

**PM10 REDESIGNATION REQUEST
AND MAINTENANCE PLAN FOR THE
ASPEN AREA**

Adopted by the Colorado
Air Quality Control Commission
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CHAPTER 1. INTRODUCTION

The City of Aspen, Pitkin County, and the State of Colorado request redesignation to an “attainment” status for the Aspen/Pitkin PM10 nonattainment area. The Aspen area has been designated as nonattainment for the National Ambient Air Quality Standards (NAAQS) for particulate matter with an aerodynamic diameter of ten microns or less (PM10) since 1990, and the area is presently demonstrating attainment with the PM10 NAAQS. The Maintenance Plan section of this document will demonstrate that the area will be able to maintain the NAAQS through the year 2015. The benefits of redesignation to attainment status include:

1. Areas redesignated to attainment lose the stigma associated with nonattainment of the NAAQS.
2. Areas redesignated to attainment do not become “serious” nonattainment areas even if a violation of the NAAQS occurs. This means that specific control measures can be applied to address a violation without going through a rigorous federal process, where serious areas must implement mandatory control measures and be subject to numerous administrative activities.
3. Prevention of Significant Deterioration (PSD) permitting requirements replace New Source Review (NSR) permitting requirements for new and modified major stationary sources. These permitting requirements are important for large industrial facilities that are not currently located, nor likely to locate, in the Aspen area.

This Redesignation Request and Maintenance Plan is designed to document and ensure continuing attainment of the NAAQS for PM10 in the Aspen area. This document is intended to comply with requirements of the federal Clean Air Act (CAA), and with relevant procedures and policies of the United States Environmental Protection Agency (EPA). This document is organized into three chapters. Chapter 1, *Introduction*, is provided as background information only and is not to be construed to be part of the federally-enforceable State Implementation Plan. Chapter 2, *Redesignation Submittal*, is the State's request to the EPA to redesignate the Aspen area to attainment for PM10. Chapter 3, *Maintenance Plan*, is being submitted for inclusion in the federally-enforceable State implementation Plan and provides for maintenance of the PM10 standard through the year 2015.

A. BACKGROUND

1. PM10 National Ambient Air Quality Standard

In 1971, the EPA set NAAQS for several air pollutants, including total suspended particulates (TSP), defined as particles with an aerodynamic diameter of less than 40 microns. In 1987, the EPA changed the TSP standard to the PM10 NAAQS. The current PM10 NAAQS allow for a maximum annual average of 50 micrograms per cubic meter (ug/m^3) and a 24-hour average of 150 ug/m^3 . The 24-hour PM10 NAAQS may not be exceeded more than three times over any three year period.

There are both primary and secondary air quality standards. The primary standards are set to protect human health, with a margin of safety to protect the more sensitive persons in the population, such as the very young, elderly and the ill. Secondary standards are set to protect property, materials, aesthetic values and general welfare. For PM10, the national primary and secondary standards are the same. The numerical levels of the standards are subject to change, based on new scientific evidence summarized in air quality criteria documents.

As stated in the Code of Federal Regulations (40 CFR Part 50.6),

The standards are attained when the expected number of days per calendar year with a 24-hour average concentration above 150 ug/m^3 is equal to or less than one (based on 3-year average), and the annual arithmetic mean concentration is less than or equal to 50 ug/m^3 (based on 3-year average), as determined by Appendix K.

In general, demonstrating attainment requires collecting representative air monitoring data and using approved measuring instruments and procedures, with adequate quality assurance and quality control. The three most recent years are examined, during which the average annual number of exceedances must be less than or equal to one. The standard allows for a maximum annual average of 50 ug/m^3 and a 24-hour average of 150 ug/m^3 . The 24-hour standard may not be exceeded more than three times over any three year period. Air quality measurements in the Aspen area satisfy this requirement, as shown in Chapter 2.

2. Aspen/Pitkin County Nonattainment Area Classification History

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Because of observed problems with air particles, monitoring of total suspended particulates (TSP) began in 1975, and continued through 1987. In 1987, based on relatively high TSP levels, the Aspen area was designated as a "Group I" area for PM10. The Aspen area was then designated a "moderate" nonattainment area in 1990 pursuant to section 107(d)(4)(B) of the CAA.

B. ORGANIZATIONS INVOLVED IN PREPARING AND APPROVING PLAN

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Preparation of this PM10 Redesignation Request/Maintenance Plan was a cooperative effort of the City of Aspen, Pitkin County, the Colorado Department of Transportation, and the Air Pollution Control APCD (APCD) of the Colorado Department of Public Health and Environment. The EPA, through its regional office in Denver, provided policy advice and technical assistance, and is responsible for final approval of this redesignation request and maintenance plan.

CHAPTER 2. REDESIGNATION SUBMITTAL

The State of Colorado requests that the EPA redesignate the Aspen/Pitkin nonattainment area to attainment status with respect to the NAAQS for PM10. The following information demonstrates, as required by Section 107(d)(3)(E) of the CAA, that the Aspen area has attained the PM10 NAAQS. This is based on quality assured monitoring data representative of the location of expected maximum concentrations of PM10 in the area.

A. REQUIREMENTS FOR REDESIGNATION

Section 107(d)(3)(D) and (E) of the CAA defines the five required components of a redesignation request and maintenance plan. These components and their descriptions follow:

C Attainment of the Standard

The State must show that the area is attaining the PM10 NAAQS. This demonstration must be based on monitoring data representative of the location of the expected maximum concentrations of PM10 in the nonattainment area.

C State Implementation Plan (SIP) Approval

The State must demonstrate that it has a fully approved State Implementation Plan (SIP) Element for Aspen under Section 110(k) of the CAA.

C Permanent and Enforceable Improvement in Air Quality

The State must demonstrate that the improvement in air quality leading to redesignation is due to permanent and federally enforceable emissions reductions.

C Section 110 and Part D Requirements

The State must meet all requirements of Section 110 and Part D of the CAA. Section 110 describes general requirements of SIPs, while Part D pertains to requirements applicable to nonattainment areas.

