Alaska Department of Environmental Conservation

Amendments to State Air Quality Control Plan

Vol. II: Analysis of Problems, Control Actions

Section III.D.2 Eagle River 2nd 10-year PM-10 Limited Maintenance Plan

Adopted

July 22, 2020

Mike Dunleavy, Governor

Jason W. Brune, Commissioner

A note on the format and organization of this document.

This document is organized and formatted to be consistent with the State of Alaska Air Quality Control Plan or SIP. The previously adopted Section III.D.2 encompassed the Eagle River 1st 10-year Limited Maintenance Plan. Sections III.D.2.1 - III.D.2.11 have been updated to reflect the 2nd 10-year Limited Maintenance Plan.

SECTION III.D.2

EAGLE RIVER 2nd 10-YEAR PM_{10} LIMITED MAINTENANCE PLAN

III.D.2.1. Introduction

This second 10-year Limited Maintenance Plan (LMP) explains how Eagle River currently meets and will continue to meet the 1987 National Ambient Air Quality Standard (NAAQS) for particulate matter 10 microns or smaller (PM_{10}) through 2033.

The U.S. Environmental Protection Agency (EPA) regulates both coarse and fine particulate matter which, when inhaled, can pose a risk to public health. Particulate matter pollution is a public health issue because these particles are small enough to penetrate deep into the lungs to cause health problems. Sources of PM_{10} include dust and soot, which can come from paved roads, unpaved roads, unvegetated lots, glacial silts, and forest fires.

On July 1, 1987, EPA revised the NAAQS from total suspended particulate (TSP) to PM_{10} because the smaller particles were determined to be more harmful.[1] The primary and secondary 24-hour standard for PM_{10} which was set at 150 micrograms per cubic meter ($\mu g/m^3$) and prohibited from exceeding more than once a year on average over three years, is still in effect. The NAAQS also used to include an annual average standard set at 50 $\mu g/m^3$, but that standard has been revoked by the EPA (71FR 61144).[2]

Between 1985 and 1987 Eagle River frequently violated the NAAQS for PM_{10}. As a consequence, on November 6, 1991, the EPA, under section 107(d)(4)(B) and 188(a) of the Clean Air Act (CAA), designated a nine square kilometer area in Eagle River as a moderate nonattainment area for PM_{10} and required the submission of an air quality attainment plan to bring the area into compliance with the standard.[3] The nonattainment designation was based on data collected at the Parkgate site in Eagle River.

In 1991, the Municipality of Anchorage (MOA) and the Alaska Department of Environmental Conservation (DEC) prepared a State Implementation Plan (SIP) to address the PM_{10} problem in Eagle River. The plan, which was entitled the Eagle River PM_{10} Control Plan, identified unpaved roads as the main source of PM_{10} and outlined an ambitious road paving program to reduce emissions from this source. EPA approved the plan as an amendment to the SIP on August 13, 1993 (58 FR 43084).[4]

---

[1] (52 FR 24634) Federal Register/Vol. 52, No. 126/Wednesday, July 1, 1987/Rules and Regulations
Revisions to the National Ambient Air Quality Standards for Particulate Matter. Final Rule effective July 31, 1987
[2] (71 FR 61144) Federal Register/Vol. 71, No. 200/Tuesday, October 17, 2006/Rules and Regulations
National Ambient Air Quality Standards for Particulate Matter. Final Rule effective December 18, 2006
[3] https://www.epa.gov/sips-wa/summary-eagle-river-particulate-matter-pm-10-maintenance-plan
[4] (58 FR 43084) Federal Register/Vol. 58, No. 155/Friday, August 13, 1993/Rules and Regulations
Approval and Promulgations of State Implementation Plan; Alaska: Eagle River Moderate PM10 Nonattainment Area SIP. Final Rule effective October 12, 1993

On September 29, 2010, the State of Alaska submitted the first 10-year Limited Maintenance Plan (LMP) and requested that EPA find the plan complete and approve the re-designation of the Eagle River nonattainment area to attainment under the LMP option. On October 19, 2010, the EPA determined that Eagle River nonattainment area had attained the NAAQS, effective December 20, 2010 (75 FR 64162)[5]. On January 7, 2013, the EPA approved the LMP and concurrently re-designated the area to attainment for the PM_{10} NAAQS, effective March 8, 2013 (78 FR 900).[6] The control measures and contingency measures from the attainment and maintenance plan are still in place.

Under the provisions in the CAA Section 175 A (United States Code (USC) Title 42 Section 7505(b)), States are required to submit a revision to the first 10-year LMP 8 years after the EPA approves the original re-designation. In the EPA Limited Maintenance Plan Option Guidance (LMP Guidance), States can prepare the required second 10-year maintenance plan if the area meets the qualification criteria.

Before developing this plan, DEC met with the representatives from Anchorage Health Department (AHD), Anchorage Metropolitan Area Transportation Solutions (AMATS), and the Municipality of Anchorage (MOA) to discuss the development plan, roles/responsibility, and proposed project schedule. Also, DEC sent a draft of the LMP development plan to EPA. The feedback and the clarifications received from EPA, particularly on the method of calculation of the Average Design Value (ADV) and the need for the computation of the Critical Design Value to further justify eligibility, were helpful in the development of this second 10-year LMP. DEC, in conjunction with the AHD, prepared this plan. This plan is the last maintenance plan for the area, and it demonstrates how the area will continue to meet the PM_{10} standard through 2033, as stipulated in the second 10-year planning requirements of CAA Section 175A(b).

III.D.2.2. Local Planning Process

This plan was prepared in accordance with the provisions of Sections 110 and 174 of the CAA, which require the consultation and participation of local political subdivisions and local elected officials. Under Section 174 (42 USC 7504), the revised plan submitted to EPA as a formal SIP amendment must be prepared by "an organization certified by the State, in consultation with elected officials of local governments." Such an organization is required to include local elected officials and representatives of the state air quality planning agency (i.e., DEC), the state transportation planning agency (i.e., Alaska Department of Transportation & Public Facilities (ADOT/PF), and the metropolitan planning organization (MPO) responsible for the transportation planning process for the affected area.

