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2022

Annual Air Quality Monitoring Network Plan

Alaska Department of
Environmental Conservation

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EXECUTIVE SUMMARY

This 2022 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 2023.

Most of the air monitoring activities are focused on population centers and areas that have shown in the past to have air quality problems. Budget cuts over the past several years allow DEC only to operate the minimum regulatory required ambient monitoring network. 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 2021 and 2022 were the transition to a new data acquisition system. The switch to Agilaire affected the entire monitoring network and took roughly three quarters of a year to complete. Acceptance testing was conducted in April 2022. Features of the new system include e-logbooks, asset tracking and automated data validation procedures.

DEC established new and moved several particulate matter (PM) precision collocation sites.

- On January 21, 2022, PM₁₀ collocation was added to the Floyd Dryden SLAMS site.
- A second Thermo Scientific Inc. Partisol 2000i is used to collect PM_{2.5} precision data at the site. Collocation started on September 28, 2021.
- On February 22, 2022, the PM_{2.5} collocation monitor for the Met One BAM 1020 network was moved from the Harrison Ct (Butte) site to Anchorage Trinity Church (Garden) site.
- The PM₁₀ FRM for the BAM 1020 network was moved from the Eagle River Parkgate site to the Anchorage Garden site on February 24, 2022.

On March 10, 2022, DEC added a Thermo Scientific 43i Sulfur Dioxide monitor to the North Pole Hurst Rd site. Hurst Road is the maximum impact PM_{2.5} monitoring site in the Fairbanks nonattainment area and also houses a Chemical Speciation Network site. The SO₂ data will be helpful for interpreting the sulfate information gained from the speciation monitors.

There are currently no planned modifications for the 2023 regulatory network other than the relocation of the Harrison Ct (Butte) particulate matter monitoring site. DEC is in the process of collecting data in preparation of moving the Harrison Ct. (Butte) site. DEC established temporary monitoring at two locations in December 2021. The goal is to collect at least one year of continuous PM_{2.5} data concurrently with the Harrison Ct site for long-term data record comparison.

EPA's American Rescue Plan direct grant award will fund monitoring site improvements for the DEC SLAMS network that include the replacement of aging Chemical Speciation Network samplers at the NCore site, an upgrade of the heating and ventilation air conditioning system (HVAC) for the A-Street site PM_{2.5} sampling shelter, the purchase replacement particulate



matter sampling shelters for the new Butte and the Juneau Mendenhall Valley sampling sites, and the purchase of a Primary Flow Standard for mass flow controller (MFC) calibrations. While these site improvements will allow for more stable site operations and improve data quality and completeness, none of these items are adding monitoring sites, samplers, or will result in changes to the data in AQS.

Additionally, DEC will expand its low-cost sensor network. While the current long term monitoring network meets the regulatory requirement in terms of number of monitoring stations and monitored pollutants, it is confined to the population centers and does not adequately characterize conditions in outlying and rural communities. Advances in sampling technology allowed for the development and commercial sale of smaller, portable, and cheaper sensors. This new low-cost sensor technology provides DEC the opportunity to expand monitoring into areas across the state that previously was cost prohibitive.

DEC currently owns 18 AQMesh sensor pods. These sensor pods will collect baseline air quality data, including particulate matter (PM), SO₂, NO, NO₂ and CO. DEC selected 17 communities based on location, interest, and population density. The current proposed communities include Anchorage, Fairbanks, Homer, Juneau, Ketchikan, Kodiak, Kotzebue, Nome, Seward, Sitka, Skagway, Soldotna, and Unalaska/Dutch Harbor. DEC started installation of the AQMesh sensor pods in nine communities during the summer of 2021. Previously limited due to travel restrictions during COVID and the cold winter months, DEC anticipates setting up the remaining 8 sensors, plus a QA sensor by the end of October 2022.

Under the American Rescue Plan Act direct grant award from EPA, DEC will receive funds for twelve additional sensor pods. DEC has identified an additional 12 communities for the AQMesh sensor pod network to provide AQI information across underserved communities in a vast state. Once the funds for the additional 12 sensor pods have been received, DEC will start the procurement process with the goal of installing all additional sensors by the end of October 2023. Tribal communities slated for AQMesh sensor pod locations include: Bethel, Big Lake/Houston, Cordova, Deltana/Delta Junction, Talkeetna, Tok/Northway, and Utqiagvik. Negotiations with other interested tribes started in summer 2022.



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 2022 Annual Monitoring Network 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 2022. This plan shall include all required stations to be operational by January 1, 2023. 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, 2022.

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-PM₁₀ 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 (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), ozone (O₃), 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 (PM₁₀). 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 732,673¹ residents in the state, about 54% of the overall population. The remainder of the population is distributed among the cities of Juneau and Fairbanks, both with populations of just over 30,000 residents,

¹ Based on population estimates for July 1, 2021 obtained from the United States Census Bureau, <https://www.census.gov/quickfacts/fact/table/US/PST045221>



and many 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 land area of the state is approximately 570,641 square miles (1.5 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 (PM₁₀) monitoring;
3. Wildland fire monitoring (PM_{2.5});
4. SO₂ from diesel emissions;
5. Carbon monoxide (CO) monitoring;
6. Rural community and tribal village monitoring (primarily PM₁₀);
7. Lead (Pb) monitoring; and
8. Ozone (O₃) 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 (see **Appendix A**) 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 2020 Census data (**Appendix B**). The four Core Based Statistical Areas (CBSA) include

² Based on the land area coverage, as of 2010, obtained from the 2021 population estimate quick facts page from the United States Census Bureau, <https://www.census.gov/quickfacts/fact/table/US/PST045221>



two Metropolitan Statistical Areas (MSA) and two Micropolitan Areas (μ SA), 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 μ SA and the Ketchikan μ SA, 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	398,807	Municipality of Anchorage	288,121
		Matanuska-Susitna Borough	110,686
Fairbanks, MSA	95,593		
Juneau, μSA	31,973		
Ketchikan, μSA	13,754		

*(based on 2021 population estimates, obtained from the United States Census Bureau, https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-metro-and-micro-statistical-areas.html#par_textimage)

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 μ SA.

Monitoring in the Juneau μ SA focuses on particulate matter monitoring. One monitoring site is required for PM₁₀ based on the PM₁₀ Limited Maintenance Plan. The Mendenhall Valley had been designated as a PM₁₀ 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 PM₁₀ monitoring requirement of 3-4 monitors based on exceedances in 2019 at several sites in the MSA and an elevated concentration in 2021 at the Parkgate site (see Table A-5 in **Appendix A**). The exceedance resulted from a high wind event that prehendend dust from frozen, but not snow-covered, braided riverbeds. In this area of the state high wind events occur semi-regularly in fall and occasionally in early spring. The event was flagged in AQS by DEC, and they have 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 PM₁₀ designation process and/or if EPA requests that DEC submit them for approval.

Based on a 2021 DV of 28 µg/m³, no PM_{2.5} monitoring sites are required in the Anchorage MSA. Currently, the two sites in the Anchorage MSA PM_{2.5} monitoring network exceeds the minimum requirements. 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. The 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	Comments	SLAMS site requirement			
		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
PM₁₀	Two monitoring sites based on PM ₁₀ Limited Maintenance Plans (Juneau and Eagle River). Additional monitors required in Anchorage MSA based on pollution levels.	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
O₃	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
SO₂	NCore site requirement	0	0	0	0
NO₂	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 (see Section 3.5.1 or **Appendix C**, Waiver C-1)



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 per 40 CFR 58 Appendix D, see Section 3.5.3.

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 2022 by DEC and are presented in **Appendix D**.

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 2022 by DEC and are summarized by MSA in **Appendix E**.



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 2022. NCore parameters measured are PM₁₀, PM_{2.5}, PM_{10-2.5}, CO, O₃, SO₂, NO_y, NO, PM_{2.5} chemical speciation, and meteorological parameters. There are four sites that are collocated: Garden (PM_{2.5} and PM₁₀), Hurst Rd. (PM_{2.5}), NCore (PM₁₀), and Floyd Dryden (PM_{2.5} and PM₁₀) which are described further in Table 3-15. All of the primary and secondary monitors are located within 1-4 meters of each other.

