

**ALASKA DEPARTMENT OF
ENVIRONMENTAL CONSERVATION**



Amendments to:

State Air Quality Control Plan

Vol. II: III.D.5.7

Control Strategies

Public Notice Draft

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Bill Walker, Governor

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5.7 Control Strategies

CAA section 172(c)(1) describes the general attainment plan requirement for reasonably available control measures (RACM). Attainment plan submissions must “provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) and shall provide for attainment” of the NAAQS.

CAA Part D, Subpart 4 has also been determined to apply to PM_{2.5} attainment plans.¹ Section 189 (a)(1)(C) requires that RACM measures in designated Moderate nonattainment areas be implemented no later than 4 years after designation.

5.7.1 Reasonably Available Control Technology (RACT)

Large stationary sources are a subgroup of emissions sources that are given special attention in the RACM analysis. These units are subject to site-specific review for Reasonably Available Control Technology. The U.S. EPA has defined RACT as “the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.”²

Per EPA guidance, DEC evaluated all emission units with emissions greater than 5 tons per year (TPY) of PM_{2.5} (see Appendix III.D.5.7 for RACT details) or its precursors (NO_x and SO₂). All PM_{2.5} precursors were addressed (NO_x, SO₂, NH₃, VOCs), but only NO_x and SO₂ were addressed on an emission unit basis. Based upon that analysis, DEC in consultation with the FNSB has concluded that the current level of controls meets RACT for all of the pollutants from all of the emission units.

See the section on RACT for more details.

5.7.2 Reasonably Available Control Measures (RACM) for other sources

Identification of RACM is a 5-step process:

- Step 1: Identify source categories with non-trivial emissions of PM_{2.5} or its precursors.
- Step 2: For each source category, source, or activity from Step 1, develop a list of technologically feasible emission control technologies and/or measures.
- Step 3: For each technologically feasible control measure, evaluate emission reductions and costs. Identify and exclude economically infeasible measures.
- Step 4: Determine whether control measure can be implemented within 4 years of designation.
- Step 5: Identify Reasonably Available Control Measures.

¹ *Natural Resources Defense Council (NRDC) v. EPA*, No. 08-1250 (D.C. Cir., Jan. 4, 2013)
² 44 FR 53762 (September 17, 1979)

The following source categories were evaluated for RACM. This list is based on emissions inventory information and other technical analyses that identify the most important sources for PM_{2.5} in the nonattainment area.

- Wood burning
 - Outdoor wood-burning boilers (hydronic heater)
 - Wood stoves
 - Fireplaces
 - Burn barrels, residential open burning
 - Agricultural and forest burns
- Residential fuel oil combustion
- Transportation
 - Automobiles
 - Heavy-duty vehicles

DEC, in consultation with the FNSB, has determined that the following control measures are RACM. Details of the analysis supporting these determinations are provided in Appendix III.D.5.7.

- Education and outreach programs for wood combustion.
- Voluntary curtailment of wood burning on episode days.
- Require new wood combustion units to be EPA-certified.
- Provide subsidies to encourage retirement/replacement of old, noncertified wood-burning equipment.
- Open-burning bans on episode days.
- Prohibit the use of burn barrels.
- Subsidize heating upgrades and weatherization

Many of these measures are already implemented. Details of current and planned programs are provided below.

The FNSB PM_{2.5} nonattainment area relies on several primary control strategies coupled with additional voluntary measures to mitigate PM_{2.5} air pollution. During the period 2008-2013, a number of programs were implemented to encourage changes in behavior that produce emission reductions. The FNSB and DEC continue to operate these programs and plan to do so in the future. Since these programs are voluntary and it is difficult to quantify their impact on behavior, the attainment demonstration and weight of evidence discuss the likely impacts of voluntary measures on attainment. The total credit taken for all voluntary measures is 0.5 µg/m³.

Following the adoption and submission of the moderate area SIP control measures in January of 2014, the Borough has adopted additional control measures into Title 21 Chapter 28 (previously

8.21) of the borough ordinances.^{3,4,5,6,7,8,9,10,11} **In March 2017, the borough adopted an ordinance amending Chapter 21.28 FNSB Code regarding the PM_{2.5} Air Quality Control Program and amending FNSB Code 1.20.080, Fine Schedule.**¹² The ordinances have been adopted into SIP Appendix III.D.5.12 – Assurance of Adequacy. The impact of these ordinances on the existing control measures is explained in the following sections.

5.7.2.1 Space Heating and Solid Fuel Heating Controls

The use of solid fuels, wood and coal, for home heating is an important source of PM_{2.5} air pollution in the nonattainment area. Winter heating costs are high and many residents rely on solid fuel burning as an economic way to heat their homes, often as a supplement to heating with more expensive fuel oil. In order to reduce PM_{2.5} emissions from solid fuel-**fired** heating devices, the FNSB and DEC have developed a number of measures that work together to lower emissions from this important source in a manner that accounts for an on-going need to use wood and coal as an economical heating source either as their sole source of heat or, more typically, as a supplement to fuel oil or electric heat. These measures will:

- upgrade solid fuel-**fired** heating devices in the community with new, cleaner burning units,
- encourage best burning practices for solid fuel-**fired** heating devices through the use of appropriate fuels, maintenance, and operation,
- implement a staged air quality event plan that contains requirements to switch to fuel oil, electricity, propane, or natural gas fuels for space heating on days with poor air quality, and
- address heaters with excessive smoke through a combination of public education, compliance assistance, and regulatory enforcement.

At the same time, the local and state government are working to encourage energy efficiency and weatherization to reduce heating needs. In the long term, efforts are underway to bring economical natural gas to the community to help reduce resident's energy costs and allow for a cleaner burning fuel for space heating. The following subsections describe space heating control programs, with an emphasis on the **solid fuel-fired** ~~solid-fuel~~ heating programs, that are being implemented or that are planned for implementation in the 2008-2019 time period.

³ Fairbanks North Star Borough Assembly Ordinance No. 2015-01, February 27, 2015

⁴ Fairbanks North Star Borough Assembly Ordinance No. 2015-18, April 23, 2015

⁵ Fairbanks North Star Borough Assembly Ordinance No. 2015-29, June 25, 2015

⁶ Fairbanks North Star Borough Assembly Ordinance No. 2015-73, January 14, 2016

⁷ Fairbanks North Star Borough Assembly Ordinance No. 2016-21, May 4, 2016

⁸ Fairbanks North Star Borough Assembly Ordinance No. 2016-37, July 28, 2016

⁹ Fairbanks North Star Borough Assembly Ordinance No. 2016-30, April 28, 2016

¹⁰ Fairbanks North Star Borough Assembly Ordinance No. 2016-20-1A, August 11, 2016

11 Fairbanks North Star Borough Assembly Ordinance No. 2017-44, June 19, 2017

12 Fairbanks North Star Borough Assembly Ordinance No 2017-18, March 9, 2017

5.7.2.2 Solid Fuel-Fired Heating Devices Upgrades and Emission Standards

Starting in June of 2010, the FNSB established an incentive program to encourage homeowners to replace their old, uncertified ~~solid fuel-fired solid-fuel~~ heaters with new EPA certified heaters. Upgrade or removal of ~~solid fuel-fired solid-fuel~~ heaters provides for immediate and long term emission reductions in PM_{2.5}. As heating fuel costs increased during the past 5 years, a large number of outdoor wood and coal boilers were installed by residents seeking to reduce their heating costs. These large units have proven problematic in some neighborhoods creating significant localized smoke impacts. The volume of ~~solid fuel-fired solid-fuel~~ heaters, whether large or small, have combined to increase PM_{2.5} levels significantly and the Borough has identified a number of “hot spot” neighborhoods. In its implementation of the change out program, the Borough has sought to prioritize their funds for upgrading units into areas with high PM_{2.5} concentrations.

