

UTAH
Division of Air Quality

ANNUAL REPORT

For the year

2008

January 2009

Table of Contents

Introduction	1
Utah Division of Air Quality	1
2008 Synopsis	1
Division Organization.....	3
Ambient Air Quality in Utah.....	4
Utah’s Air Monitoring Network.....	4
Air Quality Standards	6
NAAQS Non-attainment & Maintenance Areas.....	7
Criteria Air Pollutants.....	9
Carbon Monoxide (CO).....	9
Lead (Pb).....	10
Nitrogen Dioxide (NO ₂).....	11
Ozone (O ₃)	11
Particulate Matter: PM ₁₀ and PM _{2.5}	13
Sulfur Dioxide (SO ₂)	16
Emissions Inventories.....	17
Sources of Air Contaminants	18
Planning Branch	20
Status of Utah Projects & Initiatives	20
Ancillary Programs.....	28
Permitting Branch	29
New Source Review	30
Operating Permits.....	30
Air Standards Branch.....	31
Inspection and Enforcement	31
Stack Test Audits.....	32
2008 Compliance Summary.....	32
Air Toxics, Lead-Based Paint, Asbestos and Small Business Environmental Assistance Section (ATLAS)	32
2008 ATLAS Summary	33
Small Business Environmental Assistance Program (SBEAP)	34
Small Business Activity Summary.....	34
Outreach.....	34
Appendix 1 (Acronyms).....	34
Appendix 2 (Web-Page Links)	36

List of Tables

Table 1. Utah Monitoring Network Stations	6
Table 2. EPA Designated Criteria Pollutants.....	7
Table 3. Updated 2005 Criteria Pollutant Inventory (tons/year)	19

List of Figures

Figure 1. Utah Air Monitoring Network	5
Figure 2. Utah Non-attainment Areas as of December 31, 2008.....	8
Figure 3. Utah Maintenance Areas as of December 31, 2008	9
Figure 4. Carbon Monoxide Second Highest 8-hr. Concentration.....	10
Figure 5. Nitrogen Dioxide Annual Averages	11
Figure 6. Ozone 3-year Average 4 th Highest 8-hr Concentration	13
Figure 7. Ozone 4th Highest 8-hr Concentration	13
Figure 8. PM ₁₀ Highest 24-hr Concentration.....	15
Figure 9. PM _{2.5} 3-year Average 98 th Percentile 24-hr Concentration	15
Figure 10. PM _{2.5} 98 th Percentile of 24-hr Concentrations	16
Figure 11. Sulfur Dioxide 2 nd Highest 24-hr Values	17
Figure 12. 2005 Triennial Emissions Inventory by Source Category	18
Figure 13. PM _{2.5} Nonattainment Areas as Designated by EPA.....	21

Division of Air Quality

2008 Annual Report

Introduction

Utah Division of Air Quality

The mission of the Utah Division of Air Quality (DAQ) is to protect public health and the environment from the harmful effects of air pollution. It is the responsibility of DAQ to ensure that the air in Utah meets health and visibility standards established under the federal Clean Air Act (CAA). To fulfill this responsibility, DAQ is required by the federal government to ensure compliance with the U.S. Environmental Protection Agency's (EPA) National Ambient Air Quality Standards (NAAQS) statewide and visibility standards at National Parks. DAQ enacts rules pertaining to air quality standards, develops plans to meet the federal standards when necessary, issues preconstruction and operating permits to stationary sources, and ensures compliance with state and federal air quality rules.

Utah's mountain and valley topography, diverse economy, and a rapidly growing population create air quality challenges for the state. Despite these challenges, Utah's air is significantly cleaner than it was 25 years ago. In the early 1980s, the health standards for four of the six major ambient air pollutants identified by the EPA were violated in one or more Utah counties. More stringent federal regulations for motor vehicles and industry, as well as other emission controls developed as part of the State Implementation Plan for Utah, have resulted in reduced air pollution and improved visibility.

The DAQ allocates a large portion of its resources to implementing the CAA. The Utah Air Conservation Act empowers the Utah Air Quality Board (AQB) to enact rules pertaining to air quality issues. The DAQ staff supports the Board in its policymaking role. Board membership provides representation from industry, local government, environmental groups, and the public, and includes the Executive Director of the Department of Environmental Quality. The eleven board members have diverse interests, are knowledgeable in air pollution matters, and are appointed by the Governor with consent of the Senate. The Director of DAQ is the Board's Executive Secretary.

The Utah Air Quality Rules describe and define the Utah air quality program. Implementation of the rules requires DAQ interaction with industry, other government agencies and the public. The state air quality program is responsible for the implementation of both the federal standards under the CAA as well as state pollution rules for sources not regulated by the federal rules.

2008 Synopsis

The year 2008 saw the continuation of an ongoing trend of progress toward compliance with all federal health standards for criteria air pollutants. Despite an ever-increasing population and industrial base, Utah's monitored concentrations of all criteria pollutants have either stayed the same or continued their decreasing trends.

On March 12, 2008, the EPA revised the National Ambient Air Quality Standard (NAAQS) for ozone. They tightened the standard and eliminated the rounding convention that was found in the old standard. This, in effect, lowered the ozone standard from 0.084 ppm to 0.075 ppm. As a result of this change there are several areas along the Wasatch Front that currently have monitoring data above the new standard.

Similar efforts have been made by DAQ to curb the levels of particulate matter. During wintertime episodes of air stagnation and temperature inversion, low-lying valleys routinely experience elevated concentrations of both PM₁₀ and PM_{2.5}. Although PM₁₀ concentrations no longer exceed the standard under these conditions, the new PM_{2.5} standard is low enough that it is violated in most areas along the Wasatch Front as well as in the Cache Valley.

EPA revised the 24-hour standard for PM_{2.5} on September 21, 2006, strengthening it from the 1997 level of 65 µg/m³ to 35 µg/m³. It is based on a three-year average of the 98th percentile of monitored values. The annual standard of 15 µg/m³ was retained from the 1997 standards. All areas of Utah had been in compliance with the 1997 standards, and ambient 24-hour PM_{2.5} concentrations have steadily decreased along the Wasatch front from 2000 through 2007. DAQ spent significant resources during 2007 to analyze the areas that did not meet the new standard, and in December of that year, submitted a recommendation to EPA as to which areas should be designated nonattainment for the new standard. DAQ spent much of 2008 working with EPA to finalize the nonattainment area boundaries. EPA made its determination in December of 2008, to be effective the spring of 2009. Utah's three nonattainment areas for PM_{2.5} will be as follows: The Provo nonattainment area will include all of Utah County except for the mountainous areas East of Utah Valley. The Salt Lake City nonattainment area will encompass the remainder of the Wasatch Front. It will include all of Salt Lake and Davis Counties, all of Weber County west of the Wasatch Front, a portion of Tooele Valley, and a portion of Box Elder County surrounding Brigham City. Finally, the Logan nonattainment Area will include all of Cache Valley; including the portion on the Idaho side of the border (see Figure 13 below for a map of the new nonattainment areas).

Mercury is another pollutant that has attracted recent attention. During 2007, fish collected from several of Utah's waterways were found to have elevated levels of mercury. In an effort to understand how much of that mercury may have come through airborne transport, DAQ acquired a wet-deposition monitor to evaluate the amount of mercury that is deposited via rain or snow in Utah. In 2008, DAQ received funding from the Legislature to also acquire a dry-deposition mercury monitor to attempt to identify the amount of mercury that is deposited in Utah during dry weather. The dry-deposition monitor was installed in September 2008 and will continue to provide data throughout the coming year. The operation and maintenance of these monitors is critical to understanding the mechanism for mercury deposition in Utah, and will lead to an understanding of the sources of the mercury that is being deposited here.

DAQ also sits on the Statewide Mercury Work Group; a 15 member task force representing industry, government and advocacy groups organized to assess the extent of mercury contamination in Utah and set priorities for protecting the public. In late 2007 the Utah Department of Environmental Quality signed a Memorandum of Understanding

(MOU) with Idaho, Nevada, and EPA Regions 8, 9, and 10 to cooperate on technical and regulatory issues regarding mercury. This MOU created the Great Basin Mercury Working Group which held its first regional conference in Reno, Nevada in early January, 2008. The director of DAQ co-chaired the meeting while staff members from DAQ were among the technical presenters who attended. Scientists and researchers from around the region and the country also took part in the meeting.

Also in 2008, the Division spent a large amount of time defending the permit for a coal-fired power plant to be located near Sigurd, UT. The Sierra Club had appealed the permit over several issues that they felt were inadequately addressed. The Air Quality Board heard three full days of testimony and upheld the permit with no changes. The Sierra Club has appealed the Board's decision to the Utah Supreme Court. A decision has not been finalized at the time of publication of this report.

Division Organization

The DAQ is divided into three separate branches: Permitting, Planning, and Air Standards. The *Permitting Branch* is responsible for issuing construction and operating permits to stationary sources that emit air pollutants, and is comprised of three sections: Minor Source New Source Review (NSR), Major Source NSR, and Operating Permits. Construction permits are issued to new or modified stationary sources of air pollution through the New Source Review program. Operating permits are issued on an ongoing basis through Title V of the CAA to "major" stationary sources.

The *Planning Branch* is comprised of four sections: The Air Monitoring Center (AMC), Mobile Sources, SIP/Rules, and Technical Analysis. The AMC is responsible for establishing and operating the monitoring network to gather and analyze data used to determine concentrations of ambient air pollutants. The Planning Branch is also responsible for developing comprehensive plans to reduce air pollution. Planning staff routinely compile emissions inventories in order to understand the origins of the various contaminants detected in the air, and use computer models to evaluate the impacts of new and existing sources of air pollution. They also use computer models to understand the relationship between the emissions, meteorology, and pollutant concentrations measured in the air. The branch is also involved in identifying the air quality impacts of transportation issues which include vehicle inspection and maintenance, clean fuels, and highway construction. This information must be considered in the development of State Implementation Plans (SIPs) in order to ensure that Utah's ambient air remains in compliance with the federal health standards, even as our population and our economy continue to grow.

The *Air Standards Branch* has responsibility for ensuring that industries and residents comply with Utah's air quality regulations, and is comprised of three sections: Major Source Compliance, Minor Source Compliance, and Air Toxics, Lead-Based Paint, Asbestos, and Small Business Environmental Assistance (ATLAS). The Major and Minor Source Compliance Sections are responsible for ensuring that all Utah air quality regulatory requirements are met. This is done through inspections and enforcement. The ATLAS Section is responsible for the regulation, under various EPA air quality programs, of toxic air pollutants, also known as Hazardous Air Pollutants (HAPs). HAPs

are those pollutants listed in the CAA that are known or suspected to cause cancer and other serious health problems. The ATLAS section is also responsible for the enforcement of federal and state regulations for preconstruction asbestos removal and a number of outreach and enforcement programs designed to reduce exposure to lead-based paint.

The ATLAS section also assists small businesses in complying with state and federal regulations including New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), NSR, and Utah Air Quality Rules. The Small Business Environmental Assistance Program can advise small businesses on permitting requirements, emission calculations, technical issues, and pollution prevention techniques.

Ambient Air Quality in Utah

Utah's Air Monitoring Network

The Air Monitoring Center operates a network of monitoring stations along the Wasatch Front from Logan to Spanish Fork and in Santa Clara, Utah. The monitors are situated to measure air quality in both neighborhoods and industrial areas. Figure 1 shows the general location of the active monitoring sites in Utah, and Table 1 presents the location, meteorology and pollutants monitored for each site. In addition, meteorological data are collected at many locations to provide localized data for air quality modeling that is used to evaluate the impacts of new sources and to assess the effectiveness of regional mitigation strategies.

