ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Amendments to:

State Air Quality Control Plan

Vol. II: III.D.7.10

Reasonable Further Progress and Quantitative Milestones

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7.10 REASONABLE FURTHER PROGRESS AND QUANTITATIVE MILESTONES

7.10.1 Reasonable Further Progress and Quantitative Milestone Requirements

Reasonable Further Progress - Section 172(c)(2) of the CAA requires that plans for non-attainment areas "shall require reasonable further progress" and include a "current inventory of actual emissions from all sources of relevant pollutants in such area … to assure that the requirements of this part are met." The goal of Reasonable Futher Progress (RFP) planning is to achieve consistent progress (generally linear, or step-wise with justification) toward attainment, as opposed to deferring implementation of some of all measures until the end or projected attainment date. Every attainment plan for a $PM_{2.5}$ nonattainment area must include an RFP plan, irrespective of whether it is a Moderate Area plan, Serious Area plan, or a 5% plan pursuant to CAA Section 189(d). This section of the Serious Area SIP contains DEC's RFP plan.

Pollutants Addressed - As discussed in Section III.D.7.8, photochemical modeling-based precursor significance analyses determined that NOx, VOCs and ammonia (NH_3) do not significantly contribute to ambient $PM_{2.5}$ levels that exceed the National Ambient Air Quality Standards in the Fairbanks nonattainment area. As such, the pollutants addressed in the RFP analysis were limited to $PM_{2.5}$ (direct) and SO_2.

RFP Requirements – As required under 40 CFR 51.1012(a), an RFP plan must demonstrate that sources in the area (i.e., the nonattainment area) will achieve annual incremental reductions in emissions of direct $PM_{2.5}$ and applicable precursor pollutants (SO_2 for Fairbanks) as necessary to ensure attainment of the NAAQS as expeditiously as practicable. The RFP plan must include the following elements:

(1) A schedule describing the implementation of control measures during each year of the applicable attainment plan.

(2) RFP-projected emissions for direct $PM_{2.5}$ and precursor pollutants for each applicable milestone year, based on the anticipated implementation schedule for control measures. For purposes of establishing motor vehicle emissions budgets for transportation conformity purposes (as required in 40 CFR part 93) for a $PM_{2.5}$ nonattainment area, the state shall include in its RFP submission an inventory of on-road mobile source emissions in the nonattainment area for each milestone year.[1]

(3) An analysis that presents the schedule of control measures and estimated emissions changes to be achieved by each milestone year, and that demonstrates that the control strategy will achieve reasonable progress toward attainment between the applicable base year and the attainment year. The analysis shall rely on information from the base year inventory for the nonattainment area required in 40 CFR 51.1008(a)(1) and the attainment projected inventory for the nonattainment area required in 40 CFR

[1] In accordance with this requirement, motor vehicle emission budgets were established as described later in Section III.D.7.14 of the Serious Area SIP.

51.1008(a)(2), in addition to the RFP-projected emissions required in paragraph (a)(2) of this section.

(4) An analysis that demonstrates that by the end of the calendar year for each milestone date for the area determined in accordance with § 51.1013(a), pollutant emissions will be at levels that reflect either generally linear progress or stepwise progress in reducing emissions on an annual basis between the base year and the attainment year. A demonstration of stepwise progress must be accompanied by appropriate justification for the selected implementation schedule.

(5) At the state's election, an analysis that identifies air quality targets associated with the RFP projected emissions identified for the milestone years at the design value monitor locations.

Quantitative Milestones - Section 189(c)(1) of the CAA requires PM implementation plans to include Quantitative Milestones (QM) which are to be achieved every 3 years until the area is re-designated attainment and which demonstrate reasonable further progress (as defined above) toward attainment by the applicable date. QM requirements for a Serious $PM_{2.5}$ nonattainment area are given in 40 CFR 51.1013(a)(2) and 40 CFR 51.1013(a)(4) and summarized as follows:

40 CFR 51.1013(a)(2) – Serious Areas

i. Except as provided in 40 CFR 51.1013(a)(4), each attainment plan submission that demonstrates that a Serious $PM_{2.5}$ nonattainment area *can attain applicable $PM_{2.5}$ NAAQS by the end of the tenth calendar year* following the effective date of designation of the area with the implementation of control measures shall contain quantitative milestones to be achieved no later than milestone dates of 7.5 years and 10.5 years, respectively, from the date of designation of the area.

ii. Except as provided in 40 CFR 51.1013(a)(4), each attainment plan submission that demonstrates that a Serious $PM_{2.5}$ nonattainment area *cannot practicably attain applicable $PM_{2.5}$ NAAQS by the end of the tenth calendar year* following the date of designation of the area with the implementation of control measures required under § 51.1010(a) shall contain quantitative milestones to be achieved no later than milestone dates of 7.5 years, 10.5 years, and 13.5 years from the date of designation of the area. If the attainment date is beyond 13.5 years from the date of designation of the area, such attainment plan shall also contain a QM to be achieved no later than milestone dates of 16.5 years, respectively, from the date of designation of the area.

iii. The plan shall contain quantitative milestones to be achieved by the milestone dates specified in paragraphs (i) and (ii) above, as applicable, and that provide for objective evaluation of reasonable further progress toward timely attainment of the applicable $PM_{2.5}$ NAAQS in the area. At a minimum, each quantitative milestone plan must include a milestone for tracking progress achieved in implementing SIP control measures, including Best Available Control Measures (BACM) and Best Available Control Technology (BACT), by each milestone date.

