

State Implementation Plan Revision
For Particulate Matter (PM₁₀) in the Klamath Falls Urban Growth
Boundary

**A Plan for Maintaining
The National Ambient Air Quality Standards
For Particulate Matter (PM₁₀)
In Klamath Falls Urban Growth Boundary
Section 4.56 of the State Implementation Plan**

**Adopted by the Environmental Quality Commission on
October 4, 2002**

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4.56.0 ACKNOWLEDGMENT AND SUMMARY

4.56.0.1 Acknowledgments

Numerous individuals in state and local governments and private entities who are dedicated to healthy air have made this supplement to the Oregon State Implementation Plan possible. Special appreciation goes to:

- Klamath Falls Air Quality Plan Advisory Committee;
- Erik Noble and Cameron Gloss, City of Klamath Falls.
- Delbert Bell, Marilynn Sutherland, and Leisa Cook and staff at Klamath County.

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4.56.0.2 Executive Summary: The Klamath Falls PM₁₀ Maintenance Plan

The Klamath Falls PM₁₀ Nonattainment Area has met the national ambient air quality standards (NAAQS) for particulates, which is particulate matter ten microns and smaller in diameter (PM₁₀) since 1991 as demonstrated through monitoring data. The PM₁₀ nonattainment area is the Klamath Falls Urban Growth Boundary (UGB). In accordance with the 1990 Federal Clean Air Act Amendments, the Department of Environmental Quality has applied to the Environmental Protection Agency (EPA) to redesignate the Klamath Falls UGB from nonattainment to attainment for PM₁₀. Included with the redesignation request is a maintenance plan designed to maintain compliance with the 24-hour PM₁₀ and the annual PM₁₀ standards through the year 2015. EPA requires that maintenance plans demonstrate continued compliance for at least ten years following EPA redesignation. This redesignation request and maintenance plan has been adopted by the Oregon Environmental Quality Commission (EQC) and is submitted to EPA as an amendment to the Oregon State Implementation Plan (SIP).

Comment: Change after adoption by EQC

The maintenance plan accommodates moderate future growth and provides for continued protection of public health. The plan establishes continuing strategies to maintain compliance with the PM₁₀ standards in the Klamath Falls area and provides a PM₁₀ emission allocation (budget) for the future transportation system. Additionally, the plan removes the most stringent emission control requirements for new or expanding major industry in nonattainment areas, replacing them with requirements allowing flexibility for industrial growth while protecting the area from significant air quality degradation. To approve the maintenance plan, EPA requires that permanent and enforceable reductions in emissions to remain in effect throughout the maintenance period.

4.56.0.2.1 Background

What is PM₁₀?

PM₁₀ is particulate matter ten microns and less in size. When inhaled, these particles accumulate and aggravate respiratory conditions, particularly asthma. Fine particulate (PM_{2.5} microns and smaller) are associated with heart and lung disease, increased respiratory symptoms and disease, decreased lung function, and premature death. Sensitive groups that appear to be at greatest risk to these effects include the elderly, individuals with cardiopulmonary disease, and children, since their lungs are still

developing. Exposure to coarse particles (2.5 to 10 microns) aggravates respiratory conditions such as asthma.

Unhealthy accumulation of PM₁₀ is typically a wintertime problem in the Klamath Falls basin, due to cold air inversions that trap emissions near the ground. The two predominant sources of particulates in Klamath Falls in the winter are residential wood heating and road dust from motor vehicle travel. Other sources of PM₁₀ emissions include fuel oil use, large and small industry, forest and agricultural fires, open burning and other fuel combustion sources. Figures 4.56.0.1 and 4.56.0.1 shows the contribution of each of these source categories in the Klamath Falls UGB.

Figure 4.56.0.1 Klamath Falls UGB 1996 Worst Case Day Emissions

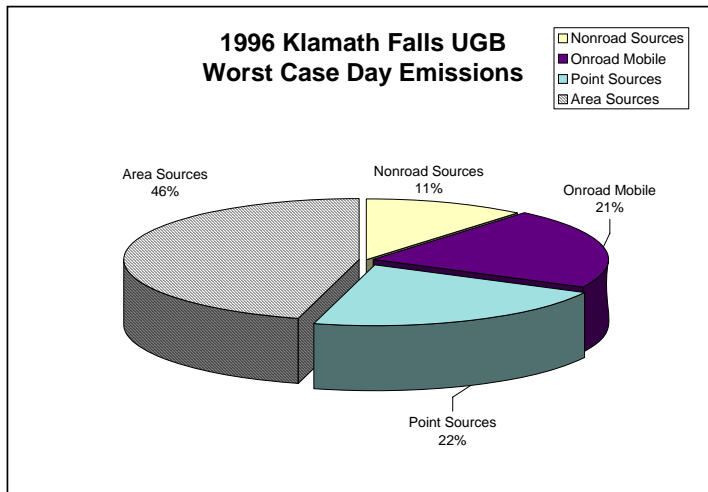
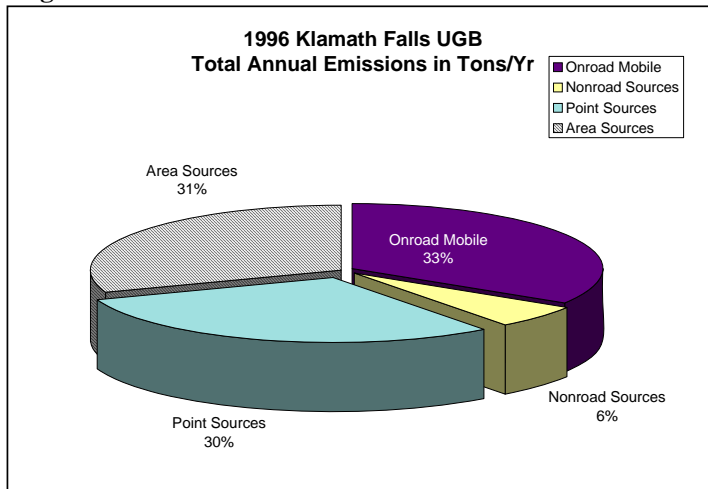


Figure 4.56.0.2 Klamath Falls UGB 1996 Annual Emissions



EPA has established health based National Ambient Air Quality Standards (NAAQS) for PM₁₀ at 150 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) 24-hour average and 50 $\mu\text{g}/\text{m}^3$ for the annual average. Any PM₁₀ concentration monitored above these levels is considered an exceedance¹ of the public health standard. Normally, four exceedances of the 24-hour standard within three calendar years is a violation. Any annual exceedance is a violation of the annual standard. If an area is in violation of the standard, EPA designates it as a nonattainment area. Experience has demonstrated that the 24-hour average is more likely to be exceeded than the annual average.

Past PM₁₀ Problems and Current Attainment of Standards

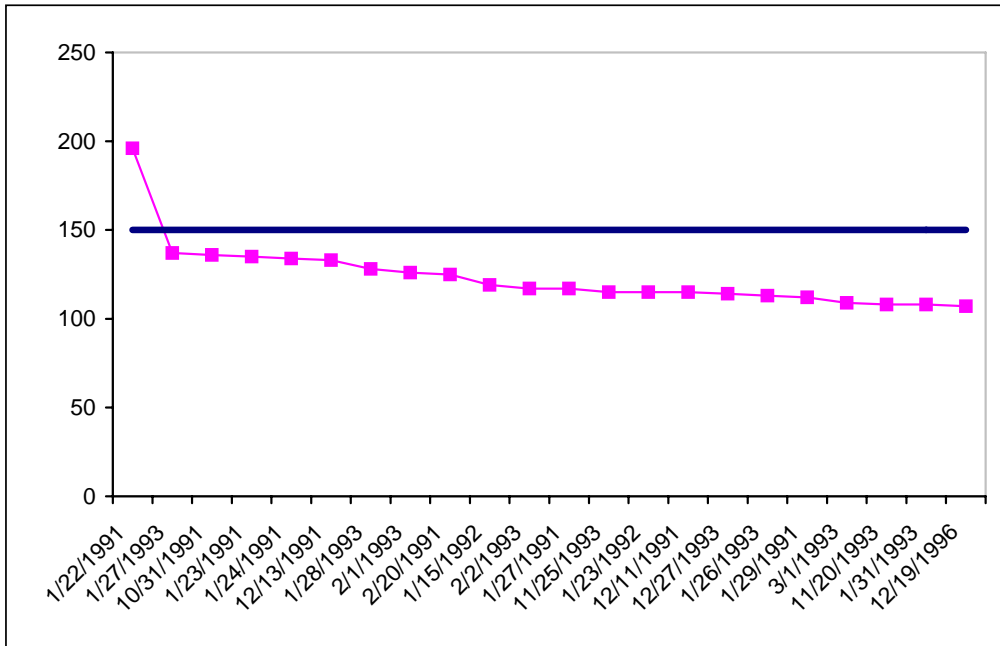
The Klamath Falls area violated both the federal 24-hour PM₁₀ standard of 150 $\mu\text{g}/\text{m}^3$ and the annual PM₁₀ standard of 50 $\mu\text{g}/\text{m}^3$ in the late 1980s. The highest recorded 24-hour average PM₁₀ concentration was 792 $\mu\text{g}/\text{m}^3$ recorded on January 25, 1988 at Peterson School in the southeast part of the Urban Growth Boundary. Significant woodstove related PM₁₀ pollution occurred during this period due to wintertime inversions and high emissions.

There were 22 recorded daily exceedances in 1987; 28 exceedances in 1988; and 45 recorded exceedances in 1989. In 1990 the number of daily exceedances dropped to 18 and in 1991 there were only 7. The last recorded exceedance of the standard was 196 $\mu\text{g}/\text{m}^3$ on January 22, 1991 (see Figure 4.56.0-3 and 4.56.0-4). The last 24-hour average violation of the standard occurred in 1991. The period 1989-94 was a transitional period when significant reductions in woodstove emissions occurred. Since 1994, peak PM₁₀ concentrations have been significantly below the standards.

The highest annual average PM₁₀ concentration was 73.5 $\mu\text{g}/\text{m}^3$ in 1987. The annual average dropped steadily until 1990 where it was below the standard at 46.2 $\mu\text{g}/\text{m}^3$. The annual average has remained below the annual standard and in 2000 is at less than half the standard. The ten-year trend in ambient PM₁₀ concentrations as measured at the reference monitor (Peterson School) is shown below in Figures 4.54.0-3, and 4.54.0-4.

¹ Concentrations at or below 154.4 $\mu\text{g}/\text{m}^3$ round down to 150 $\mu\text{g}/\text{m}^3$ or less and are considered in compliance.

**Figure 4.56.0-3:
Highest PM₁₀ 24-Hour Concentrations Since Last Exceedance**



**Figure 4.56.0-4: Klamath Falls PM₁₀ Trend in Micrograms per Cubic Meter
Maximum 24-Hr, 1987-2000**

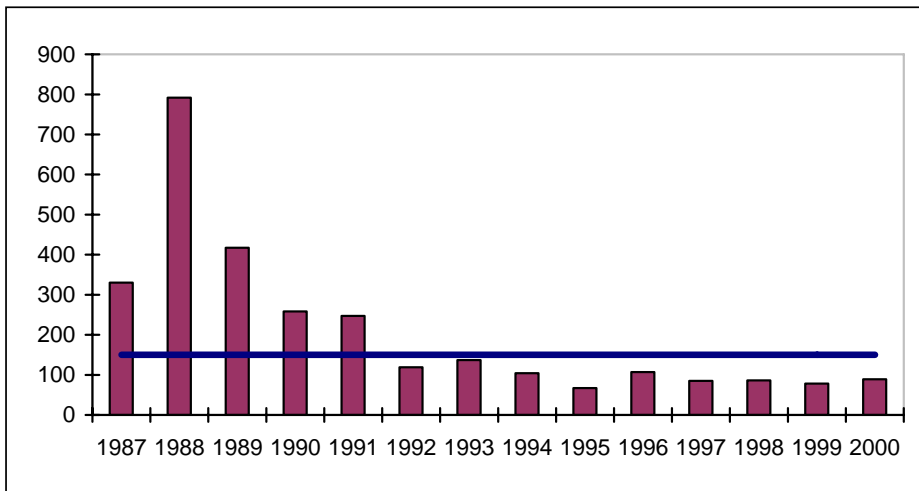
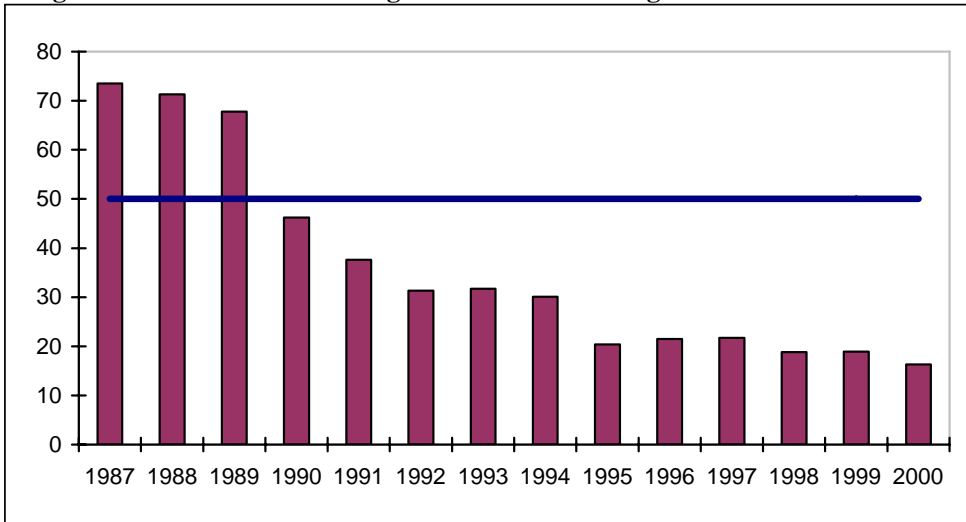


Figure 4.56.0-5: Annual Average 1987-2000 in Micrograms Per Cubic Meter



Success in Reducing PM₁₀

Particulate matter (PM₁₀) emission reduction strategies have been successful in bringing Klamath Falls into attainment with the 24-hour and the annual standards. Compliance with PM₁₀ standards was achieved at the Peterson School site by 1994 when there were no exceedances of the standard for three years. Since then, PM₁₀ concentrations have remained below both standards. Emission reduction strategies primarily responsible for compliance include:

- A statewide Woodstove Certification Program;
- A Woodstove Removal and Heating source replacement program for low income households;
- A Klamath County mandatory woodstove and open burning curtailment ordinance;
- Winter road sanding controls;
- Public education programs;
- Industrial - Significant Emission Rate requirement; and
- Forestry slash burning emission reduction and restrictions.

