

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION



Amendments to: State Air Quality Control Plan Vol. II: III.D.7.10

Reasonable Further Progress and Quantitative Milestones

Adopted

November 5, 2024

Michael J. Dunleavy, Governor

Emma Pokon, Commissioner

Note: This document provides the adopted language of the 2024 Amendment to the Serious SIP for inclusion in this section of the State Air Quality Control Plan section to address the disapproval of the Serious SIP and the 2020 Amendments. The currently adopted section of the air quality plan can be found and referenced at the following internet site: [Fairbanks PM2.5 Serious SIP](#)

7.10.1 Reasonable Further Progress and Quantitative Milestone Requirements

Reasonable Further Progress - Section 172(c)(2) of the CAA requires that plans for nonattainment 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 Further Progress (RFP) planning is to achieve consistent progress (generally linear, or step-wise with justification) toward attainment, as opposed to deferring implementation of some or 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 Revised Serious Area Attainment plan pursuant to CAA Section 189(d). In the 2016 PM_{2.5} Implementation Rule¹, EPA enumerated RFP requirements for Revised Serious Area plans under CAA Section 189(d) that are similar to those established for Serious nonattainment areas. This section of the 2024 Amendment to the 189(d) Plan for the Fairbanks Area Serious Plan (subsequently referred to as the 2024 Amendment) contains DEC’s plan for addressing applicable RFP and Quantitative Milestone requirements for a Serious Area that has failed to attain the PM_{2.5} NAAQS by the applicable Serious Area attainment date.

Pollutants Addressed - As discussed in Section III.D.7.8, photochemical modeling-based precursor significance analyses determined that NO_x and VOCs do not significantly contribute to ambient PM_{2.5} levels that exceed the National Ambient Air Quality Standards in the Fairbanks North Star Borough (FNSB) nonattainment area. There was no ammonia (NH₃) precursor analysis. Thus, although controls do not directly target ammonia, it must be included within the RFP analysis. As such, the pollutants addressed in the RFP analysis were limited to PM_{2.5} (direct), SO₂ and NH₃.

RFP Requirements – As required under 40 C.F.R. § 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 (SO₂ and NH₃ for FNSB) 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 C.F.R. 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.²

¹ Federal Register, Vol. 81, No. 164, August 24, 2016 (81 FR 58010).

² 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.

- (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 C.F.R. § 51.1008(a)(1) and the attainment projected inventory for the nonattainment area required in 40 C.F.R. § 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 40 C.F.R. § 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 PM_{2.5} for this 2024 Amendment are given in 40 C.F.R. § 51.1013(a)(3) and 40 C.F.R. § 51.1013(a)(4) as follows:

40 C.F.R. § 51.1013(a)(3) – Serious Areas that Fail to Attain by Applicable Attainment Date

- i. Except as provided in paragraph (a)(4) of this section, each attainment plan submission for a Serious area that failed to attain a particular PM_{2.5} NAAQS by the applicable Serious area attainment date and is therefore subject to the requirements of CAA section 189(d) and § 51.1003(c) shall contain quantitative milestones.
 - A. If the attainment plan is due prior to a date 13.5 years from designation of the area, then the plan shall contain milestones to be achieved by no later than a milestone date of 13.5 years from the date of designation of the area, and every 3 years thereafter, until the milestone date that falls within 3 years after the applicable attainment date.
 - B. If the attainment plan is due later than a date 13.5 years from designation of the area, then the plan shall contain milestones to be achieved by no later than a milestone date of 16.5 years from the date of designation of the area, and every 3 years thereafter, until the milestone date that falls within 3 years after the applicable attainment date.

- ii. The plan shall contain quantitative milestones to be achieved by the milestone dates for the area, 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 the SIP control measures by each milestone date.

40 C.F.R. § 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 the PM_{2.5} 2024 Amendment, the following subsection describes the applicable analysis year schedule for the FNSB nonattainment area 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, a portion of the FNSB 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, 2019 was the base year for the development of emission inventories (and subsequent attainment analysis) for this 2024 Amendment. As discussed in Section III.D.7.9, DEC currently estimates 2027 to be the most expeditious attainment date.

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

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

Base Year	Attainment Year	RFP and QM Analysis Years
2020	2027	2023, 2026, 2029

QM Metrics – The PM_{2.5} Implementation Rule allows for several objective metrics to satisfy the QM requirements, providing the metric can be accurately quantified and tracked.³ Alaska proposes to use the following EPA allowed metric: emission reductions achieved compared to projected emission reductions.

As quantified in the following subsection (7.10.3), Alaska’s quantitative milestones in each RFP year are based on projected emission reductions that are aggregated by pollutant across all adopted and implemented control measures. (Thus, the milestone reductions are not specified by individual measure.)

³ 81 FR 58010, Aug. 24, 2016, at p. 58064.

Although results in Section 7.10.3 also include projected implementation and compliance rate percentages, Alaska believes that use of projected emissions reductions (aggregated across control measures) is a more suitable quantitative milestone than projected implementation and compliance rates. This view is supported by the fact that emission reductions from some programs/activities in the nonattainment area that have not been quantified in projecting emission reductions are likely to positively impact future emission reductions achieved. Most notably, this includes non-quantified reductions from on-going efforts by the Interior Gas Utility (IGU) to continue expansion of the residential and commercial natural gas space heating infrastructure across the nonattainment area. Although emission reductions from this on-going IGU expansion were not included in the projected Control inventories because it cannot be considered as a permanent and enforceable measure, natural gas expansion (which will lead to reductions in wood and heating oil space heating emissions) is expected to continue. For this reason, Alaska plans to use actual emissions reductions achieved versus projected emission reductions as the quantitative milestone metric.