The change-out program has been popular with local residents and has evolved between 2010 and 2014 as the FNSB adapted and improved the program, **now called the FNSB Enhanced Voluntary Removal, Replacement & Repair Program**, to create additional incentives for participation. ~~Since the From~~ inception ~~of the program~~ through ~~August 2014~~ **April 2016**, the Borough has repaired, replaced, or removed significant numbers of ~~solid fuel-fired solid-fuel~~ heaters. Table 5.7-1 provides the numbers of heaters changed out in various categories, **through April 2016**. Figure 5.7-1 provides a map of the locations of change outs or heater removals throughout the nonattainment area, **through June 2010**. Between 2008 and 2019, the Borough plans to incentivize the replacement of nearly all the uncertified wood heating devices in the nonattainment area. An estimated 4,640 heater replacements or removals will be completed by 2019 (2,760 from the Borough’s program and 1,880 from natural turnover).

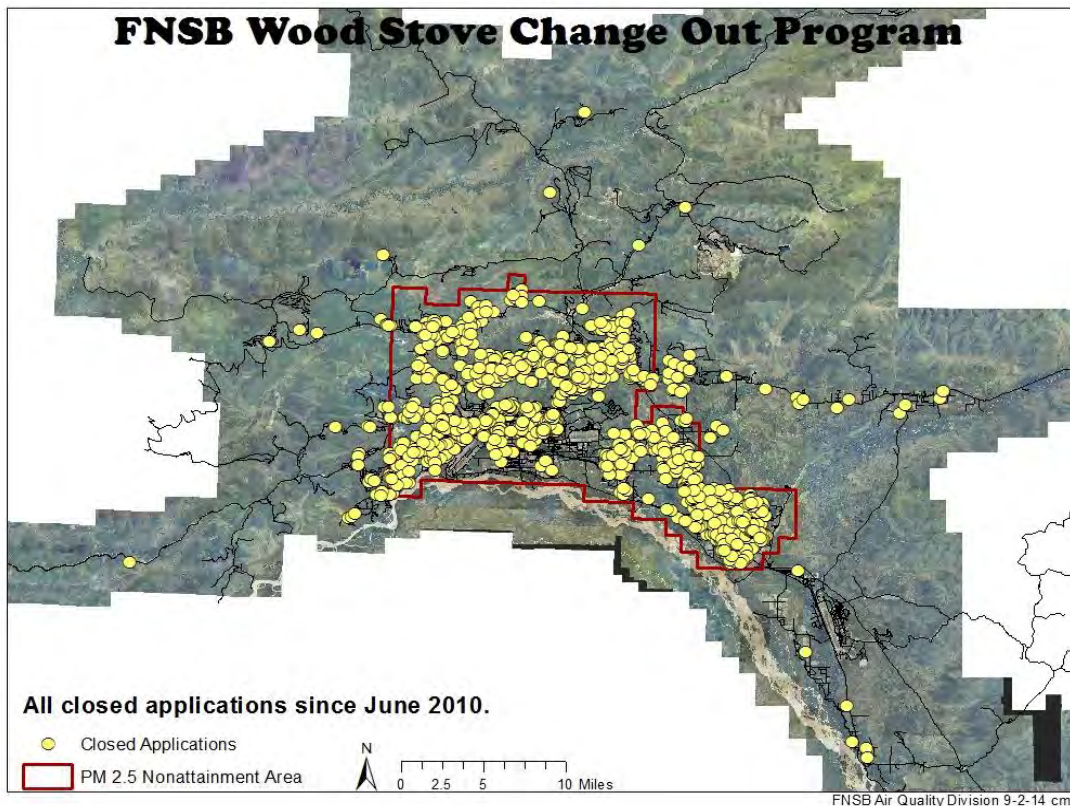
Table 5.7-1

Woodstove Change Out Statistics		(as of 9/9/14 <u>7-17</u>)
Device Type	Total Devices Removed, Replaced, or Repaired	Percentage of Total Change Outs
Replace Solid Fuel Burning Device (SFBA)	1130 <u>1807</u>	74.7 <u>75.7</u> %
Replace Outdoor Hydronic Heater (HH)	37 <u>74</u>	2.4 <u>3.1</u> %
Removal of SFBA (not replaced)	195 <u>221</u>	12.6 <u>9.3</u> %
Removal of Outdoor Hydronic Heater (not replaced)	72	4.8 %
Removal of Indoor Hydronic Heater (not replaced)	16	1.1 %

<u>Removal of Hydronic Heater (not replaced)</u>	<u>99</u>	<u>4.1%</u>
Repairs to EPA certified devices	<u>48 74</u>	<u>3.2 3.1%</u>
Fireplace Replacements	<u>17 113</u>	<u>1.5 4.7%</u>

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Figure 5.7-1



In addition to the Borough’s change out program, the Alaska Legislature also funded the Alaska Resource Agency (ARA) to conduct a project that resulted in the retrofit of outdoor hydronic heaters (OHHs) within the nonattainment area. ARA identified and retrofitted 40 outdoor hydronic heaters with ClearStak or similar pollution control devices. The retrofits were performed in late 2011 and 2012 resulting in emission improvements for these heating units which are further described in the Emission Inventory, Section 5.6.

In order to provide support for the Borough’s change out program, in November 2014, the state adopted a new regulation that requires that all new wood-fired heating devices being installed within the nonattainment area meet emission standards more stringent than the 1988 EPA New Source Performance Standards. A copy of the adopted regulation, 18 AAC 50.077, is included in Appendix III.D.5.7. Under the regulation, new wood-fired heating devices in the nonattainment area meet the following emission standards **presented in Table 5.7-2:**

Table 5.7-2 **FNSB Emission Standards for Wood-Fired Heating Devices**

Device Type	PM _{2.5} Emission Standard
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Woodstoves*	2.5 grams/hour
Wood Hydronic Heaters	2.5 grams/hour
Wood Heating Appliances Greater than 350,000 btu/hr heat output	2.5 grams/hour

*woodstoves covered by this emission standard are defined in the same manner as wood heaters defined and certified by EPA under 40 CFR part 60.531

The emission standards are set at a level of 2.5 ~~grams~~gram/hour for wood stoves, wood-fired outdoor hydronic heaters, and larger wood-fired heaters (greater than 350,000BTU heat output). The state regulatory program relies on EPA and ASTM test methods. Testing of wood stoves and outdoor wood hydronic heaters is already being conducted by manufacturers to determine compliance with EPA certification and voluntary approval programs and can be relied upon to demonstrate compliance with the state regulation assuming the unit being tested is found to meet the 2.5 ~~grams/hour~~gram/hr limit. ADEC’s analysis of these emission standards showed that wood-fired heaters of various sizes meeting these standards are available in the marketplace at a variety of price points.

The Borough’s ongoing change out program includes new requirements that are more stringent than state standards. However they only apply to the Borough’s air quality control zone. Borough ordinance 2015-73, adopted January 14, 2016, limits the change out program to the air quality control zone and sets emission limits for solid fuel-fired heating devices that are installed as part of the change out program. **Borough ordinance 2017-44, adopted June 19, 2017, requires a qualified appliance properly installed by a Borough listed vendor/installer.**¹³ Wood and pellet stoves must be EPA-certified with an annual average PM_{2.5} emission rating of 2.0 grams per hour or less. Hydronic heaters must be pellet-fired, EPA-certified, and have an emission rate of 0.10 pounds per million BTU or less. These emission standards are designed to adopt EPA’s wood-fired heater New Source Performance Standards (NSPS) 2020 emission limits early for devices installed as part of the change out program.

