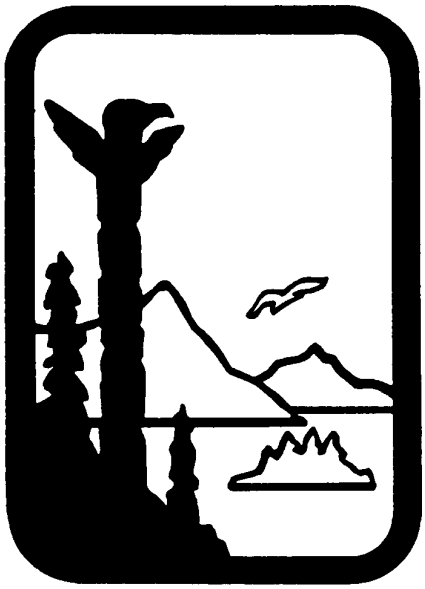
ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION



Amendments to:

State Air Quality Control Plan

Vol. II: III.D.5.11

Fairbanks Emergency Episode Plan

Public Review Draft

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Bill Walker, Governor

Larry Hartig, Commissioner

5.11. Fairbanks Emergency Episode Plan

Section 127(a) of the 1990 Clean Air Act Amendments (CAAA) requires all SIPs to include measures providing public notification of instances or areas in which any NAAQS is exceeded, and of the health hazards associated with such pollution. EPA previously issued guidance on the adoption of emergency episode plans designed to keep air pollution concentrations below those levels considered to have adverse consequences on human health.

5.11.1. Forecasting $PM_{2.5}$ Air Quality Episodes

The Fairbanks North Star Borough (FNSB) monitors $PM_{2.5}$ air quality in the nonattainment area and provides daily air quality forecasts using EPA's Air Quality Index (AQI) on its web site at http://co.fairbanks.ak.us/airquality/. The Borough posts separate AQI forecasts for Fairbanks and North Pole. The forecasts are based on $PM_{2.5}$ data collected from the Borough's ambient monitoring/meteorological reporting network and supplemented by a predictive model developed specifically for the purpose of forecasting $PM_{2.5}$ events in the community.

The AQI is an index for reporting daily air quality. It provides information on how clean or polluted the air is, what associated health effects may be of concern, and actions to take to reduce exposure and health impacts. The AQI provides six categories that correspond to a different level of health concern:

- Good – Air quality is satisfactory and poses little or no health risk.
- Moderate – Air quality is acceptable; however, pollution may pose a moderate healtth concern for a very small number of individuals.
- Unhealthy to Sensitive Groups – Members of sensitive groups (like elderly, children, those with heart or lung disease) may experience health effects, but the general public is unlikely to be affected.
- Unhealthy – Everyone may begin to experience health effects. Members of sensitive groups may experience more serious health effects.
- Very Unhealthy – Everyone may experience more serious health effects.
- Hazardous – The entire population is even more likely to be affected by serious health effects.

To support this function, FNSB uses an air quality forecasting tool called the AQ Alert Model that projects $PM_{2.5}$ concentrations over a four day window (the remainder of today, tomorrow, and the following two days). The model outputs include the predicted values for $PM_{2.5}$ concentrations (rolling 8-hour averages and 24-hour daily averages) at each monitor site over the next four days along with the weather conditions forecast by NWS as context for understanding the $PM_{2.5}$ predictions. To accomplish this, the model accesses in near-real time a wide range of data on recent $PM_{2.5}$ concentrations and meteorological conditions at the monitor sites, surface observations and upper air soundings taken at the Fairbanks airport, and forecasts of surface and upper air conditions from the Global Forecast System (GFS) weather prediction model operated by the National Weather Service. These data are combined within the model to drive a statistical representation of the relationship between meteorological conditions and ambient $PM_{2.5}$ concentrations. The statistical model is based on a detailed analysis of data from the FNSB area

and is updated annually to account for changes in consumer behavior that influence $PM_{2.5}$ concentrations. FNSB recently completed an assessment of the model's performance in the 2013-2014 winter and found that 88 percent of the time it correctly predicted whether an exceedance would occur on the following day.

