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2020

Annual Air Quality Monitoring Network Plan

Alaska Department of Environmental Conservation

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EXECUTIVE SUMMARY

This 2020 Annual Monitoring Plan describes the Alaska air quality monitoring network under the Alaska Department of Environmental Conservation's (DEC) oversight and spells out anticipated changes to the network for the calendar year 2021.

Most of the air monitoring activities are focused on population centers and areas that have shown in the past to have air quality problems. Due to budget cuts over the past several years DEC continues to reduce the ambient monitoring network to include only regulatory required sites. Looking ahead, DEC does not expect to expand the network during the next several years due to fiscal constraints.

The most significant changes to the network during 2019 were:

- The downtown Fairbanks State Office Building site was shut down on July 12th, 2019.
- Regulatory monitoring at the new A Street $PM_{2.5}$ SLAMS site, with a Thermo Scientific Partisol 2025 sequential FRM sampler began on July 15th, 2019.
- DEC started speciation sampling at the Hurst Road monitoring site on August 1st, 2019. EPA OAQPS provided DEC with a Met One SuperSASS and URG 3000N for the site.
- A second Thermo Scientific Sequential Partisol 2025i $PM_{2.5}$ sampler was set-up at the Hurst Road site and began sampling on July 18th, 2019. The Hurst Road site has replaced the State Office Building site as the collocation site for the 2025 Sequential sampler Federal Reference Method.
- DEC discontinued NO_x sampling at NCore on October 1st, 2019. DEC conducted the sampling to better understand wintertime nitrogen chemistry. The required NO_y sampling continues.
- DEC received state funding in SFY20 to replace aging gaseous analyzers at the NCore site. DEC has ordered replacement analyzers and started to place them into service.

Planned Network Modifications for 2020/21

DEC will work with EPA on a saturation study for the winter 2020/21 to determine potential alternate monitoring site locations in Butte, AK. Once a new location has been agreed upon, DEC will establish a new SPM site and collect FEM data for at least one calendar year to establish a correlation to the Harrison Court Butte site. If the data are deemed acceptable by EPA, DEC will then discontinue the Butte SLAMS site and move it to the new location replacing the SPM station.

1 INTRODUCTION

The Code of Federal Regulations (CFR) Title 40 §58.10 requires each state agency to adopt and submit to the U.S. Environmental Protection Agency (EPA) Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network made up of the following types of monitoring stations:

- State and local air monitoring stations (SLAMS) including monitors that are designated as:
  - Federal Reference Method (FRM), or
  - Federal Equivalent Method (FEM)
- National Core Multi-Pollutant Monitoring Stations (NCore)
- $PM_{2.5}$ Chemical Speciation Network (CSN), and
- Special Purpose Monitoring (SPM) stations.

The plan shall include a statement of purpose for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of 40 CFR 58 where applicable.

The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA. Any annual monitoring network plan that proposes SLAMS network modifications, including new monitoring sites, is subject to the approval of the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove the plan and schedule within 120 days. If the State or local agency has already provided a public comment opportunity on its plan and has made no changes subsequent to that comment opportunity and has submitted the received comments together with the plan, then the Regional Administrator is not required to provide a separate opportunity for comment.

This 2020 Annual Monitoring Plan describes the Alaska air quality monitoring network under the State's oversight and spells out anticipated changes to the network for the calendar year 2020. This plan shall include all required stations to be operational by January 1, 2021. Specific locations for the required monitors shall be included in the annual network plan which is due to be submitted to the EPA Regional Administrator by July 1, 2020.

The annual monitoring network plan must contain the following information for each existing and proposed site:

1. The AQS site identification number;
2. The location, including street address and geographical coordinates;
3. The sampling and analysis method(s) for each measured parameter;
4. The operating schedules for each monitor;
5. Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal;

6. The minimum monitoring requirements for spatial scale of representativeness for each monitor as defined in 40 CFR 58, Appendix D;
7. The minimum monitoring requirements for probe and monitoring path siting criteria as defined in 40 CFR 58, Appendix E;
8. The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS as described in 40 CFR 58.30;
9. The Metropolitan Statistical Area, Core-Based Statistical Area, Combined Statistical Area or other area represented by the monitor;
10. The designation of any lead monitors as either source-oriented or non-source-oriented according to 40 CFR 58, Appendix D;
11. Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of 40 CFR 58, Appendix D; and
12. Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM_{10} monitoring in lieu of lead total suspended particulate (Pb-TSP) monitoring as allowed for under paragraph 2.10 of 40 CFR 58, Appendix C.

2 AIR QUALITY MONITORING PRIORITIES

In 1970 the Congress of the United States created the U.S. Environmental Protection Agency (EPA) and promulgated the Clean Air Act (CAA). Title I of the CAA established National Ambient Air Quality Standards (NAAQS) to protect public health. NAAQS were developed for six *criteria pollutants*: particulate matter (PM), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead (Pb). Particulate matter has two associated NAAQS: one for fine particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$) and one for coarse particulate matter less than 10 micrometers in aerodynamic diameter (PM_{10}). Threshold limits established under the NAAQS to protect human health are known as primary standards. The primary health standards are to protect the most sensitive of the human population, including those people with existing respiratory or other chronic health conditions, children, and the elderly. Secondary standards established under the NAAQS are to protect the public welfare and the environment. Since promulgation of the original CAA, the EPA has continued to revise the NAAQS based on its assessment of national air quality trends and on current (and ongoing) health studies.

To protect public health and assess compliance with NAAQS, DEC established an air quality monitoring program. The State of Alaska has a large geographical area with a small population. Anchorage and the Matanuska-Susitna (Mat-Su) Valley have the bulk of the 746,582[1] residents in the state, about 55% of the overall population. The remainder of the population is distributed among the cities of Juneau and Fairbanks with populations of about 30,000-40,000 and many

[1] Population projection for July 1, 2020 obtained from the Alaska Population Projections: 2017-2045, Alaska Department of Labor and Workforce Development, http://live.laborstats.alaska.gov/pop/projections.cfm

scattered and isolated small villages, most of which are off the road system and have populations ranging from 16 to 10,000 people. The total area of the state is approximately 665,384 square miles (1.7 million square kilometers)[2].

In accordance with the National Monitoring Strategy, DEC plans air monitoring activities using the following criteria:

- Monitor in larger communities to cover the largest possible population exposure;
- Monitor in designated smaller towns and villages that are representative of multiple communities in a region; and
- Monitor in response to air quality concerns, as funding and staffing levels allow.

The Air Monitoring & Quality Assurance (AMQA) program of the DEC Air Quality Division has a relatively small staff of professionals who conduct the State's air quality assessment efforts. To enhance the quality of work performed statewide, DEC's staff works closely with the Municipality of Anchorage (MOA), the Fairbanks North Star Borough (FNSB), the Matanuska-Susitna Borough, the City & Borough of Juneau (CBJ), and environmental staff in other, smaller communities to assess air quality levels statewide. To continue to protect public health and the environment, air quality monitoring is focused on seven primary issues by descending priority:

1. Fine particulate matter ($PM_{2.5}$) monitoring;
2. Coarse particulate matter (PM_{10}) monitoring;
3. Wildland fire monitoring ($PM_{2.5}$);
4. Carbon monoxide (CO) monitoring;
5. Rural community and tribal village monitoring (primarily PM_{10});
6. Lead (Pb) monitoring; and
7. Ozone (O_3) monitoring.

3 STATE OF ALASKA AMBIENT AIR MONITORING NETWORK

3.1 MINIMUM MONITORING REQUIREMENTS

Minimum monitoring requirements are based on several factors including pollutant levels and populations in statistically defined metropolitan areas. The definitions for the statistical based metropolitan areas are provided by the US Office of Management and Budget (OMB) and the Census Bureau (Census).

Alaska has four statistical areas as designated by OMB in 2009 with updated boundaries based on the 2013 Census data[3]. The four Core Based Statistical Areas (CBSA) include two

[2] https://www.census.gov/geo/reference/state-area.html#n1
[3] https://www2.census.gov/geo/maps/metroarea/stcbsa_pg/Feb2013/cbsa2013_AK.pdf

Metropolitan Statistical Areas (MSA) and two Micropolitan Areas (μSA), see Table 3-1 below. The two MSAs are the Anchorage MSA which includes the entire Municipality of Anchorage and the entire Matanuska-Susitna Borough and the Fairbanks MSA which is comprised of the Fairbanks North Star Borough. The two Micropolitan Areas are the Juneau μSA and the Ketchikan μSA, which encompass the City and Borough of Juneau and the Ketchikan Gateway Borough, respectively.

Table 3-1: Alaska's Core Based Statistical Areas

Core Based Statistical Areas	Population*	Includes:	
Anchorage, MSA	410,188	Municipality of Anchorage	299,970
		Matanuska-Susitna Borough	110,218
Fairbanks, MSA	98,555		
Juneau, μSA	32,242		
Ketchikan, μSA	13,620		

*(based on population estimates for July 1, 2020 obtained from the Alaska Population Projections: 2017-2045, Alaska Department of Labor and Workforce Development, http://live.laborstats.alaska.gov/pop/projections.cfm)

The minimum number of sites required for the Alaskan CBSAs for the six criteria pollutants are summarized for the Alaska network in Table 3-2. No monitoring is required for lead anywhere in the Alaskan CBSAs. No air quality monitoring sites are currently required for the Ketchikan μSA.

Monitoring in the Juneau μSA focuses on particulate matter monitoring. One monitoring site is required for PM_{10} based on the PM_{10} Limited Maintenance Plan. The Mendenhall Valley had been designated as a PM_{10} non-attainment area and has met the standard since 1994. No $PM_{2.5}$ monitoring site is required; however, a single continuous $PM_{2.5}$ monitor is used to issue burn curtailments by the local government.

CO monitoring is required in the Anchorage and Fairbanks MSAs based on the Limited Maintenance Plans for the MSAs. Both areas had been previously designated as non-attainment and have been able to lower their concentrations. Neither MSA has had a violation of the CO standard since 2001.

The Anchorage MSA triggered the PM_{10} monitoring requirement of 3-4 monitors based on four exceedances elevated concentrations in 2016 and 2018 (see Table E-5 in **Appendix E**). The exceedances result from high wind events that pick up dust from frozen, but not snow-covered, braided river beds. These high wind events occur semi-regularly in fall and occasionally in early spring. DEC has flagged the events in AQS and has amassed relevant supporting evidence for exceptional event waiver requests (EEWR). As EPA and the state are currently focused on $PM_{2.5}$, DEC plans to prepare EEWRs for the events when EPA starts another PM_{10} designation process and/or if EPA requests that DEC submit them for approval.

