Division of Air Quality
2004 Annual Report

Introduction

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.

Utah's air quality is threatened by three of the six criteria pollutants identified by the U.S. Environmental Protection Agency (EPA). These pollutants, ozone and particulate matter affect the health and well being of many of Utah's urban residents. They can aggravate respiratory disorders during high pollution episodes and lead to chronic illness as well.

Poor air quality also affects residents in rural areas of the state. Areas located far from major population centers can be impacted by industrial, automotive, or other air pollution that may contribute to health or visibility problems.

Many of the DAQ's resources are spent administering the federal Clean Air Act (CAA). Congress delegated that authority to the EPA, which in turn delegates much of its authority to each of the states. In Utah, that authority resides with the Utah Air Quality Board (the Board), and DAQ serves as staff for the Board.

Board membership is structured so as to provide representation to a diverse sampling of Utah's industries, local governments, environmental groups, and residents. The Director of DAQ sits on the Board as its Executive Secretary, a nonvoting member.

The Utah Air Quality Rules (available on-line at http://www.airquality.utah.gov) reflect the state air program, and describe the many ways in which the DAQ interfaces with industry, other government agencies, and residents of the state. The air program mirrors the federal program to a large degree, but also includes oversight of air pollution sources not considered large enough by federal standards.

2004 Synopsis

The year 2004 saw the continuation of an ongoing trend of progress toward compliance with all of the federal health standards for criteria air pollutants. Despite ever increasing numbers of people and their cars, Utah remained in compliance with both the 1-hour ozone standard and the 8-hour standard. Our air monitors showed that we are very close to the standards, but measures taken in the past as well as continued cooperation by local residents on "no drive days" kept us in compliance.

The same can be said of our efforts to curb the levels of particulate matter. Throughout the state, we remained within the federal health standards for both PM_{10} and $PM_{2.5}$. Nevertheless, high concentrations of particulate matter are brought on by wintertime episodes of air stagnation and temperature inversion. As such, there are always periods during the winter months when ambient concentrations approach the standards. Continued cooperation by the public on "no-burn days" has been a large part of our success.

Historically, Utah had problems meeting the NAAQS for CO; however, it has been many years since violations occurred. DAQ submitted a re-designation request and associated maintenance plan to EPA for Provo City CO in March 2004. The plan demonstrates that there is no longer a need for oxygenated fuels, and revises the transportation conformity budget so as to be consistent with MOBILE6. EPA has performed a transportation conformity adequacy review and approved the revised conformity budget. All other areas of historic CO problems are now in attainment of the CO NAAQS.

The regional haze plan was amended in 2004 to reflect federal changes in requirements to reduce vehicle emissions. The plan will ensure that overall visibility continues to improve at the five national parks in Utah throughout the coming decades. The plan includes recommendations from the Grand Canyon Visibility Commission and a regional cap on sulfur dioxide emissions.

In 2004, DAQ in cooperation with Utah State University (USU), and the State of Idaho, began particulate studies for Logan and the surrounding Cache Valley area. These studies will help to determine the causes of elevated levels of PM_{10} in the Cache Valley, as well as identify control measures that could be implemented to reduce particulate concentrations.

Division Organization

DAQ is divided into three separate branches: Permitting, Planning, and Air Standards. The Permitting Branch is responsible for issuing two kinds of permits. Construction permits are issued to new or modified sources of air pollution through the New Source Review program. Operating permits are issued, on an ongoing basis, through Title V of the CAA. In addition, the Small Business Assistance Program has been set up within the Permitting Branch to help small businesses deal with the many requirements surrounding air quality, including the various permitting requirements.

The Planning Branch is responsible for developing comprehensive plans to reduce air pollution. Emissions inventories are routinely compiled in order to understand the origins of the various contaminants detected in the air. Computer models are used to evaluate the impacts of new and existing sources of air pollution, and to understand the relationship between the emissions, meteorology, and pollutant concentrations measured in the air. The branch is also involved in the air quality impacts of transportation issues,

including vehicle inspection and maintenance, clean fuels, and highway construction. All of 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 is responsible for ensuring that industries and residents are complying with Utah's air quality requirements. In addition to the criteria pollutants, this includes activities associated with hazardous air pollutants (HAPs), asbestos, and lead based paints. The Air Standards Branch also includes the Air Monitoring Center, which operates a network of air quality monitors throughout the state.

Ambient Air Quality in Utah

Air Quality Standards

The EPA has established health-based National Ambient Air Quality Standards (NAAQS) for six pollutants known as "criteria pollutants." These are: carbon monoxide, lead, nitrogen dioxide, particulate matter, sulfur dioxide, ozone, and volatile organic compounds. Each of these pollutants is addressed in greater detail later in this chapter, but Table 1 provides a brief description of each.

Criteria Pollutants

Name	Source	Health Effects	Environmental Effects
Carbon Monoxide (CO); a clear, colorless, odorless gas	burning of gasoline, wood, natural gas, coal, oil, etc.	reduces ability of blood to bring oxygen to body cells and tissues; cells and tissues need oxygen to work. Carbon monoxide bay be particularly hazardous to people who have heart or circulatory (blood vessel) problems and people who have damaged lungs or breathing passages	
Lead	paint (houses, cars), smelters (metal refineries); manufacture of lead storage batteries	brain and other nervous system damage; children are at special risk. Some lead-containing chemicals cause cancer in animals. Lead causes digestive and other health problems. brain and other nervous system damage; children are at special risk. Some lead-containing chemicals cause cancer in animals. Lead causes digestive and other health problems.	lead can harm wildlife
Nitrogen Dioxide (one component of NO_x); smog-forming chemical	burning of gasoline, natural gas, coal, oil, etc. Cars are an important source of NO_2	lung damage, illnesses of breathing passages and lungs (respiratory system)	nitrogen dioxide is an ingredient of acid rain (acid aerosols), which can damage trees and lakes. Acid aerosols can reduce visibility
Particulate Matter (PM_{10}, $PM_{2.5}$); dust, smoke, soot	burning of wood, diesel and other fuels; industrial plants; agriculture (plowing, burning off fields); unpaved roads	nose and throat irritation, lung damage, bronchitis, early death	particulates are the main source of haze that reduces visibility
Sulfur Dioxide	burning of coal and oil, especially high-sulfur coal from the Eastern United States; industrial processes (paper, metals)	breathing problems, may cause permanent damage to lungs	SO_2 is an ingredient in acid rain (acid aerosols), which can damage trees and lakes. Acid aerosols can also reduce visibility

Ozone (ground-level ozone is the principal component of smog)	chemical reaction of pollutants; VOCs and NO_x	breathing problems, reduced lung function, asthma, irritates eyes, stuffy nose, reduced resistance to colds and other infections, may speed up aging of lung tissue	ozone can damage plants and trees; smog can cause reduced visibility
VOCs* (volatile organic compounds); smog-formers	VOCs are released from burning fuel (gasoline, oil, wood, coal, natural gas, etc.), solvents, paints glues and other products used at work or at home. Cars are an important source of VOCs. VOCs include chemicals such as benzene, toluene, methylene chloride and methyl chloroform	in addition to ozone (smog) effects, many VOCs can cause serious health problems such as cancer and other effects	in addition to ozone (smog) effects, some VOCs such as formaldehyde and ethylene may harm plants

*All VOCs contain carbon (C), the basic chemical element found in living beings. Carbon-containing chemicals are called organic. Volatile chemicals escape into the air easily. Many VOCs, such as the chemicals listed in the table, are also hazardous air pollutants, which can cause very serious illnesses. EPA does not list VOCs as criteria air pollutants, but they are included in this list of pollutants because efforts to control smog target VOCs for reductions.

Source: United States Environmental Protection Agency, *The Plain English Guide to the Clean Air Act*, EPA 400-K-93-001, April 1993, page 24

Table 1

The primary health standards are established by considering both the concentration level and the duration of exposure that may be incurred by an individual. Pollutant concentrations greater than the NAAQS are considered unhealthy. The NAAQS also include secondary standards to protect public welfare.

The DAQ monitors each of these criteria pollutants, as well as several non-criteria pollutants for special studies.

Utah's Air Monitoring Network

The Air Monitoring Center operates a network of monitoring stations across the state. The monitors are situated to measure air quality in neighborhoods, industrial areas, and along heavily traveled roadways. Figure 1 shows the location of current and historic monitoring sites in Utah. Table 2 shows the address of each of the monitoring stations, as well as the pollutants that are currently monitored there.

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.

