10.48	6.38	0.30
		Mobile Sources	2.31	18.17	10.59	0.44	0.16
		NonRoad	0.19	3.13	0.97	0.00	0.03
		Point Source ID	0.58	1.45	1.14	0.53	0.10
		2017 Total	**4.86**	**28.17**	**23.18**	**7.36**	**0.59**
2019	2019 Provo NA	Area Sources	1.81	6.30	10.80	6.30	0.31
		Mobile Sources	2.34	16.61	9.36	0.45	0.17
		NonRoad	0.18	2.85	1.26	0.00	0.04
		Point Source ID	0.59	1.51	0.65	0.54	0.10
		2019 Total	**4.91**	**27.27**	**22.07**	**7.29**	**0.62**

Table 4.2, Emissions Summaries for the Provo, UT Nonattainment Area; Baseline, RFP and Attainment Years (SMOKE)

The 2010 Baseline and projections to 2014, 2017 and 2019 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.

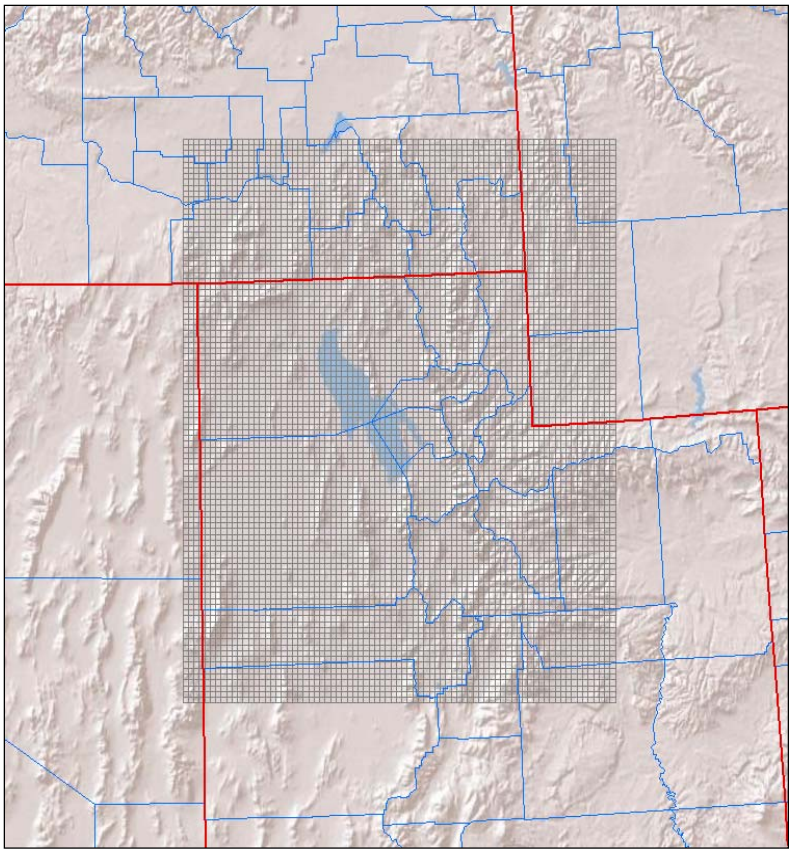


Figure 5.1: Northern Utah photochemical modeling domain.

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.

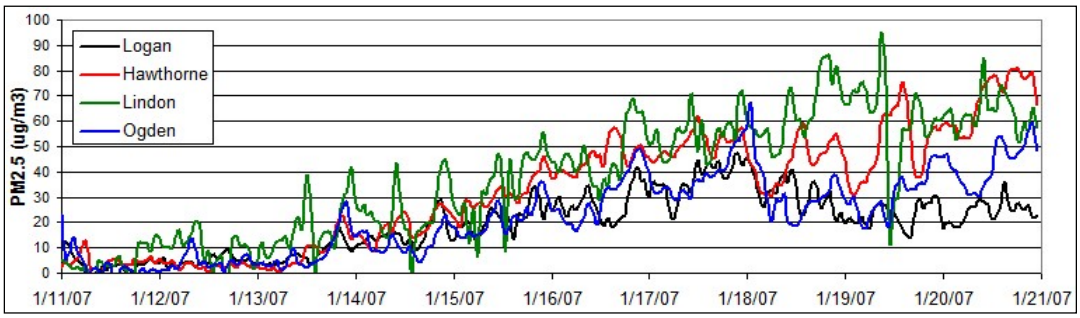


Figure 5.2: Hourly $PM_{2.5}$ concentrations for January 11-20, 2007

- **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.

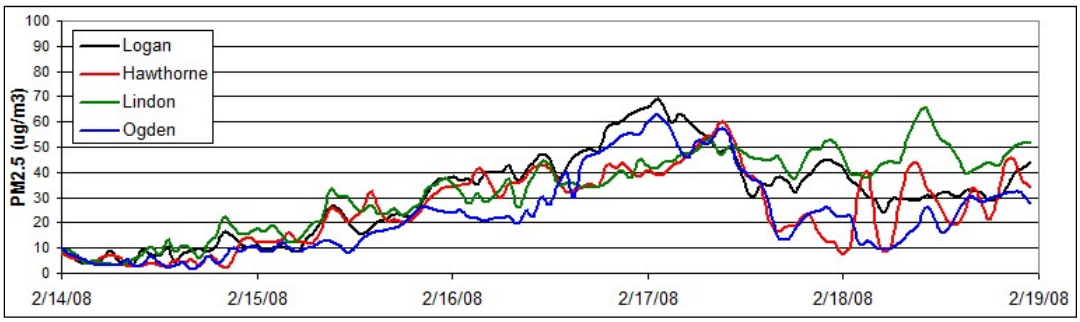


Figure 5.3: Hourly $PM_{2.5}$ concentrations for February 14-19, 2008

- **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.

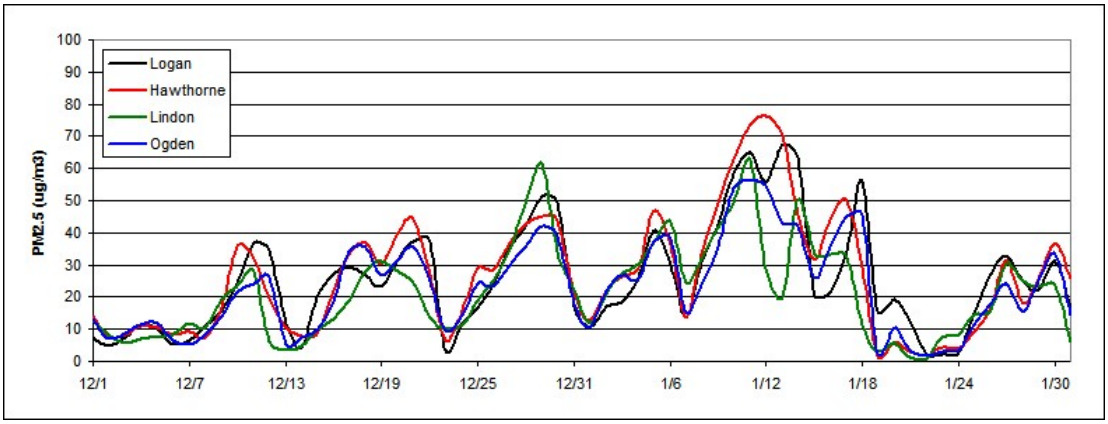


Figure 5.4: 24-hour average $PM_{2.5}$ concentrations for December-January, 2009-10.

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.

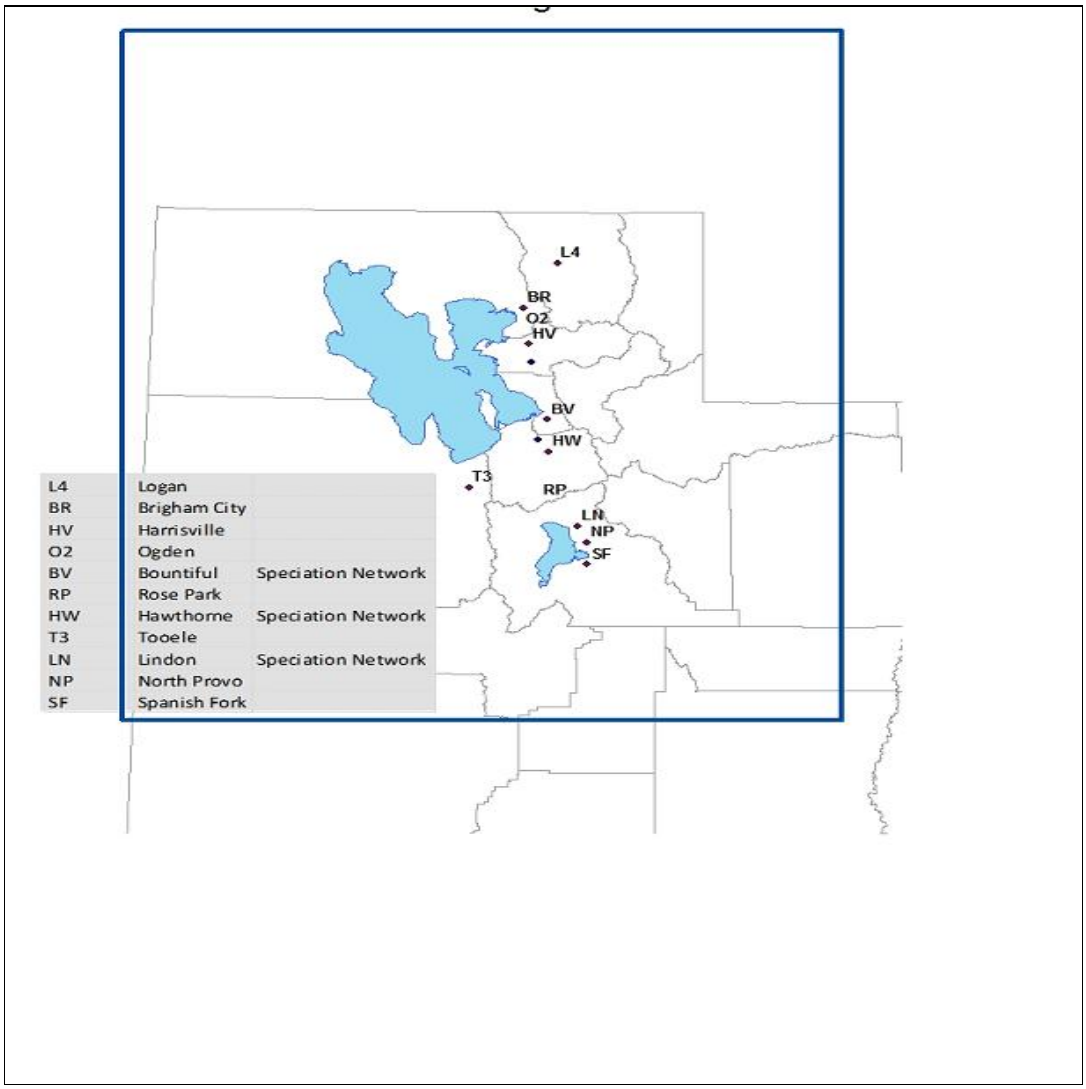


Figure 5.5: UDAQ monitoring network and model domain extent.

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.

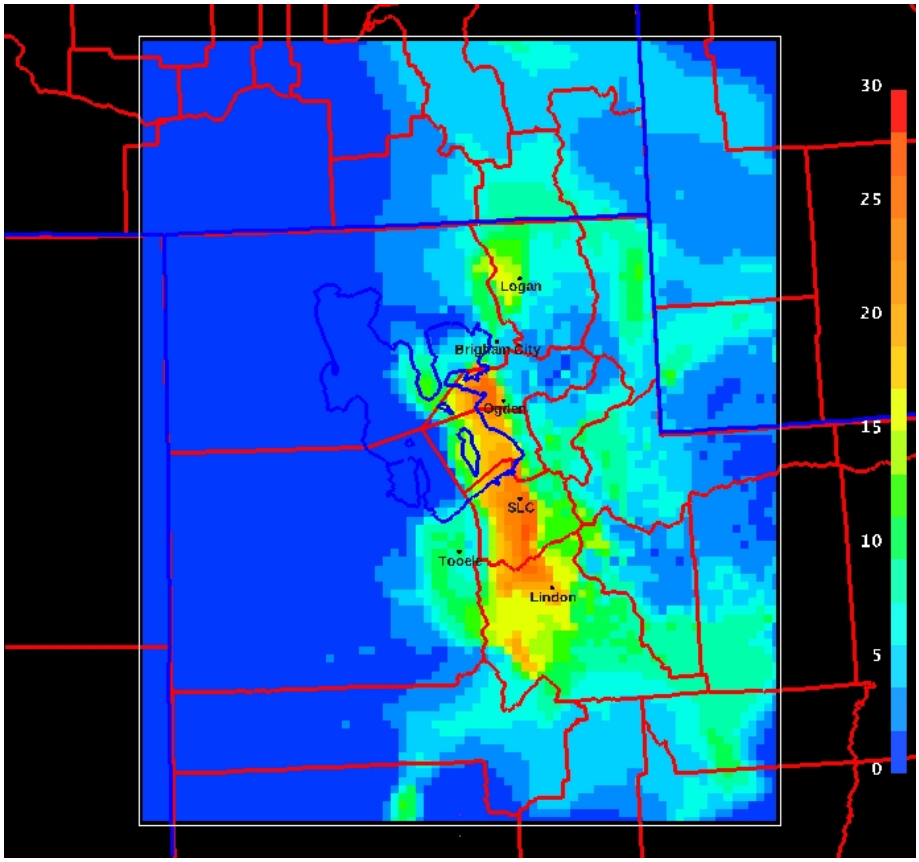


Figure 5.6: Spatial plot of CMAQ modeled 24-hr $PM_{2.5}$ ($\mu g/m^3$) for 2010 Jan. 03.

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 – 5.9 at the Hawthorne site in Salt Lake City (Fig. 5.7), the Ogden site in Weber County (Fig 5.8), and the Lindon site in Utah County (Fig. 5.9). 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. 5.10, 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). 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.

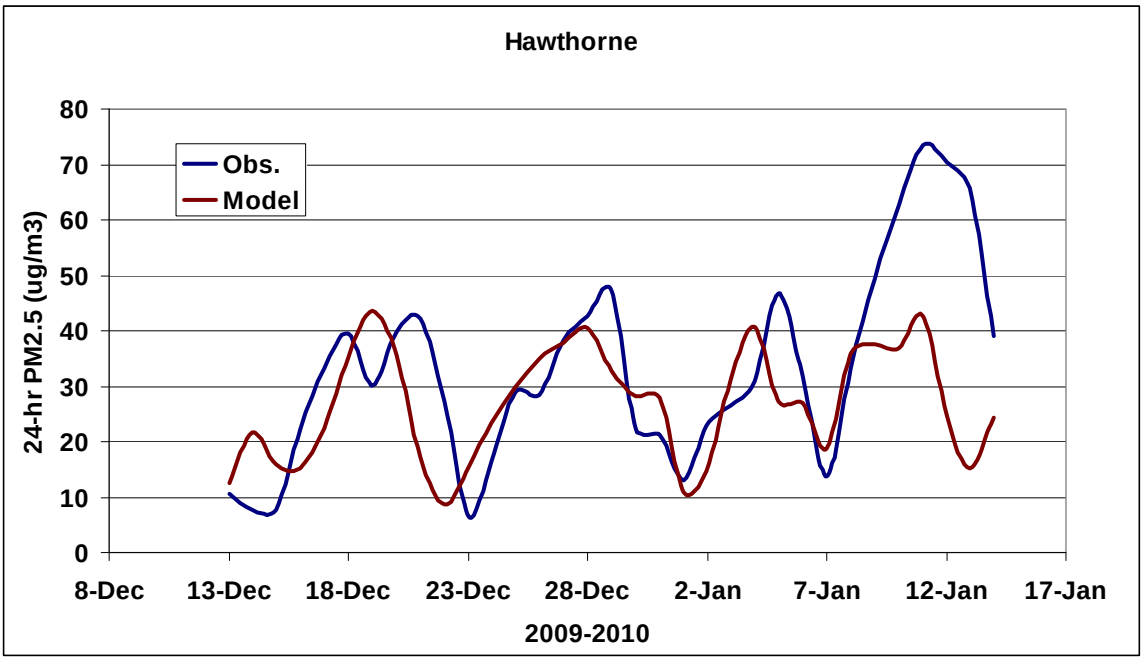


Figure 5.7: 24-hr $PM_{2.5}$ time series (Hawthorne). 24-hr PM2.5 time series. Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