In 1976, the governor designated the MOA as the MPO for the Anchorage urbanized area which includes Eagle River. In Anchorage, the MPO is known as Anchorage Metropolitan Area Transportation Solutions (AMATS). Consequently, the MOA conducts the transportation planning process required under federal regulation, in cooperation with DEC and ADOT/PF,

[5] (75 FR 64162) Federal Register/Vol. 75, No. 201/Tuesday, October 19, 2010/Rules and Regulations *Determination of Attainment for PM_{10}: Eagle River PM_{10} Nonattainment Area.* Direct Final Rule effective December 20, 2010

[6] (78 FR 900) Federal Register/Vol. 78, No. 4/Monday, January 7, 2013/Rules and Regulations *Approval and Promulgation of Air Quality Implementation Plans; Alaska: Eagle River PM_{10} Nonattainment Area Limited Maintenance Plan and Redesignation Request.* Direct Final Rule effective March 8, 2013

through the AMATS organization. In 1978, the governor designated MOA as the air quality planning agency in Anchorage. Based on this designation, MOA has continued its role as the lead planning agency in the Anchorage area. The air quality planning process is outlined in the AMATS Intergovernmental Operating Agreement for Transportation and Air Quality Planning. This agreement was last revised in April 25, 2019. This operating agreement establishes the roles and relationships between governmental entities involved in the Anchorage air quality planning process.

The *AMATS Policy Committee* provides guidance and control over studies and recommendations developed by support staff. Voting members of the Policy Committee are listed below.

MOA Mayor;
ADOT/PF Central Regional Director;
MOA Assembly representative;
MOA Assembly representative; and
ADEC Commissioner or designee.

The *AMATS Technical Advisory Committee* (TAC) and member support staff analyze transportation and land use issues and develop draft recommendations for the Policy Committee. Voting members include the following:

MOA Traffic Engineer;
MOA Project Management and Engineering Deputy Director;
MOA Planning Director;
MOA Transit Director;
MOA Department of Health & Human Services representative;
MOA Energy and Sustainability Manager
MOA Port of Alaska Deputy Director;
ADOT/PF Central Region Chief of Planning;
ADOT/PF Central Region;
DEC representative;
Alaska Railroad Corporation representative

Also, to help provide public input into the current air quality planning process by interested local groups and individual citizens, is a third AMATS committee, *the Citizens Advisory Committee*, appointed by the Policy Committee. The Citizens Advisory Committee is comprised of eleven members, with six of those members being appointed to fill a seat representing each of the Assembly districts within the Municipality of Anchorage. The other five members of the committee consist of one member each representing the Federation of Community Councils, the Anchorage Chamber of Commerce, the Chugiak-Eagle River Chamber of Commerce, the Municipal Planning and Zoning Commission and Joint Base Elmendorf Richardson (JBER).

Public Participation Process

Section 110(a) of the CAAA (42 USC 7410(a)) requires that a state provide reasonable notice and public hearings of SIP revisions prior to their adoption and submission to EPA. To ensure that the public had adequate opportunity to comment on revisions to the Anchorage air quality

attainment and maintenance plans, a multi-phase public involvement process, utilizing AMATS and the Anchorage Assembly was used.

AMATS Technical, Citizens, and Policy Committees – The AMATS Technical Advisory Committee held a work session on September 3, 2019, about the limited maintenance plan that was under a 30-day public review from August 23 – September 22, 2020. No comments were received during the public comment period. After reviewing the recommendation of the AMATS Citizen Advisory Committee which met on October 27, 2019, the AMATS Technical Committee recommended that the AMATS Policy Committee adopt the LMP on November 7, 2019. Following this recommendation, the AMATS Policy Committee met on November 21, 2019, to review and adopt the the plan.

Anchorage Assembly – The Anchorage Assembly adopted the plan during its regular public meeting held on February 25, 2020. A copy of Assembly Resolution No. AR 2020-61 is included in the Appendix to Section III.D.2.2.

ADEC hearings – The final opportunity for public involvement occurs at the state administrative level. Prior to regulatory adoption of SIP revisions, DEC holds public hearings on the revisions in the affected communities. DEC scheduled a tentative public hearing on the *Eagle River PM-10 Second 10-year Limited Maintenance Plan on* May 29, 2020; the hearing was cancelled when no one requested that it be held.

III.D.2.3. Boundary of the Eagle River Maintenance Area

Eagle River is a community of about 28,210 located roughly 10 miles northeast of downtown Anchorage and is part of the Municipality of Anchorage. It is located at the end of a glacial river valley bounded on the west by Cook Inlet and on the south by the Eagle River and the Chugach Mountains on the northeast. Eagle River is a bedroom community to Anchorage, and land use in the area is mainly suburban and rural residential with some commercial development. When the *Eagle River PM_{10} Control Plan* was prepared in 1991, it identified a nine square kilometer nonattainment area that encompassed all the central business district and most of the more densely populated suburban sections of the community. This second 10-year limited maintenance plan retains this same boundary.

A description of the maintenance area boundary follows.

Beginning from the point where the centerline of the southbound section of the Glenn Highway crosses Eagle River, thence

Northward three kilometers to point approximately 200 meters west of the Glenn Highway along the westward extension of Mercy Street, thence,

Eastward along the alignment of Mercy Street two kilometers to an undeveloped point, thence,