C Maintenance Plan

The State must have a fully approved maintenance plan that meets the requirements of Section 175A of the CAA. This plan must provide for the maintenance of the NAAQS for at least 10 years following redesignation, and the plan must contain a contingency plan that describes potential control measures that could be implemented to ensure continued maintenance of the PM10 NAAQS. The maintenance plan is set out in Chapter 3.

B. ASPEN/PITKIN COUNTY ATTAINMENT/MAINTENANCE AREA BOUNDARIES

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The boundary for the Aspen/Pitkin County PM10 attainment/maintenance area is defined as follows:

The area encompassed by the following Parcel I.D. numbers, as defined by the Pitkin County Planning Department: 2737-29, 2737-28, 2737-21, 2737-20, 2737-19, 2737-18, 2737-17, 2737-08, 2737-07, 2737-06, 2735-22, 2735-15, 2735-14, 2735-13, 2735-12, 2735-11, 2735-10, 2735-03, 2735-02, 2735-01, 2641-31, 2643-36, 2643-35, 2643-34, 2643-27, 2643-26

This area essentially includes the City of Aspen and surrounding area in Pitkin County. A map illustrating the area boundary is shown in Figure 1.

Figure 1.
Map of the Aspen Attainment/Maintenance Area

C. ASPEN HISTORICAL PERSPECTIVE

Monitoring for total suspended particulates (TSP) in Aspen began in 1975. Historic TSP levels were the basis for Aspen being designated as a “Group I” area for the new PM10 standards, which were promulgated by the EPA in 1987. Group I locations were those areas estimated to have a greater than 95 percent probability of exceeding the new PM10 standards.

Monitoring for PM10 in Aspen began in 1985. The following tables show good quarterly data completeness since 1990. Data recovery is calculated by calendar quarter, and the tables show the number of actual samples days divided by the number of scheduled samples days, with the resulting data recovery. Valid quarters must have at least 75 percent data recovery.

Aspen PM10 Data Completeness of the EPA Reference Method Hi-Vol Samplers

Year	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Overall
1990	64/90 (71%)	74/91 (81%)	78/92 (85%)	73/92 (79%)	289/365 (79%)
1991	74/90 (82%)	69/91 (76%)	69/92 (75%)	72/92 (78%)	284/365 (78%)
1992 *	83/91 (91%)	53/91 (58%) *	85/92 (92%)	81/92 (88%)	302/366 (82%)
1993	83/90 (92%)	86/91 (95%)	92/92 (100%)	87/92 (95%)	348/365 (95%)
1994	86/90 (96%)	85/91 (93%)	87/92 (95%)	71/92 (77%)	329/365 (90%)
1995	73/90 (81%)	87/91 (96%)	90/92 (98%)	84/92 (91%)	334/365 (92%)
1996	84/91 (92%)	88/91 (97%)	86/92 (93%)	73/92 (79%)	331/366 (90%)
1997	81/90 (90%)	88/91 (97%)	79/92 (86%)	86/92 (93%)	334/365 (92%)
1998**	87/30(100+)	86/30(100+%)	79/31(100+%	88/31(100+%	340/122(100+
1999***	1/31(3%)	21/31(70%)	28/31(90%)	30/30(100%)	80/123(65%)
2000	27/31(87%)	27/30(90%)	19/31(61%)	NOT YET	-

* PM10 monitoring at 204 S. Galena was discontinued on 4/14/92, and commenced at 420 E. Main on 4/24/92.

** The required frequency of sampling changed from every day to every third day.

*** The actual sampling frequency changed from every day to every 3rd day sampling on 1/1/99. There were no **HI-VOL** samples collected from 1/3/99 until 4/30/99.

Aspen PM10 Data Completeness of the EPA Equivalent Method TEOM Sampler

Year	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Overall
1998	27/30(90%)	74/30(100+%)	90/31(100+%)	91/31(100+%)	282/122(100+)
1999	89/31(100+%)	89/30(100+%)	91/31(100+%)	92/30(100+%)	361/122(100+)
2000	67/31(100+%)	58/30(100+)	71/31(100+%)	90/30(100+%)	286/122(100+)

The required frequency of is every third day. The actual sampling frequency is every day.

The next tables list the yearly maximum, second maximum, estimated exceedances and annual average for Aspen since 1990. The only year that either the 24-hour or annual NAAQS for PM10 were exceeded was 1991. However, the 1991 data are outside of the three-year period used to support the redesignation request.

Aspen PM10 Monitoring Data from the EPA Reference Method Hi-Vol Samplers

(annual average for those years with any quarterly data recovery less than 75% is shown in parentheses)

Year	Maximum Concentration ug/m ³	2 nd Max. Concentration ug/m ³	Yearly Estimated Exceedances	3-year Avg. Estimated Exceedances	Annual Avg. Concentration ug/m ³
1990	95	93	0	1.6 [†]	(33)
1991	236	143	1.22	.41	33
1992 ^{††}	97, 86	97, 77	0	.41	(40), (22)
1993	98	88	0	N / A	24
1994	88	76	0	N / A	22
1995	86	83	0	0	23
1996	88	66	0	0	19
1997	92	89	0	0	21
1998	68	64	0	0	20
1999	54	46	0	0	(22)
2000*	54	52	0	0	(20)

[†] This 3-year estimated exceedance is based on yearly estimated exceedances of 4.92, 0, and 0 for 1988, 1989, and 1990 respectively.

^{††} Values separated by commas represent the values obtained from 204 S. Galena and 420 E. Main respectively.

N / A : three years of data unavailable from this location to calculate 3-year average.

* Data are through September 2000

Aspen PM10 Monitoring Data from the EPA Equivalent Method TEOM Sampler

Year	Maximum Concentration ug/m ³	2 nd Max. Concentration ug/m ³	Yearly Estimated Exceedances	3-year Avg. Estimated Exceedances	Annual Avg. Concentration ug/m ³
1998	62	61	0	0	22
1999	109	73	0	0	25
2000	78	71	0	0	24

For this redesignation request, the APCD has designated the TEOM monitor as the primary sampler for determining attainment of the PM10 NAAQS in the Aspen area, beginning in 1998.