The Borough also adopted requirements for home heating device installations inside the air quality control zone that are not conducted as part of the change out program.¹⁴ The Borough established minimum hydronic heater setback requirements away from lot lines and sensitive locations. These requirements limit the number of properties where a hydronic heater may be installed to more rural areas due to generally larger lot sizes in less populated areas. For all solid fuel-fired appliances, the device must be EPA-certified and have an annual average emission rating of 2.5 grams per hour or less or 0.10 lbs/mmBtu for hydronic heaters. The ordinance requires all solid fuel-fired heating devices to meet these standards, effectively prohibiting the installation of other types of solid fuel-fired heating devices, including coal, unless the Borough approves an independent emission test showing the device meets the emission standards.

ADEC’s regulations help to ensure that replacements of wood-fired heaters occurring beyond the change out program within the entire nonattainment area are also moving toward the cleanest burning heaters available in the marketplace. The 2014 ADEC regulations do not mandate any

13 Fairbanks North Star Borough Ordinance No. 2017-44, adopted June 19, 2107

¹⁴ Fairbanks North Star Borough Ordinance No. 2015-73, adopted January 14, 2016

change out of existing wood-fired heating devices and allow existing heaters to continue to be used in area homes. However, Section 5.10 illustrates how ADEC regulations will require change out of non-EPA certified devices upon real estate transactions as a contingency measure should the area be designated by EPA as a Serious Nonattainment Area. The Borough's change out program, described previously, will continue to be used to incentivize a higher than normal rate of wood heater replacements within the air quality control zone. ADEC will work with retailers of wood heating devices in the implementation of the emission standards to ensure compliance for units being sold for installation in the nonattainment.

Efforts at the federal level also play a role in providing emission reductions from wood-fired heating devices, through programs that reduce emissions at the point of manufacture. The EPA has a certification program for new wood heaters. The rules governing emissions from new woodstoves (NSPS) were established in 1988 and updated in 2015. The 1988 PM standards affected adjustable burn rate stoves and pellet stoves. A voluntary program for hydronic heaters was developed to promote the development of cleaner burning technology. The EPA Phase II Hydronic Heater Partnership Agreement set voluntary emission limits that manufacturers could voluntarily meet to earn "white tags" for qualifying models. An update to the 1988 NSPS that was effective May 15, 2015 set emission limits for new wood heaters including woodstoves, pellet stoves, wood-fired hydronic heaters, forced-air wood furnaces, and single burn rate wood stoves. The NSPS is set to initially comply with the Washington State PM emission limit for wood stoves and pellet stoves of 4.5 grams per hour. Wood-fired hydronic heaters initially must meet the emission limits in the existing voluntary Phase II Program. ADEC's emission limits are currently more stringent at 2.5 grams per hour for woodstoves, pellet stoves, and wood-fired hydronic heaters. In 2020, the EPA NSPS will require manufacturers to meet lower PM emission limits of 2.0 grams per hour for wood and pellet stoves and 0.10 pounds of PM per million BTU of heat output for wood-fired hydronic heaters. These limits will be more stringent than ADEC's limit of 2.5 grams per hour. The EPA NSPS requirements will provide additional long term benefits to the nonattainment area during routine turnover and installation of cleaner burning devices as older wood-fired heaters are replaced by homeowners.

5.7.2.3 Improving Solid Fuel-Fired ~~Solid-Fuel~~ Heating Device Operations

In order to achieve the greatest PM_{2.5} emission reductions, it is critical that solid fuel-fired ~~solid-fuel-fired~~ heating devices be operated correctly by local residents. The Borough and ADEC have developed a set of complementary measures to help improve the operation of these heating devices within the nonattainment area. These measures include extensive public education, incentives for the use of wood pellets or energy logs, and regulations addressing visible emissions from stacks and the use of appropriate fuels in solid fuel-fired ~~solid-fuel~~ heating devices.

Public outreach is an important component of the Fairbanks air quality program with respect to improving resident's use of solid fuel-fired ~~solid-fuel~~ heating devices thereby reducing PM_{2.5} emissions. Public outreach efforts focus on measures residents can take to protect themselves and to reduce PM_{2.5} emissions from activities like wood and coal burning. The Borough and

ADEC have developed and implemented an extensive outreach effort to encourage residents to employ “best burning” practices when using wood heating devices. In 2011, the Borough started the “Split, Stack, Store, & Save” campaign which encourages residents to plan ahead by cutting and properly storing a winter season’s worth of wood a full year before they plan to use it. In 2014, the Borough instituted the Voluntary Burn Cessation Program (VBCP) which ~~alerts alerted~~ residents to current or impending Air Quality advisories and ~~asks asked~~ them to ~~volunarily-voluntarily~~ cease burning wood during the episode. **The Borough repealed the VBCP with the adoption of ordinance 2017-18 which strengthened the curtailment program.** ~~And just recently the~~**The** Borough ~~started-giving gives~~ away wood moisture meters and “Burn Wise”® CD’s to each applicant to the Woodstove Exchange Program. Borough Air Quality staff administer a quiz based on the content of the CD and go over any incorrect answers to ensure the applicant understands the correct way to operate their new EPA certified device and the benefits to operating it in the correct manner. This outreach will continue and be improved upon based on experience in the coming years.

In addition to public outreach, it is critically important that individuals use the appropriate fuels in their wood-fired heating device. To promote cleaner burning devices and practices, the Borough is providing incentives through the change out program for wood pellets and energy logs. When used appropriately in wood-fired heating devices, these manufactured dry wood products significantly reduced emissions. In 2014, the Borough supplied vouchers for 210 tons of energy logs and pellets to individuals who participated in the woodstove exchange program. Each participant currently receives one ton of product when they have met all requirements of the program.

To further support the efforts to reduce emissions through the proper operation of **solid fuel-fired** ~~solid-fuel~~ heating devices, ADEC is implementing programs and regulations to address this issue. These programs primarily promote the use of correct fuels, especially related to dry wood.

In 2014, ADEC established a voluntary program (Moisture Disclosure Program) to register wood sellers that sell dry wood or that agree to provide wood moisture content information to consumers at the time they purchase wood. This voluntary program is meant to encourage a dry wood market and provide additional information to residents that buy wood for use in the nonattainment area. By registering and publishing information on vendors that sell dry wood or that verify moisture content, consumers are made aware of whether the wood they purchase needs to be seasoned or whether it is ready for burning immediately. Burning dry wood is important for correct operation of both newer and older wood-fired heating devices. Not only is the burning of dry wood more efficient, but it significantly reduces PM_{2.5} emissions.

In December 2014, the state adopted a new regulation that requires that individuals operating a solid **fuel-fired** ~~fuel-burning~~ device inside the nonattainment area use the appropriate fuel (wood or coal) in their device and a requirement that dry wood be burned in the winter months. Borough code requires the use of dry wood year round.¹⁵ A copy of the adopted state regulation, 18 AAC 50.076 is included in Appendix III.D.5.7. This regulation is meant to ensure that residents do not burn inappropriate materials, such as trash, in their **solid fuel-fired** ~~solid-fuel~~

¹⁵ Fairbanks North Star Borough Assembly Ordinance No. 2015-01, February 27, 2015

heating devices. The regulation also requires that only dry wood products, 20% moisture content or less, be burned in wood-fired heating devices during the winter period inside the nonattainment area

To further assure that wood heating devices are being operated properly, the ADEC adopted regulations in 18 AAC 50.075 (see Appendix III.D.5.7) that revised the standards for visible emissions or opacity of smoke from stacks with a focus on PM_{2.5} air quality episodes. The revisions to the regulation coupled with the emergency episode provisions defined in section 5.11 of this plan, require that solid fuel-fired heaters meet 20% opacity limits during PM_{2.5} air quality episodes. This standard reflects improvements in wood heating technology and the need to burn cleanly particularly during air quality episodes. Newer wood-fired heating devices emit much less smoke than those manufactured decades ago. When operating properly, new wood stoves have little to no visible smoke emissions. If devices are operated improperly or with wet wood, dense smoke can be emitted from stacks. The opacity regulations for wood-fired heating devices assist the ADEC in responding to citizen complaints about smoky stacks in their neighborhoods and in addressing high emitting devices, particularly during periods of poor air quality.