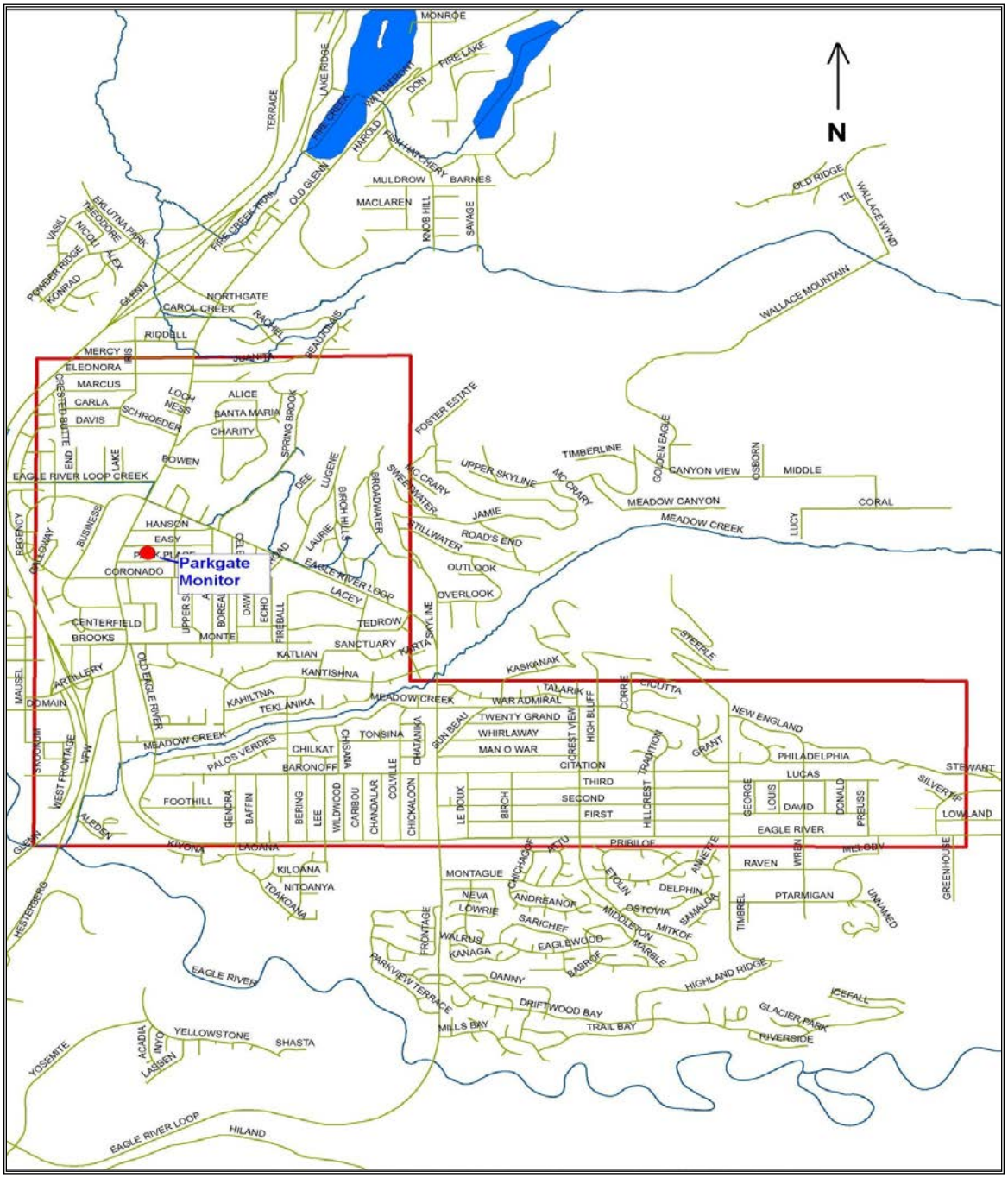
Southward two kilometers to a point approximately 150 meters west of Eagle River Loop Road and approximately 70 meters southwest of the intersection of Kantishna and Iditarod Streets (near the point where the Loop road crosses Meadow Creek); thence,

Eastward three kilometers to an undeveloped point; thence,

Southward one kilometer to a point approximately 100 meters southeast of the intersection Eagle River Road and Greenhouse Street, thence,

Westward five kilometers approximately 70 meters south of the alignment of Eagle River ending at the centerline of the southbound section of the Glenn Highway which is the point of the beginning.

Figure III.D.2-1
Eagle River PM_{10} Limited Maintenance Area Boundary
with Parkgate PM_{10} Monitoring Site



III.D.2.4. Parkgate PM_{10} Monitoring Site Information

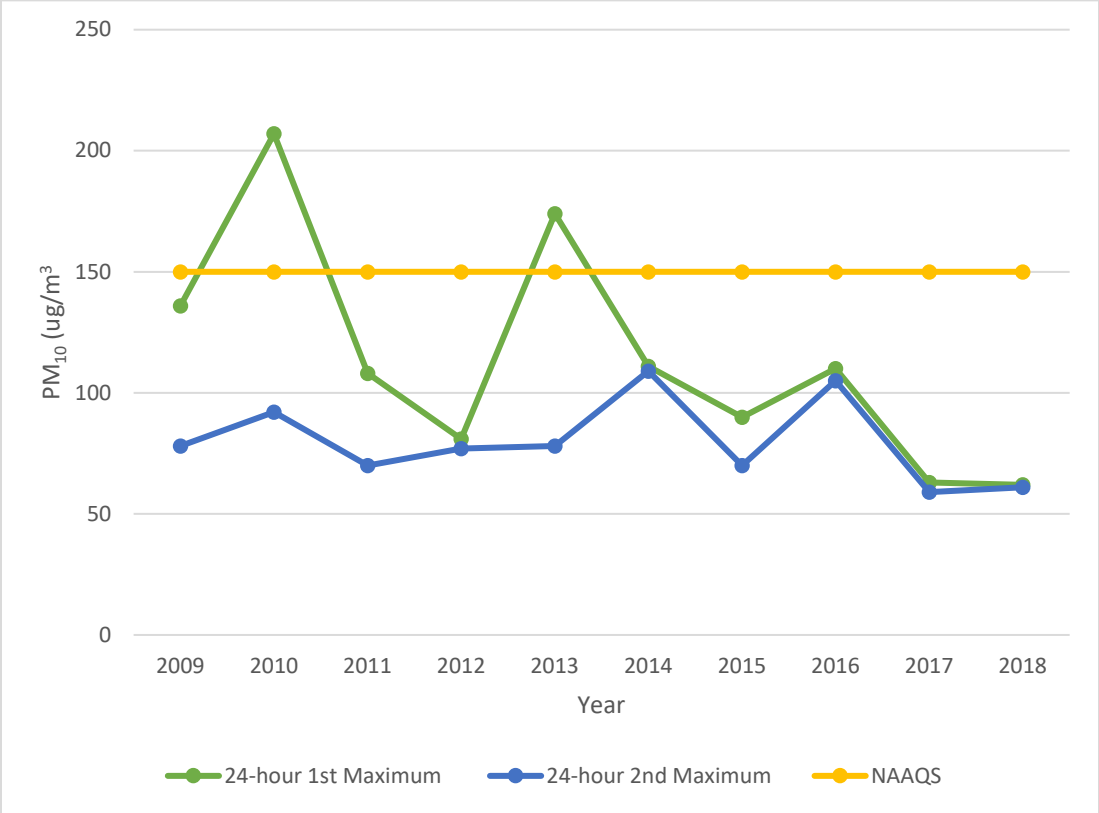
Monitoring has been performed at the Parkgate monitoring site since 1985. The site, identified in Figure III.D.2-2, is located at the Parkgate Business Center building at 11723 Old Glenn Hwy, in Eagle River at latitude 61° 19' 36.0" north (61.326667), longitude 149° 34' 10.8" west (-149.569667), and 100 meters (328 feet) above sea level. The monitoring site, which is classified as neighborhood scale and population-oriented monitoring site, is located within a commercial strip along the east side of the Old Glenn Highway. The land use to the north, west, and south of the site is generally commercial while the land to the east is primarily residential. Before 1988, this site was bounded on two sides by gravel roads.

