Alaska Department of Environmental Conservation

Annual Air Quality Monitoring Network Plan

April 12, 2017

Air Quality Division

Air Monitoring
&
Quality Assurance
Program

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TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

This 2016 Annual Monitoring Plan describes the Alaska air quality monitoring network under the State's oversight and spells out anticipated changes to the network for the calendar year 2017.

Most of the air monitoring activities are focused on population centers and areas that have shown in the past to have air quality problems. Due to budget cuts over the past several years DEC has reduced the ambient monitoring network to include mostly only regulatory required sites. Looking ahead, DEC does not expect to be extending the network significantly during the next 5 years due to fiscal constraints.

The only new site DEC anticipates to establish is a Special Purpose Monitoring (SPM) site for $PM_{2.5}$ and PM_{10} in Bethel.

Where continuous Federal Equivalence Method (FEM) meet the performance criteria DEC will replace aging FEM equipment. In the Fairbanks North Star Borough non-attainment area DEC replaced the $PM_{2.5}$ Federal Reference Method (FRM) monitors with newer models. The sampling frequency at the NCore and SOB sites will be increased to daily sampling.

DEC is proposing to remove the PM_{10} samplers from the Juneau Mendenhall Floyd Dryden site and use the $PM_{2.5}$ samplers as a surrogate.

On August 11, 2016 EPA approved the State of Alaska's waiver request for lead monitoring at the Red Dog Mine based on the results of dispersion modeling. The results of the modeling showed that the maximum ambient air 3-month rolling average lead concentration at the mine did not exceed 50 percent of the lead NAAQS.

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 use:
  - federal reference method (FRM), or
  - federal equivalent method (FEM)
- Multi-pollutant stations (NCore)
- $PM_{2.5}$ chemical speciation network stations (CSN), and
- Special purpose monitoring (SPM) stations.

The plan shall include a statement of purposes 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, the Regional Administrator is not required to provide a separate opportunity for comment.

This 2016 Annual Monitoring Plan describes the Alaska air quality monitoring network under the State's oversight and spells out anticipated changes to the network for the calendar year 2017. This plan shall include all required stations to be operational by January 1, 2017. Specific locations for the required monitors shall be included in the annual network plan which was due to be submitted to the EPA Regional Administrator by July 1, 2016.

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,
12. Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM_{10} monitoring in lieu of lead total suspended particulate (Pb-TSP) monitoring as allowed for under paragraph 2.10 of 40 CFR 58, Appendix C.

2 AIR QUALITY MONITORING PRIORITIES

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

To protect public health and assess attainment 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 (Matanuska-Susitna) Valley have the bulk of the 710,231[1] people in the state, about 54%. The remainder of the population is distributed among the cities of Juneau and Fairbanks with populations of about 30,000-40,000 and many scattered

[1] Population data obtained from the 2010 US Census, http://live.laborstats.alaska.gov/cen/dp.cfm

and isolated small villages, most of which are off the road system and have populations ranging from 16 to 10,000 people. The total area of the state is approximately 656,425 square miles (1.7 million square kilometers)[2].

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

- Monitor in larger communities to cover the largest possible population exposure;
- Monitor in designated smaller towns and villages that are representative of multiple communities in a region; and
- Monitor in response to air quality complaints.

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

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

2.1 *Fine Particulate Matter - $PM_{2.5}$*

The primary sources of fine particulates in the atmosphere are emissions from combustion processes. Health research in the lower 48 states and Alaska has found that $PM_{2.5}$ sized particles are creating major health problems throughout communities across the United States. For people in northern states with cold winters, this problem is exacerbated by increased exposure to fine particulate generated by home heating with wood during periods of extreme cold and extended wintertime temperature inversions which trap pollutants close to ground level. Smoke can also be a severe problem during spring and summer wildland fire season. Wildland fires may occur throughout Alaska and are very common to the Interior.

[2] Geographical data obtained from NetState.com, http://www.netstate.com/states/geography/ak_geography.htm

Wood smoke from home heating has been a major contributor to elevated fine particulate levels in Southeast Alaska for years. Juneau's Mendenhall Valley exceeded the PM_{10} standard[3] numerous times in the late 1980s and early 1990s, but successfully reduced particulate matter levels with an effective wood smoke control program, public education, and woodstove conversion to pellet stoves and oil-fired space heaters.

Fine particulates have also been a concern in some Interior Alaska communities, especially during the winter months when extremely strong inversions trap emitted particles close to the surface. In the smaller, rural villages, this problem is normally associated with wood smoke. In the large communities like the FNSB, which is designated as non-attainment for the 24-hour $PM_{2.5}$ NAAQS, the pollution is a mix primarily comprising wood smoke from woodstoves and hydronic heaters, but also including emissions from coal-fired power plants, vehicular traffic, and oil-fired heating systems.

2.2 *Coarse Particulates - PM_{10}*

PM_{10} or "dust" impacts are widespread throughout Alaska and have been a pollutant of concern for over 40 years. PM_{10} has been monitored in Anchorage, Juneau, the Matanuska-Susitna Valley, and Fairbanks for over twenty years. Two locations in the State were designated non-attainment for dust in 1991: the Municipality of Anchorage (Eagle River) and the City and Borough of Juneau (Juneau).

