



# Town of Truckee

## 2005 Annual Report Particulate Matter Air Quality

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## *Preface*

Within two years of the adoption of this plan and every year thereafter, the Planning Division will submit to the Town Council a report that analyzes air quality monitoring data for particulate matter including emission levels and concentrations and compliance with National and State ambient air quality standards. The Town Council will review the report to determine the success of the plan's control strategies in achieving the attainment goal of the plan, and if necessary take the appropriate steps to ensure consistency with the plan's goal and objectives.

For a plan to be effective, its strategies must be implemented and achieve their purposes as planned. It is critical to gauge the effectiveness of the control strategies to ensure the goal and objectives of the plan are being met. The Town must continue to monitor particulate matter air quality and associate any changes to particulate matter emission levels and concentrations to the control strategies and to factors that are beyond the Town's control. If emissions and concentrations increase, remain as they are, or do not decrease to the levels anticipated, this may signal that the control strategies are not succeeding and a change in the Town's efforts may be needed. This objective provides the mechanism for the Town Council to review the effectiveness of the control strategies on an annual basis and determine if they are succeeding. It is presumed that if the control strategies are not succeeding that the Town Council will take appropriate action based on the findings of the report.

***Objective 9, Truckee Particulate Matter Air Quality Management Plan***

# 2005 Annual Report for Particulate Matter Air Quality

## INTRODUCTION

This report is the fifth annual report on particulate matter air quality in the Truckee air basin. It summarizes the quality of air for particulate matter pollution in 2004 and attempts to explain the factors contributing to our air quality and any changes to our air quality for this past year. It also discusses the status of the implementation of the plan's control strategies.

## PARTICULATE MATTER MONITORS

Particulate matter air quality has been monitored in Truckee since 1988. Since 1998 the Northern Sierra Air Quality Management District has made several changes to air quality monitoring operations in Truckee. The Hi-Vol PM<sub>10</sub> monitors at the Glenshire and Downtown fire stations were removed in early 2000, and PM<sub>10</sub> monitoring data was provided solely by a TEOM (24-hour, daily sampling) monitor at the Downtown fire station until late 2003. The Northern Sierra Air Quality Management District installed a Hi-Vol PM<sub>2.5</sub> monitor at the Downtown fire station in 1999, and this monitor samples PM<sub>2.5</sub> air quality for a 24-hour period once every three days.

In 2003 the Community Development Department identified inconsistencies in the PM<sub>10</sub> TEOM data that indicated the monitoring station was giving lower-than-actual readings of PM<sub>10</sub> concentrations. In response to these findings, the District and the Town in a cooperative effort replaced the TEOM monitor with a new MetaOne Beta Attenuation Monitor (BAM) (24-hour, daily sampling). This monitor was installed and began operation in the Fall of 2003 and has been collecting PM<sub>10</sub> data from this monitor since October 2003. The District has tested this monitor for accuracy with another monitor, and the District has concluded Truckee's BAM monitor is giving accurate readings. The TEOM monitor was discontinued after the BAM monitor became operable.

The Beta Attenuation Monitor has given us accurate readings of PM<sub>10</sub> concentrations since October 2003. The BAM experienced some operational problems in November 2004, and the monitor was sent back to the factory for repair. The BAM was not operational in December, and we do not have any data for that month. However, the monitor is currently back in operation and performing properly.

## THE QUALITY OF OUR AIR

It is staff's opinion that the TEOM did not give accurate readings of PM<sub>10</sub> concentrations from late 1999 to late 2003. Consequently, it is difficult to compare monitoring data

from 2004 with data from the previous four years. Further, we do not have any monitoring data from December 2004; December is the month in which we start to see substantial increases in PM<sub>10</sub> concentrations. So how do we compare monitoring data to determine if and how our particulate matter air quality is improving or worsening?

For this report, we compared PM<sub>10</sub> data from the Truckee TEOM station for the years of 1994, 1998, and 2004. (For 2004, we used monitoring data from December 2003 to November 2004.) We also compared PM<sub>2.5</sub> monitoring data that the California Air Resources Board has collected for the past five years and the monitoring data collected for one year in 1992-1993. Lastly, we compared coarse particulate matter concentrations (particulate matter less than 10 microns in size but greater than 2.5 microns) and the proportion of fine particulate matter to coarse matter in 1992-93 and 2004. This data is found at the end of this report.

