

Fairbanks PM_{2.5} Planning Activities Past, Present & Yet-to-Come

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Overview

- > PM_{2.5} Regulatory Schedule
- > Moderate Plan findings
- > Changes since Plan submission
- > Ongoing Studies
- > Upcoming Regulatory Decisions
- > Serious SIP Composition
- > Community Challenges
- > Relevance of Conference Presentations

PM_{2.5} Regulatory Schedule

Task	Dates
24-hour standard revised (lowered from 65 – 35 µg/m ³)	December 2006
State nonattainment recommendations to EPA	December 2007
Nonattainment designations (moderate)	December 2009
Moderate SIPs due	December 2012
Moderate attainment date	December 2014
Moderate attainment date with extension	December 2019
Court of Appeals decision	January 2013
Revised Moderate SIP due date	December 2014
Revised Moderate attainment date	December 2015
Moderate SIP submitted to EPA	December 2014
Fairbanks SIP finds “impracticable” to demonstrate attainment	by December 2015
Failure to attain by December 2015 requires reclassification to Serious	within 18-months (mid-2016)
Earthjustice lawsuit for failure to perform Serious “bump-up”	Mid- 2016

Moderate SIP Summary

- > 2008 base year, 2015 attainment year
- > Design value – 44 $\mu\text{g}/\text{m}^3$
- > 20% reduction (9 $\mu\text{g}/\text{m}^3$) required to demonstrate attainment
- > Wood smoke is the dominant source of $\text{PM}_{2.5}$ emissions (~70%)
- > Selected control measures include:
 - ❖ Wood stove change out program
 - ❖ Best burning practices
 - ❖ Expanded availability/conversion to natural gas
 - ❖ Voluntary (e.g., public education, AHFC rebate/weatherization, transportation projects, etc.)
 - ❖ Modeling showed impracticable to attain by 2015
 - ❖ Modeling showed it was possible to attain by 2019

What's changed since the Submission of the SIP?

- > Reduction in fuel oil prices (drop from ~\$4.00/gallon to \$2.50 gallon)
- > Continued replacement of solid fuel burning devices
- > New control programs
- > Regulatory activities
- > Serious SIP development efforts

What's changed since the Submission of the SIP? Nonattainment Area Separation Request

- > 2015 request to EPA to divide the nonattainment area into two separate nonattainment areas
- > Badger road would mark the boundary between the eastern area (including North Pole) and the western area (including Fairbanks)
- > DEC submitted information on area differences for 10 factors (e.g., emissions, concentrations, growth, meteorology, topography, etc.)
- > Significant differences identified and provide a basis for separate air quality plans and controls
- > EPA has 18-months to respond (May 2017)

What's changed since the Submission of the SIP?

Reclassification of North Pole Fire Station Monitor

- > Installed as special purpose monitor in 2012 to monitor wintertime PM_{2.5} levels (October – March)
- > Reclassified as a state and local monitoring station (SLAMS) in 2015 and operates year round
- > Concentrations recorded at NPFS far exceed those recorded at downtown monitors (State Office Building and NCORE)
- > Design value in 2015 is 124 µg/m³ (139 µg/m³ in 2014)
- > Reductions on the order of 70% are required to demonstrate attainment using this design value

What's changed since the Submission of the SIP?

New Space Heating Survey Data

> Submitted Moderate Area SIP

- ❖ Moderate SIP inventory utilized data from 2011 Fairbanks Home Heating Survey (~700 households)
- ❖ These are telephone-based surveys of randomly selected households in nonattainment area regarding space heating devices and fuel usage
- ❖ Data were tabulated into estimates of wintertime fuel/energy use by device
- ❖ Tabulations developed by ZIP code to account for different device usage distributions across the nonattainment area (e.g., lower/higher wood-burning, natural gas, municipal heat use)

What's changed since the Submission of the SIP?

New Space Heating Survey Data (cont.)