4.56.0.2.2 Need for Maintenance Plan

Oregon uses the term “maintenance” to distinguish former nonattainment areas from areas that have never violated the health standard. The Klamath Falls PM₁₀ maintenance plan is designed to insure continued compliance with both the 24-hour and the annual PM₁₀ standards through at least 2015. In estimating future PM₁₀ emissions, growth was considered in all source categories, as well as technological changes affecting PM₁₀ emissions. This maintenance plan fulfills federal requirements in order to request EPA to redesignate the Klamath Falls UGB from nonattainment to attainment for the PM₁₀ 24-hour and annual health standards.

Projections of Future PM₁₀ Levels

Moderate growth is expected in Klamath Falls UGB through 2015. Population, housing, and employment are expected to increase gradually through this period. Growth estimates are also consistent with forecasts developed by the Oregon Office of Economic Analysis. The 1996 population estimated in Klamath Falls UGB was 40,365 and is expected to grow to approximately 50,219 by 2015 (1.2 percent per year compounded average growth rate). Population, housing and employment forecasts were used in the Oregon Department of Transportation’s latest travel demand model to predict growth in motor vehicle travel in the Klamath Falls area. Emissions from residential wood smoke are expected to decrease due to turnover in woodstoves from higher-emitting, non-certified stoves to new, low emitting certified stoves. Growth rates used to forecast future PM₁₀ emissions are shown in Table 4.56.0-1.

**Table 4.56.0-1: Annual Average Growth Rates (1996-2015)
Klamath Falls Urban Growth Boundary**

| | |
|--------------------------------|---------|
| Population Growth | 1.2%/yr |
| Household Growth | 1.1%/yr |
| Avg. Non-Industrial Employment | 0.7%/yr |
| Industrial Employment | 1.3%/yr |
| Vehicle Miles Traveled | 1.8%/yr |

Estimated compound rates

The maintenance plan analysis applied these growth rates to predict future PM₁₀ air quality conditions in Klamath Falls through 2015. Figures 4.56.0-6 and 4.56.0-7 compare the 1996 estimated emissions against the projected emissions through 2015. Although there is an increase in emissions over the years, there is no emission standard associated with pounds per day or tons per year for comparison. Therefore, ambient concentrations are projected using anticipated emissions to compare to the health standard, an ambient concentration (see table 4.56.0-2).

Figure 4.56.0-6: Klamath Falls PM₁₀ Maintenance Analysis (lbs/day)

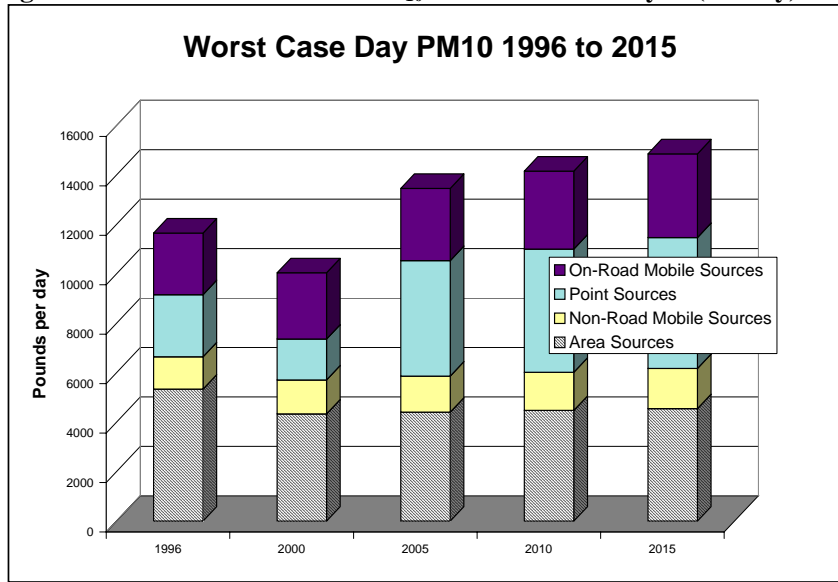
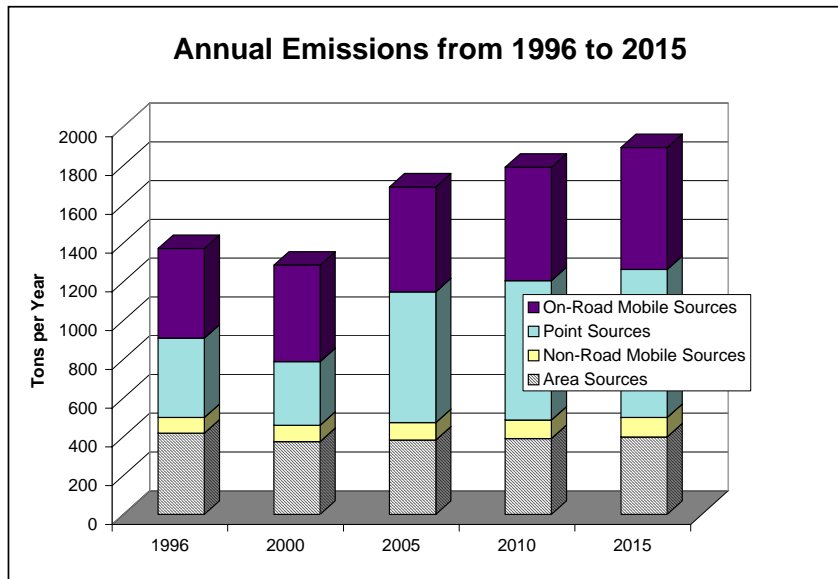


Figure 4.56.0-7: Klamath Falls PM₁₀ Maintenance Analysis (tons/year)



The analysis shown in Table 4.56.0-2 demonstrates continued compliance with standards through those same years. The result is an increase in PM₁₀ emissions from 1996 and a

slight increase in the predicted ambient concentrations through 2015. The predicted ambient concentration of PM₁₀ will remain below the national health-based standard. The estimated ambient concentrations for both the annual and the worst case day are based on a ratio of the 1996 ambient concentration to the projected emission inventory for each year through 2015.

Table 4.56.0-2 PM₁₀ Attainment Demonstration²

| YEAR | 1996 | 2000 | 2005 | 2010 | 2015 | Standard |
|---------------------------------------------------------------|---------------------------|---------------------------|----------------------------|----------------------------|----------------------------|--------------------------|
| Total Emissions from Inventory – Annual (tons per year) | 1372 | 1287 | 1744 | 1850 | 1956 | |
| Estimated Ambient Concentration | 21.0 μg/m ³ | 20.3 μg/m ³ | 24.1 μg/m ³ | 24.9 μg/m ³ | 25.8 μg/m ³ | 50 μg/m ³ |
| Total Emissions from Inventory – Worst Case Day (lbs per day) | 11,654 | 10,314 | 13,751 | 14,474 | 15,198 | |
| Estimated Worst Case Day Ambient Concentration | 95.2 μg/m ³ | 88.0 μg/m ³ | 106.5 μg/m ³ | 110.4 μg/m ³ | 114.3 μg/m ³ | 150 μg/m ³ |

Benefits of a Maintenance Plan

In order for EPA to redesignate the Klamath Falls UGB from nonattainment to attainment, EPA must approve an enforceable plan. The plan must demonstrate that the area will continue to meet the PM₁₀ standards for a minimum of ten years following EPA’s approval of the plan. The primary benefits of an EPA-approved PM₁₀ maintenance plan and redesignation are:

- Assurance that future public health will be protected from adverse impacts of PM₁₀;
- Assurance that regulatory limits, expectations and conditions will be known for at least the next ten years; and
- Flexibility for new and expanding industry.

4.56.0.2.3 Maintenance Plan Development Process

In developing the draft PM₁₀ maintenance plan, DEQ relied primarily on the 1996 PM₁₀ emission inventory, the involvement of the Klamath Falls Air Quality Plan Advisory Committee and the Oregon Department of Transportation (ODOT). The Advisory Committee reviewed a draft of the maintenance plan and emission inventory and provided final guidance and recommendations. Projections of future emissions are based on growth rates that are consistent with Oregon Department of Economic Analysis data.

When an area is redesignated as attainment (state classification will be maintenance), the federal Clean Air Act allows the most stringent emission control requirements for new and expanding industrial sources, the “Lowest Achievable Emission Rate”, to be replaced

² This analysis considers industrial permitted levels from 2001 to 2015 and a 10% increase in vehicle miles traveled in the Klamath Falls Urban Growth Boundary.

by less restrictive “Best Achievable Control Technology”. Best Achievable Control Technology allows the owners of a facility to consider cost in selecting controls, while the requirement for Lowest Achievable Emission Rate does not.

The Klamath Falls Air Quality Plan Advisory Committee recommended the following key provisions as part of the PM₁₀ Maintenance Plan:

- Continue the current strategies as required by EPA included in the woodstove and open burning ordinance. This ordinance was adopted by the County to reduce PM₁₀ emissions in the UGB;
- Continue other strategies as required by EPA that lead to the initial reduction in PM₁₀ emissions in the UGB. These strategies include reduced road sanding and a voluntary smoke management program for forest slash burning;
- Replace current emissions control technology requirement for new and expanding industry with Best Available Control Technology;
- Allow an exemption from the requirement to offset new industrial PM₁₀ emissions elsewhere in the UGB when the impact of the new emissions does not exceed limitations defined in this maintenance plan;
- Establish a transportation emissions budget that allows flexibility for transportation construction projects, but maintain air quality in the Klamath Basin below the National Ambient Air Quality Standards;
- Establish a contingency plan that calls for a planning team to identify strategies which will both prevent and correct any future violation of standards; and
- The contingency plan will also reinstate more stringent requirements for new and expanding industry should a violation of either standard occur as required by EPA.

The Klamath Falls Air Quality Advisory Committee and the Oregon Department of Transportation reviewed and made recommendations on the plan and the transportation emissions budget for PM₁₀ incorporated into the plan. The PM₁₀ emissions budget will be the benchmark for future transportation conformity determinations for regionally significant transportation projects within the Klamath Falls UGB.

4.56.0.2.4: Maintenance Plan Summary: Strategies, Conformity, and Contingency Plan

Woodstove Curtailment and other Woodstove Strategies

The home wood heating curtailment program in the Klamath Basin has been, and will remain, the most effective PM₁₀ emission reduction strategies for the Klamath Falls UGB. These strategies include certification standards for new stoves, changeout programs to encourage removal of noncertified stoves, and local ordinances to curtail burning during stagnant weather periods. During the 1990’s, the new stove certification and the woodstove replacement programs resulted in a significant emissions reduction in Klamath Falls. The continued attrition of older woodstoves coupled with a general trend away from significant woodheating are expected to continue to decrease emissions through 2015 even with a moderate growth in households. DEQ conducted household

surveys on woodstove use in 1993 and in 1999, and the results support the contention of older stove attrition. In addition, the mandatory woodstove curtailment ordinance has been an effective tool for keeping emissions low in the Klamath Basin.

Klamath County has found funding to continue with uncertified woodstove replacement in the Klamath Falls area. Most recently, the Klamath Expansion Project has provided the County with \$50,000 for an uncertified woodstove purchase program.

Industrial Requirements

The current New Source Review requirement for large new or expanding industry in the UGB is Lowest Achievable Emission Rate control technology and offsets for PM₁₀ emission impacts. This is the most stringent requirement for industrial controls. Upon EPA approval of the redesignation request, the requirement for major new industry in the UGB will be the Best Available Control Technology for PM₁₀ emissions. This is a less stringent requirement because it allows a source to consider cost in designing and evaluating the best available industrial emission controls. In addition, an exemption from offsets will be available for sources able to demonstrate through modeling that impacts from new emissions will not exceed limits established just below the standards (see Section 4.56.3.2.4).