> 40 CFR 51.1013(a)(4) – Each attainment plan submission for an area designated nonattainment for the 1997 and/or 2006 $PM_{2.5}$ NAAQS before January 15, 2015, shall contain quantitative milestones to be achieved no later than 3 years after December 31, 2014, and every 3 years thereafter until the milestone date that falls within 3 years after the applicable attainment date.

Based on these RFP and QM requirements for Serious $PM_{2.5}$ areas, the following subsection describes the applicable analysis year schedule for Fairbanks based on the control measure, modeling and attainment analyses described in Sections III.D.7.7 through III.D.7.9.

7.10.2 RFP/QM Schedule and Metrics

Schedule - As described earlier in Section III.D.7.1, Fairbanks was originally designated as a nonattainment area for the 2006 24-hour $PM_{2.5}$ NAAQS in 2009. And as discussed in Section III.D.7.6, 2013 was the base year for the development of emission inventories (and subsequent attainment analysis) for this Serious Area SIP. As discussed in Section III.D.7.9, DEC currently estimates 2029 to be the most expeditious alternative attainment date.

Thus, based on these dates and the RFP and QM requirements presented in the preceding sub-section, Table 7.10-1 lists the applicable RFP and QM analysis years.

Table 7.10-1
Fairbanks Reasonable Further Progress and Quantitative Milestone Analysis Years

Base Year	Attainment Year	RFP and QM Analysis Years
2013	2029	2017, 2020, 2023, 2026, 2029, 2032

QM Metrics – The $PM_{2.5}$ Implementation Rule allows for a number of objective metrics to satisfy the QM requirements, providing the metric can be accurately quantified and tracked. Alaska proposes to use EPA's preferred metric: emission reductions achieved compared to projected emission reductions.

7.10.3 RFP Plan Analysis

This subsection presents and summarizes the results of analysis of implementation of the control measure package being adopted by the State of Alaska in support of the attainment analysis within this Serious SIP. It includes an accounting for the schedule/phase-in of each measure being adopted and estimation of emission reductions (of directly-emitted $PM_{2.5}$ and SO_2 as noted earlier) from each measure. It also accounts for effects of overlapping measures to eliminate effects of double-counting when applied to the same source category.

Table 7.10-2 presents 2013 Baseline and 2029 Projected Attainment inventory $PM_{2.5}$ and SO_2 emissions for the nonattainment area in tons/day, averaged across the episodic modeling days.

Table 7.10-2
Baseline and Projected Attainment Inventory and Reductions After Control Measures (tons/day)

Quantity/Pollutant	2013 Baseline	2029 Projected Attainment
Emissions, Direct $PM_{2.5}$	4.36	2.06
Emissions, SO_2	11.92	15.38
Reductions from Committed Control Measures, Direct $PM_{2.5}$	n/a	2.30
Reductions from Committed Control Measures, SO_2	n/a	-3.46

n/a – Not applicable

The 2013 emissions match the nonattainment area planning inventory shown in Section III.D.7.6 those for 2029 are consistent[2] with the estimated control measure reductions shown in Section III.D.7.9.2. Below these values in Table 7.10-2, emission reductions for each pollutant are shown in the rightmost column, representing the difference in emissions between the baseline and projected attainment years. (For example, for direct $PM_{2.5}$, 4.36 – 2.06 = 2.30 tons/day). Over this period, emissions of SO2 are projected to increase due to switching of heating energy from dirtier solid fuels (wood and coal) to cleaner fuels (heating oil and natural gas) due to the combined effects of the control measures being adopted; the negative value for SO_2 thus reflects an increase, but is still tied to modeled attainment.

Using these emission reductions between the 2013 Baseline and 2029 Projected Attainment inventories, Table 7.10-3 shows calculated RFP/QM milestone year emission reduction targets based on linear progress towards attainment by 2029.

