



ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[EPA-R10-OAR-2015-0131: FRL - 9959-01-Region 10]

Air Plan Approval; AK, Fairbanks North Star Borough; 2006 PM_{2.5} Moderate Area Plan

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: The Environmental Protection Agency (EPA) is proposing to approve state implementation plan (SIP) revisions submitted by the State of Alaska (Alaska) to address Clean Air Act (CAA or Act) requirements for the 2006 24-hour fine particulate matter (PM_{2.5}) national ambient air quality standards (NAAQS) in the Fairbanks North Star Borough Moderate PM_{2.5} nonattainment area (FNSB NAA). Alaska submitted an attainment plan on December 31, 2014, and made additional submissions and provided clarifying information to supplement the attainment plan for the area in January 2015, March 2015, July 2015, November 2015, March 2016, November 2016, and January 2017 (hereafter, the initial submission and all supplemental and clarifying information will be collectively referred to as “the FNSB Moderate Plan”).

DATES: Written comments must be received on or before **[insert date 30 days after date of publication in the Federal Register]**.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA-R10-OAR-2015-0131, at <http://www.regulations.gov>. Follow the online instructions for submitting comments. Once submitted, comments cannot be edited or removed from Regulations.gov. The EPA may publish any comment received to its public docket. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose

disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.*, on the web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit <http://www2.epa.gov/dockets/commenting-epa-dockets>.

FOR FURTHER INFORMATION CONTACT: Claudia Vaupel, Air Planning Unit, Office of Air and Waste (OAW-150), Environmental Protection Agency, Region 10, 1200 Sixth Ave, Suite 900, Seattle, WA 98101; telephone number: 206-553-6121, email address: vaupel.claudia@epa.gov.

SUPPLEMENTARY INFORMATION: Throughout this document, wherever “we”, “us” or “our” are used, it is intended to refer to the EPA.

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I. Background for the EPA's Proposed Action

A. Regulatory Background

On October 17, 2006, the EPA strengthened the 24-hour PM_{2.5} NAAQS by lowering the level of the standards from 65 µg/m³ to 35 µg/m³ in order to provide increased protection of public health (40 CFR 50.13).¹ Epidemiological studies have shown statistically significant correlations between elevated PM_{2.5} levels and premature mortality. Other important adverse health effects associated with elevated PM_{2.5} exposure include aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days), changes in lung function and increased respiratory symptoms. Individuals particularly sensitive to PM_{2.5} exposure include older adults, people with heart and lung disease, and children (78 FR 3088, January 15, 2013). PM_{2.5} can be emitted directly into the atmosphere as a solid or liquid particle (“primary PM_{2.5}” or “direct PM_{2.5}”) or can be formed in the atmosphere as a result of various chemical reactions among precursor pollutants such as nitrogen oxides, sulfur oxides, volatile organic compounds, and ammonia (“secondary PM_{2.5}”).²

Following promulgation of a new or revised NAAQS, the EPA is required by section 107(d)(1) of the CAA to designate areas throughout the United States as attainment, nonattainment, or unclassifiable for the NAAQS. Nonattainment areas include both areas that are violating the NAAQS, and nearby areas with emissions sources or activities that contribute to

¹ See 71 FR 61224 (October 17, 2006). The EPA set the first NAAQS for PM_{2.5} on July 18, 1997 (62 FR 36852), including annual standards of 15.0 mg/m³ based on a 3-year average of annual mean PM_{2.5} concentrations and 24-hour (daily) standards of 65 mg/m³ based on a 3-year average of 98th percentile 24-hour concentrations (40 CFR 50.7). In 2012, the EPA revised the annual standard to lower its level to 12 mg/m³ (78 FR 3086, January 15, 2013, codified at 40 CFR 50.18). Unless otherwise noted, all references to the PM_{2.5} standard in this notice are to the 2006 24-hour standard of 35 mg/m³ codified at 40 CFR 50.13.

² See EPA, *Regulatory Impact Analysis for the Final Revisions to the National Ambient Air Quality Standards for Particulate Matter* (EPA-452/R-12-005, December 2012), p. 2-1.

violations in those areas. States with areas designated nonattainment are required to prepare and submit a plan for attaining the NAAQS in the area as expeditiously as practicable

The requirements for attainment plans for the 2006 24-hour PM_{2.5} NAAQS include the general nonattainment area planning requirements in CAA section 172 of title I, part D, subpart 1 (subpart 1) and the additional planning requirements specific to particulate matter in CAA sections 188 and 189 of title I, part D, subpart 4 (subpart 4). The EPA has a longstanding general guidance document that interprets the 1990 amendments to the CAA, commonly referred to as the “General Preamble” (57 FR 13498, April 16, 1992). The General Preamble addresses the relationship between subpart 1 and subpart 4 requirements and provides recommendations to states for meeting statutory requirements for particulate matter nonattainment planning. Specifically, the General Preamble explains that requirements applicable to Moderate area nonattainment SIPs are set forth in subpart 4, but such SIPs must also meet the general nonattainment planning provisions in subpart 1, to the extent these provisions “are not otherwise subsumed by, or integrally related to,” the more specific subpart 4 requirements. 57 FR 13538. On August 16, 1994, the EPA promulgated an addendum to the General Preamble providing additional guidance for particulate matter nonattainment areas. 59 FR 41988. Additionally, on August 24, 2016, the EPA issued a final rule, *Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements* (PM_{2.5} Implementation Rule, 81 FR 58009), to clarify our interpretations of the statutory requirements that apply to PM_{2.5} nonattainment areas.

The requirements of subpart 1 for attainment plans include, among other things: (i) the section 172(c)(1) requirements to provide for the implementation of reasonably available control measures (RACM) and reasonably available control technology (RACT), and attainment of the

NAAQS; (ii) the section 172(c)(2) requirement to demonstrate reasonable further progress (RFP); (iii) the section 172(c)(3) requirement for emissions inventories; and (iv) the section 172(c)(9) requirement for contingency measures.

The subpart 4 requirements for Moderate areas are generally comparable with the subpart 1 requirements and include: (i) section 189(a)(1)(B) requirements to demonstrate attainment by the outermost statutory Moderate area attainment date (*i.e.*, the end of the sixth calendar year following designation) or that attainment by such date is impracticable; (ii) section 189(a)(1)(C) requirements to ensure RACM will be implemented within four years of designation; (iii) section 189(c) requirements for RFP and quantitative milestones (QMs); and (iv) section 189(e) control requirements for precursor emissions from major stationary sources. In the event that the EPA reclassifies a Moderate nonattainment area to Serious, subpart 4 imposes additional requirements. In this action, the EPA is evaluating Alaska's attainment plan for the FNSB NAA for compliance with the statutory and regulatory requirements applicable to Moderate PM_{2.5} nonattainment areas.

B. FNSB NAA Background

The EPA designated a portion of the Fairbanks North Star Borough as nonattainment for the 2006 24-hour PM_{2.5} NAAQS upon evaluation of monitored air quality data for 2006–2008 (74 FR 58689, November 13, 2009). Based on the 43 µg/m³ 2006–2008 design value at the State Office Building monitoring site, Alaska and the EPA determined that a portion of the Fairbanks North Star Borough was violating the NAAQS or contained sources contributing to a violation of the NAAQS. Alaska noted that exceedances of the standard occur during cold and stagnant weather patterns in the winter season and in the summer months as the result of wildfires which Alaska flagged as “exceptional events” in accordance with the EPA's Exceptional Events Rule at

40 CFR 50.14. At the time of designation, and also when Alaska submitted the initial FNSB Moderate Plan, the regulatory monitor in the FNSB NAA used by Alaska and the EPA was the monitor located at the State Office Building in downtown Fairbanks. Accordingly, the analyses that formed the basis of the FNSB Moderate Plan were premised upon data from this monitor location. Unless otherwise noted, monitored data and future year projections discussed in this action refer to the State Office Building monitor location.

As part of its attainment planning analysis, Alaska evaluated total PM_{2.5} and speciated PM_{2.5} data from the State Office Building monitor to help identify the appropriate emission control strategy for the FNSB NAA. Alaska chose the 2006-2010 period for the baseline representing conditions before emission controls and calculated a baseline design value of 44.7 µg/m³. During the most polluted wintertime days from 2006-2010, Alaska found that ambient PM_{2.5} in the area was dominated by organic carbon, followed by sulfate. The results of Alaska’s analysis of the average speciated PM_{2.5} mass for these days are presented by chemical species in table 1.³ Through its analysis of observed data and modeling sources in the FNSB NAA, Alaska concludes that throughout the winter months, residential wood heating is the major source of PM_{2.5} and accounts for 60-80 percent of the observed PM_{2.5}. Sources of secondary sulfate account for 8-20 percent of the observed PM_{2.5}, and diesel and gasoline engines account for 0-10 percent and 0-7 percent of the observed PM_{2.5}, respectively (FNSB Moderate Plan section III.D.5.8 and its associated appendix).

Table 1. FNSB NAA Speciated PM_{2.5} Mass at the State Office Building Monitor.

Species	Observed Concentration on polluted winter days
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³ In section II.D of this proposal, we provide a more detailed discussion of air quality modeling and the presentation of speciated PM_{2.5} in the area in the FNSB Moderate Plan.

	($\mu\text{g}/\text{m}^3$)
PM _{2.5} Total	44.7
Organic Carbon	24.9
Elemental Carbon	2.9
Sulfate	8.2
Nitrate	1.9
Ammonium	3.6
Particle-Bound Water	2.7
Other PM _{2.5}	0.5

For planning and air quality modeling purposes, Alaska selected two multi-day episodes in 2008 (January 23–February 10 and November 2–17). Alaska explains that these episodes represent typical conditions in the area when PM_{2.5} concentrations exceed the NAAQS, as well as the conditions leading up to the high concentrations. The January-February episode (19 days) represents a very cold episode. The average daily temperatures were below -30 °F for 6 of the 19 days. As is typical of cold, stagnant episodes, the very cold days come in batches, with warmer and less stagnant periods occurring in between. The PM_{2.5} values for 10 of the days in this episode were above the 35 $\mu\text{g}/\text{m}^3$ standard and 4 of them were above 60 $\mu\text{g}/\text{m}^3$. The November episode (16 days) represents a relatively warm episode. None of the days in this episode had an average daily temperature below -10 °F. The PM_{2.5} values for 6 of the days were above the 35 $\mu\text{g}/\text{m}^3$ standard and the highest days were in the vicinity of 50 $\mu\text{g}/\text{m}^3$. Alaska did not use episodes with violations during the summer months because those have historically been associated with exceptional events, such as wildfires. For purposes of the 2006 24-hour PM_{2.5} NAAQS, the EPA's implementation regulations and guidance authorize states to focus their analysis on representative multi-day episodes to help to determine the most effective control strategy for a given nonattainment area.

Alaska's control strategy in the FNSB NAA focuses on reducing emissions from the key category of residential heating sources that contribute to nonattainment in the area. The EPA notes that Alaska's initial December 2014 submission cited a citizen's referendum as a basis for not adopting and implementing many of the control measures analyzed. The referendum, in place from 2010 to 2014, limited the authority of the Fairbanks North Star Borough local government (the Borough) to regulate sources related to residential heating in any manner. Despite the limit on the Borough's authority, the EPA notes that under section 110 of the CAA, the State of Alaska is ultimately responsible for development and implementation of an attainment plan to meet the NAAQS by the attainment date. The EPA does not view the referendum to be a valid basis for asserting that a control measure is unreasonable. In October 2014, the referendum expired and the Borough began the process to adopt more stringent control measures for emissions from this source category. However, it was not possible for the Borough to enact these measures and for Alaska to adopt them into the SIP by the December 31, 2014 submission deadline. In February 2015, the Borough revised and strengthened its curtailment program and enacted other control measures that Alaska adopted for inclusion in the FNSB Moderate Plan and submitted to the EPA for review in a November 22, 2016 supplementary submission.

The EPA promulgated the nonattainment designation for the FNSB NAA based on data from the State Office Building monitor, which was the monitor that at the time had the requisite 3 years of complete, quality assured data for the regulatory purpose of calculating the design value for the area. Accordingly, Alaska has conducted its analyses and developed the FNSB Moderate Plan using the data from the regulatory monitor at the State Office Building. The EPA notes that an additional monitor located at the North Pole Fire Station became a regulatory monitor in 2015, subsequent to the initial submission of the FNSB Moderate Plan. The North

Pole Fire Station monitor currently records the highest values in the FNSB NAA and had a 2013-2015 design value of 124 $\mu\text{g}/\text{m}^3$.

On December 16, 2016, the EPA proposed to find that the FNSB NAA did not attain by the latest permissible statutory Moderate area attainment date of December 31, 2015, and proposed to reclassify the area from Moderate to Serious pursuant to CAA section 188(b)(2). *See* 81 FR 91088. If the FNSB NAA is reclassified to Serious, Alaska will be required to submit a Serious area attainment plan by December 31, 2017. Although not used for the nonattainment designation or as part of the FNSB Moderate Plan, the EPA expects that the data from the North Pole Fire Station monitor will be included in the analyses for the development of a Serious area attainment plan for the FNSB NAA.

II. The EPA's Evaluation of the FNSB Moderate Plan

On December 31, 2014, Alaska submitted its initial Moderate area attainment plan for the FNSB NAA. Alaska made additional submissions and provided clarifying information to supplement the attainment plan in January 2015, March 2015, July 2015, November 2015, March 2016, November 2016, and January 2017 (as previously noted, the initial submission and all supplemental and clarifying information will be collectively referred to as "the FNSB Moderate Plan").

The primary control strategy in the FNSB Moderate Plan is to reduce emissions from residential wood combustion. The FNSB Moderate Plan includes emissions inventories, an evaluation of precursors for control in the area, RACM/RACT demonstrations for direct $\text{PM}_{2.5}$ and precursors, a demonstration that attainment by the December 31, 2015 attainment date is impracticable, QM and RFP requirements, and contingency measures. Each of these elements is discussed below.