Table 3-3: AQS Monitoring Sites as of May 2022

Site Name	Address	Latitude/Longitude ¹	AQS ID	Agency
Garden	3000 East 16 th 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
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: (see Section 3.5.2 or **Appendix C**, Waiver C-2)

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 E** of this report. Monitoring site photos and location maps can be found at: <http://dec.alaska.gov/air/air-monitoring/monitoring-site-information/>. The operation of each monitor is in compliance with the requirements identified in 40 CFR 58 Appendix A. Moreover, all SPM sites are operated like SLAMS and therefore meet these requirements.

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. Table 3-4 lists the CO monitoring sites in Anchorage and Fairbanks.

Table 3-4: CO Monitoring Sites in Anchorage and Fairbanks as of May 2022

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	7.6	Yes ¹
NCore 02-090-0034	Neighborhood	Not applicable	3	360 degrees unobstructed	70	10 m

¹One spruce tree 7.6 m tall and 1.3 m from the building. It is roughly 2.7 m to the NE of the CO probe

3.3.2 PARTICULATE MATTER (PM₁₀ 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 E**).

Table 3-5: PM Monitoring Sites in Alaska as of May 2022

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	1,030 Sunrise Dr 1,630 Airport Heights Dr.	no
Laurel 02-020-0045	Microscale	-	6.4	no obstructions	11	26,600 Tudor Rd	no
Parkgate 02-020-1004	Neighborhood	Neighborhood	10.4	no obstructions	44	11,700 Old Glenn Hwy	no
Butte ² 02-170-0008	Neighborhood	Neighborhood	4.7	no obstructions	150	3,140 ³ , Old Glenn Hwy	yes 5.5 m
A Street 02-090-0040	-	Neighborhood	4.3	no obstructions	5.8 ⁴	1,430 Hamilton Ave 3,840 Farewell Ave	no
NCore 02-090-0034	Neighborhood	Neighborhood	4.5	no obstructions	70	4,760 Philips Field Rd 940 Driveway St	no
Hurst Road 02-090-0035	-	Neighborhood	4.7	no obstructions	21	5,000 Hurst Rd	no
Floyd Dryden 02-110-0004	Neighborhood	Neighborhood	10	no obstructions	100	14,800 Mio- Mendenhall Loop Road	no

¹ Average annual traffic count 2020 traffic data accessed at:
http://dot.alaska.gov/stwdplng/transdata/traffic_AADT_map.shtml

² Site is next to a gravel pad/road so EPA has granted a siting requirement waiver (see Section 3.5.2 or **Appendix C**, Waiver C-2)

³ 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)

⁴ Site is <10m from adjacent A-Street, a paved, low traffic neighborhood street, remainder of site grass covered

3.3.3 N CORE SITE

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



Table 3-6: NCore Gaseous¹ Monitoring and Meteorological Monitoring as of May 2022 in Alaska

Parameter Name	Monitoring Scale	Height (meters)	Spacing from Obstructions (meters)	Spacing from Roadway (meters)	Traffic (VPD)	Trees < 10 m?
NO _y , NO & DIF	Neighborhood	3 ²	no obstructions	70	4760 ³	None
O ₃	Neighborhood	3	no obstructions	70	4760	None
SO ₂ (1 hr & 5 min)	Neighborhood	3	no obstructions	70	4760	None
T _{amb} , WS, & WD	Neighborhood	3	no obstructions	70	4760	None
T _{amb} , WS, & WD	Neighborhood	10	no obstructions	70	4760	None
Relative Humidity	Neighborhood	3	no obstructions	70	4760	None

¹ Excluding CO. For CO see Table 3-4.

² Probe height is 3 meters rather than the 10 meters recommended to remain below the unusually low winter inversion layer.

³ 2020 Philips Field Rd traffic data accessed at: http://dot.alaska.gov/stwdplng/transdata/traffic_AADT_map.shtml

3.4 MONITORING METHODS, DESIGNATION, AND SAMPLING FREQUENCY

Tables 3-7 to 3-15 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 3-15 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. 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 unit 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. PM₁₀, SO₂, 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. However, the NCore site is coded differently, with the secondary PM₁₀ sampler assigned a POC 1 designation since it is part of a course pair. 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 SO₂ 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 F**. 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 G**.

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



Table 3-7: Anchorage MSA: AQS Codes May 2022

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/ Anchorage 02-020-0018	PM ₁₀ STD/ PM ₁₀ LC	SLAMS	1/1/2009 STD 1/1/2015 LC	81102-3/ 85101-3	122	Continuous	Met One BAM 1020 - FEM
	PM ₁₀ STD/ PM ₁₀ LC	SPM	2/24/2022	81102-2/ 85101-2	126	1/6	Thermo Scientific Partisol 2000i - FRM
	PM _{2.5} LC	SLAMS	1/1/2009	88101-3	170	Continuous	Met One BAM 1020 (VSCC) FEM
	PM _{2.5} LC	SPM	2/22/2022	88101-2	143	1/6	Thermo Scientific Partisol 2000i (VSCC) - FRM
	CO	SLAMS	1/1/1979	42101-1	554	Continuous	Thermo Scientific Model 48i-TLE - FRM
Laurel/ Anchorage 02-020-0045	PM ₁₀ STD/ PM ₁₀ LC	SPM	5/28/2015	81102-3/ 85101-3	122	Continuous	Met One BAM 1020 - FEM
Parkgate/ Eagle River 02-020-1004	PM ₁₀ STD/ PM ₁₀ LC	SLAMS	1/1/2009 STD 1/1/2015 LC	81102-3/ 85101-3	122	Continuous	Met One BAM 1020 - FEM
Butte/ Matanuska- Susitna Valley 02-170-0008	PM ₁₀ STD/ PM ₁₀ LC	SPM	8/10/2011 STD 4/11/1998 LC	81102-3/ 85101-3	122	Continuous	Met One BAM 1020 - FEM
	PM _{2.5} LC	SLAMS	8/11/2011	88101-3	170	Continuous	Met One BAM 1020 (VSCC) - FEM



Table 3-8: FNSB monitors: AQS Codes as of May 2022

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

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 ₁₀ STD/ PM ₁₀ LC	NCORE	2/15/2011	81102-3/ 85101-3	122	Continuous	Met One BAM 1020 FEM
	PM _{2.5} LC	SPM	2/15/2011	88501-3 88502-3	731	Continuous	Met One BAM 1020 (SCC) non-FEM
	PM ₁₀ STD/ PM ₁₀ LC collocate	NCORE	11/10/2012	81102-1/ 85101-1	126	1/3	Thermo Scientific Partisol 2000i-FRM
	PM _{2.5} LC	NCORE	11/4/2009	88101-1	145	1/1	Thermo Scientific Sequential Partisol 2025i (VSCC)-FRM
	PM _{2.5} LC	NCORE	5/8/2013	88101-2	143	1/3	Thermo Scientific Partisol 2000i (VSCC)-FRM
	PM ₁₀ LC - PM _{2.5} LC	NCORE	2/15/2011	86101-1	175	1/3	Paired Thermo Scientific Partisol 2000i's
	CO	NCORE	8/1/2011	42101-1	593	Continuous	Teledyne T300U-FRM
	SO ₂ (1-hr)/ SO ₂ (5-min)	NCORE	8/1/2011/ 8/18/2011	42401-1/ 42401-2	560	Continuous	Thermo Scientific 43iQ- TL-FEM
	NO _y	NCORE	10/5/2012	42600-1	699	Continuous	Teledyne T-200U-FRM
	NO	NCORE	10/5/2012	42601-2	699	Continuous	Teledyne T-200U-FRM



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	NO _y -NO	NCORE	10/5/2012	42612-1	699	Continuous	Teledyne T-200U-FRM
	O ₃	NCORE	8/1/2011	44201-1	047	Continuous	Thermo Scientific 49iQ-TL-FEM
	WD**(V) 10 m	NCORE	4/5/2011	61104-1	068	Continuous	RM Young Ultrasonic Anemometer
	WD (V) 3 m	NCORE	4/5/2011	61104-2	068	Continuous	RM Young Ultrasonic Anemometer
	WS (V) 10 m	NCORE	4/5/2011	61103-1	068	Continuous	RM Young Ultrasonic Anemometer
	WS (V) 3 m	NCORE	4/5/2011	61103-2	068	Continuous	RM Young Ultrasonic Anemometer
	RH	NCORE	11/4/2013	62201-1	061	Continuous	Met One Relative Humidity Sensor
	Ambient Temp 3 m	NCORE	4/1/2011	62101-2	040	Continuous	Met One T-200
	Ambient Temp 10 m	NCORE	4/1/2011	62101-1	040	Continuous	Met One T-200
	PM _{2.5LC} Speciation	NCORE/CSN	1/1/2015	Multiple*	Multiple*	1/3	URG 3000N
	PM _{2.5LC} Speciation	NCORE/CSN	1/1/2015	Multiple*	Multiple*	1/3	Met One Super SASS



