

# **Final Revised PM10 Maintenance Plan for the Pagosa Springs Attainment/Maintenance Area**



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## **Colorado Department of Public Health and Environment**

### **Revised PM10 Maintenance Plan Submittal:**

*U.S. Environmental Protection Agency: submitted on -TBD  
Colorado Air Quality Control Commission, adopted on – 11/19/09*

### **PM10 Maintenance Plan Submittal:**

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# Table of Contents

<b>SECTION 1: INTRODUCTION.....</b>	<b>5</b>
<b>A. BACKGROUND .....</b>	<b>6</b>
1. PM10 National Ambient Air Quality Standard .....	6
2. Health and Welfare Effects of PM10 .....	6
3. Pagosa Springs Nonattainment Area Classification History .....	7
4. Pagosa Springs Attainment/Maintenance Area Boundaries .....	7
<b>B. ORGANIZATIONS INVOLVED IN PREPARING AND APPROVING     PLAN.....</b>	<b>8</b>
<b>C. REQUIREMENTS FOR REDESIGNATION AND MAINTENANCE .....</b>	<b>9</b>
1. Attainment of the Standard .....	9
2. State Implementation Plan (SIP) Approval .....	9
3. Permanent and Enforceable Improvement in Air Quality .....	9
4. Section 110 and Part D Requirements .....	9
5. Maintenance Plan .....	9
<b>SECTION 2: PM10 ATTAINMENT HISTORY .....</b>	<b>10</b>
<b>A. MONITORING HISTORY .....</b>	<b>10</b>
<b>B. DESIGN VALUE DETERMINATION .....</b>	<b>11</b>
<b>SECTION 3: STATE IMPLEMENTATION PLAN APPROVAL..</b>	<b>12</b>
<b>A. 1988 SIP ELEMENT.....</b>	<b>12</b>
<b>B. 1992 and 1993 SIP ELEMENTS.....</b>	<b>12</b>
<b>C. 1994 SIP ELEMENT REVISION .....</b>	<b>12</b>
<b>D. PM10 MAINTENANCE PLAN.....</b>	<b>12</b>
<b>SECTION 4: PERMANENT AND ENFORCEABLE IMPROVEMENT IN AIR QUALITY .....</b>	<b>13</b>
<b>A. OVERVIEW .....</b>	<b>13</b>
<b>B. CONTROL MEASURES .....</b>	<b>13</b>
1. Control of Emissions through Road Paving .....	14
2. Street Sanding Controls.....	14
3. Control of Emissions from Stationary Sources .....	14
4. Federal Motor Vehicle Emission Control Program .....	15
5. Voluntary and State-Only Measures .....	15
<b>SECTION 5: MAINTENANCE PLAN .....</b>	<b>16</b>
<b>A. REQUIREMENTS.....</b>	<b>16</b>
<b>B. EMISSION INVENTORIES.....</b>	<b>16</b>
1. 2007 Base Emission Inventory .....	17

2. 2015 Interim Emission Inventory.....	18
3. 2021 Emission Inventory .....	19
<b>C. MAINTENANCE DEMONSTRATION .....</b>	<b>20</b>
1. CMB Source Apportionments of High Concentrations .....	21
2. CMB Roll-forward Analysis .....	21
<b>D. PM10 EMISSION BUDGET .....</b>	<b>23</b>
<b>E. MONITORING NETWORK/VERIFICATION OF CONTINUED ATTAINMENT .....</b>	<b>23</b>
<b>F. CONTINGENCY PLAN .....</b>	<b>23</b>
1. Tracking .....	24
2. Trigger and Response .....	24
3. Potential Contingency Measures .....	24
<b>G. SUBSEQUENT MAINTENANCE PLAN REVISIONS .....</b>	<b>25</b>

## **SECTION 1: INTRODUCTION**

This document is the second revision of the PM10 Maintenance Plan for the Pagosa Springs Attainment/Maintenance Area. The Environmental Protection Agency (EPA) first approved a particulate matter under 10 microns redesignation request and maintenance plan for the Pagosa Springs area on June 15, 2001 (66 FR 32556), which became effective on August 14, 2001. The Pagosa Springs redesignation request and maintenance plan was adopted by the Colorado Air Quality Control Commission (AQCC) on March 16, 2000.

This second maintenance plan, as revised in 2009, supersedes and replaces the first maintenance plan adopted by the Commission in 2000. The 2009 revised plan includes updated the emissions inventories and projections using the latest EPA-approved tools. This maintenance plan also revises the PM10 emission budget from 7,486 pounds per winter-time day in 2012 to 1,546 pounds per average day in 2021 and beyond.