A. Emissions Inventories

1. Requirements for Emissions Inventories

Section 172(c)(3) of the CAA requires a state with an area designated as nonattainment to submit a “comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant” for the nonattainment area. By requiring an accounting of actual emissions from all sources of the relevant pollutants in the area, this section provides for the base year inventory to include all emissions from sources in the nonattainment area that contribute to the formation of a particular NAAQS pollutant. For the 2006 24-hour PM_{2.5} NAAQS, this includes direct PM_{2.5} (condensable and filterable) as well as the precursors to the formation of secondary PM_{2.5}: nitrogen oxides (NO_x), sulfur dioxide (SO₂), volatile organic compounds (VOCs), and ammonia (NH₃). 40 CFR 51.1008; 81 FR 58028. Inclusion of PM_{2.5} and all of the PM_{2.5} precursors in the emissions inventory is necessary in order to inform other aspects of the attainment plan development process, such as ascertaining which pollutants a state must control in order to attain the NAAQS in the area expeditiously.

In addition to the base year inventory submitted to meet the requirements of CAA section 172(c)(3), the state must also submit future projected inventories for the projected attainment year and each QM year, and any other year of significance for meeting applicable CAA requirements. Projected emissions inventories for future years must account for, among other things, the ongoing effects of economic growth and adopted emissions control requirements, and are expected to be the best available representation of future emissions. The SIP submission should include documentation explaining how the state calculated the emissions data for the base year and projected inventories. The specific PM_{2.5} emissions inventory requirements are set forth in 40 CFR 51.1008. The EPA has provided additional guidance for developing PM_{2.5} emissions

inventories in *Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze*.⁴

2. Emissions Inventories in the FNSB Moderate Plan

The emissions inventories for the FNSB NAA are discussed in the FNSB Moderate Plan section III.D.5.6 and appendix III.D.5.6. The FNSB Moderate Plan has three emissions inventories for the area: the 2008 base year, the 2015 projected inventory for the Moderate area attainment date, and the projected inventory for the 2017 QM year. In addition, Alaska developed a projected emissions inventory for 2019 for informational purposes to facilitate development of the attainment plan. Each inventory lists direct PM_{2.5} emissions and emissions of all PM_{2.5} precursors (NO_x, VOCs, NH₃, and SO₂). The 2008 and 2015 inventories for the FNSB NAA include separately reported filterable and condensable components of direct PM_{2.5} emissions. Alaska provided inventories from all sources in the FNSB NAA, including stationary point sources, stationary nonpoint (area sources), onroad mobile sources and nonroad mobile sources.

The inventories are based on emissions estimated during the two 2008 episodes that represent weather conditions when exceedances of the 2006 24-hour PM_{2.5} NAAQS typically occur. The inventory is an average of emissions across all days in the two episodes. It represents the average-season-day emissions, in which the emission inventory season is the wintertime episodes of cold and calm weather that coincide with exceedances of the standard.

Alaska estimated winter episode average-season-day emissions for the FNSB NAA based on a gridded inventory of actual or projected emissions developed over an area larger than the FNSB NAA for air quality modeling. The emissions were calculated for the FNSB NAA by

⁴ The EPA's *Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze* is available at <https://www.epa.gov/air-emissions-inventories/emissions-inventory-guidance-documents>

summing the emissions from grid cells within the area.

a. 2008 Base Year Emissions Inventory

Alaska selected the year 2008 as the base year of the emissions inventory. The selection of 2008 as a base year is consistent with emissions inventory requirements because it is one of the three years that the EPA used for calculating the design value for the 2006 24-hour PM_{2.5} NAAQS designations. 40 CFR 51.1008(a)(1)(i); 81 FR 58028. This inventory provides the basis for the control measure analysis, and for the RFP and impracticability demonstrations in the FNSB Moderate Plan. A summary of the 2008 base year winter episode average-season-day emissions inventory for the FNSB NAA is listed in table 2 in tons per day (tpd).

Table 2 – 2008 Base Year FNSB NAA Winter Episode Average-Season-Day Emissions Inventory.

Source Type/Category	Winter Episode Average-Season-Day (tpd)				
	PM _{2.5} ⁵	SO ₂	NO _x	VOC	NH ₃
Stationary Point (actual)	1.515	8.167	13.285	0.096	<0.001
Nonpoint/Area	2.817	3.865	2.184	11.627	0.136
Onroad	0.676	0.046	4.625	5.725	0.071
Nonroad	0.027	0.077	1.088	0.451	0.003
Total⁶	5.035	12.155	21.182	17.898	0.210

Stationary Point Sources: Alaska included the actual emissions of six major stationary point sources in the emissions inventory. Actual emissions were based on historically recorded facility operating throughput or continuous emissions monitoring systems for the two 2008

⁵ Alaska reported direct PM_{2.5} condensable and filterable emissions for point sources as 0.828 tpd and 0.686 tpd, respectively (see the November 3, 2016 clarification in the docket for this action). Alaska notes that, when accounting for the condensable component of direct PM_{2.5} emissions in its clarification, direct PM_{2.5} emissions from Stationary Point (actual) increased from 1.412 tpd to 1.515 tpd in the FNSB NAA. Alaska states that the increase has a small effect on PM_{2.5} concentrations, approximately 0.12 µg/m³ due to the relatively small contribution to total PM_{2.5} emissions from stationary point sources compared to area space-heating sources.

⁶ The 0.001 tpd discrepancy in the VOC and NH₃ totals is due to rounding.

representative pollution episodes selected for planning purposes. Alaska defines the “major source” thresholds for reporting annual emissions as the potential to emit 100 tons annually for any relevant criteria air pollutant consistent with the EPA’s Air Emissions Reporting Requirements, 40 CFR part 51, subpart A. Minor and synthetic minor sources (5 to 99 tons per year) were initially included in the stationary point sources category to ensure that smaller sources located within the nonattainment area just below the 100 ton per year major source threshold were also identified to determine if their emission levels might warrant inclusion in the inventory as stationary point sources. Those minor and synthetic minor sources that were not identified as stationary point sources were included in emissions inventory in the nonpoint/area sources category.

Nonpoint/Area Sources: In the FNSB NAA, emissions from various sources used to heat residential and commercial buildings are cumulatively the largest source of primary PM_{2.5} emissions during PM_{2.5} episodes. This category, which Alaska refers to as “space-heating” sources in the FNSB Moderate Plan, includes sources such as hydronic heaters, wood stoves, pellet stoves, and residential oil heating. Alaska estimated emissions differently for space-heating sources than for other non-space heating area sources. For the non-space heating area sources, data was projected from a 2005 emissions inventory with a population growth factor. The 2005 inventory combined seasonally-adjusted local activity estimates with EPA emission factors (*see* AP-42, Compilation of Air Pollution Emission Factors). Alaska also used data from the 2008 National Emissions Inventory to develop these estimates.

For space-heating sources, Alaska used EPA emissions factors and locally collected data to estimate emissions by heating device and fuel type. Local activity data was gathered from a Fairbanks winter home heating energy model, multiple residential wood heating surveys, a

Fairbanks wood species study, and emissions testing of Fairbanks heating devices. Table 3 provides the space heating winter episode average-season day emissions estimates by fuel type for the 2008 base year emissions inventory for the FNSB NAA.

Table 3 – PM_{2.5} Space Heating Nonpoint/Area Sources Emissions for 2008 Base Year Emissions Inventory for the FNSB NAA.

Space Heating Device/Fuel Type	Winter Episode Average-Season-Day (tpd)				
	PM _{2.5}	SO ₂	NO _x	VOC	NH ₃
Wood	2.656	0.084	0.373	10.914	0.098
Oil	0.056	3.719	1.617	0.088	0.003
Other	0.043	0.062	0.192	0.056	0.035
Total Space Heating⁷	2.756	3.865	2.182	11.058	0.136

On-road Sources: The onroad emissions inventory consists of mobile sources such as automobiles, trucks, buses, and motorcycles. It was prepared using the EPA’s Motor Vehicle Emissions Simulator (MOVES2010a), which was the latest onroad mobile sources emissions model available at the time Alaska started developing the attainment plan inventory. Alaska used local fleet and fuel inputs and the Fairbanks Metropolitan Area Transportation System travel demand model to generate local vehicle travel activity estimates. The use of engine block heaters to keep gasoline engines from freezing during winter months is common in the FNSB NAA. Alaska explains that having such a pre-warmed engine reduces the start emissions from these vehicles. The MOVES2010a model does not normally account for the impacts of engine block heaters on vehicle emissions. To account for the effects on starting exhaust PM_{2.5} emissions from wintertime plug-in block heater use in light-duty gasoline vehicles, Alaska made EPA-approved modifications to the soak time distribution inputs contained in the MOVES2010a default database. Alaska executed MOVES2010a with locally developed inputs representative of

⁷ The 0.001 tpd discrepancy in the PM_{2.5} total is due to rounding.

wintertime conditions and assumed default MOVES2010a activity for heavy-duty trucks.

Nonroad Sources: Alaska used the EPA's NONROAD2008a model to estimate emissions for the nonroad mobile sources. However, Alaska substituted local inputs for the EPA's default values in cases where locally derived data was available (*e.g.*, snowmobiles and snow blowers). Alaska estimated aircraft emissions with the Federal Aviation Administration's Emission and Dispersion Modeling System and locomotive emissions were estimated based on the EPA's emission factors for locomotives.

b. Projected Year Emissions Inventory

In addition to developing a 2008 base year inventory, Alaska developed a projected year inventory for the statutory Moderate area attainment year (2015), *i.e.*, the sixth calendar year after designation as a nonattainment area. This inventory was relevant to the determination of whether it was impracticable for the FNSB NAA to attain by December 31, 2015. Alaska also developed an informational projected inventory for the anticipated Serious area attainment year (2019), *i.e.*, the tenth calendar year after designation as a nonattainment area. Alaska used the same temporal period of emissions based on a winter episode average-season-day, the same level of detail, and separately reported the filterable and condensable fractions of direct PM_{2.5}. Alaska developed the two projected year inventories by estimating the impact on emissions from anticipated demographic and economic trends and already adopted federal, state and local control measures. Alaska then incorporated incremental emissions reductions expected to be achieved from the control measures adopted in the FNSB Moderate Plan. The two projected year inventories forecasted emissions for 2015 and 2019 for the same source categories of emissions identified in the base year inventory and were developed to support air quality modeling, demonstrate reasonable progress on reducing emissions, and to establish emission reduction

milestone targets for 2017. A summary of the FNSB NAA 2015 projected winter episode average-season-day emissions inventory is provided in table 4. Table 5 provides emissions estimates from space heating sources by fuel type for the FNSB NAA winter episode average-season day for the 2015 projected emissions inventory.

Table 4 – 2015 Projected FNSB NAA Winter Episode Average-Season-Day Emissions Inventory.

Source Type/Category	Winter Episode Average-Season-Day (tpd)				
	PM _{2.5} ⁸	SO ₂	NO _x	VOC	NH ₃
Stationary Point (actual)	1.515	8.167	13.285	0.096	<0.001
Nonpoint/Area	2.505	4.268	2.379	9.070	0.125
Onroad	0.461	0.017	2.503	3.405	0.051
Nonroad	0.025	0.082	1.062	0.403	0.003
Total	4.506	12.534	19.229	12.974	0.179

Table 5 – PM_{2.5} Space Heating Nonpoint/Area Sources Emissions for 2015 Projected Emissions Inventory for the FNSB NAA.

Space Heating Device/Fuel Type	Winter Episode Average-Season-Day (tpd)				
	PM _{2.5}	SO ₂	NO _x	VOC	NH ₃
Wood	2.330	0.084	0.373	8.308	0.085
Oil	0.063	4.118	1.809	0.099	0.003
Other	0.047	0.066	0.194	0.061	0.036
Total Space Heating⁹	2.440	4.268	2.376	8.467	0.125

3. The EPA’s Evaluation and Proposed Action: Emission Inventories

The EPA has reviewed the results, procedures, and methodologies for the FNSB NAA emissions inventories. The EPA has determined that the 2008 base year inventory and the 2015 projected inventory are based on the most current and accurate information available to Alaska at

⁸ Alaska reported direct PM_{2.5} condensable and filterable emissions for point sources as 0.828 tpd and 0.686 tpd, respectively (see the November 3, 2016 clarification in the docket for this action). Alaska notes that, when accounting for the condensable component of direct PM_{2.5} emissions in its clarification, direct PM_{2.5} emissions from Stationary Point (actual) increased from 1.412 tons/ day to 1.515 tons/ day in the FNSB NAA. Alaska states that the increase has a small effect on PM_{2.5} emissions levels, approximately 0.12 µg/m³ due to the relatively small contribution to total PM_{2.5} emissions from stationary point sources compared to area space-heating sources.

⁹ The 0.001 tpd discrepancy in the VOC and NH₃ totals is due to rounding.

the time the FNSB Moderate Plan and its inventories were being developed. The selection of 2008 for the base year inventory is also appropriate because it reflects one of the three years of data used by the EPA in the designation process for this area. The EPA finds the episodic approach that Alaska used for the emissions inventories to be consistent with the PM_{2.5} Implementation Rule in which the EPA stated that an episodic period developed in order to reflect periods of higher emissions during periods of high ambient PM_{2.5} can help, in some situations, to ensure the nonattainment area inventory reflects the emissions conditions that led to the nonattainment designation for the area. 81 FR 58030. Additionally, the 2008 and 2015 inventories sufficiently provide separately reported PM_{2.5} condensable and filterable emissions as required in 40 CFR 51.1008(a)(1)(iv) and (a)(2)(iv). The inventories comprehensively address all source categories in the FNSB NAA and Alaska used appropriate procedures to develop the inventories. In addition, Alaska developed the 2015 projected inventory based on the 2008 base year inventory and accounted for projected growth and reductions in emissions. We are therefore proposing to approve the 2008 base year emissions inventory for the FNSB NAA as meeting the requirements of CAA section 172(c)(3) and 40 CFR 51.1008(a)(1), and we are proposing to approve the 2015 projected year inventory as meeting the requirements of 40 CFR 51.1008(a)(2). We are also proposing to find that the 2008 base year inventory in the FNSB Moderate Plan provides an adequate basis for the control strategy analysis, the impracticability demonstration, and demonstrating RFP (discussed below in sections II.C, E and F, respectively).