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}	SLAMS	7/15/2019	88101-1	145	1/1	Thermo Scientific Sequential Partisol 2025i (VSCC)-FRM
	PM _{2.5LC}	SPM	11/29/2018	88501-3 88502-3	731	Continuous	Met One BAM 1020 (SCC) non-FEM
	WD** (V) 3 m	SPM	10/1/2019	61104-2	068	Continuous	RM Young Ultrasonic Anemometer
	WS (V) 3 m	SPM	10/1/2019	61103-2	068	Continuous	RM Young Ultrasonic Anemometer
	WD (V) 10 m	SPM	10/1/2019	61104-1	068	Continuous	RM Young Ultrasonic Anemometer
	WS (V) 10 m	SPM	10/1/2019	61103-1	068	Continuous	RM Young Ultrasonic 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)-FRM
	PM _{2.5LC} collocate	SLAMS	7/18/2019	88101-2	145	1/3	Thermo Scientific Sequential Partisol 2025i (VSCC)
	SO ₂ (1-hr)/ SO ₂ (5-min)	SPM	3/10/2022/ 3/10/2022	42401-1/ 42401-2	560	Continuous	Thermo Scientific 43i-TL-FEM
	PM _{2.5LC}	SPM	3/1/2012	88501-3 88502-3	731	Continuous	Met One BAM 1020 (SCC) non-FEM



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} Speciation	CSN	8/1/2019	Multiple*	Multiple*	1/3	URG 3000N
	PM _{2.5LC} Speciation	CSN	8/1/2019	Multiple*	Multiple*	1/3	Met One Super SASS
	Ambient Temp 23 m	SPM	9/24/2019	62101-3	040	Continuous	Met One T-200
	Ambient Temp 10 m	SPM	9/24/2019	62101-1	040	Continuous	Met One T-200
	Ambient Temp 3 m	SPM	9/24/2019	62101-2	040	Continuous	Met One T-200
	WD** (V) 23 m	SPM	9/24/2019	61104-3	068	Continuous	Met One Ultrasonic Anemometer
	WS (V) 23 m	SPM	9/24/2019	61103-3	068	Continuous	Met One Ultrasonic Anemometer
	WD (V) 10 m	SPM	9/24/2019	61104-1	068	Continuous	Met One Ultrasonic Anemometer
	WS (V) 10 m	SPM	9/24/2019	61103-1	068	Continuous	Met One Ultrasonic Anemometer
	WD (V) 3 m	SPM	9/24/2019	61104-2	068	Continuous	Met One Ultrasonic Anemometer
	WS (V) 3 m	SPM	9/24/2019	61103-2	068	Continuous	Met One Ultrasonic Anemometer

* Multiple AQS codes are used to identify individual chemical species ** Meteorological parameters (WS and WD) also measured in scalar



Table 3-9: Juneau μ SA: AQS Codes as of May 2022

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 _{2.5} LC	SLAMS	6/23/2021	88101-3	236	Continuous	Teledyne T640X - FEM
	PM _{2.5} LC	SPM	9/28/2021	88101-2	143	1/6	Thermo Scientific Partisol 2000i (VSCC) - FRM
	PM ₁₀ STD/ PM ₁₀ LC	SLAMS	6/23/2021	81102-3/ 85101-3	239	Continuous	Teledyne T640X - FEM
	PM ₁₀ STD/ PM ₁₀ LC	SPM	1/21/2022	81102-2/ 85101-2	126	1/6	Thermo Scientific Partisol 2000i - FRM

Table 3-10: May 2022 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 _{10-2.5} /CO/ SO ₂ /O ₃ / NO/NO _y /Speciation	(b) Typical concentrations (population density based) (d) General background concentration levels



Hurst Road	02-090-0035	PM _{2.5} / SO ₂ /Speciation	(a) Highest concentrations expected in area (c) Impact of significant sources/source categories
A Street	02-090-0040	PM _{2.5}	(a) Highest concentrations expected in area (c) Impact of significant sources/source categories
Butte	02-170-0008	PM ₁₀ /PM _{2.5}	(a) Highest concentrations expected in area (c) Impact of significant sources/source categories (d) General background concentration levels (e) Extent of regional pollutant transport
Floyd Dryden Middle School	02-110-0004	PM ₁₀ /PM _{2.5}	(b) Typical concentrations (population density based) (d) General background concentration levels



Table 3-11: 2022 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 ₁₀ STD/PM ₁₀ LC	81102-3/85101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
	PM ₁₀ STD/ PM ₁₀ LC collocated	81102-2/85101-2	Population exposure	-Determine ambient air quality standard compliance
	PM _{2.5} LC	88101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
	PM _{2.5} LC collocated	88101-2	Population exposure	-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 ₁₀ STD/PM ₁₀ LC	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 ₁₀ STD/PM ₁₀ LC	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 ₁₀ STD/PM ₁₀ LC	81102-3/85101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
	PM _{2.5} LC	88101-3	Population exposure Highest Concentration Regional Background Regional Transport	-Provide timely air pollution information -Determine ambient air quality standard compliance



Table 3-12: 2022 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
	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



Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
NCore/ Fairbanks 02-090-0034	NO	42601-2	Population exposure	-Support air pollution research studies
	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



Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
NCore/ Fairbanks 02-090-0034	Ambient Temp @ 10 m	62101-1	Population exposure	-Provide timely air pollution information. -Support air pollution research studies
	PM _{2.5} LC Speciation	Multiple*	Population exposure	-Support air pollution research studies -part of CSN
	PM _{2.5} LC	88101-1	Population exposure	-Determine ambient air quality standard compliance
	PM _{2.5} LC	88501-3/88502-3	Population exposure	-Provide timely air pollution information
	PM _{2.5} LC collocated	88101-2	Population exposure	-Determine ambient air quality standard compliance
A Street/ Fairbanks 02-090-0040	PM _{2.5} LC	88101-1	Population exposure Highest Concentration	-Determine ambient air quality standard compliance
	PM _{2.5} LC	88501-3/88502-3	Population exposure	-Provide timely air pollution information
	Ambient Temp @ 3 & 10 m	62101-2,1	Population exposure	-Provide timely air pollution information
	WD @ 3 & 10 m	61104-2,1	Population exposure	-Provide timely air pollution information
	WS @ 3 & 10 m	61103-2,1	Population exposure	-Provide timely air pollution information
Hurst/ North Pole 02-090-0035	PM _{2.5} LC	88101-1	Population exposure Highest Concentration	-Determine ambient air quality standard compliance



Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
Hurst/ North Pole 02-090-0035	PM _{2.5} LC	88501-3/88502-3	Population exposure	-Provide timely air pollution information
	PM _{2.5} LC collocated	88101-2	Population exposure	-Determine ambient air quality standard compliance
	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
	Ambient Temp @ 3, 10, & 23 m	62101-2,1,3	Population exposure	-Provide timely air pollution information
	WD @ 3, 10, & 23 m	61104-2,1,3	Population exposure	-Provide timely air pollution information
	WS @ 3, 10, & 23 m	61103-2,1,3	Population exposure	-Provide timely air pollution information



Table 3-13: 2022 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 ₁₀ STD/ PM ₁₀ LC	81102-3/ 85101-3	Population exposure	<ul style="list-style-type: none"> -Provide timely air pollution information - Determine ambient air quality standard compliance -Support air pollution research studies
	PM ₁₀ STD/ PM ₁₀ LC collocated	81102-2/ 85101-2	Population exposure	<ul style="list-style-type: none"> -Determine ambient air quality standard compliance
	PM _{2.5} LC	88101-3	Population exposure	<ul style="list-style-type: none"> -Provide timely air pollution information -Determine ambient air quality standard compliance
	PM _{2.5} LC collocated	88101-2	Population exposure	<ul style="list-style-type: none"> -Determine ambient air quality standard compliance



Table 3-14: Monitors required by Nonattainment Area (NAA) or Limited Maintenance Plan (LMP)