Air quality specialists at FNSB use the model during the day to monitor changing air quality conditions at the monitors. Forecasts of future $PM_{2.5}$ levels can be generated at any time but are normally prepared in the hour preceding 5 pm local time. Air quality specialists use the modeled forecasts as one input to the decision-making process for issuing an air quality advisory. Other inputs are the afternoon forecast of dispersion conditions issued by the NWS forecasting office in Fairbanks and the assessment by FNSB personnel of many factors based on their long-standing experience in observing air quality in Fairbanks, including the rate of change in concentrations at the monitors and the location and movement of weather fronts seen in satellite photos.

5.11.2. Borough Episode Program

In June 2010, the FNSB Assembly adopted revisions to the Borough's Code to establish the local $PM_{2.5}$ Air Quality Control Program in Chapter 8.21.[i] A copy of this ordinance, 2010-28, is included in Appendix III.D.5.12. In Section 8.21.040, the code requires the Borough to issue daily weekday $PM_{2.5}$ forecasts during the months of October through March (i.e., the period of potential wintertime $PM_{2.5}$ episodes) **before 4:30 pm. In January 2015, the FNSB assembly adopted revisions to the Borough's Code in section 8.21.040 that contain a multi-stage air quality episode program that progressivley restricts different classes of devices based on the severity of the forecasted air quality conditions. The episode program does not affect the entire nonattainment area, only the borough's 'air quality control zone' which encompasses the state's Fairbanks and North Pole zones but excludes the Goldstream zone.**

The code requires an air quality alert **or advisory** to be declared whenever the Borough determines that concentrations have reached the onset level for an air quality episode and concentrations are expected to remain at that level for 12 hours. ~~**Alerts and**~~ **Stage 1 Advisories request voluntary curtailment and** are called when the Borough's Air Quality Division determines, using available hourly data and a 24-hr rolling average of the hourly measurements, that $PM_{2.5}$ concentrations are expected to exceed ~~**35**~~ **25** $\mu g/m^3$~~**, the level of the 24-hour $PM_{2.5}$ NAAQS**~~. **Stage 2 Alerts prohibit burning in any solid-fuel burning devices that are not EPA-certified or EPA Phase II compliant with annual average emissions ratings greater than 2.5 grams per hour of PM2.5 and are issued when PM2.5 concentrations are expected to exceed 35 $\mu g/m^3$. Stage 3 Alerts prohibit burning in all solid-fuel burning heating devices and are issued when PM2.5 concentrations are expected to exceed 55 $\mu g/m^3$.** When a local air quality alert **or advisory** is declared, the Borough Air Quality Program notifies local media to ensure that the declared alert **or advisory** is broadcast to the public. This notification includes the $PM_{2.5}$ forecast and additional information on how the public can further reduce $PM_{2.5}$ emissions. ~~**Declaration of an local air quality alert results in the implementation of voluntary restrictions for the duration of the air pollution episode. Residents shall be**~~

~~**requested to voluntarily stop operation of solid fuel burning appliances, pellet stoves, and masonry heaters within the nonattainment area during the episode.**~~

In 2014, the Fairbanks North Star Borough established a program to further 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**. The Borough 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 designed and intended for households that are able to use space heating alternatives with significantly lower $PM_{2.5}$ emissions, including those fueled by gas, oil, electricity, propane or district heat, but not wood or pellet stoves or other wood burning appliances.

The Voluntary Burn Cessation Program (VBCP) consists of five 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.