D. MAXIMUM CONCENTRATION MONITORING

As illustrated in Chapter 3., some of the highest levels of PM10 emissions occur in the central Aspen - grids 16, 17, 21, 22, 23. This is where the majority of residential, commercial, and pedestrian activities occur, and it is the area where the dispersion of pollutants is likely to be the most problematic due to temperature inversions and valley-bottom topography. The APCD's monitoring site is located in the center of this high emission and concentration area in grid 22, and it is believed to be representative of maximum PM10 concentrations.

E. STATE IMPLEMENTATION PLAN APPROVAL

The following presents a brief summary of the development and the approval of the Aspen PM10 nonattainment SIP Element.

1. 1988 SIP ELEMENT

The first PM10 SIP Element was adopted by the Colorado AQCC in July 1988, and the emission controls consisted of woodburning stove and fireplace restrictions as well as street sweeping and sanding requirements. EPA Region VIII intended to approve the SIP Element, though it eventually was rejected once the Clean Air Act was amended in 1990 and new, more stringent requirements were in place.

2. 1991 SIP ELEMENT

A new Aspen SIP Element was adopted by the AQCC in November 1991. The control measures included local woodburning device restrictions and requirements to reduce silt loading on paved roads through street cleaning and other appropriate means. Additional technical information was included in this Element. This plan was not submitted to EPA due to enforceability issues surrounding the control measures.

3. 1993 SIP ELEMENTS

A revised Aspen SIP Element was adopted by the AQCC in January 1993. The enforceability issues were resolved by incorporating all control measures into State regulation. The control measures included: 1) the local woodburning and restaurant grill device restrictions, 2) specifications for street sanding materials, 3) street sweeping requirements, 4) a voluntary woodburning curtailment program, 5) mass transit service expansion and the operation of a cross-town shuttle service, 6) commercial core paid parking and resident only parking in outlying areas, and 7) a voluntary no-drive program. Additional technical information was included in this Element. The SIP Element was again revised by the AQCC in November 1993 when additional control measures were added, including 1) the establishment of park and ride spaces down-valley of Aspen for car poolers and bus riders, 2) the establishment of an intercept parking lot at the edge of Aspen, 3) the operation of a shuttle connecting the intercept lot with central Aspen, 4) the creation of a bus-priority lane in Aspen, 5) additional street sweeping requirements, and 6) strategies to reduce driving and maximize street sweeping during the President's Day holiday period. EPA approved these SIP Elements on September 14, 1994 (59 FR 47089). This approval did not include the voluntary no-drive day program, and further technical information was added to the Element.

4. 1994 SIP ELEMENT REVISION

The final revisions to the Aspen SIP Element were adopted by the AQCC in September 1994. The revisions consisted of further updating the technical and administrative information, adopting emission budgets for the Aspen area, and removing the voluntary no-drive program from consideration as part of the federal SIP. EPA approved this revision on December 17, 1997 (62 FR 66007).

F. PERMANENT AND ENFORCEABLE IMPROVEMENT IN AIR QUALITY

The State must demonstrate, based on Section 107(d)(3)(E) of the CAA, that the improvement in air quality leading to attainment of the NAAQS and the redesignation request is based on permanent and enforceable measures, and that the reductions are not the result of temporary reductions in emissions or unusually favorable meteorology.

1. OVERVIEW

It is reasonable to attribute the attainment of the PM10 NAAQS in the Aspen area to emission reductions that are permanent and enforceable. These emission reductions are the result of local, State, and federal actions, not economic factors or unusual meteorology.

Economic conditions are clearly not responsible for improved ambient PM10 levels in the Aspen area. Over the last ten years, the area has experienced strong growth while at the same time experienced PM10 concentrations far below the NAAQS. The Colorado State Demographer's Office reports that between 1990 and 1998, the population of Aspen grew 10 percent and the population of Pitkin County grew by 13 percent. The per capita personal income of Pitkin County residents increased by 56 percent between 1990 and 1997. A review of the Colorado Department of Transportation's (CDOT) information for Highway 82 in the Aspen area indicates average daily traffic increased by more than 50 percent for the 1988-1998 period. During this period of growth, attainment of the PM10 NAAQS was demonstrated, and very few concentrations above 100 ug/m³ were measured.

Favorable meteorology is also an unlikely reason why the area's PM10 concentrations are below the NAAQS. Although winter and spring meteorological conditions are highly variable in mountain settings, there is no evidence to suggest that meteorological conditions experienced in the 1990's have not been "typical" (though it is difficult to make concrete conclusions based on short-term meteorological records). Because there has not been a violation of the PM10 NAAQS in Aspen since 1990, and because there has only been one concentration in the 1990's that exceeded the 24-hour PM10 NAAQS (236 ug/m³ in 1991), the APCD concludes that the good air quality in the Aspen area is the result of the implementation of emission reduction measures, not meteorological fluctuations.

2. CONTROL MEASURES

The improvement in air quality in the Aspen area is due to enforceable control measures adopted as part of the federal SIP. The following describes the control measures that brought the Aspen area into attainment of the PM10 NAAQS.

a. Woodburning and Restaurant Emission Controls

The City of Aspen and Pitkin County have adopted local ordinances that limit the number of woodburning devices in new construction in the Aspen area. The City of Aspen has also adopted an ordinance that requires emission controls for new restaurant grills. These measures were adopted locally in the late 1980's and early 1990's and included in State regulation in 1993 (Section III.C.4. of the "State Implementation Plan-Specific Regulations for Nonattainment - Attainment/Maintenance Areas (Local Elements)). The rule was approved by EPA in 1994 and will remain part of State regulation and the federal SIP. This plan allows for revisions to the ordinances to allow greater use of natural gas devices. The use of such devices will not increase primary PM10 emissions. This will accommodate possible revisions to Pitkin County's ordinance which presently limits the number of natural gas fireplaces to two in new construction; the County could amend the ordinance to allow for more natural gas fireplaces since natural gas does not contribute to primary PM10 emissions.

b. Street Sanding Controls

There is a requirement that any user that applies street sanding materials in the Aspen attainment/maintenance area must use materials containing less than one percent fines with a durability index of less than 30 percent. This strategy was adopted in 1993 and approved by EPA in 1994, and is defined in detail in Section III.C.1. of the "State Implementation Plan-Specific Regulations for Nonattainment - Attainment/Maintenance Areas (Local Elements). The requirements will remain part of State regulation and the federal SIP.