Figure 1. *Utah Air Monitoring Network*

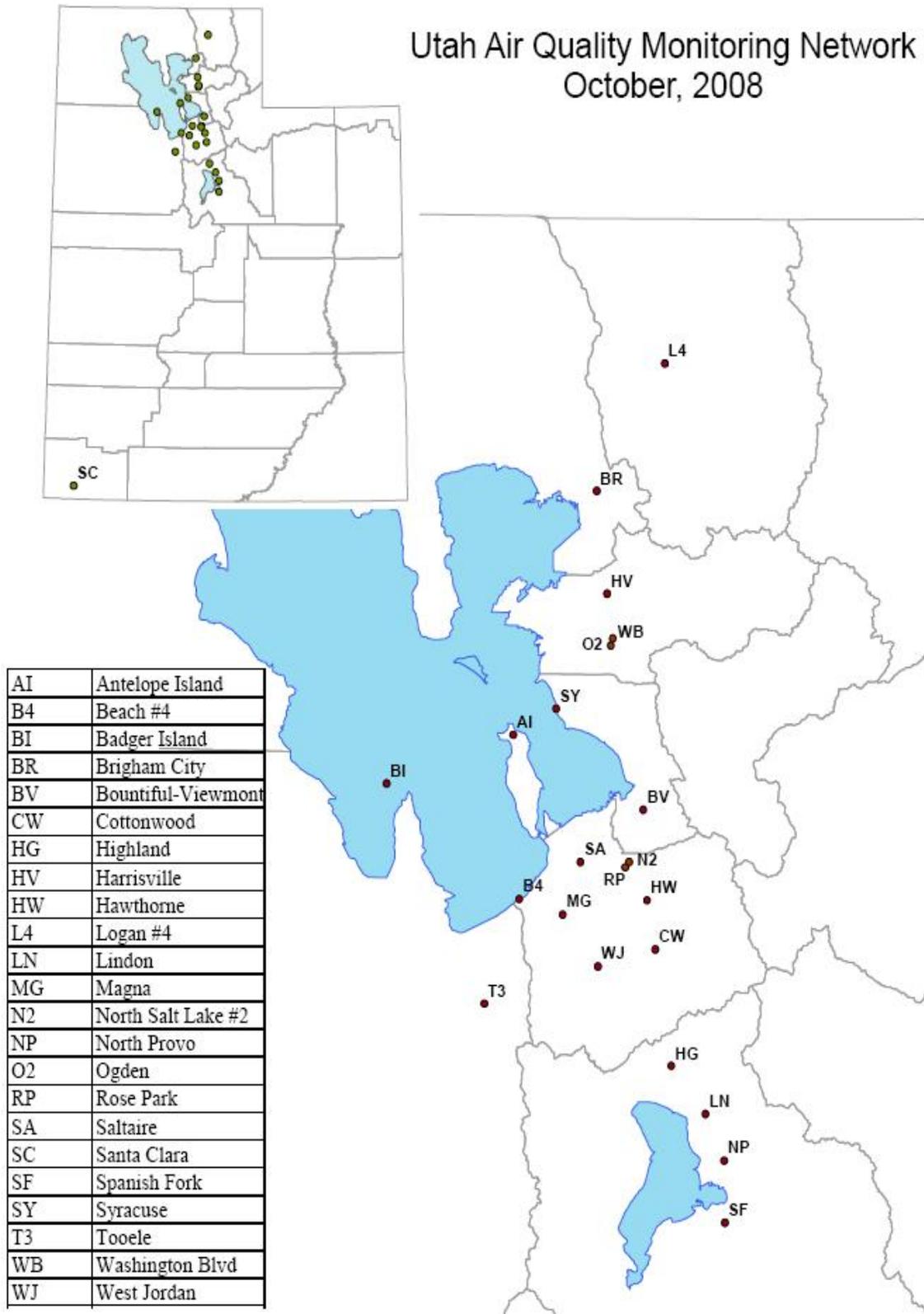


Table 1. Utah Monitoring Network Stations

Station	City	Address	CO	Lead	NO ₂	O ₃	PM ₁₀	PM _{2.5}	SO ₂	Met.
Antelope Island	None	North end of island								X
Badger Island	None	On Island								X
Beach	Lakepoint	12100 W. 1200 S.				X			X	X
Bountiful	Bountiful	171 W. 1370 N.			X	X		X	X	X
Brigham City	Brigham City	140 W. Fishburn Dr.				X		X		X
Cottonwood	SLC	5715 S. 1400 E.	X		X	X	X	X		X
Harrisville	Harrisville	425 W. 2250 N.				X		X		X
Hawthorne	SLC	1675 S. 600 E.	X		X	X	X	X		X
Highland	Highland	10865 N. 6000 W.				X		X		X
Lindon	Lindon	30 N. Main St.					X	X		X
Logan	Logan	125 W. Center St.	X			X	X	X		X
Magna	Magna	2935 S. 8560 W.					X	X	X	X
North Provo	Provo	1355 N. 200 W.	X		X	X	X	X		X
N. Salt Lake	SLC	1795 N. Warm Springs Rd.					X		X	
Ogden #2	Ogden	228 32nd St.			X		X	X		
Rose Park	SLC	1375 W. 1230 N.						X		
Saltaire	None	NW of Int'l Center								X
Spanish Fork	Spanish Fork	312 W. 2050 N.				X		X		X
Syracuse	Syracuse	5100 W. 1700 S.								X
Tooele	Tooele	434 N. 50 W.				X		X		X
Washington Blvd.	Ogden	2540 S. Washington Blvd.	X							
West Jordan	West Jordan									X
Santa Clara	Santa Clara	1215 N Lava Flow Dr (Snow Canyon Middle School)				X				X

Air Quality Standards

The Clean Air Act as last amended in 1990 requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The CAA established two types of national air quality standards: primary and secondary standards. Primary standards are set to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards are set to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA has established health-based NAAQS for six pollutants known as “criteria pollutants.” These are carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide. Each of these pollutants is addressed in greater detail later in this chapter, but Table 2 provides a brief description of each. The primary health standards are established by considering both the concentration level and the duration of exposure that can cause adverse health effects. Pollutant concentrations that exceed the NAAQS are considered unhealthy. The DAQ monitors each of these criteria pollutants, as well as several non-criteria pollutants for special studies.

Table 2. EPA Designated Criteria Pollutants

Name	Sources	Health Effects	Welfare Effects
Carbon Monoxide (CO); a clear, colorless, odorless gas	Burning of gasoline, wood, natural gas, coal, oil, etc.	Reduces the ability of blood to transport oxygen to body cells and tissues; cells and tissues need oxygen to work. Carbon monoxide may be particularly hazardous to people who have heart or circulatory (blood vessel) problems and people who have damaged lungs or breathing passages.	
Lead (Pb)	Paint (houses, cars), smelters (metal refineries); manufacture of lead storage batteries; note: burning leaded gasoline was the primary source of lead pollution in the US until unleaded gasoline was mandated by the federal government.	Lead damages nervous systems, including brains, and causes digestive system damage. Children are at special risk. Some lead-containing chemicals cause cancer in animals.	Lead can harm wildlife
Nitrogen Dioxide (NO₂) (one component of NO _x); smog-forming chemical	Burning of gasoline, natural gas, coal, oil, and other fuels; Cars are also an important source of NO ₂	Nitrogen dioxide can cause lung damage, illnesses of breathing passages and lungs (respiratory system).	Nitrogen dioxide is an ingredient of acid rain (acid aerosols), which can damage trees, lakes, flora and fauna. Acid aerosols can also reduce visibility
Ozone (O₃) (ground-level ozone is the principal component of smog)	Chemical reaction of pollutants; VOCs and NO _x	Ozone can cause breathing problems, reduced lung function, asthma, irritated eyes, stuffy noses, and reduced resistance to colds and other infections. It may also speed up aging of lung tissue.	Ozone can damage plants and trees; smog can cause reduced visibility
Particulate Matter (PM₁₀, PM_{2.5}); dust, smoke, soot	Burning of gasoline, natural gas, coal, oil and other fuels; industrial plants; agriculture (plowing or burning fields); unpaved roads, mining, construction activities. Particles are also formed from the reaction of VOCs, NO _x , SO _x and other pollutants in the air.	Particulate matter can cause nose and throat irritation, lung damage, bronchitis, and early death.	Particulate Matter is the main source of haze that reduces visibility
Sulfur Dioxide (SO₂)	Burning of coal and oil (including diesel and gasoline); industrial processes.	Sulfur dioxide can cause breathing problems and may cause permanent damage to lungs.	SO ₂ is an ingredient in acid rain (acid aerosols), which can damage trees, lakes, flora and fauna. Acid aerosols can also reduce visibility

NAAQS Non-attainment & Maintenance Areas

Areas that are not in compliance with the NAAQS are referred to as non-attainment areas. Figure 2, on the next page, is a map of the current non-attainment areas within the state. A maintenance area is an area that was once designated as non-attainment, and which subsequently demonstrated that it will attain and maintain a particular standard for a period of 10 years. EPA must approve the demonstration. Figure 3, on the following page, is a map of the current maintenance areas within the state.

Figure 2 *Utah Non attainment Areas as of December 31, 2008*

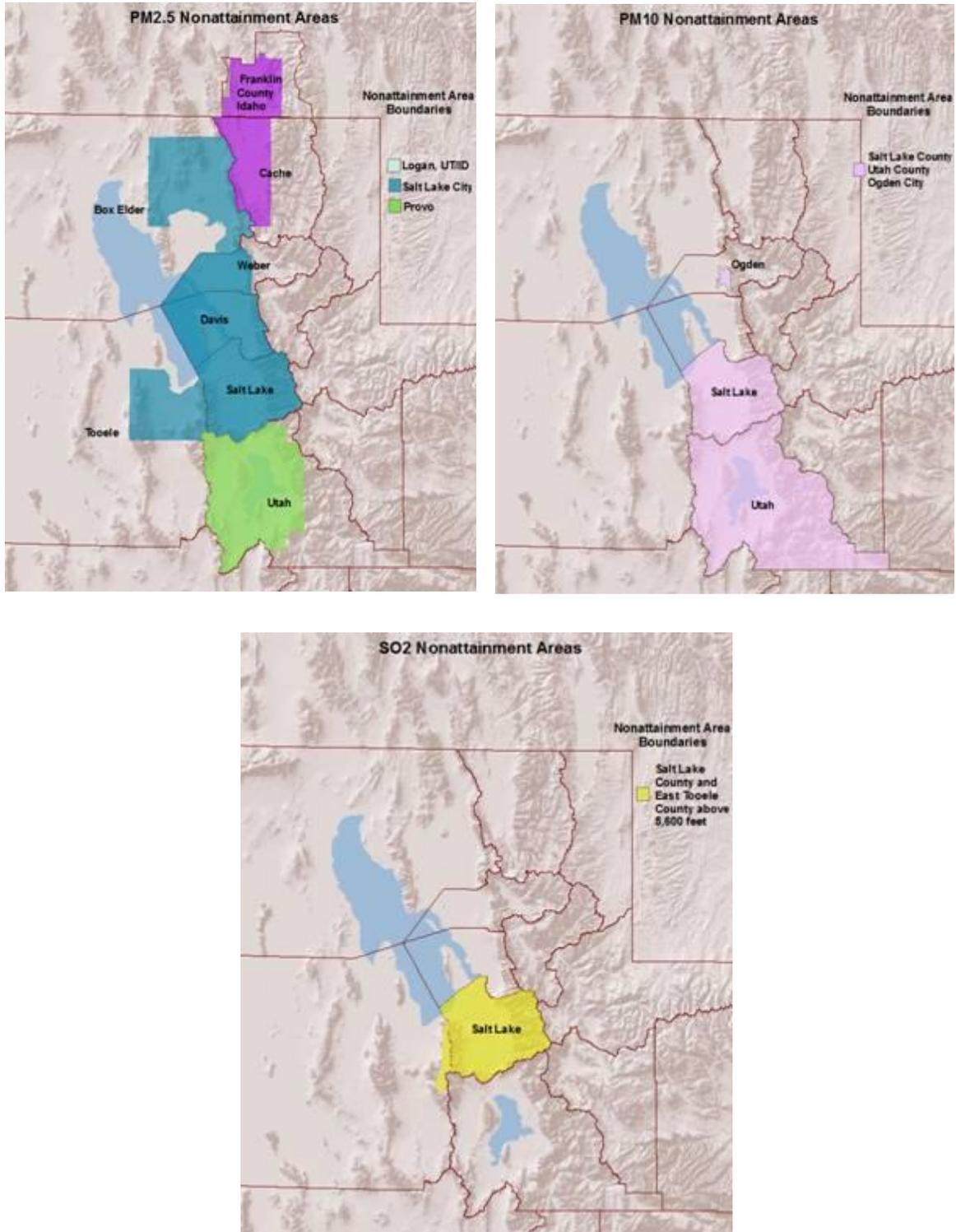
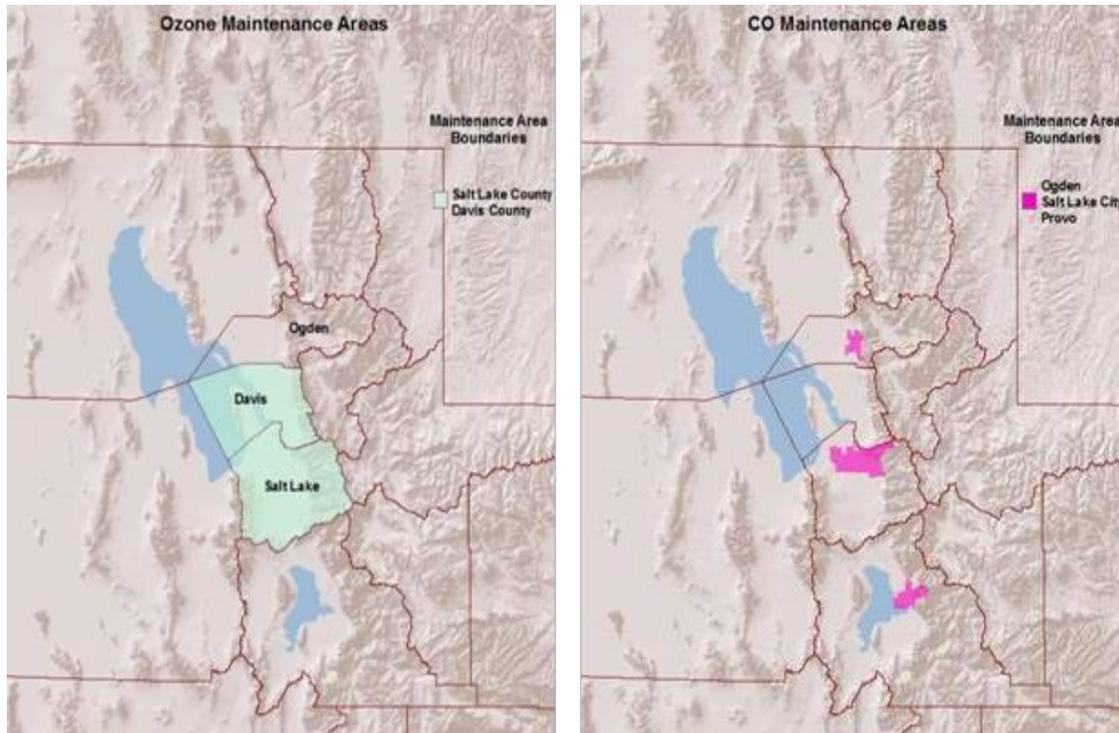


