Fine Particulate Matter (PM$_{2.5}$) Update

Presentation to: Fairbanks North Star Borough Assembly Committee of the Whole

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Overview
Purpose of the Presentation

- Updates since last year’s presentation (2/18/2016)

- Serious SIP
  - Challenges
  - Timeline
  - Potential Additional Controls
Health Impacts of High PM2.5 Concentrations

- FNSB does not meet health standards. Air Quality Plans or SIPs identify community actions to meet health based standards.
- PM2.5, due to its small size has the following health impacts:
  - Increased respiratory symptoms (coughing or difficulty breathing)
  - Aggravated asthma
  - Development of chronic bronchitis
  - Nonfatal heart attacks
  - Increased visits to medical facilities
- Sensitive populations:
  - Elderly
  - Children
  - Individuals with medical conditions
Update - Monitoring

- DEC operating regulatory monitors (FRM) and continuous analyzers (BAM) that are used to call alerts and advisories (July 2017)

- NCore, State Office Building, North Pole Fire Station #3

- FNSB operating the low cost MetOne monitoring equipment (15 deployed)

- Saturation Study
Updates - Moderate SIP

- Moderate Area SIP submitted to EPA in December 2014.

- EPA proposed full approval of Moderate SIP. (No conformity freeze.)

- Published in the Federal Register today (Feb 2). Public comment period ends March 6.

- FNSB air quality ordinances in 2015 and 2016 were a critical component of EPA’s preliminary finding.
Moving Forward

- Serious Reclassification Expected
  - EPA proposed to reclassify in Dec 16, 2016
  - EPA must make final decision by April 28, 2017

- Serious State Implementation Planning (SIP) Challenges
  - PM2.5 Implementation Rule
  - December 2017 Deadline

- More strict controls will be needed
Serious SIP
New PM2.5 Implementation Rule

- New PM2.5 Implementation rule lays out specific requirements for PM2.5 and its precursors.
- Based on the rule, the Serious SIP will be a major effort.
  - Moderate SIP was based on reasonable control measures
  - Serious SIP will be based on best and most stringent control measures
  - Increased amount of documentation and evidence required
  - New rule clarified the requirements to control not only direct PM but also the precursors (NOx, SO2, VOCs, Ammonia). So some control measures may be difficult to comprehend by public because they control a precursor vs wood smoke.
- New rule has some benefits: Precursor Demonstration. Precursor Demonstration Guidance currently out for public comment. A successful demonstration could mean limited or reduced control requirements - example ammonia.
Serious Nonattainment Area SIP

- Serious Area SIP must:
  - Include all control measures for all sources (area sources, point sources, mobile sources)
    - Unless found to be technically or economically infeasible
    - What has been implemented in other areas sets the level of expectation for the control measure test.
  - Include Best Available Control Technology on all major point sources
  - Demonstrate attainment by 2019, unless an extension is requested.
    - If extension requested, must be included in SIP at time of submittal and include framework for Most Stringent Measures (MSM).
  - Include Reasonable Further Progress (RFP) milestones for PM2.5 and Precursors. Failure to meet RFP milestones triggers contingency measures.
Control Measures

- DEC reviewed other states and communities’:
  - PM2.5 SIPS
  - Regulations
  - Ordinances
  - Included areas that are in attainment

- Developed a large list of control measures from this review
- Submitted list to FNSB Air Quality program
- List shows control measures from other areas that need to be analyzed and implemented in FNSB.
- Any control measure not implemented will need documentation that it is technologically or economically infeasible OR how an “Alaskanized” measure is equivalent.
Control Measures continued

- Examples of types of control measures in other areas (not complete list)
  - Curtailment at lower concentration threshold.
  - Date certain removal of all uncertified solid fuel fired devices
  - Surcharge on device sales
  - Installations only by certified installers
  - Require installation of thermal mass for new or existing outdoor hydronic heaters
  - Prohibit advertising of used devices
  - Zero visible emissions during curtailment
  - Registration and inspection of devices to qualify for exemptions from curtailments or to remain in place
  - Prohibit new installation of hydronic heaters or coal fired devices
  - Require sale of dry wood only during late summer to end of winter
  - Prohibit use of used oil
  - I/M program
  - Require only low sulfur oil for all sources (home heating, point sources)
Control Measures continued