In addition, Alaska will include completion statistics and phase-in percentages for each measure shown later in Section 7.10.3 in its quantitative milestone report regardless of its selected metric of projected emission reductions aggregated across control measures.

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 2024 Amendment. 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}, SO₂ and NH₃ as noted earlier) from each measure. It also accounts for the effects of overlapping measures to eliminate effects of double-counting when applied to the same source category.

7.10.3.1 Calculation of Linear Emission Reduction Targets

Table 7.10-2 presents 2020 Baseline and 2027 Attainment-Projected inventory PM_{2.5}, SO₂ and NH₃ emissions for the nonattainment area in tons/day, averaged across the episodic modeling days.

**Table 7.10-2
Baseline and Attainment-Projected Emissions and Reductions after Control Measures
(tons/day)**

Quantity/Pollutant	2020 Baseline	2027 Attainment
Emissions, Direct PM _{2.5}	2.950	1.742
Emissions, SO ₂	15.707	14.857
Emissions, NH ₃	0.285	0.310
Reductions from Committed Control Measures, Direct PM _{2.5}	n/a	1.208
Reductions from Committed Control Measures, SO ₂	n/a	0.850
Reductions from Committed Control Measures, NH ₃	n/a	Not quantified

n/a – Not applicable

The 2020 emissions match the nonattainment area planning inventory shown in Section III.D.7.6.6.8 and those for 2027 are consistent⁴ with the estimated control measure reductions shown in Section III.D.7.6.8.2 and 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}, $2.947 - 1.744 = 1.204$ tons/day). The negative reductions for NH₃ reflect population growth-projected emission increases between 2020 and 2027 coupled with the fact that NH₃ emission benefits were not quantified from controls within the sectors evaluated given the uncertainty of underlying NH₃-specific emission factors. NH₃ emission factors for residential wood-burning used in the emissions inventory were developed in a 2004 Pechan study⁵ conducted for EPA. In that study, Pechan assigned data quality/certainty ratings for each set of source-specific NH₃ emission factors consistent with EPA's AP-42 practices from A (highest quality) to E (lowest quality). Residential wood burning factors were assigned an E rating and are thus highly uncertain.

Despite the uncertainty of the NH₃ emission factors for space heating combustion, if control measure reductions for NH₃ were quantified, they would produce similar co-benefits and relative emission reduction levels to those calculated for PM_{2.5}. This is demonstrated by comparing space heating emission factor differences by device and fuel between PM_{2.5} and NH₃. Figure 7.10-1 presents a plot of space heating PM_{2.5} emission factors by device and fuel type in lb/heating mmBTU. The PM_{2.5} emission factors are sorted in descending order from left to right.

⁴ Combined 2027 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.

⁵ S. M. Roe, et al., “Estimating Ammonia Emissions from Anthropogenic Nonagricultural Sources - Draft Final Report,” E.H. Pechan & Associates, Inc., April 2004.

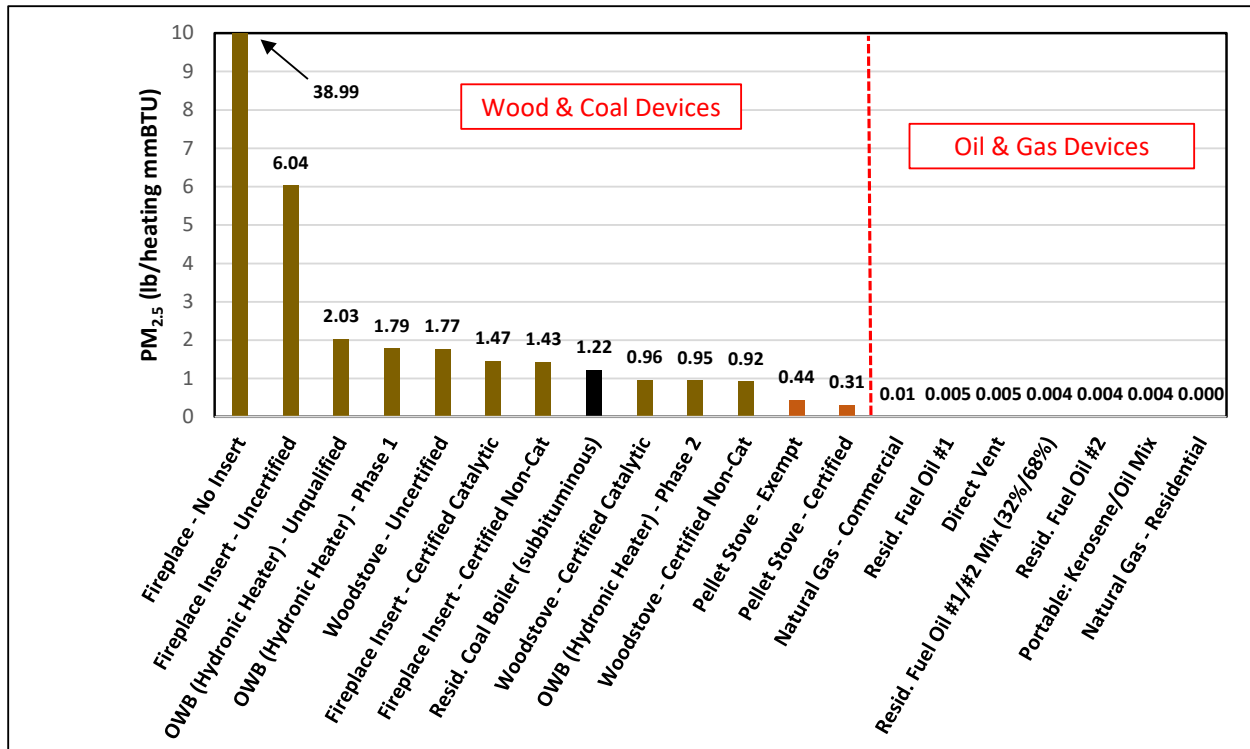


Figure 7.10-1. Space Heating PM_{2.5} Emission Factors (lb/heating mmBTU) Ranked in Descending Order

Heating mmBTU units account for the difference in heating efficiency between different devices/fuel. When evaluating control measures that incentivize or mandate shifts from higher-emitting (and generally less efficient) wood/coal devices to cleaner solid fuel devices or cleaner liquid and gaseous fuels, it is important to account for the combined effect of emission factor difference per unit of energy and the heating efficiencies of the devices.