Regulatory revisions were also proposed in 2014 to address community concerns regarding visible emissions for coal-fired heaters. Although not a major contributor overall to local PM_{2.5} emissions at this time, the use of coal for heating residential homes and businesses has seen an increase and resulted in localized nuisance complaints related to smoke from these heating devices. Comments received on the state's regulatory proposal suggested that another section of the state regulations, 18 AAC 50.055 (Industrial Processes and Fuel-Burning Equipment), already applies to coal-fired heating devices and has a lower opacity requirement (20%) than wood-fired heating units during air quality advisories. As a result, DEC did not move forward with its plan to expand 18 AAC 50.075 to include coal-fired heating devices. Regulatory revisions in 2016 resolve this potential conflict by lowering the opacity requirement in 18 AAC 50.075 to 20% to match 18 AAC 50.055. All solid fuel-fired heating devices are required to meet the 20% opacity limit during air quality advisories, including coal-fired heaters.

In 2017, ADEC amended 18 AAC 50.075 to add subsection (f) to include a 20% opacity requirement for all solid-fuel fired heating devices. This opacity requirement mirrors the FNSB ordinance in that the 20% opacity is for all operations except at startup.

ADEC is responsible for enforcing compliance with the state regulations. The department's compliance activities are conducted using the tools and authorities provided under the state statutes. The Division of Air Quality does not have statutory authority to issue administrative penalties for violations of Alaska environmental law. This means that ADEC staff cannot simply write "tickets" to individuals that are found to be violating state regulations. All compliance and enforcement activities are case specific. However, ADEC generally initiates compliance activities in response to complaints received that indicate the potential for violations of a state regulation. ADEC staff investigate complaints to verify or corroborate a problem or violation of a state requirement. In most cases, the department finds that compliance can be achieved through assistance to businesses and individuals in understanding the regulatory requirements and how they can comply. In the event that compliance assistance is not successful in resolving

a compliance issue, department staff use administrative enforcement tools such as written notices of violation, compliance agreements, nuisance abatement orders, and in rare cases, civil court actions.

5.7.2.4 Encouraging Reduced Use of **Solid Fuel-Fired Solid-Fuel** Heaters During Air Pollution Episodes

The FNSB and ADEC Air Programs work together to forecast daily air quality during the winter and asks citizens to curtail their use of ~~wood-wood~~-fired heating devices on days projected to have poor dispersion and higher PM_{2.5} concentrations. Public outreach is an important component of this strategy. Public outreach efforts focus on informing the public of air quality alerts, explaining why they were called, and giving residents options in the case of an alert. Advisories or Alerts are called during winter months when forecasts indicate that the 24-hour average PM_{2.5} standard is likely to be exceeded. During an episode, the Borough will notify local media that conditions exist that can cause a violation of the ambient PM_{2.5} standard. As part of the advisory, the public is informed of voluntary measures they can take to protect themselves and to reduce PM_{2.5} emissions from activities like wood and coal burning.

Surveys have shown that less than 4% of residences (1,280) located within the nonattainment area rely on wood as their only source of heat. However the high cost of heating oil and extreme cold temperatures force many residents to rely heavily on solid fuels to supplement their base fuel oil heating to prevent freezing homes. This makes mandatory wood heating curtailment unreasonable to implement during extreme cold temperatures. However, surveys have revealed a willingness on the part of some residents to shift away from solid fuel use during periods of poor air quality. It is therefore projected that a voluntary episodic wood and coal burning curtailment program could have benefit in reducing air pollution during poor air quality episodes. Greater numbers of residents are more likely to shift from wood or coal to another heating fuel when temperatures are warmer (e.g. warmer than -10 degrees F) as they may be less reliant on supplemental heat during these warmer episodes. During 2014, the Borough increased its efforts in this area by instituting a (VBCP). **Then in 2017 the Borough repealed the VBCP in order to strengthen its burn cessation program by lowering the concentration where a burn cessation would be called,**

The **VBCP was designed to** ~~FNSB has established a program to~~ encourage, incentivize, and facilitate the voluntary cessation of the use of wood burning appliances (i.e., wood stoves, wood-fired hydronic heaters, wood-fired furnaces, fireplaces, fireplace inserts, masonry heaters or pellet fuel burning appliances) in the nonattainment area during air quality ~~episodes~~ alerts. It is recognized that it will be difficult or impossible for some households to participate in this program (e.g., those that heat solely with wood or for which wood is a necessary supplement during periods of cold weather). Therefore, this program ~~is was~~ intended for households that ~~are~~ **were** able to use space heating alternatives with significantly lower PM_{2.5} emissions, including those fueled by gas, oil, electricity, propane or district heat.

The VBCP **consisted** of 5 separate components; an Alert System, Social Media, Public Awareness, Marketing, and Incentive program.

- **Alert System:** Alert media selected as the notification platform. Alert messages during episodes are sent out through email, text messaging and social media.
- **Social Media:** Alerts, daily forecast, and program signup are available via Facebook.

- **Public Awareness:** 4 updateable reader-boards and 10 static sandwich board signs placed alongside roads in Fairbanks and North Pole displaying VBCP activity.
- **Marketing:** Radio, TV, and Newspaper advertising to create awareness of the VBCP and current air quality.
- **Incentives:** The Borough will recognize all participants of the program at the end of the year through a Fairbanks Daily Newsminer advertisement.

In addition to the Borough's air quality **alert episode** restrictions described in 5.11, starting in 2015, ADEC implemented regulations (18 AAC 50.075(d)) that provided for more stringent visible emission (opacity) requirements for wood-fired smoke stacks during air pollution events. As described further in section 5.11, air quality episodes will trigger this requirement when 24-hour concentrations exceed $25 \mu\text{g}/\text{m}^3$. The public health concerns associated with poor air quality episodes require a response that mitigates impacts from air pollution sources in a manner that balances the health benefits from reducing the use of wood heaters with the potential negative health and safety impacts from a lack of supplemental or primary wood heat during extreme cold periods. Given the community concerns about the reasonableness of requiring residents to cease use of solid fuel-fired heating devices during periods of extreme cold, the state regulations would focus on ensuring that heating units can only be used during periods of poor air quality if they are operated in a clean and efficient manner. When operated properly, ~~solid-fuel~~ **solid fuel**-fired heating devices emit little or no smoke. Efficient operation not only reduces air pollution but allows for the burning of less wood, an economic or time savings to residents who buy or cut wood.

ADEC will use the following approaches to notify the public of requirements and address any compliance issues. The public will be notified of an air quality advisories (alert and episode) that has specific opacity level requirements utilizing several outreach methods. All episode announcements are emailed to ADEC's up-to-date distribution list. This distribution list contains all local media outlets (radio, TV), the FNSB Air Quality Program Staff, elected officials, and anyone who signs up for electronic notices. ADEC has online sign-up capabilities for various electronic notices and alerts through its *Air Online Services* accessible through the Division of Air Quality's home page at: <http://dec.alaska.gov/air>. In addition to these electronic emailed announcements, all advisories are posted to the Division's Air Quality Advisories web page at: <http://dec.alaska.gov/Applications/Air/airtoolsweb/Advisories/>, which includes the actual advisory, the start and end dates, the area, and status (expired, active) of the advisory. ADEC will also post advisories on its Burn Wise Alaska face book page as well as the department's Twitter account.