c. Street Sweeping Requirements

There are street sweeping requirements for users that use street sanding materials on defined roadways in the Aspen area. Street cleaning using broom sweepers or any other sweepers with equal efficiency must be performed within four days of the roadways becoming free and clear of snow and ice following each sanding deployment use. These requirements are defined in detail in Section III.C.2. of the "State Implementation Plan-Specific Regulations for *Aspen PM10 Redesignation Request and Maintenance Plan - Adopted January 11, 2001*

Nonattainment - Attainment/Maintenance Areas (Local Elements). The requirements as modified in Attachment B will remain part of State regulation and the federal SIP.

d. Paid Parking Requirements

Parking on public streets within the City of Aspen's commercial core and surrounding residential areas is restricted through parking fees and permits to reduce traffic and encourage transit ridership. These requirements were adopted in 1993 and approved by EPA in 1994 and will remain part of State regulation and the federal SIP. This is defined in detail in Sections III.C.3. of the "State Implementation Plan-Specific Regulations for Nonattainment - Attainment/Maintenance Areas (Local Elements).

e. Transit and Other Measures

Transit measures - expansion of the bus fleet by 14 buses, establishment of 400 Park 'n Ride lot spaces and a 250 space intercept parking lot, intercept lot and cross-town shuttle services, and a bus-priority lane (which was removed from service shortly after implementation because of the severe traffic congestion that resulted from converting a driving lane into the bus lane) - were adopted in 1993 and approved by EPA in 1994. However, these measures have been removed from State regulation and the federal SIP through this redesignation.

Other control measures have also been eliminated from State regulation and the federal SIP through this redesignation. A voluntary no-drive provision was adopted by the State in 1993 but never approved by EPA as part of the SIP. A voluntary woodburning curtailment program was also adopted by the State in 1993. These two programs were not implemented because forecasts of high pollution events were never issued by the Air Pollution Control Division due to exceptionally low, clean PM10 levels. The Presidents Day event strategies of maximized sweeping and driving reduction efforts, which were adopted in 1993, did not received emission reduction credits and were sporadically implemented.

f. Control of Emissions from Stationary Sources

Although there are no stationary sources located in the Aspen attainment/maintenance area, the State's comprehensive permit rules will limit emissions from any new source that may, in the future, locate in the area. These rules include: 1) Regulation No. 3, "Air Pollution Emission Notices, Construction Permits and Fees, Operating Permits, and Including the *Aspen PM10 Redesignation Request and Maintenance Plan - Adopted January 11, 2001*

Prevention of Significant Deterioration," 2) the "Common Provisions" regulation, and 3) Regulation No. 6, "Standards of Performance for New Stationary Sources."

The Common Provisions, and Parts A and B of Regulation No. 3, are already included in the approved SIP. Regulation No. 6 implements the federal standards of performance for new stationary sources. The maintenance plan makes no changes to these regulations. This reference to Regulation No. 6 shall not be construed to mean that this regulation is included in the SIP.

As indicated above, emissions from new or modified major stationary sources emissions of PM10 are controlled under Regulation No. 3's nonattainment-area new source review (NSR) permitting requirements. The NSR provisions require all new and modified major stationary sources to apply emission control equipment that achieves the "lowest achievable emission rate" (LAER) and to obtain emission offsets from other stationary sources of PM10. Once this redesignation request and maintenance plan has been approved by the EPA, the prevention of significant deterioration (PSD) permitting requirements become effective. The PSD requirements are a relaxation from the NSR requirements, as LAER becomes the less stringent "best available control technology" (BACT), and offsets are not required. The application of these provisions is possible, but not foreseen, in the Aspen area.

g. Federal Motor Vehicle Emission Control Program

The FMVECP has reduced PM10 emissions through a continuing process of requiring diesel engine manufacturers to produce new vehicles that meet tighter and tighter emission standards. As older, higher emitting diesel vehicles are replaced with newer vehicles, PM10 emissions in the Aspen area will be reduced.

G. CLEAN AIR ACT SECTION 110 AND PART D REQUIREMENTS

For the purposes of redesignation, all of the requirements of CAA Section 110 and Part D applicable to the area must first be met. The requirements of Section 110 and Part D applicable to the Aspen area are already included in the SIP for Colorado and have already been approved by EPA. In particular, see EPA's final approval actions for the Aspen SIP Element: 59 FR 47089; 62 FR 66007.

CHAPTER 3. MAINTENANCE PLAN

A. REQUIREMENTS

Section 107(d)(3)(E) of the CAA provides that for an area to be redesignated to an attainment classification, EPA must fully approve a maintenance plan which meets the requirements of CAA Section 175A. The maintenance plan will constitute a SIP revision and must provide for maintenance of the relevant NAAQS in the area for at least ten years after redesignation. Since the requirement is for ten years after redesignation, some lead time for the EPA approval process (up to 18 months per CAA Section 107(d)(3)(D)) should be considered in establishing the maintenance year, which the State determines to be 2015. An additional requirement (Section 175A(d)) is the submittal of a SIP revision eight years after the original redesignation request/maintenance plan is approved that provides for maintenance of the NAAQS for an additional ten years following the first ten-year period. The State of Colorado commits to submit such a revised maintenance plan as required by the CAA and EPA policy.

Section 175A further states that the plan shall contain such additional control measures as necessary to ensure maintenance. These control measures are described in Chapter 2., although only existing controls are necessary to ensure long-term maintenance. The maintenance plan shall contain a contingency plan to ensure the prompt correction of any unforeseen violation of the PM10 NAAQS. Failure to maintain the NAAQS and triggering of the contingency plan will not necessitate a revision of the SIP Element, unless required by the EPA Administrator, as stated in CAA Section 175A(d).

The provisions that are addressed in this maintenance plan include emission inventories (for a base year and a future year), a maintenance demonstration, an emission budget, an approved monitoring network, verification of continued attainment, and a contingency plan.

B. EMISSION INVENTORIES

The following presents PM10 emission inventories for the 1997 attainment year and the 2015 maintenance year. These inventories reflect the base and projected conditions in the Aspen area, and take credit for the emission control measures that have been adopted as part of this redesignation request and maintenance plan.