Figure 3. *Utah Maintenance Areas as of December 31, 2008*



Criteria Air Pollutants

Carbon Monoxide (CO)

Carbon monoxide (CO) is a colorless and odorless gas, formed by the incomplete combustion of carbon fuel. Carbon monoxide is primarily produced from on-road motor vehicle emissions. Other significant sources of CO emissions are wood burning stoves and fireplaces. The remaining emissions come from industrial facilities, construction equipment, miscellaneous mobile sources and other types of space heating.

Because motor vehicle emissions are the major source of CO, the highest concentrations occur during morning and evening rush hours near high traffic areas. The worst problems occur when there are large numbers of slow-moving vehicles in large parking lots, busy intersections, and traffic jams. Carbon Monoxide problems are greater in winter due to several factors: cold weather makes motor vehicles run less efficiently, wood burning and other space heating takes place in the winter, and cold weather temperature inversions trap CO near the ground.

Standards

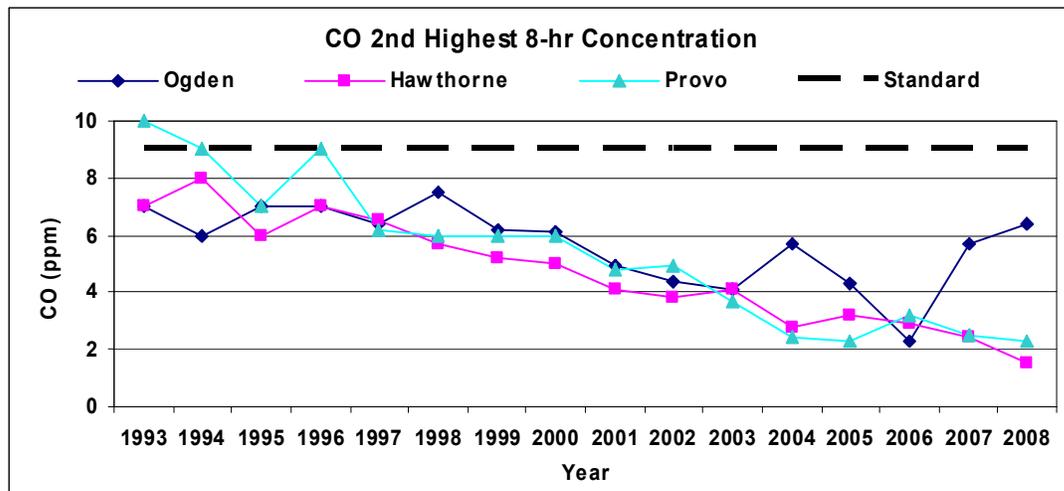
The EPA has developed two national standards (NAAQS) for CO. They are 35 ppm (parts per million) of CO averaged over a 1-hour period and 9 ppm of CO averaged over an 8-hour period. A violation of the NAAQS occurs with the second exceedance of either standard at a single location in a calendar year. Once a location measures a second exceedance of either

standard, it is considered to be in violation and becomes designated as a “non-attainment area.” Three cities in Utah (Salt Lake City, Ogden, and Provo) were at one time designated non-attainment areas for CO. Due primarily to improvements in motor vehicle technology, the State of Utah has been in compliance with the CO standards since 1994. Salt Lake City, Ogden, and Provo were successfully re-designated to “attainment” status in 1999, 2001, and 2006 respectively.

Carbon Monoxide in 2008

No exceedances of the CO standards were observed anywhere in Utah during 2008. Figure 4 shows a 16-year trend in CO emissions. The steady decline is primarily due to improvements in vehicle emissions control technology. The causes of the higher concentrations monitored for Ogden in 2007 and 2008 seem to be from nearby vehicular traffic too close to the monitor. This site location is being reevaluated to remedy this type of situation.

Figure 4.



Lead (Pb)

Lead in the ambient air exists primarily as particulate matter in the respirable size range. Historically, the major source of lead was from gasoline. However, because leaded gasoline for automobiles was completely phased-out in the United States by the end of 1995, lead from this source is no longer a significant problem. The extraction and processing of metallic ores is currently the major source of lead in Utah, and dust from the removal of lead-based paint is another.

Standard

On November 12, 2008 EPA strengthened the NAAQS for lead. The previous standard for lead was a calendar quarter (3-month) average concentration, not to exceed 1.5 micrograms per cubic meter of air. The new standard is 0.15 micrograms per cubic meter of air, measured as a 3-month rolling average. Utah had not exceeded the health standard for lead since the late 1970s, and discontinued monitoring for lead in 2006. Previous monitoring indicates that lead levels in Utah will meet the new standard. DAQ is

reviewing the new monitoring requirements for lead and will revise the monitoring network as necessary to meet the new federal requirements.

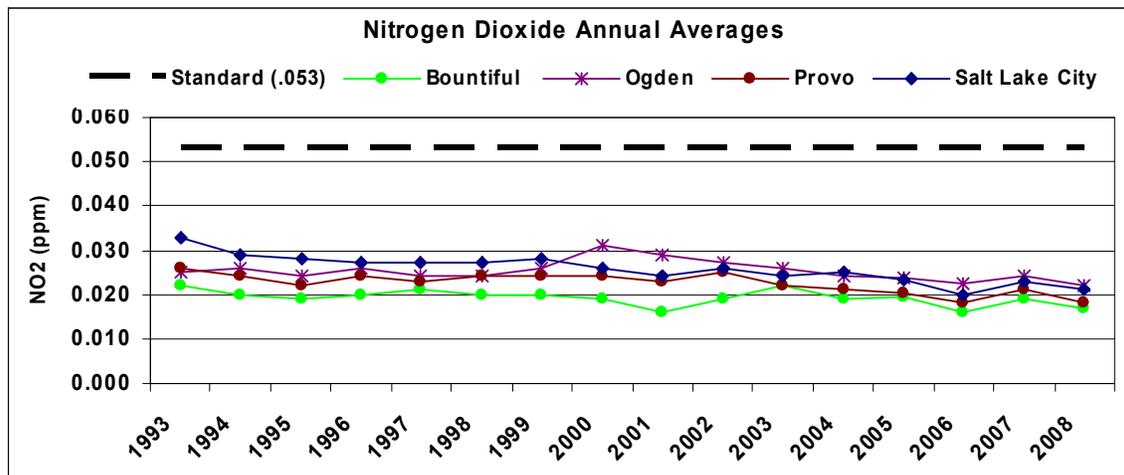
Nitrogen Dioxide (NO₂)

During high temperature combustion, nitrogen in the air reacts with oxygen to produce various oxides of nitrogen, or NO_x, a reddish-brown gas. One of the oxides of nitrogen, nitrogen dioxide (NO₂), is considered a criteria pollutant.

Standard

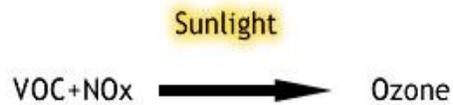
The annual standard for nitrogen dioxide is 0.053 ppm expressed as an annual arithmetic mean (average). Los Angeles is the only U.S. city that has recorded exceedances of the nitrogen dioxide annual standard in the past seventeen years. The DAQ monitors the concentrations of NO₂ at various locations throughout the state, but has never observed a violation of the annual standard. However, oxides of nitrogen react with other air contaminants to form other criteria pollutants. In the summer, photochemical reactions between NO₂ and volatile organic compounds (VOCs) lead to the formation of ground-level ozone. In the winter, NO₂ reacts with ammonia to form fine particulate matter (PM_{2.5}). Both of these seasonal scenarios can result in increased pollution. Utah continues to struggle with both the ozone and particulate matter standards, and because of this, DAQ is mindful of the trend in NO₂ emissions illustrated in Figure 5.

Figure 5.



Ozone (O₃)

Ozone is a gas composed of three oxygen atoms. Ozone at ground level can be inhaled and is considered a pollutant. Ground-level ozone should not be confused with the stratospheric ozone layer that is located approximately 15 miles above the earth's surface. It is this layer that shields the earth from cancer-causing ultraviolet radiation. Ground level ozone is formed by a complex chemical reaction involving volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) in the presence of sunlight.



Ozone production is a year-round phenomenon. However, the highest ozone levels occur during the summer when strong sunlight, high temperatures, and stagnant meteorological conditions combine to drive chemical reactions and trap the air within a region for several days. Some of the major sources for these pollutants are vehicle and engine exhaust, emissions from industrial facilities, gasoline vapors, chemical solvents, and biogenic emissions from natural sources.

Standard

On March 12, 2008 the EPA revised the National Ambient Air Quality Standard (NAAQS) for ozone. They tightened the standard and eliminated the rounding convention that was found in the previous standard. This, in effect, lowered the 8-hour standard from 0.084 ppm to 0.075 ppm. The standard is based on a 3-year average of the annual 4th highest daily 8-hour average concentration. Several areas along the Wasatch Front have current ambient monitoring data that met the standard prior to the 2008 revision, but exceed this new standard.

In response to the requirements of the new 8-hour ozone standard, DAQ is currently preparing an initial recommendation for the EPA regarding the current attainment status of all areas of the state. This recommendation will be submitted to EPA in March 2009. EPA will evaluate our recommendation and issue final attainment designations by March of 2010. Utah will then be required to submit a State Implementation Plan (SIP) to the EPA by March 2013 showing how the state intends to attain the new standard.

Ozone in 2008

As a result of the tightening of the ozone standard discussed above, several counties (Weber, Davis, Salt Lake and Utah) are currently not attaining the new ozone standard. The following charts (Figures 6 and 7) illustrate recent trends in recorded ozone concentrations along the Wasatch Front relative to the new standard.

Figure 6 presents the NAAQS threshold which is the 3-year average of the 4th highest 8-hour ozone concentration from monitors along the Wasatch front. The heavy dashed line indicates the current standard of 0.075 ppm.

Figure 6.