In addition to providing notification when the opacity requirements are in effect, the department plans to provide on-going public information on the opacity requirements and ways that residents can comply. Difficulty meeting opacity could be due to wet wood. Under state regulation, residents are required to use dry wood during winter months. Under Borough code, residents are required to use dry wood year round.¹⁶ Residents will be directed to those wood sellers participating in the voluntary *Moisture Disclosure Program* where wood sellers either disclose the moisture content of purchased wood or agree to provide dry wood. Brochures on proper maintenance and operation of a ~~solid-fuel~~ **solid fuel**-fired device will also be available. To the

¹⁶ Fairbanks North Star Borough Assembly Ordinance No. 2015-01, February 27, 2015

extent that ADEC resources allow, staff can assist residents who request help in determining in advance of episode conditions whether their typical burning operations meet the opacity levels outlined in this plan.

If a resident is found to be out of compliance with the visible emission levels identified for a specific episode, ADEC is responsible for taking actions to enforce the requirement. The department's compliance activities are conducted using the tools and authorities provided under the state statutes. The Division of Air Quality does not have statutory authority to issue administrative penalties for violations of Alaska environmental law. This means that ADEC staff cannot simply write "tickets" to individuals that are found to be violating the opacity levels. All compliance and enforcement activities are case specific, however, ADEC generally initiates compliance activities in response to complaints received that indicate the potential for violations of a state regulation. ADEC staff investigate complaints to verify or corroborate a problem or violation of a state requirement.

In most cases, the department finds that compliance can be achieved through assistance to businesses and individuals in understanding the regulatory requirements and how they can comply. In the case of problem burners failing to meet these opacity levels during air quality episodes, it is important to bring a unit into compliance quickly to reduce smoke and assist in bringing levels of PM_{2.5} into compliance in the local area. As a result, if a resident working with or without the assistance of ADEC staff is unable to bring a unit into compliance within a reasonable period, AQ staff would request that the resident stop burning for the duration of the air quality episode unless it is the sole source of heat for the structure. In the event that compliance assistance is not successful in resolving a recurring smoke concern at a specific residence or business, the department staff may use additional administrative enforcement tools, such as nuisance abatement orders, to address the concern. Understanding that there may be residents in the community for which wood burning is essential and routine difficulties complying with the requirement may be discovered, the department has also included in the regulation a provision for a temporary waiver for situations where the owner/operator of a wood-fired heating unit demonstrates financial hardship or technical feasibility issues in meeting the opacity requirements. The agency must consider the mitigation measures implemented, the proximity of the device to sensitive locations such as hospitals, day care centers, schools, clinics, and senior centers, as well the contribution of the device to the exceedance of the PM_{2.5} concentration triggering the episode announcement before granting such a waiver.

5.7.2.5 AHFC Energy Programs

The Alaska Housing Finance Corporation (AHFC) implements several energy programs that are designed to make homes more energy efficient. As homeowners make energy efficiency improvements they reduce the amount of fuel and electricity needed for power and heat leading to corresponding air quality benefits due to the reduced fuels being burned for space heating and power generation. Information on AHFC energy programs is available on the internet at: www.ahfc.us/efficiency/energy-programs/

Under the AHFC Home Energy Rebate Program, home owners may receive up to \$10,000 for making energy-efficient improvements to their existing home based on before and after energy

ratings made by Energy Raters. Homeowners must get an initial energy rating and apply for the program. Eighteen months is provided to complete improvements with a second energy rating after the improvements are done. Homeowners are reimbursed (up to a specified amount) for the energy ratings and receive a rebate based on their home's improved energy-efficiency and eligible receipts. Only those improvements recommended by the rater are eligible for the rebate.

There is also a Home Rebate program that provides a \$10,000 rebate for 6 Star homes and \$7,000 for 5 Star Plus homes (the highest AHFC energy rating categories). In addition, AHFC offers interest rate reductions when individuals finance new or existing energy efficient homes or when borrowers purchase and make energy improvements to an existing home. Any property that can be energy rated and is otherwise eligible for AHFC financing may qualify for the energy efficiency interest rate reduction program.

Individuals who meet income limits are eligible to apply for the AHFC Weatherization Assistance Program. Local weatherization providers provide program services at no cost to qualified homeowners and renters including single and multifamily homes, mobile homes, apartments, and condominiums. The Weatherization Assistance Program provides low and moderate income households with improvements to their homes which increase the energy efficiency of their dwelling, including measures such as:

- Air sealing attics, crawlspaces, etc.
- Insulating and weather stripping
- Repair and replacement of heating systems
- Replacement of doors and windows
- Installation of fans, smoke alarms, CO detectors

5.7.2.6 Expanded Availability and Use of Natural Gas

Key to reducing fine particulate matter air pollution in the long term is expanding the availability of affordable, cleaner burning fuel options within the nonattainment area. The Interior Energy Project provides the financial tools needed to bring natural gas to the Fairbanks and North Pole area. The project was established through Senate Bill 23 which passed the Alaska Legislature unanimously in April 2013. The legislation authorizes the Alaska Industrial Development and Export Authority (AIDEA) to provide the financing package to partner with the private sector to build a liquefied natural gas (LNG) plant on the North Slope and natural gas heating distribution system in Fairbanks and North Pole. The current projections indicate that the earliest this project will provide additional natural gas into the community is 2016. As a result of this timing, the project will not provide certainty of meaningful emission reductions in the short term prior to the 2015 moderate area attainment date but it will provide significant emission benefits between 2015 and 2019. Further discussion of this program is included in the contingency measure section of this plan (Section 5.10).

5.7.2.7 Transportation Control Strategies

5.7.2.7.1 Expanded Availability of Plug-Ins

Engine preheaters are used extensively throughout Fairbanks when ambient temperatures drop below 0° F to ensure that vehicles exposed to these temperatures can be easily started. Local testing programs have confirmed that preheating vehicles, a practice commonly referred to as “plugging-in,” provides a substantial reduction in motor vehicle cold start emissions.

Recognizing the many benefits of plugging-in (e.g., reduced emissions, lower need for maintenance, fuel economy, startability, etc.), the Borough has a long-standing practice of expanding the number of parking spaces equipped with electrical outlets. This has been achieved by securing funds for retrofitting existing facilities (e.g., school renovations) and including outlets in new public facilities (e.g., the construction of new schools). It has also been achieved by encouraging the private sector to retrofit existing facilities (e.g., hospital expansions) and including outlets in new private facilities (e.g., Home Depot). This strategy was made more viable with Congress’ passage of the Transportation Equity Act for the 21st Century that removed the restriction on the use of Congestion, Mitigation and Air Quality (CMAQ) funds for the Section 108(f) transportation control measure (xii) that reduces motor vehicle emissions under extreme cold start conditions.

In support of their previous carbon monoxide attainment plan, the Borough conducted a survey of employee parking lots,¹ public and private, located within the nonattainment area that were thought to have more than 100 parking spaces. The results of that survey are presented in Table 5.7-4. It shows that slightly more than 90% of employee parking lot spaces were equipped with electrical outlets in 2001. Employee parking spaces tend to have vehicles parked for longer durations resulting in greater cold start motor vehicle emissions than visiting vehicles which are often parked for short durations.

While many of the Borough parking lots have been upgraded with plug-in infrastructure in the past, the Borough has secured CMAQ funds from the Federal Highway Administration (FHWA) to continue the program of retrofitting public parking lots located in the nonattainment area with electrical outlets. As shown in Table 5.7-5, several projects have been completed, or are scheduled for completion, between 2008 and 2015.:

	Spaces	Plug-Ins	% Equipped
Government Summary			
FNSB	2,345*	2,170	93
Federal	1,948	1,928	99
State	971	937	96
City	485**	446	92**

Subtotal	5,749	5,481	95
Schools Not in CO Nonattainment Area (are within PM _{2.5} area)			
Badger Road Elementary	63	63	100
Pearl Creek Elementary	62	42	68
Ticasuk Brow Elementary	48	48	100
Weller Elementary	40	40	100
Subtotal	213	193	91
CO Nonattainment Area Government Total			
	5,536	5,288	96
Private Summary			
Lots with >250 plug-ins	2,438	2,318	95
Lots with <250 plug-ins	1,753	1,427	81
Subtotal	4,191	3,745	89
Nonattainment Area Government and Private Total	9,727	9,033	93

* Includes initial retrofit of employer parking of Lathrop High School.