Other Strategies

Open burning has been recognized as a significant contributor to emissions. A Klamath Falls ordinance prohibits burning on days with high concentrations of particulate matter. In 1998, the City of Klamath Falls further restricted open burning to only a few weeks in the fall and a few weeks in the spring. In 2001, Klamath County restricted open burning to one month in the fall and one-month in the spring. A high particulate concentration day during these periods also triggers restrictions on burning as provided in the 1991 ordinance.

The ordinance also expanded the Air Quality Zone to include developments outside the UGB that were not in the original area. Most of the other restrictions that help reduce or eliminate PM₁₀ pollution were maintained inside this zone.

PM₁₀ Transportation Emissions Budget

Transportation conformity regulations, required by the 1990 Federal Clean Air Act Amendments, require that a motor vehicle emissions budget be established in the State Implementation Plan (SIP). States must evaluate regionally significant transportation project for impacts on traffic and resulting impacts on PM₁₀ emissions.

The maintenance plan establishes an emissions budget that will serve as a benchmark for the approval of regionally significant projects within the Klamath Falls UGB. When new transportation projects are proposed, the Department of Transportation (ODOT) will forecast vehicle miles traveled and motor vehicle emissions as part of periodically

updating the Statewide Transportation Improvement Program. The emissions forecast cannot exceed the State Implementation Plan emissions budget.

The budget for Klamath Falls was developed for the legally defined nonattainment area, the Klamath Falls UGB. There are only a handful of funded regionally significant transportation projects planned in the Klamath Falls basin. Future motor vehicle emissions resulting from these projects must not exceed the emissions allocation (budget) established in this maintenance plan through 2015. In case an unfunded project within the UGB becomes a reality, an additional ten percent margin for vehicle miles traveled has been added to the emissions budget.

Contingency Plan Elements

The maintenance plan must contain contingency measures that would be implemented either to prevent or correct a violation of the PM₁₀ standard after the area is redesignated. The Clean Air Act requires that measures in the original attainment plan be reinstated if a violation occurs. Under the contingency plan recommended by the Klamath Falls air quality committee, the committee will reconvene if either the 24-hour or the annual PM₁₀ concentration equals or exceeds 90% of the standard. The planning group will assess the probable emissions events resulting in elevated PM₁₀ concentrations and reconsider all strategies associated with those sources to reduce emissions. The group will recommend an action plan and implement actions to prevent a future exceedance of either standard. If a violation occurs, the action plan will recommend additional strategies to return the community to compliance with the standards. Additionally, Lowest Achievable Emission Rate requirements, plus offsets for major new industrial sources in the UGB, will be restored and the exemption for offsets eliminated.

4.56.1 INTRODUCTION

4.56.1.1 Purpose of Redesignation Request and Maintenance Plan Document

This document requests redesignation of Klamath Falls Urban Growth Boundary (UGB), Oregon, from nonattainment for PM₁₀ to attainment (state classification will be “maintenance”). It also is a maintenance plan to ensure attainment of the 24-hour and annual National Ambient Air Quality Standards for particulate matter ten microns and less in size (PM₁₀). The document complies with the applicable 1990 Federal Clean Air Act (CAA) requirements and Environmental Protection Agency (EPA) guidance and policies. The maintenance plan provides for maintenance of the PM₁₀ standards for at least ten years following EPA approval of the plan and redesignation.

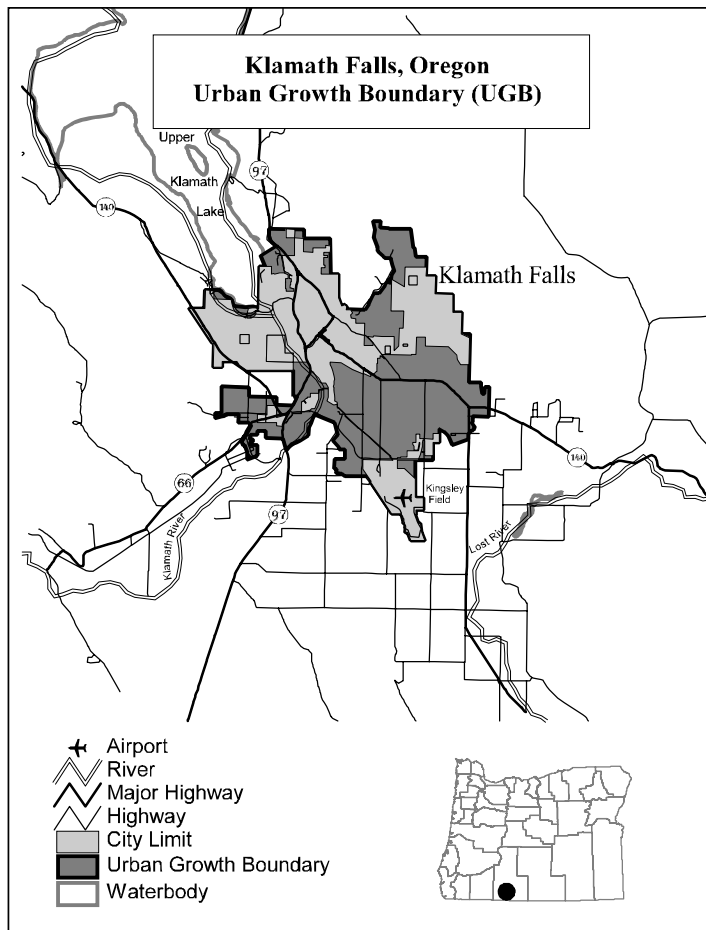
This maintenance plan for the Klamath Falls UGB continues the mandatory woodstove curtailment program, open burning requirements and allows increased flexibility for major new or major modifications of industrial sources of PM₁₀ in this area. The plan demonstrates that new and continued permanent and voluntary strategies are sufficient to prevent future violations of the PM₁₀ standards through at least 2015.

4.56.1.2 Klamath Falls Area Description

Klamath Falls is located in south central Oregon at an elevation of 4,105 feet. The Klamath Falls UGB was estimated to have a population of 40,365 in 1996. Based on the long-range forecast, the Klamath Falls UGB population is expected to grow to approximately 50,219 by 2015 (1.2 percent per year compounded average growth). The city of Klamath Falls serves as an important commercial center for south central Oregon.

The Klamath Basin is a relatively flat area of old lakebed that is drained by the Klamath River. Occasional hills and a system of elongated ridges confine the basin and the greater Klamath Falls area to the east and west. Most of the Klamath Falls residential area, especially the south suburban area, is located on the lower elevation area. Because of these features, Klamath Falls can experience very strong and shallow nighttime inversions that break up with daytime solar heating. In the wintertime, frigid arctic air masses frequently move down Upper Klamath Lake and invade the Klamath Basin. Temperatures can remain well below freezing for several weeks at a time. Under these conditions, these strong inversions occur over the south suburban area of Klamath Falls.

Figure 4.56.1-1 Klamath Falls PM₁₀ Nonattainment Area



4.56.1.3 History of PM₁₀ Problem in Klamath Falls Area

The Klamath Falls Urban Growth Boundary (UGB) was categorized by the Environmental Protection Agency (EPA) as a “Group 1 Planning Area” for the PM₁₀ standard on August 7, 1987. Following the enactment of the 1990 Clean Air Act Amendments, EPA classified Klamath Falls UGB as a moderate PM₁₀ nonattainment area. The PM₁₀ nonattainment boundary was established as the UGB. A formal PM₁₀ attainment plan was developed for the Klamath Falls UGB and submitted to the Environmental Quality Commission for approval on January 31, 1991. The attainment plan was revised on August 18, 1995 and submitted to EPA on September 22, 1995. EPA approved both the attainment plan and the addendum on April 14, 1997. The initial nonattainment design concentration was 550 µg/m³ for the 24-hour maximum and 75

$\mu\text{g}/\text{m}^3$ for the annual average³. A map of the Klamath Falls UGB is shown in Figure 4.56.1-1.

PM₁₀ concentrations have been measured at the same location in the Klamath Falls UGB (Peterson School on Clinton Street) since 1987. Between 1987 and 1991 there were 120 days that exceeded the daily health standard in Klamath Falls. During that same time, there were three years that exceeded the annual average standard. The last exceedance of the maximum 24-hour average PM₁₀ standard occurred in 1991 with a measured high concentration above the 150 $\mu\text{g}/\text{m}^3$ standard (192 $\mu\text{g}/\text{m}^3$ on 01/22/91). Since January 22, 1991 there have not been any exceedances of the 24-hour standard for PM₁₀.⁴ Klamath Falls has not had an exceedance of the annual average since 1989. EPA's deadline for meeting the standards was set at December 31, 1994. Klamath Falls met that deadline by not exceeding either standard for three years. Emission reduction strategies adopted in 1991 in compliance with the Clean Air Act Amendments have contributed to Klamath Falls' success in complying with the health standard, especially as population and associated emissions have grown. Based on this record of compliance, Klamath Falls is positioned to apply for redesignation to attainment (state classification, "maintenance") with both the PM₁₀ 24-hour and annual standards, in accordance with the 1990 Clean Air Act amendments.

4.56.1.4 National Ambient Air Quality Standards for PM₁₀

This Maintenance Plan addresses the 24-hour and the annual ambient air quality standards for PM₁₀ as defined in the Federal Clean Air Act. Particulate Matter (PM) is the general term used for a mixture of solid particles or liquid droplets found in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. These particles come in a wide range of sizes ("fine" particles are less than 2.5 micrometers in diameter and coarser-sized particles are larger than 2.5 micrometers), and originate from many different stationary, mobile sources and natural sources. Fine particles (PM_{2.5}) generally result from fuel combustion from residential fireplaces and woodstoves, pile and forest burning, industrial facilities, and motor vehicles. Coarse particles (PM₁₀) are generally emitted from sources such as vehicles traveling on paved and unpaved roads, materials handling, and wood products operations, as well as wind blown dust. The National Ambient Air Quality Standard for PM₁₀ includes all sizes of particles 10 micrometers and smaller.

Inhalable PM includes both fine and coarse particles. These particles can accumulate in the respiratory system and are associated with numerous health effects. Exposure to

³ EPA requires a design value to be calculated by statistical methods. In Klamath Falls case, the design value was calculated by integrating values from several types of samplers including a Nephelometer (used as a surrogate), a PM₁₀ medium volume sampler, a PM₁₀ high volume sampler and a TSP high volume sampler (used as a surrogate).

⁴ One of the background sites exceeded the standard on January 31, 1992 at 221 $\mu\text{g}/\text{m}^3$. The exceedance is a one-time event believed to be caused by short term dredging activity in the Klamath River.

coarse particles is primarily associated with the aggravation of respiratory conditions, such as asthma. Fine particles are most closely associated with such health effects as increased hospital admissions and emergency room visits for heart and lung disease, increased respiratory symptoms and disease, decreased lung function and premature death. Sensitive groups that are at greatest risk include the elderly, individuals with cardiopulmonary disease such as asthma, and children.

This maintenance plan addresses particles 10 microns and smaller, and therefore includes both fine and coarse particles. The primary sources of PM₁₀ in Klamath Falls are residential wood heating, open burning and road dust from vehicle travel on paved roads. The most serious PM₁₀ problems occur during the winter in urban areas, such as Klamath Falls, when cooler temperatures trap particles near the ground by atmospheric inversions.

EPA has established National Ambient Air Quality Standards (NAAQS) for PM₁₀ at 150 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) for a 24-hour average and 50 $\mu\text{g}/\text{m}^3$ as an annual average. Any value monitored above these levels, as defined by federal rules and guidance, is considered an exceedance. Generally speaking, more than three daily exceedances within three calendar years are considered a violation.⁵ An exceedance of the annual standard becomes a violation of the annual standard. If an area violates either standard, EPA designates it as a nonattainment area. This plan includes a demonstration of continuing maintenance with both standards.

In general, demonstrating "attainment" requires the collection of representative monitoring data using approved measuring instruments and procedures, with adequate quality assurance. All locations within an area must meet the standards. Generally speaking, no monitor in an area may exceed the 150 $\mu\text{g}/\text{m}^3$ 24-hour standard more than three days in the three calendar years preceding the attainment year. Air quality measurements in Klamath Falls satisfy this requirement, as shown in Section 4.56.2 of this plan.

⁵ The definition of an exceedance of the national 24-hour standard and the annual standard is contained in the Code of Federal Regulations (40 CFR part 50.6) states:

- (a) The level of the national primary and secondary 24-hour ambient air quality standards for particulate matter is 150 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), 24-hour average concentration. The standards are attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu\text{g}/\text{m}^3$, as determined in accordance with appendix K to this part, is equal to or less than one.
- (b) The level of the national primary and secondary annual standards for particulate matter is 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), annual arithmetic mean. The standards are attained when the expected annual arithmetic mean concentration, as determined in accordance with appendix K to this part, is less than or equal to 50 $\mu\text{g}/\text{m}^3$.

4.56.1.5 Redesignation Criteria/Organization of Document

Section 107(d)(3)(E) and related subsections of the Clean Air Act establish five key criteria that must be satisfied in order for a nonattainment area to be redesignated to attainment (state classification will be “maintenance”). Here is a summary of these redesignation criteria and where to find a discussion of each one in this plan.

Attainment Verification

To be eligible for redesignation a nonattainment area must have attained the applicable NAAQS. Attainment of the NAAQS for PM₁₀ in the Klamath Falls area is discussed in Section 4.56.2, "Attainment Demonstration."