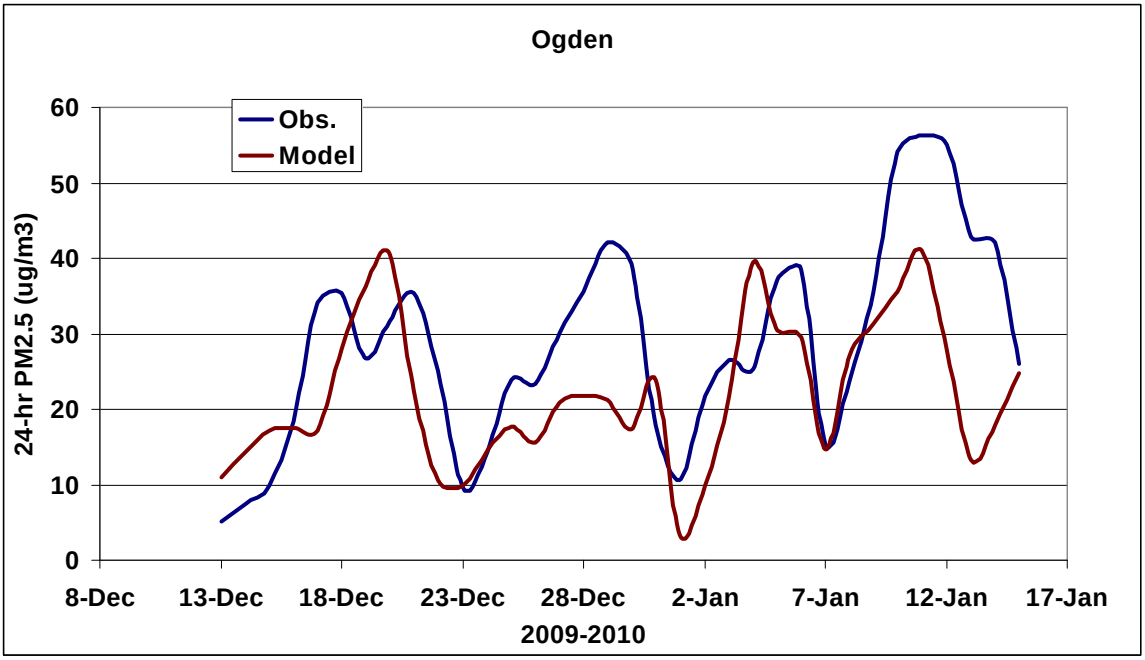


Figure 5.8: 24-hr $PM_{2.5}$ time series (Ogden). 24-hr PM2.5 time series. Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

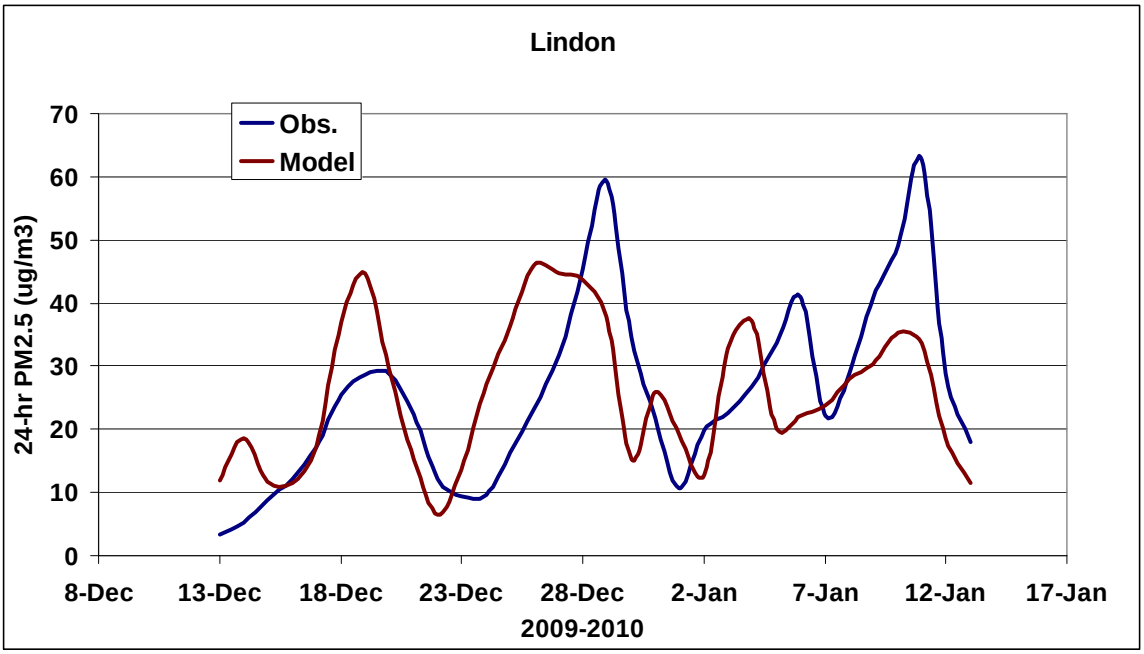


Figure 5.9: 24-hr $PM_{2.5}$ time series (Lindon). 24-hr PM2.5 time series. Observed 24-hr PM2.5 (blue trace) and CMAQ modeled 24-hr PM2.5 (red trace).

Figure 5.10: 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 5.11 – 5.13. The observed speciation is constructed using days in which the STN filter 24-hr $PM_{2.5}$ concentration was > 25 µg/m^3. For the 2009-2010 modeling period, the observed speciation pie charts were created using 10 filter days at Hawthorne, 9 days at Lindon, and 8 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 > 25 µg/m^3. Using this criterion, the simulated speciation pie chart is created from 18 modeling days for Hawthorne, 16 days at Lindon, and 16 days at Bountiful. At all 3 STN sites, the percentage of simulated nitrate is over-predicted by 5 to 7%. The simulated ammonium percentage is nearly identical to the observed STN speciation. At the Hawthorne site, organic carbon looks to be under-predicted by CMAQ with a percentage of $PM_{2.5}$ at 12% and an observed organic carbon at 21%. This discrepancy in organic carbon is not apparent at the Bountiful and Lindon site.

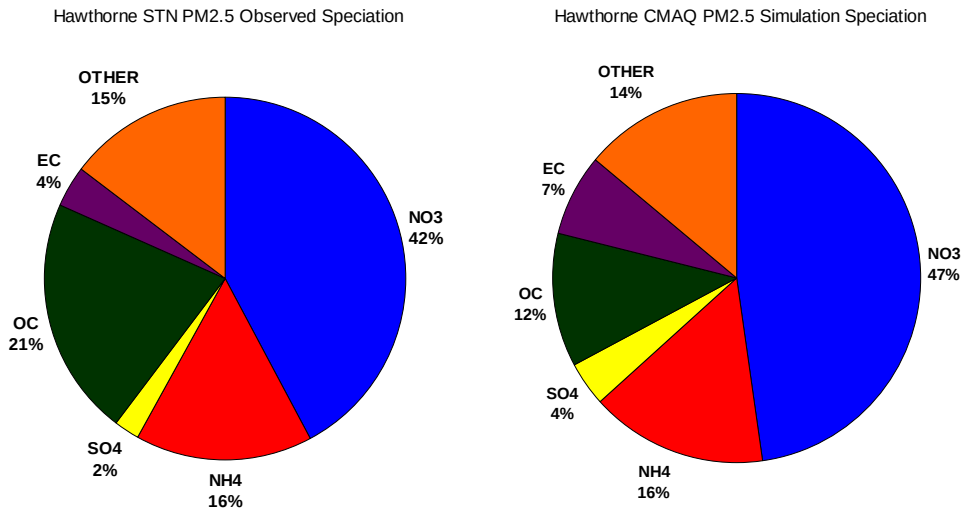


Figure 5.11: The composition of observed and model simulated average 24-hr $PM_{2.5}$ concentrations averaged over days when an observed and modeled day had 24-hr concentrations > 25 µg/m^3 at the Hawthorne STN site.

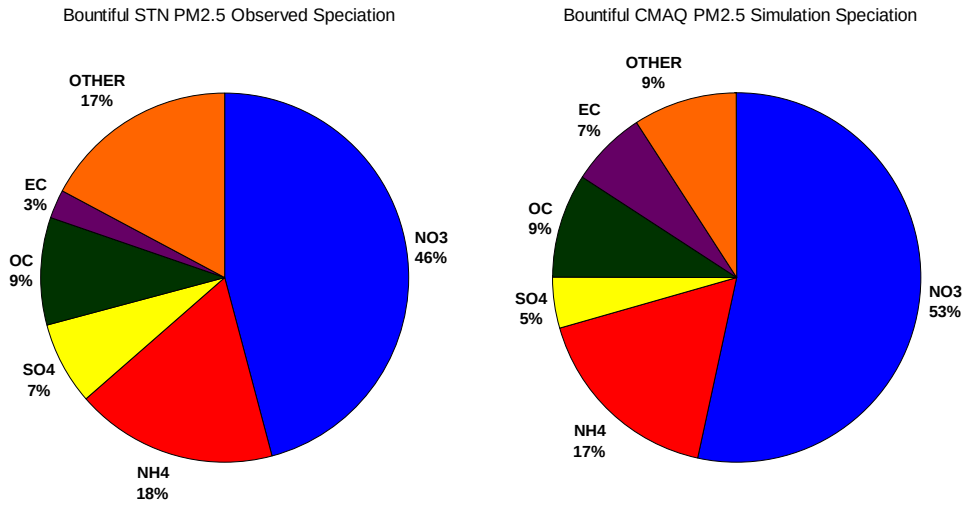


Figure 5.12: The composition of observed and model simulated average 24-hr $PM_{2.5}$ concentrations averaged over days when an observed and modeled day had 24-hr concentrations > 25 µg/m^3 at the Bountiful STN site.

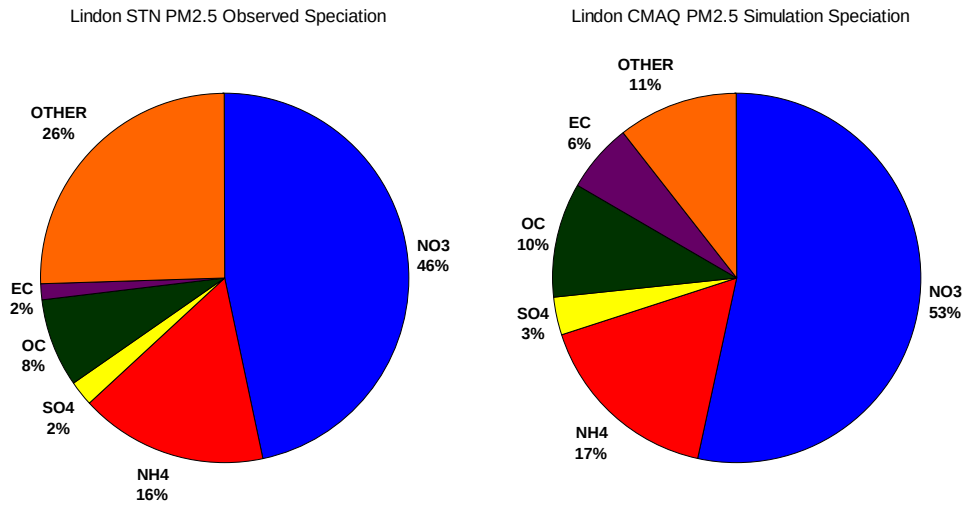


Figure 5.13: The composition of observed and model simulated average 24-hr $PM_{2.5}$ concentrations averaged over days when an observed and modeled day had 24-hr concentrations > 25 µg/m^3 at the Lindon STN site.

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 1.11).
- 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 $PM_{2.5}$. Organic carbon is underestimated at the Hawthorne location, but is reasonably estimated at the other locations (Bountiful, Lindon).

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 will use 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 2014, 2017, and 2019 (the attainment year). For comparison purposes, the monitored design value is also presented for the base year, 2010.

~~*[Editorial Note: Future year design values which assume no SIP control are not yet included in either this figure (5.16) or in Table 5.3 that follows. As of this writing, the model is still being run to determine these values, and they will be inserted when they become available.]*~~

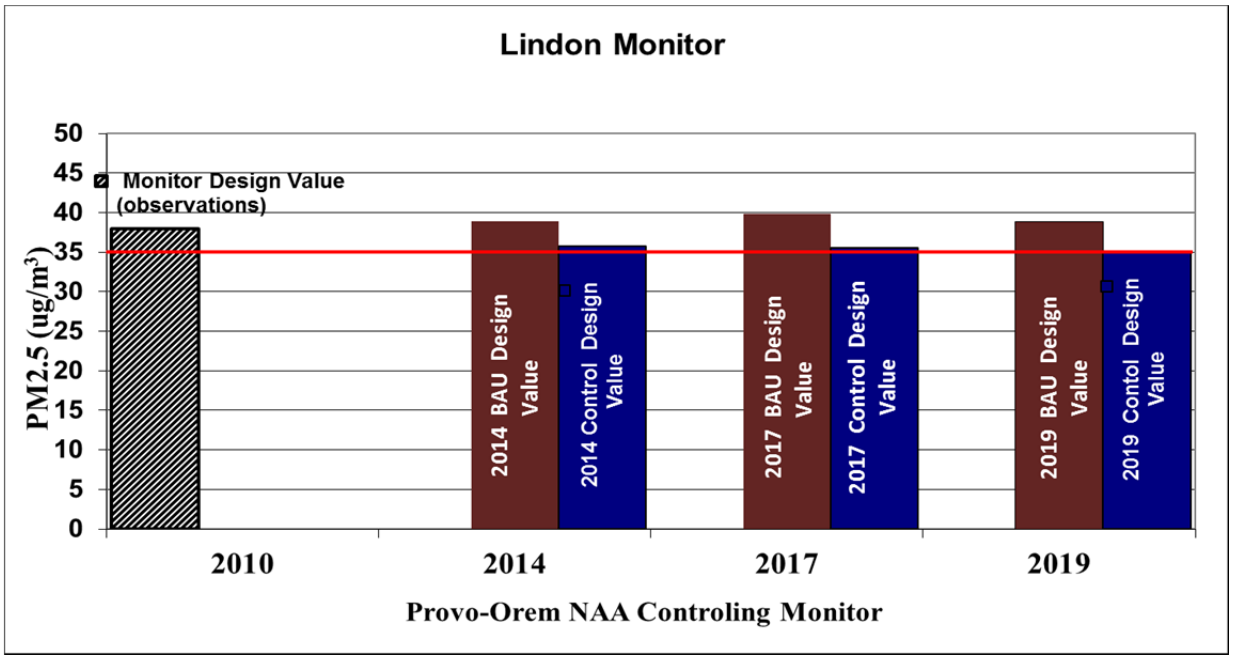


Figure 5.16, Model Results for the Provo, UT Nonattainment Area

Table 5.3 presents the same information in tabular form, and also includes any additional monitoring locations in the nonattainment area.

	2010	2014		2017		2019	
	Observed	Business-As-Usual	Control Basket	Business-As-Usual	Control Basket	Business-As-Usual	Control Basket
Lindon	*38*	*39*	*36*	*40*	*36*	*39*	*35*
N. Provo	*33*	*34*	*31*	*34*	*31*	*34*	*30*
Spanish Fork	*39*	*39*	*35*	*39*	*34*	*39*	*33*

Table 5.3, Modeled Concentrations (µg/m^3) for the Provo, 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 Attainment Date

As shown in the modeled attainment test, the emissions reductions achievable in 2014 do not allow for a demonstration that the Provo, UT nonattainment area can attain the 24-hour $PM_{2.5}$ NAAQS. Rather, additional reductions will be necessary in the time period between 2014 and 2019 in order to attain. Therefore, this plan identifies an attainment date of December 14, 2019, and requests that the Administrator extend the attainment date the full 5 years permissible under Section 172(a)(2) of the Act.

Chapter 6 – CONTROL MEASURES

6.1 Introduction

Attaining the 24-hour NAAQS for $PM_{2.5}$ will require emission controls from directly emitted $PM_{2.5}$ as well as $PM_{2.5}$ plan 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 $PM_{2.5}$.

6.4 Existing Control Measures

The idea of controlling emissions to the airshed is not a new one. Since about 1970 there have been regulations at both the state and federal level 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. Other controls that are anticipated but not yet in place do not factor into the attainment demonstration underlying this Plan.

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 attainment demonstration.

Area sources:

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

Part of the PM_{10} control for Utah County 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.

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 year 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 this SIP from 2014 through 2019 (and beyond) 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, an Inspection / Maintenance (I/M) Program was implemented in Utah County in 1986. This program has 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 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 8.1 tons per day of combined $PM_{2.5}$, SO_2, NO_x and VOC in 2014, 11.0 tons per day in 2017, and 13.4 tons per day in 2019.

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."

EPA has interpreted these requirements in the April 25, 2007 Clean Air Fine Particulate Implementation Rule, at 72 FR 20586-20667, and supplemental guidance issued March 2, 2012 (memorandum from Stephen D. Page to Regional Air Directors).

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 any pollutant identified in the plan as a significant contributor to $PM_{2.5}$ formation. For 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 identify the attainment date that is as expeditious as practicable, and 3) selection of RACT and RACM.

EPA's final rule requires States to conduct an analysis to identify RACT for all affected stationary sources. States can thereafter determine that RACT does not include controls that would not otherwise be necessary to meet Reasonable Further Progress (RFP) requirements or to attain the NAAQS as expeditiously as practicable. Any measures that, collectively, would not advance attainment by at least one year are not required for $PM_{2.5}$ RACT/RACM, even if those measures are individually reasonable. RACT may vary in different nonattainment areas based on the reductions needed for attainment as expeditiously as practicable.

Implementation of RACT measures should be as expeditiously as practicable, but in no case should it start later than the beginning of the year before the nominal attainment date. Furthermore, if the attainment date has been extended, it will be necessary to demonstrate RFP. This means that RACT measures need to be phased in to meet certain milestone goals and cannot all be delayed until the final deadline.

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

Stationary Point sources:

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 $PM_{2.5}$.

With respect to prior technology determinations other than RACT, the rule provides that prior BACT and LAER determinations, in many cases but not all, would assure at least RACT level controls. Where a State has determined VOC to be a significant contributor to $PM_{2.5}$, compliance with MACT standards may be considered in VOC RACT determinations. EPA anticipates it will be unlikely that States can do much better than what the MACT controls currently require.

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. Emissions from these sources, for the 2010 baseline as well as the projection years 2014, 2017 and 2019 are shown below in Table 6.3. 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.