Based on a 2017 DV of 32 µg/m^3, the minimum requirement for Anchorage MSA $PM_{2.5}$ monitoring was one site for the 2018 Annual Monitoring Plan. However, based on a 2019 DV of 29 µg/m^3, no $PM_{2.5}$ monitoring sites are required for this 2020 Annual Monitoring Plan. Currently, the Anchorage MSA $PM_{2.5}$ monitoring network of two sites exceeds the minimum requirements specified. The minimum requirement for $PM_{2.5}$ monitoring in the Fairbanks MSA is one monitoring site. The Fairbanks $PM_{2.5}$ monitor requirement is based on the elevated concentrations measured in Fairbanks and North Pole. DEC's Fairbanks $PM_{2.5}$ monitoring network exceeds this requirement because of its status as a serious nonattainment area.

Table 3-2: Minimum Monitoring Requirements for Alaskan CBSAs

Criteria Pollutant		SLAMS site requirement			
	Comments	Anchorage MSA	Fairbanks MSA	Juneau µSA	Ketchikan µSA
$PM_{2.5}$	Most recent 3 year design value ≥ 85% of NAAQS	0	1	0	0
	Most recent 3 year design value < 85% of NAAQS	0	0	0	0
PM_{10}	Two monitoring sites based on PM_{10} Limited Maintenance Plans (Juneau and Eagle River)	3-4	0	0	0
Pb	Waiver for source oriented monitoring - see section 3.1.1	0	0	0	0
CO	Two monitoring sites based on CO Limited Maintenance Plans (Fairbanks and Anchorage); Fairbanks also meets NCore requirement	0	0	0	0
O_3	Most recent 3 year design value ≥ 85% of NAAQS	0	0	0	0
	See EPA O_3 NAAQS waiver[1]	0[1]	0	0	0
SO_2	NCore site requirement	0	0	0	0
NO_2	Requirement based on population numbers. Alaska does not meet the threshold requirement	0	0	0	0

[1] EPA 5-Year Ozone NAAQS Monitoring Requirement Waiver: Section 3.5.3 or http://dec.alaska.gov/media/10956/2017-air-monitoring-network-plan-ozone-waiver.pdf

3.1.1 Lead

Alaska does not meet the population thresholds for lead monitoring in any of the communities. DEC currently does not monitor for lead. DEC received a waiver from EPA for source oriented monitoring as pre 40 CFR 58 App. D. See section 3.5.1.

3.1.2 Appendix D & E Siting Forms

In 2014 EPA Region 10 provided network evaluation forms to determine compliance with design and minimum monitoring requirements for each of the criteria pollutants under 40 CFR 58 Appendix D. These evaluation forms were reviewed and updated, when necessary, in 2020 by DEC and are presented in **Appendix A**. In 2014, EPA Region 10 provided siting evaluation forms to determine compliance with siting requirements for each of the criteria pollutants under 40 CFR 58 Appendix E. These site evaluation forms were reviewed and updated, when necessary, in 2020 by DEC and are summarized by MSA in **Appendix B**.

3.2 CURRENT MONITORING SITES

DEC operates and maintains a number of ambient air monitoring networks throughout Alaska. Table 3-3 provides the site name, address, geographic coordinates, and identification number for all the air monitoring sites for which data are submitted to the EPA Air Quality System (AQS) database as of May 2020. NCore parameters measured are PM_{10}, $PM_{2.5}$, $PM_{10-2.5}$, CO, O_3, SO_2, NOy, NO, CSN, and meteorological parameters.

Table 3-3: AQS Monitoring Sites as of May 2020

Site Name	Address	Latitude/Longitude[1]	AQS ID	Agency
Garden	3000 East 16th Ave. Anchorage, AK	61.205861 N 149.824602 W	02-020-0018	DEC
Laurel	4335 Laurel St. Anchorage, AK	61.181117 N 149.834003 W	02-020-0045	DEC
Parkgate	11723 Old Glenn Hwy. Eagle River, AK	61.326700 N 149.569707 W	02-020-1004	DEC
NCore	809 Pioneer Road Fairbanks, AK	64.845307 N 147.72552 W	02-090-0034	DEC
Hurst Road[2]	3288 Hurst Rd. North Pole, AK	64.762973 N 147.310297 W	02-090-0035	DEC
A Street	397 Hamilton Ave Fairbanks, AK	64.84593 N 147.69327 W	02-090-0040	DEC
Butte[3]	Harrison Court Butte, AK	61.534100 N 149.0351855 W	02-170-0008	DEC
Bethel	370A 4th Ave Bethel, AK	60.79583 N 161.767 W	02-050-0001	DEC
Floyd Dryden Middle School	3800 Mendenhall Loop Road Juneau, AK	58.388889 N 134.565556 W	02-110-0004	DEC

[1] Coordinates for latitude and longitude are consistent with the World Geodetic System (WGS 84).
[2] Hurst Road is the new name for the North Pole Fire Station #3 site. It was changed in 2018 at Fairbanks North Star Borough's request.
[3] EPA has granted a siting requirement waiver for Butte: Section 3.5.2 or https://dec.alaska.gov/media/16991/butte-site-siting-requirement-waiver-letter-epa-06032019.pdf

3.3 SITING CRITERIA

In 2014, EPA Region 10 provided site evaluation forms to determine compliance with 40 CFR 58 Appendix E requirements for monitoring path and siting criteria. These forms were

distributed to the individual site operators for completion. Summaries of the site evaluation forms are presented in three tables – PM, CO and all other gaseous pollutants – in **Appendix B** of this report. Monitoring site photos and location maps can be found at: http://dec.alaska.gov/air/air-monitoring/monitoring-site-information/.

3.3.1 Carbon Monoxide Sites

Carbon monoxide (CO) inlet probes should be at least 1 meter away, both vertically and horizontally, from any supporting structure or wall. For micro-scale sites the probe height must be between 2.5 and 3.5 meters, whereas for other scale sites the probe must be between 3 and 15 meters high.

A probe must have unrestricted airflow for at least 270 degrees, or 180 degrees if it is located on the side of a building. Obstructions must be a minimum distance away equal to twice the distance by which the height of the obstruction exceeds the height of the probe. Trees should not be present between the dominant CO source or roadway and the inlet probe.

The following table (Table 3-4) lists the CO monitoring sites in Anchorage and Fairbanks.

Table 3-4: CO Monitoring Sites in Anchorage and Fairbanks May 2020

Site Name	Monitoring Scale	Probe Distance from Wall (meters)	Height (meters)	Unrestricted Air Flow	Spacing from Roadway (meters)	Trees
Garden 02-020-0018	Neighborhood	1	3	180 degrees unobstructed except for a tree 2.3 m from probe	7.6	Yes[1]
NCore 02-090-0034	Neighborhood	Not applicable	3	360 degrees unobstructed	70	>20 m

[1] One spruce tree 7.3m tall, 2.3 m to drip line

3.3.2 Particulate Matter (PM_{10} and $PM_{2.5}$) Sites

For micro-scale sites, particulate matter inlets must be between 2 and 7 meters from ground level. For other siting scales the probe must be between 2 and 15 meters high.

A sampler must have at least 2 meters separation from walls, parapets, penthouses, etc. A sampler must have unrestricted airflow for at least 270 degrees, or 180 degrees for street canyon sites. Obstructions must be a minimum distance away from the sampler with the separation equal to twice the distance by which the height of the obstruction exceeds the height of the sampler inlet.

Micro-scale sampler inlets must be located between 5 and 15 meters from the nearest traffic lane for traffic corridor sites, and between 2 and 10 meters for street canyon sites. The minimum separation distance between the probe and nearest traffic lane for middle, neighborhood, or urban scale sites depends upon the number of vehicles per day (VPD) that use the roadway according to a table in Appendix E of 40 CFR 58. Table 3-5 lists all PM monitoring sites in Alaska and how they fit the siting criteria from Appendix E of 40 CFR 58 (also see Appendix B).

Table 3-5: PM Monitoring Sites in Alaska as of May 2020

Site Name AQS Codes	Monitoring Scale PM_{10}	Monitoring Scale $PM_{2.5}$	Height (meters)	Spacing from Obstructions (meters)	Spacing from Roadway (meters)	Traffic (VPD)	Trees within 10 meters?
Garden 02-020-0018	Neighborhood	Neighborhood	11	no obstructions	14	1,233 Sunrise Dr 1,947 Airport Heights Dr.	no
Laurel 02-020-0045	Microscale	-	6.4	no obstructions	11	37,436 Tudor Rd	no
Parkgate 02-020-1004	Neighborhood	Neighborhood	10.4	no obstructions	44	12,132 Old Glenn Hwy	no
Butte[3] 02-170-0008	Neighborhood	Neighborhood	4.7	no obstructions	150	Old Glenn Hwy, 3,225[2]	yes 5.5 m
A Street 02-090-0040	-	Neighborhood	4	no obstructions	5.8[4]	2,017 Hamilton Ave 4,553 Farewell Ave	no
NCore 02-090-0034	Neighborhood	Neighborhood	4.5	no obstructions	70	4,930 Philips Field Rd 1,020 Driveway St	no
Hurst Road 02-090-0035	-	Neighborhood	4.3	no obstructions	27 to Hurst Rd	4,923 Hurst Rd	no
Floyd Dryden 02-110-0004	Neighborhood	Neighborhood	8	no obstructions	100	13,014 Mendenhall Loop Road	no
Bethel 02-050-0001	Neighborhood	Neighborhood	5	no obstructions	>30 to Fifth Ave	6,604 Ridgecrest Dr	no

[1] Average annual traffic count 2018 traffic data accessed at: http://dot.alaska.gov/stwdplng/transdata/traffic_AADT_map.shtml

[2] McKechnie Loop has only local neighborhood traffic and the site is at the end of a gravel cul-de-sac on Harrison Court (with three houses).

[3] Site is next to a gravel pad/road so EPA has granted a siting requirement waiver: Section 3.5.2 or https://dec.alaska.gov/media/16991/butte-site-siting-requirement-waiver-letter-epa-06032019.pdf
[4] Site is <10m from adjacent A-Street, a paved, low traffic neighborhood street, remainder of site grass covered.

3.3.3 NCORE SITE

The NCore site pollutant monitors listed in Table 3-6 are representative at a neighborhood scale. Meteorological monitoring is representative at a microscale. Table 3-6 also lists additional relevant siting information.