Table 7.10-3
Linear Milestone Year Emission Reduction Targets (tons/day)

Pollutant	2017	2020	2023	2026	2029	2032
Direct $PM_{2.5}$	0.57	1.01	1.44	1.87	2.30	2.30
SO_2	-0.87	-1.51	-2.16	-2.81	-3.46	-3.46

The emission reduction targets in each milestone year were calculated using the following formula:

$$Target_{MY} = (Emis_{AY} - Emis_{BY}) \times (MY - BY) / (AY - BY)$$

[2] Combined 2029 control measure reductions presented in Table 7.9-6 of Section III.D.7.9 show separate reductions associated with each alert stage of the Curtailment program. When averaged across the modeling episodes (that include "no alert" days as well) these reductions are consistent with results presented above in Table 7.10-2.

Where *MY* is the given milestone year, *BY* is the baseline year (2013) and *AY* is the projected attainment year (2029). In 2017 for example, the linear PM2.5 reduction target was calculated as:

$$PM_{2.5}\ Target_{2017} = (4.36 - 2.06) \times (2017 - 2013) / (2029 - 2013) = 0.57$$

The reduction targets for calculated in the manner were then compared to projected emissions for each pollutant in each milestone year to evaluate linear progress toward attainment. These comparisons are summarized below in Table 7.10-4 and reflect projected implementation and phase-in of individual control measures consistent with that provided earlier in Table 7.9-6 of Section III.D.7.9.

Table 7.10-4
Linear Milestone Year Emission Reduction Targets (tons/day)

Pollutant	Metric	2017	2020	2023	2026	2029	2032
Direct $PM_{2.5}$	Target Reduction	0.57	1.01	1.44	1.87	2.30	2.30
	Achieved Reduction	0.77	1.34	1.66	2.04	2.30	2.30
	Linear Progress Met?	Yes	Yes	Yes	Yes	Yes	Yes
SO_2	Target Reduction	-0.87	-1.51	-2.16	-2.81	-3.46	-3.46
	Achieved Reduction	-0.13	-11.05	-9.89	-10.29	-3.46	-3.46
	Linear Progress Met?	Yes	No	No	No	Yes	Yes

The target reductions shown in Table 7.10-4 are from Table 7.10-3. Achieved reductions were calculated for each milestone year based on individual measure projected implementation and phase-in. Achievement of linear progress in a given milestone year is indicated by a "Yes" or "No" in the "Linear Progress Met?" row for each pollutant.

As shown in the upper half of Table 7.10-4, direct $PM_{2.5}$ emission reductions achieved within each milestone year are projected to meet or exceed linear progress toward estimated attainment by 2029.

The lower half of Table 7.10-4 presents the emission trajectory for secondary pollutant SO_2, which increases between the baseline and projected attainment years due to control strategies that shift heating energy use from high PM (but low sulfur) fuels such as wood and coal to lower PM (but higher sulfur) fuel such as heating oil. Linear emission reduction progress toward attainment in 2029 for SO_2 is complicated by the fact that between the 2013 baseline and the second milestone year (2020) SO_2 emission increase significantly after 2017 due to transition to a higher-sulfur jet fuel at both military bases (Fort Wainwright and Eielson Air Force Base), and by extension Fairbanks International Airport as explained earlier in SIP Section III.D.7.6.3.1. Transition to this higher-sulfur jet fuel increased aircraft SO_2 emissions tenfold and total SO_2 emissions (across all inventory sectors) by roughly a factor of two. Therefore the "trajectory" of projected baseline SO_2 emissions is decidedly non-linear. It is important to note that these changes in SO_2 emissions due to higher sulfur jet aircraft fuel are much more muted when applied within the air quality modeling. This is due to the fact that nearly 90% of aircraft SO_2 is emitted during takeoff/climb out at heights greater than 75 feet above ground level and during

strong temperature inversions typical of episodic meteorological conditions and is modeled to not significantly impact ground level within the nonattainment area.

It is also important to note that reductions in SO_2 emissions beyond the statutorily-required 2019 Serious SIP attainment year are consistent with, and together with direct $PM_{2.5}$ reductions beyond 2019, are projected to meet year-to-year reductions that must be demonstrated under a subsequent 5-Percent Plan.

7.10.4 QM Report Commitment

As required under 40 CFR 51.1013(b), not later than 90 days after the date on which a milestone applicable to a $PM_{2.5}$ nonattainment area occurs, each state in which all or part of such area is located shall submit to the EPA Administrator a milestone report that contains all of the following elements:

(1) A certification by the Governor or Governor's designee that the SIP control strategy is being implemented consistent with the RFP plan, as described in the applicable attainment plan;

(2) Technical support, including calculations, sufficient to document completion statistics for appropriate milestones and to demonstrate that the quantitative milestones have been satisfied and how the emissions reductions achieved to date compare to those required or scheduled to meet RFP; and,

(3) A discussion of whether the area will attain the applicable $PM_{2.5}$ NAAQS by the projected attainment date for the area.

The State of Alaska commits to fulfilling these reporting requirements as they pertain to satisfying Quantitative Milestone requirements for the progress toward attainment of the 2006 $PM_{2.5}$ NAAQS in the Fairbanks nonattainment area.