Dust has also been identified as a problem in most of the rural communities in Alaska. With the exception of the "hub" communities, most of the smaller villages have a limited road system and few resources with which to pave roads. In addition, the soil composition is often frost susceptible and not conducive to paving. With the recent addition of all-terrain vehicles (4-wheelers) and more automobiles and trucks, the amount of re-entrained dust has increased substantially.

2.3 *Carbon Monoxide-CO*

Alaska's two largest communities, Anchorage and Fairbanks, were designated non-attainment for carbon monoxide (CO) in the mid to late 1980s. Motor vehicle CO emissions increase in the cold winter temperatures experienced in Alaska. These elevated emissions, combined with strong wintertime temperature inversions, resulted in both communities exceeding the CO standards numerous times each winter. Due to the implementation of control strategies, such as public use of engine block heaters and improvement to vehicle ignition systems, neither community has had a violation of the CO standard in almost 15 years. Both communities requested re-designation to attainment and were reclassified as *Limited Maintenance Areas* in 2004.

[3] There was no separate NAAQS for $PM_{2.5}$ prior to 1997 - $PM_{2.5}$ fell under the PM_{10} NAAQS.

2.4 ***Lead Monitoring-Pb***

To comply with the November 2008 revision of the state and federal air quality standard for lead, DEC explored establishing a source-oriented, lead monitoring site near the Red Dog Mine in Alaska's Northwest Arctic Borough. The Red Dog Mine, fifty miles inland, extracts lead and zinc ore from an open-pit mine and concentrates the ore at their processing facility for transport to the coast where it is stored for barging and eventual export. The intent of the revised lead standard was for source-oriented monitoring at all facilities that had potential annual emissions equal to or greater than one half ton of lead. The Red Dog Mine is the State's only emission source that meets this criterion. The area around the mine is extremely remote, rugged terrain with no road access and no access to power. EPA sanctioned the change in the monitoring strategy from source-oriented to population-oriented because of Alaska's rural character. Initially, a monitoring location was selected in the Native Village of Noatak, the closest community to the Red Dog Mine. The monitoring site was established in January 2010 and operated periodically through the middle of August 2011. The site consisted of collocated high volume samplers which collected samples for total suspend particulate (TSP). Filter analysis was performed at the Anchorage DEC Environmental Health laboratory. The site was finally shut down after DEC was unable to maintain consistent local site operations using local residents. Several additional attempts to work through the tribe or by establishing private contracts were ultimately unsuccessful. Only two sampling periods yielded sufficient data to report to AQS, one from 1/13/2010 to 6/30/2010 and a second one from 6/6/2011 to 8/14/2011.

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. For this alternative demonstration the modeled lead concentration outside the ambient air boundary has to be less than 50% of the NAAQS. Under 40 CFR 58, Appendix D, section 4.5 (ii) DEC submitted a modeling protocol on October 23, 2012 as part of a waiver request to avoid the monitoring requirement. After initial review EPA requested updated information for the model's emissions inputs. EPA, DEC, and Red Dog Mine cooperatively set a schedule for submission of the updated information. Additional soil sampling was required to adequately determine emission factors for the gravel roads. Laboratory analysis of the required soil sampling was completed in August, 2014. DEC and EPA reviewed and approved the laboratory analysis report and the updated emissions inventory. On June 26, 2015 DEC submitted an updated draft modeling protocol. After addressing EPA concerns on the protocol, DEC submitted a draft modeling analysis before the deadline on December 31st, 2015. EPA had additional follow questions based on the modeling analysis and all of those were addressed by DEC. Finally, on April 8, 2016, DEC formally submitted a waiver request for modeling in lieu of monitoring with a modeling analysis report that showed the lead concentration along the ambient air boundary were below 50% of NAAQS. On August 11, 2016 EPA approved the State of Alaska's waiver request for lead monitoring at the Red Dog Mine based on the results of dispersion modeling. The results of the modeling showed that the maximum ambient air 3-month rolling average lead concentration at the mine 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. Therefore, if ADEC elects to renew the lead source-monitoring waiver, a formal written request for renewal must be submitted to EPA 120 days prior to the expiration of this waiver. The formal request to renew the lead source-monitoring waiver must demonstrate that the site conditions for which the previous modeling was conducted are still appropriate. 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. A copy of the EPA approval letter is in Appendix F.

2.5 *Ozone Monitoring-O_3*

The March 27, 2008 revision of the national ozone standard required the State of Alaska to establish an O_3 monitoring program by April 1, 2010. The regulation required at least one State and Local Air Monitoring (SLAMS) O_3 site in a core based statistical area (CBSA) with a population greater than 350,000. The Anchorage/Matanuska-Susitna Valley population forms the only combined Metropolitan Statistical Area (MSA) in the State of Alaska which meets the criterion. The Municipality of Anchorage conducted monitoring during the O_3 monitoring season (April- October) from 2010 through 2012. An O_3 monitoring site was also established in Wasilla in May 2011 and moved to Palmer in May 2015. The Palmer site was chosen based on analysis of historical meteorological data collected in Anchorage which indicated the area is located downwind of Anchorage on days most likely to experience maximum ozone concentrations. Ozone monitoring is ongoing in Palmer and at three multi-pollutant NCore site in Fairbanks, which began monitoring for O_3 in 2012.