B. Pollutants Addressed

1. Requirements for the Control of Direct PM_{2.5} and Precursors

The composition of PM_{2.5} is complex and highly variable due in part to the large contribution of secondary PM_{2.5} to total fine particle mass in most locations, and to the

complexity of secondary particle formation processes. A large number of possible chemical reactions, often non-linear in nature, can convert gaseous SO₂, NO_x, VOCs and NH₃ to PM_{2.5}, making them precursors to PM_{2.5}.¹⁰ Formation of secondary PM_{2.5} may also depend on atmospheric conditions, including solar radiation, temperature, and relative humidity, and the interactions of precursors with preexisting particles and with water and ice cloud or fog droplets.¹¹

The EPA interprets the CAA to require that a state must evaluate sources of all four PM_{2.5} precursors for regulation, and impose such regulations, unless it provides a demonstration establishing that it is either not necessary to regulate a particular precursor in the nonattainment area at issue in order to attain by the attainment date, or that emissions of the precursor do not make a significant contribution to PM_{2.5} levels that exceed the standard. *See* 81 FR 58017. The provisions of subpart 4 do not define the term “precursor” for purposes of PM_{2.5}, nor do they explicitly require the control of any specifically identified particulate matter precursor. The definition of “air pollutant” in CAA section 302(g), however, provides that the term “includes any precursors to the formation of any air pollutant, to the extent the Administrator has identified such precursor or precursors for the particular purpose for which the term ‘air pollutant’ is used.” The EPA has identified SO₂, NO_x, VOCs, and NH₃ as precursors to the formation of PM_{2.5}. 40 CFR 51.1000. Accordingly, the attainment plan requirements presumptively apply to emissions of direct PM_{2.5} and all four precursor pollutants from all types of stationary, area, and mobile sources, except as otherwise provided in the Act (*i.e.*, CAA section 189(e)).

10 EPA, *Air Quality Criteria for Particulate Matter* (EPA/600/P-99/002aF, October 2004), Chapter 3.

11 EPA, *Regulatory Impact Analysis for the Final Revisions to the National Ambient Air Quality Standards for Particulate Matter* (EPA-452/R-12-005, December 2012), p. 2-1.

Section 189(e) of the Act requires that the control requirements for major stationary sources of direct PM₁₀ also apply to major stationary sources of PM₁₀ precursors, except where the Administrator determines that such sources do not contribute significantly to PM₁₀ levels that exceed the standard in the area. By definition, PM₁₀ includes PM_{2.5}. Section 189(e) contains the only express exception to the control requirements under subpart 4 (*e.g.*, requirements for RACM and RACT, best available control measures (BACM) and best available control technology (BACT), most stringent measures, and nonattainment new source review) for sources of direct PM_{2.5} and PM_{2.5} precursor emissions.

Although section 189(e) explicitly addresses only major stationary sources, the EPA interprets the Act as authorizing it also to determine, under appropriate circumstances, that regulation of specific PM_{2.5} precursors from other source categories in a given nonattainment area is not necessary. *See* 81 FR 58018. For example, under the EPA's interpretation of the control requirements that apply to stationary, area, and mobile sources of PM_{2.5} precursors area-wide under CAA section 172(c)(1) and subpart 4, the EPA's recently promulgated PM_{2.5} Implementation Rule provides states the option of submitting a demonstration to show that emissions of a precursor do not contribute significantly to PM_{2.5} levels which exceed the NAAQS in a particular nonattainment area. 40 CFR 51.1006. If the EPA were to approve a state's precursor demonstration, the state would not need to address the precursor in meeting certain plan requirements, such as the imposition of RACM/RACT level control on sources of such precursor emissions.

The state has the option of performing either (1) a comprehensive precursor demonstration to establish that the state does not need to address the precursor in the attainment plan for purposes of the control strategy, RFP, QMs and associated reports, contingency

measures, motor vehicle emissions budget, or regional emissions analyses in transportation conformity determinations, or (2) a major stationary source precursor demonstration to justify the exclusion of existing major sources from control requirements for the applicable precursor. Both types of precursor demonstrations must include a concentration-based analysis, in which the state evaluates the impact of each precursor on ambient PM_{2.5} levels in the nonattainment area. A concentration-based analysis may be sufficient for the EPA to approve the demonstration, on a precursor-by-precursor basis. The state also has the option of providing an additional sensitivity-based analysis to show that changes in the emissions of a particular precursor would not result in significant changes in ambient PM_{2.5} in the area. 40 CFR 51.1006(a)(iii). The EPA's Draft PM_{2.5} Precursor Demonstration Guidance (Precursor Demonstration Guidance) recommends calculating the relative precursor impact in the context of the Software for the Modeled Attainment Test (SMAT) methodology so that the results are applicable to measured PM_{2.5} in the area.¹²

2. Direct PM_{2.5} and Precursors in the FNSB Moderate Plan

In the FNSB Moderate Plan, Alaska discusses the five pollutants that contribute to the mass of the ambient PM_{2.5} (*i.e.*, NH₃, NO_x, SO₂, VOCs, and direct PM_{2.5}). Because Alaska developed the attainment plan before the EPA proposed a new implementation rule in 2015 (80 FR 15340, March 23, 2015), and before the EPA issued the Precursor Demonstration Guidance in 2016, the FNSB Moderate Plan includes a variety of information on precursor impacts on PM_{2.5} concentrations in the FNSB NAA. Following the EPA's past approach to regulation of precursors for purposes of the PM₁₀ NAAQS, Alaska submitted technical analyses to establish that

¹² The Precursor Demonstration Guidance is available at https://www.epa.gov/sites/production/files/2016-11/documents/transmittal_memo_and_draft_pm25_precursor_demo_guidance_11_17_16.pdf

regulation of specific precursors would not be an effective attainment strategy in the FNSB NAA. After the release of the PM_{2.5} Implementation Rule and the Precursor Demonstration Guidance, Alaska included information in its January 6, 2017 clarification document (2017 Clarification) to help the EPA interpret its FNSB Moderate Plan in light of the new rule and guidance (*see* FNSB Moderate Plan appendix III.D.5.7 and the 2017 Clarification). Specifically, the FNSB Moderate Plan contains information necessary to evaluate a comprehensive precursor demonstration for all sources of VOCs and a major stationary source precursor demonstration for NO_x. The FNSB Moderate Plan reports speciated PM_{2.5} data from the State Office Building monitor that can be compared to the recommended insignificance thresholds in the Precursor Demonstration Guidance. These data are the results of the SMAT methodology and are representative of precursor concentrations for the baseline design value of 44.7 µg/m³.

Alaska's VOC precursor demonstration examined both ambient and modeled PM_{2.5} species data to help evaluate the formation of secondary organic aerosols (SOA) from VOC emissions in this specific nonattainment area. Appendix III.D.5.8 of the FNSB Moderate Plan presents several analyses involving observed chemical data, tracers of source categories, source apportionment techniques, and independent modeling efforts. Under low sunlight conditions and cold temperatures, the photochemistry normally associated with SOA production is limited.¹³ Alaska explained that VOCs that are emitted likely either remain mostly unreacted in the gas phase or condense and are evaluated for emission control as the condensable part of direct PM_{2.5}.

In appendix III.D.5.7 of the FNSB Moderate Plan and in the 2017 Clarification, Alaska did not directly determine the impact of VOCs on PM_{2.5} from speciated monitoring data alone

¹³ Joyce, P. L., von Glasow, R., and Simpson, W. R.: The fate of NO_x emissions due to nocturnal oxidation at high latitudes: 1-D simulations and sensitivity experiments, *Atmos. Chem. Phys.*, 14, 7601-7616, doi:10.5194/acp-14-7601-2014, 2014.

because it is difficult to distinguish organic carbon from direct PM_{2.5} and secondary organic carbon formed from VOC chemistry. Instead, the precursor demonstration relies on the predicted concentrations of SOA compounds from the Community Multiscale Air Quality (CMAQ) model. Alaska summed the episode-averaged concentrations of all 19 secondary organic compounds produced from the CMAQ modeling results at the State Office Building monitor location. The sum of all modeled SOA species represents the impact from all VOC sources on PM_{2.5} at the monitor. Alaska reported the modeled PM_{2.5} concentration from VOC precursors was 0.0006 µg/m³ and 0.007 µg/m³ for the 2008 base modeling year and 2015 modeling year cases, respectively.

Alaska also submitted a precursor demonstration for NO_x that modeled the PM_{2.5} impact from major stationary sources of NO_x in the FNSB NAA (*i.e.*, a major stationary source demonstration, rather than a comprehensive precursor demonstration with respect to all sources of NO_x emissions in the area). *Id.* In support of the NO_x major stationary source demonstration, Alaska performed a brute force CMAQ “zero-out” modeling analysis, as described in the FNSB Moderate Plan and 2017 Clarification, and as recommended by the Precursor Demonstration Guidance. The CMAQ modeling results are compared between one model run in which all emission sources are included and a second “zero out” model run in which all major stationary source NO_x emissions in the NAA are assumed to be zero. The model results are processed through the SMAT methodology. The difference in PM_{2.5} mass projected at the State Office Building monitor location between the two model simulations represents the estimated impact of major stationary source NO_x to ambient PM_{2.5} in the FNSB NAA. For the 2015 model simulation, the impact from major stationary source NO_x to PM_{2.5} at the State Office Building

monitor location is $0.5 \mu\text{g}/\text{m}^3$ averaged across all modeled episode days (all days within the episode produce $\text{PM}_{2.5}$ less than $0.6 \mu\text{g}/\text{m}^3$).

3. The EPA's Evaluation and Proposed Action: Pollutants Addressed

In Alaska's comprehensive precursor demonstration for VOCs using a concentration-based contribution analysis, the modeled $\text{PM}_{2.5}$ concentration from VOC precursors ($0.0006 \mu\text{g}/\text{m}^3$ and $0.007 \mu\text{g}/\text{m}^3$ for the 2008 base modeling year and 2015 modeling year cases, respectively) is well below $1.3 \mu\text{g}/\text{m}^3$ on a 24-hour basis, the recommended contribution threshold for the 24-hour $\text{PM}_{2.5}$ NAAQS, for precursor demonstrations identified in the Precursor Demonstration Guidance. Even the day with the highest modeled $\text{PM}_{2.5}$ production from VOCs produces only 1 percent of the insignificance threshold at the State Office Building. Alaska did not calculate the relative precursor impact in the context of the SMAT methodology because the VOC precursor impact on $\text{PM}_{2.5}$ was so far below the recommended insignificance threshold in the Precursor Demonstration Guidance that a SMAT adjustment was inconsequential. The modeling results are consistent with Alaska's full suite of ambient data analyses, source apportionment techniques, and modeling efforts, all of which indicate very limited photochemical pathways and inconsequential concentrations of SOA in the FNSB NAA in the winter (*See* FNSB Moderate Plan appendix III.D.5.8).

The FNSB Moderate Plan does not provide for a NO_x comprehensive precursor demonstration because the measured ammonium nitrate at the State Office Building monitor ($2.5 \mu\text{g}/\text{m}^3$) is above the recommended 24-hour $\text{PM}_{2.5}$ contribution threshold for precursor demonstrations ($1.3 \mu\text{g}/\text{m}^3$). In Alaska's major stationary source precursor demonstration for NO_x , the episode average contribution of major stationary source NO_x to $\text{PM}_{2.5}$ ($0.5 \mu\text{g}/\text{m}^3$) is less than one half of the recommended insignificance threshold ($1.3 \mu\text{g}/\text{m}^3$) for precursor

demonstrations in the Precursor Demonstration Guidance. The low amount of PM_{2.5} from major stationary source NO_x precursor emissions is consistent with other aspects of the FNSB Moderate Plan. As with VOCs, the photochemistry to produce large amounts of particle-bound nitrate is limited during wintertime pollution events in the FNSB NAA. *Id.* Furthermore, major stationary sources with elevated stacks emit most of their precursors into the extremely stable atmosphere present during wintertime pollution events. Only a fraction of the elevated plumes returns to ground level in the FNSB NAA where air quality monitors are located and much less than might be expected in most parts of the lower 48 states. Therefore, the analysis indicates that NO_x emissions from these sources will have very little impact on ground level chemistry and thus on secondary PM_{2.5} formation in the FNSB NAA.

Based on a review of the information provided by Alaska, we propose to approve Alaska's precursor demonstrations for major stationary source emissions of NO_x and for all sources of VOCs within the FNSB NAA. We propose to approve Alaska's analysis and conclusion that it is not necessary to evaluate and impose controls on sources of VOCs or on major stationary sources of NO_x in the control strategy for the FNSB Moderate Plan. Consistent with the requirements of subpart 4, Alaska must include all other PM_{2.5} precursors (NH₃ and SO₂) and NO_x from sources other than major stationary sources in the evaluation of potential RACM/RACT control measures, RFP, QM, contingency measures, and in the impracticability demonstration. We discuss Alaska's evaluation of potential control measures for sources of NH₃, SO₂, and NO_x, as well as direct PM_{2.5}, in the following section.

C. Reasonably Available Control Measures/Reasonably Available Control Technology

1. Requirements for RACM/RACT

The general SIP planning requirements for nonattainment areas under subpart 1 include CAA section 172(c)(1), which requires implementation of all RACM, including RACT. The terms RACM and RACT are not further defined within subpart 1, but past guidance has described “reasonable available” controls as those controls that are technologically and economically feasible, and necessary for attainment in a given area. *See* 57 FR 13560. The provision explicitly requires that such measures must provide for attainment of the NAAQS in the area covered by the attainment plan.

The SIP planning requirements for particulate matter nonattainment areas in subpart 4 likewise impose upon states an obligation to develop attainment plans that implement RACM and RACT on appropriate sources within a nonattainment area. Section 189(a)(1)(C) requires that states with areas classified as Moderate nonattainment areas have SIP provisions to assure that RACM and RACT level controls are implemented by no later than four years after designation of the area. As with subpart 1, the terms RACM and RACT are not specifically defined within subpart 4, and the provisions of subpart 4 do not identify specific control measures that must be implemented to meet the RACM and RACT requirements. However, past policy has described RACM (including RACT) as those measures that are technologically and economically feasible and needed for expeditious attainment of the standard. 81 FR 58034. The EPA’s recent PM_{2.5} Implementation Rule provides a process for developing an attainment plan control strategy for purposes of meeting the RACM and RACT requirements.¹⁴ *See* 40 CFR 51.1009.