The Town of Pagosa Springs, Archuleta County, and the State of Colorado request continuation of “attainment/maintenance” status for the Pagosa Springs PM10 nonattainment area. The Pagosa Springs area was originally 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, although the area is presently demonstrating attainment with the PM10 NAAQS. The Maintenance Plan section of this document has been updated and will demonstrate that the area will be able to maintain the NAAQS through the year 2021. The benefits of maintaining a 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 Pagosa Springs area.

This analysis is designed to document and ensure continuing attainment and maintenance of the NAAQS for PM10 in the Pagosa Springs 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).

## **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 24-hour average of 150 ug/m<sup>3</sup>. 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. In 2006, the EPA revoked the annual PM10 standard but maintained the 24-hour average of 150 ug/m<sup>3</sup> (see 71 FR 61144) for both the primary and secondary NAQQS.

In general, demonstrating attainment requires collecting representative air monitoring data and using approved measuring instruments and procedures, with adequate quality assurance and quality control. Air quality measurements in the Pagosa Springs area satisfy this requirement, as shown in Section 2 - "Table 1 – PM10 Monitoring Record".

### **2. Health and Welfare Effects of PM10**

Particulate matter is the term given to tiny particles of solid or semi-solid material suspended in the atmosphere, and PM10 is inhaleable particulate matter 10 micrometers in diameter and smaller. In the Pagosa Springs area, PM10 is created from re-entrained road dust, carbon black (from automobile and diesel engines) and soot (from fireplaces, woodstoves, and coal stoves). PM10 from these combustion sources contains a large percentage of elemental and organic carbon, which contributes to atmospheric haze and to health problems.

Epidemiological studies and laboratory studies of humans and animals indicate that fine particles can be inhaled deeply into the respiratory system, resulting in aggravation of existing respiratory and heart diseases, damage to lung tissue, impairment of breathing and respiratory functions, alterations to the body's physical and immune system defenses, and even premature death. Many fine particles are also composed of compounds that are known or suspected human carcinogens. People most sensitive to particulate matter are the elderly, children, and those with chronic lung disease, cardiovascular disease, influenza, and asthma.

The welfare effects of particulate air pollution are wide-spread. Because of the potential for extremely long-range transport of fine particles it is thought that no place on earth is free of particulate pollution generated by urban and rural sources. Chemical

and photo-chemical reactions involving the particles may occur in the air, or once they have been deposited on environmental media or structures. Such soiling and acid deposition cause visibility degradation, climate changes, and damage to crops, natural vegetation, water bodies, and aquatic life. In addition, sculpture and architecture may be damaged or destroyed by particulate soiling and acid deposition--both of which have been detected in the most remote areas of the world.

### 3. Pagosa Springs Nonattainment Area Classification History

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 Pagosa Springs area was designated as a "Group I" area for PM10. Pagosa Springs was then designated a "moderate" nonattainment area in 1990 pursuant to section 107(d)(4)(B) of the CAA.

### 4 Pagosa Springs Attainment/Maintenance Area Boundaries

The boundary for the Pagosa Springs PM10 attainment/maintenance area is defined as follows:

Township 35 North & Range 2 West

Sections 13, 14, 15

Section 23 NE, N ½ SE

Section 24 all except SWSW

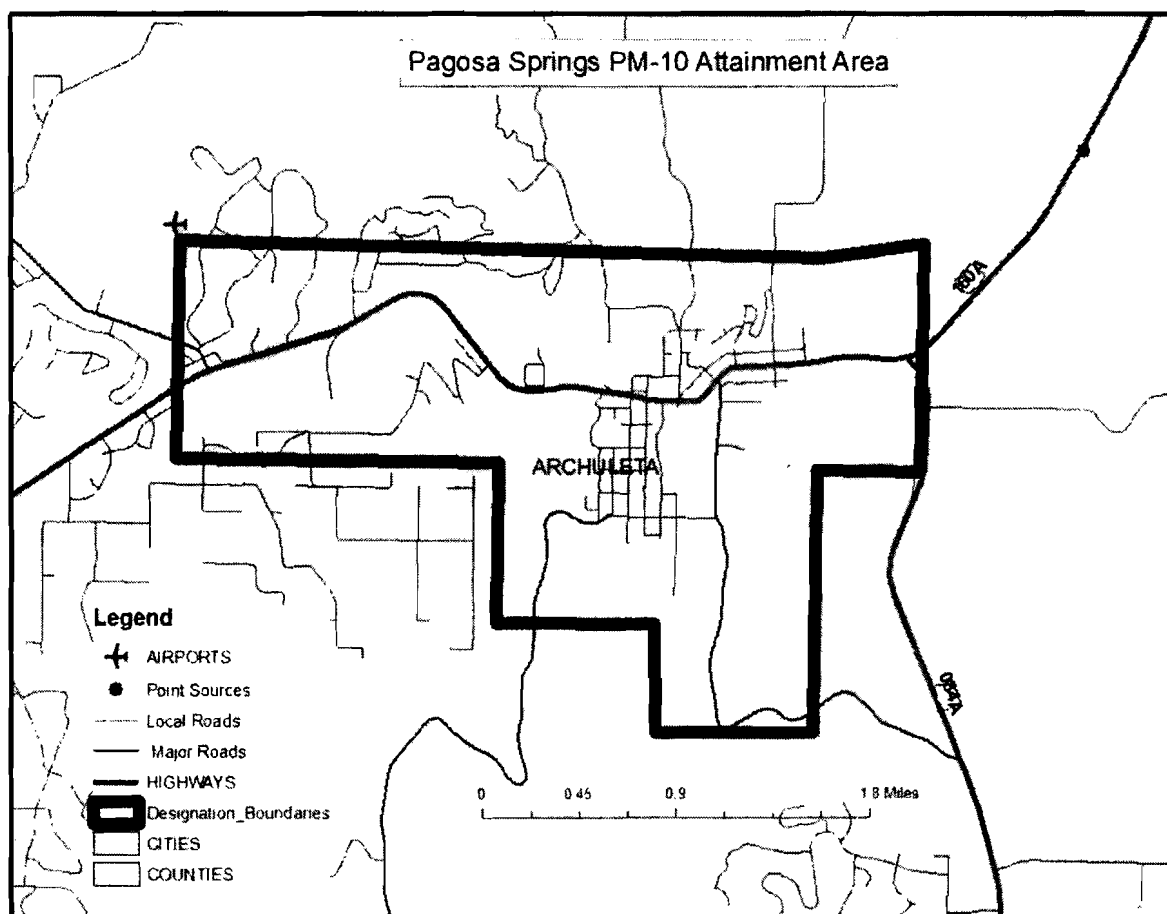
Section 25 N ½ NE, NENW

Township 35 North & Range 1 West

Section 18 W ½

This area essentially includes the Town of Pagosa Springs, some additional area along the San Juan River, some areas along U.S. Highway 160 outside of the Town's limits. A map illustrating the area boundary is shown in Figure 1.

**Figure 1: Map of the Pagosa Springs Attainment/Maintenance Area**



## ***B. ORGANIZATIONS INVOLVED IN PREPARING AND APPROVING PLAN***

Preparation of this revised maintenance plan was a cooperative effort of the Town of Pagosa Springs, Archuleta County, and the Air Pollution Control Division (APCD) of the Colorado Department of Public Health and Environment. The document was approved by the Colorado Air Quality Control Commission (AQCC) on November 19, 2009. The EPA, through its regional office in Denver, provided policy advice and technical assistance, and is responsible for final approval of this revised maintenance plan.



## **C. REQUIREMENTS FOR REDESIGNATION AND MAINTENANCE**

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:

### **1. 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.

### **2. State Implementation Plan (SIP) Approval**

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

### **3. 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.

### **4. 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.

### **5. 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.

## SECTION 2: PM10 ATTAINMENT HISTORY

### A. MONITORING HISTORY

Monitoring for total suspended particulates (TSP) in Pagosa Springs began in August 1975 at the Pagosa Springs High School and continued through September 1987. TSP monitoring was also conducted at the Town Hall from March 1987 through September 1987. Concentrations at both of these monitoring locations exceeded the 24-hour TSP NAAQS of 260 ug/m<sup>3</sup> and the annual NAAQS of 75 ug/m<sup>3</sup>. The historic TSP levels were the basis for Pagosa Springs 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 began in August 1985 at the Pagosa Springs High School and an additional PM10 monitor was established at the Town Hall in January 1988. The Town Hall site was determined to be more representative of maximum PM concentrations and accordingly the High School site was decommissioned in August 1990. The Town Hall location was operated until 2001 when a major building renovation necessitated relocation of the PM monitor back to the High School location.

Table 1 lists the yearly maximum, second maximum and estimated exceedances for the Town Hall and High School monitoring sites for the 10-year period from 1998 through 2008. Only one exceedance of the 24-hour PM10 NAAQS was recorded in 2000 at the Town Hall site.

