Alaska Department of Environmental Conservation

Amendments to:

State Air Quality Control Plan

Vol. III: Appendix III.D.7.8

{Appendix to Volume II. Analysis of Problems, Control Actions; Section III. Area-wide Pollutant Control Program; D. Particulate Matter; 7. Fairbanks North Star Borough PM2.5 Control Plan, Serious Requirements}

Public Notice Draft

September 10, 2020

Michael J. Dunleavy, Governor

Jason W. Brune, Commissioner

This document provides the appendix to the revised and/or new language proposed for inclusion in this section of the State Air Quality Control Plan addressing the Fairbanks North Star Borough $PM_{2.5}$ Serious nonattainment area. As shown on the content page, the bold and underlined is the appendix to the revised and/or new proposed language. The appendix documents to the adopted sections of the air quality plan can be found and referenced at the following internet site: http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-serious-sip/

(This page serves as a placeholder for two-sided copy)

Appendix III.D.7.08

Contents

NOx Precursor Demonstration Weight of Evidence

EPA Model Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5 , and Regional Haze" (USEPA, 2007), recommends the Species Modeled Attainment Test (SMAT) to estimate future concentrations of daily PM2.5 concentration

Gaudet, B.J., & Stauffer, D.R. (2010). Stable boundary layer representation in meteorological models in extremely cold wintertime conditions. Final Report to Environmental Protection Agency. Purchase Order EP08D000663, Reporting Period: 1 September 2008 – 31 January 2010.

Molders, N., Tran, H.N.Q., & Leelasakultum, K. (2011). Investigations of means for $PM_{2.5}$ mitigation through atmospheric modeling. Final Report Phase 1 (1 December 2008 – 31 December 2010) Prepared for the Fairbanks North Star Borough

Molders, N., Tran, H.N.Q., & Leelasakultum, K. (2011).Fairbanks North Star Borough $PM_{2.5}$ Nonattainment Area CMAQ Modeling. Final Report Phase (Reporting Period: 1 March 2011 – 31 October 2011).

Gaudet, B.J., & Stauffer, D.R. (2011). Final Report to Alaska Department of Environmental Conservation. Grant Number 127617. Reporting Period; 8 March 2011 – 31 January 2012)

Ward, T.J., Palmer, C.P., Hooper, K., Bergauff, M., & Noonan, C.W. (2013). The impact of a community-wide woodstove changeout intervention on air quality within two schools. *Atmospheric Pollution Research, 4*, 238-244

Joyce, P.L., von Glasow, R., & Simpson, W.R. (2014). The fate of NO_X emissions due to nocturnal oxidation at high latitudes: 1-D simulations and sensitivity experiments. *Atmospheric Chemistry and Physics, 14*, 7601-7616. doi: 10.5194/acp-14-7601-2014

Nattinger, K., Huff, D., & Simpson, W.R. (2014). Spatial and temporal analysis of the composition of fine particulates in Fairbanks, Alaska. Final Results Presentation.

Kotchenruther, R.A. (2016). Source apportionment of $PM_{2.5}$ at multiple Northwest U.S sites: Assessing regional winter wood smoke impacts from residential wood combustion. *Atmospheric Environment, 142*, 210-219. http://dx.doi.org/10.1016/j.atmosenv.2016.07.048

Excel Spreadsheets available as electronic files separately:

Precursor_Analysis_Serious_SIP_SMAT_2019

Preliminary_Precursor_20170306

Serious_SIP_SMAT_v0.5_042519

Serious_SIP_SMAT_v0.5_20191104

2020 SIP Amendment

Content

Modeling Technical Analysis Protocol

2020 Amendment SIP SMAT Spreadsheet

Technical Analysis Protocol

Updated modeling platform

This Technical Analysis Protocol describes updates to the Fairbanks North Star Borough (FNSB) State Implementation Plan (SIP) - modeling platform.

1. Review of Moderate, Serious and 2020 plan modeling

Moderate and Serious Area SIP modeling summary

The Fairbanks SIP modeling is completed using CMAQ 4.7.1, SMOKE 2.7, MCIP 3 processed data from WRF 3.1.

The meteorology was selected as two-two week episodes in 2008 that represent Fairbanks winter time conditions that cause exceedances. The details of the meteorology selection can be found in the moderate area SIP (ref).