MSA or μ MSA	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 _{2.5} LC	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 ₁₀ STD	81102-3	Eagle River PM ₁₀ LMP
Juneau μ MSA	Floyd Dryden Middle School/ Juneau	02-110-0004	PM ₁₀ STD	81102-3	Juneau PM ₁₀ LMP

Table 3-15: 2022 Collocations

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Method Code	Equipment	Primary or Secondary
Garden/ Anchorage 02-020-0018	PM _{2.5} LC	88101-3	170	Met-One BAM 1020	Primary
	PM _{2.5} LC collocate	88101-1	143	Thermo Scientific Partisol 2000i	Secondary
	PM ₁₀ STD	81102-3/ 85101-3	122	Met-One BAM 1020	Primary
	PM ₁₀ STD collocate	81102-1/ 85101-1	126	Thermo Scientific Partisol 2000i	Secondary
Hurst Road/ North Pole 02-090-0035	PM _{2.5} LC	88101-1	145	Thermo Scientific Partisol 2025i	Primary
	PM _{2.5} LC collocate	88101-2	145	Thermo Scientific Partisol 2025i	Secondary
NCore/ Fairbanks 02-090-0034	PM ₁₀ STD	81102-3/ 85101-3	122	Met-One BAM 1020	Primary
	PM ₁₀ STD collocate	81102-1/ 85101-1	126	Thermo Scientific Partisol 2000i	Secondary
	PM _{2.5} LC	88101-3	236	Teledyne T640X	Primary
	PM _{2.5} LC collocate	88101-2	143	Thermo Scientific Partisol 2000i	Secondary



Floyd Dryden Middle School/Juneau 02-110-0004	PM ₁₀ STD	81102-3/ 85101-3	239	Teledyne T640X	Primary
	PM ₁₀ STD collocate	81102-2/ 85101-2	126	Thermo Scientific Partisol 2000i	Secondary



3.5 MONITORING WAIVERS

3.5.1 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 in **Appendix C** (Waiver C-1) Lead Source Oriented Monitoring

3.5.2 HARRISON CT (BUTTE) SITING

DEC requested EPA waive requirements under 40 CFR 58 Appendix E, mainly in regard to several spruce trees that have grown up on the adjacent private property. EPA granted the waiver on June 4th, 2019 and can be found in **Appendix C** (Waiver C-2).

3.5.3 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 first 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. DEC submitted an updated waiver request to EPA on June 12, 2020. The waiver request included a new modeling analysis performed by Teck Alaska Inc., the operator of the Red Dog Mine, which was reviewed and approved by DEC. EPA approved the waiver request on December 7, 2021. The EPA approval letter can be found in **Appendix C** (Waiver C-3).

4 NETWORK MODIFICATIONS COMPLETED IN 2022

4.1 DATA ACQUISITION SYSTEM TRANSITION TO AGILAIRE

In July 2021, DEC started the transition to a new data acquisition system. The switch to Agilaire affected the entire monitoring network and took roughly three quarters of a year to complete. Acceptance testing was conducted in April 2022. Features of the new system include e-logbooks, asset tracking, and automated data validation procedures.



4.2 PARTICULATE MATTER COLLOCATION

4.2.1 FLOYD DRYDEN SITE

On January 21, 2022, PM₁₀ collocation was added to the Floyd Dryden SLAMS site. The FRM is a Thermo Scientific Inc. Partisol 2000i, which will provide precision data for the FEM Teledyne API T640x analyzer. A second Thermo Scientific Inc. Partisol 2000i is used to collect PM_{2.5} precision data at the site. Collocation started on September 28, 2021.

4.2.2 TRINITY CHURCH (GARDEN) SITE

On February 22, 2022, the PM_{2.5} collocation monitor for the Met One BAM 1020 network was moved from the Harrison Ct (Butte) site to Anchorage Trinity Church (Garden) site. The change was made since the Butte site will eventually be moved and to save staff driving time for filter changes on the FRM. The PM₁₀ FRM for the BAM 1020 network was moved from the Eagle River Parkgate site to the Anchorage Garden site on February 24, 2022. This change was made to coordinate filter changes more efficiently and to restart precision monitoring at the Garden site to evaluate the FEM monitors, which had not been done in many years at the Anchorage site.

4.3 SULFUR DIOXIDE SAMPLING AT HURST ROAD SITE

On March 10, 2022, DEC added a Thermo Scientific 43i Sulfur Dioxide monitor to the North Pole Hurst Rd site. The Hurst Road is the maximum impact PM_{2.5} monitoring site in the Fairbanks nonattainment area and also houses a Chemical Speciation Network site. The SO₂ data will be helpful for interpreting the sulfate information gained from the speciation monitor.

4.4 HARRISON CT SITE STUDY

After DEC conducted a saturation study in the Harrison Ct. (Butte) area to identify a suitable substitute site location during the winter of 2021/22 two locations were identified for further investigation: the Butte Elementary School and the Alaska Plant Materials Center. DEC began sampling for PM_{2.5} at both location in December of 2021. The intent is to collect at least one year of continuous PM_{2.5} data concurrently with the Harrison Ct. site for long-term data record comparison. Once the data analysis has been completed, DEC will select the new monitoring site and request approval for the official site relocation in the 2023 Annual Network Plan, if warranted.

4.5 BETHEL PM SPECIAL PURPOSE MONITORING SITE SHUTDOWN

DEC decided to permanently give up on and shut down the Bethel PM SPM monitoring site. Since the site had to be moved due to construction in June 2020, DEC has been unable to get power installed and the instruments set up at a new proposed site, due to several compounding issues related to the COVID-19 pandemic, most severely travel restrictions and lack of access to assistance from the community. DEC plans to install an AQMesh sensor pod in 2023.



4.6 LOW COST SENSOR NETWORK

While the current long term monitoring network meets the regulatory requirement in terms of number of monitoring stations and monitored pollutants, it is confined to the population centers and does not adequately characterize conditions in outlying and rural communities.

Advances in sampling technology allowed for the development and commercial sale of smaller, portable, and cheaper sensors. This new low-cost sensor technology provides DEC the opportunity to expand monitoring into areas across the state that previously were cost prohibitive.

After state funds were made available in 2019 to purchase sampling equipment for use in port communities, DEC conducted a search for multi-pollutant sampling pods and finally purchased eight AQMesh sensor pods. These pods were designated for use in Southeast and Southcentral Alaska port communities. Late in 2020, DEC was able to use carry-over grant funding to purchase ten additional sensor pods to be spread around the state, for a total of 18 sensors.

The sensor pods will collect baseline air quality data, including particulate matter (PM), SO₂, NO, NO₂ and CO. DEC selected 17 communities based on location, interest, and population density. The current proposed communities include Anchorage, Fairbanks, Homer, Juneau, Ketchikan, Kodiak, Kotzebue, Nome, Seward, Sitka, Skagway, Soldotna, and Unalaska/Dutch Harbor. In 2021 DEC began installing sensors in communities across the state including Juneau, Seward, Sitka, Soldotna, Homer, Kotzebue, Nome, Ketchikan, and Fairbanks/North Pole.

Because of the challenges of finding a single representative sampling site for the Juneau downtown area, with its highly varied topography, DEC selected sites for three sensor pods, one in 'the flats', one along the lower elevations closer to the waterline, and one along the slopes at higher elevation. Sampling began in the fall of 2020.

The Fairbanks/North Pole area will also receive multiple sensor pods to assist in informing residents regarding local air impacts.



5 PLANNED NETWORK MODIFICATIONS FOR 2023

5.1 SLAMS SAMPLING SITE IMPROVEMENTS FUNDED BY THE AMERICAN RESCUE PLAN (ARP) DIRECT GRANT AWARD

The American Rescue Plan (ARP) provides funding for EPA to address health outcome disparities from pollution and the COVID-19 pandemic, including \$50 million for activities authorized under the Clean Air Act. The American Rescue Plan Direct Awards will fund the following monitoring site improvements for the DEC SLAMS network:

- Replace aging Chemical Speciation Network samplers at the NCore site, specifically the Met One Super SASS and URG 3000n,
- Upgrade the heating and ventilation air conditioning system (HVAC) for the A-Street site particulate matter sampling shelter,
- Purchase a replacement particulate matter sampling shelter for the new Butte sampling site,
- Purchase a replacement particulate matter sampling shelter for the Teledyne T640x sampler at the Juneau Mendenhall Valley sampling site, and
- Purchase a Primary Flow Standard for mass flow controller (MFC) calibrations

While these site improvements will allow for more stable site operations and improve data quality and completeness, none of these items are adding monitoring sites or samplers or will result in changes to the data in AQS.

