Alaska Department of Environmental Conservation

Amendments to State Air Quality Control Plan

Vol. II: Analysis of Problems, Control Actions

Section III.D.3 Juneau's Mendenhall Valley 2nd 10-year PM-10 Limited Maintenance Plan

Adopted

July 22, 2020

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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.3 encompassed the Juneau's Mendenhall Valley 1st 10-year Limited Maintenance Plan. Sections III.D.3.1 - III.D.3.10 have been updated to reflect the 2nd 10-year Limited Maintenance Plan.

SECTION III.D.3

JUNEAU'S MENDENHALL VALLEY 2nd 10-YEAR PM_{10} LIMITED MAINTENANCE PLAN

III.D.3.1. Introduction

This second 10-year Limited Maintenance Plan (LMP) explains how Mendenhall Valley 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, wood smoke, heating devices, 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 The NAAQS also used to include an annual average standard set at 50 $\mu g/m^3$, but that standard has been revoked by the EPA (71FR 61144).[2]

The EPA, upon enactment of the federal Clean Air Act Amendments of 1990 (56 FR 56694)[3], on November 6, 1991, designated the Mendenhall Valley area of Alaska as a moderate nonattainment for PM_{10} for violating the 24-hour standard throughout the 1980s. On June 22, 1993, the Alaska Department of Environmental Conservation (DEC) submitted a State Implementation Plan (SIP) to the EPA. The plan, which was entitled the Mendenhall valley PM_{10} Attainment Plan, attributed the PM emissions in the area to fugitive dust from travel on roads and wood smoke from home heating devices. The SIP included a wood smoke control program, public education, real-time monitoring, open burning prohibitions in winter, new stove certification, and enforcement of a borough wood smoke ordinance. For fugitive dust, the plan focused on paving unpaved roads. On March 24, 1994, EPA approved the Mendenhall Valley PM_{10} attainment plan (59 FR 13884).[4]

On May 8, 2009, the State of Alaska submitted the first 10-year Limited Maintenance Plan (LMP) for the Mendenhall Valley nonattainment area and requested that EPA redesignate the

[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] (56 FR 56694) Federal Register/Vol. 56, No. 215/Wednesday, November 6, 1991/Rules and Regulations
Designations of Areas for Air Quality Planning Purposes. Final Rule effective January 6, 1992
[4] (59 FR 13884) Federal Register/Vol.59, No. 57/Thursday, March 24, 1994/Rules and Regulations
Approval and Promulgation of State Implementation Plans: Alaska. Final Rule effective April 25, 1994

area to attainment for PM_{10}. On May 9, 2013, the EPA approved the LMP and concurrently re-designated the area to attainment for the PM_{10} NAAQS, effective July 8, 2013 (78 FR 27071).[5] 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.