Moderate Area Review

The 35 days selected to model include FRM data at the Fairbanks State Office Building monitor site, 12 days were used for model performance evaluation from 2008. In 2008, there was no FRM monitored data in North Pole, which is now the violating monitor. The base year for Moderate Area SIP was 2009 with a 5 year Design Value of 44.7 ug/m3 at the State Office Building monitor and a future design value (FDV) of 39.6 ug/m3 in 2015 and 33.5 ug/m3 in 2019.

Serious Area Review

The Serious SIP used the same 2008 meteorology and a 2013 base year with a 5 year modeling design value from 2011-2015. The modeling design values were used for North Pole, State Office Building, NCORE and NPE. The future design values were calculated for the baseline, design value and future design values for the Serious SIP and the summary is in Table 1.1.

Table 1.1 Five Year Design Value (ug/m3) for 2011-2015

	3-yr DV						Modeled DV (5-yr except Hurst)
Site	2013	2014	2015	2016	2017	2018	2011-2015 rolling average
SOB	41	40	35	37	38	37	38.9
NCORE	40	39	35	34	35	32	38.0
Hurst Road	N/A	139	124	106	85	66	131.6
NPE	45	N/A	N/A	N/A	N/A	N/A	45.3

The Future Design Value for the year 2019 was calculated from a 2013 base year and the summary for all four monitored sites is in Table 2.

Table 1.2 Future Design Value for the 2019 control run and 2029 expeditious attainment year

	NPFS Future Design Value ($\mu g/m^3$)	**NPE** Future Design Value ($\mu g/m^3$)	**NCORE** Future Design Value ($\mu g/m^3$)	**SOB** Future Design Value ($\mu g/m^3$)
2013 Base Year	131.63	45.3	37.96	38.93
2019 Control	104.16	36.42	28.87	29.57
2029 Expeditious Attainment	33.87	17.16	18.86	19.41

The year 2019 was not able to show attainment with the change in violating monitor to the Hurst Road monitor in North Pole, which is still in the Fairbanks non-attainment area. Additional attainment modeling was performed for the years 2024 and 2029.

2020 amendment

The 2020 amendment modeling in addition to the Serious SIP modeling is in process and includes a new 4 year design value from the years 2016 to 2019, a base year of 2019. The changes in design value that decreased to 64.7 ug/m3 as well as the end of 2019 has prompted a new baseline run of 2019 and a new attainment year modeling of 2024.

Table 1.3 Design Value Summary 2013-2019

	1 yr 98% tile FRM concentrations							3-yr Design Value							Modeled DV (5 yr except Hurst)	Modeled 4 yr DV
Site	2013	2014	2015	2016	2017	2018	2019	2013	2014	2015	2016	2017	2018	2019	2011-2015 rolling average	2016-2019
SOB	36.3	34.5	35.3	39.7	38.0	27	27.7	41	40	35	37	38	35	31	38.9	32.9
NCORE	36.2	31.6	36.7	30.3	34.4	25.3	27.7	40	39	35	33	34	30	29	38.0	29.6
Hurst Road	121.6	138.3	111.6	66.8	75.5	52.8	65	NA	139	124	106	85	65	64	131.6	64.7
A st							34.1							N/A		

The modeling platform used in the Moderate area and Serious Area SIPs were the same with one modeling performance analysis at the State Office Building monitor. There was not monitoring in North Pole until 2009.

Model Performance Summary

The only model performance results were from the initial set up of the CMAQ modeling and used the speciation data from the State Office Building. This monitor was on a 1 in 3-day schedule and 10 days were used to verify the model performance in year 2008. The overall PM 2.5 performed well, but the elemental carbon was overestimated (EC), organic carbon was under (OC) and sulfate (SO4) and ammonium (NH4) performed poorly.

Table 1.4 Modeled versed Observed speciation from the Moderate Area SIP

Species	Observed (µg/m^3)	Modeled (µg/m^3)
$PM_{2.5}$	36.1	35.7
OC	17.0	24.5
EC	2.3	4.3
SO_4	6.2	2.1
NO_3	1.6	1.3
NH_4	3.1	1.2
OTH	6.3	2.3
SOA	N/A	0.01

2. Summary of need for and updated modeling platform

There are several reasons why an updated modeling platform may be beneficial. There was no model performance completed in North Pole, the violating monitor for Fairbanks non-attainment area. This remains a main problem with trying to assess controls, model attainment in North Pole, along with the poor sulfate performance. The past controls have centered on woodstoves and mainly OC reduction. As the attainment is closer and sulfate controls need to be further assessed, the model does not perform for sulfate and it is difficult to quantitatively assess the benefit of sulfate controls.