The PM_{10} (SLAMS) monitoring site is equipped with two Met One BAM 1020X monitors – one configured to monitor $PM_{2.5}$ and the other configured to monitor PM_{10}. The Met One BAM 1020X were installed in October 2008 and were tested for correlation with a collocated FRM PM10 sampler. Since January 2009, the DEC and MOA have been submitting PM_{10} and $PM_{2.5}$ hourly data from these monitors.

Figure III.D.2-2
Looking North from the Parkgate Site in Eagle River

Figure III.D.2-3
First and Second Highest 24-Hour Average PM_{10} Concentrations

Parkgate Site, Eagle River (2009-2018)



In 1987, there were over 22 miles of unpaved gravel roads in the area. The *Eagle River PM_{10} Control Plan* called for paving or surfacing about one-third of the unpaved roads in the area. By 2007, *all* roads in the area had been paved or surfaced with recycled asphalt. As demonstrated in the attainment plan, and the first 10-year limited maintenance plan, the paving of all the roads in the area contributed to a significant lowering of the PM_{10} concentrations.

The PM_{10} concentrations measured at the Parkgate monitoring site from 2009-2018, as shown in Figures III.D.2-3, were well below the NAAQS except for on September 24, 2010, and January 15, 2013, when there were exceedances as a result of wind-blown loess. The exceedances recorded were 207 µg/m^3 and 174 µg/m^3 respectively.

The highest, second highest, and the number of days of NAAQS exceedance are tabulated in Table III.D.2-1 for the period 2009-2018. These summary data show that exceedance of the PM_{10} NAAQS in Eagle River is uncommon in recent years. The Eagle River PM_{10} maintenance area has continually attained the compliance measure for the PM_{10} NAAQS since 1988.

Table III.D.2-1
Maximum, 2nd Maximum and Number of Exceedances at
Parkgate Site, Eagle River 2009-2018

Year	24-hour Max (µg/m^3)	2nd Highest 24-hour (µg/m^3)	Number of Days of NAAQS Exceedance
2009	137	78	0
2010	207	92	1
2011	108	70	0
2012	81	77	0
2013	174	78	1
2014	111	109	0
2015	90	70	0
2016	110	105	0
2017	63	59	0
2018	62	61	0

[#]Note: This Table does not include the wind-related exceptional event of October 30, 2009, that led to 24-hour PM_{10} level of 163 µg/m^3 because of the EPA's concurrence

III.D.2.5. Demonstration that Eagle River Qualifies for the LMP Option

Since EPA approved the first 10-year LMP in 2013, the State and MOA are required under the CAA Section 175 A (United States Code (USC) Title 42 Section 7505(b)) to adopt and submit a plan for Eagle River that demonstrates compliance with the NAAQS through 2033. On August 9, 2001, EPA issued guidance on streamlined maintenance plan provisions for certain PM_{10} nonattainment areas seeking redesignation to attainment (*Limited Maintenance Plan Option for Moderate PM_{10} Nonattainment Areas, Wegman 2001*). The EPA also allows States to use this policy to prepare the required second 10-year maintenance plans if the area meets the qualification criteria in the EPA LMP Guidance.

A maintenance plan typically contains an emission or modeling demonstration that shows how the area will stay in compliance through the 10-year maintenance period. This demonstration requires a projected emissions inventory usually. However, an area meeting the LMP qualification criteria is at little risk of violating the standard because emissions are not expected to grow sufficiently to threaten the maintenance of the standard. As stated in Section V.b. *Maintenance Demonstration of the Wegman memo*, "if the tests described in Section IV are met, we will treat that as a demonstration that the area will maintain the NAAQS. Consequently, there is no need to project emission over the maintenance period." Thus, for this second 10-year LMP, emissions inventory was only developed for 2017, which was selected as the base year.

The EPA observed that areas meeting specific statistical criteria have a high degree of probability of continued compliance with the NAAQS. Based on this analysis, they developed specific criteria to qualify for the LMP option. Elements of these criteria follow:

<u>LMP Qualification Criteria</u>

1. The area should be attaining the PM_{10} NAAQS;

2. The average 24-hour PM_{10} design value (DV) for the area, based on the most recent five years of air quality data at all monitors in the area, should be at or below 98 $\mu g/m^3$ with no violations at any monitor in the nonattainment area; and
3. The area should expect only limited growth in on-road motor vehicle PM_{10} emissions (including fugitive dust) and should have passed a motor vehicle regional emissions analysis test.

The next three sub-sections will demonstrate that Eagle River meets these three criteria.

1. Eagle River is attaining the PM_{10} NAAQS

The primary and secondary 24-hour standard for PM_{10} which was set at 150 micrograms per cubic meter ($\mu g/m^3$) and prohibited from exceeding more than once a year on average over three years. Eagle River nonattainment area had attained the PM_{10} NAAQS by the applicable attainment date of December 31, 1994. On September 29, 2010, the State of Alaska submitted the first 10-year Limited Maintenance Plan (LMP) and requested that EPA find the plan complete and approve the re-designation of the Eagle River nonattainment area to attainment under the LMP option. On October 19, 2010, the EPA determined that Eagle River nonattainment area had attained the NAAQS, effective December 20, 2010. On January 7, 2013, the EPA approved the LMP and concurrently re-designated the area to attainment for the PM_{10} NAAQS, effective March 8, 2013. The Eagle River maintenance area continues to attain the standard for PM_{10} despite the high values of 2010 and 2013.

2. The average DV for the Eagle River area is below 98 $\mu g/m^3$

A design value is a statistic based on monitoring data that determines an area's compliance status. Computational methods for determining the 24-hour DV are outlined in the *PM_{10} SIP Development Guideline (EPA-450/2-86-001, June 1987*). The empirical frequency distribution approach (see Section 6.3.3. of the guideline) was used to determine the DV which is defined as the site-specific PM_{10} concentration that would be expected to be exceeded at a frequency of once every 365 days. Table III.D.2-2 shows that Eagle River has a computed average DV of 96 $\mu g/m^3$ for the last five years (2014-2018), which is below the LMP criteria of 98 $\mu g/m^3$ (details of this computation can be found in the Appendix to III.D.2.5.).