** The City Manager could not provide an estimate of the total spaces. Therefore, an estimate was prepared by assuming that the City fraction equipped was the same as the Borough employee fraction (i.e., 92%).

Table 5.7-5 Fairbanks Nonattainment Area Additional Parking Lots Equipped with New Plug-Ins 2008-2015		
Facility	New Plug-Ins	Comments
West Valley High School	268	Project completed in 2013
North Pole High School	274	Project completed in 2013
Carlson Center	600	Project Timeframe 2015-2019
Big Dipper Ice Arena	300	Project Timeframe 2015-2019
North Pole Library	25	Project Timeframe 2015-2019
Fairbanks Library	50	Project Timeframe 2015-2019
Total	1517	

In addition to the Borough’s emphasis on the installation of electrical infrastructure in parking lots, the Assembly passed an ordinanceⁱⁱ on April 12, 2001, that requires employers or businesses that have 275 or more parking spaces to provide power to electrical outlets at temperatures of 20

degrees F or lower. This ordinance is included in Appendix III.D.5.7 Key provisions addressed in the ordinance include:

- Parking lot owners are required to supply electricity to outlets between November 1 of each year and March 31 of the subsequent year.
- Power to parking lots may be cycled on and off every other hour during days when temperatures fall below 21° F.
- Employers or businesses subject to the ordinance are required to keep a logbook that documents the days on which power is supplied to electrical outlets. The logbooks are required to note special circumstances that prevented the supply of electricity to outlets. The logbooks need to be maintained and available for inspection for a five-year period.
- Employers and businesses subject to the ordinance must provide outlets for any new parking spaces intended for use by a motorist for longer than two hours.
- Employers or businesses subject to the ordinance must maintain electrical outlets in operable condition and they cannot decrease the number of parking spaces with outlets without prior approval of the Borough.
- The Borough can institute a civil action and obtain penalties not to exceed one thousand dollars for each violation.

To ensure the effectiveness of the ordinance, the Borough developed policies and procedures to govern its implementation, key elements include:

- Maintaining a list of parking lots with plug-ins that are subject to the program.
- Conducting surveys at least twice each winter on days when temperatures are below 20° F to determine whether outlets have power.
- Conducting surveys at least twice each winter to determine the number of vehicles that are plugged in at each of the parking lots subject to the ordinance.
- Maintaining records of the surveys and making that information along with data on the number of parking spaces equipped with plug-ins available to the public.
- Using the results of the surveys to determine the level of plug-in usage and related emissions benefits on an annual basis and making that information available to the public.

Since plug-ins are used extensively in the Borough when temperatures fall below 0° F, the principal benefit of the ordinance is to ensure that power is available at temperatures between 0 and +20° F. The Borough has conducted surveys in the past to determine if outlets have power each winter since the ordinance was implemented. The results, which are available at the Borough Air Quality Management Program Offices, show that employers have a high level of compliance with the ordinance.

Public education is an important part of this control strategy. The Borough encourages residents to plug in their vehicles at temperatures up to 20° **F** above zero. Engine block heaters are

considered an essential component of winter driving in Fairbanks. It is estimated that a significant number of vehicles will not start at temperatures of 20° **F** below zero. Since -20° **F** or colder temperatures are a frequent occurrence in winter, it was assumed that by encouraging motor vehicle operators to plug in at warmer temperatures, carbon monoxide and PM_{2.5} emissions would be reduced without creating an onerous burden on residents, as they already have engine block heaters. Subsequent test programs conducted by ADEC and the Borough confirmed the emission benefits of plugging-in at warmer temperatures. Television spots were produced to inform the public of the multiple benefits of plugging in at warmer temperatures. Although not scientific in nature, the messages were that plugging in:

1. Reduces engine wear, thus reducing vehicle maintenance costs;
2. Keeps the air pure and improves air quality;
3. Improves chances of complying with the federal Clean Air Act; and
4. Improves vehicle starting and reduces the idling time needed before driving.

Based on its historical success in implementing the plug-in program, the Borough continues public awareness as part of its implementation of an ordinance that requires owners of parking lots to provide power to electrical outlets for plug-ins at temperatures below 20° **F**.

5.7.2.7.2 Mass Transit System

The Borough Transportation Department operates a transit program called the Metropolitan Area Commuter System (MACS). The Borough began operating the MACS fixed route transit service in 1977. The MACS system is comprised of nine fixed routes in the cities of Fairbanks and North Pole, as well as other nearby communities. MACS service operates Monday through Friday from 6:00 AM to 9:45 PM and limited routes on Saturday from 8:45 AM to 7:45 PM. There is no Sunday service.

The Borough also operates a door-to-door paratransit service, VanTran, which began in 1988. The American Disabilities Act of 1990 (ADA) requires all public transit systems that provide fixed route bus and rail service to also provide an alternative transportation service (usually vans and small buses) for people with disabilities who cannot use fixed route bus and train service. This service is usually called “paratransit.” The Van Tran service operates up to five nine-passenger vans and gives priority to ADA-certified disabled passengers within a ¾-mile zone around all MACS fixed routes, although will travel beyond the ¾-mile buffer on occasion. The vanpool system was updated in 2014 with a new approach to make it a successful operation.

Transit program ridership levels are presented in Table 5.7-6:

Table 5.7-6 Annual MACS Transit Ridership 2008 – 2013	
Year	MACS Number of Riders
2008	294,142
2009	357,964

Table 5.7-6 Annual MACS Transit Ridership 2008 – 2013	
2010	383,773
2011	391,799
2012	428,166
2013	475,875

The MACS Transit system has seen increased ridership over the last 6 years, and is projected to continue this trend through 2014, which is expected to exceed 500,000. The ridership information above shows the increase in ridership over that time period. In addition, the MACS Transit system has expanded in the last few years to include improved frequency on high ridership routes, and a new route serving Fort Wainwright. Other notable improvements include better bus stop facilities (bus stop signs and shelters) and a bus tracking system for the public. The FNSB intends to build more shelters with additional funding as it becomes available. The Borough also conducts active public outreach and education to encourage the use of mass transit.

5.7.2.7.3 DOT Anti-Idling and Diesel Emission Reductions

Within the transportation sector, heavy duty diesel activities are a source of PM_{2.5} in the FNSB. Emissions from vehicles are directly related to the amount of fuel used and the rate at which it is used. By reducing the need to have the vehicle engine on, emission reductions are achieved. This is directly related to reduction in fuel use resulting from how often the vehicle is left shut off versus left idling. In cold climates, it is often necessary to leave diesel vehicles idling to avoid performance issues. Anti-idling (idle reduction) technologies provide a means to reduce air pollution from transportation sources.

In July 2011, the Alaska Department of Transportation & Public Facilities (DOT&PF) began focusing on anti-idling and its potential benefits statewide. DOT&PF's State Equipment Fleet (SEF) and Maintenance & Operations (M&O) staff came together to formulate a long term plan for fleet management and to address on-going budget challenges. Implementation of an anti-idle policy was one of the top picks for optimizing resources and reducing costs. In November 2011, an M&O Directive was put in place to reduce idling to 10 minutes and heavy duty engines were set to turn off automatically at 10 minutes. The focus of the DOT&PF program was on large dump trucks and tractors where idle time was averaging over 30%. During a fleet optimization study, anti-idle was noted to be a way to save thousands of dollars (potentially millions of dollars) on fuel and preventative maintenance and DOT&PF began moving forward with a more visible anti-idling campaign within the department. According to the DOT&PF, reducing idling saves money, conserves fuel, reduces engine wear and maintenance, extends the life of heavy equipment, and helps to preserve the environment. DOT&PF is working to get the message out to every single DOT&PF employee that drives a state provided vehicle through a broad, consistent, and informative internal messaging campaign.