In reviewing the data, please use it only as a broad instrument in understanding how air quality has changed over the past 12 years. Most of the data compares single years where other variables such as weather may have a substantive affect on particulate matter concentrations. Even so, it is staff's opinion that the data provides us some important insights in our air quality:

- Our air quality is better today than it was in 1992, the "dark days" of our particulate matter pollution. Although we have more traffic, more visitors, more homes and residents, our PM<sub>10</sub> concentrations are less. In addition, we have not exceeded the National 24-Hour standard since April 1999.
- PM<sub>2.5</sub> concentrations have decreased by over 50% in the last 12 years. This decrease is even more dramatic during the winter months where concentrations in 2004 are more than 65% less than in 1993. Further, PM<sub>2.5</sub> concentrations continue to decrease each year.
- Counterbalancing the decrease in PM<sub>2.5</sub> is an increase in coarse particulate matter. Concentrations of particulate matter between 2.5 and 10 microns have increased by approximately 20% since 1993.
- Coarse particulate matter comprises a higher percentage of our PM<sub>10</sub>. In 1993 coarse particulate matter made up around 60% of our annual PM<sub>10</sub> concentrations. Today, that percentage is almost 80% (85% during the winter months).

## **NATIONAL AND STATE AIR QUALITY STANDARDS**

Both the United States Environmental Protection Agency and the California Air Resources Board have adopted ambient air quality standards for PM<sub>10</sub> and PM<sub>2.5</sub>. The State standards are more stringent than the National standards. However, failure to meet the National standards results in harsher consequences. (Non-compliance with State standards does not result in any legal or regulatory ramifications.) We have reviewed our monitoring data to determine our compliance with both National and State standards.

## Air Quality Annual Report 2005



National Standard:  
Compliance:

PM<sub>10</sub> Annual Concentration, 50 ug/m<sup>3</sup>  
Truckee is in compliance  
(32.6 ug/m<sup>3</sup> in 2004)



National Standard:  
Compliance:

PM<sub>10</sub> 24-Hour Concentration, 150 ug/m<sup>3</sup>  
(Not to be exceeded more than once per year)  
Truckee is in compliance  
(Highest concentration in 2004 – 107 ug/m<sup>3</sup>; this standard has not been exceeded since 1999)



National Standard:  
Compliance:

PM<sub>2.5</sub> Annual Concentration, 15 ug/m<sup>3</sup>  
(Average for 3 years)  
Truckee is in compliance  
(Average for 2002 to 2004 – 7.0 ug/m<sup>3</sup>)



National Standard:  
Compliance:

PM<sub>2.5</sub> 24-Hour Concentration, 65 ug/m<sup>3</sup>  
(98<sup>th</sup> percentile, average for 3 years)  
Truckee is in compliance  
(Average 98<sup>th</sup> percentile for 2002 to 2004 – 17 ug/m<sup>3</sup>)



State Standard:  
Compliance:

PM<sub>10</sub> Annual Concentration, 30 ug/m<sup>3</sup>  
Truckee is not in compliance  
(32.6 ug/m<sup>3</sup> in 2004)



State Standard:  
Compliance:

PM<sub>10</sub> 24-Hour Concentration, 50 ug/m<sup>3</sup>  
Truckee is not in compliance  
(The State standard was exceeded 50 times in 2004)



State Standard:  
Compliance:

PM<sub>2.5</sub> Annual Concentration, 12 ug/m<sup>3</sup>  
Truckee is in compliance  
(6.7 ug/m<sup>3</sup> in 2004)

State Standard:  
Compliance:

PM<sub>2.5</sub> 24-Hour Concentration, No Standard  
Not applicable

Truckee comfortably complies with National standards for both PM<sub>10</sub> and PM<sub>2.5</sub>. We have made substantial progress in reducing our particulate matter concentrations so that we no longer exceed the 24-Hour PM<sub>10</sub> standard, and do not threaten to exceed the PM<sub>2.5</sub> standards. We still exceed State standards for PM<sub>10</sub>, however, some progress has been made in reducing our non-compliance with those standards. The annual concentration has been reduced from around 35 ug/m<sup>3</sup> to 32.5 ug/m<sup>3</sup>, while exceedances of the 24-hour standard have been reduced from 54 to 50. We comfortably comply with the new State standard for PM<sub>2.5</sub>.

## PARTICULATE MATTER SOURCES

In 1999 the Particulate Matter Air Quality Management Plan identified re-entrained road dust, residential wood combustion, and construction processes as the three major sources of particulate matter air pollution in the Truckee air basin. However, staff believes that re-entrained road dust emissions are increasing while wood combustion emissions are decreasing. In reviewing air quality data from the past 12 years, we have

made the following conclusions in regards to particulate matter sources. Once again, please use this information as a broad instrument in understanding how emissions from particulate matter sources have changed. There is limited data, weather patterns are an integral factor in our air quality, and only indirect correlations can be made between particulate matter size and sources.