> Upcoming Serious SIP

- ❖ DEC has continued to collect home heating survey data each year
- ❖ Serious SIP will include data from 2011-2015 surveys containing over 3,500 responses (represents about 15% of all occupied households)
- ❖ Combined data show gradual increase in wood usage (22% to 24%) from 2011-2015, consistent with high heating oil prices through early 2014
- ❖ Continued downward trend in uncertified wood devices from Borough change out program and natural turnover
- ❖ Combined five year database (with 3,500 records) will support finer resolution of device/fuel usage splits smaller than ZIP code level
- ❖ In spring 2016, DEC conducted a postcard-based survey of participants in 2014 and 2015 surveys focused on assessing any usage shifts from wood back to heating oil since drop in oil prices in 2014 - analysis in process

What's changed since the Submission of the SIP?

Promulgation of Final PM_{2.5} Rule

- > EPA responds to U.S. Court of Appeals 2015 decision to base implementation requirements on Subpart 4 (versus original Subpart 1) of Part D of the CAA
- > Key planning revisions include
 - ❖ Due dates, attainment dates, extension criteria, etc.
 - ❖ Plan requirements
 - ❖ Process for selecting control measures
 - ❖ Attainment demonstration guidelines
 - ❖ Reasonable further progress (RFP), demonstration milestones
 - ❖ Contingency measures
 - ❖ Precursor requirements

What's changed since the Submission of the SIP?

Introduction of New Control Measures

- > Borough established an air quality zone for focused use of control measures. The State is in the process of establishing three air quality control zones (Goldstream, Fairbanks & North Pole)
- > Borough established stricter emission rating requirements and definitions for Borough Listed Devices to units with emission ratings of 2.0- 2.5 $\mu\text{g}/\text{m}^3$
- > Borough established visibility (opacity) limits for solid fuel burning devices (SFBAs), 20%
- > Limited new SFBA installations within nonattainment area to Borough listed devices
- > Established 25 $\mu\text{g}/\text{m}^3$ limit for PM crossing property lines
- > Established fine schedule for compliance failures

What's changed since the Submission of the SIP? Introduction of New Control Measures (cont.)

- > Established set back requirements for hydronic heaters (300' from nearest property line and 600' from schools, clinic, hospitals or senior center)
- > Established wood moisture content of 20% for home heating
- > Prohibit operation of SFBAs during air quality episodes (3-stages specified)
- > Defined Clean Wood and expanded list of materials that cannot be burned in an SFBA
- > Prohibit reinstallation of wood-fired hydronic heaters and SFBAs that do not meet emission standards

What's changed since the Submission of the SIP?

Less Clarity in Natural Gas Availability

- > 2014 IEP analysis assumed heating oil price of \$4.00/gallon
- > Current prices are ~\$2.50/gallon
- > Target gas price is ~\$2.00/gallon fuel price equivalent
- > Lower fuel oil prices reduce conversion benefits
- > Supply options have shifted
 - ❖ North slope liquefaction no longer being pursued
- > AIDEA currently evaluating Point MacKenzie transportation options (e.g., rail, trucking, etc.)
- > Distribution system expansion has been delayed
- > Updated forecasts will be employed in the Serious SIP

What's changed since the Submission of the SIP?

Monitoring Activities

- > Responsibility for operation of regulatory monitors (DEC replaced Borough for operation of State Office Bldg, NCORE and NPFS)
- > Sniffer vehicle (Borough)
- > New ordinance authorizing purchase/operation of low cost monitors to address complaints/burn bans
- > New saturation study (DEC)
- > New neighborhood reader-boards

Serious SIP - Key Components

- > New Baseline year required - looking at 2013
- > New attainment year - December 2019
- > New Design Values
- > Air quality - review of trends in PM concentrations
- > Monitoring - location and operation of monitors
- > Emission inventory - methods used to estimate emissions
- > Control programs - summary of reductions, costs, cost-effectiveness
- > Air quality modeling - combine emissions, meteorology, chemistry to estimate concentrations
- > Attainment projection - forecast of concentrations in 2019
- > Contingency plan - programs to be implemented if Borough fails to attain the standard
- > Conformity - motor vehicle emissions budget based