**Table 1: Pagosa Springs PM10 Monitoring Record**

Year	Maximum Concentration (ug/m <sup>3</sup> )	2nd Maximum Concentration (ug/m <sup>3</sup> )	Yearly Estimated Exceedances	3-yr Average Estimated Exceedances	Monitoring Site
1998	66	66	0	0	Town Hall
1999	138	82	0	0	Town Hall
2000	165	87	1	0.33	Town Hall
2001	123	121	0	0.33	Town Hall
2001	66	61	0	0.33	High School
2002	107	82	0	0.33	High School
2003	123	111	0	0	High School
2004	79	61	0	0	High School
2005	82	77	0	0	High School
2006	122	53	0	0	High School
2007	102	59	0	0	High School
2008	149	74	0	0	High School

## **B. DESIGN VALUE DETERMINATION**

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. 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 2006 - 2008 period (1,069), the third highest concentration is the design value, according to this guidance. The three highest concentrations measured during the period 2006 -2008 are as follows:

149 ug/m3 – May 1, 2008

122 ug/m3 – February 15, 2006

102 ug/m3 – June 6, 2007

Consequently, the design value for this revised maintenance plan is 102 ug/m3.

It is important to note that the May 1<sup>st</sup>, 2008 value of 149 ug/m3 may be the result of a blowing dust event, which could be considered as an “exceptional event”. The APCD is investigating the circumstances surrounding this event, but this value is still being used in the design value calculation.

## **SECTION 3: STATE IMPLEMENTATION PLAN APPROVAL**

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

### **A. 1988 SIP ELEMENT**

The first PM10 SIP Element was adopted by the Colorado AQCC in July 1988, and the emission controls consisted of paving unpaved roads. 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.

### **B. 1992 and 1993 SIP ELEMENTS**

A new Pagosa Springs SIP Element was adopted by the AQCC in November 1992 and supplemented in November 1993. The control measures included the paving of local roads adopted for the 1988 SIP Element and street sanding requirements on the State highways. New street sweeping requirements were adopted as contingency measures. EPA approved the SIP Element on May 19, 1994 (59 FR 26126).

### **C. 1994 SIP ELEMENT REVISION**

The Pagosa Springs SIP Element was revised by the AQCC in November 1994. This revision consisted of updating the technical and administrative information. EPA had previously approved these technical and administrative revisions in the May 1994 action because they were submitted directly to EPA by the APCD in December 1993.

### **D. PM10 MAINTENANCE PLAN**

The Pagosa Springs Town Council approved the PM Maintenance Plan on February 2000 that was adopted by the Commission on March 16, 2000. The U.S. Environmental Protection Agency approved the plan on June 15, 2001 which became effective on August 14, 2001

## **SECTION 4: 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

### **A. OVERVIEW**

It is reasonable to attribute the attainment of the PM10 NAAQS in the Pagosa Springs nonattainment 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 levels in the Pagosa Springs attainment/maintenance area. It is assumed that growth in population and sales tax revenue are indicators of increased activities that cause increased PM10 emissions and the potential for elevated PM10 concentrations. Information obtained for the Town of Pagosa Springs shows that during the period 2000 through 2007, sales tax revenues increased by 45.8 percent while Archuleta County population increased by 26 percent over the same period. During this period of rapid growth, attainment of the PM10 NAAQS was demonstrated with only one exceedance (165 ug/m<sup>3</sup> in 2000) and few concentrations over a 100 ug/m<sup>3</sup> threshold.

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 2000'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 Pagosa Springs since the NAAQS was promulgated in 1987, and because there have only been three concentrations since 1987 that have exceeded the 24-hour PM10 NAAQS (258 ug/m<sup>3</sup> and 262 ug/m<sup>3</sup> are thought to be due to malfunctioning or poorly operated street sweeping equipment and 165 ug/m<sup>3</sup> in 2000), the APCD concludes that the good air quality in the Pagosa Springs area is the result of the implementation of emission reduction measures, not meteorological fluctuations.

### **B. CONTROL MEASURES**

The following control measures resulted in the area's attainment of the PM10 NAAQS, and these measures should ensure continued maintenance of the PM10 NAAQS through the year 2021, which is the duration of the maintenance period.

### 1. Control of Emissions through Road Paving

The Town of Pagosa Springs paved 6.5 miles of unpaved roads during 1992, 1993, and 1994 in order to reduce PM10 emissions. This strategy was adopted locally in 1991 and included in State regulation in 1992 (Section I.B. of the "State Implementation Plan-Specific Regulations for Nonattainment - Attainment/Maintenance Areas (Local Elements)"). The rule was approved by EPA in 1994 and was removed from the Colorado regulation in 2000 as the paving requirements had been completed.