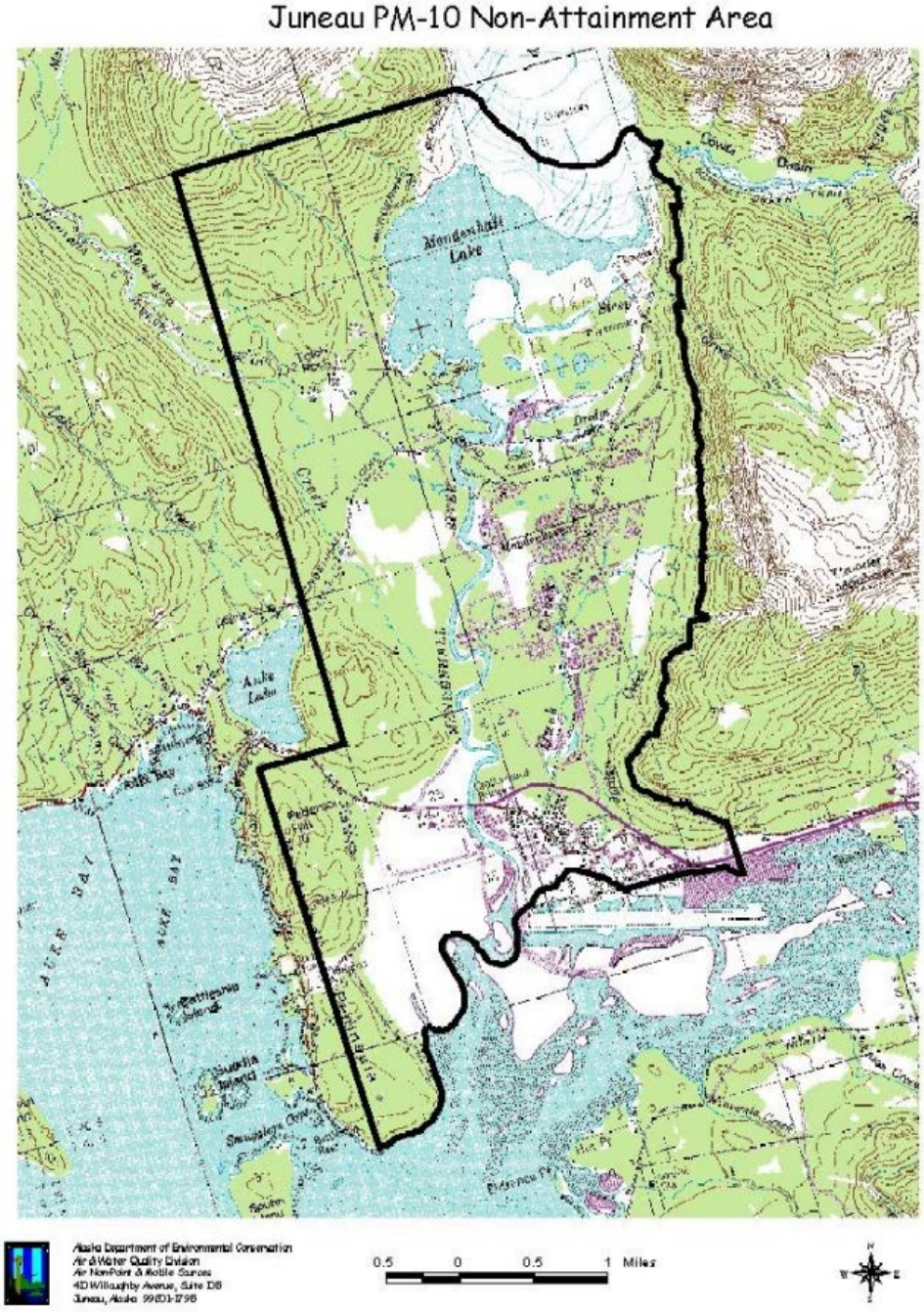
III.D.3.2. Boundary of the Mendenhall Valley Maintenance Area

The Mendenhall Valley maintenance area extends from the northern boundary of the Juneau Airport north through the Valley to the southern edge of the Mendenhall Glacier near Nugget Creek. The easterly and westerly boundaries are bound by steep ridge crests rising more than 1000 feet from the Valley floor. The second 10-year limited Maintenance Plan retains the same boundary (Figure III.D.3-1) that was identified in the Moderate Nonattainment Plan and the first 10-year limited Maintenance Plan.

The sources of particulate matter within the valley include residential wood smoke, ball fields and playgrounds, automobile exhaust, and fugitive dust. To the north, a gravel pit and the Mendenhall Glacier each may contribute to dust during windy conditions. On occasion, wildfire smoke from Western Canada has affected air quality in the Mendenhall Valley. Juneau International Airport (JIA) is just outside the maintenance area at the south end of the valley, but may affect monitoring sites when winds are from the south.

[5] (78 FR 27071) Federal Register/Vol. 78, No. 90/Thursday, May 9, 2013/Rules and Regulations
Approval and Promulgation of Air Quality Implementation Plans; Alaska: Mendenhall Valley Nonattainment Area PM10 Limited Maintenance Plan and Redesignation Request. Final Rule effective July 8, 2013

Figure III.D.3-1
Mendenhall Valley PM_{10} Limited Maintenance Area Boundary



III.D.3.3. Floyd Dryden PM_{10} Monitoring Site Information

The Alaska Department of Environmental Conservation operated multiple PM_{10} monitoring sites in the Mendenhall Valley in the 1980s and 1990s. Then, three sites in the Mendenhall Valley were designed as part of the State and Local Air Monitoring Stations. Trio Street operations occurred from 1989 to 1997. The Glacier Auto site operated from 1988 to 1993. From 1986 onward, monitoring has continued for PM_{10} at one site, Floyd Dryden Middle School, where operations began initially for total suspended particulate in 1980.

The Floyd Dryden site is located on the roof of Floyd Dryden Middle School at 3800 Mendenhall Loop Road in the Mendenhall Valley of Juneau at latitude 58.388889N and longitude -134.565556W. The school location is suburban-residential. Floyd Dryden is a neighborhood-scale, population-oriented site and is about 100 meters from the roadway.

