ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Amendments to:

State Air Quality Control Plan

Vol. II: III.D.7.10

Reasonable Further Progress and Quantitative Milestones

Replaced and Adopted

November 18, 2020

Michael J. Dunleavy, Governor

Jason W. Brune, Commissioner

Note: This chapter consists of the adopted language of the 2020 Amendments to the Serious SIP for inclusion in this section of the State Air Quality Control Plan addressing the Fairbanks North Star Borough PM2.5 Serious nonattainment area. The chapter is a replacement for the 2019 Adopted Serious SIP Requirements.

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 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 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 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 Rule[1], 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 2020 Amendment to the Serious Area SIP (subsequently referred to as the 2020 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 NOx 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 (NH_3) precusor 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), SO_2 and NH_3.

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 (SO_2 and NH_3 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 2020 Amendment plan 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 $PM_{2.5}$ 2020 Amendment plan, 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 2020 Amendment plan As discussed in Section III.D.7.9, DEC currently estimates 2024to 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
2019	2024	2020, 2023, 2026

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 2020 Amendment plan. It includes an accounting for the schedule/phase-in of each measure being adopted and estimation of emission reductions (of directly-emitted $PM_{2.5}$, SO_2

and NH_3 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.

7.10.3.1 Calculation of Linear Emission Reduction Targets

Table 7.10-2 presents 2019 Baseline and 2024 Attainment-Projected inventory $PM_{2.5}$, SO_2 and NH_3 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	2019 Baseline	2024 Attainment
Emissions, Direct $PM_{2.5}$	3.17	1.99
Emissions, SO_2	15.01	10.71
Emissions, NH_3	0.293	0.316
Reductions from Committed Control Measures, Direct $PM_{2.5}$	n/a	1.18
Reductions from Committed Control Measures, SO_2	n/a	4.30
Reductions from Committed Control Measures, NH_3	n/a	-0.023

n/a – Not applicable

The 2019 emissions match the nonattainment area planning inventory shown in Section III.D.7.6.6.8 and those for 2024 are consistent[3] 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 $PM_{2.5}$, 3.17 – 1.99 = 1.18 tons/day). The negative reductions for NH_3 reflect population growth-projected emission increases between 2019 and 2024 coupled with the fact that NH_3 emission benefits were not quantified from controls within the sectors evaluated given the uncertainty of underlying NH_3-specifc emission factors. NH_3 emission factors for residential wood-burning used in the emissions inventory were developed in a 2004 Pechan study[4] conducted for EPA. In that study, Pechan assigned data quality/certainty ratings for each set of source-specific NH_3 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 NH_3 emission factors for space heating combustion, if control measure reductions for NH_3 were quantified, they would produce similar co-benefits and relative

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[3] Combined 2024 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.

[4] S. M. Roe, et al., "Estimating Ammonia Emissions from Anthropogenic Nonagricultural Sources - Draft Final Report," E.H. Pechan & Associates, Inc., April 2004.