### 2. Street Sanding Controls

There is a requirement that any user that applies street sanding material on Highway 160 and Highway 84 in the Pagosa Springs attainment/maintenance area must use materials containing less than one percent fines. Users of street sand on these highways must also use 15 percent less sand than an established base sanding amount. These strategies were adopted in 1992 and approved by EPA in 1994, and they are defined in detail in Sections I.B. and C., respectively, of the "State Implementation Plan-Specific Regulations for Nonattainment - Attainment/Maintenance Areas (Local Elements) Regulations (5 CCR 1001-20).

### 3. Control of Emissions from Stationary Sources

Although there are no stationary sources located in the Pagosa Springs 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 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 (NAA) 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.

The EPA approval of the original PM10 Maintenance Plan, effective on 08/14/01, reinstates the prevention of significant deterioration (PSD) permitting requirements in the Pagosa Springs Attainment/Maintenance area. The federal PSD requirements are considered a relaxation from the NAA NSR requirements, as LAER is no longer required and is replaced by the less stringent "best available control technology"

(BACT), along with the removal of the requirement to offset PM10 emissions. The future reapplication of NAA NSR provisions appears unlikely in the Pagosa Springs Attainment/Maintenance area based on current PM10 monitoring trends.

#### 4 Federal Motor Vehicle Emission Control Program

The federal motor vehicle emission control program 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; the PM10 emissions in the Pagosa Springs area will be reduced.

#### 5. Voluntary and State-Only Measures

In addition to the mandatory control measures discussed above, there are other activities that result in the reduction of PM10 emissions that are not classified as “federally enforceable control measures.” Some notable examples include:

- The Town of Pagosa Springs has historically cleaned Highway 160 in town throughout the winter and spring using regenerative air vacuum sweepers. The frequency of this voluntary sweeping/cleaning has been about once after each street sanding deployment. For the future, the Town of Pagosa Springs has committed to regularly vacuum sweep/clean Highway 160 within four days of the roadway becoming free and clear of snow and ice following each street sanding deployment, as weather, temperature, and street conditions permit, between the intersections of Highway 84 to the east and 14th street to the west.
- The Town of Pagosa Springs requires that all new developments have paved streets.
- The Town of Pagosa Springs encourages private businesses to properly clean/sweep private parking lots on a regular basis.
- Archuleta County commits to pave the unpaved portion of Hot Springs Boulevard from the existing pavement to the boundary of the airshed.
- Any owner or operator responsible for the construction or maintenance of any existing or new unpaved roadway which has vehicle traffic exceeding 200 vehicles per day in the attainment/maintenance area and surrounding areas must stabilize the roadway in order to minimize fugitive dust emissions. These State-wide requirements are defined in detail in Section III.D.2.a.(I) of the AQCC's Regulation No. 1

These strategies are considered to be voluntary local initiatives and State-only requirements, and are intended to reduce PM10 emissions. These strategies are not intended to be federally enforceable.

## **SECTION 5: 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 2021. 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 has satisfied this commitment by submitting this revised maintenance plan as required by the CAA and EPA requirements.

Section 175A further states that the plan shall contain such additional control measures as necessary to ensure maintenance. All current nonattainment area control measures shall remain in place, except for the most stringent NSR stationary source permitting requirements (see Section 4.B.3.). 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 below emission inventories include the 2007 base year, 2015 interim year and the 2021 maintenance year. These inventories reflect the base and projected conditions in the Pagosa Springs Attainment/Maintenance Area, and account for the emission control measures that have been adopted as part of the original redesignation request and the previous 10-year maintenance plan. Unlike the previous Pagosa Springs plans where the emission inventories were based on a grid system of the attainment/maintenance area and an average winter-time day, the updated emission inventories, for 2007, 2015 and 2021, are based on an all-seasons average day for the whole maintenance area. Consequently there are significant differences between the emission inventories in the previous Plan and this updated PM10 Maintenance Plan.



## 1. 2007 Base Emission Inventory

The 2007 base emission inventory for the Pagosa Springs Attainment/Maintenance Area is presented below. This updated emission inventory incorporates the most current estimates for the following nine (9) source categories:

- Commercial Cooking
- Construction
- Fuel Combustion
- Non-Road
- Structure Fires
- Wood-burning
- Unpaved Road Dust
- Paved Road Dust
- Highway Vehicles
- Agriculture

The mobile source inventories (unpaved road dust, paved road dust, and highway vehicles) have been updated to reflect the following:

- Latest traffic (VMT) estimates from the Colorado Department of Transportation (CDOT)
- Revised emission factors and methods for determining paved road emissions
- Road paving of unpaved roads that has occurred in the area
- Vehicle exhaust emissions based on most up-to-date fleet mix

All emission estimates were prepared by using EPA-approved methods and assigned to the area comprising the Attainment/Maintenance area.

Table 2 presents the 2007 PM10 emission estimates for each source category in tons per year and pounds per average day.