Typical Winter Incversion Weekday Emissions (tons/day)											
		2010_E10_R2DM3					2014_E10_R43DM3				
NA Area	Site Name	PM2_5	NOX	VOC	NH3	SO2	PM2_5	NOX	VOC	NH3	SO2
Provo - UT Nonattainment Area	BYU Main Campus	0.01	0.08	0.02	0.00	0.00	0.01	0.13	0.03	0.00	0.00
	Geneva Nitrogen Plant	0.05	0.33	0.00	0.01	0.00	0.07	0.40	0.00	0.01	0.00
	Pacific States	0.02	0.21	0.58	0.00	0.01	0.02	0.26	0.71	0.00	0.01
	Pacificorp Lakeside Power Plant	0.18	0.27	0.06	0.28	0.02	0.47	0.62	0.30	0.52	0.09
	Payson City	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00
	Provo Power Plant	0.00	0.02	0.00		0.00	0.00	0.02	0.00		0.00
	Springville City Whitehead Power Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Provo NA Total	**0.26**	**0.93**	**0.67**	**0.29**	**0.03**	**0.57**	**1.45**	**1.05**	**0.53**	**0.10**

Typical Winter Incversion Weekday Emissions (tons/day)											
		2017_E10_R2DM3					2019_E10_R49DM3				
NA Area	Site Name	PM2_5	NOX	VOC	NH3	SO2	PM2_5	NOX	VOC	NH3	SO2
Provo - UT Nonattainment Area	BYU Main Campus	0.01	0.08	0.03	0.00	0.00	0.01	0.09	0.03	0.00	0.00
	Geneva Nitrogen Plant	0.08	0.45	0.00	0.01	0.00	0.08	0.49	0.00	0.01	0.00
	Pacific States	0.02	0.25	0.80	0.00	0.01	0.03	0.27	0.31	0.00	0.01
	Pacificorp Lakeside Power Plant	0.47	0.62	0.30	0.52	0.09	0.47	0.62	0.30	0.52	0.09
	Payson City	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00
	Provo Power Plant	0.00	0.02	0.00		0.00	0.00	0.02	0.00		0.00
	Springville City Whitehead Power Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Provo NA Total	**0.58**	**1.45**	**1.14**	**0.53**	**0.10**	**0.59**	**1.51**	**0.65**	**0.54**	**0.10**

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

Area sources:

As part of the RACT analysis for area sources, consideration was given to a broad list of source categories. Table 6.4 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 as well as control strategies from other states. DAQ evaluated each strategy for technical feasibility as part of the RACT analysis. The screening column in table 6.4 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 PM2.5 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 – screened, regulated under Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Architectural – initially screened, further research indicated that adopting the Ozone Transport Commission model rule is feasible. Marine – screened, only 1.2 tpy Sheet, strip & coil – retained Traffic markings - screened, regulated under FIFRA Plastic parts - retained
3. Agricultural practices using Natural Resources Conservation Service (NRSC) practice standards	VOC, $PM_{2.5}$, ammonia	Screened	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

Strategy	Constituent(s)	SCREENING STATUS	REMARKS
			comment, cost benefit analysis does not support rulemaking, high cost-low VOC reduction
12. Chain-driven charbroiler restaurant emission control	VOC, $PM_{2.5}$	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	$PM_{2.5}$	Screened	Sizeable feed lots are not located in nonattainment areas
16. Low NO_x burners in commercial, industrial, and institutional boilers	VOC, NO_x	Retained	
17. Chemical additives to manure	VOC, ammonia	Screened	Costly with limited control efficiency. Excess ammonia in inventory that would not be sufficient to be effective
18. 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 reprogrammed
19. Prohibit use of cutback asphalt	VOC	Screened	Cities and highway administration personnel need stockpile for winter time road repair. Very small inventory.
20. Control limits on aggregate processing operations and asphalt manufacturing	$PM_{2.5}$, NO_x, SO_x	Retained	
21. R307-307 Road Salt and Sanding	PM	Retained	Expand current rule to nonattainment areas

EPA has developed control measure guidance documents called, control techniques guidelines (CTGs) for volatile organic compounds (VOCs). CTGs are used as presumptive RACT for VOCs and are guidance in SIP rulemaking. DAQ has evaluated all VOC CTGs for area sources as part of the SIP process.

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 assembled draft rules, based on these CTGs, for reducing emissions from these categories. These rules will 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. Most of these rules become effective by January 1, 2014.

Provo - UT Nonattainment Area												
	2014 lb/day				2017 lb/day				2019 lb/day			
	NOX	PM2_5	SO2	VOC	NOX	PM2_5	SO2	VOC	NOX	PM2_5	SO2	VOC
Area Source Rules												
R307-302, Solid fuel burning	436.0	3,632.7	70.9	4,557.2	545.0	4,540.9	88.6	5,696.6	872.0	7,265.4	141.8	9,114.3
R307-303, Commercial cooking		131.0		34.0		124.7		32.2		131.0		34.0
R307-309, Fugitive dust*		0.0				0.0				0.0		
R307-312, Aggregate processing operations		3.0				2.6				3.0		
R307-335, Degreasing				335.0				80.2				335.0
R307-342, Adhesives & sealants				766.0				730.6				766.0
R307-343, Wood manufacturing				230.0				221.7				230.0
R307-344, Paper, film & foil coating				0.0				0.0				0.0
R307-345, Fabric & vinyl coating				62.0				123.8				128.0
R307-346, Metal furniture coating				100.0				96.3				100.0
R307-347, Large appliance coating				51.0				49.5				51.0
R307-348, Magnet wire coating				0.0				0.0				0.0
R307-349, Flat wood panel coating				23.0				21.9				23.0
R307-350 Miscellaneous metal parts coating				274.2				264.4				274.2
machinery				47.0				45.2				47.0
other transportation				10.0				9.2				10.0
Special				4.0				3.5				4.0
R307-351, Graphic arts				370.0				369.8				370.0
R307-352, Metal containers				0.0				0.0				0.0
R307-353, Plastic coating				28.0				25.8				27.0
R307-354, Auto body refinishing				572.0				546.3				572.0
R307-355, Aerospace coatings				20.0				19.7				20.0
R307-356, Appliance pilot light	167.3	0.8	1.1	9.8	695.8	3.2	4.4	40.7	693.2	3.2	4.4	40.6
R307-357, Consumer products				1,320.0				1,257.9				1,320.0
R307-361, Architectural coatings				2,913.0				6,143.4				2,913.0
TOTAL	**603.3**	**3,767.5**	**71.9**	**11,726.1**	**1,240.8**	**4,671.4**	**93.1**	**15,778.8**	**1,565.3**	**7,402.6**	**146.2**	**16,379.0**

Table 6.5, Emissions Reductions from Area Source SIP Controls

On-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.

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). The CAA regulates air pollutant emissions from mobile sources by establishing motor vehicle emissions budgets in the 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. 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 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)

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 and the responsible transportation planning organization for the Provo, Utah $PM_{2.5}$ nonattainment area is covered by MAG.

The motor vehicle emissions budget serves as a regulatory limit for on-road mobile source emissions. Motor vehicle emissions limits 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." As a condition to receive federal transportation funding, 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 conformity test consists of either an interim emissions test or a motor vehicle emissions budgets test. 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 $PM_{2.5}$ SIP.

7.4 Interim $PM_{2.5}$ Conformity Test

The EPA interim conformity test for $PM_{2.5}$ emissions requires that future nitrogen oxides (NO_x) and directly emitted $PM_{2.5}$ emissions from RTPs, TIPs, and projects funded or approved by the FHWA or the FTA not exceed 2008 levels. NO_x emissions are a gaseous $PM_{2.5}$ precursor emissions emitted from vehicle exhaust related emissions. Primary particulate emissions consist of particles emitted from vehicle exhaust (elemental carbon, organic carbon, and SO_4) and brake and tire wear. The interim conformity test requirements apply until EPA has declared the motor vehicle emissions budgets adequate for transportation conformity purposes or until it approves the $PM_{2.5}$ SIP.

7.5 Transportation $PM_{2.5}$ Budget Test Requirements

The MAG collaborated with the ICT workgroup on interim conformity and SIP related issues prior to receiving the official EPA designation status of nonattainment for $PM_{2.5}$. During the SIP development process the MAG coordinated with the ICT workgroup and developed $PM_{2.5}$ SIP motor vehicle emissions budgets using the latest planning assumptions and tools for traffic analysis and the EPA approved Motor Vehicle Emission Simulator (MOVES) emissions model. Local MOVES modeling data inputs were cooperatively developed by MAG and the ICT workgroup using EPA recommended methods where applicable.

7.6 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 directly emitted $PM_{2.5}$; motor vehicle emissions from tailpipe, 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 need a VOC motor vehicle emissions budget for transportation conformity purposes. 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 Provo, Utah $PM_{2.5}$ nonattainment area and meet the criteria of 40 CFR 93.102(b)(3). EPA Region 8 reviewed the study and concurred with the UDAQ's findings. A similar analysis was undertaken to address direct $PM_{2.5}$ emissions, but in this case

the conclusion was otherwise. Therefore, a motor vehicle emissions budget for direct $PM_{2.5}$ is established in this SIP.

7.7 Transportation Conformity $PM_{2.5}$ Budgets

This plan includes reasonable further progress demonstrations for 2014 and 2017 and attainment of the $PM_{2.5}$ standard is projected by 2019.

In this SIP, the state is establishing transportation conformity motor vehicle emission budgets (MVEB) for NO_x , VOC , and direct $PM_{2.5}$ (elemental carbon, organic carbon, SO_4, brake and tire wear) for 2014, 2017, and 2019. 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).

MAG Transportation Conformity Budgets
(tons per average winter week day)

	Direct $PM_{2.5}$	NO_x	VOC
2014	1.41	22.07	12.96
2017	1.25	18.17	10.15
2019	1.20	16.61	8.96

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.

Table 7.2 shows subtotals for VOC refueling and fugitive dust emissions. These emissions are not included in the transportation conformity MVEBs for the Provo - UT Non-attainment Area. Emissions from Table 7.1 and 7.2 can be summed to equal total VOC and $PM_{2.5}$ emissions that were modeled and reported in Table 4.2.

VOC Refueling and Fugitive Dust Emissions for the Provo - UT Non-attainment Area
(tons per average winter week day)

	VOC Refueling	Fugitive Dust
2014	0.55	0.95
2017	0.44	1.06
2019	0.40	1.14

Table 7.2. VOC Refueling and Fugitive Dust Emissions for Provo - UT Non-attainment Area.

Per section 93.124 of the conformity regulations, for transportation conformity analyses using these budgets in analysis years beyond 2019, 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:$PM_{2.5}$ ratio of 11.26:1 and/or future decreases in VOC emissions from on-road mobile sources at a VOC:$PM_{2.5}$ ratio of 6.33:1. This trading mechanism will only be used if needed for conformity analyses for years after 2019. 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 2019 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 2019 VOC budget has been met. Clear documentation of the calculations used in the trading should be included in the conformity analysis.

~~***[Editorial Note: As of this writing, the model is still being run to determine these ratios, and they will be inserted when they become available.]***~~

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)." 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 until the end, one year prior to the attainment date identified in the SIP.

For areas with an attainment date of 2014 or earlier the attainment demonstration would also be considered to demonstrate that the area is achieving RFP, and there would be no requirement to submit a separate reasonable further progress plan.

For areas with an attainment date beyond 2014, a State is required to submit an RFP plan along with its attainment demonstration and SIP. These plans must demonstrate that generally linear reductions in emissions will occur by 2014, i.e. that emissions in 2014 will be reduced to the extent represented by a generally linear progression from base year emissions (2010) to attainment-level emissions. For any area that needs an extension of the attainment deadline to 2018 or 2019, the State's RFP plan would also need to demonstrate that generally linear reductions will be achieved in the 2017 emissions year as well. The pollutants to be addressed in the RFP plan are those pollutants that are identified as significant for purposes of control measures in the attainment plan.

8.2 RFP for the Provo, UT Nonattainment Area

The attainment demonstration for the Provo, UT $PM_{2.5}$ nonattainment area shows that the 24-hr NAAQS will be achieved, but not until 2019. Therefore, this SIP identifies and proposes an attainment date of December 14, 2019.

As stated above, a State is required to submit an RFP plan along with its attainment demonstration and SIP for areas with an attainment date beyond 2014. Furthermore, the State's RFP plan would also need to include a demonstration for the 2017 emissions year.

The representation of generally linear progress is based on the notion that reductions in emissions will result in commensurate reductions in $PM_{2.5}$ concentrations. Hence, as described in the regulations, the RFP showing is based on emissions. Nevertheless, EPA acknowledges that $PM_{2.5}$ mitigation also involves a number of attainment plan precursors and that the associated chemistry is non-linear. Thus, States are given some flexibility to adopt any combination of controls involving the various pollutants that can be shown to provide equivalent benefits using procedures that EPA is recommending (or, at the State's option, air quality modeling).

The RFP plan must demonstrate that in each applicable milestone year, emissions will be at a level consistent with generally linear progress in reducing emissions between the base year and the attainment year.

The base year for the attainment demonstration underlying this plan is 2010. Therefore, the baseline year inventory for the RFP plan will also be 2010.

In keeping with the notion of linear progress, Subpart Z of 40 CFR 51 (at 51.1009) specifies four quantities to be calculated in the RFP plan. These quantities are:

- Full Implementation Reduction, equals: (baseline inventory) – (attainment inventory)
- Milestone Date Fraction, equals: (milestone year – 2010) / (2019 – 2010)
- Benchmark Emission Reduction, and equals: (Full Imp. Reduction) * (Milestone Date Fraction)
- Benchmark Emission Level equals: (baseline inv.) – (Benchmark Reduction)

Together, these four quantities result in the familiar mathematical equation for a straight line: y = mx + b. Without reporting the intermediate results of each of these quantities, Table 8.1 presents this information for emission levels of $PM_{2.5}$ and each of the attainment plan precursors: NO_x, SO_2, and VOC. For milestone years 2014 and 2017, the values representing straight linear progress are reported under the column heading "rfp". The other column for that year represents the projected emissions modeled in the attainment demonstration (labeled "projected").

For the attainment year 2019, the end point to the straight line, there is only one column.

The RFP plan must describe the control measures that provide for meeting the reasonable further progress milestones for the area, the timing of implementation of those measures, and the expected reductions in emissions of direct $PM_{2.5}$ and $PM_{2.5}$ attainment plan precursors. For a discussion of the control measures factored into the attainment demonstration, and hence reflected in the modeled emissions totals (in the "projected" column), see Chapter 6 of the Plan.

Reasonable Further Progress Provo, UT PM2.5 Nonattainment Area						
*Emissions / Year	2010	2014		2017		2019
		projected	rfp	projected	rfp	
PM2.5	4.6	4.9	4.8	4.9	4.9	4.9
NOx	36.3	32.7	32.3	28.2	29.3	27.3
SO2	0.6	0.6	0.6	0.6	0.6	0.6
VOC	30.8	26.1	26.9	23.2	24.0	22.1
Plan precursors	67.6	59.4	59.8	51.9	53.9	50.0
Total	72.3	64.3	64.5	56.8	58.7	54.9
**Concentration	38	36	37	36	36	35
* 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 Benchmarks for the Provo, UT Nonattainment Area

The RFP plan must demonstrate that emissions for the milestone year are at levels roughly equivalent to the benchmark emission levels for direct $PM_{2.5}$ emissions and each $PM_{2.5}$ attainment plan precursor to be addressed in the plan. Table 8.1 shows this to be the case for $PM_{2.5}$, each of the plan precursors, all of the plan precursors, and the total for all of the pollutants.

In addition to the emissions totals, the table also includes the 2010 baseline design value for the controlling monitor (Lindon) in the nonattainment area and the predicted $PM_{2.5}$ concentrations for each of the milestones. These concentrations are presented as another metric to establish how much improvement is necessary to meet the 24-hour standard. The RFP rule allows for a generally equivalent improvement in air quality by the milestone year as would be achieved under the benchmark RFP plan, where "equivalence" would make use of the information developed for the attainment plan to assess the relationship between emissions reductions and predicted reductions in $PM_{2.5}$ concentrations. Table 8.1 also shows the predicted $PM_{2.5}$ concentrations to be at or better than linear progress.

Motor Vehicle Emissions: 40 CFR 51.1009 also requires that State shall include in its RFP submittal an inventory of on-road mobile source emissions in the nonattainment area. This requirement is for the purposes of establishing motor vehicle emissions budgets for transportation conformity purposes (as required in 40 CFR Part 93).

Table 8.2 presents emissions totals for on-road mobile sources. These are the same totals that factor into the overall emissions reported in the preceding RFP table. For a more specific discussion of motor vehicle emissions budgets for transportation conformity purposes, see Chapter 7 of this Plan.

Mobile Source Emissions							
Provo, UT PM2.5 Nonattainment Area							
***Emissions / Year**	**2010**		**2014**		**2017**		**2019**
****PM2.5**	2.2		2.4		2.3		2.3
NOx	25.4		22.1		18.2		16.6
*****VOC**	15.6		13.5		10.6		9.4
* Emissions are presented in tons per average winter day							
** PM2.5 emissions include: tailpipe PM2.5, SO4, brakewear, tire-wear, and re-entrained road dust							
*** VOC totals include refueling emissions							

Table 8.2, Motor Vehicle Emissions for Purposes of RFP

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 Implementation 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:

<u>Woodburning Control</u> – 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 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 attainment plan precursors, will likely result from additional restrictions of VOC in consumer products, and from what will likely result from Tier III of the federal motor vehicle control program.

State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-075-13

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce Bird, Executive Director

FROM: Mark Berger, Environmental Planning Consultant

DATE: September 3, 2013

SUBJECT: PROPOSE FOR PUBLIC COMMENT: Amend R307-110-10. Section IX, Control Measures for Area and Point Sources, Part A, Fine Particulate Matter.