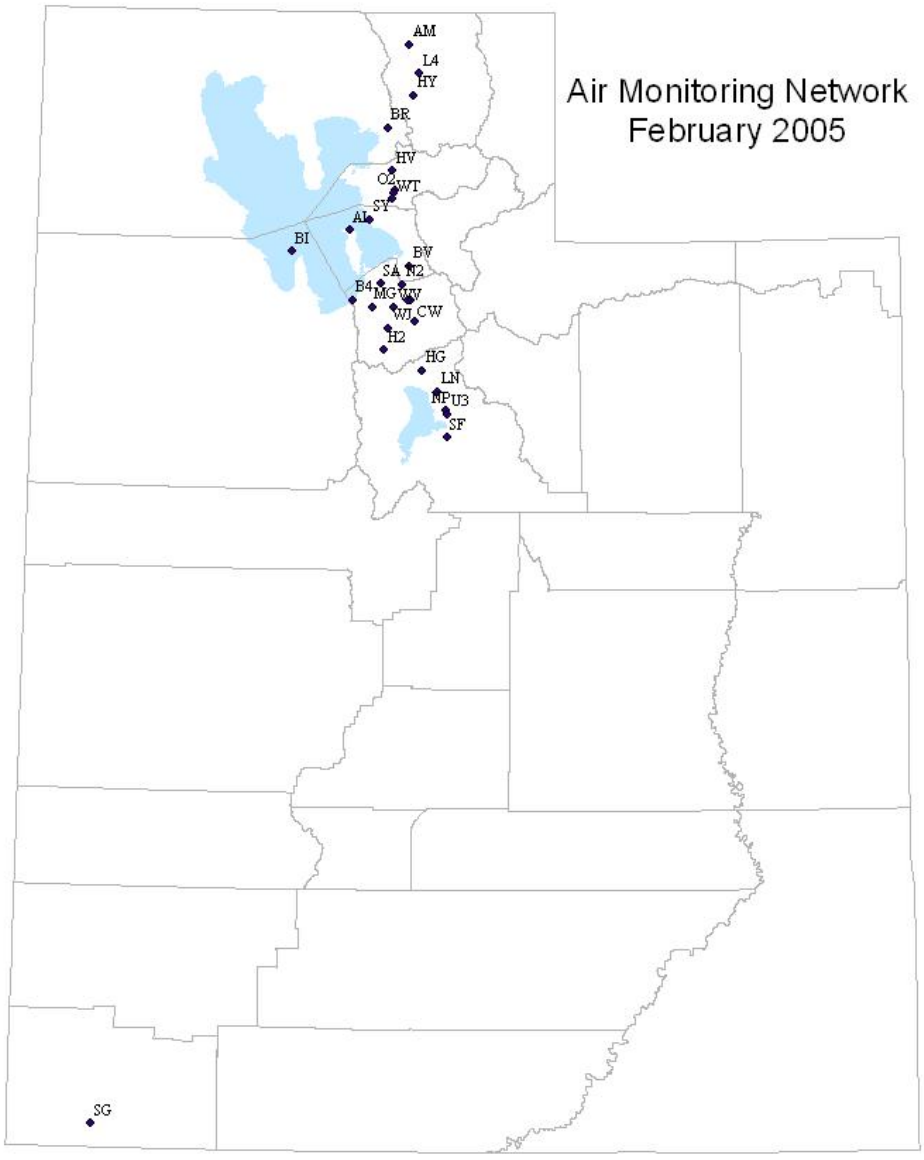

Air Monitoring Network
February 2005
AM
L4
HY
BR
HV
O2
WT
SY
AL
BI
BV
SA
N2
B4
MG
WV
WJ
CW
H2
HG
LN
PU3
SF
SG

Figure 1

Monitoring Stations

Code	Station	City	Address	CO	Lead	NO_2	Ozone	PM_{10}	$PM_{2.5}$	SO_2	Met.
AI	Antelope Island	None	North end of island								X
AG	Amalga	Amalga	6970 North 2400 West						X		
BI	Badger Island	none	On Island								X
B4	Beach	Lakepoint	12100 W. 1200 S.				X			X	X
BV	Bountiful	Bountiful	171 W. 1370 N.			X	X		X	X	X
BR	Brigham City	Brigham City	140 W. Fishburn Dr.				X		X		X
CW	Cottonwood	SLC	5715 S. 1400 E.	X		X	X	X	X		X
HY	Hyrum	Hyrum	100 North 480 West						X		X
HV	Harrisville	Harrisville	425 W. 2250 N.				X		X		X
HW	Hawthorne	SLC	1675 S. 600 E.	X		X	X	X	X		X
H2	Herriman	Herriman	12950 S. 5600 W.				X		X		X
HG	Highland	Highland	10865 N. 6000 W.				X		X		X
LN	Lindon	Lindon	30 N. Main St.					X	X		X
L4	Logan	Logan	125 W. Center St.	X			X	X	X		X
MG	Magna	Magna	2935 S. 8560 W.		X			X	X	X	X
NP	North Provo	Provo	1355 N. 200 W.	X		X	X	X	X		X
N2	North Salt Lake	SLC	1795 N. Warm Springs Rd.					X	X	X	
O2	Ogden #2	Ogden	228 32nd St.			X		X	X		
SA	Salt Air	None	NW of SL Airport								X
SF	Spanish Fork	Spanish Fork	312 W. 2050 N.				X		X		X
S3	State Street	SLC	1401 S. State St.	X							
SW	St. George	St. George	281 East 200 South			X	X		X		X
SY	Syracuse	Syracuse	5100 West 1700 South								X
U3	University Ave.	Provo	363N. University Ave.	X							
W2	Washington Blvd.	Ogden	2540 S. Washington Blvd.	X							
WJ	West Jordan	West Jordan									X
WT	Washington Terrace	Washington Terrace	4601 S. 300 W.						X		
WV	West Valley	West Valley City	3275 W. 3100 S.	X			X		X		X

Table 2

Criteria Air Pollutants

Carbon Monoxide

Carbon monoxide (CO) is produced primarily by motor vehicles. 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 the morning and evening rush hours. The worst problems are found near large concentrations of slow-moving vehicles; places like large parking lots, busy intersections, or traffic jams. CO 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.

The NAAQS for CO includes two standards: a 1-hour standard of 35 ppm, and an 8-hr standard of 9 ppm. Either of these values may be exceeded only once in a given year at any given location. Once a location measures a second exceedance of either standard, it is considered to be in violation of that standard and becomes designated as a "nonattainment area." Three cities in Utah (Salt Lake City, Ogden, and Provo) were, at one time, designated nonattainment areas. Due primarily to improvements in motor vehicles, both Salt Lake City and Ogden were successfully redesignated back to "attainment" in recent years. Provo has also been attaining the CO standards now for several years, and DAQ submitted a re-designation request and associated maintenance plan for EPA's approval in March 2004.

CO in 2004

By all accounts, Utah was in compliance with the CO standards in 2004. Not one monitor recorded an exceedance of either standard. Although the data from 2004 has yet to be quality assured, Figure 2 shows a 12-year trend in CO emissions. The steady decline is primarily due to improvements in automobile performance.

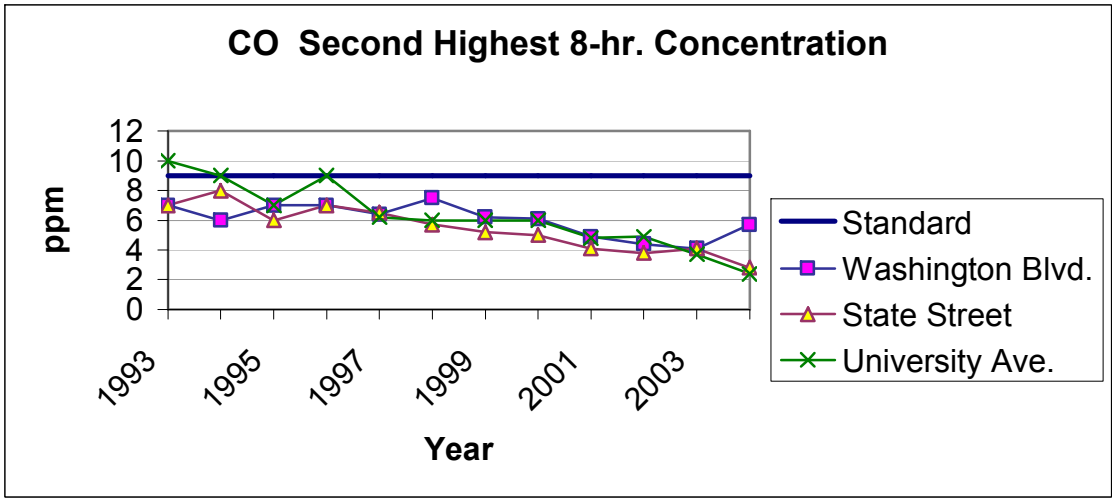


Figure 2

Another indicator of CO concentrations is the Air Quality Index (AQI). Based on a linear scale, the air quality is categorized as good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, or hazardous. Table 3 shows the number of days recorded for each category during each of the last seven years.