¹⁴ The development of the RACM and RACT requirements in the PM_{2.5} Implementation Rule was informed by the EPA’s longstanding guidance in the General Preamble providing recommendations for appropriate considerations for determining what control measures constitute RACM and RACT for purposes of meeting the statutory requirements of subpart 4. *See* 81 FR 58034.

To meet the Moderate area control strategy requirements, a state first needs to identify all sources of direct PM_{2.5} and precursor emissions in the nonattainment area, consistent with common emission inventory development practices and requirements. 40 CFR 51.1009(a)(1). Next a state must identify existing and potential control measures for each identified source or source category of emissions. *Id.* at 51.1009(a)(2). The state's compilation of potential control measures must be sufficiently broad to provide a basis for identifying all technologically and economically feasible controls that may be RACM or RACT. The state must identify potential control measures for emissions of direct PM_{2.5} and each precursor from relevant sources unless the state has provided an adequate comprehensive demonstration for the nonattainment area at issue showing that control of a particular precursor is not required, or provided an adequate demonstration with respect to control of precursor emissions from existing major stationary sources. *Id.* at 51.1009(a)(4)(i). For any potential control measure identified, a state must evaluate the technological and economic feasibility of adopting and implementing such measure. *Id.* at 51.1009(a)(3). For purposes of evaluating technological feasibility, a state may consider factors including but not limited to operating processes and procedures, raw materials, physical plant layout, and potential environmental impacts from the adoption of controls. For purposes of evaluating economic feasibility, a state may consider factors including but not limited to capital, operating and maintenance costs and the cost effectiveness of a measure (typically expressed in cost per ton of reduction). *Id.* States should also evaluate control measures imposed in other nonattainment areas as RACM and RACT as part of this analysis. For Moderate area plans that demonstrate the area cannot attain by the Moderate area statutory attainment date, the state is required to adopt all technologically and economically feasible control measures. *Id.* at 51.1009(a)(4).

CAA section 110(a)(2)(A) provides generally that each SIP “shall include enforceable emission limitations and other control measures, means or techniques . . . as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirement of the Act.” Section 172(c)(6) of the Act, which applies specifically to nonattainment area plans, imposes comparable requirements.¹⁵ Measures necessary to meet RACM/RACT and the additional control measure requirements under section 172(c)(6) must be adopted by Alaska in an enforceable form (57 FR 13541) and submitted to the EPA for approval into the SIP under CAA section 110.

2. RACM/RACT Analysis in the FNSB Moderate Plan

In the FNSB Moderate Plan, Alaska explains the multi-step process it undertook, consistent with the process set forth at 40 CFR 51.1009, to evaluate and select control measures that would constitute RACM/RACT in the FNSB NAA. Based on emissions inventory information and other technical analyses, Alaska first identified source categories in the FNSB NAA and associated emissions of PM_{2.5} and its precursors. Alaska’s approach to the RACM/RACT analysis targets emissions that occur during the wintertime when stagnant air episodes occur and concentrations of emissions build-up, leading to exceedances of the 2006 24-hour PM_{2.5} NAAQS. Based on its assessment of estimated source category contributions to ambient PM_{2.5}, Alaska proceeded to identify the following source categories for further analysis:

¹⁵ The language in sections 110(a)(2)(A) and 172(c)(6) is quite broad, allowing a SIP to contain any enforceable “means or techniques” that the state and the EPA determine are “necessary or appropriate” to meet CAA requirements, such that the area will attain as expeditiously as practicable, but no later than the designated date. Furthermore, the express allowance for “schedules and timetables” demonstrates that Congress understood that all required controls might not be in force when the EPA approves a SIP submission, *e.g.*, they could include measures to be implemented in a future year. The EPA notes, however, that all SIP provisions must meet applicable legal requirements, such as imposing emission limitations that apply continuously and being practically and legally enforceable.

residential wood heating, open burning, residential fuel oil combustion, automobile and heavy-duty vehicle transportation, and stationary point sources.

Alaska developed a list of potential control measures for relevant sources based on information compiled from various EPA guidance documents, information received during Alaska's public process, and information regarding controls that other states or the EPA have identified as RACM or RACT in attainment plans in other nonattainment areas. Alaska then evaluated control measures to determine if they are technologically and economically feasible, which included consideration of factors such as the emissions benefits and cost effectiveness of the measures. Alaska's RACM/RACT analysis and control strategy are presented in the FNSB Moderate Plan section III.D.5.7, appendix III.D.5.7, and the 2017 Clarification; sections III.D.5.6, III.D.5.8, and III.D.5.11 of the FNSB Moderate Plan also provide supporting information.

a. Non-point/Area Sources RACM/RACT Analysis in the FNSB Moderate Plan

Alaska ascertained that the key category of areas sources (non-point sources) in the FNSB NAA that requires imposition of control measures to reach attainment of the 2006 24-hour PM_{2.5} NAAQS is wood burning. Accordingly, Alaska's RACM/RACT analysis for the FNSB NAA evaluated control measures for residential heating and open burning. Alaska also evaluated control measures for transportation sources.

Residential Heating: Alaska identified and adopted a suite of control measures as RACM/RACT for residential heating sources in the FNSB NAA. The control measures include a changeout program that incentivizes the removal or replacement of inefficient wood-fired heating devices; a prohibition on certain fuels used in solid-fuel fired heaters, including a requirement that only dry wood, with a moisture content of 20 percent or less, can be used;

curtailment of solid-fuel fired heaters during polluted conditions; a 20 percent opacity limit for solid-fuel fired heaters; the exclusion of owners of newly constructed buildings from obtaining a “no other adequate source of heat” determination; a wood seller wood-moisture disclosure program; setback requirements for new installations of hydronic heaters; and wood heating education and outreach programs to increase public understanding and compliance with regulations and to encourage efficient operation of wood heaters.

The changeout program in the FNSB NAA provides subsidies up to \$4,000 to replace wood stoves, and up to \$10,000 to replace hydronic heaters, with cleaner burning certified devices (FNSB Moderate Plan section III.D.5.7-3, III.D.5.6-50, table 5.6-18). Higher subsidies are available for removal of a solid-fuel burning device and replacement with a heating source that burns oil or natural gas. The changeout program also provides incentives for removing (rather than replacing) older uncertified devices. Subsidies to retrofit hydronic heaters to reduce emissions were also offered. Between 2010 and 2014, Alaska estimates that 3,365 solid-fuel fired heating devices were replaced and 888 devices were removed through the wood stove changeout program (FNSB Moderate Plan section III.D.5.6-51, table 5.6-19).

Alaska estimates that in the absence of a dry wood program, the average moisture content of wood used in the FNSB NAA is 39.7 percent. The requirement to burn only dry wood (moisture content of 20 percent or less) will result in more efficient residential wood heating, decreased fuel use, and reduced emissions (FNSB Moderate Plan section III.D.5.6-45).

The curtailment program in the FNSB NAA places restrictions on the operation of solid-fuel fired heaters during certain ambient and meteorological conditions (FNSB Moderate Plan section III.D.5.11 and 2017 Clarification). The solid-fuel fired heater curtailment alerts are announced by local authorities based on forecasted PM_{2.5} concentrations in the three different air

quality zones: Fairbanks, North Pole, and Goldstream. The curtailment program includes one voluntary and two mandatory stages. When $PM_{2.5}$ ambient levels are forecasted to reach or exceed $25 \mu\text{g}/\text{m}^3$ or more in a particular zone, a stage one alert is issued for that zone. During a stage one alert, residents are asked to voluntarily curtail or stop using solid-fuel heating devices, pellet stoves, waste oil devices, and masonry heaters. When $PM_{2.5}$ levels are forecasted to reach $35 \mu\text{g}/\text{m}^3$ or more in a particular zone, a stage 2 alert is issued for that zone. During a stage 2 alert, burning is only permitted in U.S. EPA certified devices, EPA Phase II hydronic heaters with $PM_{2.5}$ annual average emissions ratings of 2.5 grams per hour or less, masonry heaters, pellet stoves, and fireplaces. A stage 3 alert is issued when $PM_{2.5}$ ambient levels are forecasted to reach $55 \mu\text{g}/\text{m}^3$. During a stage 3 alert, the use of solid-fuel burning devices, masonry heaters, pellet-fueled appliances, cook stoves, fireplaces, and waste oil devices is prohibited. The mandatory restrictions imposed during stage 2 and 3 alerts do not apply during periods of power failure or to buildings that have “no other adequate source of heat” designations. During a stage 3 alert, the mandatory restrictions do not apply when the temperature is below $-15 \text{ }^\circ\text{F}$ (as recorded at the Fairbanks International Airport). Alaska included these limitations in the mandatory curtailment program due to the unique circumstances of the FNSB NAA, which experiences extreme winter temperatures and has limited availability of alternative fuel sources such as natural gas.

The voluntary programs in the FNSB NAA are expected to increase compliance with regulations and encourage behaviors that reduce emissions. These programs include public awareness and education on wood storage, heating device operation and maintenance, and curtailment alert notifications (FNSB Moderate Plan section III.D.5.7-7 and 2017 Clarification). Alaska relied on these measures for a small portion of the necessary emission reductions, consistent with EPA guidance for voluntary measures.

The residential heating control measures that Alaska identified as RACM/RACT primarily reduce emissions of direct PM_{2.5}. To evaluate potential measures to reduce SO₂ emissions, Alaska conducted a RACM/RACT analysis for providing economic incentives to encourage FNSB NAA residents that use heating oil to switch to low-sulfur heating oil. Alaska determined that this control measure was not cost effective at this time (FNSB Moderate Plan appendix III.D.5.7-57).

Open Burning: Alaska identified and adopted prohibitions on open burning during the wintertime as RACM/RACT for the FNSB NAA. Open burning, including the use of burn barrels, is prohibited in the FNSB NAA from November 1 through March 31. (FNSB Moderate Plan section III.D.5.7-22).

Transportation: Alaska identified and adopted a suite of transportation control measures as RACM/RACT for the FNSB NAA. These include measures providing for “plug-in” engine block heating, programs to encourage the use of mass transit, federal motor vehicle fuel economy standards, and federal and state diesel emissions reduction programs.

b. Stationary/Point Sources RACM/RACT Analysis in the FNSB Moderate Plan

The FNSB NAA has six major stationary point sources. Alaska evaluated these sources for potential PM_{2.5} and SO₂ control technologies. As discussed in section II.B.3 of this proposal, Alaska demonstrated that VOCs and NO_x emissions from these major stationary sources do not contribute significantly to violations of the 2006 24-hour PM_{2.5} NAAQS in this area, consistent with the requirements of CAA section 189(e). Alaska also excluded from consideration control technologies to address NH₃, which accounts for less than 0.001 tons per day of emissions in the FNSB NAA.

The six major stationary sources in the FNSB NAA are: Fort Wainwright Central Heating Power Plant, Aurora Energy Chena Power Plant, University of Alaska Fairbanks Campus Power Plant, GVEA North Pole Power Plant, GVEA Zehnder Power Plant, and the Flint Hills North Pole Refinery. Alaska's RACM/RACT analysis addressed 12 coal-fired boilers, five gas turbines, and two dual-fuel fired boilers at these facilities (FNSB Moderate Plan appendix III.D.5.7-64). The following is a summary of the control measures that Alaska identified as RACM/RACT for the stationary sources.

Coal-fired Boilers: Alaska provided a detailed description of the coal-fired units in the FNSB NAA including the existing controls and the 2011 direct PM_{2.5} and SO₂ emissions. Six of the 12 coal-fired boilers are at the Fort Wainwright Central Heat and Power Plant. The direct PM_{2.5} emissions for each of these six units were less than 5 tons per year (tpy) and the SO₂ emissions were between 87 and 171 tpy. The Aurora Energy Chena Power Plant has four coal-fired boilers that share a common stack and exhaust control system. The direct PM_{2.5} emissions for the combined four units were 7.81 tpy and the SO₂ emissions were 838.9 tpy. The remaining two coal-fired boilers are at the University of Alaska Fairbanks Campus Power Plant. There are also two dual fuel-fired boilers at this power plant that use gas and liquid fuel. The direct PM_{2.5} emissions for each of these boilers were less than 5 tpy and the SO₂ emissions for all of the boilers combined were 281.7 tpy.

Alaska identified fabric filters (baghouses) as RACM/RACT to control direct PM_{2.5} emissions. With respect to SO₂, Alaska concluded that the use of low-sulfur fuels at these stationary sources constitutes RACM/RACT in the FNSB NAA for purposes of the 2006 24-hour PM_{2.5} NAAQS (FNSB Moderate Plan appendix III.D.5.7-72).

Gas Turbines: For the five gas turbines in the FNSB NAA, Alaska analyzed the emissions of the individual units for potential RACM/RACT level emissions controls. The GVEA North Pole Power Plant has three gas turbines. Only one of these units runs at baseload throughout the year. In 2011, the direct PM_{2.5} emissions for the baseload unit were 16 tpy and the SO₂ emissions were 1.9 tpy. The other two units at the GVEA North Pole Power Plant operate during peak hours. The direct PM_{2.5} emissions for each of these units were 16 and 131 tpy and the SO₂ emissions were 42 and 326 tpy. The remaining two gas turbines are at the GVEA Zehnder Power Plant and ran a combined total of about 53 days in 2011. The direct PM_{2.5} emissions for these units were 11 and 16 tpy. The SO₂ emissions for these units were 26 and 40 tpy.

Alaska identified the use of low sulfur naphtha and light straight-run (LSR) fuel as RACM/RACT level controls for the unit that runs at baseload throughout the year. For the other four gas turbines, Alaska determined that, in the FNSB NAA, the continued use of heavy fuel oil constitutes RACM/RACT for these units. (FNSB Moderate Plan appendix III.D.5.7-88 – 91).