The new State Implementation Plans (SIPs) for $PM_{2.5}$ will have to be incorporated into the air quality rules. R307-110-10 is the rule that presently does this for fine particulate matter. We are proposing to expand Section IX, Part A of the SIP to address $PM_{2.5}$. The proposed amendment to R307-110-10 would re-incorporate SIP Section IX, Part A after the SIPs for $PM_{2.5}$ have been adopted by the Board.

Staff Recommendation: Staff recommends the Board propose R307-110-10 for public comment as amended.

195 North 1950 West • Salt Lake City, Utah
Mailing Address: P.O. Box 144820 • Salt Lake City, Utah 84114-4820
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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 [~~5, 2012~~]4, 2013, pursuant to Section 19-2-104, is hereby incorporated by reference and made a part of these rules.

KEY: air pollution, PM10, PM2.5, ozone
Date of Enactment or Last Substantive Amendment: [~~December 6, 2012~~]2013
Notice of Continuation: February 1, 2012
Authorizing, and Implemented or Interpreted Law: 19-2-104(3)(e)

State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQA-626-13

M E M O R A N D U M

TO: Air Quality Board

FROM: Bryce C. Bird, Executive Secretary

DATE: August 7, 2013

SUBJECT: Air Toxics, Lead-Based Paint, and Asbestos (ATLAS) Section Compliance Activities – July 2013

MACT Compliance Inspections	0
Asbestos Demolition/Renovation NESHAP Inspections	20
Asbestos AHERA Inspections	12
Asbestos State Rules Only Inspections	0
Asbestos Notifications Accepted	162
Asbestos Phone Calls Answered	516
Asbestos Individuals Certifications Approved/Disapproved	30/0
Asbestos Company Certifications/Re-certifications	1/3
Asbestos Alternate Work Practices Approved/Disapproved	3/0
Lead-Based Paint (LBP) Inspections	3
LBP Notifications Approved	0
LBP Phone Calls Answered	68
LBP Letters Prepared and Mailed	43
LBP Courses Reviewed/Approved	0/0
LBP Course Audits	0
LBP Individual Certifications Approved/Disapproved	17/0

LBP Firm Certifications	24
Notices of Violation Issued	0
Compliance Advisories Issued	13
Warning Letters Issued	12
Settlement Agreements Finalized	2
Penalties Agreed to:	$1,093.75
Grand County School District	$93.75
Utah Correctional Industries	$1,000.00

State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQC-1008-13

M E M O R A N D U M

TO: Air Quality Board

FROM: Bryce C. Bird, Executive Secretary

DATE: August 20, 2013

SUBJECT: Compliance Activities – July 2013

Annual Inspections Conducted:

Major..... 15
Synthetic Minor 3
Minor 19

On-Site Stack Test Audits Conducted: 4

Stack Test Report Reviews:..... 57

On-Site CEM Audits Conducted: 6

Emission Reports Reviewed: 19

Temporary Relocation Requests Reviewed & Approved:..... 9

Fugitive Dust Control Plans Reviewed & Accepted:..... 97

Soil Remediation Report Reviews:..... 11

[1]Miscellaneous Inspections Conducted:..... 12

Breakdown Reports Received:..... 0

Breakdown Reports Resulting in Compliance Actions:..... 0

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Complaints Received: 11

Warning Letters Issued: 0

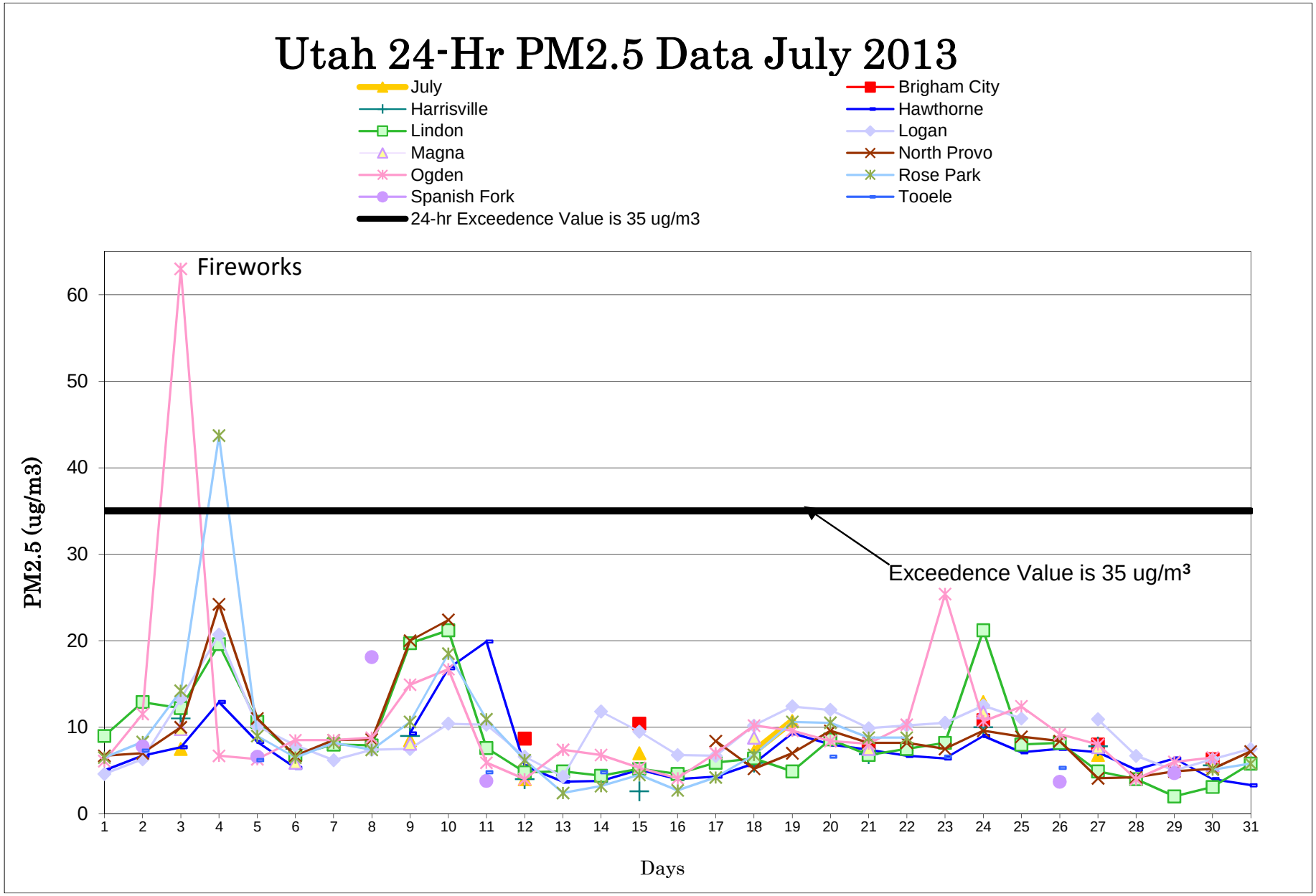
Notices of Violation Issued:..... 0

Compliance Advisories Issued:..... 0

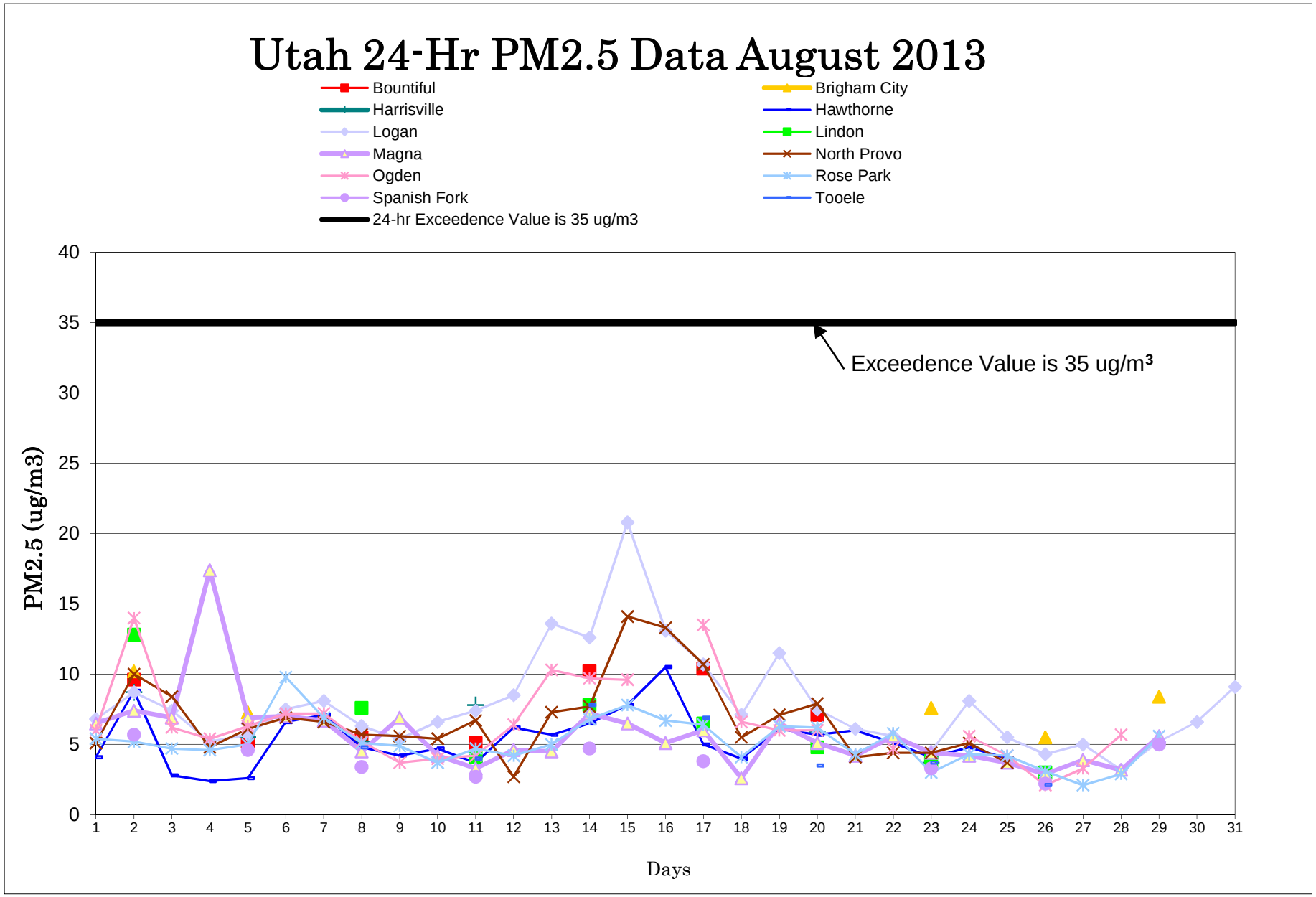
Settlement Agreements Reached: 3

Travis Rowser $60.00
Sunset Rail $1,600.00
TM Crushing..... $1,966.00

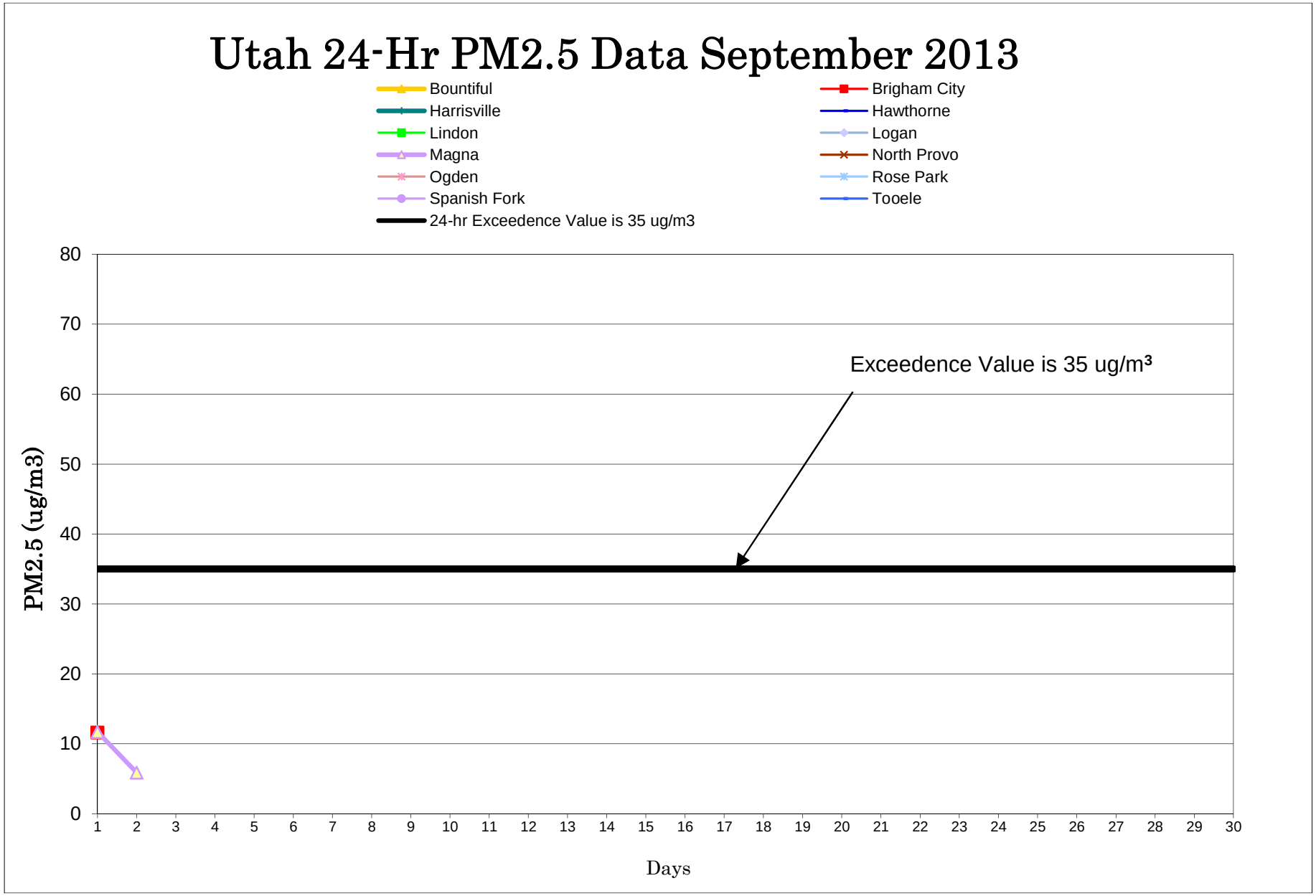
[1]Miscellaneous inspections include, e.g., surveillance, level I inspections, VOC inspections, complaints, on-site training, dust patrol, smoke patrol, open burning, etc.