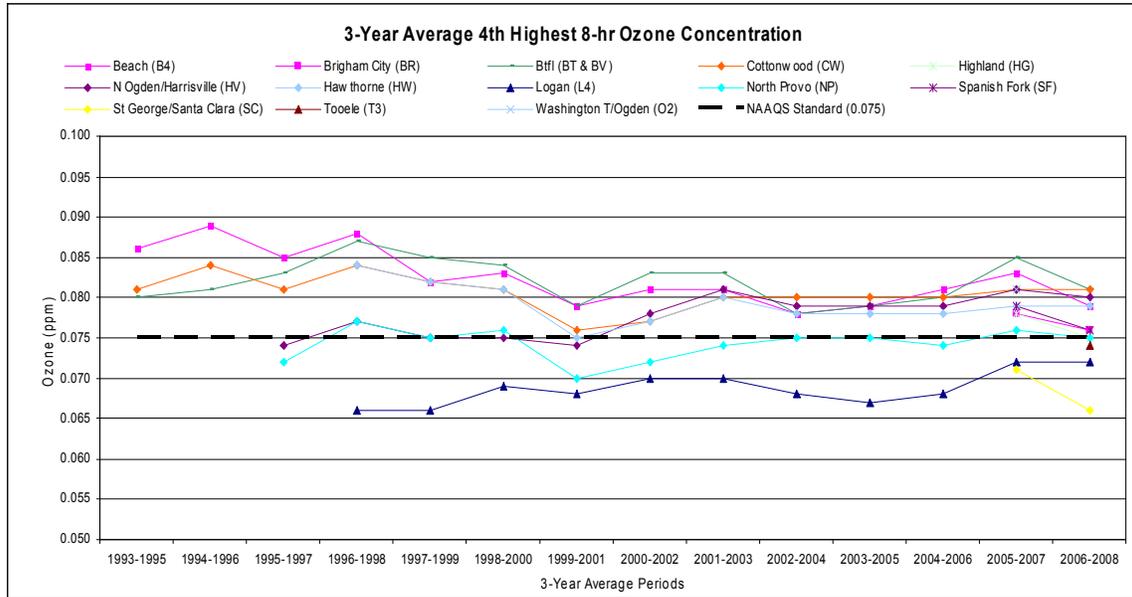
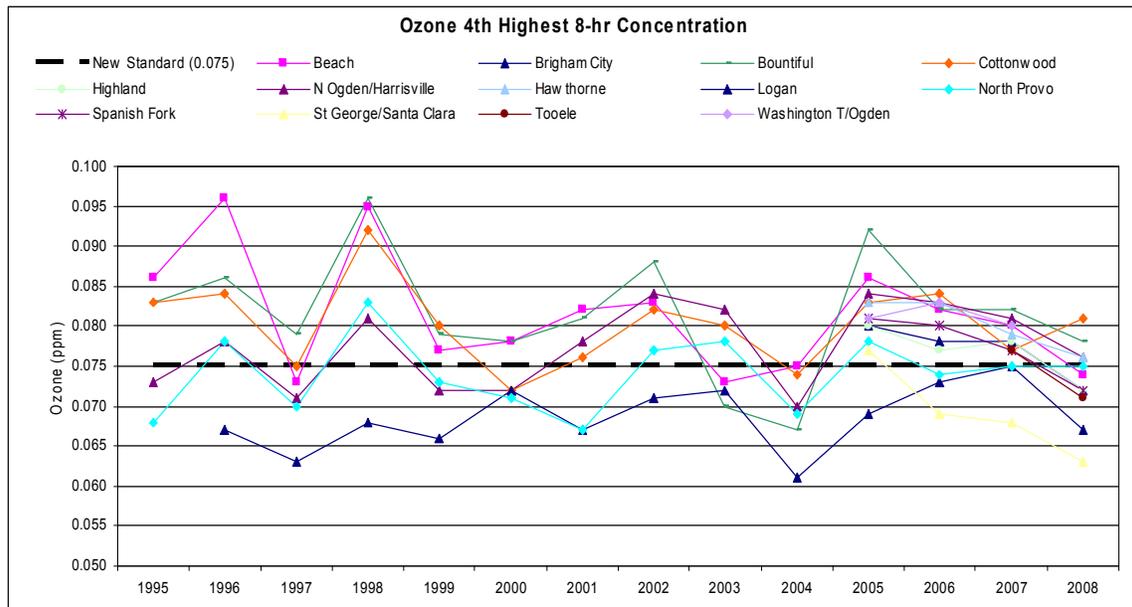


Figure 7 shows the 8-hour ozone concentrations by looking at the 4th highest annual concentration at network monitors for the past fourteen years.

Figure 7.



Particulate Matter (PM₁₀ and PM_{2.5})

Regulated particulate matter (PM) is a complex mixture of extremely tiny particles of solid or semi-solid material suspended in the atmosphere and is divided into two categories: PM₁₀ and PM_{2.5}. PM₁₀ is particulate less than 10 micrometers in diameter, which is about one-seventh the width of a strand of human hair. PM₁₀ can lodge deep in the lungs and cause respiratory problems. The coarse fraction of PM₁₀, that which is

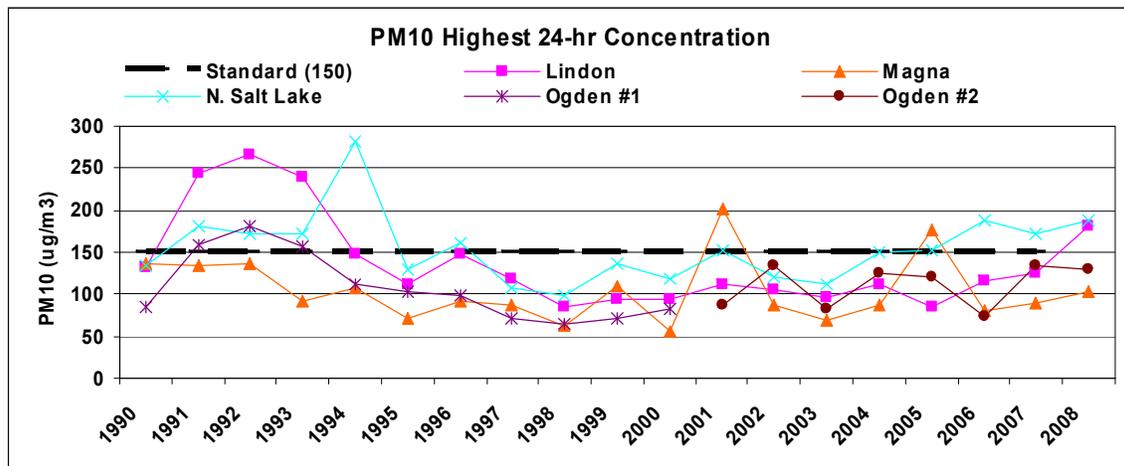
larger than 2.5 microns, is typically made up of “fugitive dust” (sand and dirt blown by winds from roadways, fields, and construction sites) and contains large amounts of silicate (sand like) material.

PM_{2.5}, or fine particulate, is less than 2.5 micrometers in diameter. PM_{2.5} is generally produced from combustion sources and includes fly ash from power plants, carbon black from cars and trucks, and soot from fireplaces and woodstoves. Much of Utah’s PM_{2.5} is called secondary aerosol meaning that it was not emitted directly as a particle, but was produced when gasses such as sulfur dioxide (SO₂) or nitrogen oxides (NO_x) reacted with other gasses in the atmosphere such as ammonia (NH₃) to become tiny particles. SO₂ and NO_x are also products of combustion. Wintertime temperature inversions not only provide ideal conditions for the creation of secondary aerosols, but at the same time act to trap air in valleys long enough for concentrations of PM_{2.5} to build up to levels that can be unhealthy. The smallest of particles that make up PM_{2.5} are major contributors to visibility impairment in both urban and rural areas. Along the Wasatch Front, the effects can be seen as the thick brownish haze that lingers in our northern valleys, particularly in the winter. These particles are so small that they can become imbedded in human lung tissue, exacerbating respiratory diseases and cardiovascular problems. Other negative effects are reduced visibility and accelerated deterioration of buildings. DAQ currently operates PM₁₀ and PM_{2.5} monitors throughout the state to assess the ambient air quality with respect to the standards for both PM₁₀ and PM_{2.5}.

Standards - PM₁₀

Annual and 24-hour air quality standards for PM₁₀ were established by the EPA in July 1987. The 24-hour standard was set at 150 micrograms per cubic meter (µg/m³) and is met when the probability of exceeding the standard is no greater than once per year for a 3-year averaging period. In other words, four exceedances within a 3-year period would constitute a violation. The annual PM₁₀ standard was set at 50 µg/m³ and calculated as the 3-year average of annual means. The PM standards were revised by EPA in December of 2006. In so doing, the agency retained the 24-hour PM₁₀ standard but revoked the annual standard. Utah had never violated the annual standard for PM₁₀, but Utah County, Salt Lake County, and Ogden City are officially designated as PM₁₀ nonattainment areas because of past difficulty with the 24-hour standard. Figure 8 presents the highest 24-hour PM₁₀ concentrations recorded at each station from 1990 to 2008. The heavy dashed line indicates the national ambient air quality standard. Control strategies contained in State Implementation Plans promulgated in 1991 were responsible for the marked decrease in concentrations observed in the early 1990s. The associated control strategies were phased in through 1995. High monitoring values resulting from exceptional events (high winds and wildfires) in 2005 through 2008 have been flagged and are currently under review.

Figure 8.



Standards - PM_{2.5}

EPA first established standards for PM_{2.5} in 1997, and then revised those standards in December of 2006. It lowered the 24-hour PM_{2.5} standard from 65 µg/m³ to 35 µg/m³, and retained the current annual PM_{2.5} standard at 15 µg/m³. Both standards are evaluated by considering monitored data collected during a 3-year period. In this way, the effects of meteorological variability are minimized. For the annual standard, a 3-year average of the annual mean concentrations must not exceed 15 µg/m³. The 24-hour standard is met when the average of 98th percentile values collected for each of the three years is less than or equal to 35 µg/m³. The 98th percentile concentration for each year is selected from all of the data recorded at a given monitor, such that the values of at least 98 percent of all that data were of a lower concentration. Some historical PM_{2.5} data is presented in Figures 9 and 10. Figure 9 presents the 3-year averages of the 98th percentile concentrations at Wasatch front monitors for 2000 – 2008. The following graph shows that Utah was in compliance with the 1997 standard but is not in compliance under the revised standard.

Figure 9.

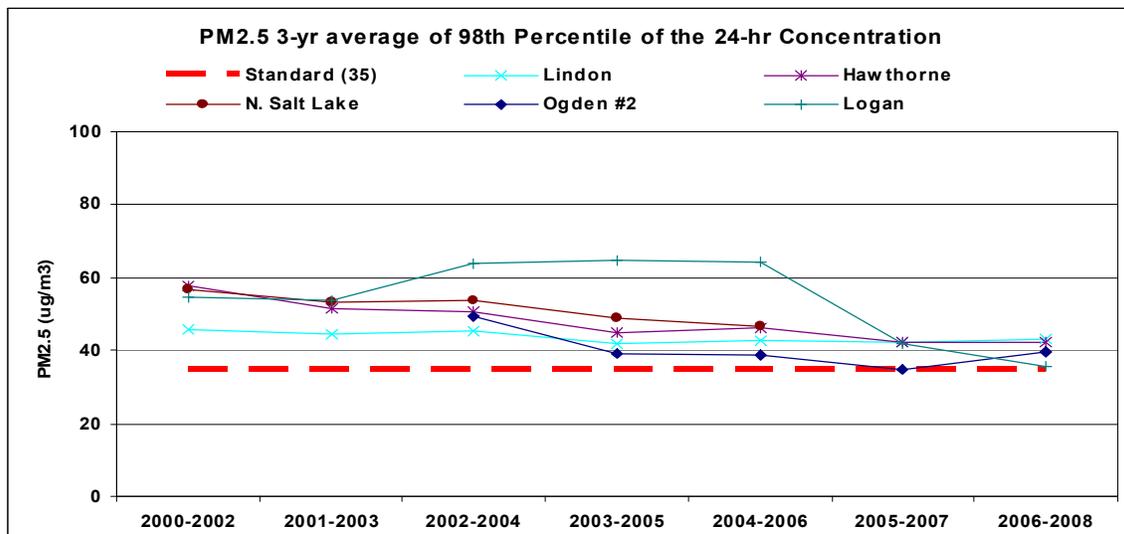
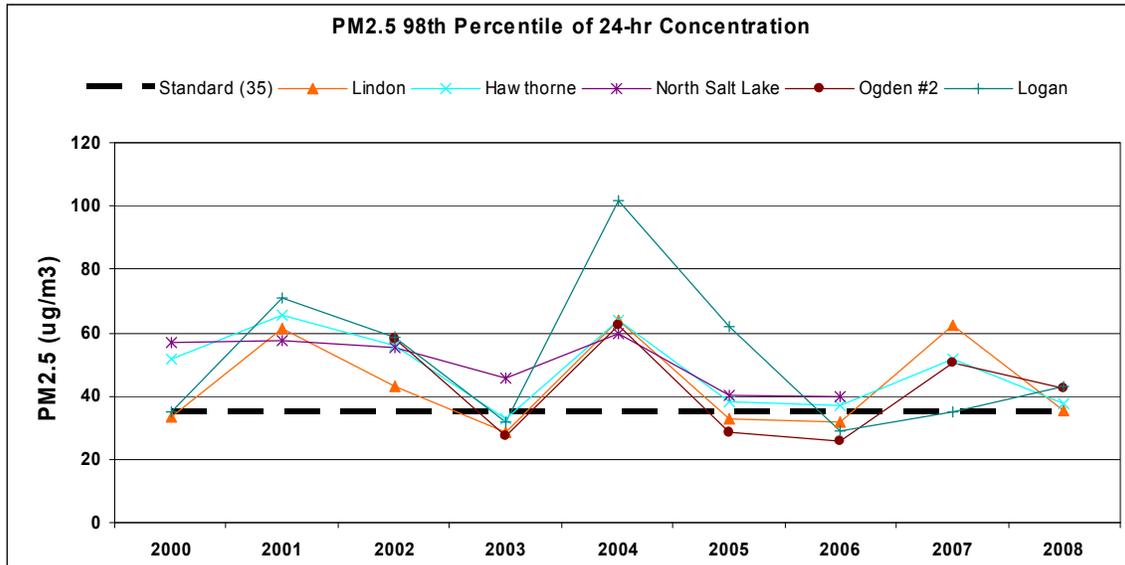


Figure 10 shows the 98th percentile concentrations for discrete years within the period 2000-2008. This illustrates the effect of meteorological variability. In particular, the severity of wintertime temperature inversions has a dramatic effect on PM_{2.5} concentrations collected year to year.