Table 3-6: NCore Gaseous[1] Monitoring and Meteorological Monitoring as of May 2020 in Alaska

Parameter Name	Monitoring Scale	Height (meters)	Spacing from Obstructions (meters)	Spacing from Roadway (meters)	Traffic (VPD)	Trees < 10 m?
NOy, NO & DIF	Neighborhood	3[2]	no obstructions	70	4930[3]	None
O_3	Neighborhood	3	75 m to 12 m building	70	4930	None
SO_2 (1 hr & 5 min)	Neighborhood	3	no obstructions	70	4930	None
T_{amb}, WS & WD (3 m)	Microscale	2	no obstructions	70	4930	None
T_{amb}, WS & WD (10 m)	Microscale	10	no obstructions	70	4930	None
Relative Humidity[4]	Neighborhood	4	no obstructions	70	4930	None
Barometric Pressure	Neighborhood	4	no obstructions	70	4930	None

[1] Excluding CO. For CO see Table 3-4.
[2] Probe height is 3 meters rather than the 10 meters recommended in order to remain below the unusually low winter inversion layer.
[3] 2018 Philips Field Road traffic data accessed at: http://dot.alaska.gov/stwdplng/transdata/traffic_AADT_map.shtml
[4] Will be installed and operational in June 2020

3.4 MONITORING METHODS, DESIGNATION, AND SAMPLING FREQUENCY

Tables 3-7 to 3-17 present information for current sites (and monitors) used in coding the data submitted by DEC to the AQS database. The information provided in Tables 3-7 to 3-17 for each monitoring site includes pollutant parameter name, monitor designation, the AQS parameter

codes and parameter occurrence codes (POC), the AQS method code, the frequency of sampling, and the instrumentation used. DEC has purchased new analyzers for the NCore gaseous pollutants, but due to the current restrictions because of COVID 19 is not able to install them. The new equipment will be in operation for the next calendar year though, and therefore was entered in the table for completeness. The monitor designation states the purpose for which the data are to be used, such as: for State & Local Air Monitoring Stations (SLAMS) to demonstrate NAAQS compliance, Special Purpose Monitoring sites (SPM) for general air quality assessments, and the Chemical Speciation Network (CSN) for atmospheric chemistry assessments. AQS parameter, method and units codes are specific to the pollutant, instrumentation, and sampling equipment used, and how the concentration units are expressed in either local conditions or corrected to standard conditions for temperature and pressure. The 5-digit parameter code identifies the parameter being measured e.g. PM_{10}, SO_2, or wind speed. The 1-digit POC code is the parameter occurrence code. As suggested by Region 10 EPA, DEC uses the POC to indicate whether the sampler or instrument is (1) a primary data source, or (2) a secondary data source such as a collocated sampler, or (3) that an instrument is measuring on a continuous basis. The AQS method code provides information specific to the analytical technique used for the pollutant determination such as instrumental analysis using chemiluminescence for nitric oxide or gravimetric analysis for particulate. The notation presented in the sample frequency indicates how often the pollutant concentration is determined. For example, 1/6 indicates that one sample is collected every sixth day according to the national EPA air monitoring schedule. Continuous indicates that an instrument is continuously analyzing a sample stream providing a pollutant concentration on a real-time basis (e.g. 1-min SO_2 reading) or a near-real time basis (e.g. 1-hour $PM_{2.5}$ reading from a beta attenuation monitor, a BAM). The equipment information column identifies on-site equipment (either a sampler or instrument) specific to the AQS parameter code.

Other monitoring sites operated by DEC to gather data related to rural road dust and wildland fires, but that are not submitted to the AQS database are discussed in **Appendix C**. The IMPROVE monitoring sites operated in Alaska under the federal program to characterize and protect scenic visibility around National Parks and designated wilderness areas are described in **Appendix D**.

A summary of pollutant concentration data calculated as NAAQS design values, maxima, or as averages are presented in **Appendix E**.

Table 3-7: Anchorage MSA: AQS Codes May 2020

STD = standard conditions of temperature and pressure; LC = local (actual) conditions of temperature and pressure

Site Name/ Location/ AQS ID	Pollutant Parameter	Monitor Designation	Monitor Starting Date	AQS Parameter/ Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
Garden Site/ Anchorage 02-020-0018	PM_{10STD}/ PM_{10LC}	SLAMS	1/1/2009 STD 01/1/2015 LC	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020
	$PM_{2.5LC}$	SLAMS	1/1/2009	88101-3	170	Continuous	Met-One BAM 1020 (VSCC)
	CO	SLAMS	1/1/1979	42101-1	554	Continuous	Thermo Scientific. Inst. Model 48i-TLE
Laurel/ Anchorage 02-020-0045	PM_{10STD}/ PM_{10LC}	SPM	5/28/2015	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020
Parkgate/ Eagle River 02-020-1004	PM_{10STD}/ PM_{10LC}	SLAMS	1/1/2009 STD 01/01/2015 LC	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020
	PM_{10STD}/ PM_{10LC}	SLAMS	7/31/2018	81102-3/ 85101-3	126	1/6	Thermo Scientific Partisol 2000i
Butte/ Matanuska-Susitna Valley 02-170-0008	PM_{10STD}/ PM_{10LC}	SPM	4/11/1998	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020
	$PM_{2.5LC}$	SLAMS	8/10/2011	88101-3	170	Continuous	Met-One BAM 1020 (VSCC)
	$PM_{2.5LC}$	SLAMS	7/31/2018	88101-1	143	1/6	Thermo Scientific Partisol 2000i (VSCC)

Table 3-8: FNSB monitors: AQS Codes as of May 2020

STD = standard conditions of temperature and pressure; LC = local (actual) conditions of temperature and pressure

Site Name/Location	Pollutant Parameter	Monitor Designation	AQS Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
NCore/ Fairbanks 02-090-0034	PM_{10STD}/ PM_{10LC}	NCORE	2/15/2011	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020
	$PM_{2.5LC}$	NCORE	2/15/2011	88501-3 88502-	731	Continuous	Met-One BAM 1020 (SCC)
	PM_{10STD}/ PM_{10LC} collocate	NCORE	11/10/2012	81102-1/ 85101-1	126	1/3	Thermo Scientific Partisol 2000i
	$PM_{2.5LC}$	NCORE	11/4/2009	88101-1	145	1/1	Thermo Scientific Sequential Partisol 2025i (VSCC)
	$PM_{2.5LC}$	NCORE	5/8/2013	88101-2	143	1/3	Thermo Scientific Partisol 2000i (VSCC)
	PM_{10LC} - $PM_{2.5LC}$	NCORE	2/15/2011	86101-1	175/176	1/3	paired Thermo Scientific Partisol 2000i's
	CO	NCORE	8/1/2011	42101-1	554	Continuous	Thermo Scientific 48i-TLE
	CO	NCORE	to replace previous analyzer	42101-1	593	Continuous	Teledyne T300U (Replaces 48i-TLE, Summer 2020)

Site Name/Location	Pollutant Parameter	Monitor Designation	AQS Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
NCore/ Fairbanks 02-090-0034	SO_2 (1-hr)	NCORE	8/1/2011	42401-1	560	Continuous	Thermo Scientific 43i-TL
	SO_2 (5-min)	NCORE	8/18/2011	42401-2	560	Continuous	Thermo Scientific 43i-TL
	SO_2 (1-hr)	NCORE	to replace previous analyzer	42401-1	560	Continuous	Thermo Scientific 43iQ-TL (Replaces 43i-TL, Summer 2020)
	SO_2 (5-min)	NCORE		42401-2	560	Continuous	Thermo Scientific 43iQ-TL (Replaces 43i-TL, Summer 2020)
	NO_Y	NCORE	01/01/2013 10/5/2012 AQS	42600-1	674	Continuous	Thermo Scientific 42i-Y
	NO	NCORE	10/5/2012	42601-2	674	Continuous	Thermo Scientific 42i-Y
	NO_Y-NO	NCORE	10/5/2012	42612-1	674	Continuous	Thermo Scientific 42i-Y
	NO_Y	NCORE	to replace previous analyzer	42600-1	599	Continuous	Teledyne T-200U (Replaces 42i-Y, Summer 2020)
	NO	NCORE		42601-2	599	Continuous	Teledyne T-200U (Replaces 42i-Y, Summer 2020)
	NO_Y-NO	NCORE		42612-1	599	Continuous	Teledyne T-200U (Replaces 42i-Y, Summer 2020)
	O_3	NCORE	8/1/2011	44201-1	087	Continuous	Teledyne 400E
	O_3	NCORE	to replace previous analyzer	44201-1	047	Continuous	Thermo Scientific 49iQ-TL (Replaces T-400E, Summer 2020)

Site Name/Location	Pollutant Parameter	Monitor Designation	AQS Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
NCore/ Fairbanks 02-090-0034	WD Vector 10 m WD Scalar	NCORE	4/5/2011	61104-1 61102-1	061	Continuous	RM Young Sonic Anemometer
	WD Vector 3 m WD Scalar	NCore	4/5/2011	61104-2 61102-2	061	Continuous	RM Young Sonic Anemometer
	WS Vector 10 m WS Scalar	NCORE	4/5/2011	61103-1 61101-1	061	Continuous	RM Young Sonic Anemometer
	WS Vector 3 m WS Scalar	NCORE	4/5/2011	61103-2 61101-2	061	Continuous	RM Young Sonic Anemometer
	BP	NCORE	4/5/2011	64101-1	014	Continuous	Met-One BAM 1020 Barometer
	RH	NCORE	11/4/2013	62201	061	Continuous	Met-One Relative Humidity Sensor
	Ambient Temp @ 3 m	NCORE	4/1/2011	62101-2	061	Continuous	Met-One Temp Sensor
	Ambient Temp @ 10 m	NCORE	4/1/2011	62101-1	061	Continuous	Met-One Temp Sensor
	$PM_{2.5LC}$ Speciation	NCORE/CSN	1/1/2015	Multiple[1]	Multiple[1]	1/3	URG 3000N

Site Name/Location	Pollutant Parameter	Monitor Designation	AQS Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
A Street/ Fairbanks 02-090-0040	$PM_{2.5LC}$ Speciation	NCORE/CSN	1/1/2015	Multiple[1]	Multiple[1]	1/3	Met-One Super SASS $PM_{2.5}$ LC
	$PM_{2.5LC}$	SLAMS	7/18/2019	88101-1	145	1/1	Thermo Scientific Sequential Partisol 2025i (VSCC)
	$PM_{2.5LC}$	SLAMS	11/29/2018	88501-3 88502-3	731	Continuous	Met-One BAM 1020 (SCC)
	WD Vector 3 m WD Scalar	SPM	12/4/2019	61104-2 61102-2	068	Continuous	RM Young Sonic Anemometer
	WS Vector 3 m WS Scalar	SPM	12/4/2019	61103-2 61101-2	068	Continuous	RM Young Sonic Anemometer
	WD Vector 10 m WD Scalar	SPM	1/31//2019	61104-1 61102-1	068	Continuous	RM Young Sonic Anemometer
	WS Vector 10 m WS Scalar	SPM	1/31/2019	61103-1 61101-1	068	Continuous	RM Young Sonic Anemometer
Hurst Road/ North Pole 02-090-0035	$PM_{2.5LC}$	SLAMS	3/1/2012	88101-1	145	1/1	Thermo Scientific Sequential Partisol 2025i (VSCC)
	$PM_{2.5LC}$ collocate	SLAMS	7/19/2019[2]	88101-2	145	1/3	Thermo Scientific Sequential Partisol 2025i (VSCC)