Figure III.D.3-2
Looking North from the Floyd Dryden Site in Mendenhall Valley

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}, on hourly basis. The

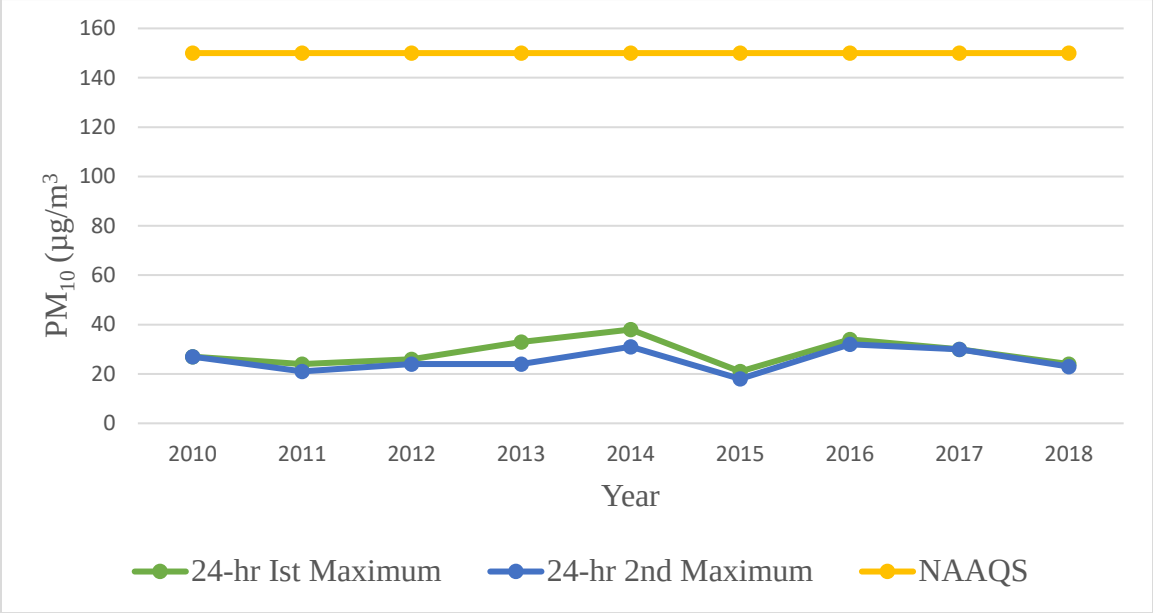
elevation for the monitors is approximately 8 meters. Before July 30, 2018, two Partisol FRM samplers were operated on a 1 in 3 schedule with collocated sampling on every sixth day.

Table III.D.3-1
Maximum, 2nd Maximum and Number of Exceedances at
Floyd Dryden Site, Mendenhall Valley 2010-2018

Year	24-hour Max (µg/m³)	2nd Highest 24-hour (µg/m³)	Number of Days Exceeding NAAQS
2010	27	27	0
2011	24	21	0
2012	26	24	0
2013	33	24	0
2014	38	31	0
2015	21	18	0
2016	34	32	0
2017	30	30	0
2018	24	23	0

Note: 2009 data points were removed from time series because of data completeness issue

Figure III.D.3-3
First and Second Highest 24-Hour Average PM_{10} Concentrations
Floyd Dryden Site, Mendenhall Valley (2010-2018)



Note: 2009 data points were removed from time series because of data completeness issue

As shown in both Table III.D.3-1 and Figure III.D.3-3, the PM_{10} concentrations measured at the Floyd Dryden monitoring site from 2010-2018 were well below the NAAQS. The Mendenhall Valley PM_{10} maintenance area has continually attained the compliance measure for the PM_{10} NAAQS since 1994.

Per EPA's guidance, 2009 data points were removed from time series because of data completeness issue, which DEC addressed in the letter submitted to EPA, dated January 6, 2010 (a copy of the letter can be found in the Appendix to III.D.3.3).

During the third quarter of 2009, data capture was above 75% for all sites reporting with the exception of the Floyd Dryden site in Juneau (AQS ID 02-110-0004). The sampling site was shut down on July 1, 2009 for a complete platform rebuild and did not resume sampling until August 5, 2009. Subsequent to the platform rebuild, intermittent power outages at the site were frequent, ultimately resulting in complete loss of PM_{10} filter data. Once the power to the new platform was re-wired, data collection returned to acceptable data capture.