1. 1997 Emission Inventory

The 1997 PM10 emission inventory for the Aspen attainment/maintenance area is presented below. This inventory incorporates the emission estimates for woodburning (fireplaces and wood stoves) for the year 1997 that are contained in the latest version of the nonattainment area SIP Element adopted September 22, 1994. Restaurant and mobile exhaust emissions for the year 1997 were also taken from the 1994 SIP Element. Emissions from the airport were developed for 1997 based on activity information provided by the Federal Aviation Administration (FAA). There are no stationary sources in the attainment/maintenance area. Highway re-entrained road dust emissions for the year 1997 were developed using the latest traffic counts from CDOT as well as revised emission factors that incorporate the latest EPA methods for determining paved road emissions and measured silt loadings from the area. Arterial and local street re-entrained emissions for 1997 were determined using VMT information contained in the 1994 SIP Element as well the latest EPA methods for determining paved road emissions and measured silt loadings from the area. Finally, gravel road emissions were developed using VMT information contained in the 1994 SIP Element as well EPA methods for determining gravel road emissions. All emission estimates were prepared by using EPA-approved methods and assigned to geographic grids. The 30 grids (one square kilometer each) from the 1994 SIP element were preserved for consistency, and the following map illustrates these grids.

The following table presents the 1997 daily PM10 emission estimates for each source category in pounds per winter day. Detailed explanations of the methods used to determine these emissions may be found in the Technical Support Document for this maintenance plan.

Aspen PM10 Emission Inventory Grid System

**1997 PM10 Emission Inventory (assuming Street Sanding) for the
Aspen/Pitkin County Attainment/Maintenance Area (lbs./day)**

Grid	Highway 82	Paved Arterial Roads	Paved Local Roads	Gravel Roads	Vehicle Exhaust	Aircraft	Restau- rants	Wood Stoves/ Inserts	Fire- Places	Station. Source	Total
1	848	0	0	0	2	0	0	0	0	0	850
2	941	0	1	0	2	28	0	0	0	0	972
3	691	0	44	0	2	0	1	5	2	0	745
4	0	39	0	0	0	0	0	0	0	0	40
5	0	0	0	0	0	0	0	0	0	0	0
6	0	19	5	2	0	0	0	0	0	0	26
7	368	19	24	1	1	0	0	0	0	0	412
8	970	3	2	4	5	0	1	0	7	0	992
9	500	0	1	1	2	0	0	0	0	0	504
10	0	234	228	0	2	0	0	7	37	0	507
11	0	0	13	0	0	0	0	0	2	0	16
12	0	25	16	1	0	0	0	0	5	0	46
13	0	0	4	2	0	0	0	0	0	0	6
14	279	31	7	25	2	0	0	0	0	0	344
15	1261	247	24	1	6	0	1	3	0	0	1543
16	642	100	136	2	5	0	1	8	25	0	920
17	0	98	48	2	0	0	0	12	12	0	170
18	0	0	11	13	0	0	0	5	2	0	32
19	0	179	6	0	1	0	0	3	2	0	191
20	0	172	2	0	1	0	0	5	0	0	180
21	294	55	25	3	2	0	0	2	25	0	406
22	487	16	234	1	7	0	21	13	42	0	821
23	177	0	128	3	1	0	0	15	49	0	373
24	0	0	1	0	0	0	0	0	0	0	1
25	0	83	11	0	0	0	2	0	0	0	97
26	0	148	3	0	1	0	0	0	0	0	152
27	0	0	0	15	0	0	0	0	0	0	15
28	0	0	2	4	0	0	0	0	0	0	6
29	33	0	11	0	1	0	0	5	9	0	60
30	49	0	12	0	1	0	0	0	14	0	76
Total	7540	1468	1000	79	44	28	27	84	233	0	10503

2. 2015 Emission Inventory

The following table presents the 2015 daily emission estimates for each source category in pounds per winter day. The 1997 fugitive dust emissions from paved and unpaved roads were increased by 60.6 percent based on long-term traffic projections from CDOT (58%) through 2015 and adding some additional VMT (1.65%) in the year 2015 to account for eliminating from the federally-approved plan some transit and parking measures. The road paving that the City of Aspen and Pitkin County plan on completing is not assumed in the 2015 inventory as the paving is considered voluntary and not enforceable by the State. The 1997 emissions from woodburning stoves and restaurants were increased by 33.1%, which was determined from Pitkin County population projections obtained from the Colorado State Demographer's Office. Fireplace emissions were held at 1997 levels due to a city/county caps on new fireplace construction. Emissions from the airport were developed for 2015 based on projected activity information provided by the FAA. Detailed information on these growth rates may be found in the Technical Support Document.

**2015 PM10 Emission Inventory (assuming Street Sanding) for the
Aspen/Pitkin County Attainment/Maintenance Area (lbs./day)**

Grid	Highway 82	Paved Arterial Roads	Paved Local Roads	Gravel Roads	Vehicle Exhaust	Aircraft	Restau- rants	Wood Stoves/ Inserts	Fire- Places	Station. Source	Total
1	1361	0	0	0	2	0	0	0	0	0	1363
2	1511	0	2	0	2	44	0	0	0	0	1559
3	1110	0	70	0	2	0	1	7	2	0	1192
4	0	63	0	0	0	0	0	0	0	0	64
5	0	0	0	0	0	0	0	0	0	0	0
6	0	31	8	3	0	0	0	0	0	0	42
7	590	31	38	1	1	0	0	0	0	0	661
8	1558	5	3	7	5	0	1	0	7	0	1586
9	803	0	1	2	2	0	0	0	0	0	808
10	0	375	366	0	2	0	0	9	37	0	789
11	0	0	21	0	0	0	0	0	2	0	24
12	0	40	26	1	0	0	0	0	5	0	71
13	0	0	7	3	0	0	0	0	0	0	10
14	449	50	11	41	2	0	0	0	0	0	552
15	2025	397	38	1	6	0	1	4	0	0	2473
16	1032	161	218	3	5	0	1	11	25	0	1456
17	0	157	77	3	0	0	0	16	12	0	263
18	0	0	18	21	0	0	0	7	2	0	48
19	0	288	9	0	1	0	0	4	2	0	305
20	0	276	3	0	1	0	0	7	0	0	287
21	472	89	40	5	2	0	0	2	25	0	635
22	782	25	376	1	7	0	28	18	42	0	1279
23	284	0	206	4	1	0	0	20	49	0	564
24	0	0	2	0	0	0	0	0	0	0	2
25	0	134	18	0	0	0	2	0	0	0	155
26	0	237	5	0	1	0	0	0	0	0	243
27	0	0	0	25	0	0	0	0	0	0	25
28	0	0	3	6	0	0	0	0	0	0	10
29	53	0	18	0	1	0	0	7	9	0	88
30	79	0	20	0	1	0	0	0	14	0	113
Total	12109	2358	1606	127	44	44	36	112	233	0	16668