Site Name/Location	Pollutant Parameter	Monitor Designation	AQS Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
Hurst Road/ North Pole 02-090-0035	$PM_{2.5LC}$	SLAMS	3/1/2012	88501-3 88502-3	731	Continuous	Met-One BAM 1020 (SCC)
	$PM_{2.5LC}$ Speciation	CSN	8/1/2019	Multiple[1]	Multiple[1]	1/3	URG 3000N
	$PM_{2.5LC}$ Speciation	CSN	8/1/2019	Multiple[1]	Multiple[1]	1/3	Met-One Super SASS
	Ambient Temp 23 m	SPM	9/24/2019	62101-3	061	Continuous	Met-One Temp Sensor
	Ambient Temp 10 m	SPM	9/24/2019	62101-1	061	Continuous	Met-One Temp Sensor
	Ambient Temp 3 m	SPM	9/24/2019	62101-2	061	Continuous	Met-One Temp Sensor
	WD Vector 23 m WD Scalar	SPM	9/24/2019	61104-3 61102-3	061	Continuous	Met-One Sonic Anemometer
	WS Vector 23 m WS Scalar	SPM	9/24/2019	61103-3 61101-3	061	Continuous	Met-One Sonic Anemometer
Hurst Road/ North Pole 02-090-0035	WD Vector 10 m WD Scalar	SPM	9/24/2019	61104-1 61102-1	061	Continuous	Met-One Sonic Anemometer

Site Name/Location	Pollutant Parameter	Monitor Designation	AQS Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
	WS Vector 10 m WS Scalar	SPM	9/24/2019	61103-1 61101-1	061	Continuous	Met-One Sonic Anemometer
	WD Vector 3 m WD Scalar	SPM	9/24/2019	61104-2 61102-2	061	Continuous	Met-One Sonic Anemometer
	WS Vector 3 m WS Scalar	SPM	9/24/2019	61103-2 61101-2	061	Continuous	Met-One Sonic Anemometer

[1] Multiple AQS codes are used to identify individual chemical species
[2] Located at Fairbanks State Office Building (FSOB) from 5/17/2018 to 7/18/2019

Table 3-9: Juneau µSA: AQS Codes as of May 2020

STD = standard conditions of temperature and pressure; LC = local (actual) conditions of temperature and pressure

Site Name/Location	Pollutant Parameter	Monitor Designation	Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
Floyd Dryden Middle School/ Juneau 02-110-0004	PM_{10STD}/ PM_{10LC}	SLAMS	7/30/2018	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020
	$PM_{2.5LC}$	SLAMS	8/21/2009	88101-3	170	Continuous	Met-One BAM 1020 (VSCC)

Table 3-10: Bethel: AQS Codes as of May 2020

STD = standard conditions of temperature and pressure; LC = local (actual) conditions of temperature and pressure

Site Name/Location	Pollutant Parameter	Monitor Designation	Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
Bethel 02-050-0001	PM_{10STD}/ PM_{10LC}	SPM	5/23/2018	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020
	$PM_{2.5LC}$	SPM	5/23/2018	88501-3 88502-3	731	Continuous	Met-One BAM 1020 (SCC)

Table 3-11: May 2020 Site Level Monitoring Objectives

Site Name	AQS ID	Pollutant(s)	Monitoring Objectives 40 CFR Part 58 App D 1.1.1
Garden	02-020-0018	$PM_{10}/PM_{2.5}/CO$	(b) Typical concentrations (population density based) (d) General background concentration levels
Laurel	02-020-0045	PM_{10}	(a) Highest concentrations expected in area (c) Impact of significant sources/source categories
Parkgate	02-020-1004	PM_{10}	(b) Typical concentrations (population density based) (d) General background concentration levels
NCore	02-090-0034	$PM_{10}/PM_{2.5}/PM_{10\text{-}2.5}/CO/SO_2/O_3/NO/NOy$/Speciation	(b) Typical concentrations (population density based) (d) General background concentration levels
Hurst Road	02-090-0035	$PM_{2.5}$/Speciation	(a) Highest concentrations expected in area
A Street	02-090-0040	$PM_{2.5}$	(a) Highest concentrations expected in area
Butte	02-170-0008	$PM_{10}/PM_{2.5}$	(c) Impact of significant sources/source categories (a) Highest concentrations expected in area
Bethel	02-050-0001	$PM_{10}/PM_{2.5}$	(b) Typical concentrations (population density based) (d) General background concentration levels
Floyd Dryden Middle School	02-110-0004	$PM_{10}/PM_{2.5}$	(b) Typical concentrations (population density based) (d) General background concentration levels

Table 3-12: 2020 Anchorage MSA Instrument-Level Monitoring Purposes and AQS Monitoring Objective

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
Garden/ Anchorage 02-020-0018	PM_{10STD}/PM_{10LC}	81102-3/85101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
	CO	42101-1	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
Laurel/ Anchorage 02-020-0045	PM_{10STD}/PM_{10LC}	81102-3/85101-3	Source Oriented Highest Concentration	-Provide timely air pollution information -Determine ambient air quality standard compliance
Parkgate/ Eagle River 02-020-1004	PM_{10STD}/PM_{10LC}	81102-3/85101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
Butte/ Mat-Su Valley/ 02-170-0008	PM_{10STD}/PM_{10LC}	81102-3/85101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88101-3	Population exposure Highest Concentration	-Provide timely air pollution information -Determine ambient air quality standard compliance

Table 3-13: 2020 FNSB Instrument-Level Monitoring Purposes and AQS Monitoring Objective

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
NCore/ Fairbanks 02-090-0034	PM_{10STD}/ PM_{10LC}	81102-3/ 85101-3	Population exposure	-Provide timely air pollution information - Determine ambient air quality standard compliance -Support air pollution research studies

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
	$PM_{2.5LC}$	88101-3	Population exposure	-Provide timely air pollution information -Support air pollution research studies
	$PM_{2.5LC}$	88101-1/2	Population exposure	-Determine ambient air quality standard compliance -Support air pollution research studies
	PM_{10LC} - $PM_{2.5LC}$	86101-1	Population exposure	-Determine ambient air quality standard compliance -Support air pollution research studies
	CO	42101-1	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies
	SO_2 (1-hr)	42401-1	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies
	SO_2 (5-min)	42401-2	Population exposure	-Determine ambient air quality standard compliance -Support air pollution research studies
	NO_Y	42600-1	Population exposure	-Support air pollution research studies
NCore/ Fairbanks 02-090-0034	NO	42601-2	Population exposure	-Support air pollution research studies

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
	NO_Y-NO	42612-1	Population exposure	-Support air pollution research studies
	O_3	44201-1	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies
	WD	61104-1	Population exposure	-Provide timely air pollution information -Support air pollution research studies
	WS	61103-1	Population exposure	-Provide timely air pollution information -Support air pollution research studies
	BP	64101-1	Population exposure	-Provide timely air pollution information. -Support air pollution research studies
	RH	62201-1	Population exposure	-Provide timely air pollution information. -Support air pollution research studies
	Ambient Temp @ 3 m	62101-2	Population exposure	-Provide timely air pollution information. -Support air pollution research studies
NCore/ Fairbanks 02-090-0034	Ambient Temp @ 10 m	62101-1	Population exposure	-Provide timely air pollution information. -Support air pollution research studies

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
	$PM_{2.5LC}$ Speciation	Multiple*	Population exposure	-Support air pollution research studies -part of CSN
	$PM_{2.5LC}$	88101-1	Population exposure	-Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88501-3/88502-3	Population exposure	-Provide timely air pollution information
	$PM_{2.5LC}$ collocated	88101-2	Population exposure	-Determine ambient air quality standard compliance
Hurst/ North Pole 02-090-0035	$PM_{2.5LC}$	88101-1	Population exposure Highest Concentration	-Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88501-3/88502-3	Population exposure	-Provide timely air pollution information
	$PM_{2.5LC}$ collocated	88101-2	Population exposure	-Determine ambient air quality standard compliance
	Ambient Temp @ 3, 10, & 23 m	62101-2,1,3	Population exposure	-Provide timely air pollution information
	WD Vector/Scalar @ 3, 10 & 23 m	61104-2,1,3 61102-2,1,3	Population exposure	-Provide timely air pollution information
	WS Vector/Scalar @ 3, 10 & 23 m	61103-2,1,3 61101-2,1,3	Population exposure	-Provide timely air pollution information

Table 3-14: 2020 Juneau Instrument-Level Monitoring Purposes and AQS Monitoring Objective

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
Floyd Dryden Middle School/ Juneau 02-110-0004	PM_{10STD}/ PM_{10LC} collocated	81102-3/ 85101-3	Population exposure	-Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance

Table 3-15: 2020 Bethel Instrument-Level Monitoring Purposes and AQS Monitoring Objective

Site Name/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
Bethel/ 02-050-0001	PM_{10STD}/ PM_{10LC}	81102-3/85101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88501-3 88502-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance

Table 3-16: Monitors required by Nonattainment Area (NAA) or Limited Maintenance Plan (LMP)

MSA or μMSA	Site Name/ Location/	AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	Required by NAA or LMP?
Fairbanks MSA	Hurst Road/North Pole	02-090-0035	$PM_{2.5LC}$	88101-1	Fairbanks $PM_{2.5}$ NAA
	NCore/Fairbanks	02-090-0034	CO	42101-1	Fairbanks CO LMP
Anchorage MSA	Garden/Anchorage	02-020-0018	CO	42101-1	Anchorage CO LMP
	Parkgate/Eagle River	02-020-1004	PM_{10STD}	81102-3	Eagle River PM_{10} LMP
Juneau μMSA	Floyd Dryden Middle School/ Juneau	02-110-0004	PM_{10STD}	81102-3	Juneau PM_{10} LMP