Table III.D.2-2
DV Computed from Empirical Data Distribution
Parkgate Site, Eagle River 2009-2018

3-year Period	DV ($\mu g/m^3$)
2009-2011	96
2010-2012	90
2011-2013	88
2012-2014	107
2013-2015	106

2014-2016	108
2015-2017	86
2016-2018	82
Average DV for the last 5 years (2014-2018)	96
LMP criteria	98.0

*Note: The DV was computed from the empirical data distribution of 3 years data

However, to further justify the eligibility of Eagle River for the second 10-year LMP, EPA, during the discussion on the development plan, suggested the calculation of a site-specific value (known as critical design value (CDV)) and its inclusion in the second 10-yr LMP. CDV allows areas with design values with little inter-annual variability to qualify for the LMP option if their DV is above 98 µg/m^3.

Tables III.D.2-3 and III.D.2-4 represent the 3-yr Average Design Values (ADVs) and the calculated CDVs respectively (detailed explanation on the computation as well as the spreadsheet consisting of all the data can be found in Appendix to III.D.2.5)

Table III.D.2-3
3-Year Average Design Values (ADVs) Data

Years	**3-Yr OBS**	**Tabular ADV**		**Empirical ADV**	**Empirical ADV**	**Upper 10% Tail Dist - ADV**
		upper	lower	all data	>= 40 µg /m^3	
2011-2014	1041	111	109	107	114	108
2012-2015	1037	111	109	106	114	105
2013-2016	1038	110	109	108	109	107
2015-2017	1045	90	86	86	93	96
2016-2018	1043	105	86	82	91	95

Table III.D.2-4
Critical Design Value Calculation

CDV = NAAQS/(1+t_CCV)	**Tabular**	**Empirical (all)**	**Empirical (>39)**	**U10% Tail Dist**
SD	12.6	12.9	11.3	6.2
Mean	99.8	98.0	104.2	102.2
CV	0.126	0.131	0.109	0.061
NAAQS	150.0	150.0	150.0	150.0
n	5	5	5	5
df	4	4	4	4
t_C (10%, one-tail)	1.533	1.533	1.533	1.533

Critical Design Value (CDV)	125.7	124.8	128.5	137.2

With the 5-year ADV (96 µg/m^3) for this monitoring station, less than the CDV (124.8 µg/m^3), these CDVs provide additional evidence that the Eagle River Maintenance Area continues to remain eligible for a Limited Maintenance Plan. Hence, there is less than 10% probability of violating the PM_{10} 24-hr standard in the future at the Parkgate site in Eagle River.

3. Eagle River Passes Motor Vehicle Regional Emissions Analysis Test

Increases in emissions from on-road mobile sources must be taken into account over the next 10 years to help ensure that PM_{10} concentrations will remain below the NAAQS. The EPA LMP guidance recommends the use of the following equation to assess the impact of future emission increases from motor vehicle travel:

$$\textbf{Projected DV in 2033} = \mathbf{DV_{2017}} + (\mathbf{VMT_{pi}} \times \mathbf{DV_{mv}}) \leq \mathbf{MOS}$$

Where:

DV = the area's average DV in µg/m^3 for the period used to demonstrate LMP qualification (base year 2017)

VMT_{pi} = the projected % increase in vehicle miles traveled (VMT) between 2017 (the base year) and 2033 (the last year of the second 10-year LMP period).

DV_{mv} = Portion of DV for the base year (2017) inventory in µg/m^3 that is derived from on-road emissions

MOS = margin of safety for the relevant PM_{10} standard in µg/m^3 for a given area. This can be = 98 µg/m^3 or a site-specific value computed from data collected at the site of interest using methods outlined in Attachment A of the LMP guidelines. The computed site-specific values for the Parkgate site in Eagle River are 125.7 µg/m^3, 124.8 µg/m^3, 128.5 µg/m^3, and 137.2 µg/m^3 (See Appendix to III.D.2.5 for details of this computation). The site-specific value 125.7 µg/m^3 (the critical design value for all the empirical data) was selected as the MOS for this computation.

In the preceding sub-section, the average DV was computed to be 96 µg/m^3.

The VMT for 2017, as estimated in the 2007 Chugiak/Eagle River Long Range Transportation Plan (CE/LRTP), was 212,308 while projected VMT for 2033, as estimated by travel demand model (TDM), is 265,731. VMT was projected to grow by 25.2% from 2017 to 2033. Thus, the projected increase in VMT (VMT_{pi}) is 0.252. The projected VMT estimate for 2033, which was calculated from the TDM of the road network coverage within the maintenance area, was obtained from the TDM consultant for the Anchorage Transportation Planning Department. The spreadsheet consisting of the VMT data can be found in the Appendix to III.D.2.5.

As will be shown in the PM_{10} emission inventory presented later in Section III.D.2.6, the proportion of total PM_{10} from on-road mobile emissions varies with the season in the Eagle River maintenance area. In the base year 2017 emission inventory, on-road mobile emissions, including fugitive dust emissions, were responsible for 56.3% of total daily emissions in spring and 48.6% in the fall (see Table III.D.2-5 for details). For the Motor Vehicle Regional Emissions Analysis Test, the higher spring season proportion was assumed. The portion of 2017 DV that is attributed to on-road mobile sources (DV_{mv}) can be readily calculated as follows:

DV_{mv} = DV x 0.563 = 96 µg/m^3 x 0.563 = 54.0 µg/m^3

Knowing the values of the four variables, the projected DV in 2033 can be readily computed:

Projected DV in 2033 = DV_{2017} + (VMT_{pi} x DV_{mv})

= 96 µg/m^3 + (0.252 x 54.0 µg/m^3)

Projected DV in 2033 = 109.6 µg/m^3 < MOS

The projected DV in 2033 is less than the 125.7 µg/m^3 margin of safety value (MOS). Hence, this demonstrates that the Eagle River Maintenance Area meets the Motor Vehicle Regional Emissions Analysis Test.

III.D.2.6. Emission Inventory for Eagle River

A maintenance plan typically contains an emission or modeling demonstration that shows how the area will stay in compliance through the 10-year maintenance period. This demonstration requires a projected emissions inventory usually. However, an area meeting the LMP qualification criteria is at little risk of violating the standard because emissions are not expected to grow sufficiently to threaten the maintenance of the standard. As stated in Section V.b. *Maintenance Demonstration of the Wegman memo*, "if the tests described in Section IV are met, we will treat that as a demonstration that the area will maintain the NAAQS. Consequently, there is no need to project emission over the maintenance period." Thus, for this second 10-year LMP, emissions inventory was only developed for 2017, which was selected as the base year.