As clearly seen in Figure 7.10-1, PM_{2.5} emission factors decrease moving from uncertified cordwood wood (and coal devices) to certified cordwood devices, more significantly moving to pellet devices and dramatically to liquid (heating oil) or gaseous (natural gas) fuels. (The PM_{2.5} emission factors in lb/heating mmBTU for liquid and gaseous fuels are so small the height of their bars are not visible in Figure 7.10-1, although their values are shown.) These differences in emission factors (and accounting for device heating efficiencies) drive the significant quantified control measure reductions for PM_{2.5} shown within the RFP analysis.

Figure 7.10-2 presents a similar plot of NH₃ emission factors by heating device and fuel, again in units of lb/heating mmBTU. Instead of re-sorting them by descending NH₃ emission factor, they are presented in the same order as those shown for PM_{2.5} in Figure 7.10-1. Even without re-sorting, Figure 7.10-2 shows a similar decrease in NH₃ emission factors with uncertified cordwood and coal devices at the highest levels, followed by certified cordwood and pellet devices, with heating oil and natural gas generally the cleanest fuels. These qualitative comparisons reflected in Figure 7.10-1 and Figure 7.10-2 clearly demonstrate that the State’s

control measures would be expected to provide NH₃ co-benefits at levels similar to those for PM_{2.5} if quantified.

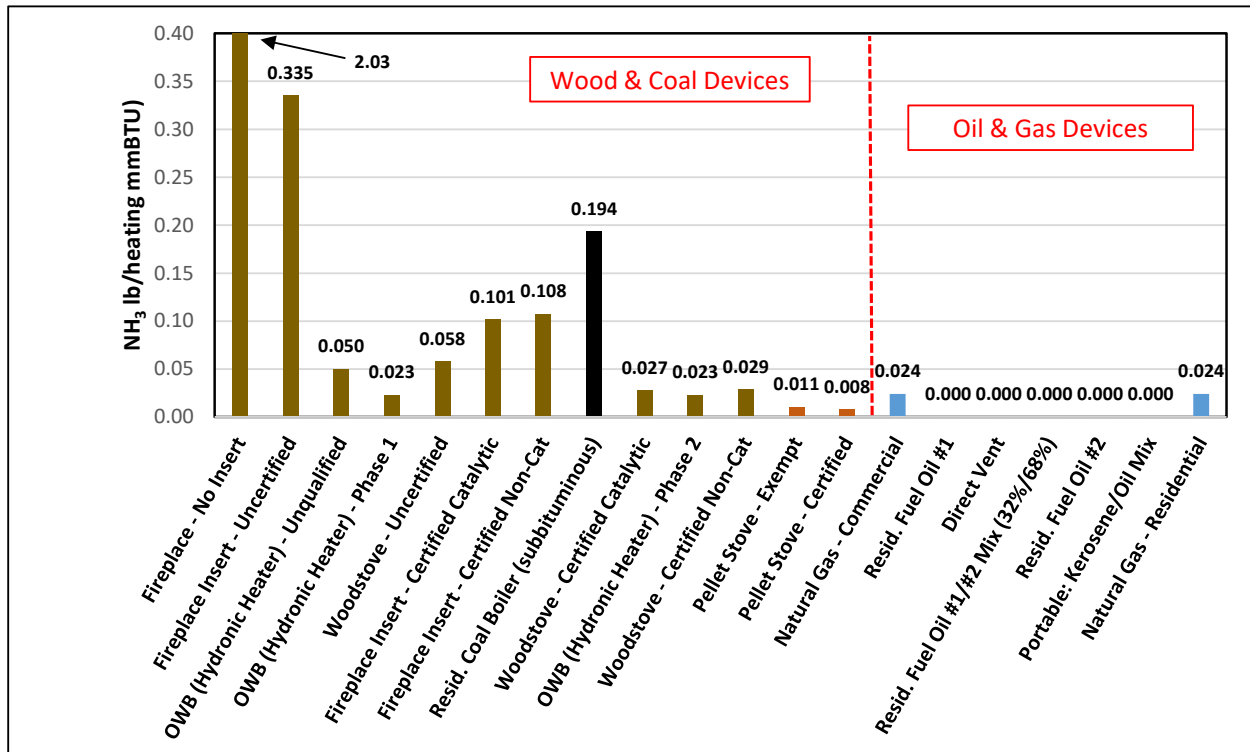


Figure 7.10-2. Space Heating NH₃ Emission Factors (lb/heating mMBTU)

Using these emission reductions between the 2020 Baseline and 2027 Attainment-Projected 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	Emissions (tons/day)		Reduction Targets (tons/day)		
	2020	2027	2023	2026	2029
Direct PM _{2.5}	<i>2.950</i>	<i>1.746</i>	0.518	1.035	1.208
SO ₂	<i>15.707</i>	<i>14.857</i>	0.364	0.729	0.850
NH ₃	<i>0.285</i>	<i>0.310</i>	-0.011	-0.021	-0.025