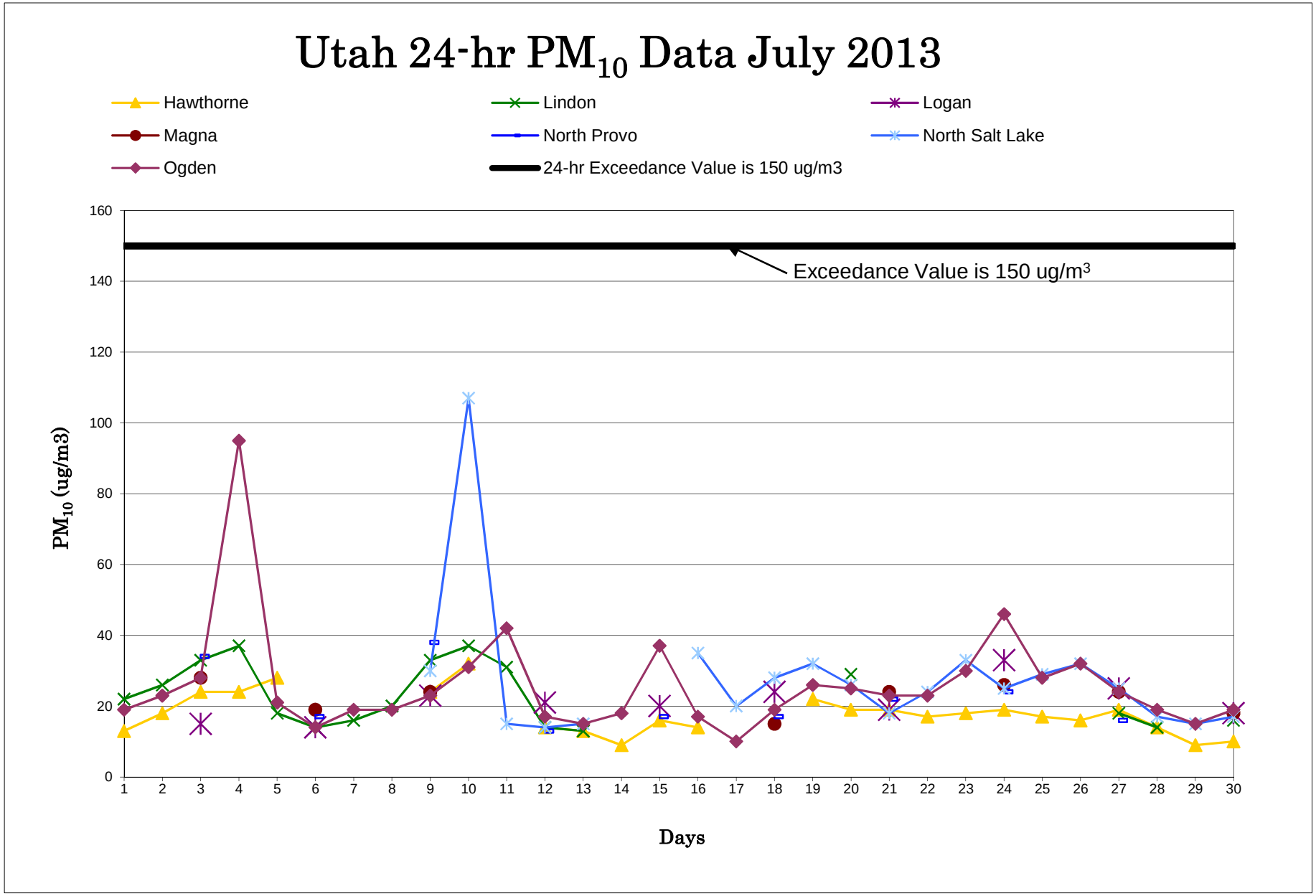
Utah Division of Air Quality



Utah Division of Air Quality



Utah Division of Air Quality



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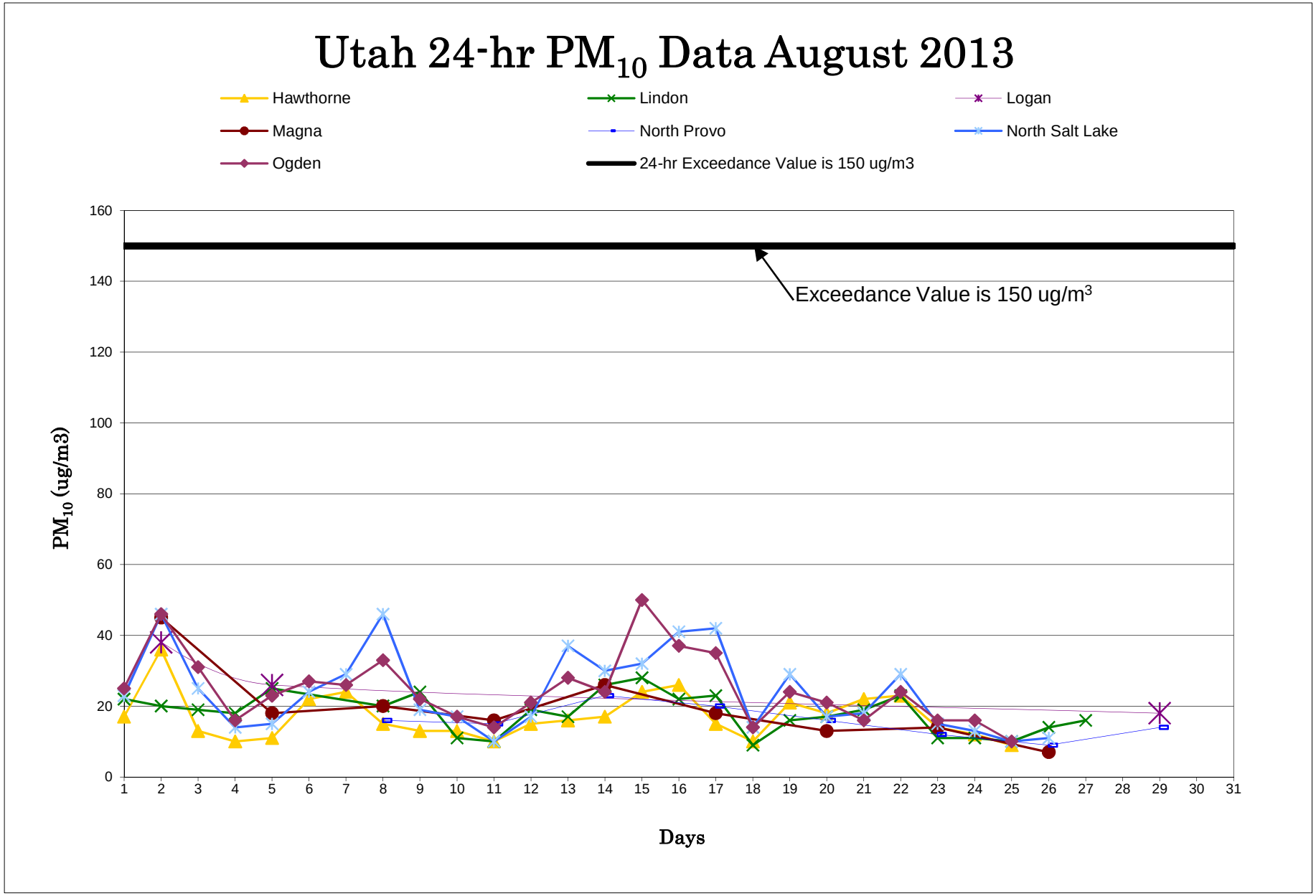

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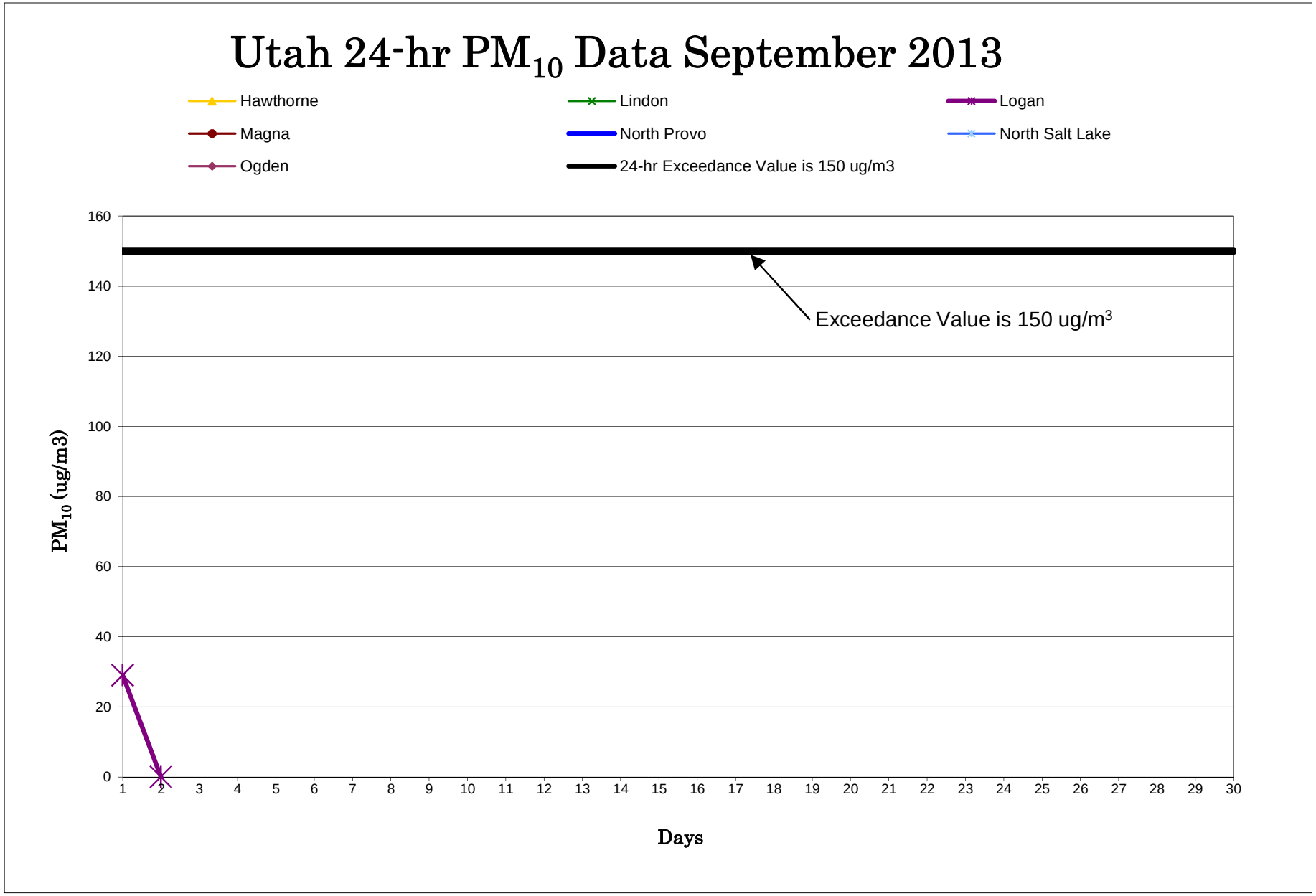
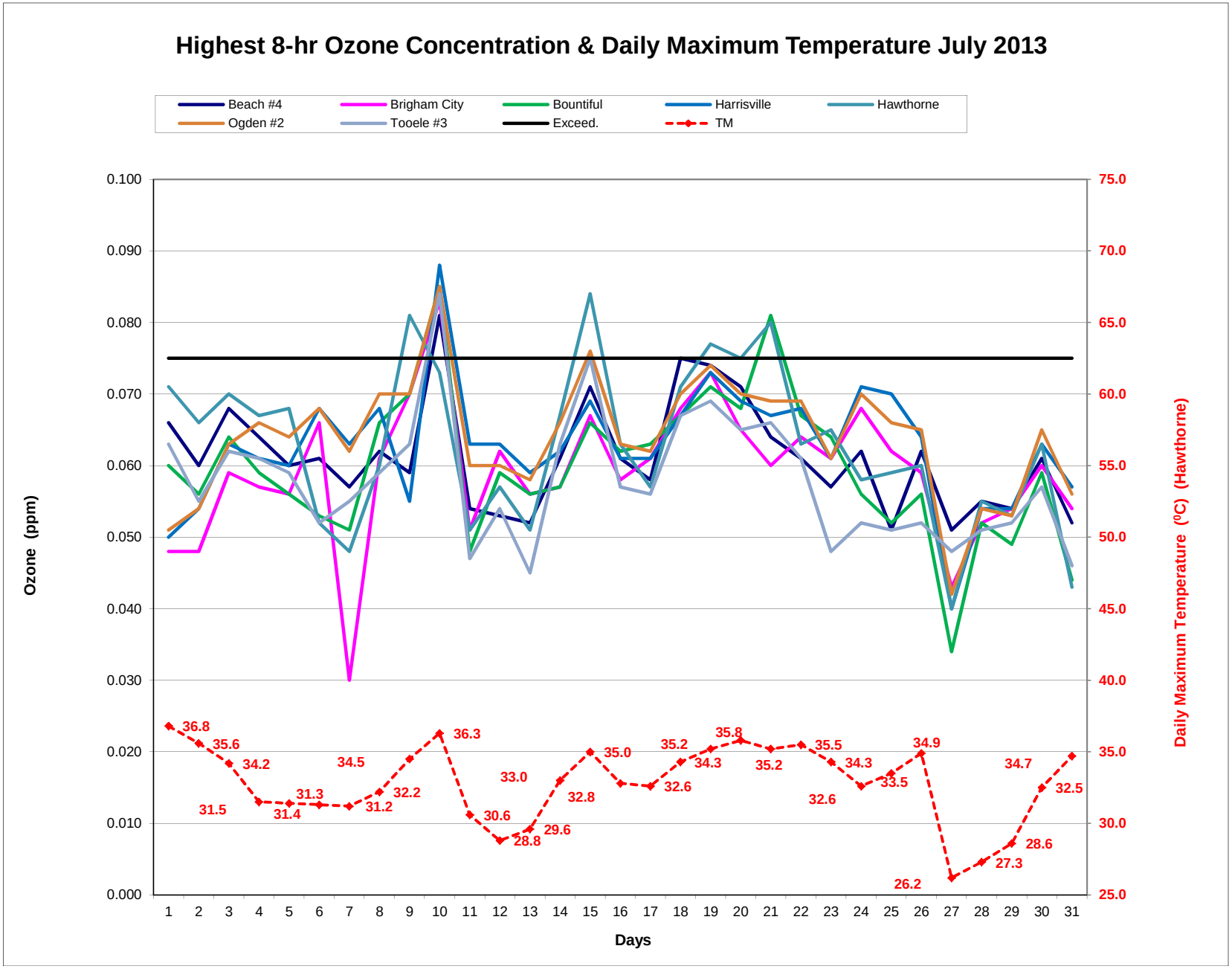
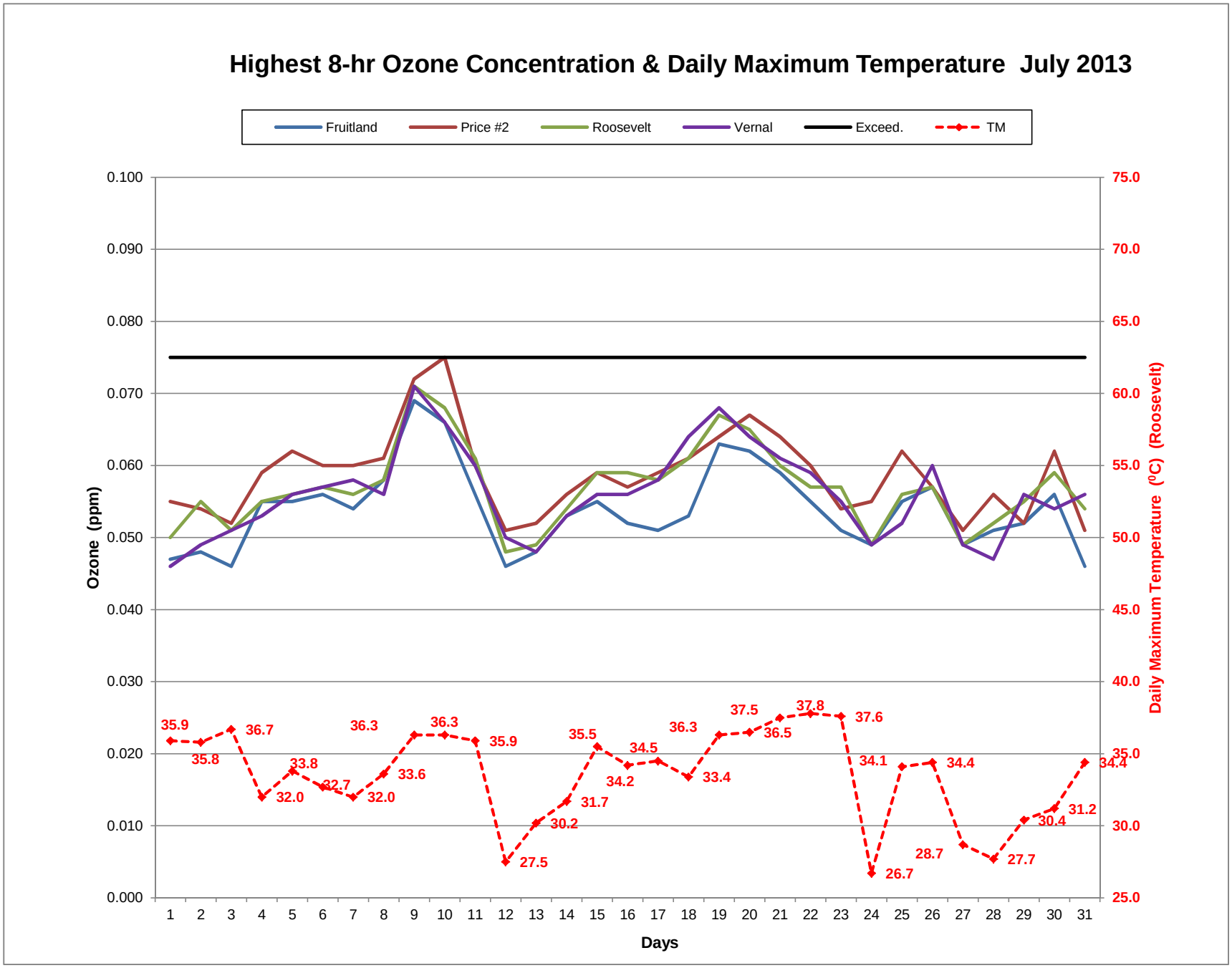


Utah Division of Air Quality


Highest 8-hr Ozone Concentration & Daily Maximum Temperature July 2013
Beach #4
Brigham City
Bountiful
Harrisville
Hawthorne
Ogden #2
Tooele #3
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (°C) (Hawthorne)
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
36.8
35.6
34.2
31.5
31.4
31.3
34.5
31.2
32.2
36.3
30.6
28.8
33.0
29.6
32.8
35.0
32.6
35.2
34.3
35.8
35.2
35.5
32.6
34.3
33.5
26.2
34.9
27.3
28.6
34.7
32.5