5.11.3. State Episode Program

In addition to the Borough AQI forecast and local episode actions, ADEC has also been implementing actions to address high concentration episodes. ADEC's statewide $PM_{2.5}$ air episode and air advisory requirements are framed in regulation at 18 AAC 50.246. The regulations split the overall emergency episode response approachces into two categories: air episodes and air advisories. $PM_{2.5}$ air episodes rely on air monitoring data and are called when concentrations reach specific thresholds defined in the regulation. Air advisories are not strictly reliant on air monitoring data and may be called when the department finds that, in its judgment, that air quality conditions exist that might threaten public health; the advisory regulation allows for ADEC response to poor air quality in areas where no air monitors may exist. These two categories have differing response features and trigger different supporting requirements within the state regulations. In both cases, like the Borough, ADEC publicizes the air quality episode or advisory and any actions to be taken to protect public health. However, 18 AAC 50.246 also allows ADEC to take action upon a Borough air quality episode or advisory. To avoid duplication of effort, ADEC and the Borough may clarify their respective roles under 18 AAC

50.246 through the Air Quality Memorandum of Understanding (MOU). In the absence of a revised MOU, ADEC will continue addressing high concentration episodes as described in this section.

Air episodes for $PM_{2.5}$ are defined in 18 AAC 50.246. Formal episodes may be triggered if the concentration of an air pollutant in the ambient air has reached, or is likely in the immediate future to reach, any of the concentrations established in Table 6a of the regulation. For $PM_{2.5}$ the formal episode concentrations adopted in 2014 **and updated in 2016** are as follows:

Table 5.11-1. State $PM_{2.5}$ Episode Levels

Episode Type	24-hour Average $PM_{2.5}$ Concentration (micrograms per cubic meter)
Air Advisory	**25**
Air Alert **Episode**	35~~.5~~
Air Warning **Episode**	55~~.5~~
Air Emergency **Episode**	150.5

During a formal air episode, in addition to providing information on protecting an individual's health, ADEC will provide information on how an individual may assist in reducing emissions. In some instances, ADEC may prescribe and publicize opacity limits for solid fuel-fired heating devices as described further below. ADEC tailors its response and curtailment actions to address the specific conditions surrounding a specific air pollution event. The following state regulations are also triggered by the declaration of an air episode (in addition to any regulations triggered by the declaration of an air quality advisory as described below):

- 18 AAC 50.075 (d) **– (e)**

(d) A person may operate a **solid fuel fired** [WOOD-FIRED] heating device in an area for which the department has declared a PM-2.5 air quality episode under 18 AAC 50.246 or under emergency episode provisions included in a local air quality plan incorporated in the *State Air Quality Control Plan*, adopted by reference in 18 AAC 50.030, only if

(1) visible emissions or opacity from the **solid fuel-fired** [WOOD-FIRED] heating device is below the opacity limits identified in the episode announcement for that area as defined in the *State Air Quality Control Plan*, adopted by reference in 18 AAC 50.030; or

(2) the owner or operator of the **solid fuel-fired** [WOOD-FIRED] heating device obtains a written temporary waiver from the department or local air quality control program from the opacity limits identified in the episode announcement; the department or local air quality program may grant a temporary waiver after considering

(A) financial hardship information provided by the owner or operator;

(B) technical feasibility information provided by the owner or operator;

(C) potential impact to locations with populations sensitive to exposure to PM-2.5; locations under this subparagraph include hospitals, schools, child care facilities, health clinics, long-term care facilities, assisted living homes, and senior centers;

(D) mitigation measures implemented by the owner or operator to prevent adverse health impacts to individuals sensitive to exposure to PM-2.5; and

(E) the contribution of the device to the exceedance of the PM-2.5 concentration triggering the episode announcement.

(3) the department has not prohibited operation under 18 AAC 50.075(e).

(e) The department may prohibit operation of a solid-fuel fired heating device in an area for which the department has declared a PM-2.5 air quality episode under emergency episode provisions included in a local air quality plan incorporated in the *State Air Quality Control Plan*, adopted by reference in 18 AAC 50.030, only if

(1) the temperature is above the triggering threshold identified in a local air quality plan incorporated in the *State Air Quality Control Plan*, adopted by reference in 18 AAC 50.030;

(2) the announcement identifies the air quality zone(s); and

(3) the announcement identifies exemptions as identified in the *State Air Quality Control Plan*, adopted by reference in 18 AAC 50.030.