Table 2.1 Comparison of the technical components of the current CMAQ 4.7.1 versus the new CMAQ system 5.3.1

CMAQ 4.7.1	CMAQ 5.3.1
Aero 5 chemistry	Aero6 chemistry
MCIP 3	MCIP 5
SMOKE 2.7	SMOKE 4.7
Model Performance in Fairbanks	Model performance in Fairbanks and North Pole
Speciation collected at State Office Building	Speciation collected at Hurst Rd and NCORE
2008 WRF meteorology	2019/2020 WRF meteorology

Updating the modeling platform requires not only North Pole FRM and speciation data that was not available before, but new meteorology and WRF model runs, CMAQ model version update, and preprocessor model version update (SMOKE, SMOKE-MOVES and MCIP). In the next few paragraphs and Table below, each model update and an estimated timeline is summarized:

Table 2.2. Phase 1 and 2 of the technical updates to the modeling platform and estimated timeline

Phase 1 Development of the CMAQ 5.3.1 system using existing emissions and meteorology

2.1	MCIP5 (using original 2008 WRF meteorology)	completed	EPA OAR as part of the FY20 RARE grant
2.2	CMAQ 5.3.1 compile	Completed	Compiled on the DEC Linux server using MPI and the benchmark simulation
2.3	Upgrade to SMOKE 4.7 using Serious SIP 2019 EI	July - August 2020	Contractor Ramboll

2.4	CMAQ 5.3.1- 2019 EI and 2008 WRF (MCIP5)	October – November 2020	DEC – Initial comparison modeling run on the original 2008 met and emissions

Phase 2 Development of the CMAQ 5.3.1 system with new emissions and meteorology

Section	Component	Estimated Timeline	Notes
Transition Phase	Long term WRF and CMAQ modeling contracts already in progress and items that need be completed prior to phase 2	Ongoing	Contractors and DEC
2.5	WRF Meteorology simulations for new episode winter 2019/2020	Currently in process/ March- May 2021	Contractor Ramboll
2.6	MCIP5- 2019-2020	March – May 2021	Contractor Ramboll
2.7	North Pole Speciation Data analysis of entire winter and SMAT	November - December 2020	DEC
2.8	Inventory Step A Emission Inventory Revisions (2019): -Day/Hour-specific point sources - Episodic temperature dependence for other sectors	February- April 2021	Contractor Trinity
2.9	Inventory Step B Emission Inventory Revisions (All Applicable Years): - Updated space heating survey - Integration of MOVES202X	2023	Contractor Trinity/ DEC
2.10	SMOKE 4.7 2019 EI	April – May 2021	Contractor Ramboll
2.11	CMAQ 5.3.1 model performance	June - August 2021	Contractor Ramboll
2.12	EPA review of CMAQ 5.3.1 model performance	2-3 months?	EPA
2.13	CMAQ 5.3.1 model run with new 2019 emissions and meteorology *timing subject to new activity data if collected for 2019	Effort to begin after approved model performance model runs and inventory step revisions 1-2 months of effort	DEC / Ramboll – fully updated QA/QC and model performance version of CMAQ 5.3.1

Phase 1

The initial phase of the modeling update is to run CMAQ 5.3.1 with existing 2008 WRF meteorology and 2019 Serious SIP emissions inventory. The purpose of this phase is to directly compare CMAQ model version differences with existing inputs. This will allow time for getting a new CMAQ system up and running and understanding a direct comparison of new speciation and chemistry with no other changes. The following four sections describe the steps to running CMAQ 5.3.1 verses CMAQ 4.7.1 with no other changes.

2.1 MCIP

MCIP is the meteorology preprocessor for the WRF meteorology to input into the CMAQ model. The original 2008 meteorology was completed using MCIP 3 for CMAQ 4.7.1. MCIP 3 is not compatible with CMAQ 5.3.1. For the first phase of the modeling update, a direct comparison from the old 2019 Serious SIP run using CMAQ 4.7.1 to the new CMAQ 5.3.1 is needed. The first step in the modeling platform development is to run the same meteorology and emissions through CMAQ 5.3.1. The original 2008 meteorology was upgraded to MCIP 5 by EPA OAR as part of the FY20 RARE grant. The MCIP 5 data is in 12 min resolution and the emissions are in hourly.