Highest 8-hr Ozone Concentration & Daily Maximum Temperature July 2013
Fruitland
Price #2
Roosevelt
Vernal
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (°C) (Roosevelt)
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
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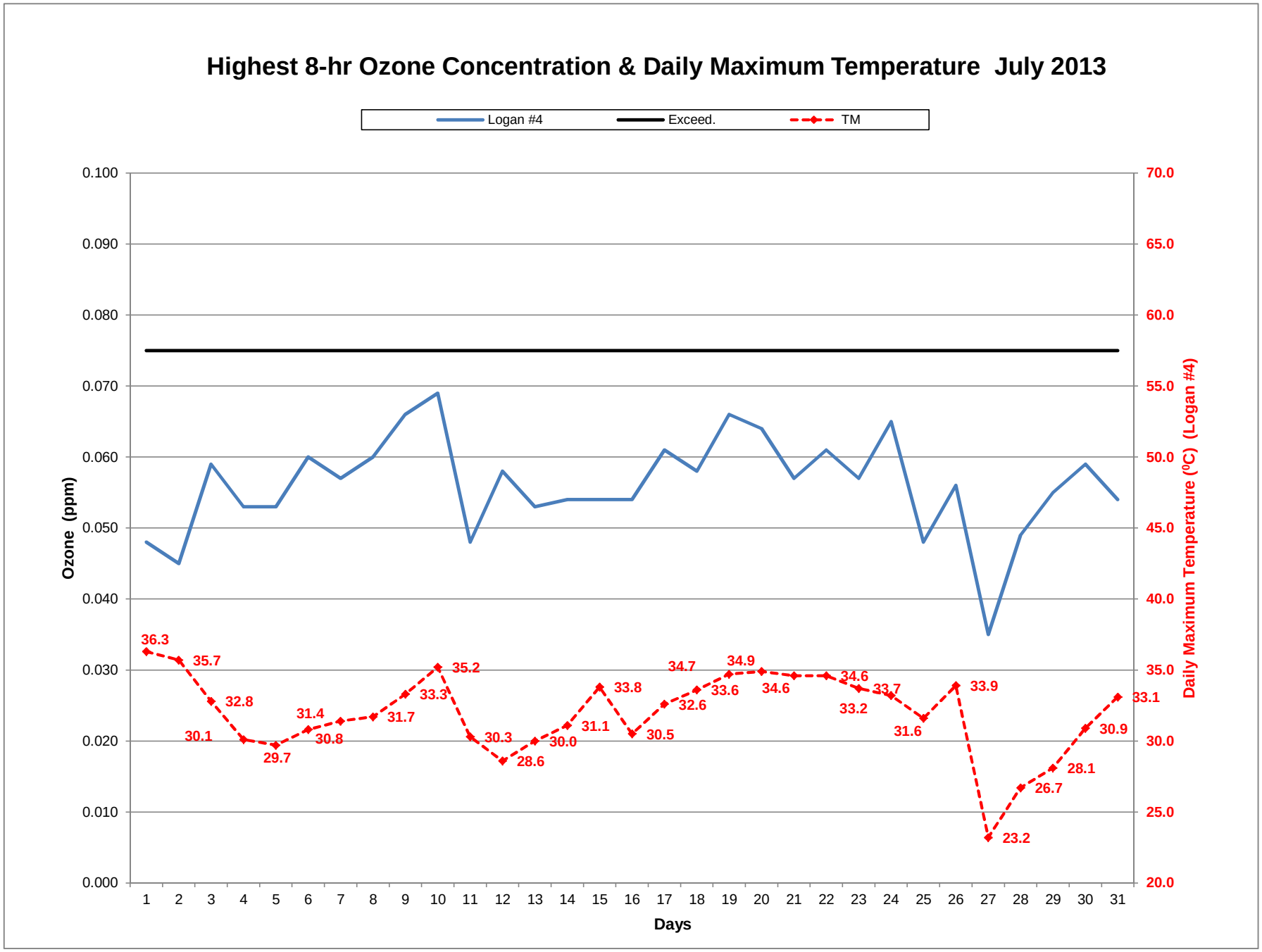
45.0
40.0
35.0
30.0
25.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
35.9 35.8 36.7 32.0 33.8 32.7 32.0 36.3 33.6 36.3 35.9 27.5 30.2 31.7 35.5 34.2 34.5 36.3 33.4 37.5 36.5 37.8 37.6 34.1 26.7 28.7 34.4 27.7 30.4 31.2 34.4


Highest 8-hr Ozone Concentration & Daily Maximum Temperature July 2013
Logan #4
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (°C) (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
36.3
35.7
30.1
32.8
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31.4
30.8
31.7
33.3
35.2
30.3
28.6
30.0
31.1
33.8
30.5
34.7
32.6
33.6
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31.6
33.9
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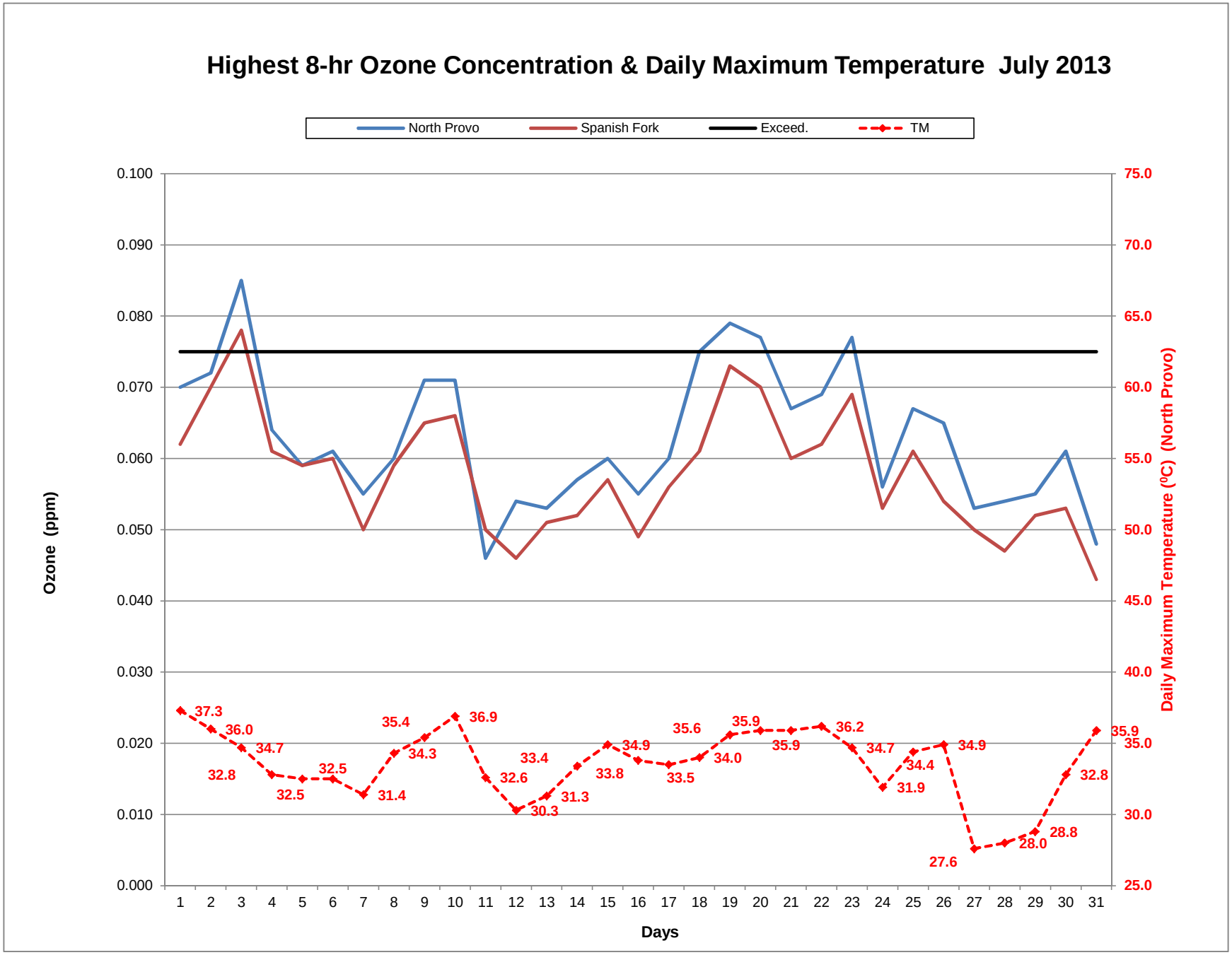
26.7
28.1
30.9
33.1


Highest 8-hr Ozone Concentration & Daily Maximum Temperature July 2013
North Provo
Spanish Fork
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (°C) (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
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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
37.3
36.0
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30.3
33.4
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33.8
34.9
33.5
35.6
34.0
35.9
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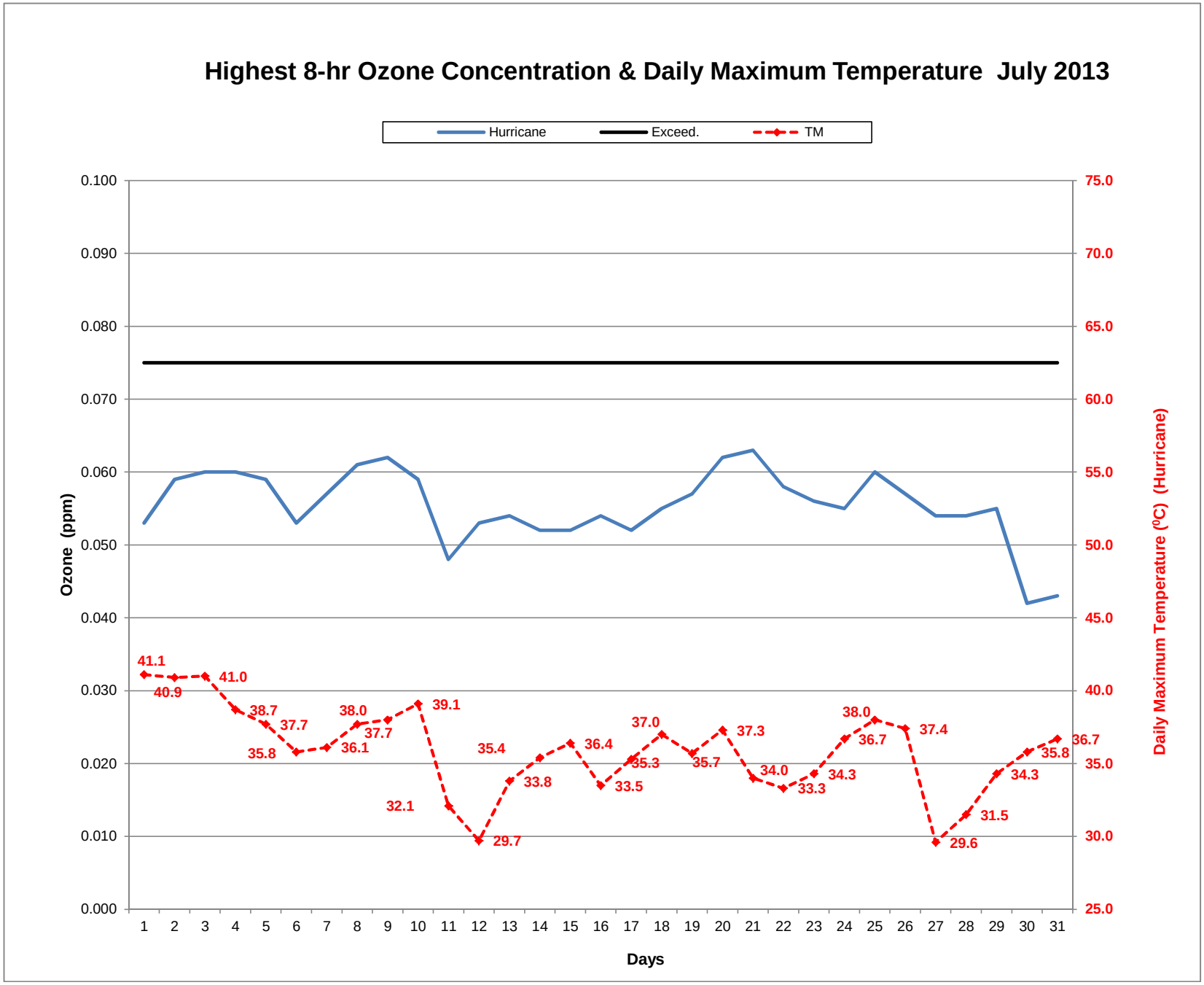
32.8
35.9


Highest 8-hr Ozone Concentration & Daily Maximum Temperature July 2013
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
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
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40.9
41.0
38.7
35.8
37.7
36.1
38.0
37.7
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32.1
29.7
35.4
33.8
36.4
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37.0
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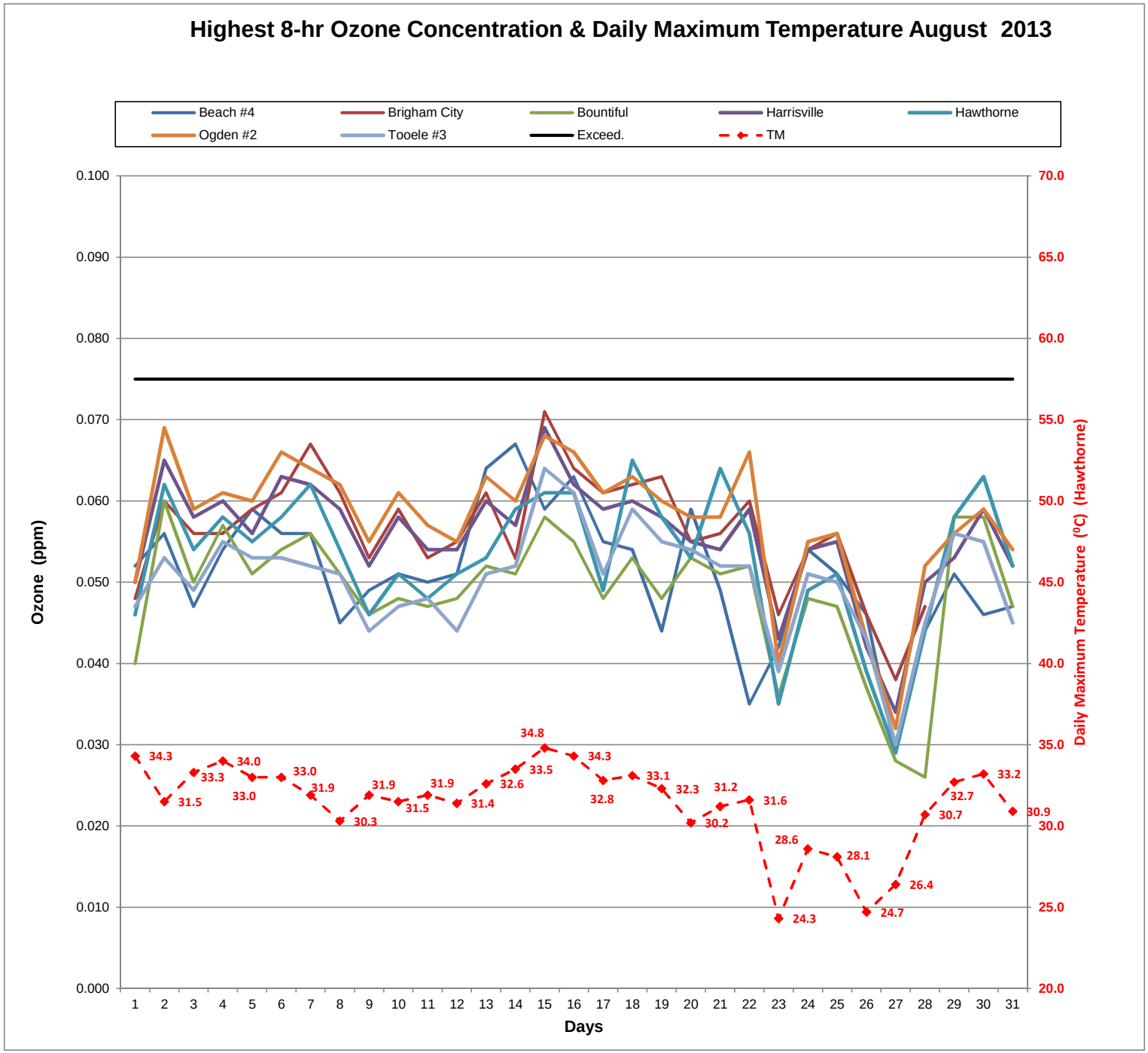
34.3
35.8
36.7


Highest 8-hr Ozone Concentration & Daily Maximum Temperature August 2013
Beach #4
Brigham City
Bountiful
Harrisville
Hawthorne
Ogden #2
Tooele #3
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (°C) (Hawthorne)
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
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55.0
50.0
45.0
40.0
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30.0
25.0
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33.0
33.0
31.9
30.3
31.9
31.5
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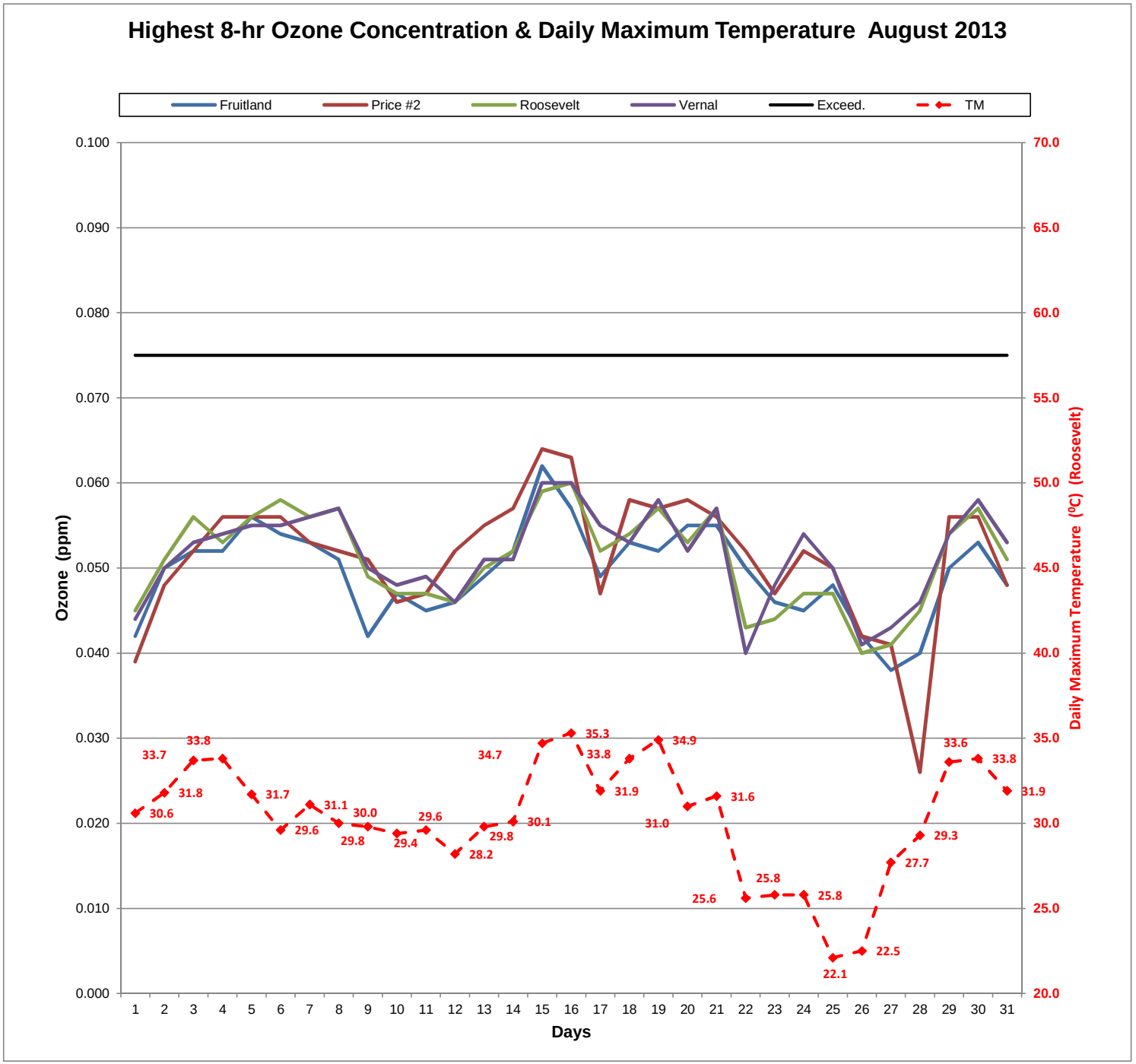
33.2
30.9