Dual Fuel-fired Boilers: Alaska provided an analysis of potential control measures for the two dual-fired boilers at the University of Alaska Fairbanks Campus Power Plant. Alaska analyzed the individual units for RACM/RACT and provided the 2011 actual PM_{2.5} and SO₂ emissions for these units. From the combustion of fuel oil, the SO₂ emissions from these units were 17.7 and 11.2 tpy. For PM_{2.5}, emissions were less than 5 tons per year. Alaska concluded that, in the FNSB NAA, the use of No. 2 distillate fuel constitutes RACM/RACT for these boilers. (FNSB Moderate Plan appendix III.D.5.7-87).

c. Adopted Control Strategy in the FNSB Moderate Plan

Alaska evaluated the different source categories in the FNSB NAA for potential controls. In the case of the point sources, Alaska determined that the existing level of control meets

RACM/RACT requirements. With respect to mobile sources, Alaska determined that existing federal fuel and engine emission standards provide sufficient levels of emission reduction from these sources for purposes of the 2006 24-hour PM_{2.5} NAAQS. In addition, however, Alaska concluded that an existing local control measure to provide for plug-in engine block heating is an appropriate RACM/RACT control measure for vehicles in this area because it will provide needed reductions in emissions during the critical winter episodes when NAAQS exceedances occur in the FNSB NAA.

Alaska’s control strategy focuses primarily on imposing control measures on the key sources contributing to nonattainment during the winter season when exceedances of the 2006 24-hour PM_{2.5} NAAQS occur, *i.e.*, residential wood heating. Alaska estimated that by 2015, the emissions reductions from the adopted control strategy in the FNSB Moderate Plan would result in a 5.14 µg/m³ reduction from the baseline design value of 44.7 µg/m³ at the State Office Building monitor (FNSB Moderate Plan section III.D.5.8, table 5.8-12 and 2017 Clarification). The emissions reductions estimated from the control strategy and the implementation dates are summarized in the table below.

Table 6. FNSB Moderate Plan Control Strategy.

Control Measure	Emission Reductions		Implementation Dates
	tpd	µg/m ³	
Voluntary Measures - Transportation - Residential Heating	PM _{2.5} : 0.004 PM _{2.5} : 0.055	0.04 0.50	2001-2015
Wood Heating Device Incentives - Changeout Program - Hydronic Heater Retrofits	PM _{2.5} : 0.397 SO ₂ : -0.014 NO _x : 0.033 NH ₃ : 0.014	3.10	2010-2012
Energy Efficiency Measures	PM _{2.5} : <0.002	<0.02	2008
Opacity Limit	PM _{2.5} : <0.001	<0.01	2015
Open Burning	PM _{2.5} : <0.001	<0.01	2015

Vehicle/Device Turnover (SIP): - Federal Motor Vehicle Control Program (~ 95% of reductions) - Uncertified Wood Device Turnover (~5% of reductions)	PM _{2.5} : 0.135	1.50
TOTALS	PM_{2.5}: 0.591 SO₂: -0.014 NO_x: 0.033 NH₃: 0.014	5.14	

3. The EPA’s Evaluation and Proposed Action: RACM/RACT

The EPA proposes to approve the control strategy in the FNSB Moderate Plan. In the FNSB Moderate Plan, Alaska appropriately followed a process to analyze and select RACM/RACT level controls for this specific nonattainment area consistent with the procedures for Moderate nonattainment areas identified at 40 CFR 51.1009. The result of this process was Alaska’s adoption and implementation of a control strategy that includes the identified technologically and economically feasible control measures for sources in the FNSB NAA. The EPA proposes to find that the FNSB Moderate Plan provides for the implementation of RACM/RACT as required by CAA sections 189(a)(1)(C) and 172(c)(1), and additional reasonable measures as required by CAA sections 172(c)(6) and 40 CFR 51.1009. The EPA’s evaluation of the FNSB Moderate Plan indicates that the control strategy includes permanent and enforceable requirements on the appropriate sources at the relevant time of year (*i.e.* during wintertime stagnant air episodes) and takes appropriate credit for emissions reductions from the suite of control measures.

a. The EPA’s Evaluation and Proposed Action: Non-Point/Area Sources – RACM/RACT

As explained previously, Alaska’s initial SIP submission cited a citizen’s referendum as a basis for not adopting and implementing many of the control measures analyzed. The referendum, in place from 2010 to 2014, limited the Borough’s authority to regulate home

heating sources in any manner, thereby effectively preventing the local government from controlling emissions from the critical heating source category.¹⁶ The EPA does not consider social acceptability to be an appropriate basis for rejecting required emission control measures, but the capability of effective implementation and enforcement are relevant considerations. *See* 81 FR 58041. Therefore, the EPA does not view the referendum to be a valid basis for asserting that a control measure is unreasonable, whether for social, economic or technical reasons.

However, in October 2014, the referendum expired and Alaska began the process of adopting more stringent controls for the FNSB NAA, including control measures applicable to residential heating sources that are a major contributor to violations of the 2006 24-hour PM_{2.5} NAAQS in this nonattainment area. Due to the timing of the expiration of the referendum, it was not possible for the Borough to enact these measures, and for Alaska to submit the measures for inclusion into the attainment plan, by the December 31, 2014 deadline for Moderate area attainment plans. In February 2015, the Borough enacted its mandatory curtailment program and other measures and Alaska adopted the measures in the SIP and submitted them for EPA review in a November 22, 2016 supplementary submission. The EPA supports ongoing state efforts to improve attainment plan control strategies and therefore believes it is appropriate to consider the entirety of adopted control measures for the FNSB NAA submitted for the EPA's review, notwithstanding the timing of the submission.

The control strategy in the FNSB Moderate Plan includes a number of control measures targeted at reducing residential wood heating emissions during the winter months when exceedances of the NAAQS typically occur. The control measures, including the wintertime open burning prohibition, dry wood requirement, visible emissions limit of 20 percent opacity,

¹⁶ FNSB Code 8.21.025 "The borough shall not, in any way, regulate, prohibit, curtail, nor issue fines or fees associated with, the sale, distribution, or operation of heating appliances or any type of combustible fuel."

prohibited fuel sources, and mandatory curtailment program are similar to approved control programs adopted in other nonattainment areas impacted by emissions from residential wood heating sources. In addition, the FNSB Moderate plan includes emissions standards for wood stoves and hydronic heaters that are more stringent than the current EPA emissions standards for these devices. *See* 40 CFR part 60, subparts AAA and QQQQ. For example, Alaska adopted an emissions standard of 2.5 grams per hour for wood stoves, which is more stringent than the emissions standard of 4.5 grams per hour for Step 1 EPA-certified wood stoves. Also, the Borough's emissions standards apply to coal-fired heaters, which the EPA does not regulate. *See* 80 FR 13676, March 16, 2015. The control strategy includes a provision that excludes owners of newly constructed buildings from obtaining a "no other adequate source of heat" determination, which encourages installation of alternative heating sources in new buildings so that the building occupants may comply with curtailments. These control measures are beyond what is typically found in other nonattainment areas impacted by wood heating sources but were appropriate for inclusion as RACM/RACT in the FNSB Moderate Plan. Because of the specific facts and circumstances of FNSB NAA, and the severity of the nonattainment problem in this area, Alaska is appropriately focusing multiple control measures on this important source category.

Alaska did not specifically analyze area source controls for NH₃. The EPA agrees with Alaska's decision to exclude NH₃ area source controls from its analysis. The EPA is unaware of any available technologies to control NH₃ emissions from combustion sources where ammonia is emitted as a product of combustion (other than improved combustion conditions such as those achieved via wood stove changeout). Although the control strategy primarily focuses on reducing direct PM_{2.5} emissions, it also provides for emissions reductions for some PM_{2.5} precursors. For

example, NH₃ emissions from wood heating were estimated to be 13 percent lower in the 2015 inventory than in 2008 base year inventory.

As noted, the control strategy focuses on reducing emissions from residential wood heating sources and includes control measures such as a woodstove changeout program, a requirement to use only dry wood, a mandatory curtailment program, and an opacity limit for residential heating sources. The EPA agrees that these control measures appropriately target the emissions contributing to nonattainment and provide for reductions during winter stagnation events when concentrations of emissions build-up and lead to exceedances of the 2006 24-hour PM_{2.5} NAAQS.

As discussed in section II.C.2.a of this proposal, the mandatory curtailment control program has two stages, with ambient PM_{2.5} trigger levels at 35 µg/m³, referred to as a stage 2 alert, and 55 µg/m³, referred to as a stage 3 alert. During a stage 2 alert, the only solid-fuel fired heaters that can be operated are U.S. EPA certified devices, EPA Phase II hydronic heaters with PM_{2.5} annual average emissions ratings of 2.5 grams per hour or less, masonry heaters, pellet stoves, and fireplaces. During a stage 3 alert, the use of solid-fuel heaters, masonry heaters, pellet-fueled appliances, cook stoves, fireplaces, and waste oil devices is prohibited. The EPA believes that the two-stage alert system meets RACM/RACT level control requirements for this source category for the FNSB NAA. The EPA notes that the mandatory curtailment program includes applicability limitations during stage 3 alerts (no other adequate source of heat, power outage, and ambient temperatures below -15 °F). We have reviewed Alaska's mandatory curtailment program which operates in conjunction with the other control measures that apply to, and reduce emissions from, the same sources, including a 20 percent limit on opacity and a requirement that only dry wood (with a moisture content of 20 percent or less) be burned at all

times. We believe the suite of control measures provides for continuous control of this source category, consistent with CAA requirements. We have also considered that many mandatory curtailment programs in other nonattainment areas contain limitations on applicability when there is no other adequate source of heat that are based on considerations of public welfare. The EPA concludes that in the FNSB NAA, where wintertime temperatures can be extreme and there is limited availability of fuel alternatives such as natural gas, the three limitations in Alaska's mandatory curtailment program similarly invoke public welfare considerations that are appropriate in the context of a Moderate area plan. Additionally, the FNSB NAA is relatively new to programs for reducing emissions from wood heating and, prior to 2015, the community had not experienced mandatory curtailments. The two-stage mandatory curtailment program is therefore appropriately suited for the FNSB NAA in that it provides for implementation of a curtailment program that will reduce emissions in a manner that can facilitate program adoption and implementation by the community. We also note that if the FNSB NAA is reclassified to Serious for failure to attain the 2006 PM_{2.5} NAAQS, as proposed (81 FR 91088, December 16, 2016), Alaska will need to reevaluate and strengthen its SIP control strategy to meet the more stringent Serious area requirement for BACM.

We have reviewed Alaska's determination in the FNSB Moderate Plan that its area source control measures represent the adoption of reasonable control measures that meet RACM requirements and we believe that Alaska adequately justified its conclusions with respect to each of these measures. As noted, the EPA proposed to reclassify the FNSB NAA to Serious for failure to attain the PM_{2.5} NAAQS by the December 31, 2015 attainment date. *Id.* If the reclassification is finalized, Alaska will need to reevaluate and strengthen its attainment plan

control strategy for the PM_{2.5} NAAQS as necessary to meet the more stringent Serious area requirement for BACM and BACT, among other requirements.

b. The EPA's Evaluation and Proposed Action: Stationary Point Sources – RACM/RACT

Alaska's RACM/RACT analysis for the six major stationary sources located in the FNSB NAA appropriately focused on PM_{2.5}, SO₂ and NH₃. The EPA agrees with the selection of fabric filters (baghouses) as meeting RACM/RACT-level controls for direct PM_{2.5} emissions. This control technology is well established as meeting RACM/RACT for this application. In the FNSB NAA, NH₃ accounts for less than 0.001 tons per day of emissions in the FNSB NAA. Alaska's RACM/RACT analysis did not identify any control technologies for NH₃ and the EPA is unaware of any available technologies to control emissions of NH₃ from combustion sources where the ammonia is solely a product of combustion. The EPA therefore agrees with Alaska's decision with respect to stationary source controls for NH₃.

With respect to SO₂, Alaska identified a suite of controls that could potentially be implemented at the stationary sources in the FNSB NAA and conducted a cost analysis to determine the capital costs and cost effectiveness of the controls to conclude that SO₂ controls were not economically feasible. The EPA understands that, due to the fact that the FNSB Moderate Plan demonstrated the impracticability of attaining the 2006 PM_{2.5} NAAQS by the end of 2015 and the expectation that the area will be reclassified from Moderate to Serious, Alaska has started working on a BACM and BACT analysis for stationary sources to strengthen its SIP control strategy to meet the more stringent Serious area requirements. Alaska conducted its RACM/RACT analysis for stationary sources with the expectation that it would need to prepare a Serious area nonattainment plan and therefore presupposing that a BACM/BACT analysis would

also be required in the near future.¹⁷ Accordingly, Alaska's conclusion that additional SO₂ emissions controls for these stationary sources were not economically feasible for purposes of meeting RACM/RACT requirements will be revisited in the context of Alaska's BACM/BACT analysis.

We have reviewed Alaska's determination in the FNSB Moderate Plan that its stationary source control measures represent the adoption of reasonable control measures that meet RACM/RACT requirements and we believe that Alaska adequately justified its conclusions with respect to each of these measures.

As discussed previously, the EPA has proposed to reclassify the FNSB NAA to Serious for failure to attain the PM_{2.5} NAAQS by the December 31, 2015 attainment date (81 FR 91088). Alaska will need to reevaluate and strengthen its attainment plan control strategy for the PM_{2.5} NAAQS as necessary to meet the more stringent Serious area requirement for BACM and BACT, among other requirements.

D. Air Quality Modeling

1. Requirements for Air Quality Modeling

CAA section 189(a)(1)(B) requires each state with a Moderate nonattainment area to submit a plan that includes, among other things, either (i) a demonstration (including air quality modeling) that the plan will provide for attainment by the applicable attainment date; or (ii) a demonstration that attainment by such date is impracticable. For model attainment demonstrations, the EPA's modeling requirements are in 40 CFR part 51, appendix W (82 FR 5182, January 17, 2017). The EPA's guidance recommendations for model input preparation,

¹⁷ The EPA has acknowledged that it is appropriate for a state to consider implementing RACM/RACT in a way that supports addressing BACM/BACT. 81 FR 58045.

model performance evaluation, use of the model output for the attainment demonstration, and modeling documentation are described in *Draft Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM_{2.5}, and Regional Haze* (Modeling Guidance).¹⁸ The EPA recommends that states prepare modeling protocols as part of their modeled attainment demonstrations. The Modeling Guidance describes the topics states should address in this modeling protocol. A modeling protocol should detail and formalize the procedures for conducting all phases of the modeling analysis, such as describing the background and objectives, creating a schedule and organizational structure, developing the input data, conducting model performance evaluations, interpreting modeling results, describing procedures for using the model to demonstrate whether proposed strategies are sufficient to attain the applicable standard, and producing documentation to be submitted for EPA Regional Office review and approval prior to actual modeling.