2.2 Technical specifications for CMAQ 5.3.1

The new version of CMAQ 5.3.1 was compiled using PGI 19.10, updated netCDF-C and netCDF-fortran libraries. The operating environment is Centos7 and the multiple processing capacities use OpenMPI 3.1.3. The virtual Linux system runs with 16 processors and is run by DEC. A contractor has been selected (see phase 2) and a parallel system is being set up to help with any debug issues and prepare for model performance for CMAQ 5.3.1.

2.3 SMOKE

Updating the SMOKE 2.75b to SMOKE 4.7 (any updated version for CMAQ 5.3.1). The SMOKE preprocessor model has updated speciation profiles and more emission profile categories. The same 2019 Serious SIP emissions inventory needs to be run through SMOKE 4.7 to input into CMAQ 5.3.1. The DEC Linux server does not have a compiled current version of SMOIKE. The tasks for our contractor to run SMOKE is as follows:

- Run the 2019 emissions through SMOKE 4.7
- Set up and compile SMOKE 4.7 on the DEC Linux server for future use (phase 2)

2.4 CMAQ 5.3.1 2019 EI and 2008 WRF

The first test of the working updated model for CMAQ will be to run the current 2019 emission inventory and 2008 meteorological episode. We will not have model performance or North Pole speciation, but we can directly compare the results the current modeling system. This will give an initial impression of the updated model biases. We will also be able to work out running the CMAQ model with multiple processors for a Fairbanks simulation on the DEC Linux system and this has not been completed.

Phase 2

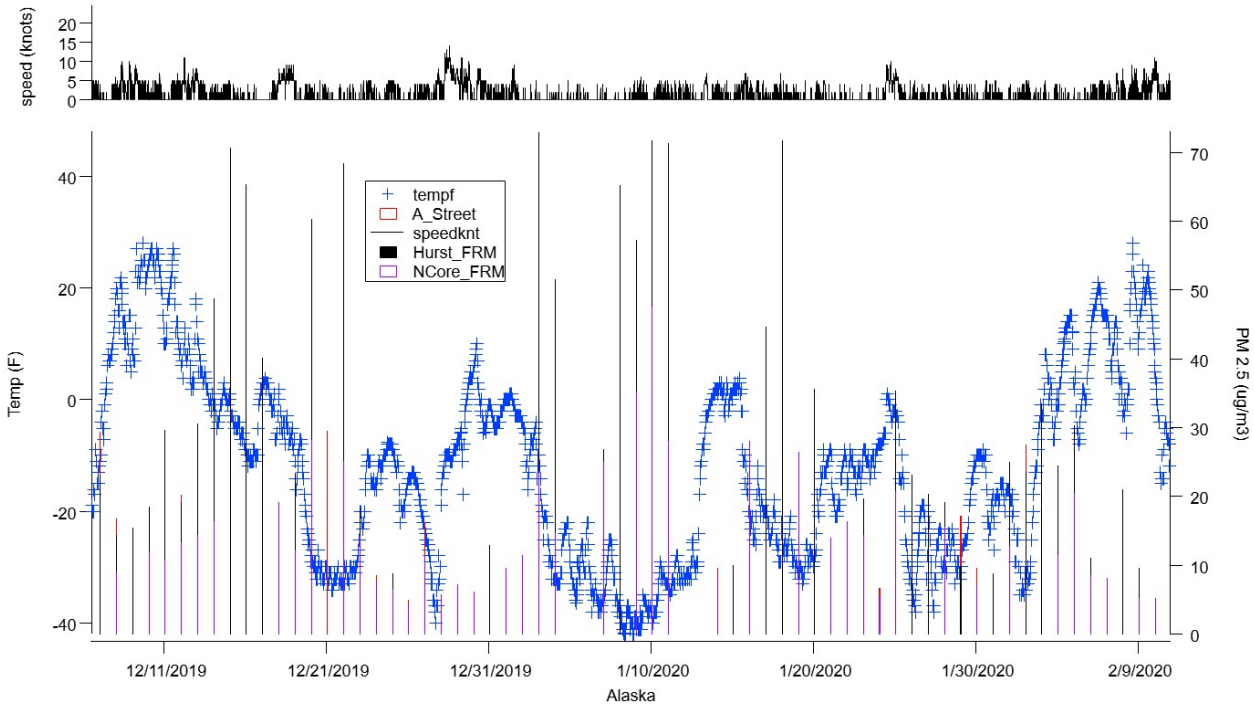
Phase 2 is new input development for the model and these contracts are in place and the work is already being completed. There is a transition period of 4 months after phase 1 and this is needed to allow the work to continue. These contracts for new WRF meteorology and modeling were established for phase 2 development work over the next two years. The transition period from phase 1 to 2 will allow continued work on these contracts. Other tasks during this transition time will be getting letters together to send to the point sources for hourly emissions for our new WRF episode. The development of a new Fairbanks wintertime meteorology episode takes time and collaboration. The model