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 NH$_3$. 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 oder from left to right.
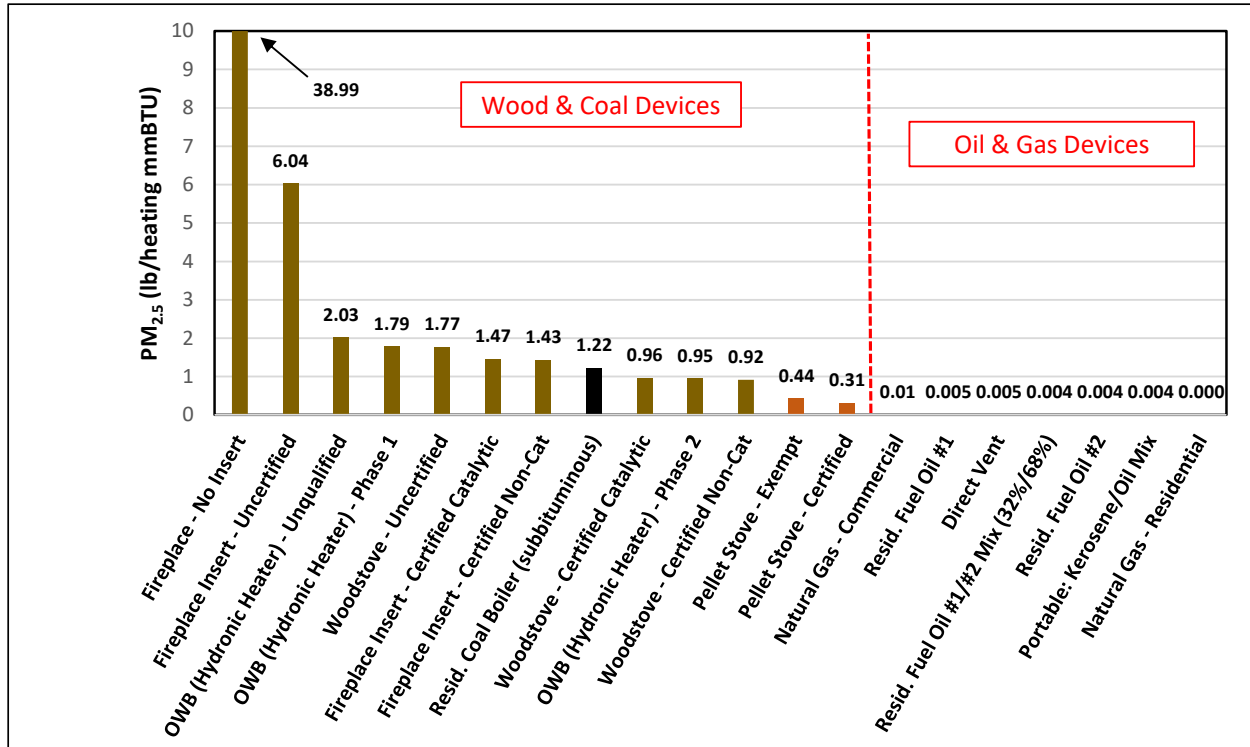

Figure 7.10-1. Space Heating PM$_{2.5}$ Emission Factors (lb/heating mmBTU) Ranked in Descending Order

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 NH$_3$ emission factors by heating device and fuel, again in units of lb/heating mmBTU. Instead of re-sorting them by descending NH$_3$ emission factor, they are presented in the same order as those shown for PM2.5 in Figure 7.10-1. Even without re-

sorting, Figure 7.10-2 shows a similar decrease in NH_3 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 NH_3 co-benefits at levels similar to those for $PM_{2.5}$ if quantified.
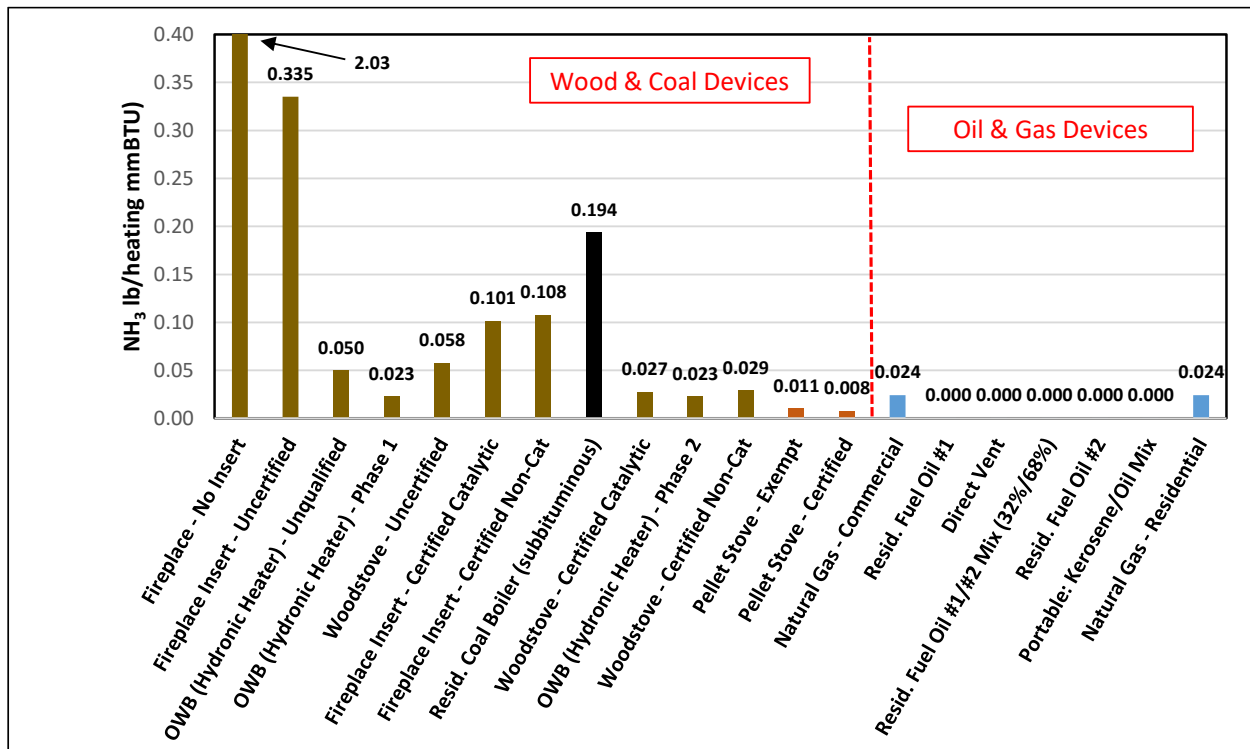