Table 3-17: Collocations January 2020

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Method Code	Equipment	Primary or Secondary
Butte/ Matanuska-Susitna Valley 02-170-0008	$PM_{2.5LC}$	88101-3	170	Met-One BAM 1020	Primary
	$PM_{2.5LC}$ collocate	88101-1	143	Thermo Scientific Partisol 2000i	Secondary
Hurst Road/ North Pole 02-090-0035	$PM_{2.5LC}$	88101-1	145	Thermo Scientific Partisol 2025i	Primary
	$PM_{2.5LC}$ collocate	88101-2	145	Thermo Scientific Partisol 2025i	Secondary
NCore/ Fairbanks 02-090-0034	PM_{10STD}	81102-3/ 85101-3	122	Met-One BAM 1020	Primary
	PM_{10STD} collocate	81102-1/ 85101-1	126	Thermo Scientific Partisol 2000i	Secondary
Parkgate/Eagle River 02-020-1004	PM_{10STD}	81102-3/ 85101-3	122	Met-One BAM 1020	Primary
	PM_{10STD} collocate	81102-1/ 85101-1	126	Thermo Scientific Partisol 2000i	Secondary

3.5 MONITORING WAIVERS

3.5.1 LEAD SOURCE ORIENTED MONITORING

To meet source-oriented lead monitoring requirements and after consultation with EPA, DEC decided to pursue a modeling demonstration to show that lead concentrations at the ambient boundary of the Red Dog Mine meet the new lead standard. On August 11, 2016, EPA approved the State of Alaska's waiver request for lead monitoring at the Red Dog Mine based on the results of dispersion modeling. The results of the modeling showed that the maximum ambient air 3-month rolling average lead concentration at the mine boundary did not exceed 50 percent of the lead NAAQS. Pursuant to 40 CFR Part 58 Appendix D, section 4.5(a)(ii), this waiver must be renewed every 5 years as part of the Alaska 5-year Air Monitoring Network Assessment. A copy of the EPA approval letter can be found at https://dec.alaska.gov/media/10608/red-dog-mine-lead-monitoring-waiver-letter-epa-081116.pdf. DEC is currently working with Teck Alaska Inc., the operator of the Red Dog Mine, on an updated modeling analysis, which will be used for an update waiver request. The intent is to be able to request the waiver prior to July 1, 2020.

3.5.2 HARRISON CT (BUTTE) SITING

DEC requested EPA waive requirements under 40 CFR 58 Appendix E, mainly in regards to several spruce trees that have grown up on the adjacent private property. EPA granted the waiver on June 4th, 2019. See link below.
https://dec.alaska.gov/media/16991/butte-site-siting-requirement-waiver-letter-epa-06032019.pdf

3.5.3 ANCHORAGE MSA OZONE MONITORING

On October 15th, 2018 EPA waived the ozone monitoring requirements for the Anchorage MSA. The population of the MSA triggered a monitoring requirement, but previous ozone measurements in several areas of the MSA showed ozone concentrations well below 80% of the NAAQS. The waiver approval can be found at the link below.
http://dec.alaska.gov/media/10956/2017-air-monitoring-network-plan-ozone-waiver.pdf

4. NETWORK MODIFICATIONS COMPLETED IN 2019 AND 2020

4.1 FAIRBANKS STATE OFFICE BUIDLING SITE SHUTDOWN

On July 12th, 2019, DEC shut down the SOB site in Fairbanks. The two Thermo Scientific Partisol 2025 sequential FRM samplers were distributed to different sites. One was used to establish the new A Street SLAMS site and the second one was set up as the new collocated monitor at the Hurst Road site in North Pole. The EPA approval of the site shutdown can be found at the bottom of the DEC Air Monitoring website: http://dec.alaska.gov/air/air-monitoring/monitoring-plans/ .

4.2 NEW SLAMS SITE AT A-STREET

DEC established a new maximum impact $PM_{2.5}$ monitoring site in the Fairbanks Air Quality Zone at the Nordale Elementary School. The new A Street site is equipped with a Thermo Scientific Partisol 2025 sequential FRM sampler and a Met One BAM 1020 with a Sharp Cut Cyclone to provide AQI information. The site went into operation on November 29th, 2018 and began regulatory monitoring July 15th, 2019.

4.3 SPECIATION AND $PM_{2.5}$ COLLOCATION AT HURST ROAD

DEC started speciation sampling at the Hurst Road on August 1, 2019. EPA OAQPS provided DEC with a Met One SuperSASS and URG 3000N for the site.
A Thermo Scientific Sequential Partisol 2025i $PM_{2.5}$ sampler was set-up at the Hurst Road site on July 18th, 2019, after the Fairbanks State Office site was discontinued.

4.4 DISCONTINUATION OF NCORE NO_X MONITORING

DEC discontinued NO_x sampling at NCore on October 1st, 2019. DEC conducted the sampling to better understand winter time nitrogen chemistry. The required NO_y sampling continues.

4.5 NCORE INSTRUMENTATION SWAP OUT

DEC received state funding in SFY20 to replace aging equipment. Most of the original NCore gaseous analyzers still in operation were purchased in 2011 and are being replaced. DEC has ordered replacement analyzers and will place them into service as staffing and social distancing requirements due to COVID 19 allow.

5. Planned Network Modifications For 2020/21

While DEC received a waiver from EPA regarding the siting issues at the Butte site, DEC is committed to finding a new location for the maximum PM site for the Anchorage MSA. DEC will develop a saturation study for the winter 2020/21 to determine potential alternate site locations. After EPA approval of a new location, DEC will establish a new SPM site and collect FEM data for at least one calendar year to establish a correlation to the Harrison Ct Butte site. If the data are deemed acceptable by EPA, DEC will then discontinue the Butte SLAMS site and move it to the new location replacing the SPM station.

Appendix A **Network Evaluation Forms**

Table A-1 $PM_{2.5}$ Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR PM2.5				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE**: 4/10/2020 **EVALUATOR:** D. WARNER				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.7.1(a)	States, and where applicable local agencies must operate the minimum number of required $PM_{2.5}$ SLAMS sites listed in Table D-5 of this appendix. Use the form below and Table D-5 to verify if each of your MSAs have the appropriate number of SLAMS FRM/FEM/ARM samplers.	✓		
4.7.1(b)	Each required SLAMS FRM/FEM/ARM monitoring stations or sites must be sited to represent area-wide air quality in the given MSA (typically neighborhood or urban spatial scale, though micro-or middle-scale okay if it represent many such locations throughout the MSA).	✓		
4.7.1(b)(1)	At least one SLAMS FRM/FEM/ARM monitoring station is to be sited at neighborhood or larger scale in an area of expected maximum concentration for each MSA where monitoring is required by 4.7.1(a).	✓		
4.7.1(b)(2)	For CBSAs with a population of 1,000,000 or more persons, at least one FRM/FEM/ARM $PM_{2.5}$ monitor is to be collocated at a near-road NO_2 station.			✓
4.7.1(b)(3)	For MSAs with additional required SLAMS sites, a FRM/FEM/ARM monitoring station is to be sited in an area of poor air quality.	✓		
4.7.2	Each State must operate continuous $PM_{2.5}$ analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor, in which case no collocation requirement applies.	✓		
4.7.3	Each State shall install and operate at least one $PM_{2.5}$ site to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport (note locations in comment field). Non-reference PM2.5 monitors such as IMPROVE can be used to meet this requirement.	✓		
4.7.4	Each State shall continue to conduct chemical speciation monitoring and analyses at sites designated to be part of the $PM_{2.5}$ Speciation Trends Network (STN).	✓		
Comments:				

MSA Description[1]	MSA population [2,3]	Design Value for years 2017-2019 24-hr/Annual Avg. µg/m^3	Minimum required number of PM2.5 SLAMS FRM/FEM/ARM sites (from Table D-5)	Present number of PM2.5 SLAMS FRM/FEM/ARM sites in MSA	Present number of continuous PM2.5 FEM/ARM analyzers in MSA	Present number of continuous PM2.5 STN analyzers in MSA
Anchorage MSA	410,188					
Municipality of Anchorage	299,970		0	2	2	0
Garden Site		23/6.4	SLAMS/FEM	1	1	0
Parkgate Site		15/4.7	SLAMS/FEM	1	1	0
Matanuska-Susitna Valley Borough	110,218		1	1	3	0
Butte Site		26/5.3	SLAMS/FRM & FEM	1	1	0
Palmer Site		10/3.0	SPM/FRM & FEM	1	1	0
Fairbanks North Star Borough	98,555		1	3	1*	2 speciation
A Street		N/A	SPM/FRM	1	1*	0
NCore Site		29/8.3	NCore/FRM	1	1*	1 speciation
Hurst Rd		65/12.1	SPM/2 FRM	1	1*	1 speciation
City and Borough of Juneau	32,242		0	1	1	0
Floyd Dryden Site		23/6.1	SLAMS/FEM	1	1	0

[1]see https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html

[2]Minimum monitoring requirements apply to the metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3]Population based on population estimates for July 1, 2020 obtained from the Alaska Population Projections: 2017-2045, Alaska Department of Labor and Workforce Development, http://live.laborstats.alaska.gov/pop/projections.cfm.

*MetOne BAM w/ SCC; per discussion with EPA VSCC cyclone removed

Table D-5 of Appendix D to Part 58 – PM2.5 Minimum Monitoring Requirements

MSA population[1, 2]	Most recent 3-year design value ≥85% of any PM2.5 NAAQS[3]	Most recent 3-year design value <85% of any PM2.5 NAAQS[3, 4]
>1 million	3	2
500K to 1 million	2	1
50K to <500K[5]	1	0

[1]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
[2]Population based on latest available census figures. https://www.census.gov/
[3]The $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

Table A-2 PM_{10} Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR PM10				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE:** 4/10/2020 **EVALUATOR:** D. WARNER				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.6(a)	Table D-4 indicates the approximate number of permanent stations required in MSAs to characterize national and regional PM10 air quality trends and geographical patterns. Use the form below and Table D-4 to verify if your PM10 network has the appropriate number of samplers.	✓		
Comments: All of the site locations are based on historical agreements among the EPA, ADEC and (where applicable) local agencies. Two exceedances on April 9, 2016 and November 16, 2018 at Palmer, and two exceedances at Butte on April 24, 2018 and May 10, 2018 2018 cause the entire Anchorage MSA to be categorized as high concentration. DEC qualified the exceedance day data as RJ (high winds). These four days could be the basis for a 2016 EEWR and a 2018 EEWR should EPA request DEC or EPA start another PM_{10} designation process. Thus DEC assumes that medium concentration is applicable when these exceptional events are excluded from the compliance calculations (Table E-5 with assumed EEWRs).			