**Table 2: 2007 PM10 Emission Inventory for the Pagosa Springs Attainment/Maintenance Area**

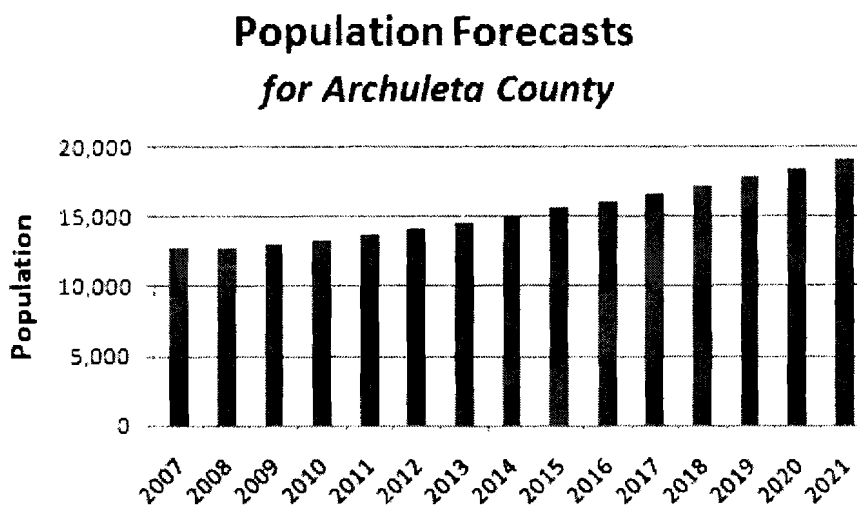
<b>Source Category</b>	<b>2007 PM10 [tons/year]</b>	<b>2007 PM10 [lbs/day]</b>
Commercial Cooking	1.18	6.44
Construction	52.11	285.52
Fuel Combustion	0.01	0.07
Non-Road	1.73	9.49
Structure Fires	0.02	0.09
Wood Burning	17.77	97.38
Unpaved Road-Dust	16.27	89.16
Paved Road-Dust	93.10	510.13
Highway Vehicles	2.06	11.31
Agriculture	0.03	0.15
<b>Totals:</b>	<b>184.3</b>	<b>1,009.8</b>

## 2. 2015 Interim Emission Inventory

Table 3 presents the 2015 PM<sub>10</sub> emission estimates for each source category in tons per year and pounds per average day.

The 2015 emissions for the following source categories: commercial cooking; construction; fuel combustion; non-road; structure fires; and wood burning, were increased by an annual compounded rate of 2.90 percent per year (1.02897 or 23.18% total), which is based on the population forecast (from State Demography Office) for Archuleta County over the period 2007 to 2015 as indicated in Figure 2. Detailed information on the growth rate may be found in the Technical Support Document.

**Figure 2: Population Forecasts for Archuleta County**



The 2007 mobile source re-entrained dust emissions for all road categories (paved and unpaved) were increased by an annual compounded rate of 4.013 percent to 2015 (1.040125 or 32.100 total). This growth rate was based on CDOT's highest projected traffic growth rates for different segments of the State highways in the Pagosa Springs area.

The 2007 mobile source tailpipe PM emissions were reduced by an annual compounded rate of 0.81 percent to 2015 (-0.008125 or -6.500% total). The reduction in PM emissions is associated with anticipated fleet turnover projected by MOBILE 6.2.

The Pagosa Springs Attainment/Maintenance Area is urbanized with mountainous terrain that is largely unsuitable for agriculture, so the future growth in agriculture emissions is assumed to be flat.

The road paving that the Town of Pagosa Springs and Archuleta County plan on completing is not assumed in the 2015 inventory as the paving is considered voluntary and not enforceable by the State. Detailed information on the growth rates may be found in the Technical Support Document.

**Table 3: 2015 PM10 Emission Inventory for the Pagosa Springs Attainment/Maintenance Area**

<b>Source Category</b>	<b>2015 PM10 [tons/year]</b>	<b>2015 PM10 [lbs/day]</b>	<b>Change from 2007 Base Year [%]</b>
Commercial Cooking	1.45	7.93	23.176%
Construction	64.18	351.69	23.176%
Fuel Combustion	0.02	0.09	23.176%
Non-Road	2.13	11.69	23.176%
Structure Fires	0.02	0.12	23.176%
Wood Burning	21.89	119.95	23.176%
Unpaved Road-Dust	21.49	117.78	32.087%
Paved Road-Dust	122.98	673.89	32.102%
Highway Vehicles	1.93	10.58	-6.500%
Agriculture	0.03	0.15	0.000%
<b>Totals:</b>	<b>236.1</b>	<b>1,293.9</b>	

**3. 2021 Emission Inventory**

Table 4 presents the 2021 PM10 emission estimates for each source category in tons per year and pounds per average day.