Air Quality Index (AQI) summary information for Carbon Monoxide

For calendar years 1998 - 2004

CO	Number of Days With AQI Values Of:					
year	good 0 - 50	moderate 51 - 100	unhealthy for sensitive grps. 101 - 150	unhealthy 151 - 200	very unhealthy 201 - 300	hazardous > 300
1998	319	46	0	0	0	0
1999	319	46	0	0	0	0
2000	337	29	0	0	0	0
2001	353	12	0	0	0	0
2002	360	5	0	0	0	0
2003	364	1	0	0	0	0
2004	297	9	0	0	0	0

2004 data through Oct. 31, 2004.

Table 3

Lead (Pb)

Lead in the ambient air exists primarily as particulate matter in the respirable size range. The major source of lead used to be gasoline. However, because leaded gasoline for

automobiles was completely phased-out in the United States at the end of 1995, this 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.

The current standard for lead is a calendar quarter (3-month) average concentration, not to exceed 1.5 micrograms per cubic meter of air. Utah has not exceeded the health standard for lead since the late 1970s.

Nitrogen Dioxide (NO_2)

During high temperature combustion, the nitrogen in the air reacts with oxygen to produce various oxides of nitrogen, or NOx, a reddish-brown gas. One of the oxides of nitrogen, nitrogen dioxide (NO_2), is considered a criteria pollutant.

DAQ monitors the concentrations of NO_2 at various locations, but has never found there to be a likelihood of violating the annual standard of 0.053 ppm. However, these oxides of nitrogen tend to react with other air contaminants to form other criteria pollutants. In the summer, photochemical reactions with volatile organic compounds (VOCs) lead to ground-level ozone. In the winter, NOx reacts with ammonia to form fine particulate matter.

Utah continues to struggle with both the ozone and particulate matter standards, and because of this, DAQ is mindful of the trend in NOx emissions illustrated in Figure 3.

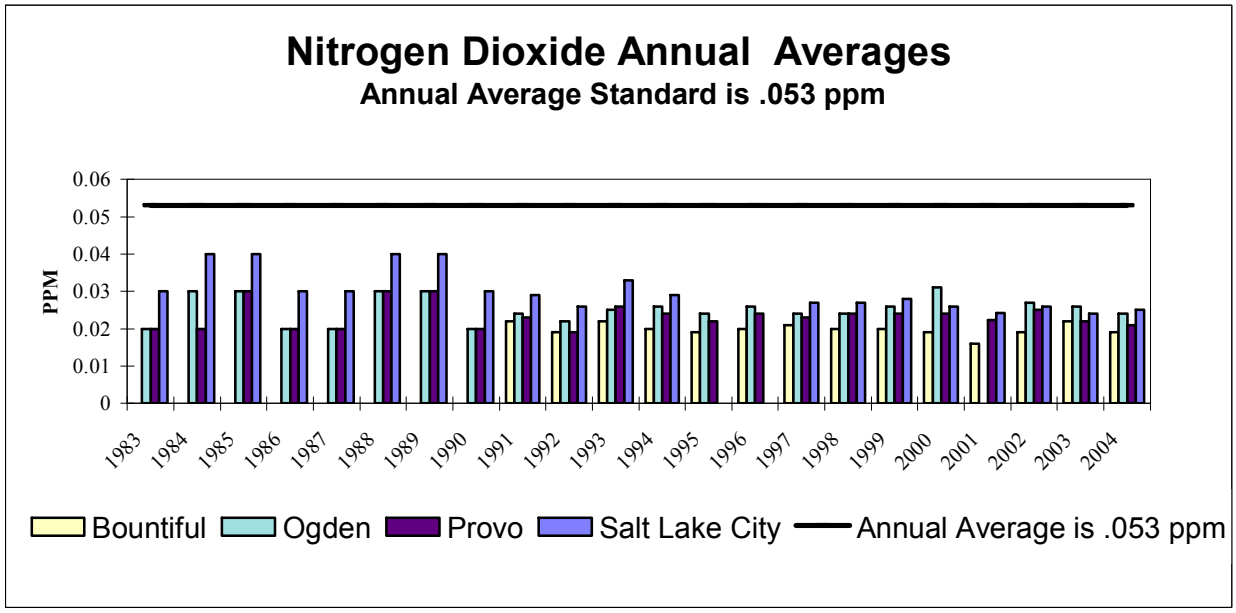


Figure 3

Particulate Matter: PM_{10} and $PM_{2.5}$

Particulate matter is the term given to the tiny particles of solid or semi-solid material found in the atmosphere. Particles ranging in size from less than a tenth of a micron (a micron is one millionth of a meter) all the way up to 50 microns are collectively called total suspended particulate (TSP). Anything larger tends to settle out of the air very quickly. Particles 10 microns in size and smaller can lodge deep in the lungs and cause respiratory problems. They are called PM_{10}. Recent health studies suggest that it is the particles 2.5 microns in size and smaller that pose the most serious health problems. This particulate matter is called $PM_{2.5}$, and in 1997 the EPA adopted new standards for $PM_{2.5}$.

By far, the majority of man-made particulates would be termed PM_{10}. PM_{10} particles larger than 2.5 microns are typically due to "fugitive dust" (sand and dirt blown by winds from roadways, fields, and construction sites) and contain large amounts of silica (sand like) materials.

By contrast, $PM_{2.5}$ is generally born of combustion 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. "Secondary" means that it was not emitted directly as a particle, but instead results when gasses such as sulfur dioxide (SO_2) or nitrogen oxides (NOx) react with other gasses in the atmosphere such as ammonia (NH_3) to become tiny particles. SO_2 and NOx are also products of combustion. These chemical reactions occur predominantly during cold weather, and Utah's wintertime temperature inversions act to trap air in our valleys long enough for concentrations of secondary aerosol to build up to levels that can be unhealthy. Particles smaller than 2.5 microns are also major contributors to visibility-related problems 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.

DAQ presently operates PM_{10} and $PM_{2.5}$ monitors throughout the state to assess the ambient air quality with respect to the standards for each. For PM_{10}, the NAAQS are set at 50 micrograms per cubic meter (ug/m3) on an annual basis, and 150 ug/m3 for a 24-hour average. For $PM_{2.5}$, the standards are15 ug/m3 on an annual basis, and 65 ug/m3 for a 24-hour average. EPA is currently reviewing both of these standards to verify that the current levels are protective enough of the public health.

Particulate Matter in 2004

Utah remained in compliance with all particulate matter standards in 2004. This marks 11 years of continued statewide compliance with the PM_{10} standards, which is significant in that Utah has three areas that have been designated as nonattainment. Steps were taken in the early 1990s to bring these areas back into compliance with the health standards, and these efforts continue to pay dividends.

2004 also marks the fifth year that DAQ has been collecting $PM_{2.5}$ data, and although we may be close to the standards at some locations, we are nevertheless attaining the

NAAQS at every monitor. Continued cooperation by the public on "no-burn days" has been a large part of our success, as have the measures taken to mitigate PM_{10} concentrations in the early 1990s. Many of these measures were directed at precursors to secondary aerosols that count as both PM_{10} and $PM_{2.5}$.

Figures 4 through 7 show the recent trends in both PM_{10} and $PM_{2.5}$.