* 1997 emissions from Highway 82, paved arterial roads, paved local roads, and gravel roads were increased by 60.6% to determine 2015 emissions. 1997 emissions from restaurants, and wood stoves/inserts were increased by 33.1% to determine 2015 emissions. 1997 emissions from vehicle exhaust and fireplaces are assumed to remain constant through 2015. Aircraft emissions are based on FAA activity projections.

Because 1997 PM10 emissions for all source categories remain flat or grow at a constant rate to 2015 levels, and because projected emissions for the year 2015 are higher than for any year prior to 2015, no interim year emissions were included in this maintenance plan. Therefore, the demonstration of maintenance of the PM10 NAAQS for 2015 is adequate to demonstrate maintenance for all years before 2015.

C. ASPEN DESIGN VALUE

The “design value” is the critical air quality value from which the maintenance plan is based. The design value, and the conditions that occurring on the day which it was measured, are utilized to develop emission inventories and serve as a baseline for modeling ambient concentrations into the future. PM10 values are discussed in terms of the 24-hour PM10 NAAQS, rather than the annual NAAQS, because the 24-hour NAAQS is the standard of concern and the annual NAAQS has never been exceeded. The selection of this design value utilized EPA’s table look-up method from EPA’s “PM10 SIP Development Guideline” document. Based on the number of samples collected during the 1996 - 1998 period (1,005) by the EPA reference method hi-vol samplers, the third highest concentration should be the design value, according to this guidance (1999 data were not considered due to the incompleteness of data). The three highest concentrations measured during the period 1996-98 are:

92 ug/m³ - 3/19/97

89 ug/m³ - 3/20/97

88 ug/m³ - 11/11/96

Because the third highest concentration occurred outside of the traditional late winter/early spring high pollution season, the second highest concentration of 89 ug/m³ is selected as the design value for this redesignation request and maintenance plan. One concentration measured by the EPA equivalent method TEOM sampler was higher than the values presented above - 109 ug/m³ (March 1999). If this value were considered in the determination of the design value, the 89 ug/m³ concentration would still be an appropriate design value for this maintenance plan.

D. MAINTENANCE DEMONSTRATION

In order for this redesignation request to be complete and approvable, the CAA requires that the maintenance plan provide for maintenance of the PM10 NAAQS for at least 10 years following EPA’s approval of the plan. As stated earlier in this document, attainment of the 24-hour and annual PM10 NAAQS has been demonstrated in the Aspen area, and this maintenance demonstration will demonstrate continued attainment, or maintenance, of the 24-hour NAAQS through the year 2015. Because there have never been exceedances of the annual standard in Aspen, an analysis for maintenance of the annual standard was not prepared. Protection of the 24-hour standard should be sufficient to protect the annual standard since the 24-hour standard has always been the standard of concern.

Data presented throughout this document are utilized to demonstrate maintenance of the PM10 NAAQS for the Aspen area. Chemical Mass Balance (CMB) data are used to generally identify the sources of emissions that influence ambient PM10 concentrations. The 1997 emission inventory is used to further refine this CMB-source identification. This information is then used to apportion the design day concentration, which becomes the basis for the "roll forward" modeling. The apportioned design day concentration is then projected, or rolled forward, into the future based on the changes that occur in the emissions inventory from 1997 to 2015. If this 2015 projection is below the 24-hour PM10 NAAQS of 150 ug/m^3 , then maintenance is demonstrated. As demonstrated below, the 2015 maintenance concentration for the Aspen attainment/maintenance area is **130 ug/m³**.

The following presents CMB the roll-forward methodology that was used to calculate the 2015 maintenance concentration. First, CMB data for the years 1988-1991 are presented below. The source apportionments from each of these days were averaged to develop a design day apportionment for use in the roll-forward modeling. No other CMB analyses have been performed for the area due to extremely low PM10 levels that have been recorded since 1991. There has not been a PM10 concentration above 100 ug/m^3 since March of 1991, except for the 109 ug/m^3 concentration measured by the TEOM monitor, and CMB analyses cannot be performed on TEOM measured values. The APCD does not typically perform CMB modeling on concentrations below 100 ug/m^3 . Therefore, the average apportionments are assumed to be representative of high concentration episodes in the area. Second, the roll-forward modeling, which utilized the CMB and emissions data (which account for growth as well as controls) contained in this section, is presented. Detailed information regarding the CMB and roll-forward modeling can be found in the Technical Support Document.

1. CMB Source Apportionments of High Concentrations (Percent)

Date	PM10 Concentration (ug/m ³)	Geologic Material	Vegetative Burning	Nitrate	Sulfate	Mobile Sources	Unknown
02/24/88	173	80.3	16.9	0.9	0.5	2.9	-1.5
02/25/88	159	85.9	14.3	0.7	0.6	0.5	-2.0
02/02/91	117	75.1	19.2	0.7	0.7	2.3	2.0
02/05/91	111	72.9	19.9	0.6	0.5	1.9	4.1
02/06/91	108	75.6	16.1	0.6	0.6	2.2	5.0
02/07/91	103	74.0	24.9	0.9	0.7	2.2	-2.6
02/09/91	143	71.8	20.8	0.7	0.6	1.0	5.1
02/21/91	126	90.2	8.7	0.6	0.6	1.2	-1.5
02/22/91	236	73.9	8.3	0.4	0.4	0.7	16.1
02/23/91	106	90.7	8.8	0.8	1.0	0.4	-1.5
03/18/94	111	89.4	7.6	0.7	1.0	1.4	-0.2
Average	-	80.0	15.1	0.7	0.7	1.5	2.1

Geological = Sources rich in crustal elements (street sand, soil, road dust).