Figure 10.



Sulfur Dioxide (SO₂)

Sulfur dioxide is a colorless gas with a pungent odor. In the atmosphere, sulfur dioxide is easily converted into sulfates, which are detected as particulates. It is also converted into sulfuric acid, the major acidic component of acid rain. It is emitted primarily from stationary sources that burn fossil fuels (mainly coal and oil) such as power plants and refineries, and is also a byproduct of copper smelting and steel production. Diesel fuel and, to a lesser extent, gasoline contain sulfur and are considered contributors to sulfur dioxide in the atmosphere.

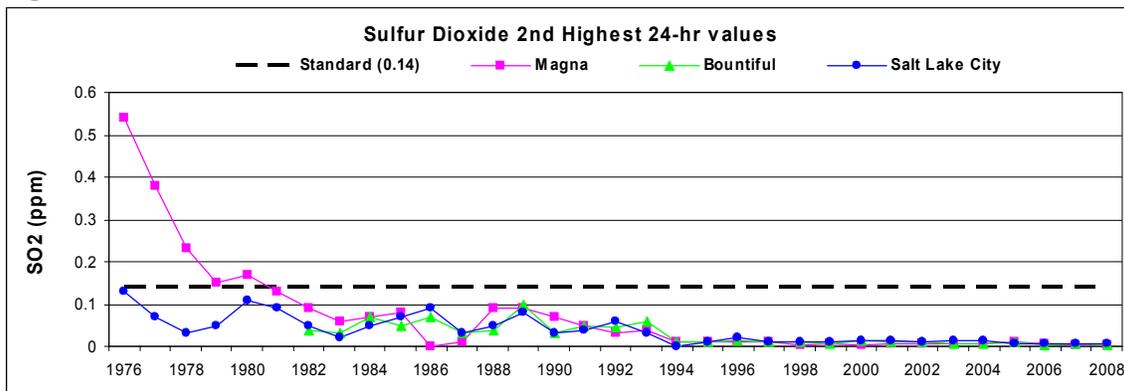
Standards

There are two primary health based NAAQS for SO₂: a 1-year average of 0.03 ppm, and a 24-hour average of 0.14 ppm. In addition, there is a secondary welfare-related standard of 0.5 ppm averaged over a 3-hour period.

The DAQ has situated its monitors near the largest sources of SO₂ (Kennecott Utah Copper and the five refineries along the Wasatch Front). Throughout the 1970s the Magna monitor routinely measured violations of the 24-hour standard. Consequently, all of Salt Lake County and parts of eastern Tooele County above 5600 feet were designated as non-attainment for SO₂. Two significant technological upgrades at the Kennecott smelter have resulted in continued compliance with the SO₂ standard since 1981.

In the mid 1990s, Kennecott, Geneva Steel, the five refineries, and several other large sources of SO₂ made dramatic reductions in emissions as part of an effort to curb concentrations of secondary particulate (sulfates) that were contributing to PM₁₀ violations. Utah submitted an SO₂ Maintenance Plan and re-designation request for Salt Lake and Tooele Counties to EPA in April of 2005. Recent measurements of SO₂ indicate that Utah's ambient air is well within the federal health standards. Figure 11 shows the trend in SO₂ concentrations over the past 33 years.

Figure 11.



Emissions Inventories

Every three years, DAQ collects information about the quantity and characteristics of the various air pollutants released by all emission sources in the state. In between the triennial inventory years, emissions information is also collected annually for the larger industrial sources. Finally, more detailed inventories are prepared as needed for special projects to quantify emissions during specific seasonal air pollution episodes.

Figure 12 presents the updated 2005 triennial emissions inventory by source category in six pie charts for the criteria pollutants, VOCs, and biogenic emissions. The triennial inventory covers 355 individual point sources, 75 area source categories, and 12 non- and on-road source categories. Biogenic emissions are produced from non-anthropogenic, non-human natural activity sources which include wildfires and vegetation. The 2008 triennial inventory will be available in the 2009 annual report.

Once collected, the inventory information is reviewed, quality assured, analyzed, and stored in the DAQ data system. This emissions information is used by DAQ to look at trends over time, and to feed air quality modeling analysis. The emissions information is also tallied according to source type to provide billing information for the Title V operating permits program. A copy of the emissions inventory data is uploaded to the EPA's National Emissions Inventory data system. In recent years, Utah has made significant strides toward automating the collection of emissions information from the major industrial sources resulting in more timely and higher quality inventories.

Sources of Air Contaminants

Emission inventories are typically organized into three categories of sources: Point, Area and Mobile.

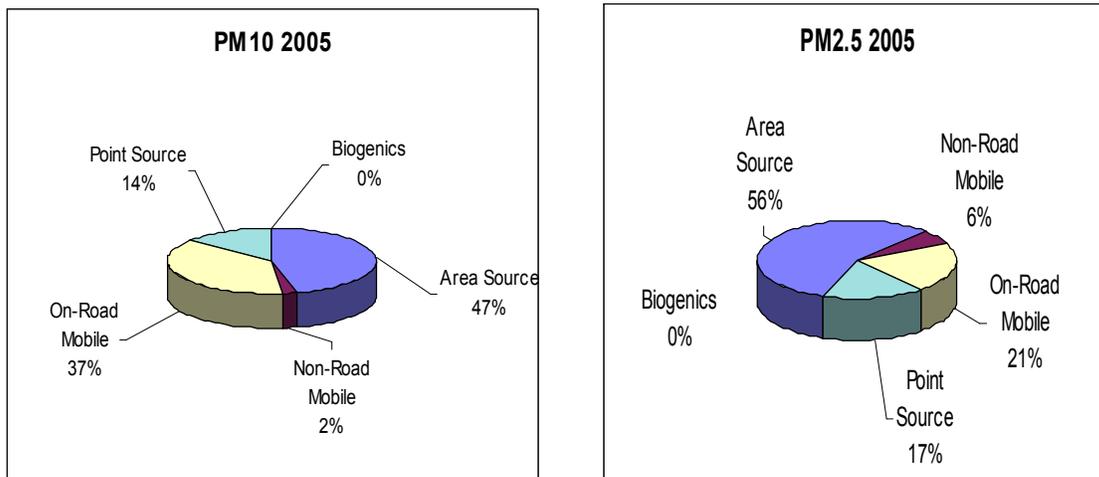
Point sources are larger, stationary industrial or commercial facilities such as power plants, steel mills, and manufacturing facilities. Air pollutants released from stationary sources are accounted for on a facility-by-facility basis.

Area sources are smaller stationary sources and due to their greater number, are accounted for by classes of sources. Home heating, agricultural burning and harvesting, construction, residential and commercial energy generation, wildfires, and biogenics (emissions from vegetation) are examples of area sources.

Mobile sources make up the third category in the inventory, and consist of emissions from non-stationary sources such as cars, trains, and aircraft. Mobile emissions are further broken down into on-road mobile and off-road mobile categories. On-road mobile sources primarily consist of cars and trucks, and contribute by far the largest part of the mobile source emissions. Off-Road Mobile sources consist of a diverse group of heavy construction equipment, small engines (lawnmowers and snow blowers), trains, and aircraft. Estimating emissions from mobile sources requires an understanding of the various emission characteristics of the many types of vehicles and model years that make up the fleet, as well as an understanding of how they are driven and the distances they travel.

The 2005 triennial inventory is the most recent state-wide inventory available. Table 3 shows, by county, the criteria pollutants and volatile organic compounds (VOCs) for the 2005 triennial statewide emissions inventory. Figure 12 shows the 2005 emissions inventory by source category for the criteria pollutants and VOC's.

Figure 12. 2005 Triennial Emissions Inventory by Source Category
(Direct emissions, annual average)



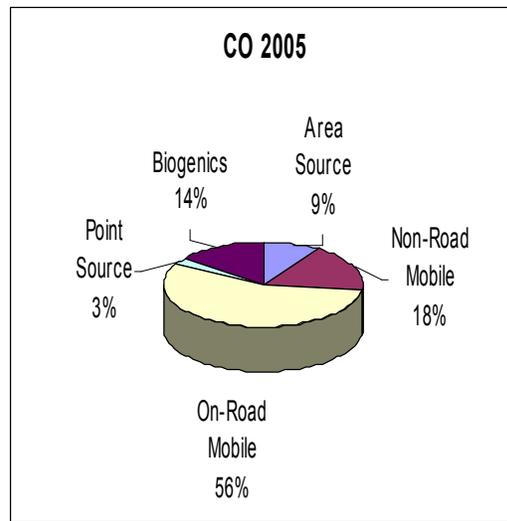
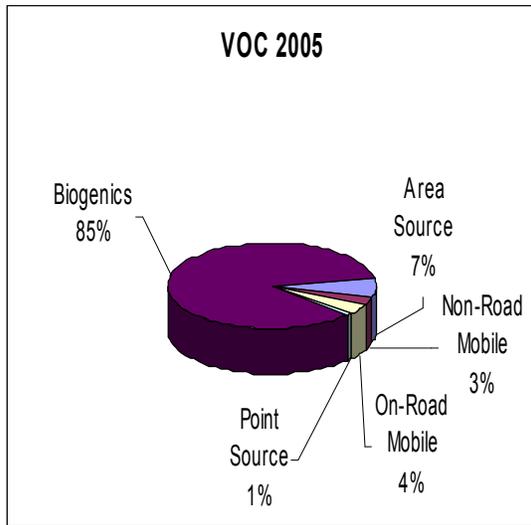
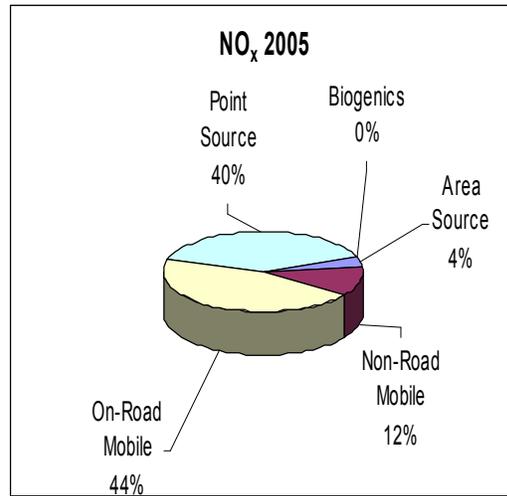
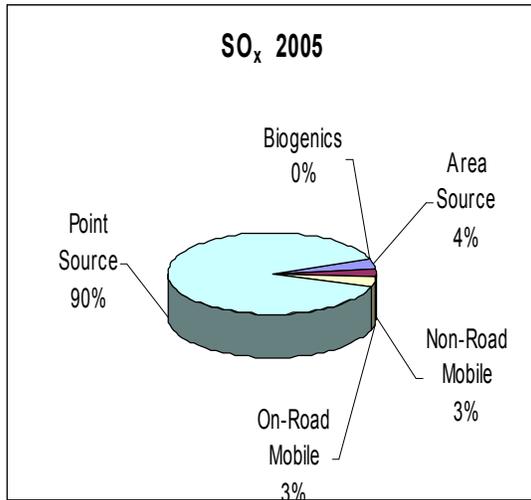


Table 3. Updated 2005 Triennial Inventory (tons/year)

County Summary	PM ₁₀	PM _{2.5}	SO _x	NO _x	VOC	CO
Beaver	1,322	320	98	1,552	29,953	14,394
Box Elder	6,286	2,443	233	5,616	41,019	58,377
Cache	3,404	966	206	4,086	17,478	30,492
Carbon	1,391	408	6,496	5,999	17,013	13,394
Daggett	371	185	7	919	14,423	5,125
Davis	3,641	1,000	3,480	10,720	16,958	63,439
Duchesne	1,631	539	72	1,874	24,244	14,197
Emery	3,576	1,166	23,795	30,025	32,613	19,933
Garfield	1,715	608	57	648	45,625	16,160
Grand	941	256	28	1,616	36,949	18,537
Iron	2,128	606	301	3,277	40,512	28,894
Juab	2,288	785	132	4,758	30,026	30,904
Kane	893	329	54	654	49,410	16,585
Millard	3,190	862	3,775	27,020	51,487	29,679
Morgan	675	170	247	3,171	10,062	6,872
Piute	257	68	19	139	11,705	3,012

Rich	780	262	27	246	9,465	4,643
Salt Lake	15,086	4,056	6,071	38,030	44,494	221,888
San Juan	2,077	800	374	1,664	65,900	25,200
Sanpete	1,310	310	206	1,122	18,902	12,711
Sevier	1,609	470	262	3,426	19,459	17,273
Summit	1,971	479	265	4,163	20,945	24,407
Tooele	5,184	1,935	267	5,492	44,550	43,568
Uintah	1,856	746	84	1,855	31,492	20,580
Utah	7,198	1,994	716	13,559	35,054	76,943
Wasatch	883	201	44	1,228	18,320	11,013
Washington	6,350	3,750	275	6,300	62,657	70,774
Wayne	526	130	80	228	24,670	6,896
Weber	2,882	807	238	6,868	14,796	47,956
Total	81,423.93	26,651.13	47,910.36	186,253.86	880,180.58	953,846.29

Planning Branch

The Planning Branch is responsible for developing State Implementation Plans (SIPs) in order to ensure that Utah’s ambient air meets the federal health standards, even as our population and our economy continue to grow. These plans address a variety of air quality issues, but most often focus on areas of the state where the monitoring found air quality to be unhealthy for one or more of the criteria pollutants.