MSA Description[1]	MSA population[2, 3]	Minimum required number of PM10 stations (from Table D-4)	Present number of PM10 stations in MSA
Anchorage MSA (includes Mat-Su Borough)	410,188	3-4 (high conc)/1-2 (med conc; high winds EE exceedances removed)	4 (SLAMS [1 collocated], 1 SPM)
Fairbanks North Star Borough MSA	98,555	0 (low conc)	1 (NCore, collocated)
City and Borough of Juneau µSA	32,242	0 (low conc)	1 (SLAMS/LMP)

[1]see http://www2.census.gov/econ/susb/data/msa_codes_2007_to_2011.txt

[2]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3]Population based on population estimates for July 1, 2020 obtained from the Alaska Population Projections: 2017-2045, Alaska Department of Labor and Workforce Development, http://live.laborstats.alaska.gov/pop/projections.cfm.

Table D-4 of Appendix D to Part 58 – PM10 Minimum Monitoring Requirements

MSA population[1, 2]	High concentration[2]	Medium concentration[3]	Low concentration[4 5]
>1 million	6-10	4-8	2-4
500K to 1 million	4-8	2-4	1-2
250K to 500K	3-4	1-2	0-1
100K to 250K	1-2	0-1	0

[1]Selection of urban areas and actual numbers of stations per area will be jointly determined by EPA and the State agency.

[2]High concentration areas are those for which ambient PM10 data show ambient concentrations exceeding the PM10 NAAQS by 20 percent or more.

[3]Medium concentration areas are those for which ambient PM10 data show ambient concentrations exceeding 80 percent of the PM10 NAAQS.

[4]Low concentration areas are those for which ambient PM10 data show ambient concentrations less than 80 percent of the PM10 NAAQS.

[5]These minimum monitoring requirements apply in the absence of a design value.

Table A-3 CO Site Evaluation Form

PART 58 APPENDIX D SITE EVALUATION FORM FOR CARBON MONOXIDE (CO)

STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02

EVALUATION DATE: 4/10/2020 **EVALUATOR:** D. Warner

APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
4.2.1(a)	One CO monitor is required to operate collocated with one required near-road NO_2 monitor in CBSAs having a population of 1,000,000 or more persons. If a CBSA has more than one required near-road NO_2 monitor, only one CO monitor is required to be collocated with a near-road NO_2 monitor within that CBSA.				✓
4.2.2(a)	Has the EPA Regional Administrator required additional CO monitoring stations above the minimum number of monitors required in 4.2.1? If so, note location in comment field.		✓		

Comments: The State of Alaska has no CBSA with a population of 1,000,000. Therefore, there are no near-road collocated sites for CO and NO_2. The Garden Site (AQS ID 02-020-0018) is the single CO site currently operating in the Municipality of Anchorage for Limited Maintenance Plan compliance. A single CO SLAMS monitor operated for Limited Maintenance Plan compliance in the Fairbanks North Star Borough at the Old Post Office Building site (AQS 02-090-0002) until 4/30/2014. Since then the Fairbanks North Star Borough multi-pollutant NCore site (02-090-0034) currently is the single CO site for compliance with NCore requirements and for Limited Maintenance Plan compliance in Fairbanks.

MSA Description[1]	CBSA population[2, 3]	Minimum required number of SLAMS CO sites	Present number of SLAMS CO sites in MSA
Combined Municipality of Anchorage and Matanuska-Susitna Borough	410,188	0	1*
Fairbanks North Star Borough	98,555	0	1*

[1]see http://www2.census.gov/econ/susb/data/msa_codes_2007_to_2011.txt

[2]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3]Population based on population estimates for July 1, 2020 obtained from the Alaska Population Projections: 2017-2045, Alaska Department of Labor and Workforce Development, http://live.laborstats.alaska.gov/pop/projections.cfm

* Monitoring sites in both MSAs satisfy their respective CO Limited Maintenance Plans requirements

Table A-4 O_3 Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR OZONE (O_3)				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE**: 4/10/2020 **EVALUATOR:** D. WARNER				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.1(b)	At least one O_3 site for each MSA, or CSA if multiple MSAs are involved, must be designed to record the maximum concentration (note location in comment field).		✓	
4.1(c)	The appropriate spatial scales for O_3 sites are neighborhood, urban, and regional (note deviations in comment field).	✓		
4.1(f)	Confirm that the monitoring agency consulted with EPA R10 when siting the maximum O3 concentration site.	✓		
4.1(i)	O_3 is being monitored at SLAMS monitoring sites during the "ozone season" as specified in Table D-3 of Appendix D to Part 58.	✓		
Comments: DEC received an EPA 5-Year Ozone NAAQS Monitoring Requirement Waiver for the Anchorage MSA: http://dec.alaska.gov/media/10956/2017-air-monitoring-network-plan-ozone-waiver.pdf (Palmer O_3 was discontinued at the end of ozone season 2018. An ozone monitoring site was established in the Fairbanks North Star Borough at the multi-pollutant NCore site (AQS 02-090-0034) in August 2011 and has been operated year-round since then.				

MSA Description[1]	MSA population [2,3]	Minimum required number of SLAMS O_3 sites (from Table D-2)	Present number of SLAMS O3 sites in CBSA	
Combined Municipality of Anchorage and Matanuska-Susitna Valley Borough (MSAs)	410,188	1	0	See EPA ozone waiver link*
Fairbanks North Star Borough	98,555	0	1**	NCore Site

[1]see http://www2.census.gov/econ/susb/data/msa_codes_2007_to_2011.txt

[2]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3]Population based on population estimates for July 1, 2020 obtained from the Alaska Population Projections: 2017-2045, Alaska Department of Labor and Workforce Development, http://live.laborstats.alaska.gov/pop/projections.cfm

* DEC received a EPA 5-Year Ozone NAAQS Monitoring Requirement Waiver for the Anchorage MSA

** Fulfills State of Alaska NCore requirement

Table D-2 of Appendix D to Part 58 - SLAMS O_3 Monitoring Minimum Requirements		
MSA population[1, 2]	Most recent 3-year design value concentrations ≥85% of any O_3 NAAQS[3]	Most recent 3-year design value concentrations <85% of any O_3 NAAQS[3, 4]
>10 million	4	2
4-10 million	3	1
350,000-<4 million	2	1
50,000-<350,000[5]	1	0

[1]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.
[2]Population based on latest available census estimates.
[3]The ozone (O3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

Table D-3 of Appendix D to Part 58—Ozone Monitoring Season by State		
State	Begin month	End Month
Alaska	April	October
Idaho	May	September
Oregon	May	September
Washington	May	September

Table A-5 SO_2 Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR SULFUR DIOXIDE (SO_2)				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE**: 4/10/2020 **EVALUATOR:** D. WARNER				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.4.1	State and, where appropriate, local agencies must operate a minimum number of required SO_2 monitoring sites (based on PWEI calculation specified in 4.4.2 – use Table 1 and 2 below to determine minimum requirement for each CBSA)	✓		
4.4.2(a)(1)	Is the monitor sited within the boundaries of the parent CBSA and is it one of the following site types: population exposure, highest concentration, source impacts, general background, or regional transport?			✓
4.4.3(a)	Has the EPA Regional Administrator required additional SO_2 monitoring stations above the minimum number of monitors required in 4.4.2? If so, note location in comment field.		✓	
4.4.5(a)	Is your agency counting an existing SO2 monitor at an NCore site in a CBSA with a minimum monitoring requirement?			✓
Comments: As evident from the calculations shown below, the State of Alaska has no CBSAs which require SO_2 monitoring. The operating SO_2 monitor is located at the multi-pollutant NCore site in the Fairbanks North Star Borough operated for compliance with NCore site requirements.				

Table 1.

CBSA Description[1]	CBSA population[1, 2]	total amount of SO2 in tons per year emitted within the CBSA (from 2014 NEI[4])	PWEI (population x total emissions ÷ 1,000,000)	Minimum required number of SO_2 monitors in CBSA (see Table 2 below)	Present number of SO_2 monitors in CBSA
Combined Municipality of Anchorage and Matanuska-Susitna Valley Borough (MSA)	410,188	635.5	253.7	0	0
Fairbanks North Star Borough (MSA)	98,555	2390.8	236.6	0	1*
City and Borough of Juneau (µSA)	32,242	712.7	22.9	0	0
North Slope Borough	9,872	1235.0	12.2	0	0

[1] see http://www2.census.gov/econ/susb/data/msa_codes_2007_to_2011.txt

[2]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3]Population based on population estimates for July 1, 2020 obtained from the Alaska Population Projections: 2017-2045, Alaska Department of Labor and Workforce Development, http://live.laborstats.alaska.gov/pop/projections.cfm.

[4]see https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data

*Satisfies NCore requirement

Table 2. Minimum SO_2 Monitoring Requirements (Section 4.4.2 of App D to Part 58)

PWEI (Population weighted Emission Index) Value	Required number of SO_2 monitors
>= 1,000,000	3
>= 100,000 but < 1,000,000	2
>= 5,000 but < 100,000	1

Table A-6 NO_2 Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR NITROGEN DIOXIDE (NO_2)				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE**: 4/10/2020 **EVALUATOR:** D. WARNER				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.3.2(a)	Near-road NO2 Monitors: One microscale near-road NO_2 monitoring station in each CBSA with a population of 1,000,000 or more persons.			✓
4.3.2(a)	Near-road NO2 Monitors: An additional near-road NO_2monitoring station is required for any CBSA with a population of 2,500,000 persons, or in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT count.			✓
4.3.2(b)	Near-road NO2 Monitors: Measurements at required near-road NO_2 monitor sites utilizing chemiluminescence FRMs must include at a minimum: NO, NO_2, and NO_X			✓
4.3.3(a)	Area-wide NO2 Monitoring: One monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO_2 concentrations representing the neighborhood or larger spatial scales.			✓
Comments: The State of Alaska has no CBSA with a population of 1,000,000. The Fairbanks North Star Borough is currently analyzing for NO, NOy, and Difference, which satisfies the NCore requirement for NO2.				