In Table 7.10-3, 2020 baseline and 2027 attainment year emissions are also shown in italics. These were used to calculate linear emission reduction targets in each milestone year using the following formula:

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

Where *MY* is the given milestone year, *BY* is the baseline year (2020) and *AY* is the projected attainment year (2027). In 2023 for example, the linear PM_{2.5} reduction target was calculated as:

$$PM_{2.5} Target_{2023} = (2.950 - 1.742) \times (2023 - 2020) / (2027 - 2020) = 0.518 \text{ tons/day}$$

7.10.3.2 Control Measure Implementation/Phase-In Schedule

Based on the nature of each control measure and their planned implementation dates, Table 7.10-4 shows the implementation/phase-in schedule for each measure by RFP year. This list of control measures corresponds to those presented earlier in Table 7.9-7 of Section III.D.7.9 for which PM_{2.5} and SO₂ emission benefits were quantified. For each measure, Table 7.10-4 lists the start year (first full calendar year from planned implementation date), the parameter used to describe measure penetration or phase-in and their forecasted values in each RFP year.

For most measures listed in Table 7.10-4 the implementation parameter is the combined compliance and penetration rate forecasted for the measure in each applicable year. For the Wood Stove Change Out (WSCO) Program, which also included the Borough-funded Oil-To-Gas Conversion (OGC) Program discussed in detail in Section III.D.7.6.8.1, the implementation metric listed is the expected number of change-outs.

These projected phase-in levels reflect the State's current implementation schedule. They will be re-evaluated with the submission of each required RFP report based on updated available data. For example, the Wood Stove Change Out (WSCO) Program phase-in schedule reflects current funding from the awarded 2016, 2017, 2018, 2019-2020, 2021 and 2022 EPA Targeted Airshed Grants (TAGs). As additional funding is secured, the WSCO implementation schedule will be updated. As noted earlier in Section III.D.7.9, although emission benefits from natural gas expansion (NGE) within the nonattainment area occur within the required QM period (2023-2029), the State has conservatively projected that additional benefits will not occur beyond what has been historically reported given the uncertainty behind forecasting of natural gas expansion.

Alaska's enforcement process underpins the compliance/penetrations rates forecasted for each control measure. As explained earlier in Chapter III.D.7.9 (Section 7.9.1.1), DEC employs a combination of advisory and non-compliance letters as well as issuances of notices of violation and penalties to enforce the requirements contained in each control measure.

**Table 7.10-4
Control Measure Implementation/Phase-In Schedule**

Measure Abbrev	Measure Description	Start Year	Implementation Parameter	Phase-In Schedule by RFP Year		
				2023	2026	2029
WSCO	WSCO Program	2010, On-going ^a	No. of Changeouts	3,576	5,078	5,937
CURT	Curtailment Program	2016, On-going ^b	Compliance Rate	38%	38%	38%
STF-12	Shift #2 to #1 Oil	2023	Combined Penetration/Compliance Rate	72%	95%	95%
STF-13	Commercial Dry Wood	2022	Combined Penetration/Compliance Rate	40%	45%	50%
STF-17	Wood Device Removal	2020	Combined Penetration/Compliance Rate	30%	30%	30%
BACM-R8	Wood Emission Rates	2020	Combined Penetration/Compliance Rate	35%	35%	35%
BACM-48	Remove Coal Devices	2024	Combined Penetration/Compliance Rate	25%	25%	25%
STF-22	No Primary Wood Heat	2020	Combined Penetration/Compliance Rate	0%, 0%	20%, 40%	20%, 40%
STF-23	NOASH/Exmptn Requirements	2020	Combined Penetration/Compliance Rate	30%	50%	50%
NGE	Natural Gas Expansion	2020	Household Conversion Percentage	0%	0%	0%

n/a – Not applicable

^a In the Serious Area Plan, WSCO counts were reported from 2013 forward. Under this Revised 2024 Amendment Plan, historical counts back to program start-up in July 2010 were also included.

^b Includes lowering of alert stage thresholds from 25 µg/m³ and 35 µg/m³ to 20 µg/m³ and 30 µg/m³ for Stages 1 and 2, respectively, effective January 8, 2020 as adopted under State regulations.

7.10.3.3 RFP Emission Reduction Calculations

Based on the control measure phase-in schedule presented in Table 7.10-4, projected emission reductions for each pollutant in each milestone year were calculated and compared to their targets to evaluate linear progress toward attainment. These comparisons are summarized below in Table 7.10-5.

The target reductions shown in Table 7.10-5 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 third of Table 7.10-5, direct PM_{2.5} emission reductions achieved within the first two milestone years (2023 and 2026) are projected to slightly lag the trajectory of linear progress toward estimated attainment by 2027 (and through 2029). This results from several factors that include future increases in WSCO Program throughput and marshalling of State staffing to increase compliance for several measures over time.

Table 7.10-5
Projected Progress toward Linear Emission Reduction Targets (tons/day)

Pollutant	Metric	2023	2026	2027	2029
Direct PM _{2.5}	Target Reduction	0.518	1.035	1.208	1.208
	Achieved Reduction	0.476	1.012	1.208	1.322
	Linear Progress Met?	No	No	Yes	Yes
SO ₂	Target Reduction	0.364	0.729	0.850	0.850
	Achieved Reduction	0.798	0.941	0.850	0.668
	Linear Progress Met?	Yes	Yes	Yes	No
NH ₃	Target Reduction	-0.011	-0.021	-0.025	-0.025
	Achieved Reduction	-0.020	-0.024	-0.025	-0.028
	Linear Progress Met?	No	No	Yes	No

The middle portion of Table 7.10-5 indicates that progress toward attainment for secondary pollutant SO₂ is expected to be non-linear but includes early year (2023 and 2026) progress that significantly exceeds the linear progress trajectory. This non-linearity in control measure reductions for SO₂ is due to two causes. First, most of the measures designed to reduce direct PM_{2.5} through removal, curtailment or replacement of solid-fuel devices trigger a shift in heating energy to higher SO₂ emitting heating oil. Second, decreases in SO₂ emissions reflected in Table 7.10-5 to offset these increases are the result of the SO₂-specific measure STF-12 (Shift from #2 to #1 heating oil) which was implemented in September 2022.