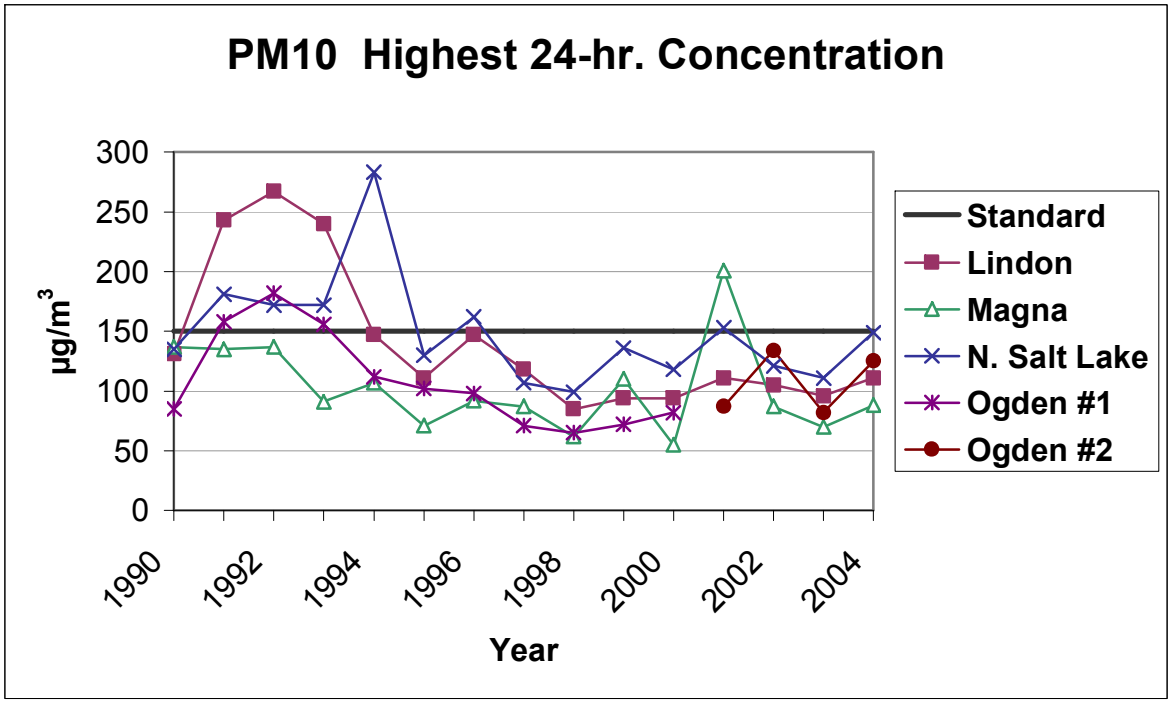


Figure 4

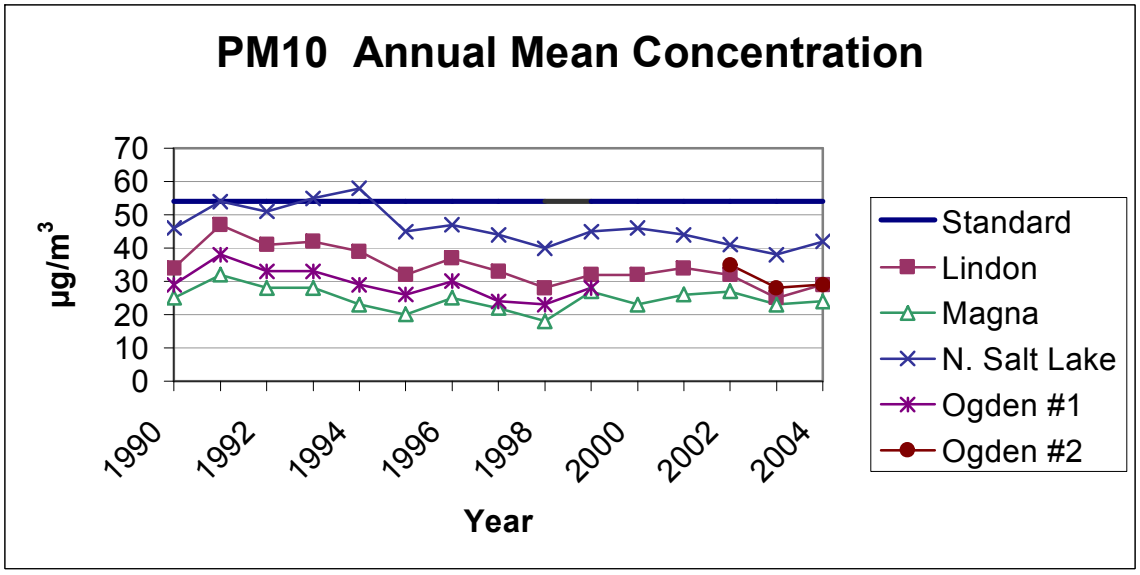


Figure 5

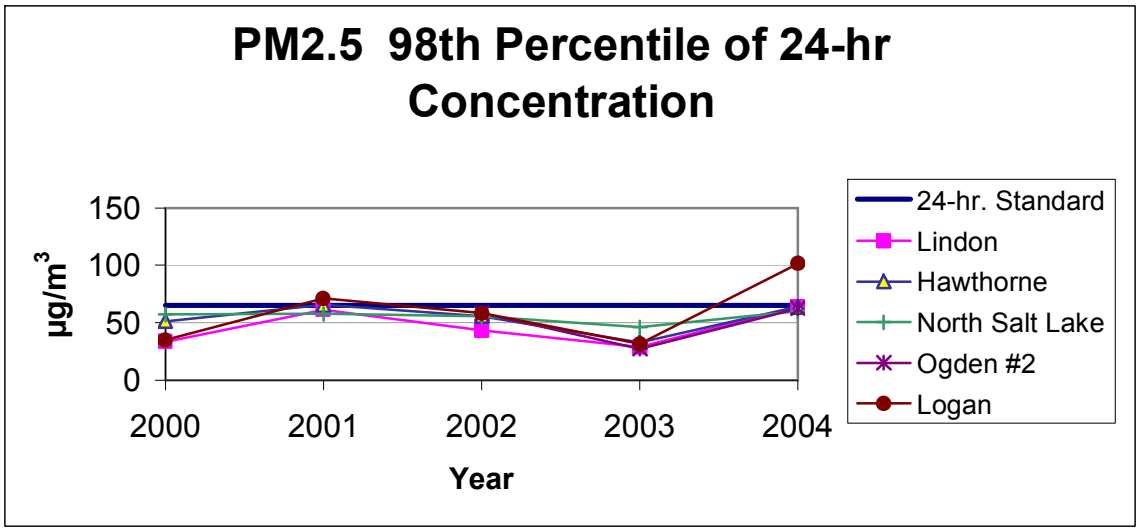


Figure 6

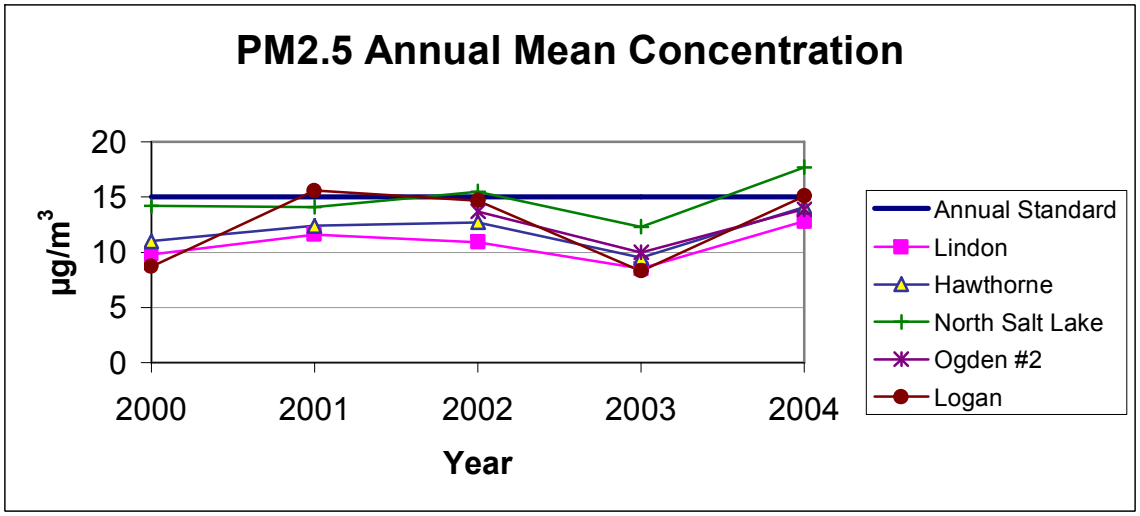


Figure 7

Another indicator of particulate concentrations is the Air Quality Index (AQI). Based on a non-linear scale, the air quality is categorized as: good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, or hazardous. Tables 4 and 5 show the number of days recorded for each category during each of the last seven years for PM_{10} and $PM_{2.5}$ respectively.

Air Quality Index (AQI) summary information for PM10

For calendar years 1998 - 2004

PM10	Number of Days With AQI Values Of:					
year	good	moderate	unhealthy for sensitive grps.	unhealthy	very unhealthy	hazardous
	0 - 50	51 - 100	101 - 150	151 - 200	201 - 300	> 300
1998	269	96	0	0	0	0
1999	247	118	0	0	0	0
2000	245	121	0	0	0	0
2001	253	111	0	0	0	0
2002	261	103	0	0	0	0
2003	286	75	3	0	1	0
2004	246	119	1	0	0	0

Table 4

Air Quality Index (AQI) summary information for PM2.5

For calendar years 1998 - 2004

PM2.5	Number of Days With AQI Values Of:					
year	good	moderate	unhealthy for sensitive grps.	unhealthy	very unhealthy	hazardous
	0 - 50	51 - 100	101 - 150	151 - 200	201 - 300	> 300
1998	246	22	3	2	0	0
1999	293	59	11	0	0	0
2000	279	70	10	4	0	0
2001	263	75	15	12	0	0
2002	220	41	14	8	0	0
2003	285	70	10	0	0	0
2004	244	79	24	19	0	0

Table 5

Sulfur Dioxide (SO_2)

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 that is 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.