In the past, the highest PM_{10} concentrations have typically occurred during spring break-up and fall freeze-up. For this reason, the emission inventories reflect conditions and activity levels (e.g., amount of silt loading on roads, residential wood heating rates) that commonly occur during these two times of the year. The assumptions, methods, and computations used to generate the 2017 emission inventory are described in detail in the Appendix to III.D.2.6.

Unlike in the first 10-year LMP where five sources of PM_{10} emissions were identified and inventoried, for this second 10-year LMP, six sources were inventoried. These include (1) dust from paved roads; (2) wind-generated dust from roads, parking lots and un-vegetated areas; (3) fireplaces and woodstoves, (4) natural gas combustion; (5) exhaust, tire and brake wear emissions from motor vehicles; and (6) non-road equipment.

However, similar to the emission inventories prepared for the first 10-year LMP (2007 and 2020), emission estimates for this second 10-year LMP were only for paved roads. This is because all the unpaved roads in Eagle River had been paved since the *Eagle River PM10 Control Plan* was prepared.

The EPA publication, AP-42, *Compilation of Air Pollutant Emission Factors*, outlines recommended assumptions and methods for estimating emission factors for various sources. AP-42 methods were used to estimate emission factors for four of the six sources inventoried. The latest EPA's mobile source emission factor model, MOVES2014b, was used to generate emissions for motor vehicle exhaust, tire, and brake wear, as well as for the non-road equipment. In the first 10-year LMP, the emissions from non-road equipment in Eagle River were assumed

to be zero. DEC, however, went ahead to run MOVES2014b for the non-road equipment in the area. While the on-road emissions for Eagle River Maintenance area were calculated from the county-level emissions derived from the local fleet data that was submitted to EPA for the 2017 NEI, the non-road estimates were derived from the county-level defaults. The methods, assumptions, and computations are described in detail in the Appendix to III.D.2.6, and the attached spreadsheets.

The results of the inventory are presented in Table III.D.2-5. Paved road dust, windblown dust and fireplace, and wood stove emissions remain the main sources of PM_{10} in the Eagle River maintenance area.

Table III.D.2-5
Eagle River 2nd 10-year Limited Maintenance Area PM_{10} 2017 Emissions Inventory
(All Emissions in tons/day with % of Total)

Source Category	Spring Break-up (March, April) (tons/day)	Fall Freeze-up (October, November) (tons/day)
Paved Roads	3.71 (56.3%)	1.06 (48.6%)
Wind-blown Dust from Paved Roads, Parking Lots and Un-Vegetated Areas	2.48 (37.6%)	0.73 (33.4%)
Fireplaces and Wood Stoves	0.35 (5.31%)	0.35 (16.0%)
Natural Gas Combustion	0.009 (0.13%)	0.009 (0.41%)
Exhaust, Tire and Brake Wear Emissions from Motor Vehicles	0.026 (0.39%)	0.027 (1.23%)
Non-Road Equipment Emissions	0.0135 (0.20%)	0.0132 (0.60%)
Total	6.58 (100%)	2.18 (100%)

In accordance with the LMP guidance memo, the State will review its inventory every three years to ensure emissions growth is incorporated in the attainment inventory if necessary.

III.D.2.7. Demonstration of the Continued Implementation of the Control Measures

As noted in the first 10-year LMP, a large decline in PM_{10} concentrations has continued to be observed in the Eagle River maintenance area, and this decline was attributed primarily to the paving of local gravel roads in the area. In 1987, almost one-half of all the roads in the area (22 miles) were unpaved. By 2007 all of these roads were paved either with traditional hot asphalt paving or surfaced with recycled asphalt product (RAP). The MOA continues to commit to the maintenance of these roads (22 miles) through the end of the second 10-year limited maintenance period (2033).

All RAP-surfaced roads in the maintenance area were chip-sealed to improve their durability. The effective lifetime of these chip-sealed roads is estimated to be 10 to 15 years. When these roads have reached the end of their lifetime, a new lift of chip seal (a mix of crushed aggregate or "chips" and asphalt emulsion), which serves as a new wearing course for the road, will be applied.

Prior to submitting the first 10-year LMP, the Anchorage Assembly adopted a revised land use code that requires paving of all streets except those in low density residential areas zoned R-6, R-7, R-8 or R-9.[7] Anchorage Municipal Code (AMC) Title 21 was fully replaced with new version, effective as of January 1, 2014.[8] References 21.45.080.W.7 and 21.85.030 are outdated references to the repealed version of AMC Title 21, which was in effect prior to 01/01/2014. Although most of the Eagle River maintenance area is "built out" and few new roads are likely to be constructed, the requirements stipulated in Anchorage Municipal Code 21.08.050 will help ensure that new streets constructed in the Municipality, including Eagle River, will not cause new PM_{10} problems. Section 21.08.050 is the applicable code reference within the current version of Title 21 which requires paved road improvements for non-rural, residential properties in the MOA. Section 21.08.050 should replace references 21.45.080.W.7 and 21.85.030 in the SIP, as it is the similar road paving requirement under current Anchorage Municipal Code.

Note: The Anchorage Assembly on March 3, 2018, repealed pre-existing AMC Chapter 15.30 (South Central Clean Air Program) and Chapter 15.35 (South Central Clean Air Ordinance Regulations) and replaced them with a new Chapter 15.30 (Clean Air Ordinance).

Reenactment of AMC Chapter 15.30 (Clean Air Ordinance) is not a PM_{10} control measure, nor was it intended to better control PM_{10} emissions or allow for maintenance of the PM_{10} NAAQS. The repeal of old Chapters 15.30 and 15.35 was accomplished to correct an outdated reference to the governmental body responsible for air quality planning and standards within the Municipality of Anchorage (MOA) and to re-align local vs. state air quality permitting requirements to reflect current needs and delineation of air contaminant permitting responsibilities between state and local government. The replacement Chapter 15.30 included a new 20% opacity limit applicable stack emissions for all solid fuel heating devices. This new ordinance provision could have a minor ancillary effect of reducing wintertime PM_{10} emissions; however, that new provision was not intended to reduce peak-season PM_{10} emissions, nor is it expected to substantially facilitate maintenance of the PM_{10} NAAQS within the MOA.