SIP Approval

EPA must have fully approved the applicable State Implementation Plan for the area under Section 110(k) of the federal Clean Air Act. The Klamath Falls PM₁₀ attainment plan was originally approved by the Environmental Quality Commission on January 31, 1991, initially revised and adopted on November 8, 1991 and revised again and adopted on August 18, 1995. EPA published the final version of the plan in the Federal Register on June 5, 1996. These SIP revisions and compliance with Section 110(k) of the federal Clean Air Act are discussed in Section 4.56.4.1, "SIP Requirements/ Nonattainment Area Requirements".

Permanent and Enforceable Improvements in Air Quality

Improvement in air quality must be due to permanent and enforceable reductions in emissions resulting from the implementation of the applicable SIP, federal air pollution control regulations, and other permanent and enforceable reductions. The permanent and enforceable emission reductions that are responsible for improvements in ambient PM₁₀ concentrations in Klamath Falls are discussed in Section 4.56.2.4, "Permanent and Enforceable Improvements in Air Quality."

Nonattainment Area Requirements

The State must have met all requirements applicable to the nonattainment area under Section 110 and Part D of the Clean Air Act. Compliance with Section 110 and Part D of the Act is discussed in Section 4.56.4.1, "SIP Requirements/Nonattainment Area Requirements."

Maintenance Plan Elements

In order for EPA to redesignate a nonattainment area to attainment (state classification will be “maintenance”), EPA must have fully approved a maintenance plan for the area that meets the requirements of Section 175A of the Clean Air Act. Concurrent approval of the maintenance plan and redesignation request is allowed. There are five parts to the

maintenance plan: an attainment inventory, a maintenance demonstration, a commitment to the continuation of operating the monitoring network, a commitment to continue to verify attainment, and a contingency plan. These sections are outlined below in Table 4.56.1.1.

Table 4.56.1-1: Summary of Redesignation Requirements

| Required Element | Section of Plan | |
|-------------------------------------------------------|-----------------|-----------------------------|
| Attainment Verification | Section 4.56.2: | ATTAINMENT DEMONSTRATION |
| SIP Approval | Section 4.56.4: | ADMINISTRATIVE REQUIREMENTS |
| Permanent and Enforceable Improvements in Air Quality | Section 4.56.2: | ATTAINMENT DEMONSTRATION |
| Nonattainment Area Requirements | Section 4.56.4: | ADMINISTRATIVE REQUIREMENTS |
| Attainment Inventory | Section 4.56.3: | MAINTENANCE PLAN |
| Maintenance Demonstration | Section 4.56.3: | MAINTENANCE PLAN |
| Monitoring Network | Section 4.56.4: | ADMINISTRATIVE REQUIREMENTS |
| Verification of Continued Attainment | Section 4.56.4: | ADMINISTRATIVE REQUIREMENTS |
| Contingency Plan | Section 4.56.3: | MAINTENANCE PLAN |

4.56.2 ATTAINMENT DEMONSTRATION

4.56.2.1 Ambient Air Quality Monitoring Data

The Klamath Falls area has three particulate (PM₁₀) monitoring sites (see Appendix D6-2) with the primary sampler located at 4856 Clinton Street, also known as Peterson School. Other samplers are essentially background samplers, one located at 1211 Miller Island and another located at 10500 Hwy 140. DEQ has monitored at the Peterson School site since 1987. After rigorous quality assurance, the data from these sites are transferred to EPA's database. These data are used as the basis for this maintenance plan.

4.56.2.2 Attainment Years and Concentrations, Air Quality Summary

Klamath Falls has not had an exceedance of the PM₁₀ standards for ten consecutive calendar years. In January of 1991 there were a total of seven wintertime exceedances. The last recorded wintertime exceedance of the PM₁₀ National Ambient Air Quality Standard (NAAQS) in Klamath Falls occurred on January 22, 1991 (192 µg/m³). The maximum 24-hour average PM₁₀ concentrations for the ten-year period (1990 to 2000) are shown in Table 4.56.2-1. PM₁₀ values in 1988 and 1989 represent the last annual violations recorded at Peterson School.

Table 4.56.2-1
Klamath Falls PM₁₀ Concentrations
Maximum 24-hour Concentration and Annual Average Since 1987

| Annual Average Concentration | Year | Concentration Highest Annual 24-hour | Date |
|------------------------------|------|--------------------------------------|-------------------|
| 73.5 µg/m ³ | 1987 | 330 µg/m ³ | January 21, 1987 |
| 71.3 µg/m ³ | 1988 | 792 µg/m ³ | January 25, 1988 |
| 67.8 µg/m ³ | 1989 | 417 µg/m ³ | January 20, 1989 |
| 46.2 µg/m ³ | 1990 | 258 µg/m ³ | December 30, 1990 |
| 37.6 µg/m ³ | 1991 | 247 µg/m ³ | January 5, 1991 |
| 31.3 µg/m ³ | 1992 | 119 µg/m ³ | January 15, 1992 |
| 31.7 µg/m ³ | 1993 | 137 µg/m ³ | January 27, 1993 |
| 30.1 µg/m ³ | 1994 | 104 µg/m ³ | February 1, 1994 |
| 20.4 µg/m ³ | 1995 | 67 µg/m ³ | February 27, 1995 |
| 21.0 µg/m ³ | 1996 | 107 µg/m ³ | December 19, 1996 |
| 21.7 µg/m ³ | 1997 | 85 µg/m ³ | January 7, 1997 |
| 18.8 µg/m ³ | 1998 | 86 µg/m ³ | December 11, 1998 |
| 18.9 µg/m ³ | 1999 | 78 µg/m ³ | January 5, 1999 |
| 16.3 µg/m ³ | 2000 | 89 µg/m ³ | December 6, 2000 |

Figures 4.56.2-1 and 4.56.2-2 show that PM₁₀ concentration trends since 1988 are clearly downward. Even with trends leveling in recent years, PM₁₀ concentrations remain significantly below the standards.

**Figure 4.56.2-1
Klamath Falls Annual PM₁₀ Trend**

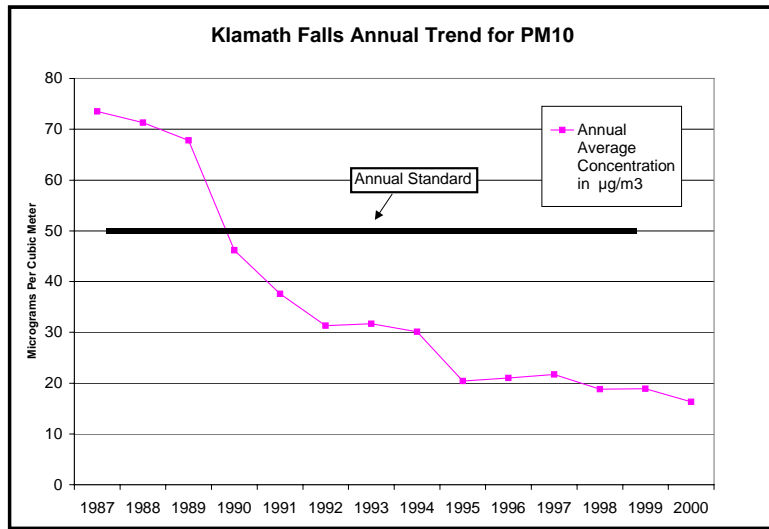
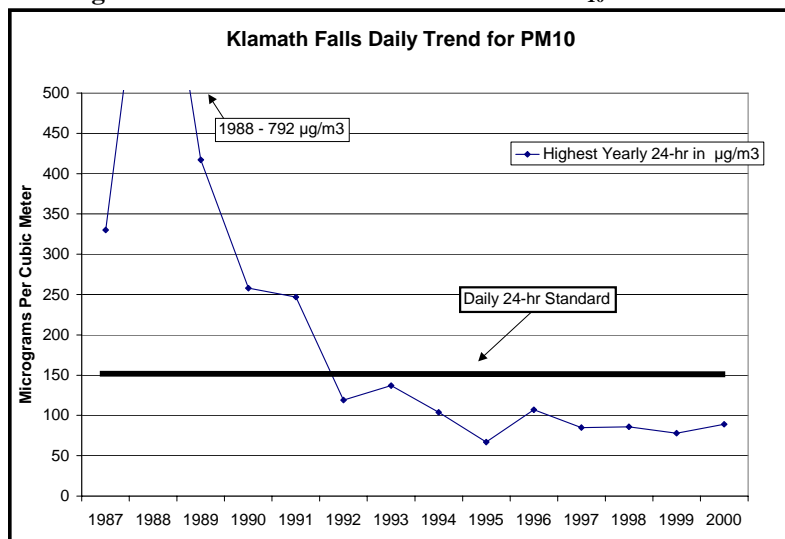


Figure 4.56.2-2 Klamath Falls 24-Hour PM₁₀ Trend



4.56.2.3 Permanent and Enforceable Improvement in Air Quality

In order for EPA to redesignate an area to attainment (state classification will be “maintenance”), the EPA's guidance specifies that improvements in air quality reasonably attributable to emission reduction measures that are permanent and enforceable. EPA recommends an analysis demonstrating that attainment has not been due to either a temporary economic downturn or to especially favorable meteorology.

Klamath Falls did not have an exceedance since 1991 prior to the implementation of the attainment plan developed late in 1991. Emission reduction measures identified in this plan have contributed to the steady decline of PM₁₀ concentrations since 1991 and likely prevented exceedances since 1991. This next section discusses economic and meteorological factors in Klamath Falls.

Economic Factors

Population and employment are key indices of the overall level of economic activity and growth, reflecting changes in industrial activity and vehicle miles traveled. Information on the population and household projections used in developing this maintenance plan is presented in Appendix D6-6. Klamath Falls is the largest city within the Klamath County and statistics from both the County and City were used to characterize the Klamath Falls Urban Growth Boundary. Employment is displayed in Figure 4.56.2-3. Population and percapita income trends are displayed in Figure 4.56.2-4. Major employment sector trends are in Figure 4.56.2-5.

Despite a recession in the 1980s the area appears to have stabilized. During the decade of the 1980s, Klamath County experienced some loss in population. However since 1990, population levels have rebounded with an average growth rate of approximately 0.9 percent per year. From 1990-97, total employment countywide has increase by 12 percent. Not all economic sectors have shared evenly in this rate of job growth. Employment in construction has increased 70 percent and 42 percent in the service sector, while conversely the number of manufacturing jobs declined by 11 percent⁶.

Klamath Falls has not exceeded the standards since 1991. Since 1991, PM₁₀ levels declined significantly despite growth in population, employment, and a decrease in unemployment between 1993 and 1995. It is reasonable to conclude, therefore, that improvements in Klamath Falls PM₁₀ air quality have not been the result of a downturn in economic conditions.

⁶ From the report: Klamath Falls Economic Impact Assessment, E.D. Hovee & Co, April 1999

Figure 4.56.2-3 Employment and Unemployment in Klamath County

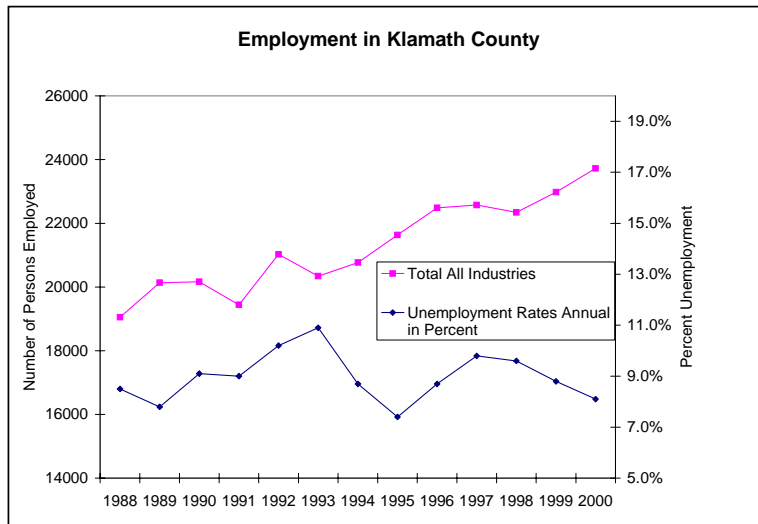


Figure 4.56.2-4: Population and Percapita Income

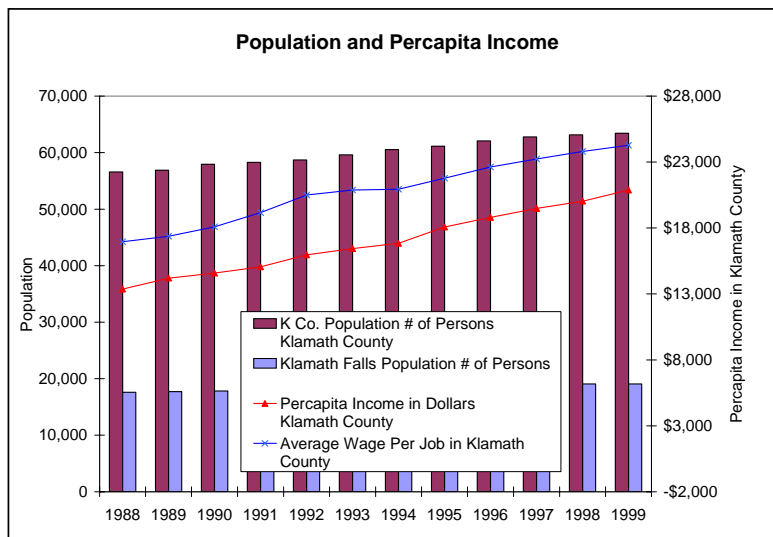
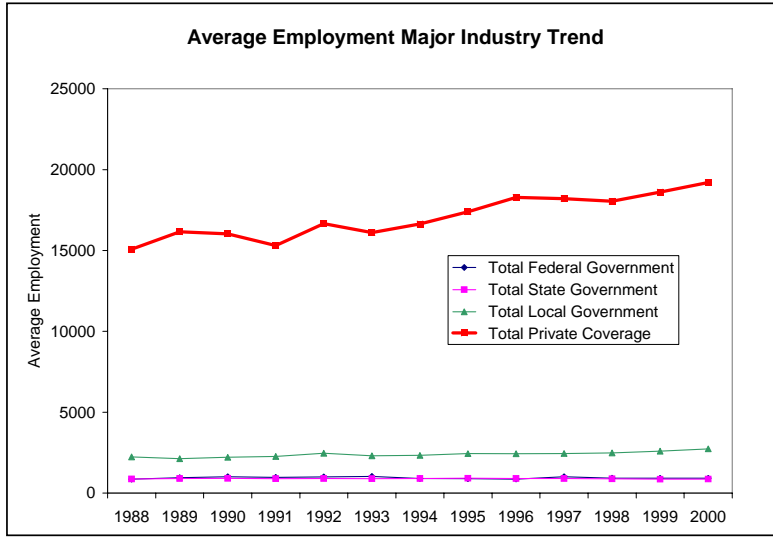