Figure 7.10-2. Space Heating NH_3 Emission Factors (lb/heating mmBTU)

Using these emission reductions between the 2019 Baseline and 2024 Attainment-Projected inventories, Table 7.10-3 shows calculated RFP/QM milestone year emission reduction targets <u>based on linear progress</u> towards attainment by 2024.

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

Pollutant	Emissions (tons/day)		Reduction Targets (tons/day)		
	2019	*2024*	*2020*	*2023*	*2026*
Direct PM$_{2.5}$	*3.17*	*1.99*	0.24	0.94	1.18
SO$_2$	*15.01*	*10.71*	0.86	3.44	4.30
NH$_3$	*0.293*	*0.316*	-0.005	-0.018	-0.023

Table 7.10-3, 2019 baseline and 2024 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 (2019) and *AY* is the projected attainment year (2024). In 2023 for example, the linear PM$_{2.5}$ reduction target was calculated as:

$$PM_{2.5}\ Target_{2023} = (3.17 - 1.99) \times (2023 - 2019) / (2024 - 2019) = 0.94\ tons/day$$

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 SO$_2$ 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 detailed in Section III.D.7.6.8.1, the implementation metric listed is the expected number of change-outs. At the bottom of Table 7.10-4, the implementation parameter listed is the point source sector-averaged SO$_2$ reduction factor. These factors (22% in 2023 and 53% in 2026) represent percentage reductions in emissions totaled across all facilities in the nonattainment area from BACT controls adopted by the state that begin phasing in by calendar year 2021. Since DEC has determined some facilities will not require additional BACT controls, these reduction factors represent total SO$_2$ reductions across all operating point source facilities (including those without additional controls). They are internally consistent with the facility and emission unit specific reduction factors presented earlier in Section III.D.7.6.8.1 under "Point Source Controls."

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

Measure Abbrev	Measure Description	Start Year	Implementation Parameter	Phase-In Schedule by RFP Year		
				2020	2023	2026
WSCO	WSCO Program	2010, On-going[a]	No. of Changeouts	791	3,645	3,791
CURT	Curtailment Program	2016, On-going[b]	Compliance Rate	30%	45%	50%
STF-12	Shift #2 to #1 Oil	2023	Combined Penetration/ Compliance Rate	n/a	100%	100%
STF-13	Commercial Dry Wood	2022	Combined Penetration/ Compliance Rate	n/a	75%	75%
STF-17	Wood Device Removal	2024	Combined Penetration/ Compliance Rate	n/a	n/a	50%
BACM-R8	Wood Emission Rates	2020	Combined Penetration/ Compliance Rate	100%	100%	100%
BACM-48	Remove Coal Devices	2024	Combined Penetration/ Compliance Rate	n/a	n/a	75%
STF-22	No Primary Wood Heat	2020	Combined Penetration/ Compliance Rate	80%, 100%	80%, 100%	80%, 100%
STF-23	NOASH/Exmptn Requirements	2020	Combined Penetration/ Compliance Rate	0%	50%	100%
NGE	Natural Gas Expansion	2020	Household Conversion Percentage	0%	0%	0%
BACT	Point Source SO_2 BACT	2021	Sector-Averaged Reduction Factor	n/a	22%	53%