There are two primary health based NAAQS for SO_2: 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.

DAQ has situated its monitors near the largest sources of SO_2 (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, Salt Lake County and Tooele County above 5600 ft were designated as non-attainment for SO_2. Two significant technological upgrades at the Kennecott smelter have resulted in continued compliance with the SO_2 standard since 1981. In the mid 1990s, Kennecott, Geneva Steel, the five refineries, and several other large sources of SO_2 made dramatic reductions in emissions as part of an effort to curb concentrations of secondary aerosol (sulfates) that were contributing to PM_{10} violations. Utah will submit a maintenance plan and redesignation request for Salt Lake and Tooele Counties to EPA in April of 2005.

SO_2 measurements from 2004 indicate that Utah's ambient air is well within the federal health standards. Figure 8 shows the trend in SO_2 emissions over the past 34 years.

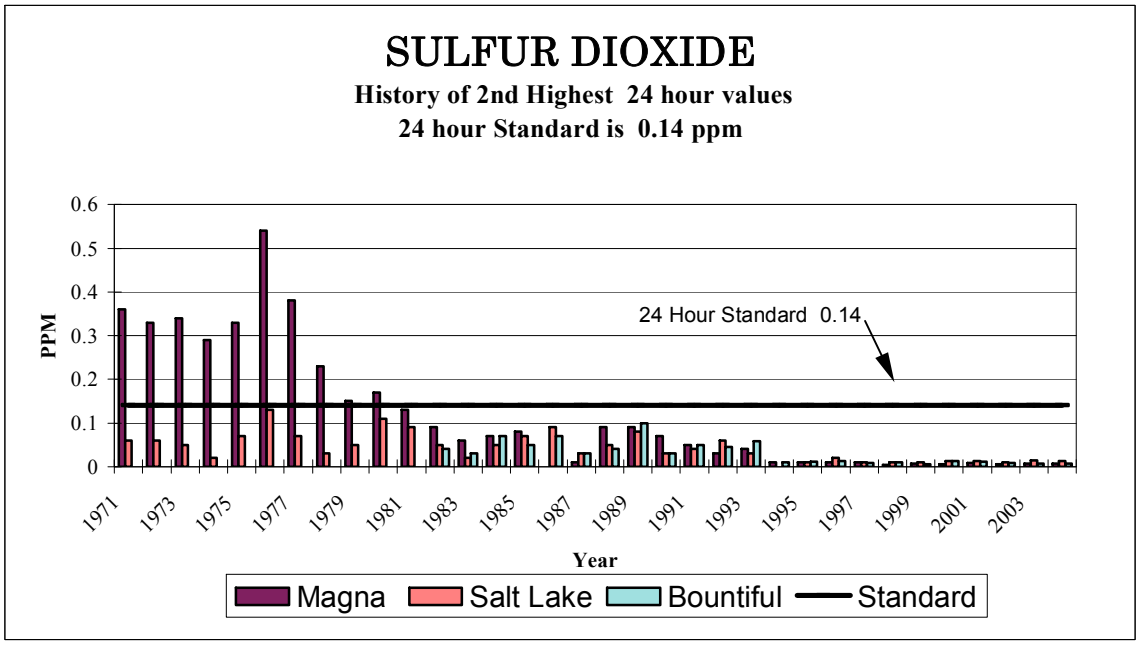


Figure 8

Ozone (O_3)

Ozone is formed when hydrocarbons (also known as volatile organic compounds, or VOCs) and nitrogen oxides (NOx) chemically react in the presence of sunlight and heat. Hydrocarbons are emitted from automobiles, gasoline stations, painting, degreasing, cleaning fluids, and many other sources. Plants also give off some reactive hydrocarbons, such as terpenes from pine trees. Nitrogen oxides are emitted by automobiles, power plants, and other combustion processes.

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 the chemical reactions and trap the air in the region for several days. Ozone produced under these conditions can then be transported many miles outside the urban area.

Ozone at ground level, where it can be inhaled, is a pollutant. Ground-level ozone should not be confused with the stratospheric ozone layer that is located approximately 15 miles high in the atmosphere. It is this layer that shields the earth from cancer-causing ultraviolet radiation.

On July 18, 1997 the EPA issued a new ozone standard. The existing 1-hour standard of 0.12 ppm was replaced by an 8-hour standard at a level of 0.08 ppm. The new standard is based on health studies that indicate that long-term exposures to ozone are more harmful than short, 1-hour exposures.

Ozone in 2004

Utah remained in compliance with the ozone standards (which is based on two calendar years), but once again the margin of safety was slim. The following charts illustrate recent trends in ozone concentrations along the Wasatch Front. Figure 9 shows the highest 1-hr concentrations recorded at a number of monitoring locations relative to the existing 1-hour standard (0.12 ppm). Figure 10 examines the new 8-hour standard (0.08 ppm) by looking at the 4th highest readings at selected monitors. Although we continue to comply with both of these standards, it is not uncommon to record values that are greater than the NAAQS.

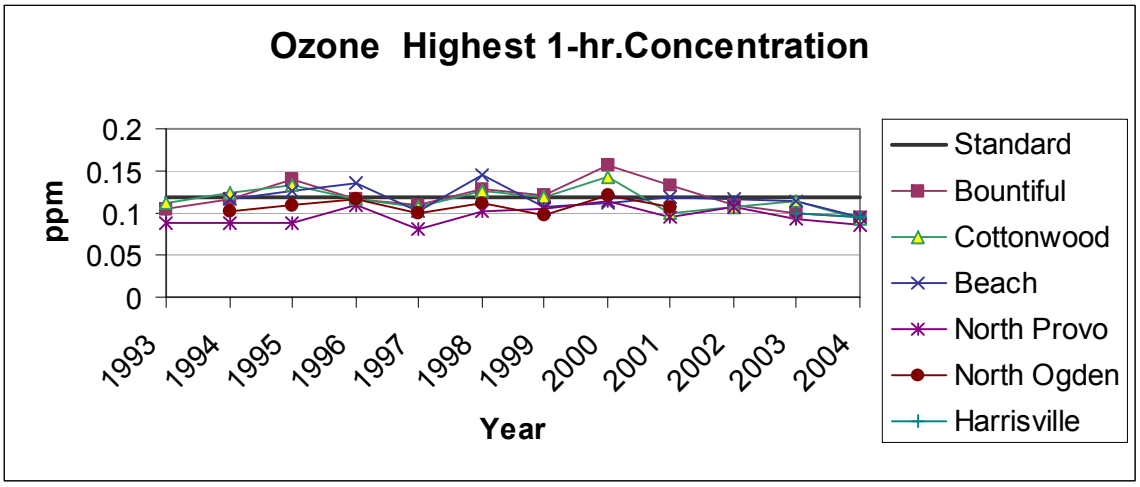


Figure 9

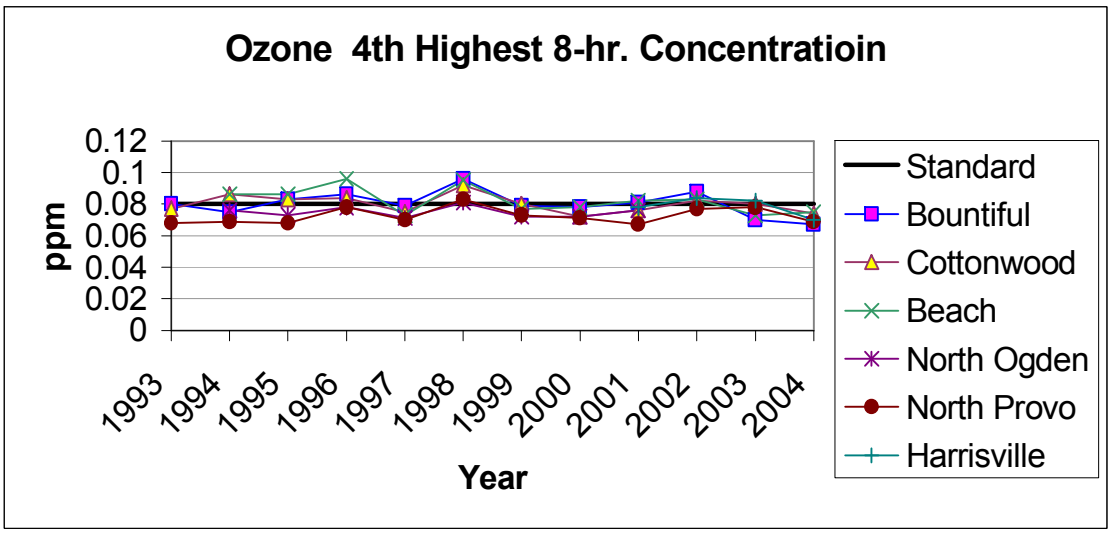


Figure 10

Another indicator of ozone concentrations is the Air Quality Index (AQI). Based on a non-linear scale, the air quality is categorized as good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, or hazardous. Ozone is measured for 153 days each year from May 1st to September 30th. It is assumed that the air quality would be categorized as good on the remaining days of the calendar year due to lower ambient temperatures and weather conditions that are not conducive to ozone formation. Table 6 shows the number of days recorded for each category during each of the last seven years.