performance requires an entire winter of FRM and speciation data to be collected for North Pole. All of the tasks involved in the development of new meteorological and emissions inputs into the CMAQ model are outlined in this section.

2.5 WRF Meteorology

The winter 2019-2020 is the focus for choosing the new WRF (weather research and forecast model) episodes that represent Fairbanks wintertime conditions that cause exceedances.

Figure 2.1. Proposed WRF episode for Fairbanks winter 2019-2020



The selection criteria were sent by EPA region 10 in accordance with the PM 2.5 modeling guidance. The following list the criteria that must be met based on Fairbanks winter conditions and past meteorological episode analysis.

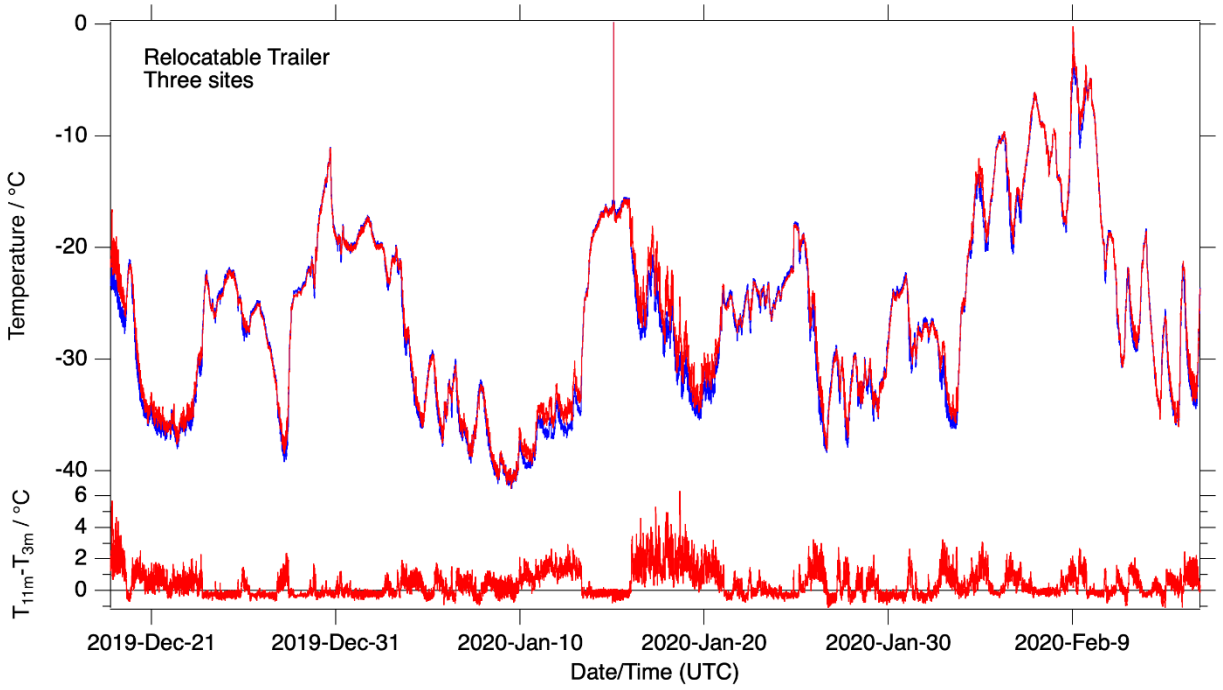
- Days with 24-hour concentrations near the 2017-2019 design value (i.e., 69 ug/m3 at Hurst Rd).
- Sufficient days with total PM2.5 and PM2.5 speciation measurements at regulatory monitors to facilitate model performance evaluation.
- Meteorological conditions representative of inversion conditions typically associated with high pollution episodes.
- Time periods of elevated concentrations and sufficient days before and after these time periods to show the transitions from low --> high --> low pollutant concentrations

Past meteorological studies on long term weather patterns in the Crawford (2019) study, show severe inversion conditions in recent years have included temperatures decreasing to approximately -25 to -35 degrees C. Using the median temperatures (-8 to -12 degrees C) presented in the Crawford (2019) study

as pollution episode guides for temperatures during non-severe pollution episodes was also suggested as a relevant criteria for the Fairbanks winter time episode.