5.2 LOW-COST SENSOR NETWORK EXPANSION

DEC started installation of the AQMesh sensor pods in nine communities during the summer of 2021. Installations were limited during the fall of 2021 through the spring of 2022 due to travel restrictions during COVID and the cold winter months. DEC anticipates setting up the remaining eight sensors, plus a QA sensor, by the end of October 2022.

Under the American Rescue Plan Act direct grant award from EPA, DEC will receive funds for 12 additional sensor pods. DEC has identified an additional 12 communities for the AQmesh sensor pod network to provide AQI information across underserved communities across the state. Tribal communities slated for AQMesh sensor pod locations include: Bethel, Big Lake/Houston, Cordova, Deltana/Delta Junction, Talkeetna, Tok/Northway, and Utqiagvik. Negotiations with other interested tribes started in summer 2022. Once the funds for the additional 12 sensor pods have been received, DEC will start the procurement process with the goal of installing all additional sensors by the end of October 2023.



Appendix A **NAAQS Summary Tables**



Table A-1 PM_{2.5} DV under local/actual conditions (µg/m³)

Exceedance exceptional event values not included. Some values in this table have been calculated by DEC to exclude exceptional events. The numbers in the parentheses are reported from the AQS Design Value report (AMP 480) and include these exceptional events.

PM _{2.5} Monitoring Sites	AQS Site ID	98 th Percentile			Weighted Annual Mean			2021 Design Value	
		2021	2020	2019	2021	2020	2019	24-hour	Annual
Garden/ Anchorage	02-020-0018	18.7	22.2	24.6 (42.2)	6.0	5.9	7.3 (8.2)	21.8 (28)	6.4 (6.7)
Butte/ Matanuska-Susitna Valley	02-170-0008	21.2	24	27.7	4.4	4.6	6.5	24	5.2
NCore Site/ Fairbanks	02-090-0034	27.5	26.6	27.7 (60)	8.0	7.2	8.4 (10.1)	27.3 (38)	7.9 (8.5)
Hurst Rd/ North Pole	02-090-0035	65.5	71.4	65 (78.3)	11.8	12.1	11.4 (15.5)	67.3 (72)	11.8 (13.2)
A Street/Fairbanks	02-090-0040	29.6*	36.1	34.1*	12*	8.3	8.5*	N/A	9.6
Floyd Dryden/Juneau	02-110-0004	17.1	17.2	24.9	4.7	4.8	6.8	20	5.4

* Annual values did not meet data completeness criteria



Table A-2 DV O₃ (ppb)

O ₃ Monitoring Sites	Site ID	2021			2020			2019			3-Years	
		Valid Days	Percent Compl	4 th Max	Valid Days	Percent Compl	4 th Max	Valid Days	Percent Compl	4 th Max	Percent Compl	Design Value
NCore/Fairbanks	02-090-0034	279	76	0.046	178	49	0.043*	299	82	0.047	69	0.045*

* Does not meet completeness criteria

Table A-3 DV SO₂ (ppb)

SO ₂ Monitoring Sites	Site ID	2021		2020		2019		3-yrs Design Value
		99 th Percentile	Completed Quarters	99 th Percentile	Completed Quarters	99 th Percentile	Completed Quarters	
NCore/Fairbanks	02-090-0034	33	4	30	4	30	4	31

Table A-2 DV CO (ppm)

CO Monitoring Sites	Site ID	2021			2020			2019		
		Exceed ances	1 st Max 8-hr	2 nd Max 8-hr	Exceed ances	1 st Max 8-hr	2 nd Max 8-hr	Exceed ances	1 st Max 8-hr	2 nd Max 8-hr
NCore/Fairbanks	02-090-0034	0	1.8	1.5	0	1.9	1.7	0	1.7	1.5
Garden/Anchorage	02-020-0018	0	2.2	2.2	0	3.2	3.0	0	2.6	2.4



Table A-5 PM₁₀ DV under standard conditions (µg/m³)

Exceedance exceptional event values not included.

PM ₁₀ Monitoring Sites*	Site ID	2021			2020			2019		
		Exceed-ances	1 st Max 24-hr	2 nd Max 24-hr	Exceed-ances	1 st Max 24-hr	2 nd Max 24-hr	Exceed-ances	1 st Max 24-hr	2 nd Max 24-hr
Garden/ Anchorage	02-020-0018	0	49	47	0	43	42	0	88	87
Laurel/ Anchorage	02-020-0045	0	108	97	0	80	77	0	105	98
Parkgate/ Anchorage	02-020-1004	0	125	66	0	56	45	1	168	79
NCore/ Fairbanks	02-090-0034	0	70	57	0	55	43	0	124 (209, 200, 166, & 160 wildland fire EEs)	84
Butte/ Matanuska-Susitna Valley	02-170-0008	0	92	75	0	84	77	1	148 (186 high wind EEs)	85
Floyd Dryden Middle School/Juneau	02-110-0004	0	28	25	0	35	34	0	64	50

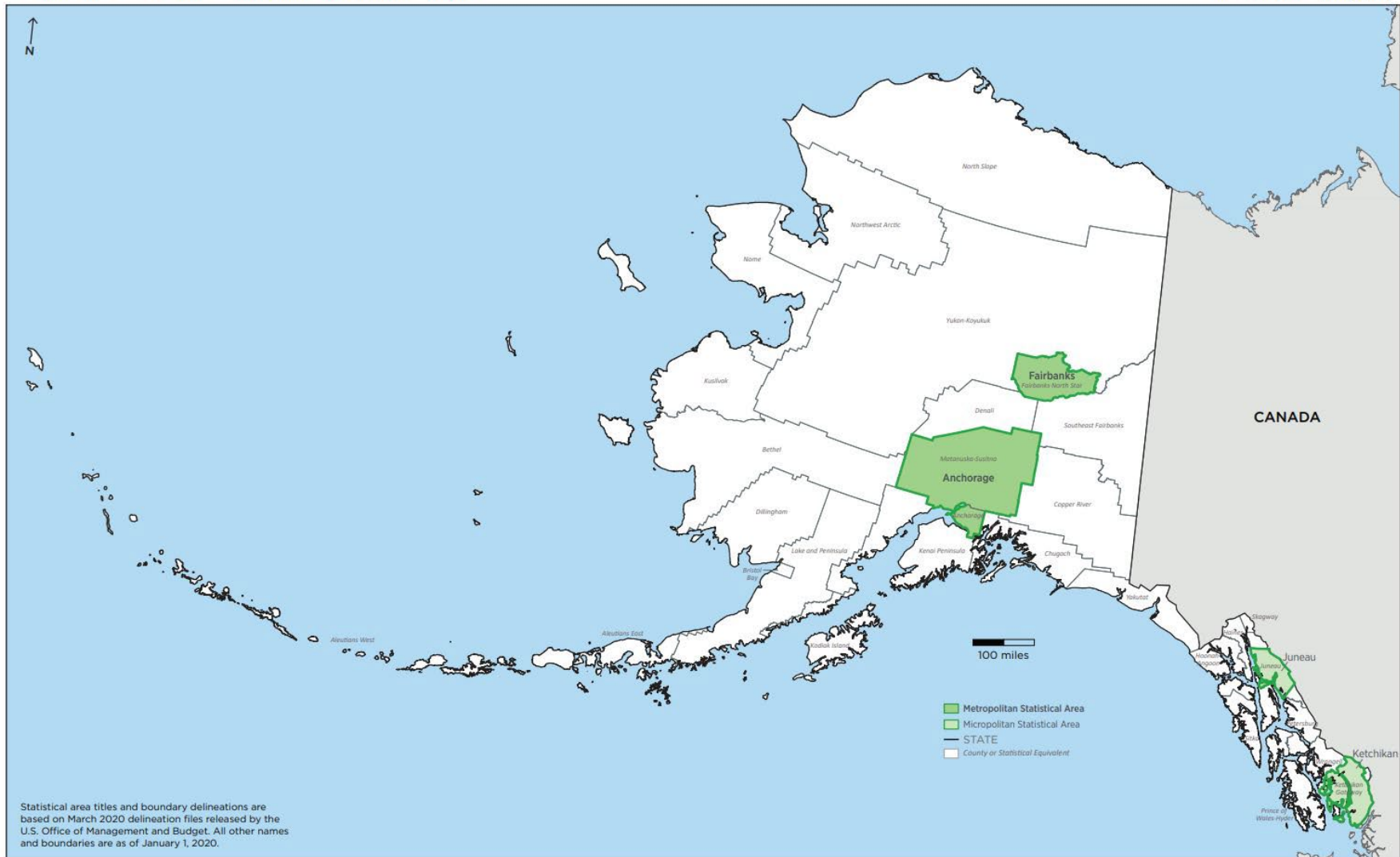


Appendix B Map of Alaska's Core Based Statistical Areas (CBSA)