Thus, control measure emission reductions for SO₂ exhibit stepwise rather than linear progress. The explanation above justifies this stepwise progress as required under 40 CFR 51.1012(4).

Finally, progress for NH₃ is shown in the lower portion of Table 7.10-5 and indicates that linearly established targets will not be met until the forecasted 2027 attainment year. The negative emission reductions for NH₃ shown in Table 7.10-5 (i.e., emission increases) are not due to control measure benefits. As noted earlier, control measure reductions were only quantified for direct PM_{2.5} and SO₂ due to large uncertainty in NH₃ emission factors for key sources.

Figure 7.10-3 through Figure 7.10-5 provide a visual picture of forecasted emission reduction progress for direct PM_{2.5}, SO₂ and NH₃, respectively between the 2020 base year, the 2027 attainment year, and the applicable 2023, 2026 and 2029 QM years. Projected controlled emissions in each QM year are plotted in blue; the linear progress trajectory is shown as a dashed red line.

As shown in Figure 7.10-3, forecasted controlled PM_{2.5} emissions are very close to the linear progress line in QM years 2023 and 2026. And PM_{2.5} emissions in the 2029 QM year are forecasted to continue decreasing from 2027 attainment year levels. Figure 7.10-4 illustrates the stepwise progress toward 2024 attainment for SO₂ emissions in the nonattainment area.

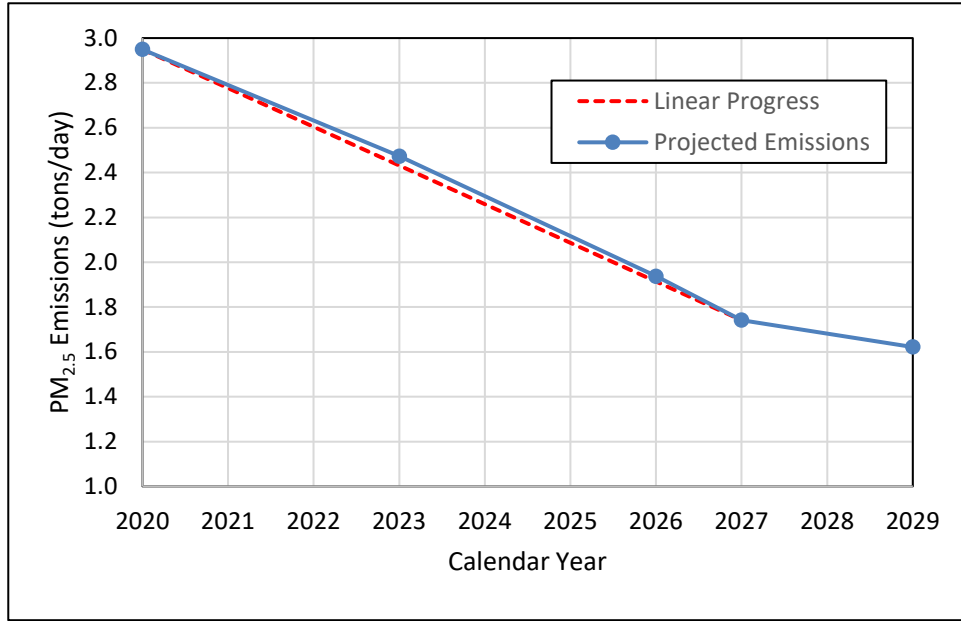


Figure 7.10-3. FNSB Nonattainment Area RFP 2020 - 2029, Direct PM_{2.5} (tons/day)

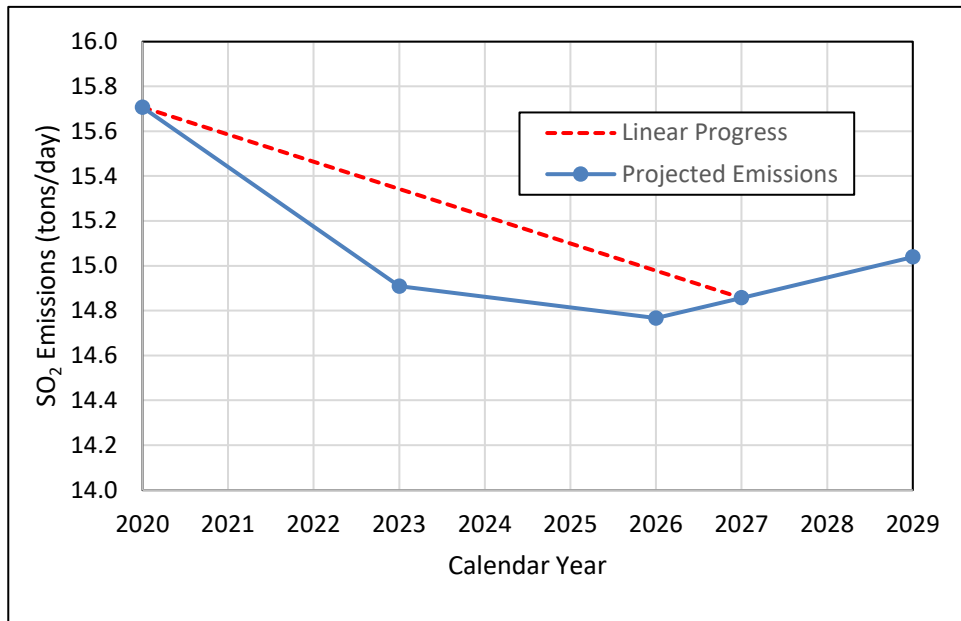


Figure 7.10-4. FNSB Nonattainment Area RFP 2020 – 2029, SO₂ (tons/day)

Finally, Figure 7.10-5 compares the projected emissions and linear progress for NH₃, albeit without quantifying NH₃ benefits from adopted control measures.