Air quality modeling is used to establish emissions targets, the combination of emissions of PM_{2.5} and PM_{2.5} precursors that the area can accommodate and still attain the standard, and to assess whether the proposed control strategy is likely to result in attainment of the relevant NAAQS. Air quality modeling is performed for representative episodes in the past and compared to air quality monitoring data collected during those episodes in order to determine model performance. To project future design values, the model response to emission reductions, in the form of relative response factors, is applied on a chemical species-by-species basis to the baseline design value, as implemented in the SMAT methodology and described in the Modeling Guidance.

¹⁸ The Modeling Guidance is available on the EPA's SCRAM Web site, Web page: http://www.epa.gov/scram001/guidance_sip.htm; direct link: https://www3.epa.gov/scram001/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf.

In addition to a modeled attainment demonstration that focuses on locations with an air quality monitor, the 2016 PM_{2.5} Implementation Rule recommends an unmonitored area analysis. This analysis is intended to ensure that a control strategy leads to reductions in PM_{2.5} at other locations that have no monitor but might have base year and/or projected future year ambient PM_{2.5} levels exceeding the standard. This is particularly critical where the state and/or the EPA has reason to believe that potential violations may be occurring in unmonitored areas. An unmonitored area analysis is of lesser value in the case of an impracticability demonstration that shows an area will not attain the standard at monitored locations. Finally, as discussed in the Modeling Guidance, the EPA recommends supplemental air quality analyses. These are used as part of a weight of evidence analysis, in which the likelihood of attainment is assessed by considering evidence other than the main air quality modeling attainment test.

The EPA has not issued modeling guidance specific to impracticability demonstrations, but believes that a state seeking to make such a demonstration, generally, should provide air quality modeling similar to that required for an attainment demonstration. The main difference between an attainment demonstration and an impracticability demonstration is that despite the implementation of a control strategy including RACM/RACT and additional reasonable measures, an impracticability demonstration does not demonstrate attainment of the standard by the statutory Moderate area attainment date. Alternatively, a model projection could show that the implementation of the SIP control strategy results in attainment of the standard after the statutory Moderate area attainment date. However, there are cases where modeling may not be needed to demonstrate that it is impracticable to attain by the statutory Moderate area attainment date and the EPA has therefore determined that modeling is not a regulatory requirement to support an impracticability demonstration. 40 CFR 51.1009(a)(4); 81 FR 58048. For an

attainment demonstration, a thorough review of all modeling inputs and assumptions is especially important because the modeling must ultimately support a conclusion that the plan (including its control strategy) will provide for timely attainment of the applicable NAAQS.

In contrast, for an impracticability demonstration, if the state and the EPA determine that the area cannot attain the NAAQS by the latest statutory Moderate area attainment date, the result is that the EPA will reclassify the area from a Moderate nonattainment area to a Serious nonattainment area. This reclassification obligates the state to submit a new attainment plan that meets more stringent regulatory requirements (e.g. BACM and BACT level emission controls on sources in the area) and the requirement for a Serious area attainment demonstration that will necessarily need to include air quality modeling that demonstrates attainment by the applicable attainment date. Thus, the Serious area planning process would provide an opportunity to refine the modeling analysis and/or correct any technical shortcomings in the impracticability demonstration.

2. Air Quality Modeling in the FNSB Moderate Plan and the EPA's Evaluation

In FNSB Moderate Plan section III.D.5.8 and appendix III.D.5.8, Alaska provided air quality modeling to support its demonstration that it was impracticable for the FNSB NAA to attain the 2006 24-hour PM_{2.5} NAAQS by the statutory Moderate area attainment date of December 31, 2015. The modeling demonstration uses three-dimensional grid-based meteorological modeling and full photochemical grid modeling, combined with speciated monitoring data from 2006-2010 from the State Office Building site in Fairbanks, to assess attainment. Alaska used the CMAQ photochemical model version 4.7.1, the most current version of the model at the time Alaska developed modeling for the FNSB Moderate Plan. Alaska examined subsequent versions of CMAQ but did not upgrade model versions because the newer

versions did not include significant scientific improvements relevant for the FNSB NAA. The Weather Research Forecasting Model (model version 3.1) was used to prepare meteorological input for CMAQ. The Sparse Matrix Operator Kernel Emissions (SMOKE) processor was used to create photochemical transport model inputs. Emissions inventory estimates were combined with meteorological inputs developed for the two multiday air quality episodes of elevated PM_{2.5} concentrations (January 23 – February 10, 2008; and November 2 – 17, 2008) and with the available chemistry mechanisms in CMAQ to assess the ability of the FNSB NAA to demonstrate attainment in 2015.

To calculate the projected 2015 PM_{2.5} design value, Alaska performed the SMAT methodology. Alaska used the ratio of future year (2015) to base year (2008) modeling results to derive relative response factors for each chemical species and these response factors were applied on a chemical species-by-species basis to the baseline design value. The concentrations of chemical species used in the baseline design value was an average of the monitoring data for the top 25 percent most polluted wintertime days (in the first and fourth quarters) of the years 2006-2010. Only the top 25 percent was used because there are many cleaner days when the emission source mix and contributions of PM_{2.5} to the monitor are not relevant for air quality planning to meet the 24-hour PM_{2.5} standard. The top 25 percent most polluted wintertime days captured the days with weather conditions and emissions patterns that occur when the standard is exceeded. The average of the speciated concentrations on the top 25 percent most polluted days were weighted to the observed PM_{2.5} concentrations from the official regulatory data at the State Office Building, such that the speciated PM_{2.5} data used for air quality modeling (and for the precursor demonstration) are reflective of the baseline design value of 44.7 µg/m³. The technique was not used for the second and third quarters because an examination of the PM_{2.5} data from the

baseline period 2006-2010 showed that the all high monitored values from those quarters had been flagged as exceptional events and submitted to the EPA for concurrence. Therefore, second and third quarter monitoring data has no influence on the FNSB 24-hour PM_{2.5} NAAQS design values.

Alaska evaluated the results of their CMAQ modeling with observed PM_{2.5} mass and speciated PM_{2.5} mass from the monitor at the State Office Building. The base year modeling for the two multiday episodes of 2008 used hourly meteorology and emissions specific to those episodes and are Alaska's best attempt at reproducing air quality during the two wintertime pollution episodes. Alaska selected generally accepted techniques for assessing model performance, such as goal and criteria thresholds from academic literature and past attainment modeling done by other areas. Criteria are metrics for when the modeling can be considered generally acceptable, and goals are metrics for when the modeling can be considered to be performing well. After comparing model performance to the selected techniques, Alaska concluded that the model meets modeling goals for total PM_{2.5} and meets criteria for organic carbon, elemental carbon, and nitrate. In contrast, modeled estimates of the sulfate, ammonium, and other PM_{2.5} components of PM_{2.5} mass were underpredicted. Alaska explained that the large underprediction of sulfate is likely due to the fact that the CMAQ existing sulfate chemistry mechanisms are intended for locations with liquid water clouds, warmer temperatures, and more sunlight. Alaska notes that the underprediction of ammonium is very likely a by-product of the sulfate underprediction. Thus, Alaska believes that NH₃ controls or NO_x controls would likely still be accurately reflected in the modeling results irrespective of the large underprediction of sulfate.

In light of acceptable model performance for PM_{2.5} overall and for certain chemical species, Alaska used CMAQ to test control strategies on primary PM_{2.5}, NO_x, and NH₃. The sulfate component of PM_{2.5} was considered to stay constant in future years because, for the reasons explained above, the modeling system was not considered adequate to assess SO₂ controls. As weight of evidence, Alaska presented a sensitivity study in which the changes in SO₂ emissions from the control strategy are used to estimate changes in sulfate. For the purposes of the sensitivity study, Alaska assumed that sources of SO₂ are responsible for sulfate in proportion to their share of the SO₂ inventory. Because the control strategy shifts home heating fuel from relatively sulfur-poor wood to relatively sulfur-rich oil, the 2015 PM_{2.5} design value in this analysis would increase by 0.5 µg/m³. This is a relatively small increase in PM_{2.5} compared to the projected decrease in PM_{2.5} from the control strategy of 6.9 µg/m³.

The FNSB Moderate Plan section III.D.5.8 also contains an unmonitored area analysis and a weight of evidence analysis as additional support for the modeling demonstration. Alaska used various analytical techniques to inform modeling decisions and to assess model performance. Statistical evaluations with positive matrix factorization and chemical mass balance modeling were used to attribute and prioritize source significance. To understand the distribution of emissions from wood burning versus fossil fuels, a Carbon-14 analysis was used to determine the age distribution of carbon molecules found at each monitoring site. Levoglucosan, an organic compound that is considered to be a tracer of biomass burning, was analyzed to assess the significance of wood burning. A dispersion modeling study using the CALPUFF model was used to characterize PM_{2.5} contribution from permitted stationary sources to the State Office Building monitor.

The weight of evidence analysis consistently attributed more than 50 percent of the PM_{2.5} at the State Office Building monitor to wood smoke. Stationary sources are estimated to contribute 5 percent of the measured PM_{2.5} at the State Office Building monitor based on emissions of direct PM_{2.5} alone, and potentially another 15 percent if all of the sulfate at the monitor could be attributed to stationary sources rather than split with residential oil heat. In contrast, Alaska's emission inventory reports that stationary sources make up 29 percent of the emissions of direct PM_{2.5}. The large difference between the proportion of direct PM_{2.5} emissions from stationary sources and their modeled contribution at the State Office Building monitor is primarily due to the influence of the stable atmosphere near the surface, and secondarily because prevailing winds at the top of the stacks do not carry plumes of many of the stationary sources in the direction of the monitor. This shows the value of using modeling and source apportionment techniques, as compared to emissions inventory information alone, in assessing the source of PM_{2.5} air pollution in the nonattainment area.

Based on the unmonitored area analysis, Alaska projects 2015 design values above the standard in several parts of the FNSB NAA, including the western part of downtown Fairbanks, to the southeast of downtown Fairbanks, and in the North Pole area. This modeling suggests there are locations other than the State Office Building location where exceedances may be occurring. Alaska should design any Serious area plan in order to address such potential exceedances in the FNSB NAA.

3. The EPA's Conclusions on Air Quality Modeling

The EPA is proposing to find that Alaska's model is adequate for assessing whether the FNSB NAA will attain the PM_{2.5} NAAQS by the statutory Moderate area attainment date, *i.e.*, by December 31, 2015, in the context of this SIP submission. The model inputs, episode selection,

performance evaluation, extensive supplemental information, and attainment test methodology are well-described and conform with the state-of-the art for air quality modeling. Alaska found unacceptable model performance for some PM_{2.5} chemical species, but the control strategy did not rely on controls of those chemical components. The EPA therefore proposes to find that the modeling is also adequate for purposes of supporting the control strategy analysis, RFP, and impracticability demonstrations.

As discussed previously, the EPA notes that because the FNSB NAA did not attain the 2006 24-hour PM_{2.5} NAAQS by December 31, 2015, Alaska will be required to submit a Serious area SIP by December 31, 2017. In a separate action, the EPA has recently proposed to find that the area failed to attain and thus will be reclassified from Moderate to Serious if the Agency finalizes that proposal. The EPA expects Alaska to further analyze modeling gaps related to sulfate for the Serious area plan. In addition, the EPA believes that the heterogeneity of wood smoke emissions and lack of air movement during polluted episodes, will continue to make an unmonitored area analysis an important component in the Serious area plan.

E. Demonstration That Attainment by the Moderate Area Attainment Date is Impracticable

1. Requirements for Attainment/Impracticability of Attainment Demonstrations

CAA section 189(a)(1)(B) requires that each Moderate area attainment plan include a demonstration that the plan provides for attainment by the latest applicable Moderate area deadline or, alternatively, that attainment by the latest applicable attainment date is impracticable. A demonstration that the plan provides for attainment must be based on air quality modeling, and the EPA generally recommends that a demonstration of impracticability also be

based on air quality modeling and be consistent with the EPA's modeling regulations and guidance (51.1011(a)(2); 51.1011(a)(4)(ii); and 81 FR 58049).

CAA section 188(c) states, in relevant part, that the Moderate area attainment date "shall be as expeditiously as practicable but no later than the end of the sixth calendar year after the area's designation as nonattainment." For the 2006 24-hour PM_{2.5} NAAQS, effective December 14, 2009, the applicable Moderate area attainment date under section 188(c) for the FNSB NAA is as expeditiously as practicable, but no later than December 31, 2015. In SIP submissions to demonstrate impracticability, the state should document that its required control strategy in the plan represents the application of RACM/RACT to existing sources. Moderate areas that do not demonstrate timely attainment should adopt all reasonable control measures (*i.e.*, those measures that are technologically and economically feasible). 81 FR 58035. The impracticability demonstration should be a showing that the area cannot attain by the applicable date, notwithstanding implementation of all reasonable controls in the Moderate area attainment plan. 81 FR 58045.

2. Impracticability Demonstration in the FNSB Moderate Plan

The FNSB Moderate Plan includes a demonstration, based on air quality modeling and additional supporting analyses discussed in section II.D of this proposal, that attainment by the statutory Moderate area attainment date of December 31, 2015 was impracticable. Implementation of the selected control strategy resulted in a projected 2015 design value of 39.6 µg/m³ at the State Office Building, and Alaska's unmonitored area analysis shows that several other parts of the FNSB NAA may also violate the NAAQS in 2015. On November 22, 2016, and January 6, 2017, Alaska submitted a SIP revision supported by additional clarifying information that included the adoption of control measures that have been implemented since the

initial submission of the FNSB Moderate Plan in December 2014. The control measures include a mandatory curtailment program for solid-fuel fired heaters, a requirement to use dry wood in wood-fired heaters, an opacity limit applicable to solid-fuel fired heating devices, and other measures that strengthened the overall control strategy. In the 2017 Clarification, Alaska provided a demonstration that included the additional emissions reductions from these control measures, which resulted in a projected 2015 future year design value of 37.8 $\mu\text{g}/\text{m}^3$. Accordingly, Alaska demonstrated that attainment by the statutory Moderate area attainment date would still have been impracticable even if all control measures had been adopted earlier.