Air Quality Index (AQI) summary information for Ozone

For calendar years 1998 - 2004

Ozone	Number of Days With AQI Values Of:					
year	good	moderate	unhealthy for sensitive grps.	unhealthy	very unhealthy	hazardous
	0 - 50	51 - 100	101 - 150	151 - 200	201 - 300	> 300
1998	71	61	20	1	0	0
1999	84	62	6	1	0	0
2000	73	72	6	2	0	0
2001	80	67	4	2	0	0
2002	70	74	9	0	0	0
2003	69	77	7	0	0	0
2004	83	70	0	0	0	0

Utah ozone monitoring season is May 1 - Sept. 30; 153 days.

Table 6

Emissions Inventories

Each year DAQ collects information about the quantity and characteristics of the various air contaminants released by the many sources of air pollution throughout the state. The information is reviewed, quality assured, analyzed, and submitted to EPA. More detailed inventories are sometimes prepared to quantify emissions during specific seasonal episodes, but in any case, proper management of air quality issues within any given airshed begins with a reliable assessment of the emissions released into the atmosphere. In recent years, Utah has made significant strides toward automating the collection of information from the major industry sources resulting in faster, quality checked inventories.

Sources of Air Contaminants

Emission inventories are typically broken out into three categories of sources. Industrial "point" sources are larger industrial or commercial facilities such as power plants, steel

mills, and manufacturing facilities. Air pollutants released from these types of facilities are generally emitted through stacks, and have certain dispersion characteristics that are of interest to air quality specialists.

Smaller "area" sources may also be associated with industry or commerce, but because they appear in large numbers within urbanized areas, their emissions are estimated by various factors that are typically related to population density or economic indicators. Other area sources, such as space heating, are proportional to residential populations. Different categories of area sources are generally associated with different criteria pollutants. For instance, wood burning contributes mostly to particulate matter and carbon monoxide concentrations, while gas stations are associated with VOC emissions that contribute to ozone formation. Non-anthropogenic emissions, also known as biogenic emissions, are also considered an area source, and make up the largest portion of VOC emissions in the statewide emissions inventory.

Mobile sources make up the third category. On-road mobile sources, like cars and trucks, are the primary contributors in this category. 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 drive and the distance they travel. The mobile source category also includes off-road mobile sources; a diverse grouping of heavy construction equipment, small engines (lawnmowers and snowblowers), trains, and aircraft.

While compiling the 2002 statewide emissions inventory, it was found that biogenic VOC emissions had increased over 340,000 tons when compared to 1999. This was mainly due to a different model being used to estimate biogenic emissions in 2002 than was used in 1999. EPA estimates biogenic emissions using the latest version of the Biogenic Emissions Inventory System (BEIS) model. Version 3.12 of the BEIS model was used for estimating 2002 biogenic emissions, while version 2 of BEIS was used for 1999.

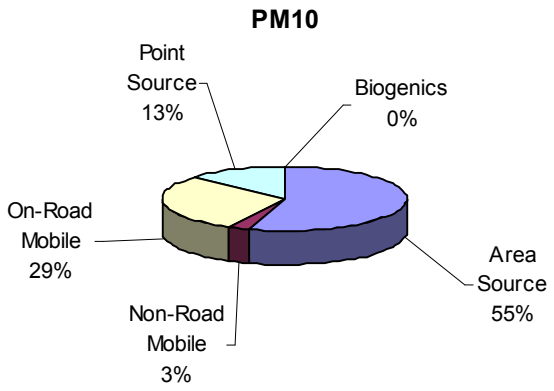
Table 7 shows, by county, the most recent statewide emissions inventory (2002) compiled by DAQ.

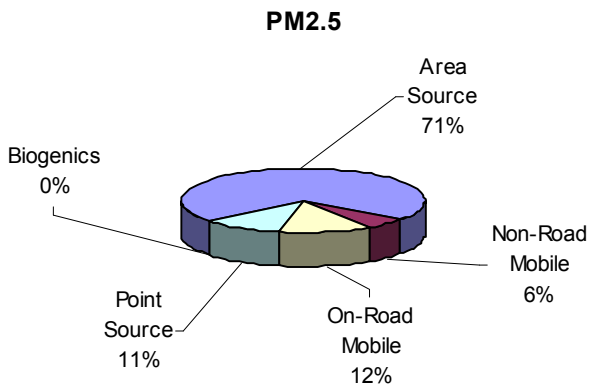
Figure 11 shows how these source categories contribute to the overall emissions inventories for the various criteria pollutants.

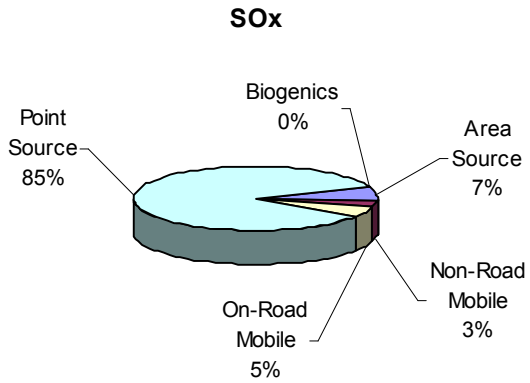
2002 Criteria Pollutant Inventory (tons)

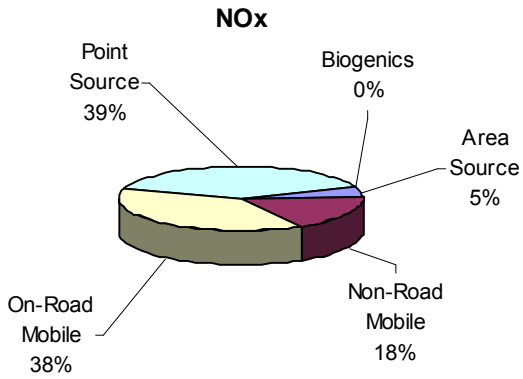
County Summary	PM_{10}	$PM_{2.5}$	SOx	NOx	VOC	CO
Beaver	1,190	391	216	1,953	30,226	18,430
Box Elder	4,917	1,743	315	6,895	38,860	59,129
Cache	3,337	1,300	191	4,145	19,051	45,414
Carbon	1,304	467	8,082	5,884	17,988	24,693
Daggett	1,061	818	6	1,150	15,363	10,896
Davis	3,480	1,029	2,441	11,099	18,611	79,341
Duchesne	1,872	751	105	1,700	24,736	19,414
Emery	3,753	1,305	21,022	32,555	33,225	29,363
Garfield	5,155	4,024	95	1,638	51,365	51,471
Grand	4,906	3,827	58	2,904	42,435	55,050
Iron	2,465	880	531	4,060	41,232	39,255
Juab	1,937	570	309	4,220	30,050	60,912
Kane	750	205	89	564	48,925	16,544
Millard	3,624	1,274	4,458	31,398	52,400	38,941
Morgan	793	220	172	3,302	10,428	9,053
Piute	381	187	38	191	13,098	7,647
Rich	1,049	465	35	309	10,303	7,860
Salt Lake	13,823	4,274	5,992	46,841	50,198	287,796
San Juan	1,544	561	1,568	2,083	65,918	28,897
Sanpete	1,562	610	395	1,292	19,583	20,470
Sevier	1,726	615	438	2,334	20,282	30,163
Summit	2,888	1,509	296	4,770	22,740	38,690
Tooele	4,032	938	464	6,129	44,012	47,287
Uintah	1,732	669	83	1,452	31,637	23,048
Utah	6,183	1,863	904	13,425	36,478	121,196
Wasatch	849	233	49	1,155	18,934	14,388
Washington	2,631	822	282	4,645	58,610	57,054
Wayne	572	173	155	266	24,675	8,526
Weber	2,924	880	297	6,953	16,064	63,113
Total	**82,439**	**32,605**	**49,090**	**205,313**	**907,427**	**1,314,041**