Air advisories are established under 18 AAC 50.245 and 18 AAC 50.246(b), which sets forth that "the department will declare an air quality advisory if, in its judgment, air quality or atmospheric dispersion conditions exist that might threaten public health". If the department declares an air quality advisory it may request voluntary emission curtailment actions. For $PM_{2.5}$, the department declares air advisories **in the FNSB nonattainment area** when pollutant concentrations have reached, or are expected to reach, ~~35~~ **25** ug/m^3~~, the level of the NAAQS~~ based on a 24-hr rolling average of the 1-hr BAM measurements. The following specific state regulations are triggered by the declaration of an air quality advisory:

- 18 AAC 50.065(e)

  "Open burning is prohibited in an area if the department declares an air quality advisory under 18 AAC 50.245 **or 18 AAC 50.246**, stating that burning is not permitted in that area for that day. This advisory will be based on a determination that there is or is likely to be inadequate air ventilation to maintain the standards set by 18 AAC 50.010. The department will make reasonable efforts to ensure that the advisory is broadcast on local radio or television."

- 18 AAC 50.075(a)(2)

  "A person may not operate a **solid fuel fired** [WOOD-FIRED] heating device in a manner that causes

  (1) black smoke; or

  (2) visible emissions that exceed **20** [50] percent opacity for more than 6 minutes in any one hour, except during the first 15 minutes after initial firing of the unit, in an area for which an air quality advisory is in effect under 18 AAC 50.245 or 18 AAC 50.246. Visible emissions are measured following opacity reading procedures as required by Vol. 3., sec. IV-3, Appendix IV-3, of the state air quality control plan, adopted by reference in 18 AAC 50.030;

Given the history of significant wintertime air quality episodes within the FNSB $PM_{2.5}$ nonattainment area and concerns of local residents related to the implementation of wood heating curtailment during air quality episodes, ADEC ~~**is defining its**~~ **defined an** approach for allowing solid-fuel fired devices to operate during an episode provided they meet an opacity level during formal air quality episodes inside the nonattainment area under 18 AAC 50.075(d). **During 2015, the FNSB established local curtailment requirements and in 2016, ADEC is adopting similar curtailment requirements into this SIP. The existing ADEC opacity requirements during air episodes will remain in effect in any instances when solid-fuel heating curtailments are not announced.**

Solid-fuel Fired Device Opacity Levels during Air Quality Episodes Under 18 AAC 50.075(d)

~~**Given community concerns about the reasonableness of requiring residents to cease use of solid fuel-fired heating devices during periods of poor air quality coupled with extreme cold temperatures, ADEC adopted state regulations that would allow continued use of solid fuel-fired heating devices during air quality episodes, but only if they are operated in a clean and efficient manner. When operated properly, solid-fuel fired heating devices emit little or no smoke.**~~

The visible emission regulations in 18 AAC 50.075(d) ~~**would**~~ apply specific opacity levels during formal air quality episodes. Properly operated, efficient solid-fueled heating devices using the proper fuels should be able to meet the stated opacity limits during an episode. Efficient operations not only reduce air pollution but allow for the burning of less wood, an economic or time savings to residents who buy or cut wood.

For the FNSB nonattainment area, ADEC ~~**is setting**~~ **set** a specific air quality episode level concentrations above which more stringent visible emission or opacity limits must be met. Should ADEC determine that the specific conditions surrounding a specific air pollution event within the FNSB nonattainment area warrant an announcement for opacity restrictions for solid fuel-fired heating devices, ADEC will issue an episode alert and within the alert identify the specific opacity limit that is in effect. For purposes of triggering the opacity regulations, PM2.5 episodes within the FNSB $PM_{2.5}$ nonattainment area shall be initiated at a 24-hour average concentration of ~~**30**~~ **25** $\mu g/m^3$ based on a 24-hr rolling average of the 1-hr BAM measurements. The opacity limits for the FNSB non-attainment area during an air episode are as follows:

Table 5.11-2
FNSB Opacity Limits during Air Episodes

Opacity Limit	$PM_{2.5}$ Concentration ($\mu g/m^3$)
20%	> ~~**30**~~ **25** (24-hour average)

For compliance and enforcement purposes, opacity is measured using EPA method 9, as modified by following opacity reading procedures as required by Vol. 3., sec. IV-3, Appendix IV-3, of the state air quality control plan, adopted by reference in 18 AAC 50.030; by a person who has passed

and is current in their Method 9 certification. DEC has also adopted into regulation the option to use a camera-based EPA method 9 alternative (EPA Method ALT-082) and may consider using camera based opacity measurements in the future.