Building off of the DOT&PF's efforts to reduce idling, the ADEC and DOT&PF have developed a Fairbanks specific CMAQ-funded pilot program intended to reduce heavy duty diesel

emissions in the nonattainment area through anti-idling, maintenance, and other emission reduction opportunities. The focus of the program is to expand the use of auxiliary heaters to reduce idle time thereby reducing emissions and providing an associated cost saving due to less use of diesel fuel. The program has the following elements:

1. Provide support for the existing DOT&PF anti-idling pilot project currently underway in Fairbanks by assisting with telemetric purchase and installation, installation of additional heaters, and assisting with education and training. With assistance from this program, the DOT&PF pilot program will be fully functional and will be able to provide additional information to assist in expanding anti-idling to others.
2. Expand anti-idling to other heavy duty vehicles within the FNSB nonattainment area; state fleets, local government fleets, private fleets, and commercial fleets. This includes working with the heavy duty fleet owners by providing education materials and training, contracting for installations of auxiliary heaters, and providing incentives for participation including purchasing of heaters and auxiliary equipment.
3. During installation of program auxiliary heaters, conduct an inspection of the vehicle to identify where additional emission reduction possibilities could be implemented – such as maintenance (filter, tune-up), if vehicle is a candidate for retrofit technologies or repower, and/or candidate for additional emission reduction equipment (particulate matter traps). Partnership and incentive opportunities with vehicle fleet owners will be explored to further emission reduction benefits while a vehicle is in shop.

This pilot program is intended to develop into an on-going program with respect to new installation of heaters and emission reduction equipment on diesel equipment within the nonattainment area. Overall operations and maintenance of the new equipment will be the responsibility of fleet owners. Original startup costs for new fleets (new installation of heaters, initial maintenance, or initial retrofits, additional emission reduction technologies) coming into the program are intended to be covered entirely or in part through the use of CMAQ funds. Once initiated, future installations within a fleet would be limited to actual heater installations and/or telemetrics only.

Project funds would be provided for first time installations only, not for replacement of worn out heaters. The cost of a single auxiliary heater installation is approximately \$3500. Conservative estimates indicate auxiliary heaters may save 30% in fuel costs alone along with a 30% reduction in emissions. The cost of the fuel alone, would easily pay for any future replacement of the auxiliary heater and software. The life of the auxiliary heaters is more than ten years, so continued anti-idling use will provide benefits (emission reductions and fuel savings) for the life of the equipment.

5.7.2.7.4 ADEC Diesel Emission Reduction Efforts

ADEC has utilized American Recovery and Reinvestment Act of 2009 (ARRA) and Diesel Emission Reduction Act of 2005 (DERA) funding to reduce emissions in the non-attainment area through several projects.

A 2009 ARRA funded project allowed DOT&PF to replace three 1985 Autocar KM64 trucks with three 2010 International 7600SFA Workstar 8 cy dump trucks equipped with snow plows and belly blades. The new vehicles meet the 2010 clean diesel requirements and are equipped with EGR and DPF technology resulting in lowered diesel emissions. The three trucks began service in August of 2010 and the three older engines were rendered inoperable. The 2009 ARRA Locomotive Overhauls with Emissions Upgrades project purchased and installed emissions upgrade kits and automatic engine start-stop technology on two engines operated by the Alaska Railroad Corporation. The upgraded engines meet the Tier 0+ emissions requirements. These engines operate throughout the Alaska Railroad Corporation (ARRC) track system including within the nonattainment area.

In 2013, DEC partnered with DOT&PF using DERA grant funding to retrofit 23 diesel vehicles with anti-idling technology (as described above). The direct-fired heaters allow operators to maintain warm cabin conditions in cold conditions without idling the main engines. Reduction in idle time was estimated to be 4,020 hours per year with a savings of 3,015 to 4,820 gallons of diesel fuel assuming an estimated 0.75-1.2 gallons of fuel consumed per hour of idling. The DERA program was extended through 2016 in 2010 and if funding continues, future projects may also implement clean diesel technology in the nonattainment area.

5.7.2.7.5 Federal Diesel Emission Reduction Programs

The federal government has multiple regulations and initiatives that will help address emissions in the non-attainment area. EPA's National Clean Diesel Campaign works with manufacturers, fleet operators, air quality professionals, environmental and community organizations, and state and local officials to reduce diesel emissions. The National Clean Diesel Campaign offers Diesel Emission Reduction Act funding opportunities through the competitive National Clean Diesel Funding Assistance Program to fund retrofit projects using Smartway verified diesel emission reduction technologies and the non-competitive State Clean Diesel Grant Program that funds grant and loan projects for clean diesel projects. Smartway is a public-private initiative between EPA, large and small trucking companies, rail carriers, logistics companies, commercial manufacturers, retailers, and other federal and state agencies. Its purpose is to improve fuel efficiency and the environmental performance (reduction of both greenhouse gas emissions and air pollution) of the goods movement supply chains. Smartway evaluates emissions control technologies and determines the eligibility of individual technologies for funding under DERA grants. Federal emissions standards for exhaust and evaporative emissions exist for Light-Duty Vehicles, Trucks, and Motorcycles, Heavy-Duty Engines and Vehicles, and Non-road Engines and Vehicles. These emissions standards on manufacturers have incrementally reduced the amount of emissions permitted from each type of regulated engine, resulting in cleaner diesel engines. Phase 3 emissions standards will take effect starting in 2017.

5.7.2.7.6 Federal Motor Vehicle Control Program

The Federal Motor Vehicle Control Program (FMVCP) is the federal certification program that requires all new cars sold in 49 states to meet certain emission standards. (California is excluded because it has its own state-mandated certification program.) These standards vary according to vehicle age, with the newer vehicles required to be considerably cleaner than older models. The

result of more stringent emission standards over time from newly manufactured vehicles results in a drop in overall emissions from the vehicle fleet in Fairbanks, as older, dirtier vehicles are replaced with newer, cleaner vehicles. Carbon monoxide cold temperature (down to +20° F) emission standards phased in between 1994 and 1996 for passenger cars and light duty trucks significantly enhanced control system performance for all pollutants at the temperatures associated with cold climate exceedances.

Tier 2 emission standards for passenger cars, light trucks and larger passenger vehicles are focused on reducing emissions most responsible for ozone and particulate matter (i.e., nitrogen oxide or NO_x and hydrocarbon or HC emissions). Mandated reductions in the sulfur content of gasoline further enhanced the performance of motor vehicle emission control systems. Starting in 2017, Tier 3 will further reduce both tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. Additional reductions in gasoline sulfur will make emission control systems more effective for both existing and new vehicles, and enable more stringent vehicle emissions standards. EPA's MOVES model has been used to assess the benefits of the FMCVP and Tier 2 emission standards. Insufficient time has been available to use the recently released MOVES2014 to incorporate the benefits of Tier 3 controls on the motor vehicle emissions in the SIP. Subsequent inventory analysis will be based on MOVES2014 and subsequent available releases of the model.

5.7.2.8 Open Burning

5.7.2.8.1 Winter Season Open Burning Ban

Since the 1970s the Fairbanks North Star Borough had an ordinance to restrict wintertime open burning. In 2013, the Borough Assembly repealed that ordinance in response to a voter initiative that restricted the Borough's authorities to regulate burning. As a result, to ensure that smoke emissions from open burning did not increase in the future, ADEC revised its regulations. ADEC implements open burning regulations found in 18 AAC 50.065. Within the existing regulations (18 AAC 50.065(e)), ADEC can and does prohibit open burning in an area during an air quality advisory (see 18 AAC 50.245).