Vegetative Burning = Carbon-rich sources such as woodburning.

Nitrate = Formed in the atmosphere from NO_x and NH₃.

Sulfate = Formed in the atmosphere from SO₂ and NH₃.

Mobile Sources = Auto, truck and aircraft exhaust.

2. Roll-forward Analysis

Normalize the Average Apportionments to 100%:

$$80.0\% + 15.1\% + 0.7\% + 0.7\% + 1.5\% + 2.1\% = 100.1\%$$

$$100 / 100.1 = 0.999$$

80.0% x 0.999 =	79.9%
15.1% x 0.999 =	15.1%
0.7% x 0.999 =	0.7%
0.7% x 0.999 =	0.7%
1.5% x 0.999 =	1.5%
2.1% x 0.999 =	2.1%

Subtract the Background Concentration from the Design Value Concentration:

The background concentration is subtracted from the design day concentration of 89 ug/m³ (see Section 2.C.) because the background concentration would remain if all emissions in the emissions inventory were reduced to zero. A background PM₁₀ concentration of 8 ug/m³ is assumed to occur on any given day in the area, as described in the November 1994 SIP Element.

$$\begin{array}{r} \text{Design Day Concentration: } 89 \text{ ug/m}^3 \\ \text{Background Concentration: } - 8 \text{ ug/m}^3 \\ \hline \mathbf{81 \text{ ug/m}^3} \end{array}$$

Apportion the Design Day Concentration with the Normalized CMB Apportionments:

$$\begin{array}{r} \text{Geologic: } 81 \times 0.799 = 64.8 \text{ ug/m}^3 \\ \text{Vegetative Burning: } 81 \times 0.151 = 12.2 \text{ ug/m}^3 \\ \text{Ammonium Nitrate: } 81 \times 0.007 = 0.6 \text{ ug/m}^3 \\ \text{Ammonium Sulfate: } 81 \times 0.007 = 0.6 \text{ ug/m}^3 \\ \text{Mobile Sources: } 81 \times 0.015 = 1.2 \text{ ug/m}^3 \\ \text{Unknown: } 81 \times 0.021 = 1.7 \text{ ug/m}^3 \\ \hline \mathbf{81.1 \text{ ug/m}^3} \end{array}$$

Percent Changes in Emissions between 1997 and 2015 (these percents will be used to roll-forward the CMB apportionments to the year 2015):

Highways, Paved Roads, and Gravel Roads: emissions increased by 6112.28 lbs./day, or **60.6%**

Woodburning and Restaurants: emissions increased by 36.58 lbs./day, or **10.6%**

Vehicle Exhaust and Aircraft: emissions increased by 15.89 lbs./day, or **21.9%**

Roll-forward Apportionments to 2015 by the Percent Changes in Emissions from 1997 to 2015:

Geologic: Re-entrained fugitive dust from highways, paved roads, and unpaved roads are assumed to contribute all geologic emissions that resulted in 64.8 ug/m³ of PM₁₀. This concentration will change by the percent change in emissions from these sources.

$$64.8 \text{ ug/m}^3 \times 1.606 = \mathbf{104.1 \text{ ug/m}^3}$$

Vegetative Burning: Woodburning and restaurant activities are assumed to contribute all vegetative burning emissions that resulted in 12.2 ug/m³ of

PM10. This concentration will change by the percent change in emissions from these sources.

$$12.2 \text{ ug/m}^3 \times 1.106 = \mathbf{13.5 \text{ ug/m}^3}$$

Ammonium Nitrate: Unknown sources contributed emissions that resulted in 0.6 ug/m³ of secondary PM10. It is assumed that this concentration remains constant because no emissions can be assigned to this category.

$$0.6 \text{ ug/m}^3 \times 1.000 = \mathbf{0.6 \text{ ug/m}^3}$$

Ammonium Sulfate: Unknown sources contributed emissions that resulted in 0.6 ug/m³ of secondary PM10. It is assumed that this concentration remains constant because no emissions can be assigned to these category.

$$0.6 \text{ ug/m}^3 \times 1.000 = \mathbf{0.6 \text{ ug/m}^3}$$

Mobile Sources: Vehicle exhaust and aircraft emissions are assumed to contribute all mobile sources emissions that resulted in 1.2 ug/m³ of PM10. This concentration will change by the percent change in emissions from these sources.

$$1.2 \text{ ug/m}^3 \times 1.219 = \mathbf{1.5 \text{ ug/m}^3}$$

Unknown: Unknown sources contributed emissions that resulted in 1.7 ug/m³ of PM10. It is assumed that this concentration remains constant because no emissions can be assigned to these category.

$$1.7 \text{ ug/m}^3 \times 1.000 = \mathbf{1.7 \text{ ug/m}^3}$$

Total of Apportionments in 2015 Plus the Background Concentration Results in the 1997 VMT Capped Projected 2015 Concentration:

$$104.1 + 13.5 + 0.6 + 0.6 + 1.5 + 1.7 + 8 = \mathbf{130.0 \text{ ug/m}^3}$$

E. MAINTENANCE PLAN CONTROL MEASURES

The maintenance plan includes the requirements of State Implementation Plan Specific Regulations for Nonattainment -- Attainment/Maintenance Areas (Local Elements), 5 CCR 1001-20, Section III, Aspen/Pitkin County PM10 Attainment/Maintenance Area, as amended by the Commission on January 11, 2001, a copy of which is attached. The maintenance plan eliminates from the SIP certain obsolete and unnecessary transit and parking measures (expansion of the bus fleet by 14 buses, establishment of 400 Park 'n Ride lot spaces and a 250 space intercept parking lot, intercept lot and cross-town shuttle services, and a bus-priority lane) and a voluntary woodburning curtailment program. The maintenance retains the street sand

specifications, street sweeping requirements, the paid parking provisions, and the woodburning and restaurant emissions requirements previously included in the SIP in substantially the same form.