Table 1

CBSA Description[1]	CBSA population[2, 3] (2010)	Required number of Near-road NO_2 sites	Present number of Near-road NO_2 sites	Required number of Area-wide NO_2 sites	Present number of Area-wide NO_2 sites
Combines Municipality of Anchorage and Matanuska-Susitna Valley Borough (MSA)	410,188	0	0	0	0
Fairbanks North Star Borough (MSA)	98,555	0	0	0	0*
City and Borough of Juneau (µSA)	32,242	0	0	0	0

[1]see http://www2.census.gov/econ/susb/data/msa_codes_2007_to_2011.txt

[2]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3]Population based on population estimates for July 1, 2020 obtained from the Alaska Population Projections: 2017-2045, Alaska Department of Labor and Workforce Development, http://live.laborstats.alaska.gov/pop/projections.cfm

*NCore site requirement is satisfied with NOy monitoring

Appendix B **Summary of Monitoring Path & Siting Criteria Evaluation Forms**

Table B-1 Summary of Appendix E Forms: $PM_{2.5}$, PM_{10}, & $PM_{10-2.5}$

	Garden	Parkgate	Laurel*	Butte	Hurst Road	A Street	NCore	Floyd Dryden	Bethel
Parameter(s)	$PM_{2.5}$ & PM_{10}	$PM_{2.5}$ & PM_{10}	PM_{10}	$PM_{2.5}$ & PM_{10}	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$, PM_{10} & $PM_{10-2.5}$	$PM_{2.5}$ & PM_{10}	PM2.5 & PM10
Address	1600 E 16th Ave Anchorage	11723 Old Glenn Hwy, Eagle River	4335 Laurel St Anchorage	Harrison Ct Butte	3288 Hurst Rd North Pole	397 Hamilton Ave, Fairbanks	809 Pioneer Rd. Fairbanks	Floyd Dryden Middle School, Juneau	4th Ave, Bethel
AQS ID	02-020-0018	02-020-1004	02-020-0045	02-170-0008	02-090-0035	02-090-0040	02-090-0034	02-110-0004	02-050-0001
2. HORIZONTAL AND VERTICAL PLACEMENT	Criteria met, 8m	Criteria met, 7m	Criteria met, 7m	Criteria met, 4m	Criteria met, 4m	Criteria met, 4m	Criteria met, 4m	Criteria met, 7m	Criteria met, 7m
3. SPACING FROM MINOR SOURCES (a)	Criteria met, neighborhood	Criteria met	Criteria met, max impact site, winter graveled streets	Criteria **not** met, gravel cul-de-sac**	Criteria met	Criteria met	Criteria met, ~160m to Diving Duck Roasters, ~450m to power plant	Criteria met	No, on gravel pad & next to gravel roads
4. SPACING FROM OBSTRUCTIONS (a)	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted
4. SPACING FROM OBSTRUCTIONS (b)	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted
5. SPACING FROM TREES (a)	Criteria met, >10 m	Criteria met, >10 m	Criteria met, no trees within 200 m	Criteria **not** met, 5.5 m**	Criteria met, >10 m	Criteria met, >10 m	Criteria met, none	Criteria met, 12 m tall 25 m away	Criteria met
5. SPACING FROM TREES (c)*			Criteria met						
6. SPACING FROM ROADWAYS	Criteria met, ~14 m to road	Criteria met, 23 & 44 m to roads	Criteria met[t], 15 m to road, maximum exposure site	Criteria met, road > 150 m	Criteria met, 23 m to road	Criteria met, 23 m to road	Criteria met, ~ 70 m to road	Criteria met, 65 m to road	>30m to 5th Ave
Changes that might compromise siting?	No	No	No	No	No	No	New trees 10m	No	No

*Laurel is the only microscale site in Alaska's PM network
** See Butte siting waiver (Section 3.5.2)

Table B-2 Summary of Appendix E Forms: CO

	Garden	NCore
Parameter(s)	CO	CO
Address	1600 E. 16th St. Anchorage	809 Pioneer Rd Fairbanks
AQS ID	02-020-0018	02-090-0034
2. HORIZONTAL AND VERTICAL PLACEMENT	Criteria met, 3.1 m	Criteria met, 3 m
3. SPACING FROM MINOR SOURCES	Criteria met, residential	Criteria met, ~160m to Diving Duck Roasters, ~450m to power plant
4. SPACING FROM OBSTRUCTIONS (a)	Criteria met, no obstacles	Criteria met, no obstacles
4. SPACING FROM OBSTRUCTIONS (b)	Criteria met, 180°	Criteria met, unrestricted
5. SPACING FROM TREES (a)	Criteria not met, 7.3 meters tall tree 2.3 meters away from probe	Criteria met, none (see comment below)
5. SPACING FROM TREES (c)	Criteria not met, 2.3 m from spruce dripline	Criteria met, no significant trees < 50 m
6. SPACING FROM ROADWAYS	Neighborhood scale but 7.6 meters from roadway	Neighborhood scale but 85 m from roadway
9. PROBE MATERIAL & RESIDENCE TIME (a)	FEP Teflon	Glass w/ FEP sample lines
9. PROBE MATERIAL & RESIDENCE TIME (c)	Criteria **not** met, 24 seconds[1]	Criteria met, < 5 seconds
Changes that might compromise siting?	No	Trees planted 10 m away from inlet; may be an issue when they grow

[1]CO is a non-reactive gas, so current residence time is not expected to impact quality of measurement. A bypass pump will be added prior to 2020 to improve resident time.

Table B-3 Summary of Appendix E Forms: O_3, SO_2, NO, Diff, and NO_y

	NCore		
Parameter(s)	O_3	SO_2	NO, Diff, & NO_y
AQS ID	02-090-0034		
Address	809 Pioneer Rd. Fairbanks		
2. HORIZONTAL AND VERTICAL PLACEMENT	Criteria met, 3m	Criteria met, 3m	Criteria met, 3m
3. SPACING FROM MINOR SOURCES	Criteria met, ~ 160m to Diving Duck Roasters, ~450m to power plant	Criteria met, ~ 160m to Diving Duck Roasters, ~450m to power plant	Criteria met, ~ 160m to Diving Duck Roasters, ~450m to power plant
3. SPACING FROM MINOR SOURCES (b)	Criteria met, no furnaces/flues		
4. SPACING FROM OBSTRUCTIONS (a)	Criteria met, no obstacles	Criteria met, no obstacles	Criteria met, no obstacles
4. SPACING FROM OBSTRUCTIONS (b)	Criteria met, unrestricted 360° airflow	Criteria met, unrestricted 360° airflow	Criteria met, unrestricted 360° airflow
4. SPACING FROM OBSTRUCTIONS (d)			No near-road
5. SPACING FROM TREES (a)	Criteria met, none	Criteria met, none	Criteria met, no significant trees <50 m
5. SPACING FROM TREES (b)		NA	NA
5. SPACING FROM TREES (c)	NA	NA	NA
6. SPACING FROM ROADWAYS	Criteria met, road > ~70m		NA
9. PROBE MATERIAL & RESIDENCE TIME (a)	Glass w/ FEP sample lines	Glass w/ FEP sample lines	Glass w/ FEP sample lines
9. PROBE MATERIAL & RESIDENCE TIME (c)	< 5 seconds	< 5 seconds	< 5 seconds
Changes that might compromise siting?	Trees planted 10 m away from inlet; may be an issue when they grow	Trees planted 10 m away from inlet; may be an issue when they grow	Trees planted 10 m away from inlet; may be an issue when they grow

Table B-4 Blank Part 58 Appendix E Form for PM

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5, and Pb					
SITE NAME:	SITE ADDRESS:				
AQS ID:	EVALUATION DATE:	EVALUATOR:			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale $PM_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	.			
3. SPACING FROM MINOR SOURCES	(a) For neighborhood or larger spatial scales avoid placing the monitor near local, minor sources. The source plume should not be allowed to inappropriately impact the air quality data collected at a site. Particulate matter sites should not be located in an unpaved area unless there is vegetative ground cover year round.				
4. SPACING FROM OBSTRUCTIONS	(a) To avoid scavenging, the inlet must have unrestricted airflow and be located away from obstacles. The separation distance must be at least twice the height that the obstacle protrudes above the probe inlet.				
	(b) The inlet must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential. For particle sampling, a minimum of 2 meters of separation from walls, parapets, and structures is required for rooftop site placement.				
5. SPACING FROM TREES	(a) To reduce possible interference the inlet must be at least 10 meters or further from the drip line of trees.				
	(c) No trees should be between source and probe inlet for microscale sites.				
6. SPACING FROM ROADWAYS	Spacing from roadways is dependent on the spatial scale and ADT count. See section 6.3(b) and figure E-1 for specific requirements.				
Are there any changes that might compromise original siting criteria?					
Other Comments:					

Table B-5 Blank Part 58 Appendix E Form for CO

PART 58 APPENDIX E SITE EVALUATION FORM FOR CO					
SITE NAME:	SITE ADDRESS:				
AQS ID:	EVALUATION DATE:		EVALUATOR:		
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	For neighborhood or larger spatial scale sites the probe must be located 2-15 meters above ground level and must be at least 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.				
3. SPACING FROM MINOR SOURCES	(a) For neighborhood scale avoid placing the monitor probe inlet near local, minor sources. The source plume should not be allowed to inappropriately impact the air quality data collected at a site.				
4. SPACING FROM OBSTRUCTIONS	(a) To avoid scavenging, the probe inlet must have unrestricted airflow and be located away from obstacles. The separation distance must be at least twice the height that the obstacle protrudes above the probe inlet (exception is street canyon or source-oriented sites where buildings and other structures are unavoidable).				
	(b) The probe inlet must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential.				
5. SPACING FROM TREES	(a) To reduce possible interference the probe inlet must be at least 10 meters or further from the drip line of trees.				
	(c) No trees should be between source and probe inlet for microscale sites.				
6. SPACING FROM ROADWAYS	2. (b) Microscale CO monitor probes in downtown areas or urban street canyon locations shall be located a minimum distance of 2 meters and a maximum distance of 10 meters from the edge of the nearest traffic lane.				
	2. (c) Microscale CO monitor inlet probes in downtown areas or urban street canyon locations shall be located at least 10 meters from an intersection and preferably at a midblock location.				
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex) for reactive gases.				
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.				
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.					
Other Comments:					

[1] Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Table B-6 Blank Part 58 Appendix E Form for O_3

PART 58 APPENDIX E SITE EVALUATION FORM FOR O3					
SITE NAME: SITE ADDRESS: AQS ID EVALUATION DATE EVALUATOR					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	2-15 meters above ground level. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.				
3. SPACING FROM MINOR SOURCES	(a) For neighborhood scale avoid placing the monitor probe inlet near local, minor sources. The source plume should not be allowed to inappropriately impact the air quality data collected at a site.				
	(b) To minimize scavenging effects, the probe inlet must be away from furnace or incineration flues or other minor sources of SO_2 or NO.				
4. SPACING FROM OBSTRUCTIONS	(a) To avoid scavenging, the probe inlet must have unrestricted airflow and be located away from obstacles. The separation distance must be at least twice the height that the obstacle protrudes above the probe inlet.				
	(b) The probe inlet must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential.				
5. SPACING FROM TREES	(a) To reduce possible interference the probe inlet must be at least 10 meters or further from the drip line of trees.				
	(c) No trees should be between source and probe inlet for microscale sites.				
6. SPACING FROM ROADWAYS	See spacing requirements table below				
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex).				
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.				
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.					
Other Comments:					

[1]Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

[2]Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Table B-7 Blank Part 58 Appendix E Form for SO_2