Figure 4.56.2-5 Employment by Major Industry Trend



Meteorological Effects

High PM₁₀ concentration periods generally correspond to periods of low sustained wind speeds. Klamath Falls seasonal wind speed conditions are evaluated for 1987 to 1998 during the six-month winter period from October through March. The distribution of seasonal wind speeds is evaluated based on data from the DEQ meteorological station at Peterson School, and is provided in Table 4.56.2-2 and Figures 4.56.2-6, 4.54.2-7, and 4.56.2-8. In this analysis average wind speeds of 3 miles per hour or less are used as an indicator of generally poor ventilation and the potential for exceedance conditions. The purpose of the analysis is to verify that lower PM₁₀ concentrations since 1991 are not the result of atypical winter dispersion conditions.

The 1987/88, 1988/89 and 1989/90 winter seasons were used to designate the Klamath Falls area as nonattainment for PM₁₀ based on the frequency and magnitude of exceedances. Many of the PM₁₀ seasons since 1987-88 have demonstrated low wind speed conditions similar to those occurring during the 1987-88 exceedance events. In the years since 1991, the most stagnant PM₁₀ season is 1992-93 and ambient concentrations of PM₁₀ are significantly less than the standard of 150 µg/m³. During the least stagnant PM₁₀ season, 1988-89, there were a substantial number of exceedances of the PM₁₀ standard. The data demonstrates that recent compliance with the PM standards is not attributable to favorable meteorology.

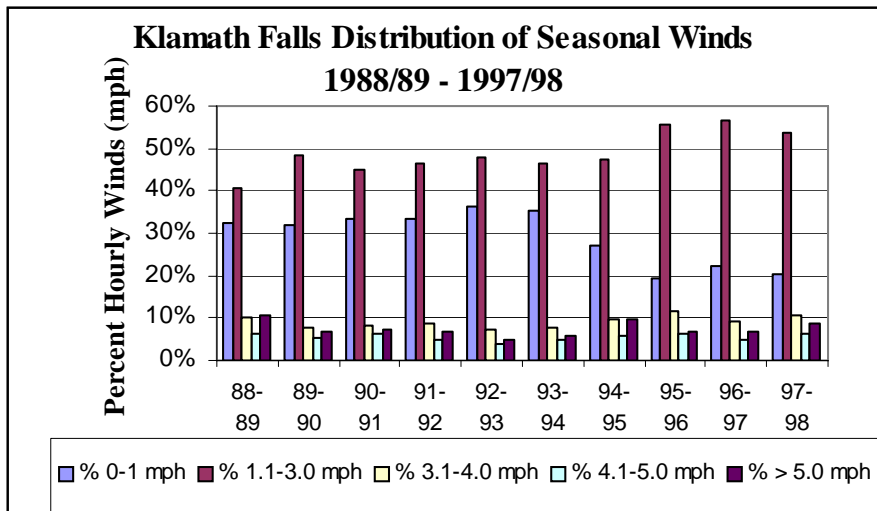
**Table 4.56.2-2: Distribution of Seasonal Low Wind Speed Conditions
October through March
Recorded at Peterson School**

| Winter Season | Wind Speed | | | | | | |
|----------------------|----------------------------------------|----------------------------------------|---------------|---------------|----------|----------------------------------------------------------|-------------------------------------------------------|
| | Percent Hourly wind speeds 0 – 3.0 mph | Rank – Most (1) to Least (11) Stagnant | 3.1 – 4.0 MPH | 4.1 – 5.0 MPH | 5.0+ MPH | Highest High Max. 24-hr avg. PM ₁₀ Oct –March | 2 nd High Max. 24-hr avg. PM ₁₀ |
| 1987-88 ⁷ | | | | | | 792 | 723 |
| 1988-89 | 73% | 10 | 10% | 6% | 10% | 417 | 400 |
| 1989-90 | 80% | 3 | 8% | 5% | 7% | 236 | 233 |
| 1990-91 | 78% | 6 | 8% | 6% | 7% | 258 | 247 |
| 1991-92 | 79% | 4 | 9% | 5% | 7% | 136 | 133 |
| 1992-93 | 84% | 1 | 7% | 4% | 5% | 137 | 128 |
| 1993-94 | 82% | 2 | 8% | 5% | 6% | 115 | 114 |
| 1994-95 | 74% | 8 | 10% | 6% | 10% | 104 | 82 |
| 1995-96 | 75% | 7 | 12% | 6% | 7% | 86 | 79 |
| 1996-97 | 79% | 5 | 9% | 5% | 7% | 107 | 85 |
| 1997-98 | 74% | 9 | 11% | 6% | 9% | 72 | 66 |
| Avg. | 78% | | | | | | |
| Std Dev | 3.6% | | | | | | |
| +1 Std Dev | 82% | | | | | | |
| - 1 Std Dev | 74% | | | | | | |

Variation in low wind speed from season to season is modest and the trend is relatively stable.

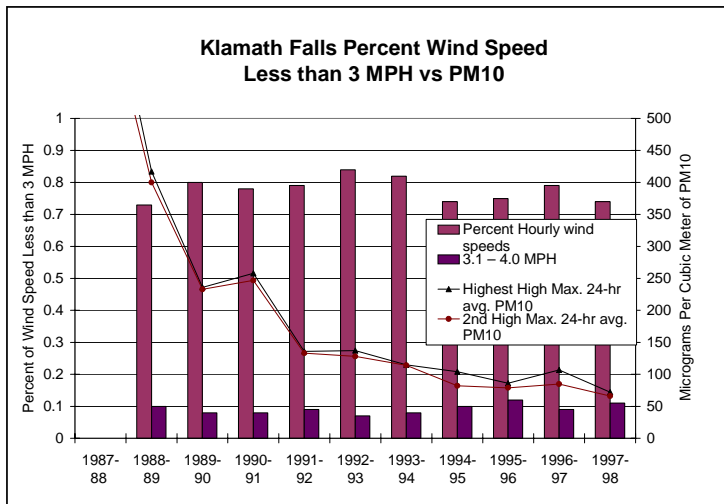
Figure 4.56.2-6 also shows how 2nd high PM₁₀ concentrations continued to improve during the 1990-1998 period in spite of generally poor ventilation conditions similar to those experienced during the 1987/88-exceedance period.

Figure 4.56.2-6: Distribution of Winter Season Winds



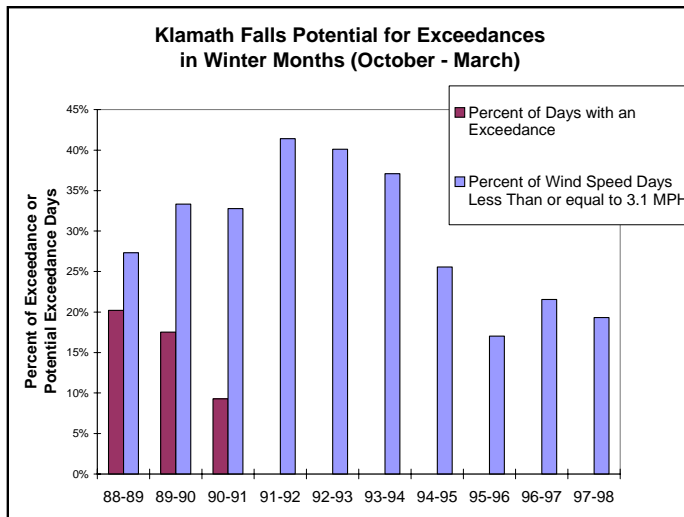
⁷ Wind speed is unavailable for 1987-88 at Peterson School.

Figure 4.56.2-7: Low Wind Speed Distribution with PM₁₀ Concentrations



Individual PM₁₀ exceedances have occurred under 24-hr average wind speed conditions as low as 1.0 mph, and as high as 5.6 mph. A review of seasonal 24-hour average wind speed data from 1988 through 1998 shows the potential for exceedance days for each season. The 1991-92 and 1992-93 PM₁₀ seasons had the highest number of potential exceedance days yet there were no exceedances. Again, this indicates that the recent compliance with the PM standards is not attributable to favorable meteorology. Figure 4.56.2-8 shows the trends in exceedance potential and the number of PM₁₀ values exceeding the standard by season as monitored at Peterson School.

Figure 4.54.2-8: Frequency of winds less than typical exceedance threshold compared to actual number of exceedances by season



The 1991-92 and the 1992-93 winter seasons suggest that other factors account for improving air quality. In more recent years, even with the improvements in ventilation, Klamath Falls still experienced a high level of stagnant conditions and there were no exceedances.

Permanent and Enforceable Emission Reductions

Permanent and enforceable emission reduction strategies that were in place during the attainment period include:

1. A mandatory woodstove certification program, requiring all new woodstoves sold in the State to be laboratory tested for emissions and efficiency prior to sale (mandatory since 1988);
2. A Klamath County mandatory woodstove and open burning ordinance (since 1991);
3. A ban on the sale and installation of uncertified woodstoves (since 1991); and
4. Major New Source Review Program for industry (since 1988).

Beginning in 1986, woodstove manufacturers certified stoves in a voluntary program. Since July 1988 in Oregon, a mandatory woodstove certification program required all new woodstoves to emit 70% less smoke than conventional woodstoves in Oregon. In 1991, EPA established a woodstove certification requirement based on Oregon's program.

Klamath County implemented a mandatory woodstove and open burning curtailment ordinance. Curtailment advisories continue to be issued during excessive pollution episodes and poor ventilation conditions. Advisories are issued at three levels, "green", "yellow" and "red". Community surveys are conducted at night using an infrared camera to determine general compliance with the advisory.

The new source review program for industry is established in Oregon for new and modified industrial sources. As a designated nonattainment area, Klamath Falls has met the stricter guidelines for new or modified sources.

4.56.2.4 Verification of Monitor Siting (area of highest PM₁₀ concentration)

DEQ routinely conducts field studies to verify that the location of the PM₁₀ monitor generally represents "worst case" or peak level PM₁₀ concentrations within the nonattainment area boundary (UGB). The most recent field study was conducted in the winter of 1996-97. The monitoring site at Peterson School was verified as the most

appropriate location for a PM₁₀ monitor. All PM₁₀ levels measured during the study were below the NAAQS. The Peterson School site continues to be an appropriate location for ongoing PM₁₀ sampling.

Two other sites sampled in the Klamath Falls area study, Hope Street and Avalon Street, also had high particulate levels. Both sites are located in close proximity to Peterson School and share the same neighborhood layout, topography and terrain, meteorology and share suspected impacts from residential wood heating and traffic. The Hope street site had the highest concentrations but is not the best location for a full time sampler because of its proximity to the State Highway (South 6th Street). This highway is regularly sanded during the PM₁₀ season and is located in a more commercial setting. The Avalon Street site is comparable to the Peterson School site but does not have the history of data collection that the Peterson School site has. The Peterson School site is located next to neighborhood streets and residential areas where residential wood combustion occurs and represents potential impacts to schoolchildren. Since the Peterson School and Avalon sites are located in the same geographic area with the UGB, the Peterson School site continues to represent peak PM₁₀ concentrations in the UGB. The highest estimated 24-hr PM₁₀ concentrations vary between these two sites by only about 10-15 µg/m³. The 1996/97 PM₁₀ saturation survey is included as Appendix D6-3.

4.56.2.5 Conclusions Regarding Demonstration of Attainment

This section demonstrates the attainment of the PM₁₀ standard in Klamath Falls nonattainment area and demonstrates that the monitoring data may be reasonably considered to represent the “worst case” concentrations. Monitoring data shows that Klamath Falls is in attainment with the national ambient air quality standards for particulate matter ten microns and less in size (PM₁₀). Economic data shows that attainment is not attributable to a “downturn” in the Klamath Falls economy. An evaluation of meteorological conditions shows that attainment was not attributed to especially favorable meteorology. The 1996/97 saturation study demonstrates that the Peterson School monitoring location does represent the general area of “worst case” peak PM₁₀ concentrations within the Klamath Falls UGB.