In addition, the Clean Air Act now requires transportation planning organizations to prepare information detailing the air quality impacts associated with improvements in the transportation infrastructure. These transportation plans must conform to the mobile source emission budgets used by the DAQ to develop the SIPs. Therefore, many of the recent SIP revisions were undertaken with the goal of helping transportation planners adapt to an ever-growing population base and updated air quality health standards.

Status of Utah Projects and Initiatives

PM_{2.5}

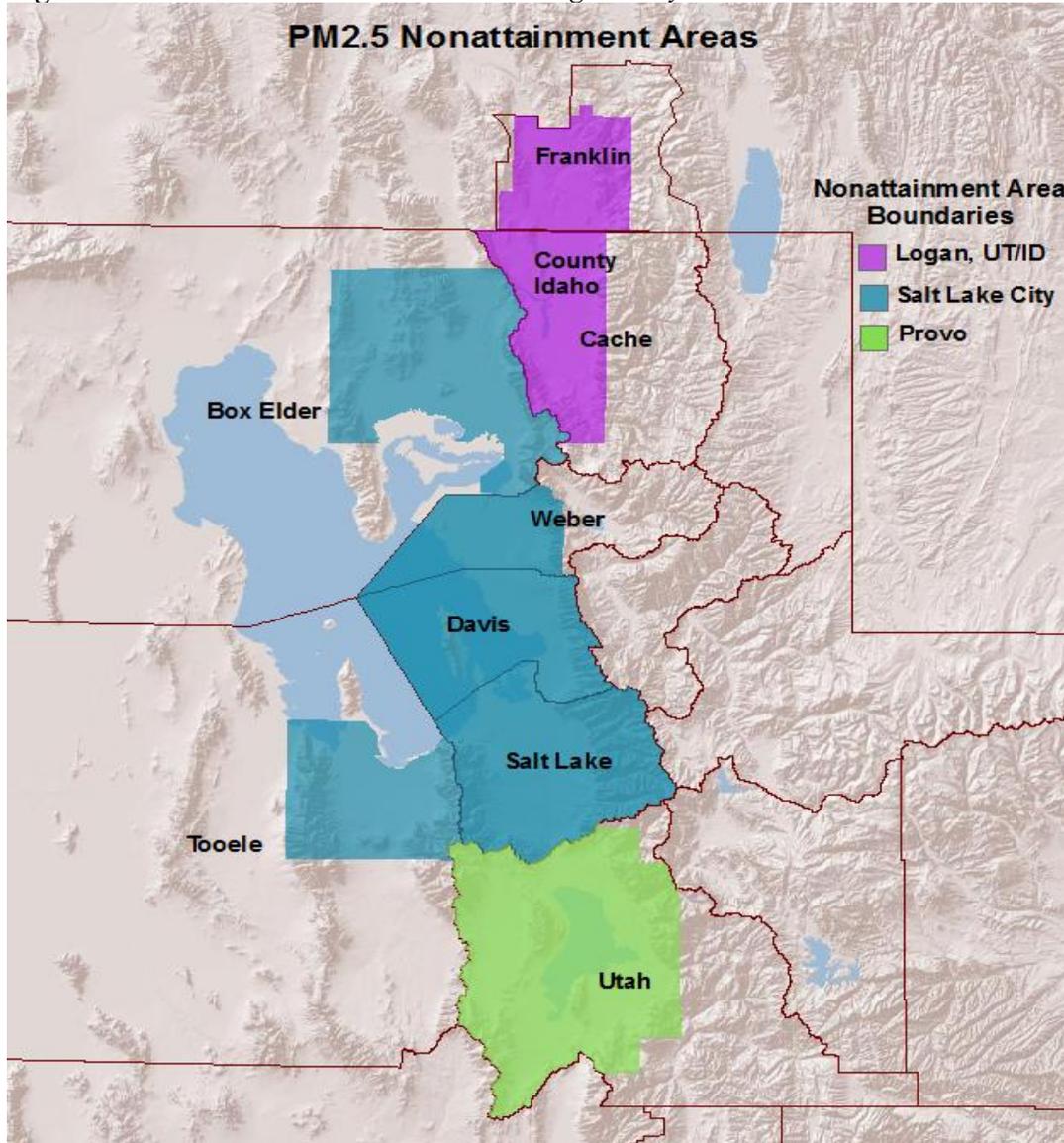
One of the six “criteria” pollutants identified for regulation in the original Clean Air Act of 1970 was total suspended particulate (TSP). In 1987, EPA defined an “indicator” of the suspended particles that were of concern to public health. These were particles with an aerodynamic diameter of ten microns or less, and this regulated subset of TSP was called PM₁₀. It includes a complex mixture of extremely small particles and liquid droplets that can be emitted directly, as in smoke from a fire, or it can form in the atmosphere from reactions of “precursor” gases such as sulfur dioxide and ammonia.

Further study of PM₁₀ has revealed a bi-modal size distribution. There are typically two distinct groups of PM₁₀ particles – those between 2.5 and 10 microns in diameter, and those smaller than 2.5 microns. A growing body of health studies has led to the conclusion that it is the smaller of these particle groups that most severely impacts public health. In response, EPA in 1997 added a new indicator to the regulatory framework for

particulate matter. “PM_{2.5}” is inclusive of particles having an aerodynamic diameter of 2.5 microns or less.

DAQ has monitored PM_{2.5} since 2000, and found that all areas within the state have been in compliance with the 1997 standards. In September of 2006, EPA revised the standards for PM_{2.5}. While the annual standard remained unchanged at 15 micrograms per cubic meter (µg/m³), the 24-hr standard was lowered from 65 µg/m³ to 35 µg/m³. At this new level, all or parts of five counties have collected monitoring data that is not in compliance with the 24-hr standard. This monitoring data, in conjunction with other considerations such as topography, population density, and projected growth estimates has led to the establishment of three nonattainment areas for PM_{2.5} (see Fig. 13). To address non-compliance, the state will have to prepare comprehensive plans to meet the revised standards in these areas within three years of EPA’s final action. The monitoring data DAQ has been collecting since 2000 suggests that meeting this new standard will be one of our greatest challenges.

Figure 13. PM_{2.5} Nonattainment Areas as Designated by EPA



In this past year, DAQ completed a specialized air monitoring field project in the Cache Valley to help determine what role volatile organic compounds (VOCs) play in the formation of PM_{2.5}. Results from this study are now being used in computer modeling studies in anticipation of SIP work where it will be critical to accurately predict the effects of possible control strategies.

Looking forward to 2009, DAQ plans to address PM_{2.5} along the Wasatch Front by collecting detailed information about the chemical species present during wintertime inversions. DAQ is working with atmospheric scientists at BYU and using specialized instrumentation to measure reactive species critical to ammonium nitrate (a secondary particulate) formation. Further, a MOU was signed with Dugway Proving Ground's Meteorology Division to provide weather data during inversion episodes. This atmospheric chemistry and meteorological information will help DAQ model and understand the formation of secondary aerosol, which is a large fraction of the overall PM_{2.5} during wintertime episodes of elevated concentrations. Elsewhere, DAQ will also collect speciated PM_{2.5} data in the Vernal area and assist the local health department in Park City with the collection of PM_{2.5} data in that area.

Community and Neighborhood Health

The Division of Air Quality, in conjunction with local health departments and local governments participated in air quality assessments, public meetings, and health assessments in communities and neighborhoods throughout the state. These types of activities are usually in response to concerns raised by neighbors to industrial areas or other sources of air pollution. Community scale investigations include a review of the compliance status of the sources of air pollution including any emission testing and reporting required by applicable permits. In some cases, further assessments include additional targeted air monitoring correlated with observations logged by neighboring residents and evaluation of health statistics by the Utah Department of Health. Findings are presented at public meetings and, in cases where there is general interest, informational web pages are developed to provide a repository for information.

Community investigations included work in the following areas:

- Cottonwood Heights City (Gravel, Asphalt and Concrete operations at the mouth of Big Cottonwood Canyon)
- West Bountiful City (Trinity Highway Safety Products)
- North Salt Lake (Stericycle Medical Waste Incinerator and Refineries)
- Salt Lake City (Beck Street Sand and Gravel operations)
- Salt Lake City (Intermountain Vermiculite)
- Mapleton - Spanish Fork (Ensign Bickford Company)
- Washington County (Sand, Gravel and Construction activities and support for the Southern Utah Air Quality Task Force)

Utah Clean School Bus Project

In 2007, the Utah Division of Air Quality started the Utah Clean School Bus Project in conjunction with Utah Office of Education, local school districts, county and municipal governments, as well as community and non-profit organizations. This coalition is working together to secure funding sources for school districts to purchase emission reducing technologies for buses statewide.

Retrofits are aftermarket vehicle additions that help reduce harmful pollutants found in the bus cabin and in tailpipe emissions. The selected technologies are efficient, easy to install, and cost effective. Based on analyses, recommendations, and cost effectiveness, the Utah Division of Air Quality is recommending the use of Diesel Oxidation Catalyst and Closed Crank Ventilation systems for this project. More information about these technologies can be found on the following website:

- <http://www.epa.gov/cleanschoolbus/retrofit.htm>

The application of these technologies is expected to reduce particulate matter by 30%, carbon monoxide by 50%, and volatile organic compounds (hydrocarbons) by 74%. Based on initial analysis, the cost per bus is \$2,025. The total projected statewide cost for the project is \$3,500,000.

Several sources of funding have been secured for the project. These include money from the Clean School Bus Project USA and the Clean Fuel Vehicles Grant and Loan Program, funds from the Utah Department of Environmental Quality as appropriated by House Bill 146 (2008) and money from the Congestion Mitigation Air Quality (CMAQ) fund. We also received \$55,000 from companies found in violation of air quality rules which will be used as matching funds for this project.

Utah's Clean School Bus Retrofit Project is underway. The overall project will be broken up into several phases. Each phase will focus on a particular geographic area of the state. Depending on current funding levels, some phases may run concurrent with one another.

The first phase is in the Southwest area of the state and involves the Beaver, Garfield, Iron, Kane, Millard, Piute, Sevier, South Sanpete, Washington, and Wayne school districts. In addition, buses from the Murray School District will be included in this first phase of the project. A total of 258 buses are expected to be retrofitted in this phase of the project. Installations for this phase started in late December 2008.

The second phase will include all three school districts from Utah County (Alpine, Nebo, and Provo school districts). A total of 360 buses are expected to be retrofitted during this phase. Installation for this phase will start in early 2009.

The next phase is anticipated to include buses from Box Elder, Salt Lake City, Tintic, Tooele, and Juab school districts. This phase will began when funding becomes available, which is anticipated to be as early as January 2009.

Another phase will also include buses from Granite and Jordan school districts. This phase will begin when funding becomes available, which is anticipated to be as early as September 2009.

Grant and Loan Program

The Utah Clean Fuels and Vehicle Technology Grant and Loan Program, funded through the Clean Fuels and Vehicle Technology Fund, provides grants to assist businesses and government entities in covering:

- 1) the cost of converting a vehicle to operate on clean fuels;
- 2) the incremental cost of purchasing an Original Equipment Manufacturer (OEM) clean fuel vehicle; and
- 3) the cost of retrofitting diesel vehicles with U.S. Environmental Protection Agency verified closed crankcase filtration devices, diesel oxidation catalysts, and/or diesel particulate filters.

The Clean-Fuels Grant and Loan Program also provides loans for the cost of converting a vehicle to operate on a clean fuel, for the purchase of OEM clean fuel vehicle, and for the purchase of fueling equipment for public/private sector business and government vehicles. Finally, the program can provide grants and loans to serve as matching funds for federal and non-federal grants for the purpose of converting vehicles to operate on a clean fuel, purchasing OEM clean fuel vehicles, or retrofitting diesel vehicles.

The Clean Fuels Grant and Loan Program began accepting application on October 15, 2008. DAQ plans on awarding money by spring 2009.