Alaska: 2020 Core Based Statistical Areas and Counties

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U.S. Census Bureau, Population Division



Appendix C **Waivers**



Waiver C-1 EPA 5-Year Ozone NAAQS Monitoring Requirement Waiver



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101-3140

OFFICE OF AIR AND WASTE

OCT 15 2018



Ms. Barbara Trost
Air Quality Division
Air Monitoring & Quality Assurance Program
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501-2617

Dear Ms. Trost:

In our August 2, 2018 response to your 2017 Annual Monitoring Network Plan, Region 10 indicated approval of a waiver to discontinue ozone monitoring in the Anchorage Metropolitan Statistical Area and stated a formal approval would follow in a separate correspondence. This correspondence is our formal approval for waiving ozone monitoring requirements for the Anchorage MSA for five years (2019 through 2023). For future Annual Monitoring Network Plans, please enclose a copy of this waiver as an appendix to the ANP.

In considering your waiver request, Region 10 examined the available historic monitoring data produced by ADEC for the Anchorage MSA as well as factoring in the resources constraints you have identified. Region 10 examined the data available in AQS and past Annual Network Plans and found that Alaska has monitored in four separate areas in the Anchorage MSA since ozone monitoring commenced in 2010 (Anchorage, Eagle River, Wasilla, and Palmer). There have been no exceedances of the ozone standard. Additionally, we did not observe any concentrations at or above 80 percent of the NAAQS. Given ADEC's resource constraints and a low likelihood of ozone exceedances in the Anchorage MSA, we are supporting your waiver request.

If ADEC would like to continue to not operate an ozone monitor in the Anchorage MSA after 2023, ADEC should resubmit a request for renewal of the waiver. The EPA reserves the right to reinstate ozone monitoring requirements in the MSA sooner than five years should a future need arise (e.g., changes in air quality, monitor regulation changes, or revisions to the NAAQS).

If you have any questions regarding this correspondence, please contact me at (206) 553-2970 or Doug Jager at (206) 553-2961.

Sincerely,

[Handwritten signature]

Gina Bonifacino
Acting Manager, Air Planning Unit



Waiver C-2 Siting Requirement Waiver for Butte



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101-3123

AIR & RADIATION
DIVISION

JUN - 4 2019

Ms. Barbara Trost
Air Quality Division
Air Monitoring & Quality Assurance Program
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501-2617

Dear Ms. Trost:

This letter is in response to your May 14, 2019, correspondence requesting that the siting requirements specified in 40 CFR Part 58, Appendix E be waived for the existing Butte ambient air monitoring station (AQS ID: 02-170-0008). Such waivers may be approved pursuant to Appendix E upon a demonstration that either (1) the site can be demonstrated to be as representative of the monitoring area as it would be if the siting criteria were being met, or (2) the monitor or probe cannot reasonably be located so as to meet the siting criteria because of physical constraints (e.g., inability to locate the required type of site the necessary distance from roadways or obstructions). My staff have completed the review of the information provided in your request. In considering your waiver request, Region 10 examined the information you provided in the correspondence to us and the available historic monitoring data produced by ADEC for this monitoring station.

Region 10 agrees with your assessment that the spacing from roadways requirement, as specified in 40 CFR Part 58, Appendix E §6, is met for the Butte air monitoring station. The vehicle traffic at this location is minimal and sufficiently offset from the ambient air monitoring station such that the requirements of Table E-1 of Appendix E to Part 58 are satisfied. Region 10 acknowledges the uniqueness of this monitoring station's position on the Harrison Court cul-de-sac. EPA is affirming through this correspondence that the Butte air monitoring station (AQS ID: 02-170-0008) meets the regulatory requirements of 40 CFR Part 58, Appendix E §6 and as such ADEC does not require a waiver from EPA for this requirement.

The measurements provided in your request documenting the distances between the probe inlets for the Butte monitoring station to the driplines of the nearby trees demonstrate that the requirement for spacing monitoring inlets away from trees found in 40 CFR Part 58, Appendix E §5 is not met and a monitoring waiver is needed for this ambient air monitoring station. Region 10 agrees with your assessment that the probe inlets are not so obstructed as to change the representativeness of the PM₁₀ and PM_{2.5} measurements at this ambient air monitoring station. As such, Region 10 approves a waiver from the 40 CFR Part 58, Appendix E §5 siting requirements for this site. This waiver is in effect for five years from the date of this letter.

Due to the proximity of the trees to the probe inlets and siting conditions that will continue to degrade due to tree growth, Region 10 encourages ADEC to remedy the siting conditions if possible through limb trimming or tree removal if possible. If the trees cannot be trimmed or removed, ADEC should begin investigating an alternate ambient air monitoring station that is



representative of this maximum concentration site. DEC can request a renewal of this waiver at the end of the 5-year period based on the siting conditions at that time, but Region 10 encourages ADEC to either remedy the siting conditions at this location or find a replacement ambient air monitoring site within the timeframe of this waiver. If you have any questions regarding this correspondence, please contact me at (206) 553-0985 or Doug Jager at (206) 553-2961.

Sincerely,

A handwritten signature in blue ink that reads "Debra Suzuki". The signature is written in a cursive style.

Debra Suzuki, Chief
Air Planning, State/Tribal Coordination Branch



Waiver C-3 Red Dog Mine Lead Monitoring Waiver



UNITED STATES ENVIRONMENTAL PROTECTION
AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101

AIR & RADIATION
DIVISION

December 7, 2021

Alice Edwards, Director
Division of Air Quality
Alaska Department of Environmental Conservation
P.O. Box 111800
Juneau, AK 99811

Dear Ms. Edwards,

In your letter dated November 4, 2021, Alaska Department of Environmental Conservation (ADEC) Air Quality Division provided an updated request for a waiver of the lead (Pb) monitoring requirements at the Red Dog Mine. By this letter, Region 10 approves a waiver for lead monitoring at the Red Dog Mine. ADEC's waiver request was based on the results of dispersion modeling conducted by Teck Alaska Inc. (Teck), which were reviewed and approved by ADEC. The request was an update to the initial waiver request submitted June 12, 2020. The Red Dog Mine is a source of lead emissions exceeding 0.5 tons per year, which requires lead monitoring as specified in 40 C.F.R. Part 58, Appendix D, section 4.5(a). The lead emissions from Red Dog Mine were reported as 1.2 tons in the 2017 National Emissions Inventory, and 10.1 tons in the 2014 National Emissions Inventory.

According to 40 C.F.R. Part 58, Appendix D, section 4.5(a)(ii), the Regional Administrator may waive the requirement for lead source monitoring if the state can demonstrate that the source will not contribute to a maximum lead concentration in ambient air in excess of 50 percent of the lead National Ambient Air Quality Standards (NAAQS). A 5-year waiver for the lead monitoring requirement for Red Dog Mine was approved on August 11, 2016. The current waiver renewal request was timed to be in sync with the 5-year Air Monitoring Network Assessment, but the approval was delayed. The modeling approach and protocol for the Red Dog Mine conducted by Teck were consistent with the EPA's guidance, and were approved by the EPA. The results of this modeling demonstrates that the maximum ambient 3-month rolling average lead concentration at the mine does not exceed 50 percent of the lead NAAQS. This satisfies the requirement of remaining below 50 percent of the NAAQS, and, therefore, I approve a waiver for lead monitoring at the Red Dog Mine.

Pursuant to 40 C.F.R. 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. Therefore, if ADEC elects to renew the lead source-monitoring waiver, a formal written request to renew the lead source-monitoring waiver must demonstrate that the site conditions for which the previous modeling was conducted are still applicable. If site conditions have changed such that the previous modeling is no longer appropriate, then ADEC must update the modeling based on the current conditions.

This approval and existence of this lead source-monitoring waiver for the Red Dog Mine should be identified in the next ADEC Annual Ambient Air Monitoring Network Plan submitted to the EPA, after public review and comment, and shall be identified in all future Alaska Annual Ambient Air Monitoring Network Plans and the Alaska 5-year Air Monitoring Network Assessment Reports submitted to the EPA.