n/a – Not applicable

[a] In the Serious Area Plan, WSCO counts were reported from 2013 forward. Under this Revised Attainment 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.

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 2016, 2017 and 2018 EPA Targeted Airshed (TAGs). As noted earlier in Section III.D.7.6.8.1, Alaska anticipates that additional funding will be awarded under the State's 2019-2020 TAG application. 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 may occur within the required QM period (2020-2026), the State has conservatively projected that benefits will not occur until after 2026 given the uncertainty behind forecasting of natural gas expansion.

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.

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

Pollutant	Metric	2020	2023	*2024*	2026
Direct PM$_{2.5}$	Target Reduction	0.24	0.94	*1.18*	1.18
	Achieved Reduction	0.3	1.03	*1.18*	1.42
	Linear Progress Met?	Yes	Yes	*Yes*	Yes
SO$_2$	Target Reduction	0.86	3.44	*4.30*	4.30
	Achieved Reduction	-0.27	2.42	*4.30*	4.17
	Linear Progress Met?	No	No	*Yes*	No
NH$_3$	Target Reduction	-0.005	-0.018	*-0.023*	-0.023
	Achieved Reduction	-0.005	-0.020	*-0.023*	-0.028
	Linear Progress Met?	Yes	No	*Yes*	No

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 each milestone year are projected to meet or exceed linear progress toward estimated attainment by 2024 (and through 2026).

The middle portion of Table 7.10-5 indicates that progress toward attainment for secondary pollutant SO$_2$ is expected to be non-linear. This non-linearity in control measure reductions for SO$_2$ 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 SO$_2$ emitting heating oil. Second, decreases in SO$_2$ emissions reflected in Table 7.10-5 to offset these increases are the result of the following SO$_2$-specific measures:

- Shift from #2 to #1 Oil (STF-12) for space heating by 2023; and
- Point source SO$_2$ BACT controls that phase in from 2021-2024.

Thus, control measure emission reductions for SO$_2$ exhibit stepwise rather than linear progress. The explanation above justifies this stepwise progress as required under 40 CFR 51.1012(4).

Finally, progress for NH$_3$ is shown in the lower portion of Table 7.10-5 and indicates that linearly-established targets for will be met in RFP year 2020 (and the forecasted 2024 attainment year). The emission reductions for NH$_3$ shown in Table 7.10-5 are not due to control measures benefits. As noted earlier, control measure reductions were only quantified for direct PM$_{2.5}$ and SO$_2$.) The State plans to more formally evaluate benefits from NH$_3$ controls in the future once its significance as a PM$_{2.5}$ precursor in Fairbanks is better understood.

Figure 7.10-3 through Figure 7.10-5 provide a visual picture of forecasted emission reduction progress for direct $PM_{2.5}$, SO_2 and NH_3, respectively between the 2019 base year, the 2024 attainment year, and the applicable 2020, 2023 and 2026 QM years. Projected emissions in each QM year are plotted in blue; the linear progress trajectory is shown as a dashed red line.