Section 2.3(a) of Appendix K to 10 C.F.R. Part 50 and the Wegman memo, through reference of the "PM_{10} SIP Development Guideline," require that at least 75% data completeness per quarter be achieved. However, Per EPA's "Guideline on Exceptions to Data Requirements for Determining Attainment of Particulate Matter Standards" quarters with data completeness below 75% can be used to demonstrate attainment via applying the quarterly maximum data substitution test. To be eligible for this test at least 50% data completeness is needed.

III.D.3.4. Demonstration that Mendenhall Valley Qualifies for the LMP Option

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. 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. Since the EPA approved the first 10-year PM_{10} LMP in 2013, the State is required to adopt and submit a plan for Mendenhall Valley that demonstrates compliance with the NAAQS through 2033.

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:

LMP Qualification Criteria

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 Mendenhall Valley meets these three criteria.

1. Mendenhall Valley is attaining the PM_{10} NAAQS

On July 1, 1987, EPA revised Title 40, Part 50, of the Code of Federal Regulations to change the National Ambient Air Quality Standard (NAAQS) from total suspended particulate (TSP) to particulate matter less than 10 micrometers in diameter (PM_{10}). The primary and secondary NAAQS for PM_{10} standards follow:

24-Hour Standard

The NAAQS for PM_{10} is 150 $\mu g/m^3$ for 24-hour average concentration. The standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is less than or equal to one, as determined in accordance with 40 CFR 50, Appendix K.

Annual Standard

In 1987, the annual NAAQS for PM_{10} was set at 50 $\mu g/m^3$ calculated as an annual arithmetic mean. Due to lack of evidence linking health problems to long-term exposure to coarse particle pollution, the EPA revoked the annual standard on September 21, 2006.

On March 24, 1994, EPA approved the Mendenhall Valley PM_{10} attainment plan. On May 8, 2009, 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 Mendenhall Valley nonattainment area to attainment under the LMP option. On May 9, 2013, the EPA approved the LMP and concurrently re-designated the area to attainment for the PM_{10} NAAQS, effective July 8, 2013.

EPA determines whether an area's air quality meets the PM_{10} NAAQS based upon monitored data gathered in accordance with federal standards in 40 CFR Part 58. Since 2010 Mendenhall Valley has not exceeded the standard of 150 $\mu g/m^3$ for the 24-hour average concentration.

2. The average DV for the Mendenhall Valley 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.3-2 shows that Mendenhall Valley has a computed average DV of 49.2 µg/m^3 for the last five years (2014-2018), which is well below the LMP criteria of 98 µg/m^3 (details of this computation can be found in the Appendix to III.D.3.4).

Table III.D.3-2
DV Computed from Empirical Data Distribution
Floyd Dryden Site, Mendenhall Valley (2009-2018)

Three-year Period Used to Compute DV	DV (computed from empirical data distribution of 3 years data using all points) (µg/m^3)
2012-2014	45
2013-2015	46
2014-2016	59
2015-2017	52
2016-2018	42
Average DV for the last 5 years (2013-2018)	**49**
LMP criteria	**98**

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

Although the Average Design Value (ADV) is much less than 98 µg/m^3, DEC did calculate the critical design value (CDV) per EPA guidance to further justify the eligibility of Mendenhall Valley for the second 10-year LMP.

Tables III.D.3-3 and III.D.3-4 below represent the 3-yr Design Values (DVs) data and the calculated CDV respectively.

Table III.D.3-3
3-yr Design Values

Years	3-Yr OBS	Tabular-ADV = lower		Empirical - ADV	Upper 10% Tail Dist - ADV
		upper	lower		
2012-2014	185	0	38	45	38
2013-2015	183	0	38	46	40
2014-2016	188	0	38	59	44
2015-2017	187	0	34	52	54
2016-2018	285	0	34	42	45

Table III.D.3-4
Critical Design Value Calculation

CDV = NAAQS/(1+t_CCV)			
Parameter	**Tabular**	**Empirical (all)**	**U10% Tail Distribution**
St. Dev	2.2	7.0	6.2
Mean	36.4	48.8	44.2
CV	0.060	0.143	0.140
n	5	5	5
df	4	4	4
NAAQS	150.0	150.0	150.0
t_C (10%, one-tail)	1.533	1.533	1.533
Critical Design Value	**137.3**	**123.0**	**123.5**

With the 5-year ADV (40 µg/m^3) for this monitoring station, much less than the CDV for all the empirical data (123.0 µg/m^3), the CDV provide additional evidence that the Juneau's Mendenhall Valley 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 Floyd Dryden Site in Mendenhall Valley.