If you have any questions on the subject, please have your staff contact Sarah Waldo at (206) 553-1949 or waldo.sarah@epa.gov.

Sincerely,

DEBRA
SUZUKI

Digitally signed
by DEBRA SUZUKI
Date: 2021.12.07
20:20:32 -08'00'

Debra Suzuki, Manager
Air Planning, State/Tribal Coordination Branch



Appendix D **Network Evaluation Forms**



Table D-1 PM_{2.5} Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR PM _{2.5}				
STATE: <u>ALASKA</u> AGENCY: <u>DEPARTMENT OF ENVIRONMENTAL CONSERVATION</u> AQS AGENCY CODE: <u>02</u>				
EVALUATION DATE: <u>5/12/2022</u> EVALUATOR: <u>R.MILLS</u>				
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 represents 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 PM _{2.5} 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 2019-2021 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	398,807					
<i>Municipality of Anchorage</i>	288,121		0	1	1	0
Garden Site		28/6.4	SLAMS/FRM & FEM	1	1	0
<i>Matanuska-Susitna Valley Borough</i>	110,686		1	0	1	0
Butte Site		24/5.2	SLAMS/FEM	0	1	0
Fairbanks North Star Borough MSA	95,593		1	5	3*	2 speciation
A Street		33**/9.6**	SPM/FRM	1	1*	0
NCore Site		38/7.9	NCore/FRM	2	1*	1 speciation
Hurst Rd		72/11.8	SPM/ FRM	2	1*	1 speciation
City and Borough of Juneau µSA	31,973		0	1	1	0
Floyd Dryden Site		20/5.4	SLAMS/FEM & FRM	1	1	0

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

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

³Population based on population estimates for July 1, 2021 obtained from the United States Census Bureau, <https://www.census.gov/quickfacts/fact/table/US/PST045221>

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

** Did not meet minimum sampling 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

¹Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).

²Population based on latest available census figures. <https://www.census.gov/>

³The PM_{2.5} National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.

⁴These minimum monitoring requirements apply in the absence of a design value.

⁵Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.



Table D-2 PM₁₀ Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR PM ₁₀				
STATE: <u>ALASKA</u> AGENCY: <u>DEPARTMENT OF ENVIRONMENTAL CONSERVATION</u> AQS AGENCY CODE: <u>02</u>				
EVALUATION DATE: <u>5/10/2022</u> EVALUATOR: <u>R.MILLS</u>				
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 PM ₁₀ air quality trends and geographical patterns. Use the form below and Table D-4 to verify if your PM ₁₀ network has the appropriate number of samplers.	✓		
<p>Comments: All of the site locations are based on historical agreements among the EPA, DEC and (where applicable) local agencies.</p> <p>One exceedance on May 7, 2019 at the Butte site caused the entire Anchorage MSA to be categorized as high concentration. DEC qualified the exceedance day data as RJ (high winds). These one day could be the basis for a 2019 EEWR should EPA request DEC or EPA start another PM₁₀ designation process. Thus DEC assumes that medium concentration is applicable when these exceptional events are excluded from the compliance calculations (Appendix A, Table A-5 with assumed EEWRs).</p>				

MSA Description ¹	MSA population ^{2,3}	Minimum required number of PM ₁₀ stations (from Table D-4)	Present number of PM ₁₀ stations in MSA
Anchorage MSA (includes Mat-Su Borough)	398,807	3-4 (high conc)/1-2 (med conc; high winds EE exceedances removed)	4 (SLAMS [1 collocated], 1 SPM)
Fairbanks North Star Borough MSA	95,593	0 (low conc)	1 (NCore, collocated)
City and Borough of Juneau μSA	31,973	0 (low conc)	1 (SLAMS/LMP, collocated)

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

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

³Population based¹ on population estimates for July 1, 2021 obtained from the United States Census Bureau, <https://www.census.gov/quickfacts/fact/table/US/PST045221>

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



- ¹Selection of urban areas and actual numbers of stations per area will be jointly determined by EPA and the State agency.
- ²High concentration areas are those for which ambient PM10 data show ambient concentrations exceeding the PM10 NAAQS by 20 percent or more.
- ³Medium concentration areas are those for which ambient PM10 data show ambient concentrations exceeding 80 percent of the PM10 NAAQS.
- ⁴Low concentration areas are those for which ambient PM10 data show ambient concentrations less than 80 percent of the PM10 NAAQS.
- ⁵These minimum monitoring requirements apply in the absence of a design value.

Table D-3 CO Site Evaluation Form

PART 58 APPENDIX D SITE EVALUATION FORM FOR CARBON MONOXIDE (CO)					
STATE: <u>ALASKA</u> AGENCY: <u>DEPARTMENT OF ENVIRONMENTAL CONSERVATION</u> AQS AGENCY CODE: <u>02</u>					
EVALUATION DATE: <u>5/10/2022</u> EVALUATOR: <u>R.MILLS</u>					
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	398,807	0	1*
Fairbanks North Star Borough	95,593	0	1*

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

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

³Population _ based on population estimates for July 1, 2021 obtained from the United States Census Bureau, <https://www.census.gov/quickfacts/fact/table/US/PST045221>

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



Table D-4 O₃ Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR OZONE (O ₃)				
STATE: <u>ALASKA</u> AGENCY: <u>DEPARTMENT OF ENVIRONMENTAL CONSERVATION</u> AQS AGENCY CODE: <u>02</u>				
EVALUATION DATE: <u>5/10/2022</u> EVALUATOR: <u>R.MILLS</u>				
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 O ₃ 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: Appendix C (Waiver C-1) 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 O ₃ sites in CBSA	
Combined Municipality of Anchorage and Matanuska-Susitna Valley Borough (MSAs)	398,807	1	0	See EPA ozone waiver link*
Fairbanks North Star Borough	95,593	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, 2021 obtained from the United States Census Bureau, https://www.census.gov/quickfacts/fact/table/US/PST045221 * DEC received a EPA 5-Year Ozone NAAQS Monitoring Requirement Waiver for the Anchorage MSA. (Appendix C , Waiver C-1) ** 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 (O ₃) 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	April	September
Oregon	May	September
Washington	May	September



Table D-5 SO₂ Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR SULFUR DIOXIDE (SO ₂)				
STATE: <u>ALASKA</u> AGENCY: <u>DEPARTMENT OF ENVIRONMENTAL CONSERVATION</u> AQS AGENCY CODE: <u>02</u>				
EVALUATION DATE: <u>5/10/2022</u> EVALUATOR: <u>R.MILLS</u>				
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 SO ₂ 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 SO₂ monitoring. One of the operating SO₂ monitors is located at the multi-pollutant NCore site in the Fairbanks North Star Borough operated for compliance with NCore site requirements. The other SO₂ analyzer was added to the Hurst Road site in 2021. This data will be helpful for interpreting the sulfate information gained from the speciation monitor at this site.

Table 1.

CBSA Description ¹	CBSA population ^{1,2}	total amount of SO ₂ in tons per year emitted within the CBSA (from 2017 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
Anchorage Municipality	288,121	394.2	114	0	0
Matanuska-Susitna Borough	110,686	160.4	18	0	0
Fairbanks North Star Borough	95,593	2,356.0	225	0	2*
Juneau City and Borough	31,973	101.5	3	0	0
Ketchikan Gateway Borough	13,754	62.9	1	0	0

¹See http://www2.census.gov/econ/susb/data/msa_codes_2007_to_2011.txt
²Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.
³Based on population estimates for July 1, 2021 obtained from the United States Census Bureau, <https://www.census.gov/quickfacts/fact/table/US/PST045221>
⁴see <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data>
 *One monitor present to satisfy NCore requirement

Table 2. Minimum SO₂ 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 D-6 NO₂ Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR NITROGEN DIOXIDE (NO ₂)				
STATE: <u>ALASKA</u> AGENCY: <u>DEPARTMENT OF ENVIRONMENTAL CONSERVATION</u> AQS AGENCY CODE: <u>02</u>				
EVALUATION DATE: <u>5/10/2022</u> EVALUATOR: <u>R.MILLS</u>				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.3.2(a)	Near-road NO ₂ 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 NO ₂ Monitors: An additional near-road NO ₂ monitoring 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 NO ₂ 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 NO ₂ 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, NO _y , and Difference, which satisfies the NCore requirement for NO ₂ .				