The Anchorage Street Maintenance section has found that due to high maintenance and challenging mix of wet & dry conditions, waterless street sweepers are not ideal for removal of road sediments exposed by melting snow and ice during the March/April spring melt season when Anchorage roadway PM_{10} emissions typically spike. The Anchorage and State of Alaska, Street Maintenance programs have been successful at controlling roadway PM_{10} emissions by application of Magnesium Chloride brine solutions to exposed sediments on road surfaces to suppress their disturbance by traffic until such time that the sediments can be effectively removed by conventional wet sweep methods combined with a post-sweep flush of residual fine particulates. Anchorage Street Maintenance applies magnesium chloride solutions ranging from

[7] R-6, R-7, R-8 and R-9 are residential zoning designations defined in Title 21 of the Anchorage Municipal Code. R-7 zoning allows between one and two dwelling units per acre. The maximum dwelling unit density allowed in R-6, R-8 and R-9 varies from one per acre (R-6) to one per four acres (R-9).

[8] https://library.municode.com/ak/anchorage/codes/code_of_ordinances?nodeId=TIT21LAUSPLNECOFFJA12014

31% magnesium chloride – full strength brine for icy conditions – to 8% magnesium chloride (1:4 water diluted brine) for light duty dust suppression at temperatures consistently above 32˚F.

The MOA is committed to continued maintenance of existing RAP/chip-sealed roads in the maintenance area and the MOA and ADOT&PF are committed to maintaining traction sand specifications that allow no more than 2% fines or silt through 2033.

III.D.2.8. Compliance with Air Quality Monitoring Requirements and Verification of Continued Attainment

According to CAA Section 110(a)(2), once an area is redesignated, the State must continue to operate an appropriate air monitoring network in accordance with 40 CFR Part 58 to verify the attainment status of the area. The DEC and MOA are committed to the continued operation of at least one EPA-approved PM_{10} monitoring site in the Eagle River maintenance area through the end of the maintenance planning period, 2033, and will continue to operate the monitor consistent with the EPA approved ADEC annual network plan. Monitoring will be conducted in accordance with 40 CFR Part 58.

Continued reliable PM_{10} monitoring is essential in the limited maintenance area because there is no cap on emissions, that is, LMPs do not require an emissions budget. Hence, monitoring will be used to verify continued maintenance of the standard through the maintenance plan period. The MOA will annually recalculate the design value using the most recent five years of monitor data in order to verify that the area continues to qualify for the LMP option.

However, if after performing the annual recalculation of the area's average design value in a given year, the State determines that the area no longer qualifies for the LMP, outlined below, in the LMP guidance memo, are the steps the State will take:

"If, after performing the annual recalculation of the area's average design value in a given year, the State determines that the area no longer qualifies for the LMP, the State should take action to attempt to reduce PM_{10} concentrations enough to requalify for the LMP. One possible approach the State could take is to implement a contingency measure or measures found in its SIP. If, in the next annual recalculation the State is able to re-qualify for the LMP, then the LMP will go back into effect. If the attempt to reduce PM_{10} concentrations fails, or if it succeeds but in future years it becomes necessary again to address increasing PM_{10} concentrations in the area, that area no longer qualifies for the LMP. We believe that repeated increases in PM_{10} concentrations indicate that the initial conditions that govern air quality and that were relied on to determine the area's qualification for the LMP have changed, and that maintenance of the NAAQS can no longer be assumed. Therefore, the LMP cannot be reinstated by further recalculations of the design values at this point. Once the LMP is determined to no longer be in effect, a full maintenance plan should be developed and submitted within 18 months of the determination."

III.D.2.9. Natural Events Action Plan

Exceptional events are unusual or naturally occurring events that can affect air quality but are not reasonably controllable using techniques that tribal, state or local air agencies may implement in order to attain and maintain the NAAQS. Exceptional events may include wildfires, high wind dust events, prescribed fires, stratospheric ozone intrusions, and volcanic and seismic activities.

The MOA filed for exceptional event waiver request (EEWR) for the high wind events that occurred on October 30 and 31 of 2009. The DEC forwarded the EEWR to the EPA on June 7, 2012. On November 2, 2012, the EPA approved the exceptional event of October 30, 2009, effective March 8, 2013 (78 FR 900). Thus, the 163 $\mu g/m^3$, recorded on October 30, 2009, was excluded from the 2009 data and Table III.D.2-1. A copy of the exceptional event documentation, with the EPA's approval letter, is included in the Appendix to III.D.2.9. EPA did not act on the event of October 31, 2009, that led to 24-hour PM_{10} level of 137 $\mu g/m^3$, on the basis that it did not have a regulatory significance.

DEC submitted EEWR for the high wind event of September 24, 2010, that led to an unpreventable exceedance (207 $\mu g/m^3$) at the Parkgate monitoring site. The EPA acknowledged receipt of the EEWR and stated, "based on our initial review of your request, we have determined that the event will not affect a regulatory decision for Eagle River." The EPA also stated, "If at some point in the future, the regulatory status of this even changes, we will work with you at that time to review this exceptional event submission and prepare formal response."

The 24-hour PM_{10} level (174 $\mu g/m^3$) recorded at the Parkgate monitoring site on January 15, 2013, was attributed to the deposition of sediments and other particulate matter on the roads by rain and melting snow, followed by dry, cold weather. Although the Department issued an air quality advisory on the afternoon of January 15, it was canceled in the morning of January 16, when the problem got resolved by snowfall and an increase in the humidity. Hence, the Department did not file for EEWR.

III.D.2.10. Contingency Provisions

Section 175A of the CAA requires that a maintenance plan include contingency measures in order to promptly correct any violation of the standard that may occur after the redesignation of the area to attainment.[9] Normally, the implementation of contingency measures is triggered by a violation of the NAAQS.

This section identifies a process and a timeline to identify and evaluate appropriate contingency measures in the event of a violation of the PM_{10} NAAQS.

Contingency Measures Assessment

Within 30 days following a violation of the PM_{10} NAAQS, the MOA will convene an assessment team to identify control measures that appropriately address the source(s) and circumstances causing the violation.

[9] The *Eagle River PM_{10} Control Plan* drafted in 1991 included two contingency measures. The first contingency measure called for the surfacing of two additional miles of gravel roadway in the nonattainment area with RAP. The second called for "sweetening" existing RAP roads with asphalt emulsion to improve their PM_{10} reduction effectiveness. Even though these measures were never triggered by a violation of NAAQS, *all* roads in the nonattainment area have now been surfaced with RAP or paved. In addition, all RAP roads have been enhanced with a chip-seal coating to improve their effectiveness at reducing dust and to increase their durability.