3. The EPA's Evaluation and Proposed Action: Impracticability Demonstration

We have evaluated the FNSB Moderate Plan's demonstration that it was impracticable for the area for attain by the December 31, 2015 statutory Moderate area attainment date, supporting air quality modeling, and control strategy analyses addressing the adoption of all reasonable measures. We are proposing to approve Alaska's demonstration that it was not practicable for the area to attain the 2006 NAAQS standard by December 31, 2015.

In addition to the information in the FNSB Moderate Plan and supplement, we have reviewed recent $\text{PM}_{2.5}$ monitoring data from the FNSB NAA. The data show that the area did not attain the $\text{PM}_{2.5}$ NAAQS by the December 31, 2015 attainment date. The State Office Building monitor, which is the original violating monitor in the FNSB NAA and was the basis of the FNSB Moderate Plan, had a 2013-2015 design value of 43 $\mu\text{g}/\text{m}^3$.¹⁹ In addition, the monitor at the North Pole Fire Station became a regulatory monitor in 2015, after Alaska's development and submission of the initial FNSB Moderate Plan. The North Pole Fire Station monitor has a 2013-2015 design value of 124 $\mu\text{g}/\text{m}^3$. The EPA has therefore separately proposed to find that the

¹⁹ The 2013-2015 design value excludes exceedances during summer months that were identified as wildfire exceptional events and the EPA has approved excluding the data. (*See* section II.I of this proposal.)

FNSB NAA did not attain by the statutory Moderate area attainment date and reclassify the area from Moderate to Serious pursuant to CAA section 188(b)(2) (81 FR 91088, December 16, 2016). If the EPA finalizes the reclassification of the FNSB NAA from Moderate to Serious, Alaska will be required to submit a Serious area attainment plan by December 31, 2017. Because the North Pole Fire Station monitor is now a regulatory monitor in the FNSB NAA, Alaska and the EPA will address it in the development of the Serious area plan for the FNSB NAA.

F. Reasonable Further Progress and Quantitative Milestones

1. Requirements for RFP and QMs

CAA section 172(c)(2) requires nonattainment area plans to provide for RFP. In addition, CAA section 189(c) requires PM_{2.5} nonattainment area SIPs to include QMs to be achieved every 3 years until the area is redesignated to attainment and which demonstrate RFP. CAA section 171(1) defines RFP as “such annual incremental reductions in emissions of the relevant air pollutant as are required by [Part D] or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable [NAAQS] by the applicable date.” Neither subpart 1 nor subpart 4 require that a set percentage of emissions reductions be achieved in any given year for purposes of satisfying the RFP requirement for PM_{2.5} NAAQS.

The EPA has historically interpreted the requirement to be met by a state showing annual incremental emission reductions in its attainment plan sufficient to maintain generally linear progress toward attainment by the applicable deadline. 40 CFR 51.1012(a)(4); *see also* 59 FR 41998, 42015 (August 10, 1994). In some circumstances, the EPA has acknowledged that RFP may be better represented as step-wise progress as controls are implemented and achieve significant reductions over a relatively short period. The EPA’s recent implementation rule for the PM_{2.5} NAAQS has reiterated these requirements. An attainment plan for a PM_{2.5} nonattainment

area must include an RFP analysis that demonstrates that sources in the area will achieve such annual incremental reductions in emissions of direct PM_{2.5} and PM_{2.5} plan precursors as are necessary to ensure attainment as expeditiously as practicable. 40 CFR 51.1012(a). The RFP analysis must include a schedule for implementation of the control measures and provide projected emissions from these measures for each applicable milestone year. *Id.* at 51.1012(a)(1)-(2). At the state's election, the RFP analysis may also identify ambient air quality targets for the milestone years at the design value monitor locations. *Id.* at 51.1012(a)(5).

Section 189(c) provides that attainment plans must include QMs that will be used to measure RFP every 3 years until redesignation. Thus, the EPA determines an area's compliance with RFP in conjunction with determining its compliance with the QM requirement. 40 CFR 51.1013(a) (requiring attainment plans to include specific QMs that will demonstrate RFP toward attainment). Because RFP is an annual emission reduction requirement and the QMs are to be achieved every 3 years, when a state demonstrates compliance with the QM requirement, it provides an objective evaluation of RFP that has been achieved during each of the relevant 3 years. *Id.* at 51.1013(a)(1)(ii). The EPA has historically interpreted the CAA to authorize a broad variety of QMs, so long as they provide a way to verify compliance with the RFP requirement. QMs are not required to take any particular form but they should consist of elements that allow progress to be quantified or measured objectively. 81 FR 58064. However, at a minimum, QMs for a Moderate area attainment plan must track progress in implementing control measures by each milestone date. Therefore, timely implementation of control measures comprising the RFP plan provides a means for satisfying the QM requirement. *Id.* The Act requires states to include RFP and QMs in attainment plans for all Moderate areas, even for areas that cannot practicably attain by the attainment date.

The CAA does not specify the starting point for counting the 3-year periods for QMs under CAA section 189(c). However, the EPA's longstanding interpretation of the CAA is that the first QM should fall 3 years after the latest date on which the state should have submitted the attainment plan. For the 2006 PM_{2.5} NAAQS, the EPA set QMs to be achieved no later than the 3 years after December 31, 2014, and every 3 years thereafter until the QM date falls within 3 years after the applicable attainment date. 40 CFR 51.1013(a)(4). Accordingly, the first QM date for the FNSB NAA must be met no later than December 31, 2017 (3 years after December 31, 2014). Following reclassification of the FNSB NAA to Serious with a new applicable attainment date of December 31, 2019, the later QM of December 31, 2020 will apply, with additional QMs every 3 years thereafter as may be necessary for the Serious area plan in light of any extension of the applicable attainment date.

A state must submit a QM report to the EPA no later than 90 days after the QM date. 40 CFR 51.1013(b). The QM reports must contain: (1) a certification that the attainment plan control strategy is being implemented, (2) technical support to demonstrate that the QMs have been satisfied and how the emissions reductions achieved to date compare to those scheduled to meet RFP, (3) a discussion of whether the area will attain the 2006 PM_{2.5} NAAQS by the projected attainment date.

2. RFP and QMs in the FNSB Moderate Plan

The RFP demonstration in the FNSB Moderate Plan addresses emissions of direct PM_{2.5}, NO_x, SO₂, and NH₃ and includes a projected emissions inventory for the 2017 QMs based on implementing the control strategy (*see* the FNSB Moderate Plan sections III.D.5.6 and III.D.5.8, the 2017 Clarification, and table 6 in section II.C, above). Alaska assessed the emissions reductions that would be achieved from the base year emissions inventory by 2017 from the

control measures included in the control strategy. To determine whether the 2017 emissions projections were consistent with generally linear progress towards attainment, Alaska interpolated linearly between the 2015 projected emissions inventory for the FNSB NAA and the 2019 inventory that Alaska based on projected attainment for the FNSB NAA by that year, *i.e.*, the tenth year following designation. The table below summarizes the 2017 QMs and RFP demonstration in the FNSB Moderate Plan.

Table 7. FNSB NAA RFP demonstration and QMs (tons per day).

Emissions Projections	PM_{2.5}	NO_x	SO₂	NH₃
2017 Linear Progress QMs	3.96	18.97	13.00	0.200
2017 Projected Emissions	3.91	18.95	12.41	0.188

Alaska included an inventory for 2017 and motor vehicle emissions budgets, which are discussed in section II.H below. The RFP analysis is based on winter episode average-season-day emissions for the FNSB NAA and actual emissions for stationary point sources. The RFP analysis projected that emissions of direct PM_{2.5} and NO_x would decline from 2015 to 2017. The SO₂ and NH₃ emissions were projected to slightly increase, due in large part to implementation of the control strategy which places greater reliance on gas and oil heating in place of wood and other solid fuels to reduce overall emissions and concentrations of PM_{2.5} in the FNSB NAA. The EPA has acknowledged that in some circumstances a state could meet the RFP requirement even when emissions of one or more plan precursors are not decreasing, provided that the relative air quality impacts of the emissions reductions of direct PM_{2.5} and aggregate PM_{2.5} plan precursors have generally linear reductions towards what is needed for expeditious attainment in the area. In such a circumstance the state would demonstrate that even when one or more plan precursor is not decreasing, the emissions reductions of direct PM_{2.5} and remaining PM_{2.5} plan precursors are the dominant factors in reducing ambient PM_{2.5} concentrations and therefore adequate to

demonstrate RFP. 81 FR 58057. Alaska's RFP analysis projected that implementation of the control strategy would decrease emissions of direct PM_{2.5} and NO_x and slightly increase emissions of SO₂ and NH₃ emissions, with aggregate emissions reductions of direct PM_{2.5} and all precursors lower than linear progress.

As previously noted, on November 22, 2016, and January 6, 2017, Alaska provided a supplementary submission and clarifying information to the EPA that included implementation of control measures for area sources in 2015. The control measures include a mandatory curtailment program for solid-fuel heaters, a requirement to use only dry wood in wood heaters, an opacity limit for solid-fuel fired heating devices, and other measures that strengthened the control strategy. Alaska updated the RFP analysis to include the implementation of these new measures.

3. The EPA's Evaluation and Proposed Action: RFP and QMs

The FNSB Moderate Plan, including the 2016 supplement and 2017 Clarification, demonstrates that the control strategy, including all reasonable controls, has been implemented and identifies projected emissions levels, in a 2017 emissions inventory, that reflect full implementation of the control strategy for the area. In an area that cannot practicably attain the PM_{2.5} NAAQS by the applicable Moderate area attainment date, we believe it is reasonable to find that full implementation of a control strategy that satisfies the Moderate area control requirements (RACM/RACT and additional reasonable measures) represents RFP toward attainment. We propose, therefore, to approve the RFP demonstration for direct PM_{2.5}, NO_x, SO₂, and NH₃ as meeting the requirements of CAA section 172(c)(2).

In evaluating whether the submitted attainment plan meets the RFP and related QM requirements, we are relying in part on the FNSB Moderate Plan's analysis of the implementation of control measures adopted before 2015 and more recently in 2016. As

previously noted, if the FNSB NAA is reclassified from a Moderate to Serious nonattainment area, as proposed, the area will be subject to Serious area plan requirements and Alaska will need to reevaluate and strengthen its attainment plan control strategy, and provide a new attainment demonstration and revised RFP demonstration and QMs based on the Serious area control strategy.

The EPA proposes to approve the FNSB Moderate Plan as meeting both the RFP and QM requirements. The FNSB Moderate Plan provides sufficient data and analyses that demonstrate emissions reductions that provide RFP toward attainment in 2017, and the QM for 2017 provides an objective way for the EPA to verify that Alaska has met the RFP requirements for the relevant 3 years of the attainment plan for this area.

On January 6, 2017, Alaska submitted a QM report (2017 QM Report) to the EPA certifying that the 2017 QMs for the FNSB NAA have been achieved.²⁰ The EPA has evaluated the 2017 QM Report and determines that, it adequately meets the requirements of 40 CFR 51.1013(b). The 2017 QM Report includes a certification from the Governor's designee and an appropriate demonstration that the control strategy has been fully implemented and that the emissions reductions achieved are consistent with the 2017 QMs that demonstrate RFP at the State Office Building monitor. In the 2017 QM Report, Alaska acknowledges that, consistent with the impracticability demonstration in the FNSB Moderate Plan, the FNSB NAA did not attain the PM_{2.5} NAAQS by the moderate area attainment date of December 31, 2015. Based on our review of Alaska's 2017 QM Report, the EPA agrees that the FNSB NAA has achieved the RFP emissions goals and the 2017 QMs in the FNSB Moderate Plan for direct PM_{2.5}, NO_x, SO₂, and NH₃.

²⁰ Alaska's 2017 quantitative milestone report is available in the docket for this action.

G. Contingency Measures

1. Requirements for Contingency Measures

Under CAA section 172(c)(9), PM_{2.5} plans must include contingency measures to be implemented if an area fails to meet RFP or fails to attain the PM_{2.5} standards by the applicable attainment date. Under subpart 4, however, the EPA interprets section 172(c)(9) in light of the specific requirements for particulate matter nonattainment areas. CAA section 189(b)(1)(A) differentiates between Moderate area attainment plans that provide for timely attainment by no later than the sixth calendar year after designation and those that demonstrate that attainment by that date is impracticable. Where the SIP submission includes a demonstration that attainment by the applicable attainment date is impracticable, the EPA interprets CAA section 172(c)(9) not to require contingency measures that would take effect upon failure to attain. 81 FR 58067. In an attainment plan submission that meets the impracticability demonstration requirement, the state need only submit contingency measures to be implemented if a state fails to meet any RFP requirement of the plan, any QM in the plan, or to submit a QM report, as provided in 40 CFR section 51.1014(a)(1)-(3).²¹

The purpose of contingency measures is to continue progress in reducing emissions during the period while a state is revising its SIP to address a failure, such as a failure to meet a QM requirement or failure to attain. The principal considerations for evaluating contingency measures are:

²¹ The EPA does not interpret the requirement for failure-to-attain contingency measures to apply to Moderate PM_{2.5} nonattainment areas that cannot practicably attain the NAAQS by the statutory attainment date. Rather, the EPA believes it is appropriate for the state to identify and adopt attainment contingency measures as part of the Serious area attainment plan that it will develop once the EPA reclassifies the area. 81 FR 58067.

- Contingency measures must be fully adopted rules or control measures that are ready to be implemented quickly upon failure to meet RFP or failure of the area to meet the NAAQS by its attainment date.
- The SIP must contain trigger mechanisms for the contingency measures, specify a schedule for implementation, and indicate that the measures will be implemented without further action by the state or by the EPA. In general, we expect all actions needed to affect full implementation of the measures to occur within 60 days after the EPA notifies the state of a failure.
- The contingency measures shall consist of control measures that are not otherwise included in the control strategy or that achieve emissions reductions not otherwise relied upon in the control strategy for the area.
- The measures should provide for emissions reductions equivalent to approximately one year of reductions needed for RFP calculated as the overall level of reductions needed to demonstrate attainment divided by the number of years from the base year to the attainment year. 81 FR 58066.