The proposed episode selection is from 12/7/2019 to 2/10/2020 (Figure 2.1). There are 10 days > 50 ug/m3 (all the highest PM 2.5 days at Hurst Road) and this satisfies the criteria of having design value episode days at 69 ug/m3. The wintertime episode includes all days at 40 below for the winter 2019/2020 and strong inversions. There are a few missing FRM days at 40 below, but the one long episode will ensure that there are plenty of FRM days for model performance. The quantity and quality of the sonic anemometer data at Hurst Road during this time is being evaluated by DEC. There are missing data, but with a long episode we will capture enough additional met data. The NCORE sonic anemometer is available at 10 and 23 meters for the Fairbanks area to help with the model performance. The Hurst Road sonic anemometers are at 3, 10 and 23 meters. The sonic anemometers track wind speed, temperature, and wind direction.

Figure 2.2 Temperature gradients of three temperature sites at 11 and 3 meters in the FT WW area



The University of Alaska Fairbanks Bill Simpson research group conducted a concurrent study of temperature gradients in the Fairbanks area and the results are shown in Figure 2.2.In Figure 2.2, there are areas of large temperature gradient and a strong inversion from Jan 15-20th, A large temperature gradient where at 3 meters the temperature is 6 degrees colder than the temperature at 11 meters, there is an inversion present. These strong inversions are typical in Fairbanks winter and lead to a stable boundary where and increasing PM 2.5. The same dates for example, Jan 15-20th coincides with Figure 1.1 where Hurst Rd PM 2.5 concentrations are near 70 ug/m3. There are periods of neutral stability or no temperature difference from the 12-15th of Jan. The wintertime episode contains high PM 2.5 days at different inversion strengths and includes periods of neutral stability where the PM 2.5 is low.

The WRF meteorology simulations will be performed by our contractor. A modeling protocol will be presented prior to the simulations. The model performance will include comparison to local meteorological stations, sonic anemometers at NCORE and Hurst Rd as well the data presented in Figure 2.2 from the mobile trailers.