The stationary source controls in the Common Provisions, 5 CCR 1001-2; Regulation No. 3, Air Contaminant Emissions Notices, 5 CCR 1001-5; and Regulation No. 6, Standards of Performance for New Stationary Sources, 5 CCR 1001-8. The Common Provisions, and Parts A and B of Regulation No. 3, are already included in the approved SIP. Regulation No. 6 implements the federal standards of performance for new stationary sources, but is not part of the SIP. This maintenance plan makes no changes to these regulations. This reference to Regulation No. 6 shall not be construed to mean that this regulation is included in the SIP.

F. EMISSION BUDGET

Federal “transportation conformity” regulations provide for the use of mobile source emission budgets in making conformity determinations in the area. The emission budget serves as a ceiling on mobile source emissions that federally funded or approved transportation projects must comply or “conform” with.

This maintenance plan establishes an emission budget for the area of 16,244 lbs./day for 2015 and beyond for the modeling area. This budget is the total of the 2015 mobile source PM10 emissions presented in B.2. above, which includes emissions from vehicle exhaust, highways, paved arterial and local roads, and gravel roads. This budget has been adopted in the AQCC’s “Ambient Air Quality Standards for the State of Colorado” regulation, a copy of which is attached.

G. MONITORING NETWORK/VERIFICATION OF CONTINUED ATTAINMENT

The APCD has monitored ambient PM10 concentrations in the Aspen area since 1985. The APCD has operated, and will continue to operate, the Aspen PM10 monitoring network in full accordance with the federal provisions of 40 CFR Part 58 and the EPA-approved Colorado Monitoring SIP Element. The APCD will also analyze the monitoring data to verify continued attainment of the PM10 NAAQS. This information will provide the necessary information to determine whether the Aspen area continues to attain the PM10 NAAQS. Detailed information regarding the State's monitoring efforts and historical monitoring data can be found in Chapter 2. of this document.

In addition, the State will track the progress of the maintenance plan through a periodic review (every three years) of the assumptions made in the emissions inventories to assure continued maintenance of the PM10 NAAQS. A revised inventory will be developed if assumptions indicate a significant change in the factor(s) used to develop the attainment inventory.

H. CONTINGENCY PLAN

Section 175(A)(d) of the CAA requires that the maintenance plan contain contingency provisions to assure that the State will promptly correct any violation of the PM10 NAAQS that may occur after the redesignation of the area to attainment. EPA's redesignation guidance notes that the State is not required to have fully adopted contingency measures that will take effect without further action by the State. However, the contingency plan should ensure that contingency measures are adopted expediently once the need is triggered. The primary elements of the contingency plan involve the tracking and triggering mechanisms to determine when contingency measures would be needed and a process for implementing appropriate control measures.

1. Tracking

The tracking plan for the Aspen area will consist of monitoring and analyzing PM10 concentrations. In accordance with 40 CFR Part 58, Colorado will continue to operate and maintain the Aspen PM10 monitoring network.

2. Trigger and Response

Triggering of the contingency plan does not automatically require a revision of the SIP nor is the area necessarily redesignated once again to nonattainment. Instead, the State will normally have an appropriate time-frame to correct the violation with implementation of one or more adopted contingency measures. In the event that violations continue to occur, additional contingency measures will be adopted until the violations are corrected.

Upon notification of a PM10 NAAQS exceedance, the APCD and local government staff in the Aspen area will develop appropriate contingency measure(s) intended to prevent or correct a violation of the PM10 standard. Information about historical exceedances of the standard, the meteorological conditions related to the recent exceedance(s), and the most recent estimates of
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growth and emissions will be reviewed. The possibility that an exceptional event occurred will also be evaluated. (Notification to EPA, and to the local governments in the Aspen area, of any exceedance will generally occur within 30 days, but no later than 45 days.) This process will be completed within six months of the exceedance notification. If a violation of the PM10 NAAQS has occurred, a public hearing process at the State and local level will begin. If the AQCC agrees that the implementation of local measures will prevent further exceedances or violations, the AQCC may endorse or approve of the local measures without adopting State requirements. If, however, the AQCC finds locally adopted contingency measures to be inadequate, the AQCC will adopt State enforceable measures as deemed necessary to prevent additional exceedances or violations. Contingency measures will be adopted and fully implemented within one year of a PM10 NAAQS violation. Any State-enforceable measures will become part of the next revised maintenance plan, submitted to the Colorado Legislature and EPA for approval.

3. Potential Contingency Measures

The APCD and local government staff may choose one or more of the following contingency measures to recommend to local officials and the AQCC for consideration. Contingency measures will be selected that quickly bring the area back into compliance with the PM10 NAAQS and that specifically meet the needs of the Aspen area. It is likely that no federal or State General Fund monies will be available to fund the implementation of the selected contingency measure(s). Most, if not all, of the costs will be borne by local citizens and governments, local industries, and any State government agency implementing a contingency measure.

- Increased street sweeping requirements
- Road paving requirements
- More stringent street sand specifications
- Re-implementing the voluntary woodburning curtailment program removed from the federally-approved plan
- Mandatory woodburning curtailment
- Bans on all woodburning
- Expanded, mandatory use of alternative de-icers
- Re-establishing new source review permitting requirements for stationary sources
- Re-implementing the following measures removed from the federally-approved plan (but only if they are not being implemented at the time the contingency measures are triggered): expansion

of the bus fleet by 14 buses; establishment of 400 Park 'n Ride lot spaces and a 250 space intercept parking lot; intercept lot and cross-town shuttle services

- Transportation control measures designed to reduce vehicle miles traveled
- Other emission control measures appropriate for the area based on the consideration of cost-effectiveness, PM10 emission reduction potential, economic and social considerations, or other factors that the State deems appropriate

I. SUBSEQUENT MAINTENANCE PLAN REVISIONS

As stated above, it is required that a maintenance plan revision be submitted to the EPA eight years after the original redesignation request/maintenance plan is approved. This revision is to provide for maintenance of the NAAQS for an additional ten years following the first ten-year period. The State of Colorado commits to prepare and submit a revised maintenance plan as required.