Highest 8-hr Ozone Concentration & Daily Maximum Temperature August 2013
Fruitland
Price #2
Roosevelt
Vernal
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (ºC) (Roosevelt)
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
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55.0
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20.0
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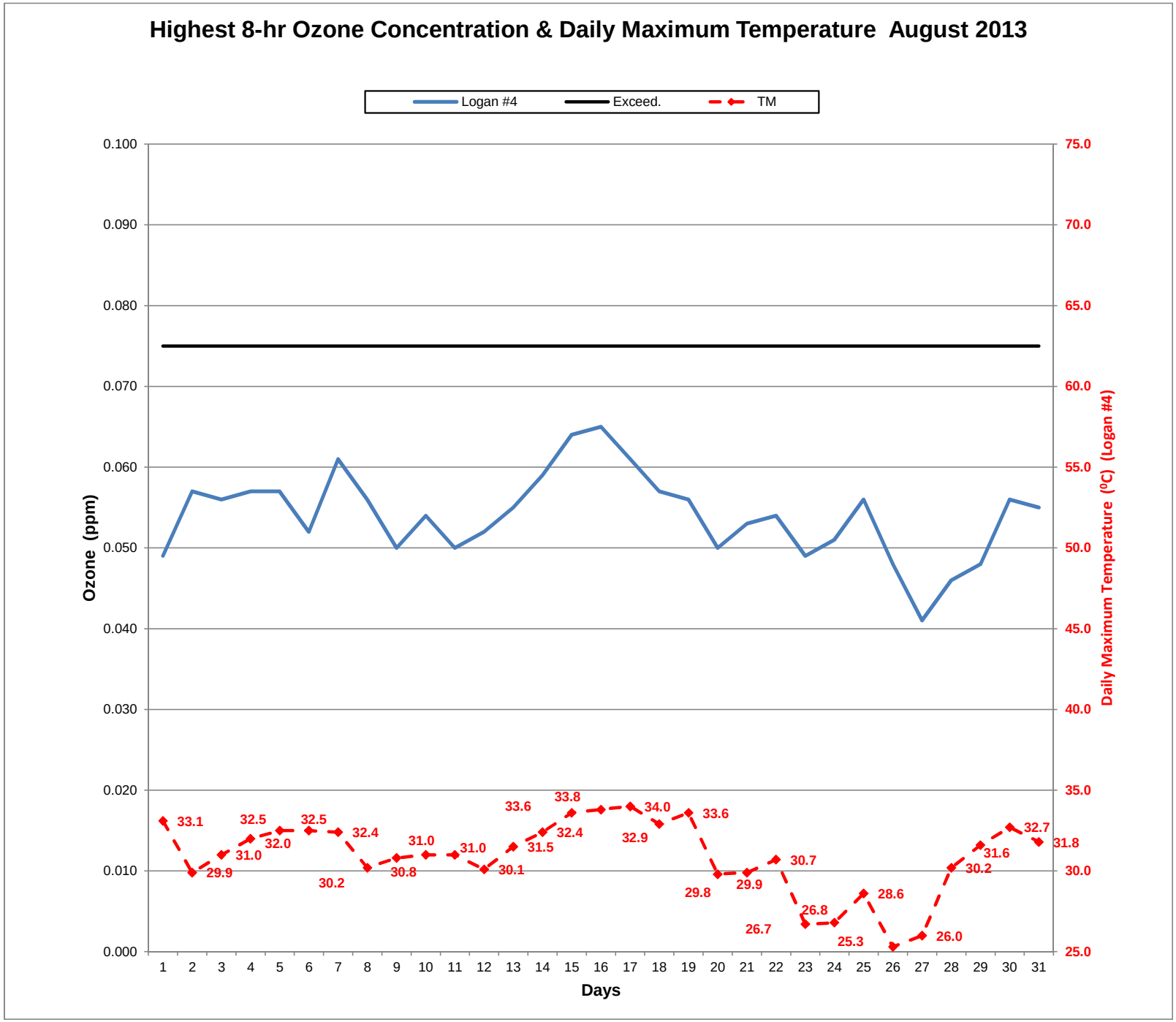
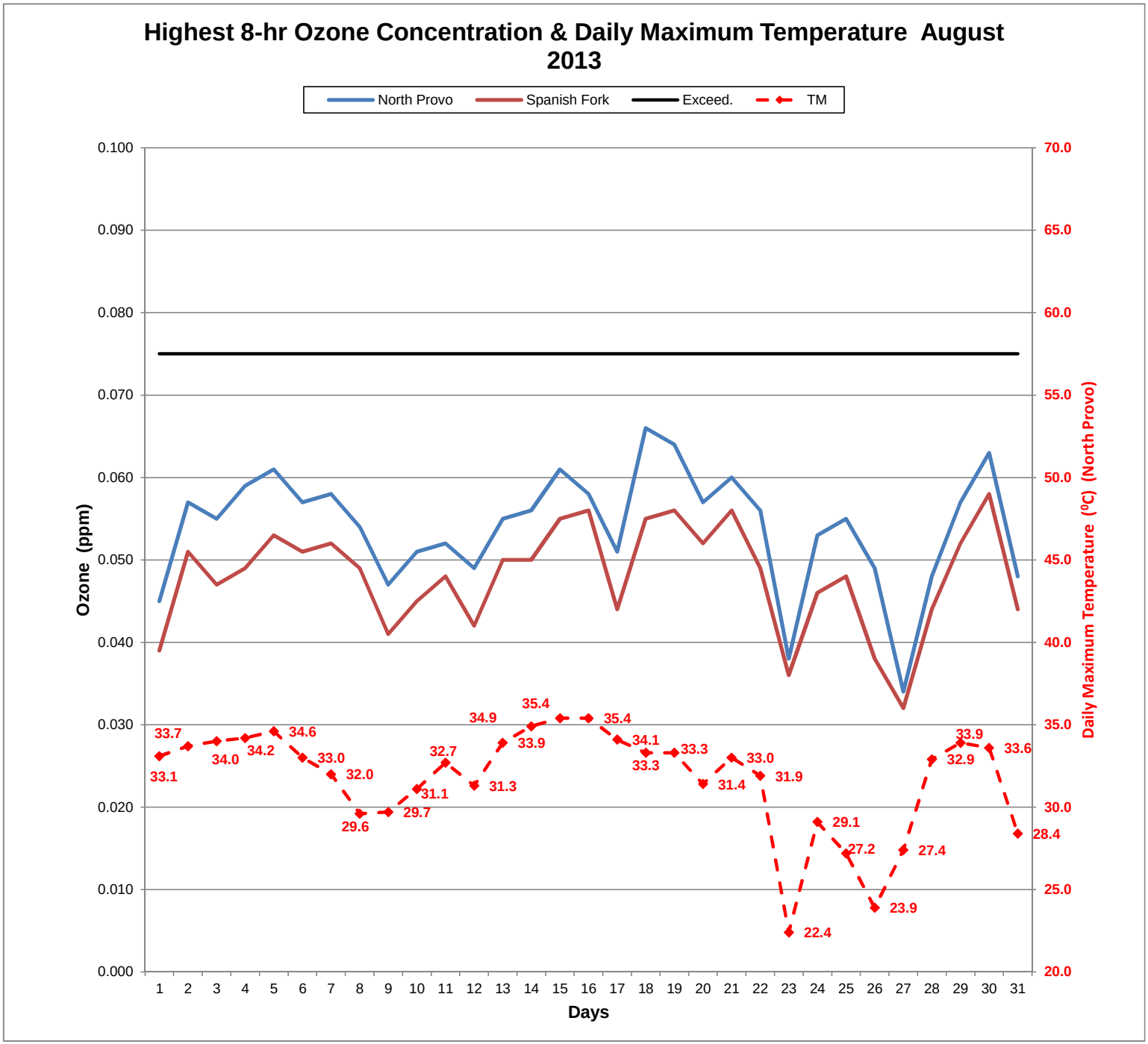
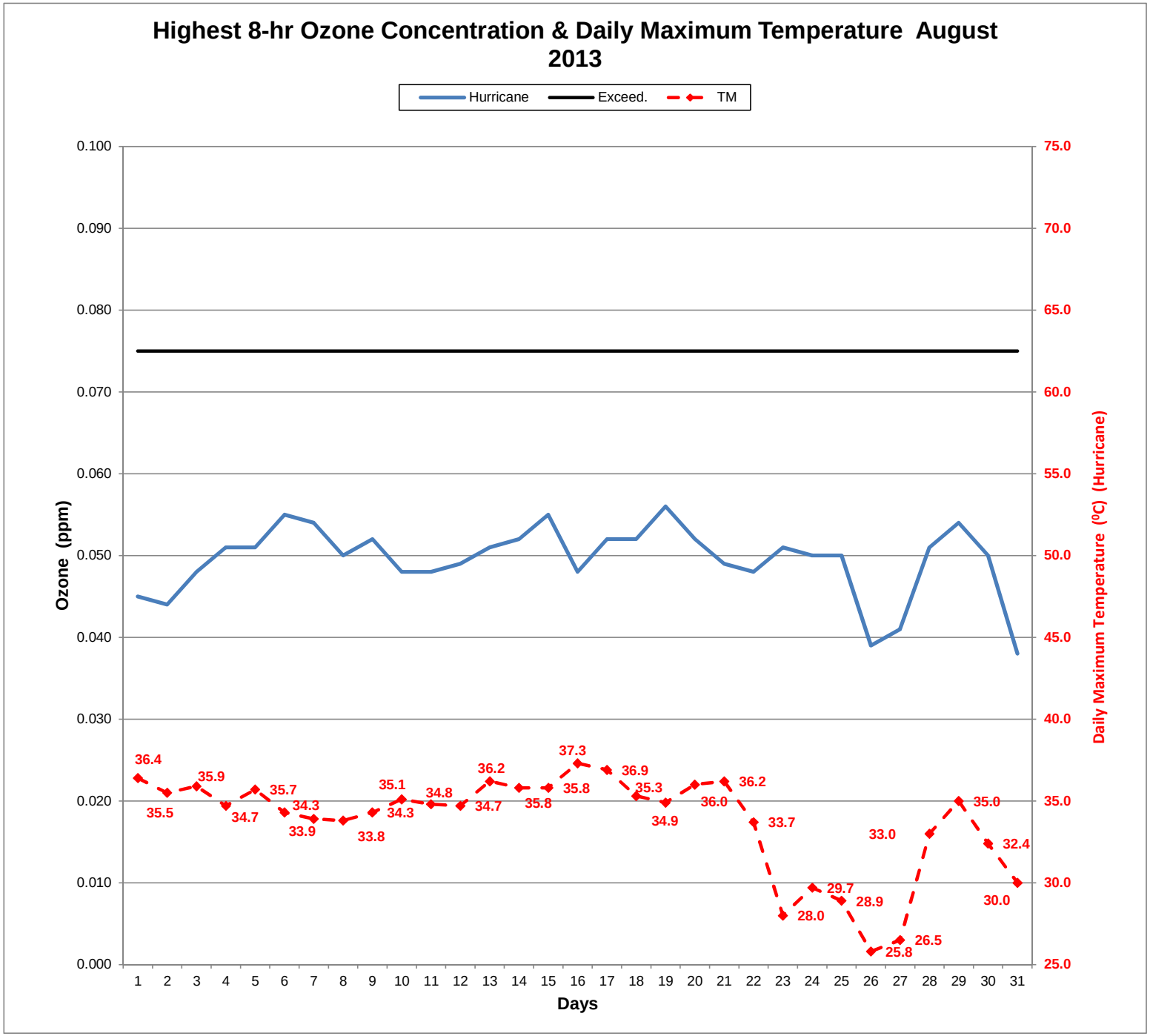
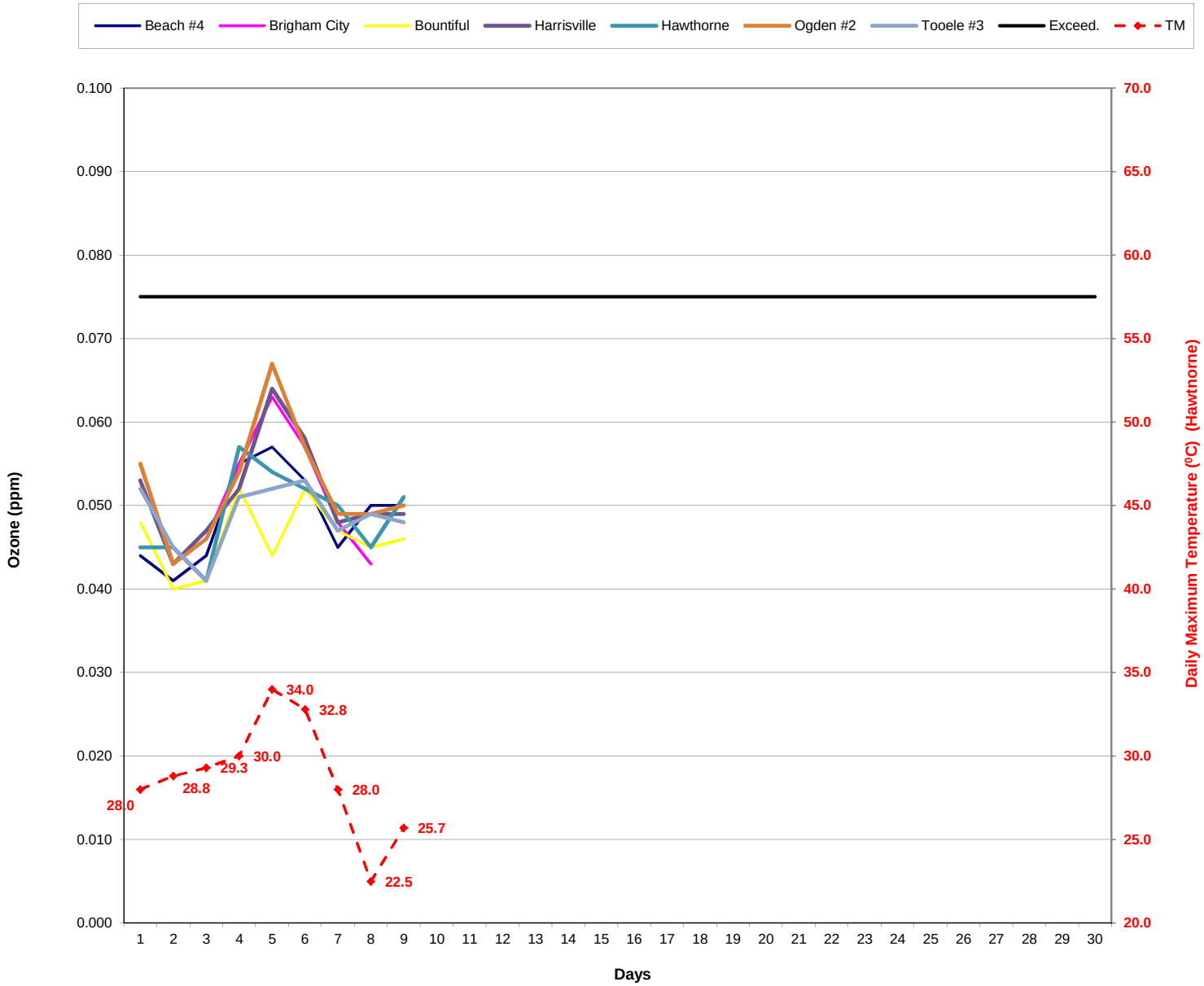
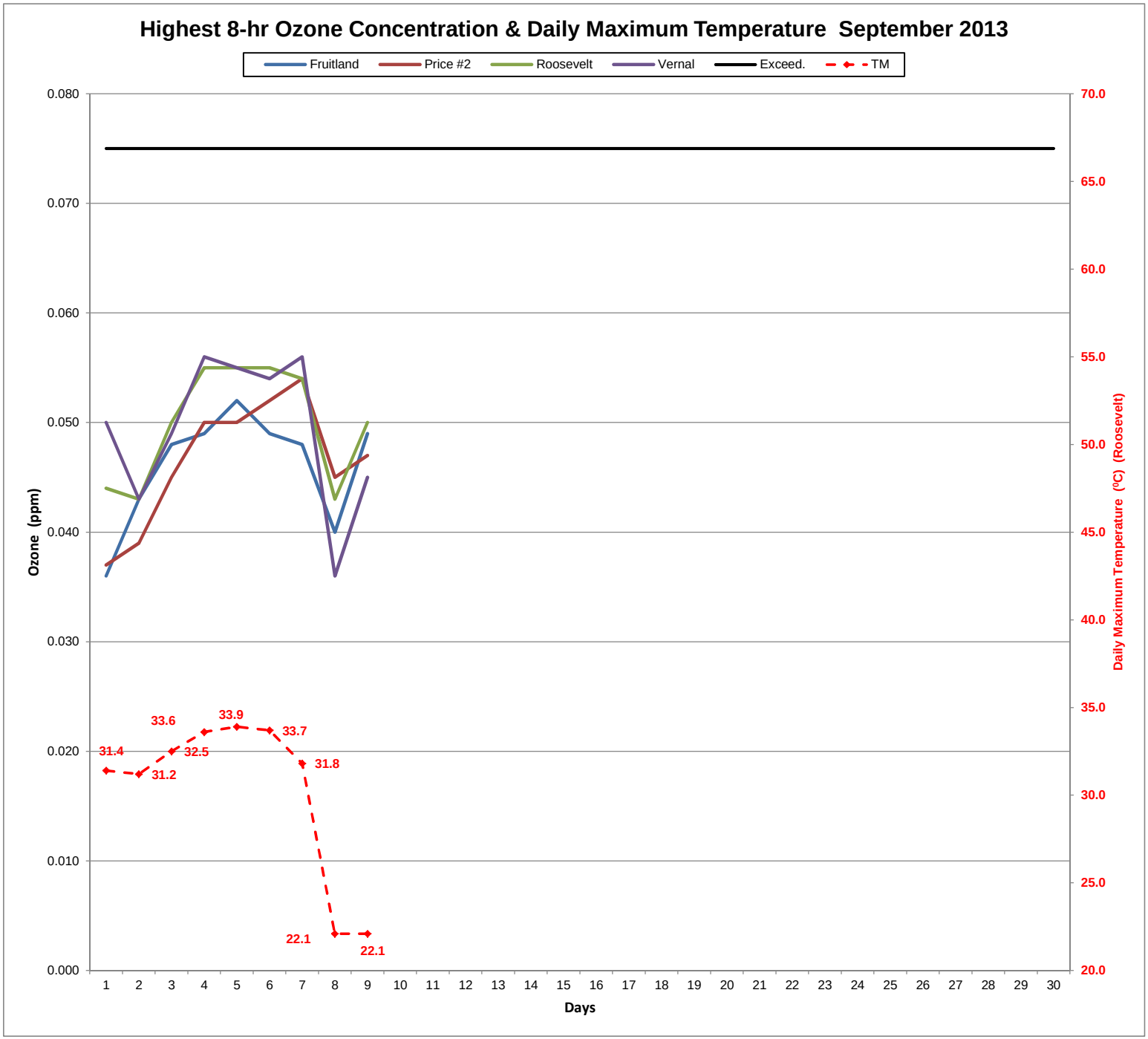
33.8
31.9
31.0
34.9
31.6
25.6
25.8
25.8
22.1
22.5
27.7
29.3
33.6
33.8
31.9