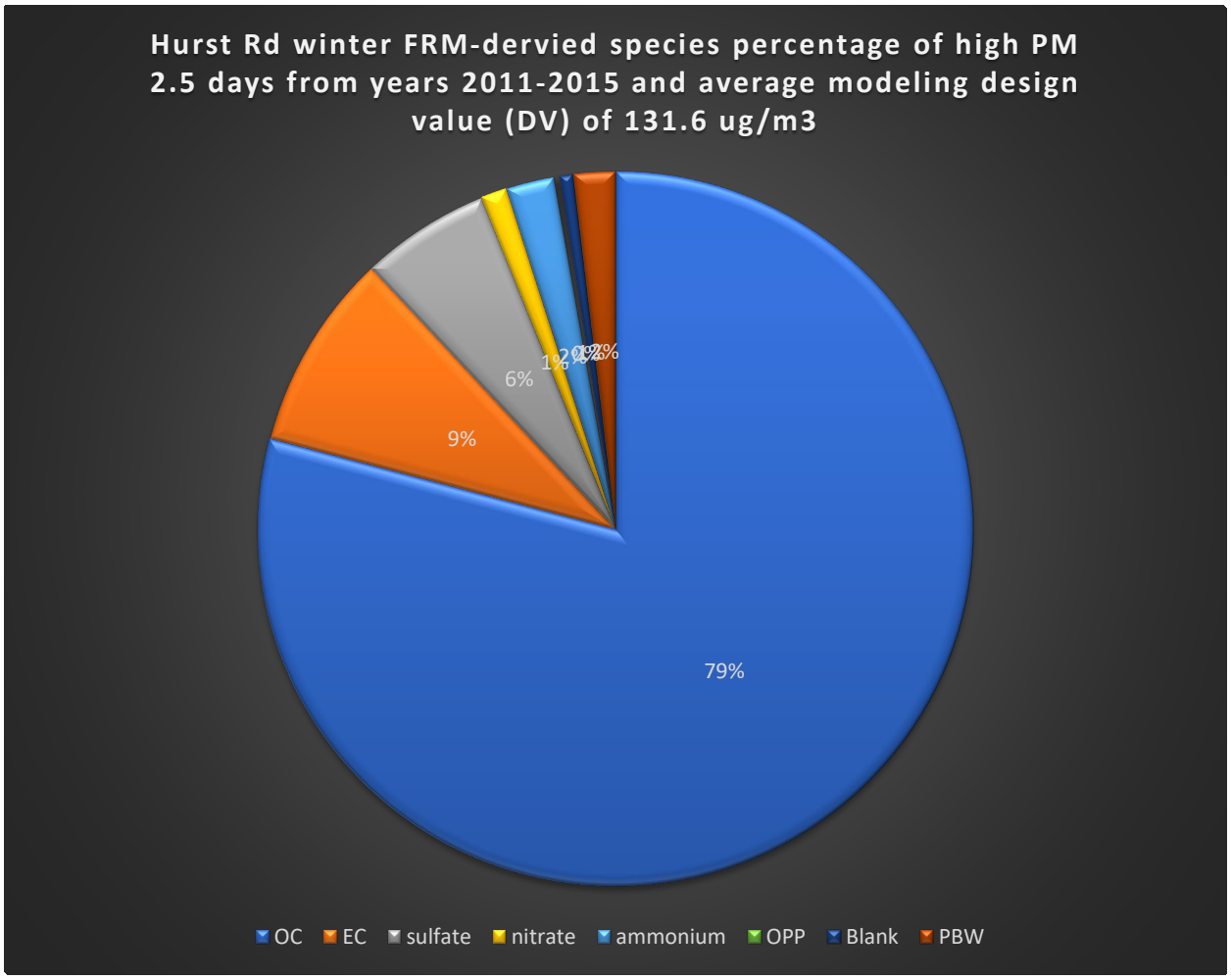
2.6 MCIP

MCIP 5 needs to be completed after the WRF meteorological episode is competed for Fairbanks winter 2019-2020. MCIP 5 will input into the CMAQ 5.3.1 model. This task will be completed by our contractor along with the new WRF meteorology.

2.7 North Pole Speciation data analysis and SMAT

The current North Pole speciation for Serious SIP was based on available years of data from 2012-2015 for the 2011 to 2015 modeling design value (Figure 2.3). The only other speciation data available in North Pole was one quarter in 2009. A SASS – speciation monitor was placed at the Hurst Road location in October of 2019 and will run through the winter 2020. The new modeling meteorology and model performance will be all be concurrent for updating the modeling platform.

Figure 2.3 Serious Area SIP Hurst Rd winter FRM-derived species percentage of high PM 2.5 days from the years 2011 to 2015 and average modeling design value of 131.6 ug/m3



2.8 Inventory Step A Emission Inventory Revisions (2019)

The emissions inventories (EIs) supporting the new modeling platform will be updated in two phases dictated by likely data/model availability and lead-time requirements. As noted earlier in Table 5, the Step A EI will be completed in the Feb-Apr 2021 timeframe. Both EI phases will include emission estimates for the following pollutants: $PM_{2.5}$, PM_{10}, SO_2 (SOx), NOx, VOC, and NH_3 over the selected modeling domains.

The Step A EI will be prepared only for calendar year 2019, the Base Year for the 5% Plan based on its use in evaluating model performed for the new platform and timing. Generally speaking, the Step A 2019 EI will utilize data sources and methods from the Initial 5% Plan with the following key revisions:

- Use of New Episode Days – New modeling episode days selected from the winter 2019/2020 monitoring period will be selected and used to update source emissions that are day-specific or temperature dependent. DEC currently envisions that the model modeling episode(s) will encompass up to approximately 80 days within the winter 2019/2020 period. As described

separately below, the 2019 EI revisions triggered by use of the new episodes will be handled separately by source sector.

- Incorporation of 2019/2020 Episodic Data for Point Sources – Once the 2019/2020 wintertime episode days are established, DEC will send request letters to each of the major point source facilities within the $PM_{2.5}$ nonattainment area to obtain day- and hour-specific fuel usage and emissions data by emission unit/release point corresponding to the selected 2019/2020 episode days. Eielson AFB (just outside the nonattainment area) will also be included in this episodic data solicitation since it is anticipated that Eielson's actual day-specific stationary source emissions may change associated with the F-35 squadron deployment phasing in. The data provided by the point source facilities will be reviewed/validated and re-formatted for episodic input to SMOKE using the "PTHOUR" input structure. Where only fuel usage data are provided, facility/emission unit/fuel-specific emission factors from the Initial 5% Plan will be used to calculate episodic emissions.