Utah Asthma Task Force

The Utah Asthma Task Force is a State of Utah initiative to develop a multi-agency task force to address the problem of asthma in Utah. The task force convened in March of 2002 and released a State of Utah Asthma Plan in September of 2003. The task force meets quarterly and has a number of projects currently underway in addition to the programs initiated under the State Plan. The task force issued an update of the Asthma Plan in 2007. The Risk Factors Action Group, one of several action groups created by the task force, is comprised of air quality experts, school officials, and health care professionals. Work performed by the Risk Factors Action Group has led to guidance for school districts in Cache County and along the Wasatch Front regarding when it would be recommended that accommodation be made for indoor recess on bad pollution days. It is anticipated that this guidance will help reduce confusion for students, parents, and schools on the appropriate action to take during high pollution events. The guidance is keyed to current air pollution levels reported on the Utah Division of Air Quality's web page. Presently, the Utah Asthma Task Force and the DAQ are cooperating with DOH colleagues in the development of air quality indicators for the Indicator Based Information System (IBIS) authorized and funded by CDC. Similar participation is

ongoing in development of the Environmental Public Health Tracking System, and in the development of guidelines and public messaging related to safe outdoor exercise during the summertime ozone season.

Mercury

Although mercury is a naturally occurring metal, it is a neurotoxin that easily penetrates the brain and central nervous system. It can also become toxic when biochemical processes transform it into methylmercury. Methylmercury builds up in the food chain, accumulating in muscle tissue and putting people and wildlife at risk. The most common pathway to human exposure is consumption of contaminated food; most typically this contamination occurs in fish.

The State has issued specific consumption advisories for both fish and waterfowl. Current information concerning these advisories may be found online at <http://www.deq.utah.gov/Issues/Mercury/index.htm>.

Mercury emissions are a global problem. The US presently accounts for only 3% of global mercury emissions and of the total deposition in the US in 2001, 84% was due to sources outside of the US and Canada. Much of the global contamination ends up in the oceans, where it finds its way into the food chain.

Coal fired power plants are the largest remaining source of mercury emissions in the US. Other sources include gold mines, hazardous waste incinerators, medical waste incinerators, and salvage operations that dispose of mercury switches in cars.

In order to address mercury emissions from coal-fired power plants, EPA issued the Clean Air Mercury Rule (CAMR) on May 18, 2005.

- It targets coal-fired electrical generating units (EGUs) that are larger than 25 MW.
- It sets nation-wide caps of 38 tons/yr in 2010 and 15 tons/yr in 2018 and beyond.
- Each state has been allocated a cap total for each phase of the program.
- The rule allows states to adopt plans appropriate to their circumstances.

To comply with the CAMR, Utah wrote a “Designated Facilities Plan” and a number of other rules in the Spring of 2007. Utah also implemented restrictions on mercury emissions from coal-fired EGUs that go beyond what is required by the CAMR. In February of 2008, the D.C. Circuit Court of Appeals vacated the CAMR, and it is now up to the EPA to develop a new rule regarding mercury emissions from power plants. Utah will look to see what action EPA ultimately takes and revise its rules accordingly.

DAQ also sits on the Statewide Mercury Work Group, a task force representing industry, government, and advocacy groups that was organized to assess the extent of mercury contamination in Utah and set priorities for protecting the public.

Regional Haze SIP

When the Clean Air Act was reauthorized by Congress in 1990 it included provisions to improve visibility in large national parks and wilderness areas and established the Grand Canyon Visibility Transport Commission (GCVTC) to determine the causes of poor visibility at the Grand Canyon. The Commission determined that numerous sources contribute to visibility impairment and recommended strategies for improvement. These strategies were included in EPA's 1999 regulations as an option that western states could use in writing the visibility plans (SIPs) required of all states. Utah is one of four states that are implementing a regional haze plan under this option. Key elements of the plan include using a regional cap (emission milestones) on SO₂ emissions and a backstop market trading program to be triggered if emissions exceed the emissions cap. Other components identify reduced emissions from prescribed fires and require tracking emissions and visibility conditions every five years through 2018.

In 2008, the Air Quality Board updated the 2003 Regional Haze SIP. The sulfur dioxide milestones for the years 2008-2018 were revised to reflect current emissions and to address new requirements in the federal regional haze rule. The new milestones will ensure that SO₂ emissions decrease by 50% from the 1990 baseline by the year 2018. The updated SIP also addressed Best Available Retrofit Technology (BART) for NO_x and PM emissions from two power plants in central Utah. Emissions of NO_x from these two plants will decrease by over 6,200 tons/year and emissions of PM₁₀ will decrease by over 900 tons/year. This is in addition to the decrease of 13,000 tons of SO₂ emissions from these plants that will occur under the regional milestones.

The Regional Haze SIP addresses emissions from a wide variety of sources, including vehicles and anthropogenic fire. Smoke emissions under the Regional Haze SIP are controlled with an Enhanced Smoke Management Plan which was updated January 16, 2006. The purpose of the plan is to facilitate coordination between federal land managers and DAQ to mitigate the impact on public health and visibility from prescribed and wildland fires.

Greenhouse Gas Emissions and Climate Change

In June 2008, Utah established a goal to reduce greenhouse gas (GHG) emissions to 2005 levels by the year 2020. Because Utah continues to grow rapidly, this goal will represent a 28% reduction in GHG emissions compared to business as usual in 2020. Utah set its goal through a measured analytical process. Experts from government agencies, business, and the public were consulted extensively, and the goal reflects that input. DAQ provided staff support to this process. The final product reflects an ambitious yet realistic goal. It reflects actions on a regional and national level as well as state activities. A number of significant policies are already in place such as Utah's renewable energy portfolio and federal mileage standards. Achieving the goal will have a cost. Preliminary analysis suggests that it is not prohibitive nor will it disadvantage Utah business or families. Additional analysis will explore how climate policies will interact with major economic indicators such as jobs, prices, etc., and this work will further refine the goal and our ability to meet or exceed it. Further information about Utah's GHG reduction goal can be found at <http://www.climatechange.utah.gov/>.

In May 2007, the State of Utah joined the Western Climate Initiative (WCI), a group of western states and provinces that is working together to address greenhouse gas

emissions. Through 2008, DAQ staff provided input to various WCI subcommittees. In September 2008, the WCI released design recommendations for a regional GHG cap and trade program that will reduce GHG emissions to 15% below 2005 levels by the year 2020. Further details regarding the design recommendations can be found at www.westernclimateinitiative.org.

DEQ has established a new Energy and Sustainability Group that will support implementation of Utah's GHG reduction goals, and will continue to provide input to the WCI as the details of the cap and trade program are developed.

Transportation Conformity

Several Metropolitan Planning Organizations are responsible for developing, producing, and adopting the Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP) for the state of Utah. These include Cache, Dixie, Mountainland Association of Governments (MAG), and Wasatch Front Regional Council (WFRC). MPO's located in nonattainment and/or maintenance areas have the responsibility to ensure that the current RTP and TIP conform to the Utah State Implementation Plan (SIP). The Federal Highway Administration and Federal Transit Administration review the conformity determinations along with the RTP and TIP in consultation with EPA to ensure that the relevant planning regulations have been adequately addressed.

During 2008, MAG and WFRC demonstrated conformity to the SIP. In September 2008 the MAG established conformity for the amended 2007-2030 RTP and 2007-2011 TIP for the Provo\Orem City Carbon Monoxide maintenance area and the Utah County PM₁₀ non-attainment area. In October 2008, the WFRC established conformity for the amended 2030 RTP and the 2009-2014 TIP for the Salt Lake City Carbon Monoxide maintenance area, the Ogden City Carbon Monoxide maintenance area and PM₁₀ non-attainment area, and the Salt Lake County PM₁₀ nonattainment area. In the summer of 2009, WFRC plans to update the TIP (2010-2015) and demonstrate conformity to the SIP.

Stage I Vapor Recovery

Stage I vapor recovery systems collect vapors resulting from the dispensing of gasoline to both aboveground and underground storage tanks. Stage I vapor recovery requirements were implemented in Salt Lake and Davis Counties in the 1980's and in Utah and Weber Counties in 1999. They have proven to be a successful method of controlling both volatile organic compounds (VOC) and hazardous air pollutants (HAP) emissions along the Wasatch Front. A growing information base indicates that the emission of these ozone precursors and the subsequent formation of ozone is no longer an issue only along the Wasatch Front.

In January 2008 a stakeholder meeting was held to discuss the feasibility of extending Stage I vapor recovery requirements to the remaining twenty-five counties within Utah. A subsequent cost-benefit analysis showed that over two thousand tons of VOC and HAP emissions could be eliminated annually if Stage I controls were implemented statewide. A consensus of stakeholders recommended that DAQ act proactively to establish Stage I controls statewide.

In June 2008 DAQ held a series of public meetings throughout the state to present information regarding Stage I vapor recovery technology and to take comments from the public. In September 2008, the Air Quality Board adopted changes to the Gasoline Transfer and Storage rule (R307-328) which extended Stage I vapor recovery statewide. This extension will be phased in over three years, but will be fully implemented in all areas of Utah by April 2011.

Ancillary Programs

Air quality programs and information outreach programs which have their roots in the air quality plans developed at DAQ include the following:

Utah Air Quality Public Notifications - In response to the changes in PM_{2.5} air quality standards and to improve the presentation of air quality information to the public DAQ has updated its air quality forecasting webpage. The web page now shows the air quality forecast for today and the next two days. The Air Monitoring Center (AMC) provides air pollution information based on daily air quality status. The AMC data is used to determine the relationship of existing pollutant concentrations to the National Ambient Air Quality Standards. There is a three tiered air quality alert system: Green, Yellow (alert days), and Red (Actions Days) that is used to implement winter and summer controls on the use of wood and coal burning stoves, fire places, and motor vehicles. There are five health advisory categories: good, moderate, unhealthy advisories A and B, and very unhealthy. The AMC advisory is calculated for 5 major pollutants including ground-level ozone, particulate pollution (particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. The new index now also incorporates recommendations for actions to take on days when concentrations are in the red zone, to mitigate the effects of pollution for affected groups and recommendations for industry and citizens that help reduce pollution levels. The outreach program information consolidated in the three day forecast include: the Summer and Winter Control Programs and Choose Clean Air information.

Winter Control Program (red-burn / green-burn) – This program originated with the PM₁₀ SIP. Although the program was originally met with some skepticism, the measurable success has been outstanding, owing much to the voluntary cooperation of Wasatch Front residents. The program runs annually from November through early March. In addition to the burning restrictions, residents are encouraged to drive less and industry is encouraged to optimize operating conditions.

Summer Control Program (red, yellow and green) – These are announced whenever the probability of exceeding the ozone standard is forecast to be high. High temperature and stagnant air masses contribute to this probability. Residents are encouraged to minimize driving whenever the ozone or PM standards are approached.

Choose Clean Air – An interactive source of information about ways individuals can help improve air quality by making smart choices in their personal lives. The Utah Department of Environmental Quality is also sponsoring an electronic mail server (Listserv). Subscribers are automatically notified by e-mail when unhealthy air pollution levels are forecast for the Wasatch Front.

Vehicle Inspection/Maintenance Programs – Although not run directly by DAQ, the emissions portions of these programs were instituted because of past problems in attaining the federal health standards for several pollutants; most notably CO and ozone. Implementation of these programs was critical to attaining the federal standards, and their continued operation is necessary for the Wasatch Front to remain in attainment of these standards. These programs are administered by the county health departments.

Smoking Vehicles - Vehicles emitting excessive smoke contribute to poor air quality. To promote clean air, several local health departments operate smoking vehicle education and notification programs. People who spot a vehicle producing excessive smoke can report it through their respective county health department:

Cache County	435-792-6611
Davis County	801-546-8860
Salt Lake County	801-944-SMOG (7664)
Utah County	801-851-SMOG (7664)
Weber County	801-399-7140

Permitting Branch

The DAQ Permitting Branch is responsible to ensure that air quality is not significantly degraded by any new or modified stationary source that emits air contaminants by issuing permits. Permits are legally enforceable documents that specify construction limitations, emission limits, and how the emissions source must be operated. Permit limits can be actual emissions or surrogate limits such as production rates, hours of operation, fuel consumption or a combination thereof. Opacity, the transparency of emission plumes, is also a common metric used to both limit and measure source emissions.

The branch issues two types of permits. New Source Review (NSR) permits, also known as Approval Orders, are pre-construction permits for new and modified sources of air emissions. These are issued by the New Source Review Sections and have been required since 1969. The Operating Permits Section issues the Title V Operating Permits to the larger “major” stationary sources in the state; there are approximately 100 of these sources. Operating permits consolidate all air quality related requirements from numerous federal air quality programs into a single regulatory document. The purpose of an operating permit is to clarify for the permit holder as well as DAQ compliance inspectors the wide range of requirements for any regulated source in one consolidated document.

In addition, the branch processes a number of smaller actions such as *de minimus* determinations for NSR, name changes, tax exemption certificates for pollution control equipment purchases, and soil aeration approvals.