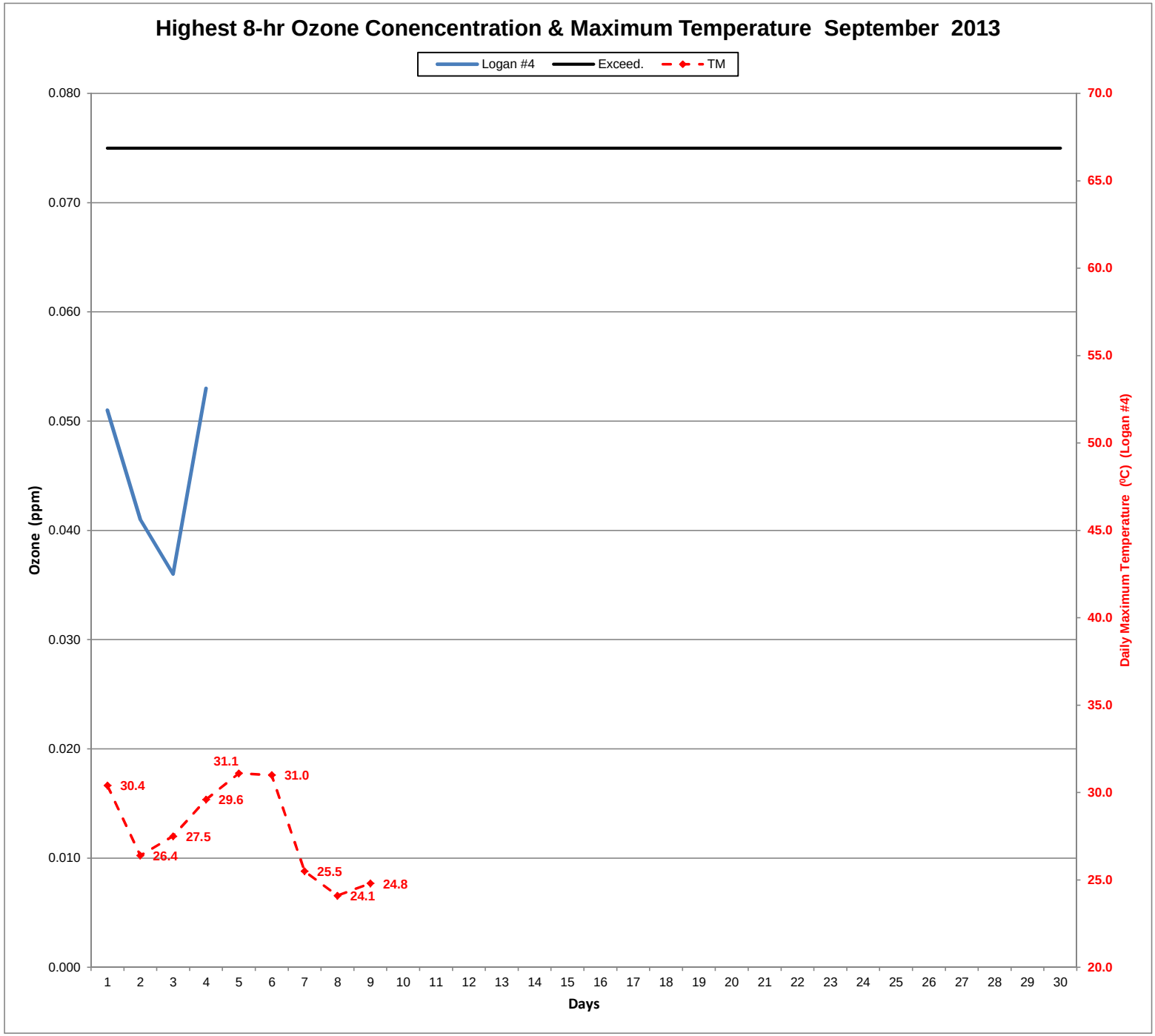

Highest 8-hr Ozone Concentration & Daily Maximum Temperature August 2013
Logan #4
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (ºC) (Logan #4)
Days
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
33.1
29.9
31.0
32.5
32.0
32.5
30.2
32.4
30.8
31.0
31.0
30.1
33.6
31.5
32.4
33.8
32.9
34.0
33.6
29.8
29.9
26.7
30.7
26.8
25.3
28.6
26.0
30.2
31.6
32.7
31.8

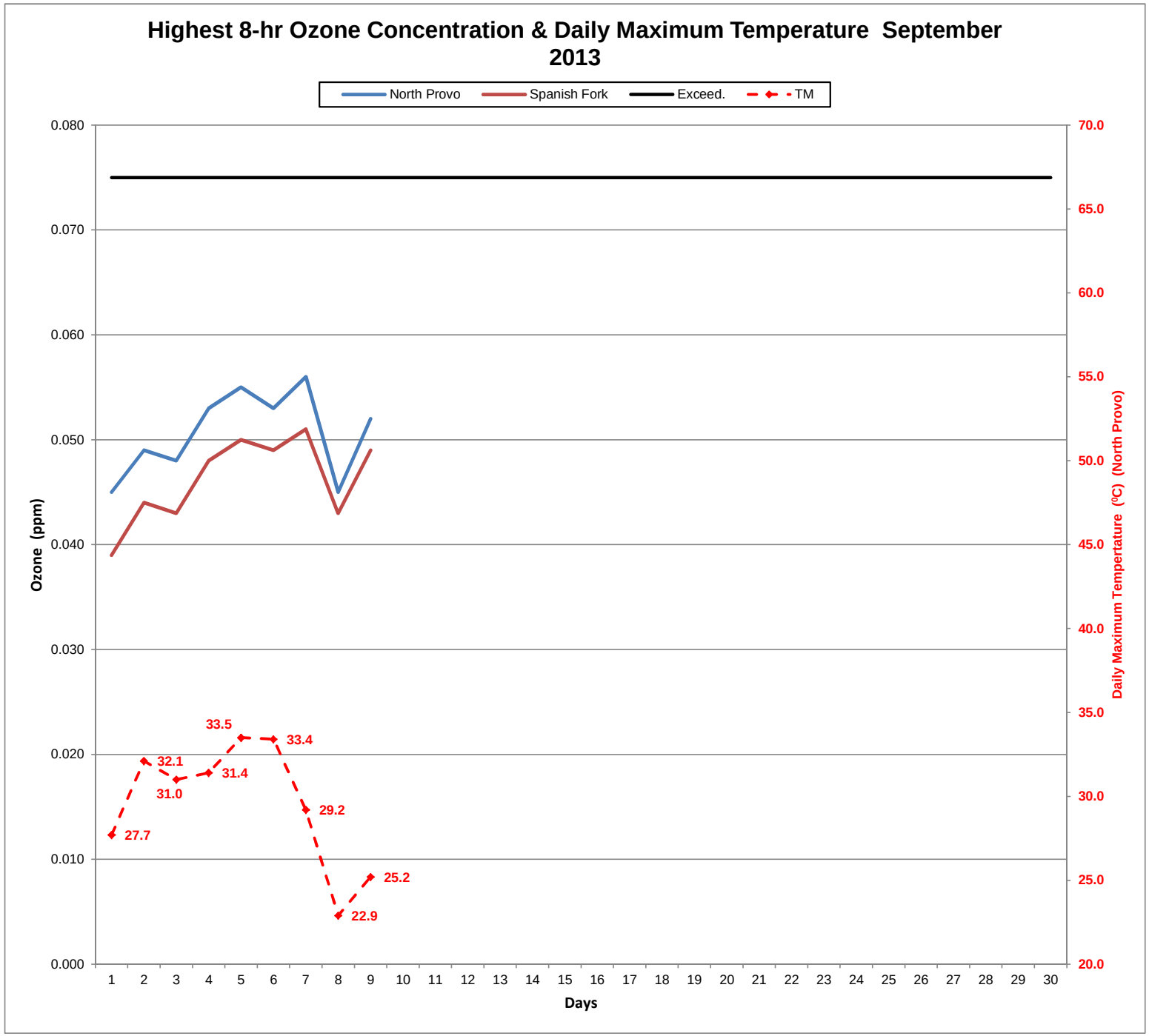

Highest 8-hr Ozone Concentration & Daily Maximum Temperature August 2013
North Provo
Spanish Fork
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (°C) (North Provo)
Days
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
1 2 3 4 5 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
33.1
33.7
34.0
34.2
34.6
33.0
32.0
29.6
29.7
31.1
32.7
34.9
31.3
33.9
35.4
35.4
34.1
33.3
33.3
31.4
33.0
31.9
22.4
29.1
27.2
23.9
27.4
32.9
33.9
33.6
28.4

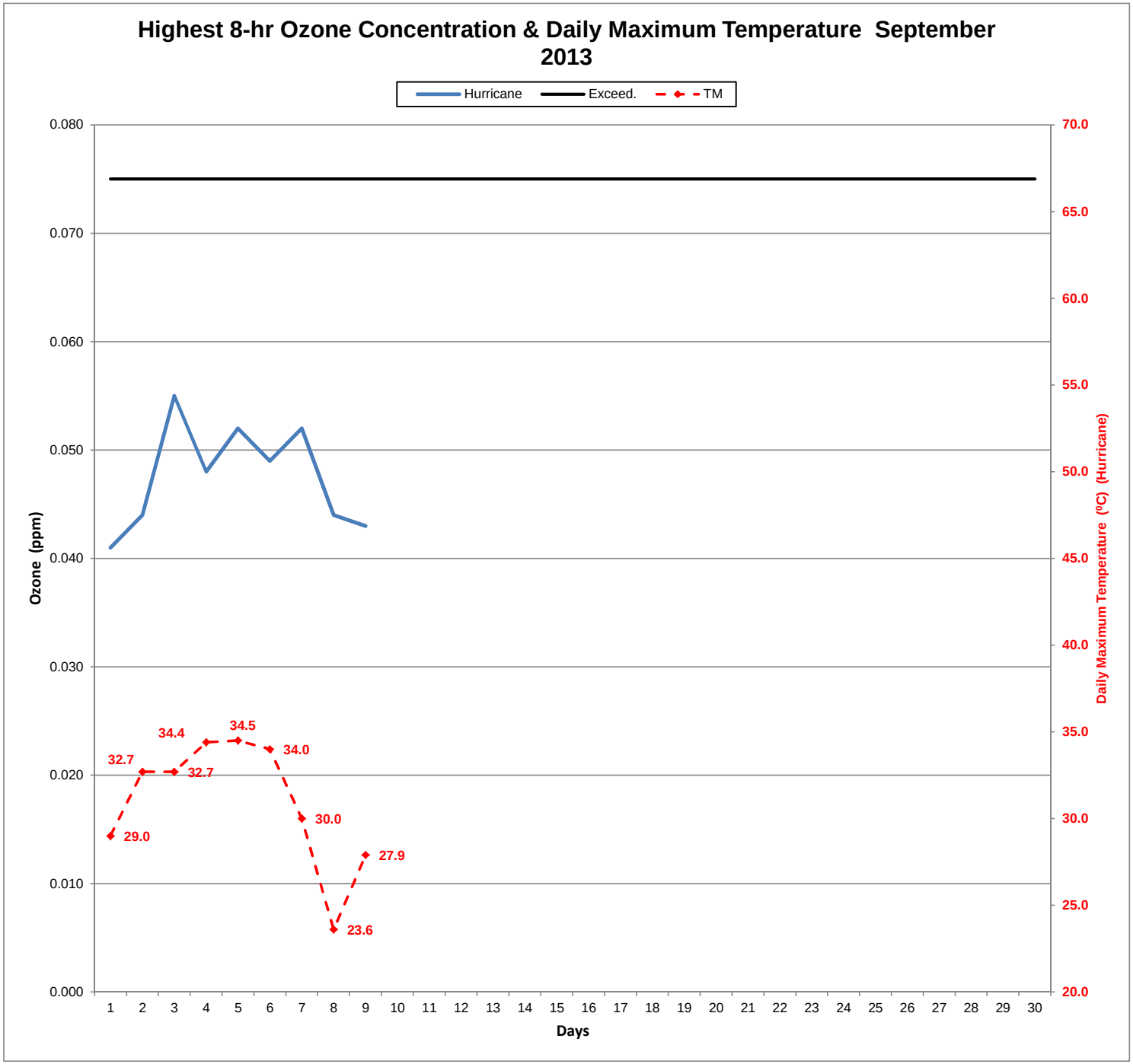

Highest 8-hr Ozone Concentration & Daily Maximum Temperature August 2013
Hurricane
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (ºC) (Hurricane)
Days
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
36.4
35.5
35.9
34.7
35.7
34.3
33.9
33.8
35.1
34.3
34.8
34.7
36.2
35.8
37.3
35.8
36.9
35.3
34.9
36.0
36.2
33.7
28.0
29.7
28.9
25.8
33.0
26.5
35.0
32.4
30.0


Highest 8-hr Ozone Concentration & Daily Maximum Temperature September 2013
Beach #4
Brigham City
Bountiful
Harrisville
Hawthorne
Ogden #2
Tooele #3
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (°C) (Hawthorne)
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
28.0
28.8
29.3
30.0
34.0
32.8
28.0
22.5
25.7


Highest 8-hr Ozone Concentration & Daily Maximum Temperature September 2013
Fruitland
Price #2
Roosevelt
Vernal
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (ºC) (Roosevelt)
Days
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
31.4
31.2
33.6
32.5
33.9
33.7
31.8
22.1
22.1


Highest 8-hr Ozone Conencentration & Maximum Temperature September 2013
Logan #4
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (ºC) (Logan #4)
Days
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
30.4
26.4
27.5
29.6
31.1
31.0
25.5
24.1
24.8


Highest 8-hr Ozone Concentration & Daily Maximum Temperature September 2013
North Provo
Spanish Fork
Exceed.
TM
Ozone (ppm)
Daily Maximum Tempertature (ºC) (North Provo)
Days
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
27.7
32.1
31.0
31.4
33.5
33.4
29.2
22.9
25.2


Highest 8-hr Ozone Concentration & Daily Maximum Temperature September 2013
Hurricane
Exceed.
TM
Ozone (ppm)
Daily Maximum Temperature (°C) (Hurricane)
Days
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
29.0
32.7
32.7
34.4
34.5
34.0
30.0
23.6
27.9