2. Contingency Measures in the FNSB Moderate Plan

Alaska identified two contingency measures in the FNSB Moderate Plan in section III.D.5.10. In accordance with basic requirements for valid contingency measures, these two measures are not required to meet other attainment plan requirements and are not relied on in the control strategy. The first contingency measure requires the replacement of wood heating devices upon sale or lease of property if the existing devices do not meet specific emissions requirements. The second contingency measure is a mandatory enhanced dry wood compliance

program that requires commercial wood sellers to register with the State and to disclose moisture content information to consumers at the time of wood sale and delivery.

The FNSB Moderate Plan contingency measures have been fully adopted into Alaska State Code (18 AAC 50.076 and 50.077). In accordance with basic requirements for valid contingency measures, they will go into effect with minimal further action by the state or the EPA in response to a triggering event; in this case the measures adopted by Alaska will be implemented within 60 days of the EPA making a finding that the FNSB NAA failed to attain the NAAQS and reclassifying the area from a Moderate to a Serious nonattainment area.

3. The EPA's Evaluation and Proposed Action: Contingency Measures

The EPA acknowledges that Alaska developed, adopted, and submitted the FNSB Moderate Plan prior to the EPA's publication of the proposed PM_{2.5} Implementation Rule and interpretation that the requirement for contingency measures for failure to attain does not apply to a Moderate area that a state demonstrates cannot practicably attain by the statutory attainment date, but rather contingency measures for failure to meet RFP or QMs apply to such areas. *See* CAA 172(c)(9); 80 FR 15392, March 23, 2015; and 81 FR 58067. Hence, Alaska's FNSB Moderate Plan submission includes contingency measures that would take effect at the first possible triggering event – in this case the failure of the FNSB NAA to attain by the applicable Moderate area statutory attainment date, December 31, 2015. The EPA believes that had Alaska been aware of the interpretation provided in the proposed (and final) PM_{2.5} Implementation Rule at the time it developed and submitted the FNSB Moderate Plan, it would have provided contingency measures for failure to meet RFP, meet any QM, or submit a QM report on time. 40 CFR 51.1014.

Although the FNSB Moderate Plan did not include contingency measures for failure to meet RFP, the EPA is in the unusual position of reviewing the contingency measure requirement at a later point in time than would normally occur (*i.e.*, after the applicable attainment date and Alaska's submission of the 2017 QM Report), when it is possible to determine whether the area has, in fact, achieved RFP, up to and including the 2017 QM (*see* section II.F of this proposal for discussion of Alaska's 2017 QM Report). We are proposing to find that the FNSB Moderate Plan is approvable and that the RFP contingency measures for the 2017 milestone year is moot as applied to the FNSB NAA given the specific facts of the situation, including that the area achieved its 2017 QM emission reductions.

As noted, the EPA has proposed (consistent with the impracticability demonstration in the FNSB Moderate Plan) to reclassify the area to Serious. Upon reclassification of this area to Serious nonattainment, Alaska will be required to submit a Serious area plan for this area that must include contingency measures for purposes of both failure to meet RFP and failure to attain by the Serious area attainment date, consistent with the requirements of the CAA and the PM_{2.5} Implementation Rule.

In addition, Alaska included in the FNSB Moderate Plan contingency measures that are triggered by failure to attain. Although not required, as discussed above, Alaska can elect to include these control measures pursuant to its authority under CAA section 116. Because contingency measures for failure to attain are not required in this type of attainment plan, the EPA is not proposing to approve these control measures as contingency measures. Instead, the EPA is proposing to approve them as SIP strengthening measures because they will achieve additional emission reductions needed in this area.

Approving these control measures will help to assure that further reductions of emissions occur during the period in which Alaska is developing the Serious area attainment plan for this area. In developing the Serious area attainment plan for this area, Alaska will be required submit a SIP revision that will ensure the area achieves the next QM of December 31, 2020 (and additional QMs every three years thereafter as may be necessary). As discussed previously, the analyses in the Serious area attainment plan will be based on the highest violating regulatory monitor which is currently the monitor at the North Pole Fire Station. Thus, the 2020 QMs will be based on meeting RFP at the North Pole Fire Station monitor.

The EPA is therefore proposing to approve, as SIP strengthening measures, the requirement to replace wood heating devices upon sale or lease of property when existing devices do not meet specific emissions requirements and the mandatory enhanced dry wood compliance program. As discussed previously, the EPA has proposed to reclassify the FNSB NAA to Serious and the control measures are set to take effect upon reclassification of the FNSB NAA from Moderate to Serious.

H. Motor Vehicle Emissions Budgets

1. Requirements for Motor Vehicle Emissions Budgets

CAA section 176(c) requires Federal actions in nonattainment and maintenance areas to conform to the goals of the SIP to eliminate or reduce the severity and number of violations of the NAAQS and achieve expeditious attainment of the standards. Conformity to the goals of the SIP means that such actions will not (1) cause or contribute to violations of a NAAQS, (2) worsen the severity of an existing violation, or (3) delay timely attainment of any NAAQS or interim milestones.

Actions involving Federal Highway Administration (FHWA) or Federal Transit

Administration (FTA) funding or approval are subject to the transportation conformity rule (40 CFR 51.390 and part 93, subpart A). Under this rule, metropolitan planning organizations (MPOs) in nonattainment and maintenance areas coordinate with state air quality and transportation agencies, the EPA, FHWA and FTA to demonstrate that an area's long-range transportation plans ("transportation plans") and transportation improvement program (TIP) conform to applicable SIPs. This demonstration is typically made by showing that estimated emissions from existing and planned highway and transit systems are less than or equal to the motor vehicle emissions budgets ("budgets") contained in all control strategy plans. An attainment plan for the PM_{2.5} NAAQS should include budgets for the attainment year and each required QM year, as appropriate. Budgets are generally established for specific years and specific pollutants or precursors and must reflect all of the motor vehicle control measures contained in the attainment and RFP demonstrations (40 CFR 93.118(e)(4)(v)).

Attainment plans for PM_{2.5} NAAQS should identify motor vehicle emission budgets for each QM year and the attainment year for direct PM_{2.5} and NO_x (*See* 40 CFR 93.102(b)(2)(iv)), and for VOCs, SO₂, and NH₃, if, during the SIP development process, transportation-related emissions of these precursors have been found to contribute significantly to the PM_{2.5} nonattainment problem in the area at issue (40 CFR 93.102(b)(2)(v)). All direct PM_{2.5} emission budgets in an attainment plan should include direct PM_{2.5} motor vehicle emissions from tailpipe, brake wear, and tire wear. A state must also consider whether re-entrained paved and unpaved road dust are significant contributors and should be included in the direct PM_{2.5} budget. *See* 40 CFR 93.102(b) and 93.122(f) and the conformity rule preamble at 69 FR 40004, 40031-40036

(July 1, 2004).²²

1. Motor Vehicle Emissions Budgets in the FNSB Moderate Plan

In section III.D.5.6, the FNSB Moderate Plan provides budgets for direct PM_{2.5} and NO_x for 2017, the QM year for RFP. The budgets were calculated using the MOVES2010a vehicle emissions model, which was the latest onroad mobile sources emissions model available at the time Alaska started developing the attainment plan inventory. Alaska used local fleet and fuel inputs and the Fairbanks Metropolitan Area Transportation System travel demand model to generate local vehicle travel activity estimates over the six-month nonattainment season (October through March). The average winter day emissions, as detailed in section II.A of this proposal, were used by Alaska to set the motor vehicle emissions budgets. Exceedances of the 2006 24-hour PM_{2.5} NAAQS in the FNSB NAA occur almost exclusively during the winter months. Alaska executed MOVES2010a with locally developed inputs representative of wintertime calendar year 2017 conditions. Table 8 summarizes the regional average winter day onroad vehicle PM_{2.5} and NO_x emissions that represent the applicable motor vehicle emissions budgets for 2017 including the plug-in block heater adjustments to starting exhaust emissions for light-duty gasoline vehicles. Alaska estimated that the contribution of onroad vehicles to total emissions from all sources comprises 8.7 percent of direct PM_{2.5} emissions and 16.7 percent of NO_x emissions.

Table 8. Motor Vehicle Emissions Budgets for FNSB (tons per day).

Calendar Year	PM_{2.5}	NO_x
2017	0.33	2.13

2. The EPA's Conclusion and Proposed Action: Motor Vehicle Emissions Budgets

²² For further information on transportation conformity rulemakings, policy guidance and outreach materials, see the EPA's Web site at <http://www3.epa.gov/otaq/stateresources/transconf/policy.htm>.

We have evaluated the budgets developed by Alaska against our adequacy criteria in 40 CFR 93.118(e)(4) as part of our review of the approvability of the budgets. The EPA finds that they are consistent with meeting RFP requirements toward attainment of the 2006 24-hour PM_{2.5} NAAQS in this area and meet the criteria for adequacy and approval. The EPA proposes to approve Alaska’s motor vehicle emissions budgets in table 8 for 2017 for direct PM_{2.5} and NO_x for the FNSB NAA.

I. FNSB NAA Exceptional Event Demonstrations and Concurrences

The CAA allows for the exclusion of air quality monitoring data from design value calculations when there are exceedances caused by events, such as wildfires, that meet the criteria for an exceptional event identified in the EPA’s implementing regulations, the Exceptional Events Rule at 40 CFR 50.1, 50.14 and 51.930. Emissions from wildfires influenced PM_{2.5} concentrations recorded in the FNSB NAA in 2009, 2010, and 2013. Alaska submitted three exceptional event demonstrations for wildfires for which the EPA concurred on as follows:

Table 9. EPA Concurred Exceptional Events days that affected data in the FNSB NAA

<u>Day(s) Affected by Wildfire</u>	<u>Affected Monitor(s)</u>	<u>EPA Concurrence</u>
<u>Exceptional Events</u>		
July 6 - 15 - 30, 2009 August 2 - 5 - 8, 2009	State Office Building	December 19, 2012
July 13, 2010	State Office Building	March 11, 2014
June 27, 2013	State Office Building, National Core (NCore)	November 9, 2016

The 2009 and 2010 events had regulatory significance for purposes of the modeling and impracticability demonstration in the FNSB Moderate Plan. The 2013 event has regulatory significance for purposes of the Serious area plan submittal in development. Further details on Alaska's analyses and the EPA's concurrences can be found in the docket for this regulatory action. The EPA has concurred with the Alaska's request to exclude event-influenced data for the dates listed above.²³ As such, the event-influenced data have been removed from the data set used for regulatory purposes and, for this proposed action, the EPA will rely on the calculated values that exclude the event-influenced data.

III. Proposed Action

Under CAA section 110(k), the EPA is proposing to approve the FNSB Moderate Plan for the PM_{2.5} NAAQS. Specifically, the FNSB Moderate Plan meets the substantive statutory and regulatory requirements for base year and projected emissions inventories, precursor demonstrations, analysis and imposition of RACM/RACT level emission controls, RFP, and QMs. In addition, the EPA is proposing to approve the 2017 motor vehicle emissions budgets as shown in table 8 above because they are derived from an approvable RFP demonstration and meet the requirements of CAA section 176(c) and 40 CFR part 93, subpart A.

Accordingly, the EPA is proposing to determine that the FNSB Moderate Plan, for the FNSB NAA for the 2006 24-hour PM_{2.5} NAAQS, meets applicable requirements for purposes of approval under section 110(k) of the CAA. The EPA also proposes to approve state and local rules submitted in the FNSB Moderate Plan and the exceptional event demonstrations as discussed in this action.

IV. Incorporation by Reference

²³ The EPA concurrence letters for exceptional events are included in the docket for this action.

In this rule, the EPA is proposing to include in a final EPA rule regulatory text that includes incorporation by reference. In accordance with requirements of 1 CFR 51.5, the EPA is proposing to incorporate by reference state and local regulations for solid-fuel fired heaters and open burning. The EPA has made, and will continue to make, these materials generally available through www.regulations.gov and/or at the EPA Region 10 Office (please contact the person identified in the “For Further Information Contact” section of this preamble for more information).

VI. Statutory and Executive Order Reviews

Under the Clean Air Act, the Administrator is required to approve a SIP submission that complies with the provisions of the Act and applicable Federal regulations. 42 U.S.C. 7410(k); 40 CFR 52.02(a). Thus, in reviewing SIP submissions, the EPA’s role is to approve state choices, provided that they meet the criteria of the Clean Air Act. Accordingly, this proposed action merely approves state law as meeting Federal requirements and does not impose additional requirements beyond those imposed by state law. For that reason, this proposed action:

- is not a “significant regulatory action” subject to review by the Office of Management and Budget under Executive Orders 12866 (58 FR 51735, October 4, 1993) and 13563 (76 FR 3821, January 21, 2011);
- does not impose an information collection burden under the provisions of the Paperwork Reduction Act (44 U.S.C. 3501 et seq.);
- is certified as not having a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 et seq.);

- does not contain any unfunded mandate or significantly or uniquely affect small governments, as described in the Unfunded Mandates Reform Act of 1995 (Public Law 104-4);
- does not have Federalism implications as specified in Executive Order 13132 (64 FR 43255, August 10, 1999);
- is not an economically significant regulatory action based on health or safety risks subject to Executive Order 13045 (62 FR 19885, April 23, 1997);
- is not a significant regulatory action subject to Executive Order 13211 (66 FR 28355, May 22, 2001);
- is not subject to requirements of Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) because application of those requirements would be inconsistent with the Clean Air Act; and
- does not provide the EPA with the discretionary authority to address, as appropriate, disproportionate human health or environmental effects, using practicable and legally permissible methods, under Executive Order 12898 (59 FR 7629, February 16, 1994).

The SIP is not approved to apply on any Indian reservation land or in any other area where the EPA or an Indian tribe has demonstrated that a tribe has jurisdiction. In those areas of Indian country, the rule does not have tribal implications and will not impose substantial direct costs on tribal governments or preempt tribal law as specified by Executive Order 13175 (65 FR 67249, November 9, 2000).

List of Subjects in 40 CFR Part 52

Environmental protection, Air pollution control, Incorporation by reference, Intergovernmental relations, Nitrogen dioxide, Particulate matter, Reporting and recordkeeping requirements, Sulfur oxides, Volatile organic compounds.

Authority: 42 U.S.C. 7401 *et seq.*

Dated: _____

January 18, 2017.

Dennis J. McLerran
Regional Administrator
EPA Region 10.

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