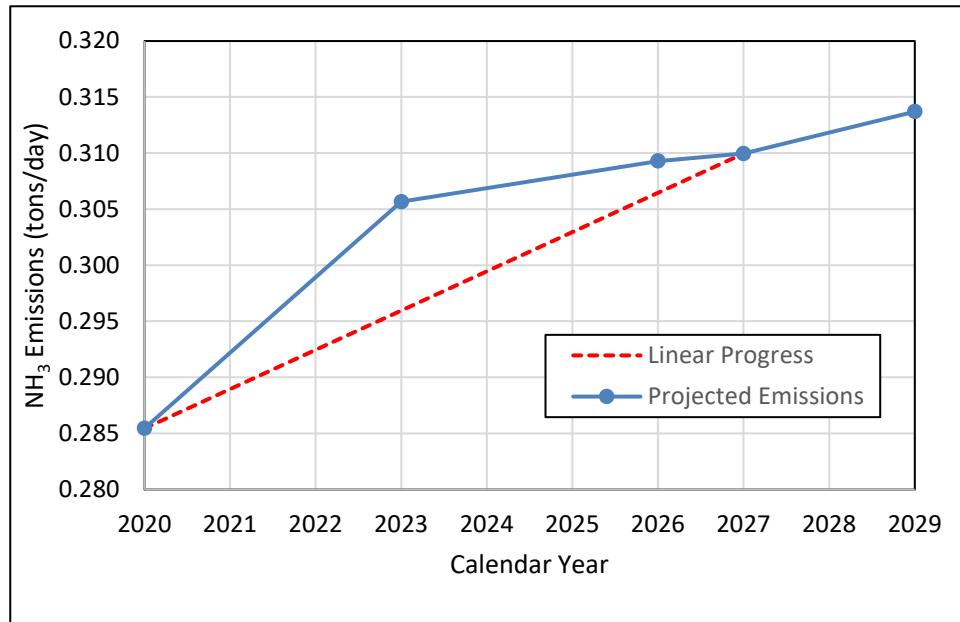


Figure 7.10-5. FNSB Nonattainment Area RFP 2020 – 2029, NH₃ (tons/day)

In addition to the emissions and control measure reductions summarized here, a detailed spreadsheet is contained in the electronic Section III.D.7.10 Appendix that provides emission breakdowns by source sector and includes calculations of the emission benefits for each measure.

7.10.3.4 Contingency Measure Benefits

This subsection discusses how emission benefits from the contingency measure package discussed in further detail in Section III.D.7.11 would affect RFP and the QM emission reduction targets presented in the preceding subsection. For historical completeness, the contingency measures proposed under the Serious Plan, the 2020 Amendments, and this 2024 Amendment and their impacts on RFP are presented separately below. And it is noted that the emission reductions and RFP targets for the preceding Serious Plan and 2020 Amendments are those calculated under these respective plans and differ from those developed under the 2024 Amendments that reflect revised emission inventories and attainment modeling.

Moreover, EPA published draft guidance^{6,7} in March 2023 for contingency measure (CM) requirements in ozone and particulate matter nonattainment areas. Longstanding EPA policy preceding this 2023 draft guidance recommended that CMs provide emission reductions equal to or exceeding one year’s worth (OYW) of RFP (based on the linear RFP trajectory). The 2023 draft guidance continues to recommend an annual progress-based approach but revises the metric to OYW reductions relative to attainment at the time CMs would be triggered. Thus, since 2023 draft CM guidance has not been finalized, this subsection compares CM reductions to the “old” metric, OYW reductions of RFP. Section III.D.7.11 provides a comparison of CM reductions to new metric, OYW of attainment, contained in the 2023 draft guidance.

⁶ <https://www.epa.gov/air-quality-implementation-plans/draft-contingency-measures-guidance>

⁷ Federal Register, Vol. 88, No. 56, March 23, 2023 (88 FR 17571).

Serious Plan Contingency Measure - In accordance with 40 C.F.R. § 51.1014 and as described in Section III.D.7.11, DEC has included in its regulations a control package that will act as the contingency measure for the Serious Area plan. It requires removal and replacement of all EPA-certified stoves greater than 25 years old with an emission rating above 2.0 g/hr. This “older certified stove” turnover is triggered through several mechanisms including, but not limited to, the sale of property.

The approach used to estimate the contingency measure emission reductions utilized data sources and methods consistent with other wood-burning control measure analysis within this 2024 Amendment plan. Key assumptions and elements are outlined below:

- Assumed the measure applies to cordwood stoves and fireplace inserts.
- Total and wood device-specific average episodic household energy use was estimated from the 2011-2015 Fairbanks Home Heating (HH) Survey (which is discussed at length in the SIP).
- The fraction of wood stoves/inserts over 25 years old was estimated from the HH Survey and found to be 19.1%.
- The fractions of certified stoves/inserts above and below the 2.0 g/hr rating within the nonattainment area and the ratio of PM emissions between the two subsets was estimated from DEC’s 2013 Wood Tag survey (also discussed in the SIP).