- Emissions from residential wood combustion have decreased dramatically and continue to decrease. This is supported by air quality data showing that PM<sub>2.5</sub> concentrations have dropped by 50% over the past 12 years and have also decreased over the past five years. These decreases are even more substantial during the winter months. Residential wood combustion is the only major source of fine particulate matter during the winter. (The other major source – construction processes – occur from late spring to fall.)
- The primary reason for this decrease in residential wood combustion emissions is the community's reduced reliance on woodstoves and fireplaces as a home heating source. The extension of a natural gas pipeline to Truckee and the availability of natural gas service has resulted in many homeowners removing woodstoves, especially old non-compliant stoves, or using their woodstoves less often for heating purposes.
- However, PM<sub>2.5</sub> concentrations have continued to decline substantially since 2001 when natural gas was extended to the last remaining parts of the community. Staff believes that the Town's programs to remove non-certified woodstoves are a big contributor to this reduction. The removal of these gross-polluting woodstoves obliges homeowners to use natural gas or other cleaner heating sources or use a EPA-certified woodstove which emits substantially less particulate matter than the old woodstove.
- While residential wood combustion emissions are decreasing, emissions from re-entrained road dust are, at best, holding steady and, at worst, are increasing. Re-entrained road dust by far is the #1 source of coarse particulate matter in Truckee, and there has been an increase in coarse particulate matter emissions, including during the winter months.

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## CONTROL STRATEGIES

As part of your consideration of the 2004 Annual Report, the Council established a schedule for the implementation of four control strategies identified in the Air Quality Management Plan. These strategies and their estimated schedule were:

- |    |  |                                 |
|----|--|---------------------------------|
| 1. | Joint financial assistance program with Placer County  | To be completed by Fall 2004    |
| 2. | Mitigation fee program for single family homes   | To be considered by Winter 2005 |
| 3. | Administrative procedures and guidelines for ordinance requiring removal of all non-certified woodstoves and inserts | To be completed by July 2004    |
| 4. | Street sanding guidelines  | To be initiated in FY2005-2006  |

As part of setting the Town's priority for 2004, the Town Council designated implementation of air quality control strategies as an "A" priority. Unfortunately, Community Development Department staff and resources in 2004 were assigned to a number of "A+" priorities and the processing of development and building applications. The amount of time that we could devote to air quality was substantially lessened. The Community Development Department only had resources to administer the woodstove rebate program and the ordinance requiring removal of non-certified woodstoves and fireplace inserts prior to sale or transfer of property. We have only been able to allocate a minimal amount of staff time to implementing the control strategies listed above, and no time has been devoted to those control strategies since April 2004.

## CONCLUSION

Our goals for particulate matter pollution, as expressed in Air Quality Management Plan, are:

- Achieve and maintain compliance with the National Ambient Air Quality Standards; and
- Strive to achieve compliance with State Ambient Air Quality Standards and make reasonable progress towards achieving these standards.

In meeting these goals, and the Town's approach to improving our air quality is working as planned. Step #1, which we have been implementing for the past five years, is to substantially reduce emissions from residential wood combustion by reducing our dependence on wood combustion for heat and removing old, gross-polluting stoves. The main objectives of Step #1 were to produce immediate reductions in PM<sub>10</sub> concentrations, especially during winter months, and offset increases in PM<sub>10</sub> emissions

from other sources while still allowing residents to operate woodburning devices. We are achieving these objectives.

The Council's actions to strongly support the extension of natural gas in Truckee and to adopt an ordinance requiring the removal of non-certified woodstoves and fireplace inserts prior to property transfer have substantially decreased PM<sub>2.5</sub> emissions and are the two main reasons why our air quality is better. However, growth and development will continue. Particulate matter emissions will increase with this growth, and there is still a large number of non-certified woodstoves and fireplace inserts emitting a considerable amount of fine particulate matter into Truckee's air.

Also, we cannot go too far forward with Step #2 until we finish Step #1. Step #2 will focus on our major source of particulate matter pollution: re-entrained road dust. And this type of particulate matter emission will be tougher to handle. The most effective control strategies for re-entrained road dust can only reduce emissions up to 30%; 80% of the re-entrained road dust is generated from State highways which are beyond the control of the Town; and traffic on winter streets will be continue to increase.

This past year the Town has not had sufficient staff resources to apply to our commitment to air quality. Not by any purposeful action by the Council, but rather by increased obligations imposed on staff by development activity and by other higher priority projects. If we wish to see continued improvement in our air quality, the Council will need to renew the commitment to implementing the control strategies of the Air Quality Management Plan by allocating the necessary staff resources.