PART 58 APPENDIX E SITE EVALUATION FORM FOR SO2					
SITE NAME_ _____ SITE ADDRESS____ _____ AQS ID_____ EVALUATION DATE_____ EVALUATOR ___ _____					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	2-15 meters above ground level. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.				
3. SPACING FROM MINOR SOURCES	(a) For neighborhood scale avoid placing the monitor probe inlet near local, minor sources. The source plume should not be allowed to inappropriately impact the air quality data collected at a site.				
4. SPACING FROM OBSTRUCTIONS	(a) To avoid scavenging, the probe inlet must have unrestricted airflow and be located away from obstacles. The separation distance must be at least twice the height that the obstacle protrudes above the probe inlet.				
	(b) The probe inlet must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential.				
5. SPACING FROM TREES	(a) To reduce possible interference the probe inlet must be at least 10 meters or further from the drip line of trees.				
	(c) No trees should be between source and probe inlet for microscale sites.				
6. SPACING FROM ROADWAYS	There are no roadway spacing requirements for SO2.				
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex).				
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.				
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.					
Other Comments:					

Table B-8 Blank Part 58 Appendix E Form for NO, NOx, NO_2, and NO_y

PART 58 APPENDIX E SITE EVALUATION FORM FOR NO, NOx, NO2, and NOy					
SITE NAME_____ SITE ADDRESS _____ AQS ID_____ EVALUATION DATE_____ EVALUATOR _____					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	For neighborhood or larger spatial scale sites the probe must be located 2-15 meters above ground level and must be at least 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. Microscale near-road NO_2 monitoring sites are required to have sampler inlets between 2 and 7 meters above ground level. If located near the side of a building or wall, then locate the sampler probe on the windward side relative to the prevailing wind direction during the season of highest concentration potential.				
3. SPACING FROM MINOR SOURCES	(a) For neighborhood scale and larger avoid placing the monitor probe inlet near local, minor sources. The source plume should not be allowed to inappropriately impact the air quality data collected at a site.				
4. SPACING FROM OBSTRUCTIONS	(a) To avoid scavenging, the probe inlet must have unrestricted airflow and be located away from obstacles. The separation distance must be at least twice the height that the obstacle protrudes above the probe inlet.				
	(b) The probe inlet must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential.				
	(d) For near-road NO_2 monitoring stations, the monitor probe shall have an unobstructed air flow, where no obstacles exist at or above the height of the monitor probe, between the monitor probe and the outside nearest edge of the traffic lanes of the target road segment.				
5. SPACING FROM TREES	(a) To reduce possible interference the probe inlet must be at least 10 meters or further from the drip line of trees.				
	(c) No trees should be between source and probe inlet for microscale sites.				
6. SPACING FROM ROADWAYS	See spacing requirements table below				
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex).				
	(c) Sampling probes for reactive gas monitors at NCore and at NO_2 sites must have a sample residence time less than 20 seconds.				
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.					
Other Comments:					

Table B-9 Roadway ADT for CO, O_3, SO_2, and NO suite Part 58 Appendix E Forms

Roadway average daily traffic, vehicles per day	Minimum distance[1] (meters)
≤10,000	10
15,000	25
20,000	45
30,000	80
40,000	115
50,000	135
≥60,000	150

Appendix C **Additional Monitoring Projects**

SMOKE MONITORING FOR AIR QUALITY ADVISORIES

Smoke from wildland fires can affect large areas and impact air quality in regions both close to and far away from the burning fire. Almost every summer, large areas of the State are impacted by smoke from wildland fires, with air quality degrading into the very unhealthy to hazardous range. DEC assists the Alaska Fire Service in assessing air quality impacts in areas affected by wildland fires and provides information needed to protect public health. The DEC Air Quality Division uses two separate methods to assess air quality impacts and issue air quality advisories statewide: monitoring data if available and visibility information. Due to current budget and staffing levels, DEC will not explore the use of low cost sensors during the 2021 wildland fire season, and will attempt to support and leverage other agencies with sampling equipment to place monitors where needed. The DEC meteorologist or air quality staff with assistance from the National Weather Service (NWS) use meteorological and air monitoring data to forecast smoke movement and predict where air quality impacts might occur.

VOLCANIC ASH MONITORING

The Alaska Volcano Observatory and DEC will cooperate on volcanic ash monitoring should a volcano begin erupting. DEC uses a PM_{10} Met One E-BAM with an AIRSIS communication system that allows the DEC meteorologist to review data in near real time and issue air quality advisories for affected areas during volcanic eruptions.

RADIATION MONITORING

The State has three radiation monitoring network sites (RadNet) located in Anchorage, Fairbanks, and Juneau. Various agencies and groups operate the equipment. The site in Anchorage is operated by the Alaska Department of Health and Social Services. The DEC Air Quality Division operates the sites in Fairbanks and Juneau.

JUNEAU CRUISE SHIP AMBIENT AIR IMPACT SATURATION STUDY

DEC conducted a study of air quality impacts from cruise ship activity in Juneau during the 2019 cruise ship season. The project was a result of increased public complaints regarding air emissions from cruise ships and changes to ship operations and numbers. DEC deployed a network of low cost particulate matter sensors in downtown Juneau. A draft summary report will be published on the DEC website.

While the PM sensors provided initial insight about severity and pollution patterns, the study indicated only short term impacts in the range of a few hours. Future monitoring therefore should include gaseous sensors for SO_2 and NO_2, to better characterize potential impacts from diesel emissions from cruise ships. DEC purchased equipment for use during the 2020 season, but

delivery has been delayed. DEC will develop a monitoring plan once the equipment has been tested and integrated into the DEC data acquisition system. It is expected that monitoring with survey grade equipment will be established in several port communities in 2020 and 2021.

Appendix D **Improve Network**

The Alaska Regional Haze SIP includes a monitoring plan for measuring, estimating, and characterizing air quality and visibility impairment at Alaska's four Class I areas. The haze species concentrations are measured as part of the IMPROVE monitoring network deployed throughout the United States. Alaska uses four IMPROVE monitoring stations representing three of the four Class I Areas. Three of these areas (Denali National Park and Preserve, Simeonof and Tuxedni National Wildlife Refuges) have monitors deployed specifically in response to Regional Haze Rule requirements. There is no air monitoring being conducted at the Bering Sea Wilderness Area due to its remote location.

Monitoring site information and additional Regional Haze information are available at DEC's Regional Haze website, http://dec.alaska.gov/air/anpms/regional-haze. Monitoring data and additional information for the Alaskan IMPROVE sites are available from the EPA website, http://vista.cira.colostate.edu/improve.

Appendix E **NAAQS Summary Tables**

Table E-1 $PM_{2.5}$ DV under local/actual conditions (µg/m^3); exceedance exceptional event values not included

$PM_{2.5}$ Monitoring Sites	AQS Site ID	98th Percentile			Weighted Annual Mean			2019 Design Value	
		2019	2018	2017	2019	2018	2017	24-hour	Annual
Garden/ Anchorage	02-020-0018	24.6	17.7	26.9	7.3	5.4	5.5	23	6.1
Parkgate / Eagle River	02-020-1004	18.5	14.4	15.4	8.6*	5.1	4.2	15	4.7
Butte/ Matanuska-Susitna Valley	02-170-0008	27.7	19.2	29.7	6.5	4.6	5.7	26	5.3
Palmer/ Matanuska-Susitna Valley	02-170-0012	18.7	8.5	11.1	6.3*	3.3	3.2	10	3.0
State Office Building/ Fairbanks	02-090-0010	27.7	27.0*	38.0	8.6*	7.6*	9.1*	31	8.1
NCore Site/ Fairbanks	02-090-0034	27.7	25.3	34.4	8.4	7.3	8.6	29	8.3
Hurst Rd/ North Pole	02-090-0035	65.0	52.8	75.5	11.4	10.9	13.9	65	12.1
A Street/Fairbanks	02-090-0040	34.1		-	7.8*	-	-	-	-
Floyd Dryden/Juneau	02-110-0004	24.9	22.1	22.4	6.8	6.9	2.6	23	6.2
Bethel***	02-050-0001	9.1	-**	-	3.4*	-	-	-	-

* Annual values did not meet data completeness criteria
**Did not meet completeness; A Street began operation 11/29/2018, Bethel began operation 6/6/2018
***non-FEM SPM monitor used for AQI calculations

Table E-2 DV O_3 (ppb)

O_3 Monitoring Sites	Site ID	2019 Valid Days	2019 Percent Compl	2019 4th Max	2018 Valid Days	2018 Percent Compl	2018 4th Max	2017 Valid Days	2017 Percent Compl	2017 4th Max	3-Years Percent Compl	3-Years Design Value
NCore/ Fairbanks	02-090-0034	298	82	0.047	324	89	0.041	277	76	0.048	82	0.045

Table E-3 DV SO_2 (ppb)

SO_2 Monitoring Sites	Site ID	2019 99th Percentile	2019 Completed Quarters	2018 99th Percentile	2018 Completed Quarters	2017 99th Percentile	2017 Completed Quarters	3-yrs Design Value
NCore/Fairbanks	02-090-0034	30	4	37	4	35	4	34

Table E-4 DV NO_2 (ppb)

NO_2 Monitoring Sites	Site ID	2019 98th Percentile	2019 Completed Quarters	2018 98th Percentile	2018 Completed Quarters	2017 98th Percentile	2017 Completed Quarters	3-yrs Design Value
NCore/ Fairbanks	02-090-0034	53.2	2	53.8	4	55.2	4	54 *insufficient data

Table E-5 PM_{10} DV under standard conditions (µg/m^3); exceedance exceptional event values not included

PM_{10} Monitoring Sites*	Site ID	2019			2018			2017		
		Exceed-ances	1st Max 24-hr	2nd Max 24-hr	Exceed-ances	1st Max 24-hr	2nd Max 24-hr	Exceed-ances	1st Max 24-hr	2nd Max 24-hr
Garden/ Anchorage	02-020-0018	0	88	87	0	59	59	0	68	65
Laurel/Anchorage	02-020-0045	0	105	98	0	128	102	0	99	87
NCore/ Fairbanks	02-090-0034	0	124 (209, 200, 166, & 160 wildland fire EEs)	84	0	72	59	0	37	36
Butte/ Matanuska-Susitna Valley	02-170-0008	1	148 (186 high wind EE)	85	0	52 (187 & 155 high wind EEs)	49	0	113	107
Palmer/ Matanuska-Susitna Valley	02-170-0012	0	90	58	0	131 (255 high wind EE)	80	1	156	119
Bethel	02-050-0001	0	124	99	--	108**	104**	--	--	--

* See Juneau and Eagle River Limited Maintenance Plans for Floyd Dryden and Parkgate
** Began operation 6/6/18; did not meet completeness