Upon observing an opacity limit exceedance during a declared episode the department will attempt to provide education on the correct maintenance and operation of the solid fuel-fired device. Education could also include the use of proper fuels. If education does not provide a remedy to the opacity exceedances, the department may issue a Notice of Violation, Abatement Order, or may pursue other administrative enforcement remedies.

Solid-fuel Fired Device Curtailment during Air Quality Episodes Under 18 AAC 50.075(e)

In 2016, ADEC expanded its regulations to include a framework that would allow ADEC to institute curtailments during air quality episodes, if an episode plan includes specific requirements of the burn curtailment. ADEC also divided the nonattainment areas into three zones to allow for the ability to tailor its response to air quality episodes and advisory specifically to a more defined area.

Under 18 AAC 50.075(e) the department may declare prohibitions on the operation of solid-fuel fired heating devices during air quality episodes if, at a minimum, the following conditions exist:

- **An air quality episode has been declared under 18 AAC 50.246, based on air quality episode thresholds located in Table 5.11-1**
- **The temperature is not lower than -15˚Fahrenheit as measured at the Fairbanks International Airport**

ADEC must also issue an episode announcement that identifies the following:

- **The air quality control zone or zones where the prohibitions are in effect; the boundaries of the Goldstream, Fairbanks, and North Pole Air Quality Control Zones are located in III.D.5.03.**
- **Exemptions to the prohibition of solid-fuel heating device operation.**

Given previous community concerns about the reasonableness of requiring residents to cease use of solid fuel-fired heating devices during periods of poor air quality coupled with extreme cold temperatures, ADEC's regulations provide exceptions for continued use of solid fuel-fired heating devices during air quality episodes if conditions or individual circumstances require the use of solid-fuel heating devices.

Exceptions to the requirement to cease operation of a solid-fuel heating device must include:

- **Cases where electrical power outages prevent the use of alternative heating devices**
- **Cases where the device owner or operator has obtained a temporary waiver from the Department or local program under 18 AAC 50.075(d)(2)**

Exceptions may also include:

- **Exceptions based on the class of solid fuel fired heating device**
- **Exceptions based on device particulate matter emission rates**

Before declaring a prohibition on the operation of solid fuel-fired heating devices during an air quality episode, ADEC will review the relevant and available NWS, FNSB, and state meteorological data, weather forecasts, affected area, strength of the inversion, and potential duration of the inversion. It is possible that ADEC will issue air quality episodes that do not include a prohibition of the use of solid fuel-fired heating devices, especially if weather conditions indicate a clearing prior to any effect of a curtailment could be realized. ADEC will endeavor to ensure a curtailment is a reasonable approach given the conditions and available data, with the objective of realizing air pollution reduction benefits from the action

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 episode that has specific opacity limits **and/or curtailment 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 (alert and episode) 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 limits **and/or curtailment requirements** are in effect, the department plans to provide on-going public information on the opacity limits and ways that residents can comply. Difficulty meeting opacity limits could be due to wet wood. Residents will be encouraged to find dry wood or purchase manufactured wood logs (e.g., energy logs) to mix with their wet wood to assist in bringing down emissions. 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 fired device will also be available. To the 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 limits outlined in this plan.

If a resident is found to be out of compliance with the opacity limits **or curtailment requirements** identified for a specific episode, ADEC is responsible for taking actions to enforce the **state** requirement**s**. **The FNSB is responsible for taking actions to enforce any local requirements. Where the local and state requirements are substantively similar, the two agencies coordinate to ensure that only one agency takes enforcement action.** 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 limits. 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 does not come into compliance, ADEC staff would request that the resident stop burning for the duration of the air quality episode if they have another heating source available. 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 or Notices of Violation, to address the concern.

[i] Fairbanks North Star Borough Assembly Ordinance No. 2010-28, June 10, 2010.