As shown, forecasted $PM_{2.5}$ emissions in Figure 7.10-3 and Figure 7.10-5 are below the linear progress line in each QM year from 2020 through 2026. Figure 7.10-4 illustrates the stepwise progress toward 2024 attainment for SO_2 emissions in the nonattainment area.
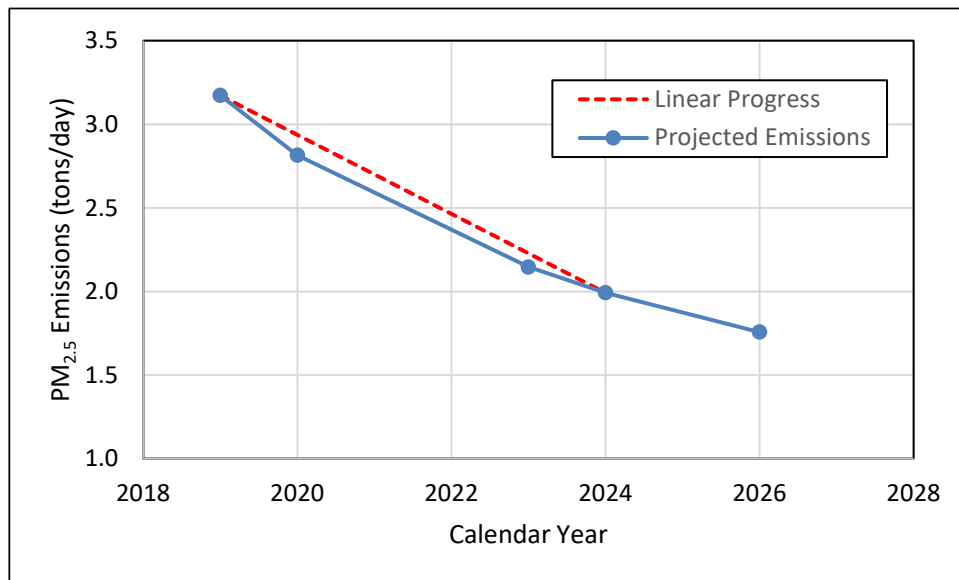

Figure 7.10-3. FNSB Nonattainment Area RFP 2019 - 2026, Direct $PM_{2.5}$ (tons/day)
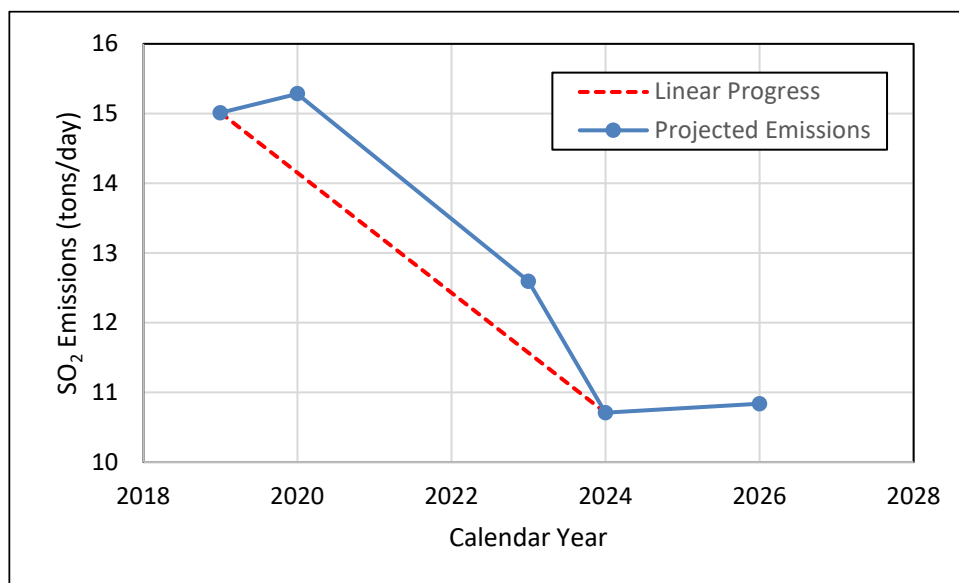

Figure 7.10-4. FNSB Nonattainment Area RFP 2019 – 2026, SO_2 (tons/day)