The 2021 emissions for the following source categories: commercial cooking; construction; fuel combustion; non-road; structure fires; and wood burning, were increased by an annual compounded rate of 3.59 percent per year (1.03592 or 50.28% total), which is based on the population forecast (from State Demography Office) for Archuleta County over the period 2007 to 2021 as indicated in Figure 2 above. Detailed information on the growth rate may be found in the Technical Support Document.

The 2007 mobile source re-entrained dust emissions for all road categories (paved and unpaved) were increased by an annual compounded rate of 4.013 percent to 2021 (1.04125 or 56.175% total). This growth rate was based on CDOT's highest projected traffic growth rates for different segments of the State highways in the Pagosa Springs area.

The 2007 mobile source tailpipe PM emissions were reduced by an annual compounded rate of 0.81 percent to 2021 (-0.008125 or -11.374% total). The reduction in PM emissions is associated with anticipated fleet turnover projected by MOBILE 6.2.

The Pagosa Springs Attainment/Maintenance Area is urbanized with mountainous terrain that is largely unsuitable for agriculture, so the future growth in agriculture emissions is assumed to be flat.

The road paving that the Town of Pagosa Springs and Archuleta County plan on completing is not assumed in the 2021 inventory as the paving is considered voluntary and not enforceable by the State. Detailed information on the growth rates may be found in the Technical Support Document.

The projected emissions for the year 2021 are 1,546 pounds/day, as indicated in Table 4, which are higher than the 2015 interim year emission projections of 1,294

pounds/day. Consequently, the demonstration of maintenance of the PM10 NAAQS for 2021 is adequate to demonstrate maintenance for all years before 2021.

**Table 4: 2021 PM10 Emission Inventory for the Pagosa Springs Attainment/Maintenance Area**

<b>Source Category</b>	<b>2021 PM10 [tons/year]</b>	<b>2021 PM10 [lbs/day]</b>	<b>Change from 2007 Base Year [%]</b>
Commercial Cooking	1.77	9.70	50.28%
Construction	78.31	429.10	50.28%
Fuel Combustion	0.02	0.11	50.28%
Non-Road	2.60	14.25	50.28%
Structure Fires	0.03	0.16	50.28%
Wood Burning	26.71	146.36	50.28%
Unpaved Road-Dust	25.41	139.23	56.18%
Paved Road-Dust	145.40	796.71	56.18%
Highway Vehicles	1.83	10.03	-11.37%
Agriculture	0.03	0.15	0%
<b>Totals:</b>	<b>282.1</b>	<b>1,545.8</b>	

### **C. MAINTENANCE DEMONSTRATION**

Data presented throughout this document are utilized to demonstrate continued maintenance of the PM10 NAAQS for the Pagosa Springs area. Chemical Mass Balance (CMB) data are used to generally identify the sources of emissions that influence ambient PM10 concentrations. The 2007 emission inventory is used to further refine this CMB-source identification. This information is then used to apportion the design day concentration (see Section 2.B.), 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 2007 to 2021. If the 2021 projection is below the 24-hour PM10 NAAQS of 150 ug/m<sup>3</sup>, then maintenance is demonstrated. Based on the analysis presented below, the 2021 maintenance concentration for the Pagosa Springs attainment/maintenance area is calculated at 146.3 ug/m<sup>3</sup>. Consequently, continued maintenance of the PM10 NAAQS is demonstrated.

The CMB roll-forward methodology used to calculate the 2021 maintenance concentration is based on CMB data for concentrations above 100 ug/m<sup>3</sup> that were collected in 1994, 2006 and 2008. The source apportionments from each of these days were averaged to develop a design day apportionment for use in the roll-forward modeling. Concentrations that occurred prior to 1994 underwent CMB analyses, but the results are not utilized here because the control measures adopted as part of the nonattainment SIP Element had not been fully implemented. Also, the CMB data from the two highest values measured in 1994 (262 ug/m<sup>3</sup> and 258 ug/m<sup>3</sup>), are not included because they would heavily bias the CMB results (geologic emissions were greatly elevated on these days due to malfunctioning or poorly operated street cleaning equipment, and these emissions are not representative of typical conditions that occur in the winter months). Finally, not all years with values exceeding 100 ug/m<sup>3</sup> have



94.0 ug/m<sup>3</sup>

**Percent Change in Emissions between 2007 and 2021**  
**(Values used to roll-forward the CMB apportionments to the year 2021)**

Highways, Paved Roads, and Unpaved Roads: PM10 emissions increased by 335.4 lbs./day, or 54.9%