- Revision of Episodic Emissions for Other Source Sectors – Based on timing requirements, no new activity data will be collected for the other source sectors (Area/Nonpoint and Mobile). However, emissions for source sectors that are temperature and/or calendar day-dependent will be re-calculated based on these data from the 2019/2020 episode(s). At a minimum, this will include space heating area sources and mobile sources. The Fairbanks Home Heating Energy Model (HHEM) will be re-run to reflect temperatures and days of week from the new episode days and used to adjust space heating emissions. For mobile sources, MOVES2014b and the corresponding version of SMOKE-MOVES will be re-run to reflect the dates and ambient temperatures of the new episode(s). (Although EPA may release a new version of MOVES (MOVES202x) before early 2021, the development of the corresponding SMOKE-MOVES tool may lag the release of MOVES202x. Therefore. it is currently envisioned that the Phase 1 2019 EI will be developed using the current MOVES2014b model and SMOKE-MOVES tool.)

2.9 Step B Emission Inventory Revisions (All Applicable Years)

Emission inventory revisions expected to require new data collection with lead time and other scheduling requirements or related to new source models (e.g., MOVES) will be completed under Step B of the EI development. Step B will also include development of EIs for both 2019 and applicable future years (to be determined) to support updated attainment analysis modeling. As noted in Table 5, the Step B EI work is expected to be completed in 2023.

At this time, the Step B EI revisions will include (at a minimum):

- Space Heating Survey – The Initial 5% SIP utilizes space heating device and fuel use activity data within the Fairbanks HHEM based on household survey data collected in Fairbanks from 2011-2015. This is coupled with wood-oil cross-price elasticity estimated from similar data that accounts for year-to-year shifts in wood vs. heating oil usage as oil prices change. It is envisioned that additional local space heating survey work will be conducted after the

Step A EI is completed to provide more current space heating device and fuel usage patterns beyond 2021 and/or verify the elasticity based projections of this usage from the earlier 2011-2015 survey data. The results of the new survey will be used to update the space heating activity estimates by device and fuel type (and resulting emissions) within the EI.

- MOVES202x – Although EPA may be releasing a new version of MOVES in late 2020, current uncertainty about a release date, revisions to the structure/operation of the model and availability of the correspondingly updated SMOKE/MOVES tool for use in gridding emissions within SMOKE suggest that revisions to mobile source based on the newer MOVES2020x model will be deferred until Step B of the EI revisions. This will give sufficient time to test and compare MOVES outputs to those from the current MOVES2014b version for wintertime emissions in Fairbanks from both on-road and non-road mobile sources to ensure emission changes are consistent with the underlying improvements to the MOVES model

Finally, DEC will also be evaluating potential use of revised solid fuel burning device emission factors from current/on-going testing research that is expected to be published under the Step B EI timeframe. Expected issues to be address under this evaluation include: completeness/representativeness of testing data and test methods, mechanisms to weight the test results to Fairbanks-specific usage patterns and mapping the tested devices/technologies to the population of installed devices and/or those incentivized through state/local control programs.

2.10 SMOKE Step A 2019 EI

Once the 2019 EI is prepared for the new winter 2019/2020 episode, it will need to be re-run through SMOKE 4.7 for CMAQ 5.3.1. This task will be completed initially by our contractor on a parallel system.

2.11 CMAQ model performance for 5.3.1

We will have new 2019 emissions processed and new MCIP5 inputs for the CMAQ 5.3.1 and then model performance tests will be performed for PM 2.5 and all species and precursor gases. This will include OC, EC, SO4, NH4, NO3, Other and precursor gases, SO2, NOx, NH3 and VOCs. The model performance will be performed on NCORE and Hurst RD speciation data.

2.12 EPA review of the modeling performance

The model performance will be written up and sent to EPA for review and approval of the new modeling platform.

2.13 CMAQ 5.3.1

Once the model performance and any other sensitivity run have been performed and the model performance is acceptable, then the model run with new emissions and meteorology can be run for an updated modeling platform 2019 baseline model run.