3. Mendenhall Valley 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 (Attachment B: Motor Vehicle Regional Analysis Methodology) to assess the impact of future emission increases from motor vehicle travel:

$$DV + (VMTpi * DVmv) \leq MOS$$

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

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. For this motor vehicle regional analysis test computation, 98 µg/m^3 is selected as the MOS

In the preceding sub-section, the calculated ADV is 40 µg/m^3.

The 2017 VMT estimate for Mendenhall Valley LMP area, as calculated by the Highway Data Team of the Alaska Department of Transportation and Public Facilities (DOT&PF), was 165,544, while projected 2033 VMT is 172,051 (see Appendix E for details of calculation)[6]. VMT is projected to grow by 3.93% from 2017 to 2033. Thus, the projected increase in VMT (VMT_{pi}) is 0.0393.

Based on the criteria given above, the Mendenhall Valley qualifies for the LMP option for the 24-hour and annual PM_{10} standard for all considered cases. Details of the calculations are shown below:

The parameter values used for the calculations are as follows:

- 24-hour ADV = 49 µg/m3;
- Projected % increase in VMT from 2017 to 2033, VMTpi = 3.93%.
- Margin of Safety (MOS) = 98 µg/m^3
- The percentages of the total inventory from on-road mobile sources, including fugitive dust in 2017 are:
  - Summer fraction = 62%,
  - Winter fraction = 33%

For the Motor Vehicle Regional Emissions Analysis Test, the higher summer 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} = ADV x 0.62 = 49 µg/m^3 x 0.62 = 30.4 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})

= 49 µg/m^3 + (0.039 x 30.4 µg/m^3)

Projected DV in 2033 = 50.2 µg/m^3 < MOS

The projected DV in 2033 (50.2 µg/m^3) is less than the 98 µg/m^3, the margin of safety value (MOS). Hence, this demonstrates that the Mendenhall Valley Maintenance area meets the Motor Vehicle Regional Emissions Analysis Test.

[6] Data obtained from Derrick Grimes (DOT&PF) on September 24, 2019

III.D.3.5. Emission Inventory for Mendenhall Valley

Air quality characterization in the Mendenhall Valley began in the early 1980s with phone surveys on wood combustion. In 1988, EPA conducted an emission inventory of all sources of spring and fall emissions, when monitoring had shown the highest levels of PM_{10} occurring. EPA worked with the State to determine appropriate emissions factors. Studies indicated that fugitive dust constituted over 50% of PM_{10} in the Mendenhall Valley. Fugitive dust sources include dust particles carried by wind and abrasion of surfaces such as traffic on dirt roads. In addition to fugitive dust, historical PM_{10} sources in the Mendenhall Valley include:

- Residential and commercial oil-fired furnaces;
- Residential wood-fired heating devices;
- Open burning of construction/residential waste;
- Tailpipe, tire, and brake wear emissions from surfaces;
- Jet and propeller-driven aircraft exhaust emissions;
- Wind-generated fugitive dusts from exposed soils/roadways;
- Vehicle-generated fugitive dusts from paved/unpaved roadways;
- Marine aerosols; and
- Road sanding for winter driving.

The 1988 emission inventory developed predictive emission factor equations and emission rates for paved and unpaved roads. At that time, there were a number of unpaved roads in the Mendenhall Valley. On dry days, vehicle movement disturbed high levels of dust from unpaved roads. EPA estimated peak hour vehicle counts on a limited number of roads. Emission estimates were based on vehicle counts from selected roads which were extrapolated to non-selected roads by a function of housing density. For wood smoke, emission factors from EPA Region 10 were combined with survey data.

In January 2006, the department completed an annual emission inventory for years 2004 (base year) and 2018 (projected year) for the Mendenhall Valley nonattainment area. The general approach followed the source-specific data collection and modeling procedures detailed in the EPA emission inventory guidance document "PM-10 Emission Inventory Requirements," Final Report, September 1994. In the 1988 emissions inventory, residential wood combustion and fugitive dust from both paved and unpaved roads were identified as the key sources of emissions. Given the significance of these sources and past efforts to control their emissions, a home heating survey was conducted in 2005 to provide insight into the impact of technology changes and activity levels on residential heating emissions. However, no similar survey was available to support an update of fugitive dust from paved and unpaved roads.