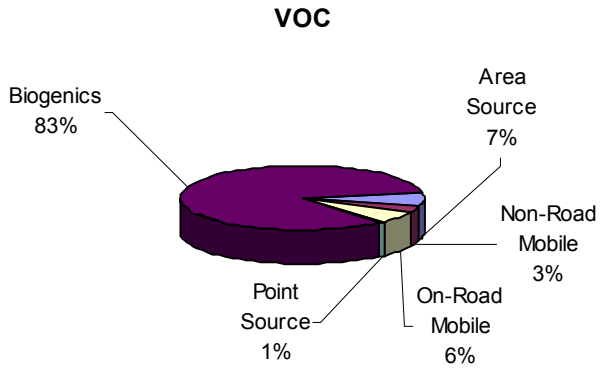
Table 7


PM10
Point Source 13%
Biogenics 0%
On-Road Mobile 29%
Area Source 55%
Non-Road Mobile 3%


PM2.5
Area Source 71%
Biogenics 0%
Non-Road Mobile 6%
Point Source 11%
On-Road Mobile 12%


SOx
Biogenics 0%
Point Source 85%
Area Source 7%
Non-Road Mobile 3%
On-Road Mobile 5%


NOx
Point Source 39%
Biogenics 0%
Area Source 5%
On-Road Mobile 38%
Non-Road Mobile 18%


VOC
Biogenics 83%
Area Source 7%
Non-Road Mobile 3%
Point Source 1%
On-Road Mobile 6%

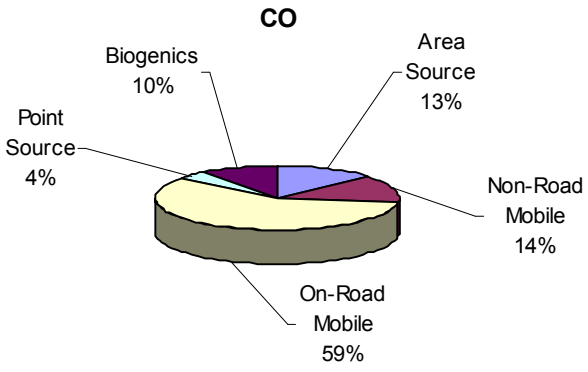

CO
Biogenics 10%
Area Source 13%
Point Source 4%
Non-Road Mobile 14%
On-Road Mobile 59%

Figure 11

Planning for the Future

The Planning Branch is responsible for developing comprehensive State Implementaion 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. These plan revisions encompass a variety of different issues, but most often focus on areas of the state where the air quality was found to be unhealthy for one 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 plans must conform to the plans (SIPs) prepared by the DAQ. Therefore, many of the current SIP revisions are undertaken with the goal of helping transportation planners adapt to an ever-growing population base.

Recent Accomplishments

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 a commission to determine the causes of poor visibility at the Grand Canyon. The Commission determined that many kinds of 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 five states that submitted plans in 2003 under this option. Key elements of the plan include using a regional cap on SO_2 emissions and a backstop market trading program to be triggered if emissions exceed the emissions cap. Other components reduce emissions from prescribed fire and require tracking emissions and visibility conditions every five years through 2018. The 2003 Milestone Report prepared by the five states shows that actual sulfur dioxide emissions in 2003 were 25 percent below the emissions cap for that year. Technical work is ongoing with other western states and tribes that are members of the Western Regional Air Partnership to prepare the plan updates that are due late in 2007. You can read more about the current plan at http://www.wrapair.org/forums/309/docs.html. Jan ok

Provo CO –In 2004, DAQ submitted a re-designation request and associated maintenance plan for Provo City CO. The plan was approved by EPA in 2005 and is effective on January 3, 2006. The plan demonstrated that there is no longer a need for oxygenated fuels, and revised the transportation conformity budget. EPA has performed a transportation conformity adequacy review and approved the revised conformity budget. EPA has also issued an enforcement discretion memo on oxygenated fuels. Revisions to both the Salt Lake City and Ogden City maintenance plans for CO have been approved by EPA. In each case, the transportation conformity budget has been updated to reflect

the use of MOBILE6. You can find the plan that was submitted to EPA @ http://www.airquality.utah.gov/SIP/SIPPDF/1-Secixc6%20Provo%2026896.pdf.

In 2004, DAQ in cooperation with Utah State University (USU), and the State of Idaho, began particulate studies for Logan and the surrounding Cache Valley area. These studies have continued through 2005 and into 2006 and will help to determine what control measures can be implemented to reduce particulate concentrations. Since the attainment area includes a portion of Idaho, the Idaho Department of Environmental Quality (DEQ) has installed particulate monitors in Preston and Franklin Idaho, and has loaned USU their NH_3 monitoring trailer. DAQ has installed a new Filter Dynamics Monitor System (FDMS), and an NH_3 (ammonia) analyzer at the Logan site, as well as two additional Cache Valley particulate monitors, one in Hyrum, and one in Amalga. Current monitoring data is available @ http://www.airmonitoring.utah.gov/f-current.htm.

Upcoming Projects

PM_{10} - The PM_{10} SIPs for Utah and Salt Lake Counties are being revised using, for the first time, a photochemical grid model. The plan will demonstrate attainment and maintenance of the PM_{10} NAAQS for a period of at least 10 years, and hence qualify the areas for redesignation to attainment for PM_{10}. Ogden City is also included in the modeling domain, and will qualify for redesignation as well. The transportation conformity budgets will be developed using the latest mobile source emissions model. This plan is being developed with extensive stakeholder involvement. More information is available @ http://airquality.utah.gov/SIP/PM10SIP/index.htm.

Ozone Plan - All areas of the state were officially designated as attainment areas for the new 8-hour ozone standard in 2004, and the 1-hour ozone standard was revoked on June 15, 2005. To complete the transition to the new 8-hour ozone standard, the State of Utah must demonstrate that the Salt Lake/Davis County ozone maintenance area will continue to maintain the new 8-hour ozone standard for the next 10 years. The Division of Air Quality is currently gathering background information and has begun preparation of the plan. The plan will be presented to the Utah Air Quality Board in late 2006 and will be submitted to EPA in 2007.

PSD/NSR - The federal permitting program for new and modified major sources was revised in December 2002, and Utah is required to update the state's permitting program by January 2006 to reflect these changes. The Division of Air Quality has been evaluating the changes to the federal program, and initiated a stakeholder review process in 2004 that focused initially on how the revisions would affect major sources. The Division will continue to work with the stakeholders in 2005 to determine how to integrate these new requirements into Utah's permitting program that applies to both major and minor sources. The Division is planning to bring recommended rule changes to the Air Quality Board in the summer of 2005. Jim Schubach ????

EPA is still developing permitting requirements for the new 8-hour ozone and $PM_{2.5}$ standards. Utah may need to delay changes to the state's nonattainment area permitting rules to ensure that these new requirements are included in the program.

DAQ secured contract services in 2004 for a Business Process Analysis and Database Development project that began in the spring of 2005 and is scheduled to reach completion in early 2006. The project is well underway and aims to provide a streamlined, accurate, and logical business data system through which customers and division employees can produce expedient business transactions. The system design will be flexible and capable of supporting new functionality as DAQ business requirements and goals evolve.

In 2004, DAQ began working with the Center for Automotive Science and Technology (CAST) at Weber State University to develop a source-customized On-Line Emission Inventory Submittal System to improve the quality of emission inventory data provided to DAQ by the sources. This on-line submittal system would include tutorial enhancements and built-in automated emissions calculations with final inventory values generated. Joe????

Ancillary Programs

Within the community there are some familiar programs and information hotlines which have their roots in some of the air quality plans developed at DAQ. These include:

Woodburning Program (red-burn / green-burn) – This has its origin in a problem with meeting the health standard for PM_{10}. Although originally met with some skepticism, the measurable success of this program has been outstanding, owing much to the voluntary cooperation of Wasatch Front residents. The program runs from November through early April of each year. In addition to the burning requirements, residents are encouraged to drive less and industry is encouraged to optimize operating conditions. Notification is given through the general media, or one can access the daily condition on the web at http://www.airmonitoring.utah.gov.

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 (NAAQS) for several pollutants; most notably CO and ozone. These programs are largely responsible for CO and ozone being currently in maintenance and attainment status respectively throughout the state. These programs are administered by the counties.

Air Quality Index (AQI) – The local newspapers routinely publish daily assessments of air quality. This information is compiled and disseminated by DAQ. Information is also available on the web at http://www.airmonitoring.utah.gov.

No Drive Days – These are announced whenever the probability of exceeding the ozone standard is forecasted to be high. High temperature and stagnant air masses contribute to this probability. Residents are also encouraged to minimize driving when we approach the PM standards.

Choose Clean Air – An interactive source of information about ways individuals can help improve air quality by making smart choices in their personal lives may be found on the website at http://www.cleanair.utah.gov. The Utah Department of Environmental Quality is also sponsoring an electronic mail server, known as a List Server or Listserv. Those who join will be automatically notified by e-mail when unhealthy air pollution levels are forecast for the Wasatch Front. Information about how to subscribe to Listserv can be found @ http://www.deq.utah.gov/ListServe.