4.56.3 MAINTENANCE PLAN

The Federal Clean Air Act, Section 175A(a), requires that a redesignation request/maintenance plan show that attainment with the applicable clean air standard will be maintained for at least 10 years after the date of EPA redesignation. This section demonstrates that Klamath Falls UGB will remain in attainment with the 24-hour and the annual national ambient air quality standards for particulate matter ten microns and less (PM₁₀) through 2015.

4.56.3.1 Attainment Inventory

An emission inventory was developed to represent base year emissions. DEQ selected 1996 as the emission inventory year and base year, the same year selected for the Klamath Falls UGB Carbon Monoxide Maintenance Plan. Using the same year for PM₁₀ allowed significant savings in resources to complete the emission inventory, since a majority of the carbon monoxide source categories are identical for PM₁₀. In many cases only the emission factors needed to be changed. Future year emission forecasts were then developed for every year through 2015.

An emission inventory consists of emission estimates from all sources that emit PM₁₀ within the Klamath Falls Urban Growth Boundary and one mile outside. Sources of PM₁₀ in this area include major industry, on-road mobile sources (e.g. cars and trucks road dust), non-road mobile sources (e.g., construction equipment, recreational vehicles, lawn and garden equipment), and area sources (e.g., fugitive dust sources, outdoor burning, woodstoves, wildfires). Emissions from these sources are tabulated based on pounds of PM₁₀ emitted during a worst-case winter day and on an annual basis. The worst-case day is used to correspond with the 24-hour standard. Tons of PM₁₀ emitted in a calendar year (annual basis) correspond with the annual standard.

The 1996 PM₁₀ attainment emission inventory is summarized in Tables 4.56.3-1 and 4.56.3-2. Road dust and tailpipe emissions of PM₁₀ from motor vehicles were calculated by applying emission factors from the MOBILE Part 5 EPA computer program to total vehicle miles traveled in the Urban Growth Boundary. Estimated vehicle miles traveled are from the Oregon Department of Transportation's travel demand model. The procedures for calculating the attainment emission inventories and detailed results of mobile emission estimates are presented in Appendix D6-4.

Figure 4.56.3-1: Emission Factors for Vehicle Emissions

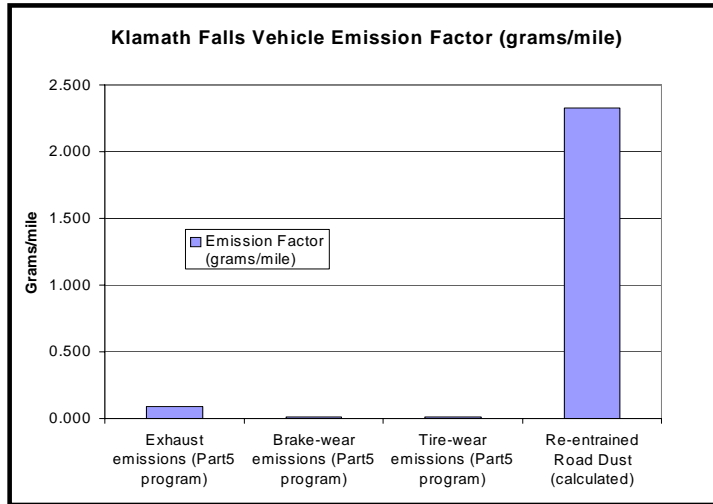
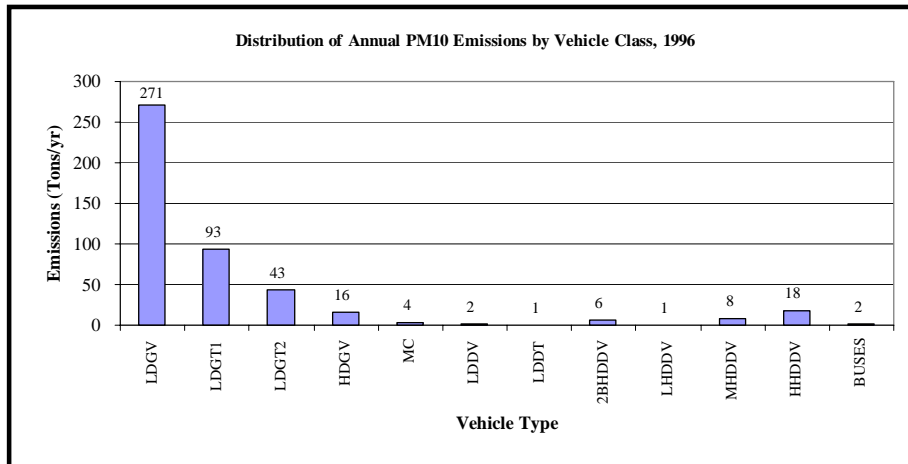


Figure 4.56.3-2: Annual emissions by vehicle type



LDGV = Light duty gas vehicle; MC= Motorcycle; LDGT1 and LDGT2 = Light duty gas trucks in different weight classes; LDDV = Light duty diesel vehicle; LDDT = Light duty diesel truck; and HDDV = Heavy-duty diesel vehicle.

Table 4.56.3-1: 1996 Attainment Emission Inventory (Typical PM₁₀ Worst Case Day)

| Source Category | PM ₁₀ Emissions (lbs/day) | Percent Contribution |
|------------------------|--------------------------------------|----------------------|
| On-Road Mobile | 2493 | 21% |
| Non-Road Mobile | 1307 | 11% |
| Major Industry | 2516 | 22% |
| Area Sources | 5338 | 46% |
| Total Emissions | 11,654 | 100% |

Table 4.56.3-2: 1996 Attainment Emission Inventory (Annual Average PM₁₀)

| Source Category | PM ₁₀ Emissions (Tons/year) | Percent Contribution |
|------------------------|----------------------------------------|----------------------|
| On-Road Mobile | 463 | 34% |
| Non-Road Mobile | 81 | 6% |
| Major Industry | 409 | 30% |
| Area Sources | 419 | 30% |
| Total Emissions | 1372 | 100% |

4.56.3.2 Maintenance Demonstration

The 1996 base year emissions were compared to a 2015 emissions projection in order to establish a ratio of base year to future year emissions. This ratio was then applied to the design concentration (less background PM₁₀) for the base year, then background was added back. The result is the forecasted PM₁₀ ambient concentration in the future year, 2015. This concentration must be below the National Ambient Air Quality Standard in order to demonstrate maintenance of the PM₁₀ standard.

The maintenance demonstration detailed in section 4.56.3.4 shows that the 2015 projected ambient concentration is below the PM₁₀ federal health standards of 150 µg/m³ for the daily average and 50 µg/m³ for the annual standard. This means that significant new emission reduction strategies are not needed in order to maintain the standards through 2015.

The plan includes modified requirements for sources of new industrial PM₁₀ emissions. The requirements provide flexibility while preventing significant backsliding of the

progress made to lower PM₁₀ emissions over the last decade. The future forecast of industrial emissions assumes a 1.4 percent annual average growth rate in permitted emissions. This growth rate is based on Oregon Economic Development Department industrial employment projections for Klamath County (see Appendix D6-4E, Tables E-4 and E-5 for detailed growth rate assumptions). For new or existing facilities wishing to obtain an air contaminant discharge permit for emissions greater than 15 tons per year, a portion of the projected air quality margin will be available for economic development.

4.56.3.2.1 Future Forecast

Figure 4.56.3-3 shows daily PM₁₀ emissions within the Klamath Falls Urban Growth Boundary through the year 2015. Tables 4.56.3-3 and 4.56.3-4 show worst case daily PM₁₀ emissions and annual emissions projected to the year 2015 by source category. The 2015 emissions assume growth rates recommended by the Klamath Falls air quality committee for the 1999 Klamath Falls UGB carbon monoxide plan. The population growth rate is 1.3 percent per year and assumes linear growth. A detailed summary of growth rates and the rate applied to each source category is provided in Appendix D6-4E, Table E-7 and E-8. The procedures used for projecting emissions are presented in Appendix D6-4.

Executive Order 97-22 directs key state agencies such as DEQ and ODOT to use population and employment forecasts developed or approved by the Oregon Office of Economic Analysis (OEA). OEA forecasts are made at the county level, not the city level. During the carbon monoxide planning process, representatives from the City of Klamath Falls, Klamath County, DEQ and ODOT developed a future population and employment forecast for the Klamath Falls UGB, that is consistent with OEA projections. Future travel in the Klamath Falls UGB is based on the following growth assumptions (1996-2015), resulting in a VMT growth rate of 1.7%:

| Category | Growth Rate (compound): Percent per Year |
|-----------------------------------|------------------------------------------|
| Population | 1.2% |
| Housing | 1.1% |
| Industrial Employment | 1.3% |
| Average Non-Industrial Employment | 0.7% |
| VMT Growth Rate | 1.7% |

Estimated Compound Rates

Figure 4.56.3-3: PM₁₀ Maintenance Analysis (Emissions Forecast)
Worst Case Winter PM₁₀ Day (Lbs PM₁₀/Day)

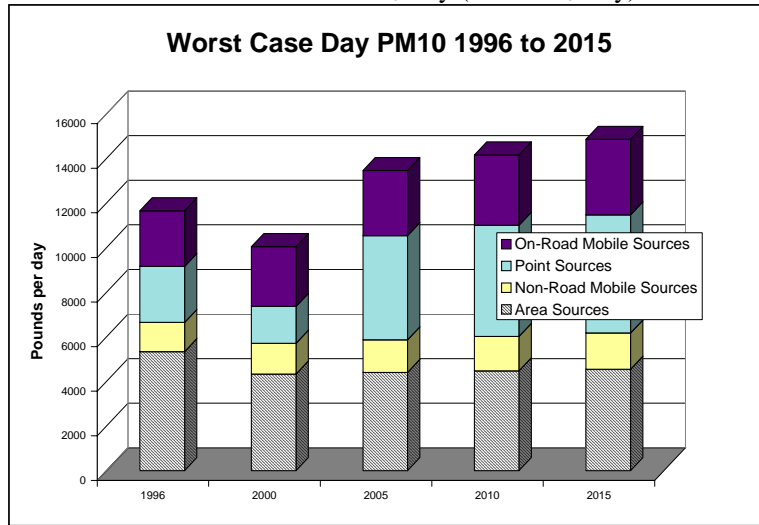


Table 4.56.3-3: PM₁₀ Emissions Forecast
PM₁₀ Nonattainment Area = Klamath Falls Urban Growth Boundary
(Pounds PM₁₀/Worst Case Winter Day)

| Year | 1996 | 2000 | 2005 | 2010 | 2015 |
|-------------------------|--------|--------|--------|--------|--------|
| Area Sources | 5338 | 4336 | 4407 | 4477 | 4548 |
| Non-Road Mobile Sources | 1307 | 1374 | 1458 | 1542 | 1625 |
| Point Sources | 2516 | 1654 | 4679 | 4989 | 5299 |
| On-Road Mobile Sources | 2493 | 2681 | 2916 | 3151 | 3386 |
| | 11,654 | 10,045 | 13,459 | 14,159 | 14,859 |

Net increase in 2015 from 1996 attainment levels = 3205 lbs/day PM₁₀.

Figure 4.56.3-3: PM₁₀ Maintenance Analysis (Emissions Forecast)
Annual PM₁₀ Day (Tons PM₁₀/Year)

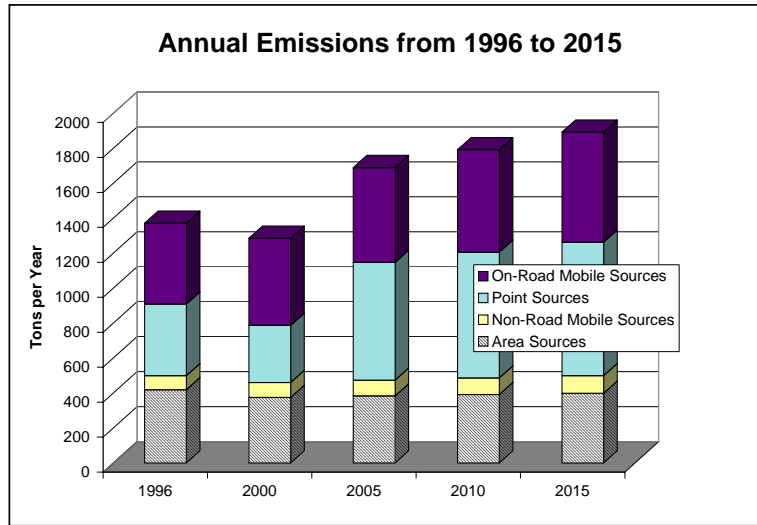


Table 4.56.3-4: PM₁₀ Emissions Forecast
PM₁₀ Nonattainment Area = Klamath Falls Urban Growth Boundary
(Tons PM₁₀/Annual)

| Year | 1996 | 2000 | 2005 | 2010 | 2015 |
|-------------------------|------|------|------|------|------|
| Area Sources | 419 | 327 | 383 | 391 | 399 |
| Non-Road Mobile Sources | 81 | 85 | 90 | 95 | 100 |
| Point Sources | 409 | 327 | 675 | 719 | 764 |
| On-Road Mobile Sources | 463 | 498 | 542 | 585 | 629 |
| Total | 1372 | 1238 | 1690 | 1791 | 1893 |

Net increase in 2015 from 1996 attainment levels = 521 tons/year PM₁₀.