The analysis of the first 10-year LMP indicated that PM_{10} emissions in the maintenance area declined by almost 30% between 1993 and 2004. Fugitive dust from paved roads accounted for 83% of the overall inventory; fugitive dust from unpaved roads accounted for 5.2%; and emissions from wood burning accounted for 1.8% of the overall inventory.

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.

Similar to the first 10-year LMP, four main source categories were inventoried for the second 10-year LMP. These include (1) On-Road; (2) Non-Road; (3) Area Sources; and (4) Point Sources. Also, the same assumptions and methods used to develop the first 10-year LMP was used to develop the 2017 base year PM_{10} emission inventory for this second 10-year LMP.

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.

Table III.D.3-5 shows the summary of 2017 (base year for the second 10-year LMP) and 2014 Mendenhall Valley PM10 emissions by season and source category, as well as the percentage decrease in emissions.

Table III.D.3-5
Summary of Mendenhall Valley PM_{10} Emissions by Season and Source Category (tons/day)

Source Category	2017 (tons/day)	2014 (ton/day)	Percent Decrease (%)
Winter PM_{10} Emissions			
On-road	0.044	0.022	+50
Non-road	0.044	0.027	+38.6
Area			
Residential - wood	0.094	0.091	+3.2
Residential - Pellet	0.006	0.006	0
Residential - Oil	0.002	0.002	0
Residential Burn Barrels	N/A	0.000	N/A
Paved Road Fugitive Dust	0.116	1.478	92.2
Unpaved Road Fugitive Dust	0.004	0.161	97.5
Other Area Sources	0.182	0.182	0
Area Subtotal	0.404	1.920	79
Point	0.000	0.000	0
Total All sources	0.492	1.969	75
Summer PM_{10} Emissions			
On-road	0.042	0.021	50
Non-road	0.042	0.049	14.3
Area			
Residential - wood	0.033	0.031	+6.1

Residential - Pellet	0.002	0.002	0
Residential Burn Barrels	N/A	0.057	N/A
Residential - Oil	0.001	0.001	0
Paved Road Fugitive Dust	0.584	4.135	85.9
Unpaved Road Fugitive Dust	0.004	0.190	97.9
Other Area Sources	0.182	0.182	0
Area Subtotal	0.806	4.598	82.5
Point	0.133	0.155	14.2
Total All Sources	1.023	4.823	78.8
Annual Average	0.758	3.400	77.7

Note: + denotes percent increase in PM_{10} emissions

Although there was an increase in on-road, non-road, and residential (wood) emissions in 2017, the analysis of the emission inventory indicates that the PM_{10} emissions in the maintenance area declined by about 78% between 2004 and 2017. The on-road and non-road emission estimates for 2017 were higher than 2014 because the latest EPA's mobile source emission factor model, MOVES2014b, which has higher emission factors were used was used to generate the emissions. In contrast, the 2014 on-road and non-road emission were based on MOBILE6.2 and were calculated using local data. The small increase in residential (wood) emissions can be attributed to increase in the number of households. The analysis of the emission inventory (2017) for the second 10-year LMP indicates that paved roads remain the most significant sources of fugitive dust (particularly during the summer) in the maintenance area. Fugitive dust from paved roads accounted for 46.2% of the overall inventory; fugitive dust from unpaved roads accounted for 0.53%; and emissions from wood burning accounted for 8.4% of the overall inventory.

The efforts by City and Borough of Juneau and the State to pave sections of unpaved roads in the Valley, as well as the woodsmoke control program, have continued to lead to significant reduction in the PM_{10} emissions.

III.D.3.6. Control Measures Necessary to Maintain the NAAQS

The Mendenhall Valley maintenance area continues to rely on the reasonably available control measures (RACM) and the enforceable wood smoke ordinances approved in the Mendenhall Valley Attainment Plan effective April 25, 1994 (59 FR 13884, March 24, 1994) and the Mendenhall Valley Limited Maintenance Plan, effective July 8,2013 (78 FR 27071, May 9, 2013). The RACM, which were chosen from a list of proven controls developed by the EPA, include paving unpaved streets, sweeping and sanding mitigation programs, dust suppressants, use of coverings and enclosures, planting, and reducing speeds.