Permitting

The Division of Air Quality Permitting Branch is responsible for issuing permits to any source that emits any contaminant into the air. These permits often establish actual emission limits that can be measured, but it's not unusual to find surrogate limits such as production rates or limited hours of operation or combinations of these surrogates. Also common are limits on opacity, which is the transparency or opaqueness of the smoke that is emitted from a source.

The branch issues two types of permits. New Source Review (NSR) permits are basically Construction Permits that are called "Approval Orders" (AO). These are issued by the New Source Review Section and have been required since 1969. The Operating Permits Section issues the Title V Operating Permits to the larger "major" sources in the state; there are approximately 100 of these sources. These Operating Permits basically consolidate all air quality related requirements into a single document, making it easier for the source to understand all of the many requirements with which they must comply. It is also easier to inspect against a consolidated document, as well.

In addition, the branch also 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. Bryce Bird

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 construct. The application, called a notice of intent (NOI), is reviewed to make sure that the source is planning to use the best available control technology (BACT). BACT is a case-by-case determination that takes into account both the cost and the benefits of the control equipment. An approval order is written based on the NOI to ensure that the source will be operated in accordance with the Utah Administrative Code (UAC) and all applicable federal requirements.

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 R307-401 of the UAC. Potential applicants are encouraged to contact DAQ prior to submitting the necessary paperwork. In fiscal year 2004 (7/1/03 to 6/30/04) the NSR section completed or was working on 282 different projects. This included the completion of 95 AO's and 112 other projects. Rusty Ruby/CC Patel

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. As stated above, a primary purpose of the permit is to consolidate the applicable air requirements from the many and varied locations such as Approval Orders, federal New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Available Control Technology (MACTs) requirements. 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 as well. The criteria indicating which sources must obtain an Operating Permit are specified in R307-415 of the UAC. As with the NSR Permit or AO, potential applicants are encouraged to contact DAQ prior to submitting the necessary paperwork.

Another significant purpose or 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, not just 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 2004, the Operating Permits section issued several 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 2004 the section issued several permit renewals. These renewal permits become a bit 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 as appropriate. Dave Beatty

Small Business Assistance Program

The Small Business Assistance Program (SBAP) helps small businesses understand and comply with state air quality rules. The SBAP provides "plain language" educational information to help small sources learn about the many air quality requirements, and also

provides on-site assistance with process evaluation, compliance assistance, and pollution prevention (P2) techniques.

Another function of the SBAP is to incorporate the advise of a Small Business Ombudsman and a Small Business Advisory Panel that is appointed by the Legislature. These additional services are designed to provide education to small businesses outside of the regulatory environment, and also to provide feedback to the SBAP regarding program effectiveness. All of these services are free of charge. A toll-free telephone hotline (1-800 270-4440) provides access to SBAP services 24 hours a day / seven days a week.

Compliance Activities

The Compliance and the Hazardous Air Pollutants Sections are responsible for ensuring that all regulatory requirements are met. This is done through inspections, emission testing, 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 these conditions are taken seriously. Inspectors in the Compliance Section average roughly 1,400 inspections per year. They also respond to about 350 complaints each year, and frequently conduct drive-by observations of visible emissions.

Should enforcement actions become necessary, the DAQ may issue written warnings called Source Compliance Action Notices (SCANs), Compliance Action Notices (CANs), or Notices of Violation (NOVs) with compliance orders. SCAN warnings are usually reserved for first-time offenders with minor infractions. CANs are less formal than NOVs and offer the company an opportunity to settle the compliance action in a rapid manner and be offered a reduced penalty for their expedient cooperation. 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 of the violations are resolved with a settlement agreement between the Executive Secretary and the operator, saving time and court costs. Early settlement compliance advisories provide incentive for source operators to address these issues in a timely manner. Settlements may also include supplemental environmental projects. These are environmentally beneficial projects that a violator agrees to undertake as a way to offset some or all of a civil penalty. Jeff Dean OK

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.

Hazardous Air Pollutants Section (HAPS)

The Hazardous Air Pollutants Section determines compliance with specific regulations involving the emission of hazardous air pollutants. The following programs currently reside within HAPS:

1) National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 61 (R307-214-1). HAPS presently oversees 12 sources operating under these regulations due to emissions of asbestos, beryllium, benzene waste, or radon from uranium mill tailings.

2) National Emission Standards for Source Categories - Maximum Achievable Control Technology (MACT), 40 CFR Part 63 (R307-214-2). These regulations cover the emission of 187 additional hazardous air pollutants, and sources of these pollutants are required to apply controls that are equivalent to what is in service for the "best controlled 12%" of all such operations in the nation. Utah presently oversees about 225 sources that must comply with these regulations.

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

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

5) Asbestos NESHAP and State asbestos work practices - 40 CFR Part 61, subpart M, R307-801. Under this program, HAPS deals with the certification of individuals and companies, review of asbestos project notifications, review of demolition notifications for structures, review of alternate work practices, inspection of asbestos abatement projects and demolition of structures, and asbestos outreach activities. Robert Ford

Outreach

DAQ holds regular workshops to help industries understand permitting and compliance issues. The goal is to achieve 100% compliance with air quality regulations. Additional information can be found at the DAQ compliance website through the DAQ homepage at http://www.airquality.utah.gov.

Frequently Asked Questions

What are Utah's nonattainment areas? Figure 12 is a map of the current nonattainment and maintenance areas within the state. A maintenance area is an area that was once designated as nonattainment, and which subsequently demonstrated that it will attain and maintain the particular standard for a period of 10 years. EPA must approve the demonstration.

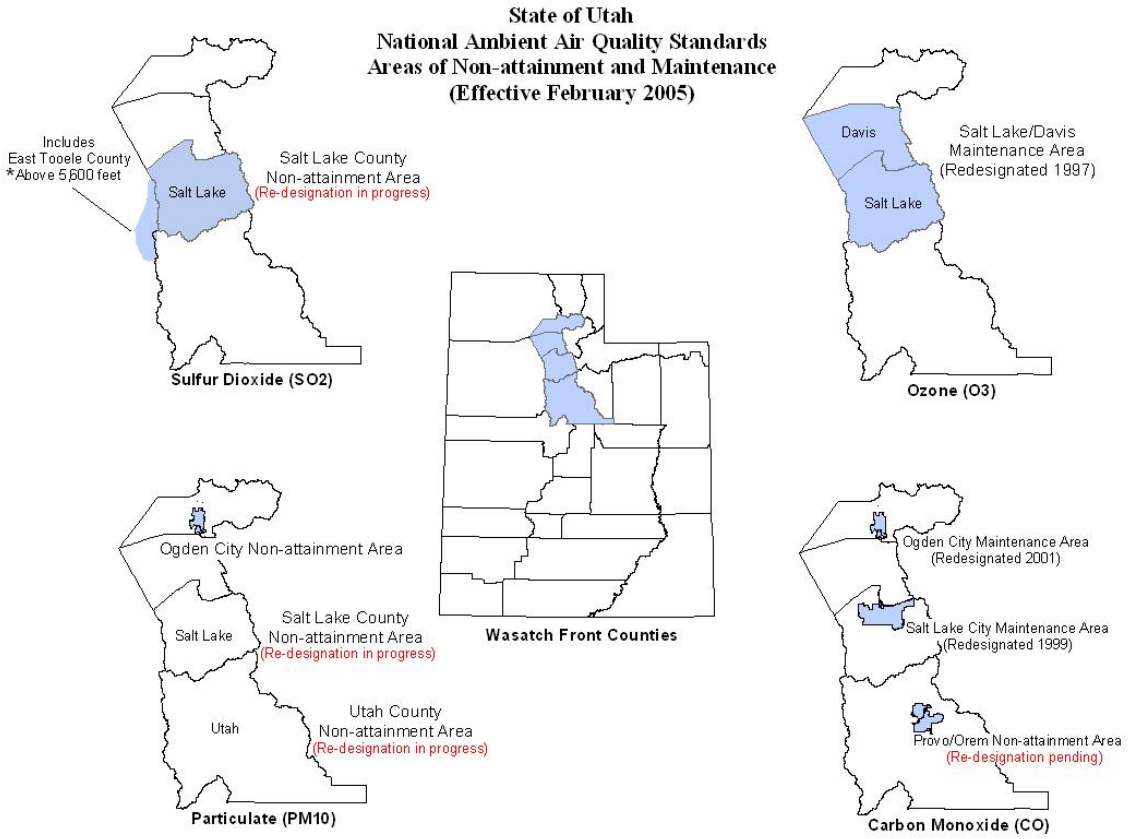


Figure 12

How do I get an air quality permit? The first step is to contact the DAQ @ (801) 536-4000 and ask to speak with the New Source Review Section. Later, in order to ensure

that the required application information is complete, request a copy of "The Methodology."