Baseline and “after replacement” emissions were then calculated using the data/assumptions above for affected households (those with > 25-year-old certified stoves) within the non-attainment area. A compliance rate of 10% was estimated based on the frequency these older stoves/inserts would be identified and replaced through residential home resales. According to data⁸ published in the Fairbanks Community Research Quarterly, the Fairbanks Borough averaged 1,215 home sales per year from 2017-2019, the most recent period of available data. Accounting for the fraction that are re-sales (that trigger a compliance mechanism) and within the nonattainment area, along with the fraction of homes with > 25-year-old wood stoves, yielded the estimated “compliance” rate of 10%. This reflects a minimum, or base-level compliance rate that only triggers removal/replacement of > 25-year-old certified stoves through real estate transactions.

Based on this minimum estimated compliance rate, the contingency measure is expected to provide PM_{2.5} reductions of 0.01 tons/day (averaged over the modeling episodes) in its first year of implementation. Reductions would also accumulate over time as the 25-year threshold targets a new year of older stoves in each successive calendar year. Thus, this contingency measure will provide meaningful PM_{2.5} reductions consistent with RFP.

2020 Amendments Contingency Measure – Also in accordance with 40 CFR § 51.1014, DEC has also evaluated a measure that will serve as a contingency measure for the 2020 Amendments. It consists of increasing the stringency of the Stage 2 alert under the Solid Fuel-Burning Appliance Curtailment Program from 30 µg/m³ to 25 µg/m³, which would result in more

⁸ Community Research Quarterly, Fairbanks North Star Borough, Volume XLII, No. 4, Winter 2019

frequent application of Stage 2 burning restrictions, which prohibit all solid fuel burning except in No Other Adequate Source of Heat (NOASH) households.

DEC is prepared to implement this contingency measure as early as Winter 2020/2021 when the 2020 Amendment SIP is made final and is effective and thus, it can be triggered upon the effective date of any EPA finding of failure in 2021 or later years. Thus, emission benefits for this contingency measure (relative to currently adopted and implemented measures) were calculated for 2021 and later calendar years. The approach used to calculate emission benefits was consistent with the approach used to estimate emission benefits resulting from reduction of the Curtailment Program alert thresholds for Stages 1 and 2 from 25 $\mu\text{g}/\text{m}^3$ and 35 $\mu\text{g}/\text{m}^3$ to 20 $\mu\text{g}/\text{m}^3$ and 30 $\mu\text{g}/\text{m}^3$, respectively. It was based on a weighting of the 35 modeling episode days under which either Stage 1, Stage 2 or no alert restrictions would have occurred based on measured $\text{PM}_{2.5}$ concentrations for each episode day.

Based on this approach, $\text{PM}_{2.5}$ emission benefits from this contingency measure are presented in Table 7.10-6 by calendar year. The emission reductions are incremental reductions above those from the currently adopted package of control measures and account for overlapping effects between measures. The forecasted Curtailment Program compliance rate is also shown in Table 7.10-6 since the approach used to calculate the contingency measure benefits is affected by the compliance rate in each given year. The measure benefits shown in Table 7.10-6 are not directly proportional to the listed compliance rate since they have been discounted to reflect overlapping control measure effects in each year.

**Table 7.10-6
2020 Amendments Curtailment Program Compliance Rate-Based
Incremental Emission Reductions (tons/day)**

Calendar Year	Curtailment Compliance Rate	$\text{PM}_{2.5}$ Emission Reduction (tons/day)
2021	30%	0.014
2022	40%	0.021
2023	45%	0.023
2024	45%	0.019
2025	45%	0.015
2026	50%	0.015

This contingency measure will also provide meaningful and quantifiable $\text{PM}_{2.5}$ emission reductions consistent with RFP goals.

The combined $\text{PM}_{2.5}$ emission benefit from these two contingency measures (if implemented in 2024) is 0.08 tons/day. Based on data presented earlier in Table 7.10-5, one year of RFP advancement is 0.24 tons/day of $\text{PM}_{2.5}$. Although emission benefits from these contingency measures will not achieve a one-year advancement of RFP as recommended by EPA guidance, surplus and additional anticipated control measure benefits not yet quantified would collectively provide $\text{PM}_{2.5}$ emission reductions in excess of this one-year advancement of the RFP target. This is summarized below in Table 7.10-7.

**Table 7.10-7
2020 Amendments Projected CM Progress Toward Linear RFP PM_{2.5} Target (tons/day)**

Control Measure Component	PM_{2.5} Emission Reduction (tons/day)
Contingency Measures	0.08
Surplus Single Year Benefits from State Control Measures	Up to 0.12
Incremental Benefits from Anticipated 2019-2020 TAG funding	0.66
TOTAL	0.86
Total Discounted for Measure Overlap	0.53
One Year RFP Advancement Target	0.24
Excess Emission Reductions Above One Year RFP Target	0.29

As shown at the top of Table 7.10-7, combined benefits from the contingency measures produce 0.08 tons/day of PM_{2.5} emission reductions. Other adopted State control measures for which benefits were quantified will provide additional surplus benefits of up to 0.12 tons/day (which can be inferred from Figure 7.10-3). In addition, based on funding anticipated under the 2019-2020 Targeted Airshed Grant program (for which benefits were not included in the attainment and RFP analysis), DEC estimates an additional 0.66 tons/day of incremental PM_{2.5} reductions would result from Wood Stove Change Out Program expansion and Curtailment Program enhancements by 2024. As shown in the “TOTAL” row of Table 7.10-7, summing these benefits yields a total of 0.86 tons/day of emission reductions. After accounting for measure benefits overlap, combined reductions 0.53 tons/day of PM_{2.5} reductions could be delivered that achieve more than the equivalent of one year of RFP advancement (0.24 tons/day of PM_{2.5}). As shown in the bottom row of Table 7.10-7, these excess reductions above the one-year advancement target were estimated to be 0.29 tons/day.