For paved roads, the CBJ and Alaska Department of Transportation optimize sanding and de-icing materials to maximize road safety and keep entrainment of fine dust into the air to a minimum. Through the paving program, which was adopted in 1991, most of the roads in maintenance area have been paved. As indicated in the 2017 VMT estimates received from ADOT&PF, only 0.17 percent of the roads in the Mendenhall Valley maintenance area are unpaved.

In the past, the CBJ relied on natural precipitation to keep dust down on unpaved roads because tested dust suppressants tend to increase rutting of roads during dry stretches, thus causing unsafe conditions. CBJ had also applied alternative measures to road surfaces with smaller capacity for developing fine particles. For high traffic roads, a D-1 gravel was used, and for low traffic roads, a coarser, rockier material was used.

In accordance with the EPA's LMP policy, all controls relied on to demonstrate attainment and continued maintenance will remain in place, and DEC has determined that no additional LMP control measures are necessary to maintain the NAAQS.

The terms of the second 10-year maintenance plan must remain in effect and all measures and requirements contained in the plan must be complied with even after the area reaches the end of its 20-year maintenance period, or until the state submits, and EPA approves, a revision to the state plan consistent with the anti-backsliding requirements of CAA section 110(l) and CAA section 193, if applicable. Furthermore, the maintenance requirement in CAA section 110(a)(1) remains in place for all areas, including attainment areas.

Below is a history of control measures implemented in the Mendenhall Valley:

• **#83-63** – "An Ordinance Regulating Open Burning and the Use of Wood-Fired Heating Devices in Smoke Hazard Areas" This ordinance has been superseded by ordinance #2008-28.

• **#88-59** – "An Ordinance Amending the Woodsmoke Control Code to Implement a New Measurement System for Measuring Air Pollution, to Adopt Federal Standards for the Issuance of Class I Permits for NonCatalytic Solid Fuel-Fired Heating Devices, and to Delete References to Oregon State Woodstove Standards." This ordinance has been superseded by ordinance #2008-28.

• **#91-52** – "An Ordinance Amending the Woodsmoke Control Code to Lower the Particulate Count Threshold for Declaring Air Alerts, to Authorize the Manager to Declare an Air Alert According to Certain Qualitative Criteria, to Provide for the Expiration of All Existing Class I Permits on July 1, 1997, to Terminate the Manager's Authority to Issue New Class I Permits, and to Prohibit the Burning in Woodstoves of Substances Other Than Paper, Cardboard, and Untreated Wood." This ordinance has been superseded by ordinance #2008-28.

• **#91-53** – "An Ordinance Amending the Woodsmoke Control Fine Schedule to Increase the Fines for Violations of the Woodsmoke Control Code." This ordinance has been superseded by ordinance #2008-28.

• **#93-01** – Ordinance on Local Improvement Districts.

• **#93-06** – An Ordinance Creating Local Improvement District No. 76 of the City and Borough of Juneau.

• **93-39am -** creating Local Improvement District No. 77 of the City and Borough, setting boundaries for drainage and paving of streets in the Mendenhall Valley. This work, which has since been completed, was approved as part of the attainment plan.

• **Fiscal Year 1994 CP-1s –** Juneau-air Quality/PM 10 Reductions in Mendenhall Valley

• **Resolution #1612 –** A resolution of the City and Borough of Juneau adopting a joint memorandum of understanding with Alaska department of Environmental Conservation and the Alaska Department of Transportation and Public Facilities to resolve the Mendenhall Valley PM-10.

• **#2008-28** "An Ordinance Amending the Woodsmoke Control Program Regarding Solid Fuel-Fired Burning Devices". This ordinance has been incorporated into CBJ Code at Title 36.40.040 "Air pollution alert and emergencies". Under this ordinance, the manager shall declare an air pollution emergency to be in effect whenever the ambient concentration of particulate matter within the air pollution zone equals or exceeds 30 micrograms per cubic meter ($\mu g/m^3$) averaged over a 24-hour period and will remain at or above 30 $\mu g/m^3$ if an emergency is not called. This ordinance is more stringent than the previous ordinance which set the particulate matter limit at 75 $\mu g/m^3$ and it supersedes the prior woodsmoke control program ordinances. Refer to the Appendix document for complete ordinance language.

III.D.3.7. 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 is committed to the continued operation of at least one EPA-approved PM_{10} monitoring site in the Mendenhall Valley 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.

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. DEC will annually recalculate the design value using the most recent five years of monitor data in order to verify 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, as instructed in the LMP guidance memo, the State will take these steps outlined below:

"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.3.8. Natural Events Action Plan

There have been no exceedances attributed to natural events in the Mendenhall Valley area.