To further strengthen this requirement inside the nonattainment area by reducing confusion on whether open burning is permitted on a given day and ensuring greater compliance and less smoke emissions in the airshed, ADEC revised 18 AAC 50.065(f) to prohibit open burning during the winter season between November 1 and March 31. A copy of the state open burning regulation, 18 AAC 50.065 is included in Appendix III.D.5.7.

In response to public comments on the 2014 regulation revision, ADEC considered a longer season for open burning restrictions. In analyzing the data available, ADEC found that in the months of October and April conditions have not shown a prevalence for significant air quality deterioration as a result of normal open burning. As a result, ADEC did not lengthen the seasonal restriction on open burning to include those two months. Problem open burns during these "shoulder seasons" can typically be addressed through the use of the Department's other open burning and air pollution regulations. Concerns raised by the public related to the potential for the proposed regulations to prohibit small winter fires for recreational warming and

ceremonial purposes were addressed through revisions to the definition of open burning that would exclude these small fires from the prohibition. The department also provided the flexibility for a local air program to institute an open burn permit program in lieu of the seasonal restriction, if they demonstrate the program will not cause or contribute to violations of the PM_{2.5} ambient air quality standards and the program has been adopted into the State Implementation Plan for the area. It should be noted, that this flexibility does not grant the local air program any authorities not provided to it by its citizens. In recent years, the Borough has not had the authority to establish a program in place of the department's seasonal restriction.

5.7.2.9 ADEC Stationary Source Program

The CAA section 172 (c) requirements for nonattainment areas apply to the PM_{2.5} nonattainment area. Under this attainment plan, the requirements of CAA Part D, New Source Review (NSR) apply for major stationary sources. Section 302 of the CAA (42 U.S. C. 7602) defines a major stationary source as any stationary facility or source of air pollutants that directly emits, or has the potential to emit, 100 tons per year of any pollutant. Permits for construction and operation of new or modified major stationary sources within the nonattainment area must be approved through the NSR program. Within the FNSB, ADEC is responsible for issuing construction and Title V operating permits. ADEC has incorporated the requirements for Prevention of Significant Deterioration (PSD) and nonattainment New Source Review in 18 AAC 50, Article 3. ADEC actively implements its permit programs. The Air Quality Division issues and amends permits, conducts inspections, reviews reports from industry, provides compliance assistance, and takes enforcement actions when needed.

Each stationary source in the nonattainment area was the subject of a Reasonably Achievable Control Technology (RACT) analysis. The results of that analysis are found in Appendix III.D.5.7. The emission units for which RACT determinations were made include boilers, process heaters, and turbines. The direct PM_{2.5} RACT is a fabric filter system for boilers. Additional PM_{2.5} controls are considered unreasonable for process heaters and turbines. RACT for SO₂ emissions is the use of current fuel for all of the fuel combustion sources. RACT controls were not recommended for NO_x because control of NO_x is not an efficient or cost effective method for reducing ambient PM_{2.5} in Fairbanks.

All of the emission units that were reviewed are already implementing the emission control techniques identified as RACT. All of the coal-fired units are already equipped with fabric filters, and Alaskan coal has a very low sulfur content. The costs associated with switching from high- to low-sulfur liquid fuels were too high to be deemed to be source specific RACT for those sources currently using liquid fuels.

Stationary source emissions in the nonattainment area have been modeled in the attainment demonstration at "potential to emit" levels from their existing air quality permits. Additionally, historical actual emissions were modeled to determine impacts during the baseline period and were projected to 2015 to provide a potential lower bound on stationary source impacts. This is discussed further in the Modeling and Weight of Evidence Section (5.8).

5.7.2.10 Calculating the Benefits of Control Measures

Calculation of emission benefits for key control measures are summarized within Section 5.6 and are discussed in detail in Appendix III.D.5.6. Generally speaking, emission benefits were calculated for those measures for which up-to-date, quantitative program activity data were available. Programs/measures for which data were not readily available were excluded from the quantitative emission benefits calculations but were collectively accounted for with credits given to voluntary measures. (Section 5.8 discussed how voluntary measures and their allowed credits were accounted for in the attainment modeling in accordance with EPA guidance.)

Table 5.7-7 summarizes how each of the control measures discussed earlier in this section were accounted for within the SIP. Check marks in the “Voluntary Measure” column identify those measures for which benefits were not individually quantified, but for which collective voluntary program credits were assigned in the attainment modeling. The “Quantified Benefits” column identified those remaining measures for which emission benefits were individually quantified in the emissions inventory. The latter two columns identify the location in inventory where the measure benefits were applied. “Baseline” refers to measures whose benefits were accounted for within the Baseline or Projected Baseline inventory. “Control” indicates those measures for which benefits were applied in the Control inventories, reflecting emission reductions from measures being adopted or expected to occur. (Within the inventory discussion in Section 5.6, only benefits for the measures under the Control column were explicitly reported. Benefits for those measures accounted for in the Baseline and Projected Baseline inventories, though quantified, were not individually reported in Section 5.6, but were included in the overall estimates of Baseline and Projected Baseline emissions.)

Table 5.7-7				
Control Measures for Which Emission Benefits were Quantified				
Control Measure/Program	Voluntary Measure	Quantified Benefits	Location in Inventory	
			Baseline	Control (year)
<i>Space Heating and Solid Fuel Heating Controls</i>				
Solid Fuel-Fired Solid Fuel-Fired Heating Device Upgrades and Emission Standards		✓		✓(2015)
Improving Solid-Fuel Solid Fuel-Fired Device Operations	✓			
Encouraging Reduced Use of Solid Fuel- Fired Heating During Air Pollution Episodes	✓			
AHFC Energy Programs		✓	✓	
Expanded Availability and Use of Natural Gas		✓		✓(2019)
<i>Transportation Control Strategies</i>				
Expanded Availability of Plug-Ins	✓			
Mass Transit System	✓			
DOT Anti-Idling and Diesel Emission Reductions	✓			
ADEC Diesel Emission Reduction Efforts	✓			
Federal Diesel Emission Reduction Programs		✓	✓	
Federal Motor Vehicle Control Program		✓	✓	
<i>Open Burning</i>				

Table 5.7-7 Control Measures for Which Emission Benefits were Quantified				
Winter Season Open Burning Ban		✓	✓	
<i>Point Sources</i>				
RACT (Appendix III.D.5.7)		✓		

Regardless of how emission reductions are credited within the planning framework, all measures that reduce PM_{2.5} from local sources are helpful in achieving the overall goal of bringing the area into attainment of the NAAQS.

5.7.2.11 Future Re-Evaluation of Control Strategies

The FNSB and ADEC recognize that in the long term the mix of PM_{2.5} control strategies implemented in Fairbanks could warrant revision. This would be accomplished through a future attainment or maintenance plan revision and subject to approval by EPA. Given the analyses of PM_{2.5} emissions and PM_{2.5} air monitoring data in this attainment plan, the agencies commit to re-evaluating the entire mix of control measures as early as 2016, following the 2015 attainment deadline, to determine whether the measures have succeeded as planned in reducing emissions and improving air quality. This evaluation could result in measures being removed or added to the plan depending on the outcome of the analyses prepared at that time. All changes to the air quality plan must be approved by EPA.

ⁱ Spreadsheet of Parking Spaces Equipped with Plug-ins, transmitted from Leah Bobick to Bob Dulla of Sierra Research, dated April 9, 2001.

ⁱⁱ Ordinance No. 2001-17, “An Ordinance Mandating a Fairbanks North Star Borough Motor Vehicle Plug-in Program.”