Wood burning and structure fires: PM10 emissions increased by 49.1 lbs/day, or 50.3%

**Roll-forward Apportionments to 2021:**  
**(Calculated by applying the Percent Change in emissions from 2007 to 2021)**

Geologic (G): Re-entrained fugitive dust from highways, paved roads, and unpaved roads are assumed to contribute all geologic emissions that resulted in 74.3 ug/m<sup>3</sup> of PM10. This concentration will change by the percent change in emissions from these sources.

$$74.3 \text{ ug/m}^3 \times 1.549 = 115.1 \text{ ug/m}^3$$

Burning (B): Wood burning and structure fires are assumed to contribute to the burning emissions that resulted in 6.9 ug/m<sup>3</sup> of PM10. This concentration will change by the percent change in emissions from these sources.

$$6.9 \text{ ug/m}^3 \times 1.503 = 10.4 \text{ ug/m}^3$$

Nitrate (N): Unknown sources contributed emissions that resulted in 0.81 ug/m<sup>3</sup> of secondary PM10. It is assumed that this concentration remains constant because no emissions can be assigned to this category

$$0.9 \text{ ug/m}^3 \times 1.000 = 0.9 \text{ ug/m}^3$$

Sulfate (S): Unknown sources contributed emissions that resulted in 1.5 ug/m<sup>3</sup> of secondary PM10. It is assumed that this concentration remains constant because no emissions can be assigned to this category.

$$1.5 \text{ ug/m}^3 \times 1.000 = 1.5 \text{ ug/m}^3$$

Unknown (U): Unknown sources contributed emissions that resulted in 10.4 ug/m<sup>3</sup> of PM10. It is assumed that this concentration remains constant because no emissions can be assigned to this category. (Mobile exhaust emissions could be assigned to this category, but mobile emissions go down slightly from 2007 to 2021, thus leaving this concentration constant is a conservative approach.)

$$10.4 \text{ ug/m}^3 \times 1.000 = 10.4 \text{ ug/m}^3$$

**Total Projected 2021 Concentration (PM10<sub>2021</sub>):**  
**(sum of 2021 apportioned components plus the background concentration)**

$$\text{PM10}_{2021} = G + B + N + S + U + \text{background} = 146.3 \text{ } \mu\text{g/m}^3$$

$$\text{PM10}_{2021} = 115.1 + 10.4 + 0.9 + 1.5 + 10.4 + 8.0 = 146.3 \text{ } \mu\text{g/m}^3$$

**Since the PM10<sub>2021</sub> value is below the daily PM10 NAAQS (150 ug/m3), maintenance of the standard is demonstrated**

#### **D. PM10 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.

This revised maintenance plan establishes a mobile source PM10 emission budget for the Attainment/Maintenance area of 946 lbs/day for 2021 and beyond. This budget is the total of the 2021 mobile source PM10 emissions (see Section 5.B.3. above), which includes PM10 emissions from highways, paved roads, and unpaved roads.

This budget has been adopted in the AQCC's "Ambient Air Quality Standards for the State of Colorado" regulation.

#### **E. MONITORING NETWORK/VERIFICATION OF CONTINUED ATTAINMENT**

The APCD has monitored ambient PM10 concentrations in the Pagosa Springs area since 1986. The APCD has operated, and will continue to operate, the Pagosa Springs 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 Pagosa Springs area continues to attain the PM10 NAAQS. Detailed information regarding the State's monitoring efforts and historical monitoring data can be found in Section 2 of this document.

#### **F. 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 Pagosa Springs area will consist of monitoring and analyzing PM10 concentrations. In accordance with 40 CFR Part 58, Colorado will continue to operate and maintain the Pagosa Springs 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 Pagosa Springs 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 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 Pagosa Springs 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 Pagosa Springs area. It is likely that no federal or State 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 businesses, and State government agencies.

- Increased street sweeping requirements
- Additional road paving requirements
- More stringent street sand specifications
- Voluntary or mandatory coal and/or wood burning curtailment
- Bans on all coal and/or wood burning
- Expanded use of alternative de-icers
- Re-establishing new source review permitting requirements for stationary sources
- Transportation control measures designed to reduce vehicle miles traveled
- Other emission control measures appropriate for the area based on the following considerations: cost-effectiveness, PM10 emission reduction potential, economic and social concerns, and/or other factors that the State deems appropriate.

#### **G. SUBSEQUENT MAINTENANCE PLAN REVISIONS**

This revised maintenance plan provides for continued maintenance of the PM10 NAAQS for an additional ten years beyond the original ten-year period. Consequently, no further maintenance plan updates are anticipated.