Serious SIP - Emission Inventory Improvements

> Space Heating

- ❖ Incorporation of home heating device/fuel usage split based on five years (rather than single year) of 3,500 home heating survey respondents
- ❖ Combined data enable development of separate distributions at sub ZIP code levels
- ❖ Potential to better represent hot-spots or zones of elevated space heating emissions within nonattainment area
- ❖ More refined treatment of spatial differences in ambient temperature across nonattainment area
- ❖ Updating non-residential space heating estimates (e.g., to better resolve wood use in non-residential buildings)

Serious SIP - Emission Inventory Improvements (cont.)

> Industrial/Point Sources

- ❖ Updating emissions for each major facility in nonattainment area to reflect changes in operating conditions/emissions since 2008 data collected for Moderate SIP
- ❖ Example: Closure of refinery operations at Flint Hills in 2015

> Mobile Sources

- ❖ Updated inventories of on-road and non-road vehicle and equipment emissions using EPA's latest MOVES model - important for projecting latest vehicle emission technology improvements over time

> All Sources

- ❖ Use of latest socioeconomic and demographic projections being developed by the Borough (including Eielson F-35 triggered growth)

Best Available Control Technology (BACT) Requirements

- > Focus on industrial point sources
- > The SIP BACT limit is set using a top-down analysis on a case-by-case basis taking into account energy, environmental and economic impacts and costs. The analysis must include all emission units at the source.
 - ❖ Unless the source provides an analysis supporting a different BACT decision, the SIP will include the most stringent technically feasible controls as the default BACT for each source.

Current BACT Status

- > The 2008 episodic emission inventory used for stationary sources in the Moderate Area SIP is being updated and scaled for the new Serious Area SIP base year of 2013.
- > Stationary sources are collecting additional information on $PM_{2.5}$ condensable and filterable components for the emission inventory as required by the $PM_{2.5}$ Implementation Rule.

Serious SIP – Best Available Control Measure (BACM) Requirements

- > Applies to all other inventory sectors beyond BACT
- > Provisions to implement BACM within 4-years after reclassification to serious
- > “Best” control measures are more stringent and potentially more costly than those contained in the Moderate SIP, which included:
 - ❖ 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 use of burn barrels
 - ❖ Subsidize heating upgrades and weatherization

Serious SIP – Best Available Control Measure (BACM) Requirements (cont.)

- > BACM is determined independent of ability to attain the standard
- > Selection process includes:
 - ❖ Inventory of sources
 - ❖ Inventory of existing controls employed in other nonattainment areas
 - ❖ Evaluation of technical feasibility
 - ❖ Evaluation of economic feasibility
 - ❖ Determination of earliest date of implementation
- > Separate BACM report required within 18 months of reclassification

Serious SIP – Modeling

> Moderate SIP

- ❖ Episode Selection
- ❖ Meteorology
- ❖ Emissions inventory
- ❖ Air Quality Modeling - 2008 base year, 2015 attainment year
- ❖ Model Attainment Test - State Office Building

> Serious Area SIP

- ❖ Episode Selection (same)
- ❖ Meteorology (same)
- ❖ Emissions inventory (updated)
- ❖ Air Quality Modeling - 2013 base year, 2019 attainment year
- ❖ Model Attainment Test - State Office Building, NCORE and NPFS

Upcoming Regulatory Findings

- > Moderate SIP Approval/Disapproval
- > Serious Designation
- > Separation Request

Community Challenges

- > Grasp level of effort employed in other communities to reduce emissions
- > Identify creative opportunities to guide compliance with burn bans
- > Identify additional resources to support expanded enforcement
- > Expand natural gas infrastructure/track supply development
- > Accept insights from expanded monitoring programs
- > Achieving emission reductions during time of growth
- > Consider strengthening existing control measures

Relevance of Conference Presentations

- > Control program accomplishments from other communities
- > Details of new rule requirements
- > Woodstove improvements
- > Science reports
- > Discussion of all of the above

Questions?