Moreover, the 2024 expeditious attainment demonstration presented earlier in Section III.D.7.9 included the finding that the modeled 2024 design value at the controlling monitor within the nonattainment area was 30.9 µg/m³, leaving a comfortable margin between this modeled value and the 24-hour PM_{2.5} NAAQS of 35.5 µg/m³ (unrounded limit of the 35 µg/m³ standard.) This margin, combined with the surplus emission benefits discussed above is believed to provide the nonattainment area with more than the equivalent of one year of RFP advancement.

2024 Amendments Contingency Measure – Again in accordance with 40 CFR § 51.1014, DEC has also evaluated package of additional controls that will serve as a contingency measure for the 2024 Amendments. It consists of two components:

1. Enhanced Curtailment Program – This would increase the stringency of the Stage 1 and Stage 2 alert levels under the Solid Fuel-Burning Appliance Curtailment Program from 20 µg/m³ and 30 µg/m³ to 15 µg/m³ and 20 µg/m³, which would result in more frequent application of burning restrictions under both stages, including Stage 2 which prohibits all solid fuel burning except in No Other Adequate Source of Heat (NOASH) households. In addition, as explained in Section III.D.7.11 DEC will mobilize additional staffing under the contingency measure to expand compliance and enforcement activities that are expected to result in an increased Curtailment Program compliance rate of 65%.

2. Enhanced Wood Device Removal – SIP control measure STF-17 requires surrender or removal of uncertified wood devices, including hydronic heaters by 2024. DEC has modeled the effectiveness of this measure over time based on a 30% compliance rate by that 2024 date. In the event contingency measure implementation is triggered starting in 2028 (the year after forecasted attainment), DEC projects that enhanced Curtailment Program stringency and enforcement will yield collateral compliance with measure STF-17, increasing its effective compliance rate to 45%.

Emission benefits from enhanced stringency and staffing-based increases in compliance from these two components under the contingency measure package for the 2024 Amendments were estimated for calendar year 2028 (one year after forecasted attainment in 2027 as noted above). Both control components work to suppress/remove wood device usage for space heating. Consistent with development of the 2024 Amendments Control inventories, this is expected to result in heating energy from suppressed or removed wood devices to be replaced by that from heating oil devices (the most common space heating devices in the nonattainment area). Thus, as was performed in the Control inventories, emissions impacts of the contingency measure package were calculated for both direct PM_{2.5} and SO₂. In addition, SO₂ was also included in these comparisons under the 2024 Amendments for consistency with comparisons presented in Section III.D.7.11 based on EPA’s 2023 draft CM guidance.

Table 7.10-8 presents these emission reductions, including accounting for overlap between the two components and compares them to OYW RFP targets established from data presented earlier in Table 7.10-3. Negative reductions refer to emission increases that occur for SO₂ due to the assumption noted earlier that suppressed or removed wood heating energy is replaced with that from heating oil devices since SO₂ emission factors per unit heating energy are higher for heating oil than wood.

**Table 7.10-8
2024 Amendments Projected CM Progress Toward Linear RFP Targets (tons/day)**

Contingency Measure Component / Metric	2028 Emission Reductions (tons/day)	
	PM _{2.5}	SO ₂
Enhanced 2-Stage Curtailment Program	0.089	-0.038
Enhanced Wood Device Removal	0.062	-0.000
Total Contingency Measure Package	0.151	-0.038
Total Package Discounted for Overlap	0.142	-0.038
OYW RFP Advancement Target	0.172	0.122
Relative Reductions to OYW RFP Target	0.82	-0.31

The first two rows of Table 7.10-8 list the individual emission reductions estimated for each of the two components of the CM package (Enhanced 2-Stage Curtailment and Enhanced Wood Device Removal). The sum of those reductions is then provided in the “Total Contingency Measure Package” row. Below that, reductions after accounting for overlap between the two components are given; as shown in Table 7.10-8, these overlap-adjusted reductions are 0.142 tons/day and -0.038 tons/day for PM_{2.5} and SO₂, respectively. Finally, the OYW RFP targets are shown below these along with the reductions provided by the CM package relative to the OYW RFP targets. As shown at the bottom of Table 7.10-8, the CM package is expected to

achieve 82% (0.82) of the OYW RFP target for PM_{2.5} and increase SO₂ emissions by 31% relative to OYW RFP.

Although the CM package does not meet recommended OYW RFP targets, it does provide emission reductions that achieve the OYW attainment target defined in the 2023 draft guidance as explained in Section III.D.7.11.

(The data and calculation details for the 2024 Amendments contingency measure emission benefits are provided in a separate spreadsheet within the electronic Section III.D.7.10 Appendix.)

7.10.4 QM Report Commitment

As required under 40 C.F.R. § 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 the following elements:

- (1) A certification by the Governor or Governor's designee that the attainment plan 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 FNSB nonattainment area. Table 7.10-9 lists the schedule for which these reports will be submitted to EPA as required under 40 C.F.R. § 51.1013(b).

**Table 7.10-9
RFP/QM Reporting Schedule**

RFP & QM Analysis Year	Report Due Date
2017	Completed
2020	Completed
2023	Completed
2026	March 31, 2027
2029	March 31, 2030