- Three Types of Control Measures – BACM, MSM, Contingency
- BACM = ‘Best’ Available Control Measures
  - Serious SIP requires BACM
  - ‘Best’ is typically defined by what has been implemented in other areas
  - Challenge will be documenting or coming up with ‘equivalencies’ between FNSB control measures and Lower 48 control measures and then proving the equivalency for EPA’s approval.
- Control measures implemented before December 2019 and meet the ‘Best’ test is considered BACM.
Control Measures continued

- MSM = Most Stringent Measure
  - MSM is a control measure that can’t be implemented before 2019, but must be implemented before any new attainment date.
  - MSM’s are measures that usually require more lead time to implement
  - MSM framework must be included in a Serious SIP if requesting an extension of the attainment date beyond 2019
  - Only one extension request may be submitted – 1 year increments up to 5 years total.
  - Example of a possible MSM – date certain removal of all noncertified devices in nonattainment area. Removing all devices by 2019 may not be possible but removing all devices between 2019-2024 may be possible.
Sanctions

- Sanction Clock starts when EPA determines there has been:
  - Failure to submit a SIP
  - A SIP was submitted and found to be incomplete
  - A SIP has been found complete but is disapproved or partially disapproved
  - A failure to implement a committed measure in an approved SIP

- Three Sanction Clocks
  - 18-months – until first sanction – likely 2:1 offsets
  - 24-months – until second sanction – likely federal highway funds
  - 24-months- until Federal Implementation Plan

- Clocks may reset or pause depending on issue and remedy
- These sanctions are in the Clean Air Act
Saturation Study
Saturation Study

• Goal
Make the needed measurements necessary for evaluating the spatial characteristics of ambient PM$_{2.5}$ concentrations across the North Pole area during wintertime episodes.

• To identify ambient PM$_{2.5}$ concentrations residents are being exposed to beyond the NPFS monitor; and

• To evaluate where a new monitor could be placed, if necessary, to better represent neighborhood scale impacts.

Organization:
• DEC: Technical Assistance. Outreach, Funding, Oversight
• FNSB: Technical Assistance, Site selection, Outreach
• Sierra Research: Project Planning and Management, Data Analysis,
• T&B Systems: Equipment Selection, Data Collection, Quality Assurance
Saturation Study Design

- Based on hourly BAM data collected at the NPFS monitoring station from 2013-2015
- **Fixed-Site Monitoring**
  - Twelve fixed-site monitors will be placed and operated continuously during the study period.
  - Extend roughly 2 miles outward from the NPFS site

- **Mobile Monitoring**
  - Using a vehicle equipped with a real-time PM$_{2.5}$ monitor that will be used for “virtual site” data collection.
  - Data at these fixed locations along the traverse will be accumulated and averaged over the hour to provide hourly average concentrations at the “virtual sites.”
  - Provides a very dense network of sites to directly address and answer questions about small scale variations that may be associated with local sources and microscale phenomena in the region.
Saturation Study: Equipment and Timeline

- Thermo Personal Data Ram (pDR) Model 1500 samplers will be used for all PM$_{2.5}$ measurements
  - Used for stationary and mobile monitoring
  - Same as ‘sniffer’ vehicle set-up

- 2 Additional meteorological sites

- 3 week study in February
  - Some daily PM$_{2.5}$ concentrations $> 35$ µg/m$^3$
  - Some daily average temperatures $<-15^\circ$F.

- Final report expected by early fall 2017
Proposed Location of Stationary Sites
Proposed Mobile Monitoring Routes
Questions?

Thank You!

For more information: http://dec.alaska.gov/air/anpm/comm/fbks1_pm.htm