CBSA Description ¹	CBSA population ^{2, 3}	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)	398,807	0	0	0	0
Fairbanks North Star Borough (MSA)	95,593	0	0	0	0*
City and Borough of Juneau (μSA)	31,973	0	0	0	0

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

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

³Based on population estimates for July 1, 2021 obtained from the United States Census Bureau, <https://www.census.gov/quickfacts/fact/table/US/PST045221>

*NCore site requirement is satisfied with NO_y monitoring



Appendix E Summary of Monitoring Path & Siting Criteria Evaluation Forms



Table E-1 Summary of Appendix E Forms: PM_{2.5}, PM₁₀, & PM_{10-2.5}

	Garden	Parkgate	Laurel*	Butte	Hurst Road	A Street	NCore	Floyd Dryden
Parameter(s)	PM _{2.5} & PM ₁₀	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
Address	3000 E 16th Ave, Anchorage	11723 Old Glenn Hwy E 16 th Ave, Eagle River	4335 Laurel St, Anchorage	Harrison Ct, Butte	3288 Hurst Rd, North Pole	397 Hamilton Ave, Fairbanks	809 Pioneer Rd, Fairbanks	3800 Mendenhall Loop Rd., Juneau
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
2. HORIZONTAL AND VERTICAL PLACEMENT	Criteria met, 11 m	Criteria met, 10 m	Criteria met, 6 m	Criteria met, 4 m	Criteria met, 4 m	Criteria met, 4 m	Criteria met, 4 m	Criteria met, 7 m
3. SPACING FROM MINOR SOURCES (a)	Criteria met, chimney 3.8 m away	Criteria met, paved parking lot >10 m away	Criteria met, max impact site, winter graveled streets	Criteria not met, gravel cul-de-sac**	Criteria met	Criteria met, near a school and a neighborhood	Criteria met, ~160 m to Diving Duck Roasters, ~450 m to power plant	Criteria met, ~15 m to kitchen vent, ~20 m to furnace flue
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
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, ~8 m to Hi-Vol RadNet Monitor
5. SPACING FROM TREES (a)	Criteria met, >10 m	Criteria met, >10 m	Criteria met, >20 m	Criteria not met, 5.5 m**	Criteria met, >10 m	Criteria met, >10 m	Criteria met, >10 m	Criteria met, >20 m
5. SPACING FROM TREES (c)*	NA	NA	Criteria met	NA	NA	NA	NA	NA
6. SPACING FROM ROADWAYS	Criteria met, >10 m to road	Criteria met, >25 m to paved roads	Criteria met, 11 m to road, maximum exposure site	Criteria met, >150 m to road	Criteria met, >20 m to road	Criteria not met, <10 m to road [†]	Criteria met, >50 m to road	Criteria met, ~100 m to road
Changes that might compromise siting?	No	No	No	No	No	No	No	No

*Laurel is the only microscale site in Alaska's PM network

** See Butte siting waiver (Section 3.5.2 and **Appendix C**, Waiver C-2)

[†]This site is located on a low-volume roadway that is paved and covered with snow and ice for six months of the year



Table E-2 Summary of Appendix E Forms: CO

	Garden	NCore
Parameter(s)	CO	CO
Address	3000 E 16th Ave, Anchorage	809 Pioneer Rd, Fairbanks
AQS ID	02-020-0018	02-090-0034
2. HORIZONTAL AND VERTICAL PLACEMENT	Criteria met, 2.6 m	Criteria met, 3 m
3. SPACING FROM MINOR SOURCES	Criteria met, residential	Criteria met, ~160 m to Diving Duck Roasters, ~450 m 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 met, although there is a tree 2.7 m NE of probe, but airflow is still available around and through the tree	Criteria met
5. SPACING FROM TREES (c)	NA	NA
6. SPACING FROM ROADWAYS	NA, Neighborhood scale but 7.6 m from roadway ¹	NA, 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, 31 seconds ²	Criteria met, < 20 seconds
Changes that might compromise siting?	No	No

¹This site was originally set up as a microscale site by the Municipality of Anchorage which would require the close (<10 m) proximity to the road.

²CO is a non-reactive gas, so current residence time is not expected to impact quality of measurement. An auxiliary pump and manifold will be added in the future to improve residence time.



Table E-3 Summary of Appendix E Forms: O₃, SO₂, NO, Diff, and NO_y

Parameter(s)	NCore			Hurst Road
	O ₃	SO ₂	NO, Diff, & NO _y	SO ₂
AQS ID	02-090-0034			02-090-0035
Address	809 Pioneer Rd, Fairbanks			3288 Hurst Rd, North Pole
2. HORIZONTAL AND VERTICAL PLACEMENT	Criteria met, 3 m	Criteria met, 3 m	Criteria met, 3 m	Criteria met, 3 m
3. SPACING FROM MINOR SOURCES	Criteria met, ~ 160 m to Diving Duck Roasters, ~450 m 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	Criteria met
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	Criteria met, no obstacles
4. SPACING FROM OBSTRUCTIONS (b)	Criteria met, unrestricted 360° airflow	Criteria met, unrestricted 360° airflow	Criteria met, unrestricted 360° airflow	Criteria met, unrestricted 360° airflow
4. SPACING FROM OBSTRUCTIONS (d)				
5. SPACING FROM TREES (a)	Criteria met, >10 m	Criteria met, > 10 m	Criteria met, >10 m	Criteria met, > 10 m
5. SPACING FROM TREES (c)	NA	NA	NA	> 10m
6. SPACING FROM ROADWAYS	Criteria met, >10 m to road	NA	Criteria met, >10 m to road	
9. PROBE MATERIAL & RESIDENCE TIME (a)	Borosilicate glass w/ FEP Teflon sample lines	Borosilicate glass w/ FEP Teflon sample lines	Borosilicate glass w/ FEP Teflon sample lines	FEP Teflon sample lines
9. PROBE MATERIAL & RESIDENCE TIME (c)	< 5 seconds	< 5 seconds	< 20 seconds	Not an NCore site < 20 seconds
Changes that might compromise siting?	No	No	No	No



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

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM _{2.5} , PM ₁₀ , PM _{10-2.5} , 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} sites. 1 meter vertically or horizontally away from any supporting structure, walls, <i>etc.</i> , 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 E-5 Blank Part 58 Appendix E Form for CO

PART 58 APPENDIX E SITE EVALUATION FORM FOR CO					
SITE NAME:		SITE ADDRESS:			
AQ5 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, <i>etc.</i> , 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 E-6 Blank Part 58 Appendix E Form for O₃

PART 58 APPENDIX E SITE EVALUATION FORM FOR O ₃					
SITE NAME:		SITE ADDRESS:			
AQ5 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, <i>etc.</i> , 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:					

¹Distance 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.

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



Table E-7 Blank Part 58 Appendix E Form for SO₂

PART 58 APPENDIX E SITE EVALUATION FORM FOR SO ₂					
SITE NAME _____ SITE ADDRESS _____					
AQ5 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, <i>etc.</i> , 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 SO ₂ .				
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 E-8 Blank Part 58 Appendix E Form for NO, NO_x, NO₂, and NO_y

PART 58 APPENDIX E SITE EVALUATION FORM FOR NO, NO _x , NO ₂ , and NO _y					
SITE NAME _____ SITE ADDRESS _____					
AQ5 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, <i>etc.</i> , 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 E-9 Roadway ADT for CO, O₃, SO₂, 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 F **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. The 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. Specifically, 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. During 2023 wildland fire season DEC will partner with other agencies to expand the network of low-cost sensors, as necessary. In addition, the DEC meteorologist or air quality staff, with assistance from the National Weather Service (NWS), will use meteorological and air monitoring data to forecast smoke movement and predict where air quality impacts might occur.

VOLCANIC ASH MONITORING

In the event of an active volcano eruption, DEC will cooperate with the Alaska Volcano Observatory on volcanic ash monitoring. The DEC meteorologist will use a PM₁₀ Met One E-BAM with an AIRSIS communication system 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. The RadNet monitor in Anchorage was moved from the Alaska State Public Health Laboratory (5455 Doctor M.L.K. Jr. Ave.) to the Garden site (3000 E 16th Ave.) on August 30, 2021 and operation of the site shifted from the Alaska Department of Health and Social Services to the DEC Air Quality Division. Currently, DEC operates the RadNet equipment at all three sites.



Appendix G **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>.