New Source Review

Any new or modified source of air pollution in Utah is required to obtain an Approval

Order (AO) before it is allowed to begin construction. For non-attainment areas that are not in compliance with the National Ambient Air Quality Standards (NAAQS), NSR insures that air quality is not further degraded from the existing levels by new emission sources. In areas that are in compliance with the NAAQS, NSR insures that new emissions do not significantly worsen air quality.

The application for an AO, called a notice of intent (NOI), is reviewed to make sure that the source will install state-of-the-art emission controls. For non-attainment areas state-of-the-art technology is known as lowest achievable emissions rate (LAER). For areas in attainment of the NAAQS, state-of-the-art controls are known as the best available control technology (BACT). Both LAER and BACT are case-by-case determinations of control technology for a specific source. BACT takes into account both the cost and environmental benefits of the control equipment while LAER technology takes into account only environmental benefits.

The general public and EPA are given an opportunity to review the proposed approval order before it is issued. The criteria indicating which sources must obtain an approval order are specified in the Utah Air Quality Rules. Potential applicants are encouraged to contact DAQ prior to submitting the necessary paperwork. In fiscal year 2008 (1/1/07 to 6/30/08), the NSR section completed or was working on 320 different projects. This included the completion of 158 AO's and 162 other projects.

Operating Permits

Congress created Title V of the Clean Air Act in 1990. This Title requires States to issue an operating permit to the larger or "major" sources of air pollution within the state. Utah developed and submitted a program in 1994 and received approval from the EPA in 1995. Operating permits are legally enforceable documents issued to air pollution sources after the source has begun to operate. As stated above, a primary purpose of the permit is to consolidate the applicable requirements from the many and varied air quality programs such as NSR, federal New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (NESHAP), and Maximum Available Control Technology (MACT). Like the approval orders, the general public is given an opportunity to review the draft operating permits before they are issued. In addition, the EPA has up to 45 days to review the proposed operating permit. The criteria indicating which sources must obtain an operating permit are specified in R307-415 of the Utah Administrative Code (UAC). As with the NSR permit or AOs, potential applicants are encouraged to contact DAQ prior to submitting the necessary paperwork.

Another significant objective of the Title V program is to shift the compliance liability from the regulating agency to the permitted source. Each year the source must certify that it is in compliance with all permit terms and conditions, or indicate non-compliance issues. False reports have criminal implications, beyond the civil liabilities of other violations. In addition, sources must report the results of monitoring at least every six months. Permit provisions for monitoring, record keeping, and reporting are added or enhanced to assure compliance with the permit conditions and limits.

During the last calendar year the Operating Permits section issued permit modifications, coordinating extensively with the NSR Section. The Operating Permit has a life of only five years (as opposed to the AO that does not expire), and in 2008 the section issued several permit renewals. These renewal permits are complex, and care must be taken to ensure that new federal requirements for the Compliance Assurance Monitoring Rule (CAM) and any other new requirements (such as new MACT Standards) are included.

Air Standards Branch

The Major Source Compliance Section, Minor Source Compliance Section, and the Air Toxics, Lead-Based Paint, Asbestos and Small Business Environmental Assistance (ATLAS) Sections are responsible for ensuring that all regulatory requirements are met. This is done through inspections, emission testing, and review of periodic reports from industry and enforcement.

Inspection and Enforcement

DAQ regulates more than 2,000 facilities within the state through approval orders, state rules, and federal emission standards. Annual inspections encourage these facilities to maintain continuous compliance with the rules and permit conditions. Possible enforcement actions, which may lead to financial penalties or additional regulatory requirements, provide incentive for source operators to see that all regulatory conditions are met. Inspectors in the Major/Minor Source Compliance Sections and the ATLAS Section average roughly 1,500 inspections per year. They also respond to about 250 complaints each year and frequently conduct drive-by observations of visible emissions.

A Source Compliance Advisory Notice (SCAN) is typically sent to sources that appear to be out of compliance with state regulatory requirements and provides an opportunity for the Division and the regulated source to discuss the findings of the inspection. If the source is issued a SCAN and responds with prompt compliance, a reduced penalty may be offered for expedient cooperation. Should enforcement actions become necessary, the DAQ may issue a Warning Letter, an Early Settlement Agreement, or a Notice of Violation (NOV) with an Order to Comply. Warning Letters are usually reserved for first-time offenders with minor infractions. Early Settlement Agreements provide incentive for regulated sources to address these issues in a timely manner. NOVs are used whenever there are significant violations of the rules or permit conditions and the violator may be fined as much as \$10,000 per day per violation. Most NOVs are resolved with a Settlement Agreement between the Executive Secretary and the regulated source which saves time and court costs. Settlements may also include Supplemental Environmental Projects (SEPs). SEPs are environmentally beneficial projects that the regulated source agrees to undertake as a way to offset some, or all, of the civil penalty.

Stack Test Audits

Regulated sources are required to conduct periodic stack tests in order to verify that their facilities are operating properly. Some of the largest sources maintain continuous emissions monitors that record real-time emission rates and concentrations around the clock. In either case, DAQ personnel will audit the records and reports to ensure that the testing was done in accordance with EPA reference methods.

2008 Compliance Summary

The following is a summary of 2008 compliance activities:

Annual Inspections completed	426
On-site Stack Test/CEM Audits	138
Stack Test/CEM Reviews	431
Temporary Relocations Accepted	139
Fugitive Dust Control Plans Accepted	61
Miscellaneous Inspections	121
Complaints Received	244
VOC Inspections	108
SCAN Warning Letters	24
Notices of Violations	1
Compliance Advisories	40
Settlements	36
Penalties Assessed	\$2,102,165.41
 Total Inspections	 793

Air Toxics, Lead-Based Paint, Asbestos, and Small Business Environmental Assistance Section

The Air Toxics, Lead-Based Paint, Asbestos, and Small Business Environmental Assistance Section (ATLAS) determines compliance with specific regulations involving asbestos, lead-based paint, and area sources of air pollutants that are not required to have a Utah Division of Air Quality (DAQ) Approval Order but are subject to Maximum Achievable Control Technology (MACT), Title 40 Code of Federal Regulations (40 CFR) Part 63 (Utah Administrative Code (UAC) R307-214-2) requirements.

The following programs are the responsibility of the ATLAS Section:

National Emission Standards for Area Source Categories – Sources that are required to comply with 40 CFR Part 63 Subpart M National Perchloroethylene Air Emission Standards for Dry Cleaning Facilities MACT or the 40 CFR Part 63 Subpart N National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks MACT and are not required to have a DAQ Approval Order are inspected by the ATLAS Section.

Lead-Based Paint - Toxic Substances Control Act (TSCA) Title IV, 40 CFR Part 745 (UAC R307-840). Under this program, ATLAS deals with the accreditation of training programs, certification of individuals and firms, work practices for lead-based paint activities, and lead-based paint outreach activities.

Asbestos in Schools – TSCA Title II Asbestos Hazard Emergency Response Act (AHERA), 40 CFR Part 763 (UAC R307-801-4). Under this program, ATLAS deals with the approval of training providers, certification of individuals and companies, inspections of school buildings, and inspections of asbestos abatement in schools.

Asbestos NESHAP and State asbestos work practices - 40 CFR Part 61, Subpart M (UAC R307-214-1) and UAC R307-801. Under this program, ATLAS deals with the certification of individuals and companies, review of asbestos project notification forms, review of demolition notification forms for structures, review of alternate work practices, inspection of asbestos abatement projects, demolition of structures, and asbestos outreach activities.

2008 ATLAS Activity Summary

The following is a summary of 2008 ATLAS activities:

Area Source MACT Inspections	21
Asbestos NESHAP Inspections	132
Asbestos State Rules Inspections	64
Asbestos Training Course Audits	24
Asbestos Notification Forms Processed	1,377
Asbestos Certifications Company/Individual	109/971
Asbestos Telephone Calls	5,187
AHERA Routine Inspections	17
AHERA Other Persons Inspections	25
AHERA Model Accreditation Plan Inspections	2
AHERA Management Plan Reviews	133
Lead-Based Paint (LBP) Abatement Inspections	21
LBP Pre-Renovation Education Rule Inspections	16
LBP Firm Records Inspections	20
LBP Training Provider Records Inspections	1
LBP Training Course Audits	10
LBP Notification Forms Processed	18
LBP Certifications Firm/Individual	27/135
LBP Telephone Calls	1,078

Penalty Assessments for 2008 ATLAS violations:

Number of violations resolved	81
Total penalties collected	\$8,481.25

Small Business Environmental Assistance Program

The Small Business Environmental Assistance Program (SBEAP) helps small businesses understand and comply with state air quality rules. The SBEAP provides “plain language” educational information to help small sources learn about the many air quality requirements. The SBEAP also provides on-site assistance with process evaluation, compliance assistance, and pollution prevention techniques.

The SBEAP works with and incorporates advice of a Small Business Ombudsman and a Small Business Compliance Advisory Panel (CAP). The CAP is appointed by the Governor and the Legislature and is required by the federal Clean Air Act. The CAP provides feedback to the SBEAP regarding program effectiveness. SBEAP services are designed to provide education to small businesses outside of the regulatory environment. All SBEAP services are free of charge. A toll-free telephone hotline number (1-800-270-4440) provides access to SBEAP services 24 hours a day/seven days a week.

2008 SBEAP Activity Summary

The following is a summary of 2008 SBEAP activities:

Phone Calls	242
Email	90
Site Visits	28
Mailed Items	574
Workshops	0

Outreach

The DAQ provides access to all plans, rules, and permits currently open for public comment, lists training workshops available to assist industry to understand permitting and compliance issues, provides Air Quality Board minutes and information and also provides access to all Air Quality Permitting and Compliance forms. Citizens in the State of Utah and sources of air pollution are assisted by DAQ staff based on assigned responsibilities. Each year, thousands of businesses are assisted, questions are answered and tasks completed through the assistance of knowledgeable DAQ staff.

Appendix 1 – Acronyms

AO – Approval Order
AQI – Air Quality Index
AHERA – Asbestos Hazard Emergency Response Act
ATLAS – Air Toxics, Lead-Based Paint, Asbestos and Small Business Environmental Assistance Section
BACT – Best Available Control Technology
BEIS – Biogenic Emissions Inventory System
CAA – Clean Air Act
CAM – Compliance Assurance Monitoring
CAP – Compliance Advisory Panel
CAST – Center for Automotive Science and Technology

CFR – Code of Federal Regulations
CO – Carbon Monoxide
Criteria Pollutants - Pollutants for which EPA sets standards to protect public health
DAQ – Division of Air Quality
DEQ – Department of Environmental Quality
EPA – Environmental Protection Agency
FDMS – Filter Dynamics Monitor System
GCVTC – Grand Canyon Visibility Transport Commission
HAPs – Hazardous Air Pollutants
KUCC – Kennecott Utah Copper Corporation
MACT – Maximum Available Control Technology
MPO – Metropolitan Planning Organization
 $\mu\text{g}/\text{m}^3$ – 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
NOI – Notice of Intent
 NO_2 – Nitrogen Dioxide
NOV – Notice of Violation
 NO_x – Nitrogen Oxides
NSPS – New Source Performance Standard
NSR – New Source Review
 O_3 - Ozone
PM – Particulate Matter
 PM_{10} – Particulate matter smaller than 10 microns in diameter
 $\text{PM}_{2.5}$ – Particulate matter smaller than 2.5 microns in diameter
ppm – Parts per million
SBEAP – Small Business Environmental Assistance Program
SCAN – Source Compliance Action Notice
SIP – State Implementation Plan
 SO_2 – Sulfur Dioxide
 SO_x – Sulfur Oxides
TSCA – Toxic Substances Control Act
VOC – Volatile Organic Compounds
UAC – Utah Administrative Code

Appendix 2 – Web-page Links

Air Monitoring Center: <http://www.airmonitoring.utah.gov/>

Air Quality Board: <http://www.airquality.utah.gov/Air-Quality-Board/Air-Quality-Board-Members.htm>

Air Quality Home Page: <http://www.airquality.utah.gov/>

Air Quality Rules: <http://www.airquality.utah.gov/Planning/Rules/index.htm>

Cache Valley PM_{2.5}: <http://www.airquality.utah.gov/Public-Interest/Current-Issues/cache-valley-PM/index.htm>

Climate Change: http://www.deq.utah.gov/Issues/Climate_Change/index.htm

Compliance Section: <http://www.airquality.utah.gov/Compliance/index.htm>

Mercury: <http://www.deq.utah.gov/Issues/Mercury/index.htm>

Permitting Section: <http://www.airquality.utah.gov/Permits/index.htm>

Planning Section: <http://www.airquality.utah.gov/Planning/index.htm>

Small Business Assistance:
http://www.airquality.utah.gov/Permits/Small_Business_Assistance_Program.htm

Regional Haze: <http://www.airquality.utah.gov/Public-Interest/Current-Issues/Regionalhazesip/index.htm>