Finally, Figure 7.10-5 compares the projected emissions and linear progress for NH_3, albeit without quantifying NH_3 benefits from adopted control measures.
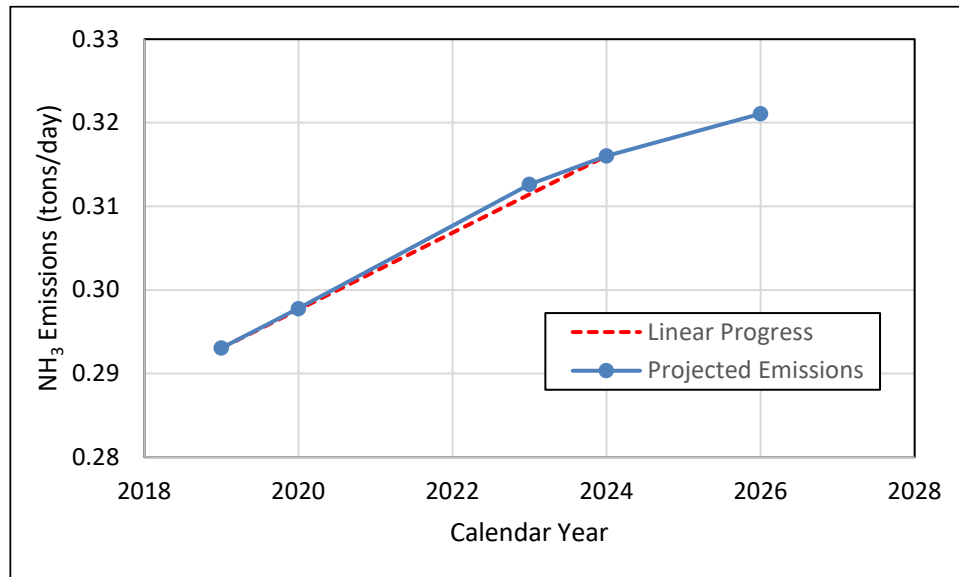

Figure 7.10-5. FNSB Nonattainment Area RFP 2019 – 2026, NH_3 (tons/day)

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 detailed calculations of the emission benefits for each measure.

7.10.3.4 Contingency Measure Benefits

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 measure 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 2020 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 data[5] 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 plan. It consists of increasing the stringency of the Stage 2 alert under the Solid Fuel-Burning Appliance Curtailment Program from 30 µg/m^3 to 25 µg/m^3, which would result in more 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 Amendments 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 µg/m^3 and 35 µg/m^3 to 20 µg/m^3 and 30 µg/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 $PM_{2.5}$ concentrations for each episode day.

Based on this approach, $PM_{2.5}$ emission benefits from this contingency measure are presented in Table 7.10-6
Projected Progress toward Linear Emission Reduction Targets (tons/day) by calendar year. The emission reductions are incremental reductions above those from the currently adopted package

[5] Community Research Quarterly, Fairbanks North Star Borough, Volume XLII, No. 4, Winter 2019

of control measures and account for overlapping effects between measures. The forecasted Curtailment Program compliance rate is also shown in Table 7.10-6 Projected Progress toward Linear Emission Reduction Targets (tons/day) 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 Projected Progress toward Linear Emission Reduction Targets (tons/day) 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
Projected Progress toward Linear Emission Reduction Targets (tons/day)

Calendar Year	Curtailment Compliance Rate	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 PM$_{2.5}$ emission reductions consistent with RFP goals.

The combined 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 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 PM$_{2.5}$ emission reductions in excess of this one year advancement of RFP target. This is summarized below in Table 7.10-7.

Table 7.10-7
Comparison of Contingency and Surplus Measure PM$_{2.5}$ Benefits to RFP Advancement

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 in 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 if 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 $\mu g/m^3$, leaving a comfortable margin between this modeled value and the 24-hour PM2.5 NAAQS of 35.5 $\mu g/m^3$ (unrounded limit of the 35 $\mu g/m^3$ 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.

(The data and calculation details for these contingency measure emission benefits are also included in the aforementioned 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 of 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 7.10-8 RFP/QM Reporting Schedule lists the schedule for which these reports will be submitted to EPA as required under 40 C.F.R. § 51.1013(b).

Table 7.10-8
RFP/QM Reporting Schedule

RFP & QM Analysis Year	Report Due Date
2017	Completed
2020	March 31, 2021
2023	March 31, 2024
2026	March 31, 2027