III.D.3.9. 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 occurs after the re-designation of the area to attainment. Normally, the implementation of contingency measures is triggered by a violation of the NAAQS but the state may choose to establish more stringent triggers, such as an exceedance of the NAAQS, in order to prevent a violation. Contingency measures do not have to be fully adopted at the time of re-designation, but they must be readily adopted if they are triggered.

This section identifies a process and a time-line to identify and evaluate appropriate contingency measures in the event of a quality assured violation of the PM_{10} NAAQS. The DEC and CBJ may, however, voluntarily initiate this or a similar local process to identify and evaluate appropriate contingency measures necessary to prevent such a violation.

Contingency Measures Assessment

Within 30 days following a violation of the PM_{10} NAAQS, DEC and CBJ will convene a team to identify appropriate measures needing to be implemented. Identified contingency measures may include but are not limited to those listed below.

The assessment team will prepare and deliver a report containing its recommendation, within 120 days for the DEC Commissioner, City Manager, and assembly based on evaluation of the:

- monitor data before and during the event;
- weather conditions that may have caused and/or contributed to violation.
- normal and unusual emissions occurring prior to and during the event.
- effectiveness of existing controls in reducing the magnitude and/or duration of the event(s).
- appropriateness of modifying and/or implementing one or more LMP contingency measures
- possible changes to the LMP, monitoring network, and public information strategies; and
- the need for additional voluntary or regulatory controls to reduce future emissions.

Local actions resulting from the assessment team's recommendations will be at the discretion of the DEC Commissioner and City Manager and assembly. The assembly may adopt and implement contingency measures as needed.

LMP Contingency Measures

The following LMP contingency measures may come into effect in the event of a PM_{10} NAAQS violation, subject to the assessment described above. One applies to unpaved roads and parking lot emissions and one applies to residential wood combustion emissions.

Fugitive Dust

Paving of Unpaved Roads: The Mendenhall Valley still has a number of unpaved roads. In the event of a NAAQS violation, the CBJ will determine whether or not to pave any or all of the remaining roads.

Other contingency measures remain in the SIP, including:

- Controlling spills from trucks hauling particulate-producing materials;
- Requiring installation of liners on truck beds;
- Requiring watering of loads;
- Requiring cargo that cannot be controlled by other measures to be covered;
- Requiring trucks to maintain a freeboard;
- Establishing controls on construction carryout and entrainment;
- Requiring construction activities to limit and remove the accumulation of dust generating materials;
- Requiring paving of construction site access roads;
- Requiring the developer of a construction site to clean soil from access road and public roadway;
- Requiring control of vehicle entrainment from unpaved areas adjacent to paved roadways;
- Requiring stabilization of unpaved areas adjacent to paved roads, such as shoulders;
- Controlling storm water from washing eroded materials onto the street;
- Developing adequate storm water control systems;
- Requiring vegetation to stabilize road sides;
- Developing programs for the rapid clean up of street debris after events;
- Controlling wind erosion from outdoor storage of loose material that could be direct emitters of PM_{10};
- Requiring covers over outdoor material that may produce dust in wind storms; and
- Requiring wind breaks in the vicinity of outdoor storage piles.

Wood Smoke

Burn Bans: CBJ code contains provisions to ban wood burning on bad air days and enforce the ban with fines.

Other contingency measures remain in the SIP to address wood smoke, including:

- Establishing an enhanced public information campaign including education in stove selection, sizing, installation, operation, and maintenance practices to minimize emissions;
- Establishing an enhanced public information campaign including education on health risks from wood smoke, new technology stoves, and alternatives to wood heating;
- Encouraging improved performance of wood burning devices such as providing voluntary dryness certification programs for dealers and/or making inexpensive wood moisture checks available to wood burners;
- Providing other inducements that would lead to reductions in the stove and fireplace population such as discouraging the availability of free (or very inexpensive) firewood by increasing cutting fees or limiting the cutting season.

The assessment team will also consider recommending other contingency measures that may more appropriately address the most probable source contributing to the violation. The CBJ, or other appropriate agency, may adopt and implement contingency measures other than those listed above, as needed.

III.D.3.10 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 to 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 Mendenhall Valley 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 for PM_{10} control measures (40 CFR 93.117). DEC will continue to

work with the affected jurisdictions and interested parties to develop an evaluation criteria and process to meet these transportation conformity requirements.