Within 120 days of the violation, the assessment team will prepare a report that identifies the cause or causes of the violation and recommends appropriate measures for mitigating future violations. The report shall be presented to the AMATS Policy Committee for review and adoption and then forwarded to DEC for approval.

The report should include an analysis of the PM_{10} monitoring data before and after the violation and a discussion of how the PM_{10} source or sources leading to the violation were determined. Other possible contributing factors, such as weather conditions should be discussed. The effectiveness of existing controls, particularly those included in this maintenance plan, should be discussed and any lapses in the implementation of such controls should be identified.

The assessment team shall review the list of possible contingency measures offered in this Plan and recommend the implementation of one or more for them to address the source or sources of the PM_{10} violation. The team has the option of recommending alternative measures not included on this list if circumstances warrant.

Local actions resulting from the assessment team recommendations will be at the discretion of the Municipal Mayor and Assembly. Several of the possible contingency measures would require changes to the local ordinance by the Anchorage Assembly before they could be implemented.

List of Potential Contingency Measures

The attainment inventory suggests that the primary sources of PM_{10} in Eagle River are traffic-related paved road dust emissions, wind-blown dust emissions from roadways, parking lots and cleared areas, and fireplace and wood stove emissions. As such, if a future violation were to occur, a combination of one or more of these sources is most likely to be the cause.

A list of potential contingency measures for each of these three sources follows:
Traffic-Related Paved Road Dust

1. Apply chemical dust palliatives to high volume roadways upon prediction of high PM_{10}.

   The highest emissions typically occur along major roads during the spring break-up period when they are heavily laden with a winter's worth of accumulated traction sand and other road sediment. Road sediment accumulates primarily in gutters, shoulders, medians and in the dividing strip between turn lanes and through lanes of high volume roadways. During the spring break-up period of 2008 the MOA performed a field study of the dust palliative magnesium chloride brine ($MgCl_2$).[10] The study concluded that absent significant precipitation, an application of $MgCl_2$ substantially reduced dust emissions for at least a week after application. This suggests that $MgCl_2$ could be used to mitigate roadway PM_{10} emissions when concentrations are predicted to approach or exceed the NAAQS.

2. Sweep major roadways prior to spring break-up and other periods when elevated PM_{10} is anticipated.

   Although sweeping has been included here as a potential contingency measure, it should be noted that its effectiveness and practicality as a control measure during the spring break-up period is questionable. Many studies have shown that without extensive back-flushing,

[10] A draft report, entitled *Field Evaluation of Suitability of Magnesium Chloride Brine for PM_{10} Control on Paved Roads in Anchorage* was completed by the MOA Department of Health and Human Services in September 2008.

traditional mechanical sweeping methods do not effectively reduce PM_{10} emissions. In late March and early April when PM_{10} is often highest, subfreezing temperatures make the use of water back-flushing impractical. Moreover, ice and snow on roadway shoulders prevent effective sweeping where the road is most heavily laden with sediment. The MOA is experimenting with alternatives to "traditional" sweeping such as post-sweep application of a dust palliative and/or "double-pass" waterless sweeping. The MOA plans to continue to experiment with alternative sweeping procedures and one or more may prove viable as a contingency measure in the future.

Wind-blown Dust from Roadways, Parking Lots and Cleared Areas

1. Implement one or more of the traffic-related paved road dust measures discussed above.

   Paved roadways comprise over 75% of the cleared area in the Eagle River PM_{10} maintenance area. Thus, the same measures suggested for controlling traffic-related PM_{10} emissions are suitable for reducing wind-blown dust. For example, the application of $MgCl_2$ brine would also be expected to reduce wind-generated dust from roads.

2. Require application of dust palliatives to paved parking areas.

   Parking lots, playgrounds, and other similar paved areas comprise about 20% of the cleared area in the maintenance area. The application of dust palliatives to these areas would be expected to reduce emissions.

3. Establish required specifications for traction sand materials applied to parking lots.

   Currently, there are no requirements placed on the quality or quantity of traction sand materials applied to parking lots. New MOA regulations could be established that would limit the amount of fines or silt allowed in the traction sand applied to contiguous parking lots and paved areas greater than five acres in size, for example.

Fireplaces and Wood Stoves

1. Curtail fireplace and wood stove use when high PM_{10} is predicted.

   Although fireplace and wood stove emissions currently make up a relatively small part of total PM_{10} emissions, it is possible that future increases in natural gas heating costs could drive more households to heat with wood. If this is the case, emissions of PM_{10} would increase over time. Presumably air quality monitoring data would provide evidence if such a trend were occurring. An increase in wood heating would likely jeopardize attainment of the $PM_{2.5}$ (fine particulate) NAAQS before PM_{10}. Nevertheless, in some circumstances it may be appropriate to consider regulating fire place and wood stove use as means to addressing PM_{10} violations.

III.D.2.11. Air Quality Conformity for LMP Areas

The transportation conformity rule and general conformity rule apply to nonattainment and maintenance areas. Under either rule, an acceptable method of demonstrating that a federal action conforms to the applicable SIP is to demonstrate that expected emissions from the planned action are consistent with emissions budget for the area.

Although EPA policy does not exempt LMP areas from the need to demonstrate conformity, it allows the area submit a SIP without submitting an emissions budget, because data demonstrates no violation of the NAAQS will occur due to reasonable growth projections. For transportation purposes, the emissions in a qualifying LMP area need not be capped for the maintenance period, and thus no regional emissions analysis is required. Regional transportation conformity is presumed due to the limited potential for emission growth in the area during the LMP period. The LMP removes the requirement to do a regional emissions analysis (40 CFR 93.118 and 93.119). Similarly, federal actions subject to the general conformity rule would automatically satisfy the "budget test' specified in Section 93.158(a)(5)(i)(A) for the same reasons. However, all other conformity requirements remain in place: consultation, timely implementation of TCMs, etc. The Table in 40 CFR 93.109 has a list of the requirements for determining conformity.

Although Eagle River is a maintenance area, transportation conformity determinations are still required for transportation plans, programs (TIPs) and projects; a regional emission analysis is, however, not required because the area has an approved LMP. The Plan and the TIP must still be made available for public review. The portions of the conformity rule that still apply are found in 40 CFR 93.112 and 93.113 and the consultation requirements as specified under state regulation, 18 AAC 50 .715 and 50.720.

In addition, transportation projects would still need to meet the criteria for PM_{10} hot spots (40 CFR 93.116 and 93.123) and PM_{10} control measures (40 CFR 93.117). The MOA will work with DEC and interested parties to develop evaluation criteria and process to meet these transportation conformity requirements.