4.56.3.2.2 Transportation Emissions Budgets for Conformity

Federal and state transportation conformity regulations require that mobile source emissions resulting from the implementation of transportation plans and transportation improvement program meet certain criteria to ensure compliance with the Clean Air Act.

For transportation conformity purposes, an emissions budget has been established for on-road motor vehicle emissions in the Klamath Falls Urban Growth Boundary. The transportation emissions budgets for selected years are shown in Table 4.56.3-5 and Table 4.56.3-6. Intervening years must be interpolated.

Table 4.56.3-5: Motor Vehicle Emissions Budget Through 2015

Klamath Falls Motor Vehicle PM₁₀ Emissions Budget
Worst Case Winter PM₁₀ Season (lbs/day)

| Year | 1996 | 2000 | 2005 | 2010 | 2015 |
|--------------------------------|------|------|------|------|------|
| Motor Vehicle Emissions Budget | 2742 | 2949 | 3208 | 3466 | 3725 |

Table 4.56.3-6: Motor Vehicle Emissions Budget Through 2015

Klamath Falls Motor Vehicle PM₁₀ Emissions Budget
Annual PM₁₀ Season (tons/yr)

| Year | 1996 | 2000 | 2005 | 2010 | 2015 |
|--------------------------------|------|------|------|------|------|
| Motor Vehicle Emissions Budget | 509 | 548 | 596 | 644 | 692 |

The daily and annual projected emission inventory increasing VMT by 10% is as follows:

Table 4.56.3-7: Motor Vehicle VMT Through 2015

Klamath Falls Motor Vehicle VMT
(Vehicle Miles Traveled)

| Year | 2000 | 2005 | 2010 | 2015 |
|------------------|-------------|-------------|-------------|-------------|
| Daily VMT+ 10% | 555,637 | 608,683 | 661,730 | 714,777 |
| Annual VMT + 10% | 202,807,353 | 222,169,432 | 241,531,512 | 260,893,592 |

The transportation emissions budgets were developed based on the Oregon Department of Transportation (ODOT) travel demand model. The budget amount for each year is the projected on-road mobile emissions for each year as calculated in the emission inventory projections with an additional ten percent vehicle miles traveled (VMT) to allow for potential new projects not currently funded. The emission inventory projections include transportation projects that have committed funding in the statewide transportation plan. The projections do not include projects planned but without funding. The additional ten percent VMT will allow a margin for unforeseen transportation projects that may result in a slight increase in VMT and in related PM₁₀ emissions. DEQ's transportation conformity rules and the transportation conformity process can be found in Appendix D6-5.

4.56.3.2.3 Continuous Emission Reduction Measures

The 2015 emission projections show an overall modest increase in PM₁₀ emissions. The projections assume that current emission reduction strategies will remain in place with the exception of a modification to industrial source requirements.

Table 4.56.3-8: 1991 Attainment Strategies & 2001 Maintenance Plan Strategies Comparison and Changes in Strategies

| 1991 Attainment Plan Strategy | Effective Date | EPA Approval Date/ Federal Register | 2001 Maintenance Plan Strategy | Effective Date | Project, Agreement, Code or Rule |
|----------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------|----------------------------------------------------------------------------------|-------------------------|---------------------------------------------|
| Woodstove Curtailment | 7/31/91 | 6/5/96 61FR28531 | Woodstove Curtailment Revised | 8/23/01 | Klamath County (K.C.) Ordinance Chapter 406 |
| Woodstove Opacity Restriction 20% | 7/31/91 | 6/5/96 61FR28531 | No Change | 8/23/01 | K.C. Ordinance Chapter 406 |
| Sole source for woodheat must have alternative source of heat by 1996; sole source exemption | 7/31/91 | 6/5/96 61FR28531 | Prohibition on sole source of heat in nonowner occupied dwellings | 8/23/01 | K.C. Ordinance Chapter 406 |
| Agricultural Burning Prohibition inside UGB | 7/31/91 | 6/5/96 61FR28531 | No Change | 8/23/01 | KC Ordinance Chapter 406 |
| Green Day only Open Burning; Prohibition on Yellow and Red Days | 7/31/91 | 6/5/96 61FR28531 | 30 day Open Burning Window (Spring /Fall) & Prohibition on Yellow/Red days. | 8/23/01 | K.C. Ordinance Chapter 406 |
| PM ₁₀ Advisory Call for Woodstoves & Open Burning | 7/31/91 | 6/5/96 61FR28531 | PM ₁₀ & PM _{2.5} Advisory Call for Woodstoves & Open Burning | 8/23/01 | K.C. Ordinance Chapter 406 |
| Air Quality Control Area greater than UGB | 7/31/91 | 6/5/96 61FR28531 | Expanded Air Quality Zone | 8/23/01 | K.C. Ordinance Chapter 406 |
| Woodstove Certification | 3/2/90 | 6/9/92 57FR24373 | No Change | 3/2/90 | OAR 340-262 |
| Woodstove Removal (One time) | 5/90 to 12/93 | 6/5/96 61FR28531 | Revised Woodstove removal (update) | 12/1/01 | 1991 PURE Pjct. 2001 Project |
| Winter Road Sanding | 12/11/89 | 6/5/96 61FR28531 | Winter Road Sanding | 12/11/89 | Interagency Agreement |
| Forest Burning and Voluntary Smoke Management Program | 1/10/90 & 4/24/91 | 6/5/96 61FR28531 | Forest Burning 20-mile SPZ & Voluntary Smoke Mgt. Program | 1/10/90, 4/24/91, & /92 | Interagency Agreement between DEQ and ODF |
| Agricultural Burning in Klamath County | 6/91 | 6/5/96 61FR28531 | Agricultural Burning in Klamath County | 6/91 | Agreement - Klamath County and Farm Bureau |
| Nonattainment Area Offset Requirements and LAER for new industrial sources | 1981 | 4-27-82 47FR18004 | Maintenance Area - BACT & Offset Exemptions | Upon redesignation | OAR 340-222 & 224 |

Woodstove and Open Burning Ordinance

On July 31, 1991, the Board of County Commissioners for Klamath County established a mandatory woodstove and open burning ordinance. The ordinance has been effective in significantly reducing emissions from woodstoves and open burning in the Klamath Falls UGB and populated subdivision areas immediately outside the UGB. The City of Klamath Falls adopted an ordinance on September 16, 1991 that implemented the County's air quality program within the city boundaries. The ordinance addressed several environmentally significant areas inside the UGB:

- Woodstove Curtailment - On days with high pollution (red days) that could damage individual's health, all woodstove activity is curtailed. On days with moderate pollution (yellow days) that may have an impact on individuals' health, uncertified woodstove activity is curtailed. Advisory calls are made on a daily basis in the winter to alert the public as to the level of pollution and the outlook for pollution levels and stagnant conditions that day;
- Opacity standard - With the exception of startup, all emissions from woodstoves must meet an opacity limitation when burning wood;
- Certification of Woodstoves - All new installations of woodstoves must be certified stoves. This requirement parallels State and Federal rules;
- Dry fuel - All fuel burned in woodstoves must be dry. Coal is not allowed to be burned. Prohibited materials are not allowed to be burned in woodstoves;
- Exemptions - Exemptions for woodstoves allowed low income and sole source homeowners to continue to burn even on yellow and red days. However, the sole source exemption terminated on December 31, 1992. There are very few to no low income exemptions issued currently;
- Open burning on poor ventilation days - Open burning is prohibited on yellow and red days;
- Prohibited materials - Materials such as tires, plastics, and wet garbage are prohibited from open burning. This rule parallels State rule;
- Agricultural burning - Agricultural burning is prohibited within the UGB; and
- Variances - variances to the open burning rules can be granted. These variances are usually issued for agricultural burning and burning outside the UGB.

On August 21, 2001, the Klamath County Board of County Commissioners adopted a revised ordinance. The revision of the 1991 ordinance maintains the salient provisions in the original and adds the following elements:

- Expands the size of the Air Quality Zone (formerly known as the Air Quality Control Area) to include those subdivisions or proposed subdivisions outside of the Urban Growth Boundary (UGB) that may impact the UGB with smoke from woodstoves or open burning;
- Strengthens and aligns the enforcement provisions with other County Code;

- Issues a particulate matter advisory call (red, yellow or green) using meteorological data and real-time pollution-related data. A nephelometer is used to determine the pollution-related data. Both a PM₁₀ and a PM_{2.5} advisory is determined by the County. If the PM₁₀ advisory is the most restrictive then the advisory call is made as it has been done in the past, otherwise the call is based on the more restrictive PM_{2.5} advisory;
- Requires homeowners to use alternative sources of heat other than wood heat on red days and also for owners of uncertified stoves on yellow days;
- Continues to limit woodstove opacity to 20 percent;
- Better describes dry fuel, which may be burned;
- Further limits the type of fuel allowed to be burned, and clearly prohibits burning coal and prohibited material;
- Requires landlords to install an alternative heat source in their rentals. Prohibits a nonowner occupied dwelling (tenant) from having wood heating as the sole source of heat in the residence;
- Restricts the time allowed for open burning to one month in the Fall and one month in the Spring in the Air Quality Zone;
- Maintains the prohibition of agricultural open burning inside the UGB and 1/4 mile outside the UGB;
- Prohibits general open burning on red and yellow days within the County; and
- Identifies variances, exemptions and waivers process and administrative criteria (see Appendix D6-7) and describes appropriate times and conditions for County staff to issue the variances, exemptions or waivers. In rare cases, a variance may be issued for agricultural open burning within the AQZ. Alternatively, a variance or waiver may be granted for general open burning through the county ordinance for open burning in an area of the county where ventilation conditions are better than in the Klamath Falls basin.

Since the 1991 ordinance, emissions from woodstoves have steadily declined and open burning has been limited. The revision and appropriate guidance documents are attached in Appendix D6-7 and are incorporated as part of this submittal.

Statewide Certification of Woodstoves

The 1991 legislature and EPA enacted a ban on the sale of uncertified used woodstoves. Additionally, the State Building Code Agency prohibits the installation of uncertified used woodstoves. The effect of this ban and prohibition has been to reduce the emissions from heavy polluting stoves and allowing only the installation of certified woodstoves effectively reducing the amount of pollution from individual certified stoves to more than half of the pollution of the uncertified stoves. Wood has been more and more difficult to obtain and residents must travel farther to cut the same volume of wood. Consequently, there is an incentive not to cut wood. Additionally, the hearth products industry has promoted natural gas fired stoves and more installations of natural gas-fired stoves are being done than woodstoves, reducing particulate pollution more. The net benefit to the airshed has been a significant reduction in emissions from woodstoves.

DEQ estimates that PM₁₀ emissions from uncertified woodstoves have substantively been reduced as identified in a recent survey to determine attitudes and wood burning behavior conducted in 1999. This emission reduction is expected to level out in subsequent years because there are fewer uncertified woodstoves to be removed and the remaining uncertified woodstoves are likely only used on an infrequent basis. The conclusion from the data indicates that more people are using woodstoves as a backup source of heat in Klamath County and that the statewide certification program has been effective in significantly reducing emissions from woodstoves.

Woodstove Replacement Program

The woodstove replacement program for low-income households was effective in significantly reducing emissions in the early 1990's. In a major one-time effort, several funding sources were combined to remove uncertified woodstoves from homes and replace them with a satisfactory heat source. Often these homes were poorly insulated and required major renovations, including weatherization, to improve the efficiency of heating the home. The "Particulate Urban Resources Effort" or the PURE project upgraded 134 heating systems. In that project 102 noncertified woodstoves were destroyed and 90 percent of the homes received a natural gas heating system as a replacement system. Nearly 80 percent of the money spent on the project was spent to upgrade homeowner-heating systems and 18 percent of the money spent was on weatherization.

This project spawned other uncertified stove removals inside the UGB and was a model for other programs in other cities. The County anticipates offering uncertified woodstove removal incentives in a 2002 project to reduce emissions from uncertified stoves further. Even though certified woodstove installations have increased in recent years, use has decreased, resulting in a reduction in Klamath County total emissions even from certified woodstoves.

Highway Road Sanding

Emissions resulting from wintertime road sanding can be significant. The Oregon Department of Transportation, the County Public Works Department, and the City's Public Works Department have made significant strides to reduce the amount of winter roadsanding material placed on the roadway. By 1996, the Oregon Department of Transportation (ODOT) on state highways substantially reduced roadway sanding substituting crushed aggregate, a less brittle material than cinders. In recent years, ODOT has utilized Magnesium Chloride as an anti-icing agent on roadways replacing sanding material nearly all together. The County reduced sanding to only intersections and sweeps up cinders immediately following the storm event. The City of Klamath Falls uses salt and plows the roads during storms, virtually eliminating sanding. Additionally, the City has made use of local geothermal energy to keep portions of streets free of ice in the winter.

Forest Burning

Smoke from prescribed burning, slash burning and underburning (burning under large pine trees) have not significantly impacted the nonattainment area, however this activity incorporates safeguards to prevent unintended smoke impacts to the Klamath Falls nonattainment area.