## Air Quality Data

**Table 1**  
**PM<sub>10</sub> Concentrations (Fine and Coarse Particulate Matter)**

	1992	1998	2004
<b>Annual Concentration</b>	35.0 ug/m <sup>3</sup>	32.0 ug/m <sup>3</sup>	32.6 ug/m <sup>3</sup>
<b>Highest 24-Hour Concentration</b>	179 ug/m <sup>3</sup>	114 ug/m <sup>3</sup>	107 ug/m <sup>3</sup>
<b>Exceedances of 24-Hour NAAQS</b>	2	0	0
<b>Exceedances of 24-Hour SAAQS</b>	54	52	50

The “annual concentration” is the average daily concentration of particulate matter, less than 10 microns in size, in our air throughout the entire year. It is expressed in micrograms (ug) of particulate matter per cubic meter (m<sup>3</sup>) of air. The “highest 24-hour concentration” denotes the highest concentration of PM<sub>10</sub> that occurred on any given day in the year. It is an average of hourly readings for the 24-hour period. The “Exceedances” count the number of days in which the National EPA 24-hour standard (> 150 ug/m<sup>3</sup>) and State ARB 24-hour standard (> 50 ug/m<sup>3</sup>) were exceeded.

**Table 2**  
**PM<sub>2.5</sub> Concentrations (Fine Particulate Matter)**

	1-Year	Three-Year Averages			
	1992-1993	1999-2001	2000-2002	2001-2003	2002-2004
<b>Annual Concentration</b>	14.1 ug/m <sup>3</sup>	9.8 ug/m <sup>3</sup>	8.4 ug/m <sup>3</sup>	7.9 ug/m <sup>3</sup>	7.0 ug/m <sup>3</sup>
<b>24-Hour Concentration (98<sup>th</sup> Percentile)</b>	50 ug/m <sup>3</sup>	28 ug/m <sup>3</sup>	22 ug/m <sup>3</sup>	21 ug/m <sup>3</sup>	17 ug/m <sup>3</sup>

PM<sub>2.5</sub> is often referred to as fine particulate matter and comprises the smallest particles in the air, less than 2.5 microns in size. The Environmental Protection Agency calculates the “Annual Concentration” for PM<sub>2.5</sub> differently than PM<sub>10</sub>. The “Annual Concentration” is a three-year average of the average daily concentrations for each year. The “24-Hour Concentration” is also calculated differently. It is a three-year average of the highest 24-hour concentrations for each year after eliminating the highest 2% of the readings.

**Table 3**  
**PM<sub>2.5 to 10</sub> Concentrations (Coarse Particulate Matter)**

	1992-1993	2004
<b>Annual Concentration</b>	21.5 ug/m <sup>3</sup>	26.0 ug/m <sup>3</sup>

This table calculates the concentration of particulate matter in the air that is less than 10 microns in size but larger than 2.5 microns. This table, along with Table 2, is useful in understanding the sources of our particulate matter because particulate matter from wood combustion and construction dust is mostly less than 2.5 microns in size, while particulate matter from re-entrained road dust is greater than 2.5 microns.

**Table 4**  
**Comparison of Fine and Coarse Materials in PM<sub>10</sub>**

	Percentage of Annual PM <sub>10</sub> Concentrations	
	1992-1993	2004
Fine Particulate Matter (< 2.5 microns)	38.9%	20.2%
Coarse Particulate Matter (< 2.5 microns, > 10 microns)	61.1%	79.8%

This table identifies the proportion of fine particulate matter to coarse matter in the annual concentrations of PM<sub>10</sub>. This table is also useful in getting a better understanding of the sources of particulate matter.

**Table 5**  
**Particulate Matter During the Months of January to March**

	1993	2004
<b>Average Daily Concentrations</b>		
Fine Particulate Matter	23.7 ug/m <sup>3</sup>	7.3 ug/m <sup>3</sup>
Coarse Particulate Matter	39.0 ug/m <sup>3</sup>	41.3 ug/m <sup>3</sup>
PM <sub>10</sub>	62.7 ug/m <sup>3</sup>	48.6 ug/m <sup>3</sup>
<b>Percentage of PM<sub>10</sub> Concentrations</b>		
Fine Particulate Matter	37.8%	15.0%
Coarse Particulate Matter	62.2%	85.0%

This table identifies particulate matter concentrations during the winter months of January, February, and March, including PM<sub>10</sub>, fine particulate matter (PM<sub>2.5</sub>), and coarse particulate (PM<sub>2.5 to 10</sub>). We experience our worse particulate matter air quality during the winter, and this table helps us understand the sources of particulate matter in the winter months.