By statute, the Oregon Department of Forestry (ODF) is responsible for administering smoke management rules. Daily burn instructions are issued by ODF for burning near Klamath Falls. A Special Protective Zone (SPZ) is identified within 20 miles of the Urban Growth Boundary where additional precaution is used when conducting prescribed burning during the winter months. The purpose is to further protect to the nonattainment area. One provision allows burning only during green days in the winter when wood smoke is not impacting the airshed.

In addition, forest landowners have entered into a voluntary smoke management program. This program was adopted in April 1990 and signed by all of the major landowners near Klamath Falls. The ODF daily smoke management forecasts and advisories are issued for all of Klamath County. The purpose is to avoid smoke intrusions into Klamath Falls and other smoke sensitive areas. Additionally, DEQ has met with Siskiyou and Modoc Counties in California. California's permitting program for forest and agricultural burning considers potential impacts to Klamath Falls before issuing a permit. The program has been effective.

The Oregon Department of Transportation (ODOT) has occasionally burned slash debris along the right of way when widening or clearing timber and slash. A letter from ODOT is being drafted to DEQ that commits to use alternative slash disposal methods other than burning.

Agricultural Burning

The Klamath County Farm Bureau adopted a voluntary agricultural smoke management program on farmlands within Klamath County in June 1991. Cooperating agricultural producers are encouraged to burn when smoke transport conditions are favorable and will avoid the nonattainment area. The cooperating producers will not burn on red or yellow days, which are indicative of excessive smoke in the Klamath Falls area. This provision corresponds to the Klamath County Clean Air Ordinance for general open burning countywide. In rare cases, a variance or waiver from the County ordinance may be granted for general open burning in an area of the county where ventilation conditions differ from conditions in the Klamath Falls basin.

New Source Review

Current rules require new or expanding sources of industrial PM₁₀ emissions greater than 15 tons per year to comply with nonattainment area New Source Review rules. These rules include Lowest Achievable Emission Rate control technology and a requirement to

provide offsets of air quality impacts (an equivalent reduction in PM₁₀ emissions from within the UGB). After redesignation to a maintenance area, the Lowest Achievable Emission Rate requirement will be replaced by Best Available Control Technology. Although the offsets requirement will continue, an exemption from offsets will be allowed if modeling demonstrates that the new PM₁₀ emissions, when combined with all other emissions in the area, will not result in air quality concentrations higher than 140 µg/m³. Impacts above this concentration will require offsets. These modifications are reflected in amendments to Oregon Administrative Rule 340-224-0060.

Other Statewide Rules such as Fugitive Emissions

Even though credit hasn't been taken in either the attainment plan or this maintenance plan, several statewide Oregon rules reduce emissions on a routine basis that will continue to protect the Klamath Falls area. Statewide rules require control of visual emissions, fugitive emissions and nuisance conditions. Additional open burning prohibitions or restrictions apply to commercial, demolition, construction, industrial and land clearing debris.

4.56.3.2.4 Future Analysis (Proportional Analysis)

The 2015 ambient concentration was estimated by applying a ratio of 2015 emissions and base year emissions, to the base year ambient concentration. The following formula was used to predict the 2015 PM₁₀ ambient concentration for the Klamath Falls UGB.

$$2015 \text{ PM}_{10} \text{ Ambient Concentration} = [(1996 \text{ DV} - \text{BKGD}) * (2015 \text{ EI}/1996 \text{ EI})] + \text{BKGD}$$

where:

- 2015 PM₁₀ Ambient Concentration is in micrograms per cubic meter and compared to the National Ambient Air Quality Standard.
- 1996 DV is the 1996 Design Value or Design Concentration in micrograms per cubic meter and is compared to the National Ambient Air Quality Standard. It equals 95.2 micrograms per cubic meter (µg/m³) for a 24-hour average or 21.0 µg/m³ for the expected annual average between 1995 and 1997.
- BKGD is the background monitoring site concentration for the Highway 140 monitor at a design concentration. It is seasonal (December through February) at 32.4 µg/m³ for the 24 hour average and at 9.9 for a seasonal (December through February) expected annual average between 1995 and 1997.
- 2015 EI is the 2015 calculated emission inventory based on growth factors. It is the 1996 emission inventory times growth through 2015. It is 14,859 pounds per day for a worst case day and 1,893 tons per year.
- 1996 EI is the 1996 calculated emission inventory of estimated emissions. It is 11,654 pounds per day for the worst case day and 1,372 tons per year.

The predicted 2015 ambient concentration is 112.4 µg/m³ for the worst-case winter day and 25.3 µg/m³ per year for the expected annual average. The ambient concentration

levels are below the NAAQS of 150 $\mu\text{g}/\text{m}^3$ for a 24-hour average and 50 $\mu\text{g}/\text{m}^3$ on an annual average and maintenance of both standards is demonstrated.

The Klamath Falls committee agreed that we should add ten percent VMT cushion to the on-road mobile PM_{10} emission calculation to account for potential future projects that are not currently funded. With this additional ten percent VMT, the 2015 predicted ambient concentration is 114.3 $\mu\text{g}/\text{m}^3$ for the 24-hour average and 25.8 $\mu\text{g}/\text{m}^3$ for the annual average.

The 2015 ambient concentration easily meets the PM_{10} federal health standard of 150 $\mu\text{g}/\text{m}^3$ for a 24-hour period and 50 $\mu\text{g}/\text{m}^3$ for the annual average and maintenance of the standard is demonstrated. 2015 total emissions, including ten percent additional VMT for the transportation emission budget, are detailed in Table 4.56.3-9.

Table 4.56.3-9: PM_{10} Attainment Demonstration with 10% VMT

| YEAR | 1996 | 2000 | 2005 | 2010 | 2015 |
|---------------------------------------------------------------|-------------------------------|-------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Total Emissions from Inventory – Annual (tons per year) | 1372 | 1287 | 1744 | 1850 | 1956 |
| Estimated Ambient Concentration | 21.0 $\mu\text{g}/\text{m}^3$ | 20.3 $\mu\text{g}/\text{m}^3$ | 24.1 $\mu\text{g}/\text{m}^3$ | 24.9 $\mu\text{g}/\text{m}^3$ | 25.8 $\mu\text{g}/\text{m}^3$ |
| Total Emissions from Inventory – Worst Case Day (lbs per day) | 11,654 | 10,314 | 13,751 | 14,474 | 15,198 |
| Estimated Ambient Concentration | 95.2 $\mu\text{g}/\text{m}^3$ | 88.0 $\mu\text{g}/\text{m}^3$ | 106.5 $\mu\text{g}/\text{m}^3$ | 110.4 $\mu\text{g}/\text{m}^3$ | 114.3 $\mu\text{g}/\text{m}^3$ |

4.56.3.3 Contingency Plan

The Maintenance Plan must contain contingency measures that would be implemented in the event of: 1) a violation of the PM_{10} standard after the area has been redesignated to maintenance, or 2) other appropriate triggering protocol contained in the plan. Klamath Falls' contingency plan is outlined below.

The Clean Air Act Section 175A(d) requires that all emission reduction measures contained in the State Implementation Plan (SIP) prior to redesignation be retained as contingency measures in the Maintenance Plan. Therefore, Lowest Achievable Emission Rate (LAER) technology and emission offsets for major industrial sources must be contingency measures in the PM_{10} Maintenance Plan.

The Klamath Falls PM_{10} Contingency Plan is designed in phases in order to first prevent a violation of PM_{10} standards, and then to promptly correct any violation that may occur.

Phase 1: Risk of Violation

The County and DEQ will reconvene a planning group to develop an action plan if ambient concentrations (actual or estimated) equal or exceed 90% of the NAAQS concentration of PM₁₀ (135 µg/m³ for the 24 hour average or 45 µg/m³ for an annual average) at Peterson School. The planning group will prepare an action plan that includes a schedule for implementation of additional strategies as necessary to prevent an exceedance or violation of PM₁₀ standards. If the high PM₁₀ concentration was determined to be a natural event based on EPA's policy or an exceptional event, no further action may be needed.

The contingency strategies to be considered include, but are not limited to:

- Review alternative heating systems, including solar and geothermal;
- Review industrial strategies;
- Consider registering woodstoves for a fee;
- Consider doubling the fines on yellow and red day violators;
- Review forest slash burning strategies;
- Consider an ordinance removing uncertified woodstoves upon sale of a home;
- Consider banning outdoor burning; and
- Evaluate all sources of particulate pollution in Klamath Basin.

The plan will consider concrete actions that will occur by ordinance or agreement that are permanent and enforceable. The actions will be placed in a schedule for implementation. This schedule will include automatic implementation of more stringent requirements should phase 2 need to be implemented.

Phase 2: Actual Violation

If a violation of the PM₁₀ standard occurs and is validated by DEQ, the following contingency measures will automatically be implemented:

- (1) All strategies developed under Phase 1 will be implemented upon the time schedule detailed in the action plan.
- (2) Any new major industrial source or a major modification to an existing source subject to the New Source Review (NSR) requirements will revert back to Lowest Achievable Emission Rate (LAER) control technology and emission offset requirements. All other New Source Review requirements for nonattainment areas will be reinstated as well.

4.56.4 ADMINISTRATIVE REQUIREMENTS

The criteria that must be satisfied for a nonattainment area to be redesignated to attainment include several administrative requirements related to compliance with Clean Air Act provisions. Each of these elements is described below.

4.56.4.1 SIP Requirements/Nonattainment Area Requirements

Klamath Falls has met all State Implementation Plan (SIP) requirements specified in Section 110 and Part D of the Clean Air Act. In summary, Section 110 requires that the state submit a plan that becomes part of the SIP, and provides for the implementation, maintenance, and enforcement of an air quality standard. Part D outlines specific plan requirements for nonattainment areas.

4.56.4.2 Summary of Fully Approved State Implementation Plan

The 1991 Klamath Falls PM₁₀ attainment plan adopted several emission reduction strategies. An addendum was adopted in 1995. The plan focused primarily on home heating and open burning. EPA approved both the attainment plan and the addendum on April 14, 1997. The strategies in the approved plan include:

- a. A mandatory wood heating curtailment and open burning ordinance and program;
- b. A woodstove removal and weatherization program;
- c. A ban on the sale or installation of uncertified woodstoves; and
- d. A requirement for industrial emission reductions for new or expanding facilities.

4.56.4.3 1990 Clean Air Act Requirements and Status

The Klamath Falls UGB has met the additional requirements for PM₁₀ nonattainment areas included in the 1990 Clean Air Act Amendments. The required attainment date of December 31, 1994 for moderate areas was met in Klamath Falls in 1994.

4.56.4.4 Monitoring Network and Commitments

DEQ is responsible for the operation of the permanent ambient PM₁₀ monitor in the Klamath Falls UGB. DEQ oversees the quality assurance program for the PM₁₀ data.

DEQ will continue to comply with the air monitoring requirements of Title III, Section 319, of the Clean Air Act. The monitoring site will also continue to be operated in compliance with EPA monitoring guidelines set forth in 40 CFR Part 58. "Ambient Air Quality Surveillance", and Appendices A through G of Part 58.. In addition, DEQ will continue to comply with the "Ambient Air Quality Monitoring Program" specified in Volume 2, Section 6 of the SIP. Further, DEQ will continue to operate and maintain the network of State and Local Air Monitoring Stations and National Air Monitoring Stations in accordance with the terms of the State/EPA Agreement.

DEQ also periodically conducts saturation studies to verify that existing monitors are recording the highest PM₁₀ concentrations in the area. DEQ will commit to conducting a re-evaluation survey in the event of major changes that may impact PM₁₀ emissions as practicable after identifying any such changes. Based on PM₁₀ monitoring data and other considerations such as special project funding availability, DEQ in consultation with EPA may reach agreement that the periodic survey is unnecessary, or should be delayed.

4.56.4.5 Verification of Continued Attainment

The DEQ will analyze on an annual basis the PM₁₀ air quality monitoring data to verify continued attainment of the PM₁₀ standard, in accordance with 40 CFR Part 50 and EPA's redesignation guidance. This data, along with the previous year's data, will provide the necessary information for determining whether the Klamath Falls UGB continues to comply with standards.

The Clean Air Act requires the state to submit a maintenance plan revision eight years after the redesignation request is approved by EPA. The revision will provide for continued maintenance of standards for an additional ten years following the first ten-year period.

For the interim period between EPA approval of this plan and the next required plan revision, DEQ will rely on ambient monitoring data to track progress of the maintenance plan. Growth projections for Klamath Falls are modest. As long as ambient monitoring data show no significant upward trend in concentration, a mid-term emission inventory update or emissions tracking program will not be necessary. If PM₁₀ concentrations significantly increase over current levels, then an evaluation of growth and other planning assumptions will be necessary.

If Phase 1 of the contingency plan is triggered, DEQ will prepare an analysis of growth factors to determine if other planning assumptions have changed. The analysis will include a review of emission factors, growth rate assumptions, traffic data, and other significant assumptions used to develop the maintenance plan. If there are significant changes, DEQ will consult with EPA to determine if a more extensive periodic emission inventory update, or other action, is warranted.

4.56.4.6 Maintenance Plan Commitments

As part of the PM₁₀ Maintenance Plan, DEQ commits to do the following:

The DEQ will commit to conducting a periodic saturation re-evaluation survey in the event of major changes in Klamath Falls that may affect PM₁₀ emissions. DEQ will also conduct a five-year periodic saturation survey, pending EPA review.

DEQ will evaluate growth and other planning assumptions if PM₁₀ concentrations significantly increase over current levels.