2.6 *Sulfur Dioxide Monitoring-SO_2*

The State of Alaska currently has no MSA which would require SO_2 monitoring under 40 CFR 58, Appendix D, paragraph 4.4.2. The only continuous SO_2 monitoring currently being performed in Alaska is at the NCore site in Fairbanks. Monitoring for SO_2 was performed in Southeast Alaska in the 1980s and early 1990s in response to public concerns about emissions from the two regional pulp mills. While elevated concentrations were observed during the monitoring, the 8-hour SO_2 standard at the time was not exceeded. With the revision of the SO_2 standard and introduction of the 1-hour standard, additional monitoring in rural communities may be warranted. Short term studies in St. Mary’s and Fairbanks indicate a potential for exceedances of the SO_2 standard during the winter time. Especially in light of the ubiquity of diesel power generation in rural Alaska, elevated SO_2 levels might be a widespread issue. A short-term monitoring program was conducted in the City of Eagle Alaska during the winter of 2013-14 due to public health concerns related to emissions from an underground shale-oil fire. No elevated concentrations were observed. As staffing and funding allow, DEC will conduct studies in rural communities to better understand the issue.

2.7 *Nitrogen Oxides Monitoring-NO_2 and NO_y*

Nitrogen oxides are a group of air pollutant compounds that primarily form during combustion and then react photo-chemically in the atmosphere to form secondary pollutants. This group of pollutants was consolidated and are regulated as a single pollutant under the NAAQS as nitrogen dioxide (NO_2). The State of Alaska currently has no MSA which would require NO_2 monitoring under 40 CFR 58, Appendix D, paragraph 4.3. However, the NCore site in Fairbanks has been monitoring for NO_y, NO and NO_y-NO since 10/5/2012 and NO_2, NO and NO_x since 7/1/2014. Historically, NO_2 monitoring was conducted as part of the Unocal Tesoro Air Monitoring Program (UTAMP) conducted in North Kenai during the early 1990s. The state operated its own independent monitoring site and measured ammonia and NO_2. Elevated short term NO_2 values were observed, but the annual concentration was not exceeded.

With the revision to the NO_2 standard and introduction of the 1- hour NO_2 standard, DEC will have to evaluate if and where additional monitoring will be warranted.

As part of the multi-pollutant monitoring program and in an effort to better understand atmospheric chemistry in a $PM_{2.5}$ non-attainment area, total reactive nitrogen compounds (NO_y) and ammonia (NH_3) monitors were installed at the NCore site in Fairbanks. Unfortunately, due to instrument response-time and other technical instrumentation issues, the NH_3 monitoring program failed and the monitor was taken out of service. The instrument was replaced with an NO_X/NO/NO_2 trace-level monitor in February 2014 and started producing AQS quality data by July 2014.

3 STATE OF ALASKA AMBIENT AIR MONITORING NETWORK

3.1 *Current Monitoring Sites*

DEC operates and maintains a number of ambient air monitoring networks throughout the State of Alaska. DEC assumed monitoring from Fairbanks North Star Borough (FNSB) on July 1, 2016 and Municipality of Anchorage (MOA) monitoring on January 1, 2017. Table 3-1 provides the site name, address, geographic coordinates, and identification number for all the air monitoring sites submitting data to the EPA Air Quality System (AQS) database as of January 1, 2017.

Table 3-1. AQS Monitoring Sites as of January 2017

Site Name	Address	Latitude/ Longitude*	AQS Identification	Agency
Garden	3000 East 16th Ave. Anchorage, AK	61.205861N 149.824602W	02-020-0018	DEC
Laurel	4335 Laurel St. Anchorage, AK	61.181312N 149.834083W	02-020- 0045	DEC
Parkgate	11723 Old Glenn Hwy. Eagle River, AK	61.326700N 149.569707W	02-020-1004	DEC
State Office Building	675 Seventh Ave. Fairbanks, AK	64.840833N 147.723056W	02-090-0010	DEC
NCore	809 Pioneer Road Fairbanks, AK	64.845307N 147.72552W	02-090-0034	DEC
North Pole Fire Station #3	3288 Hurst Rd. North Pole, AK	64.762973N 147.310297W	02-090-0035	DEC
Peger (met only)	3175 Peger Rd. Fairbanks, AK	64.81923333 147.778083W	02-090-4010	DEC
Butte	Harrison Court Butte, AK	61.534100N 149.0351855W	02-170-0008	DEC
Palmer	South Gulkana St. Palmer, AK	61.599322N 149.103611W	02-170-0012	DEC
Floyd Dryden Middle School	3800 Mendenhall Loop Road Juneau, AK	58.388889N 134.565556W	02-110-0004	DEC

*Coordinates for latitude and longitude are consistent with the World Geodetic System (WGS 84).

Figure 3-1 shows the State of Alaska air monitoring networks that report to the EPA AQS database. Regional maps show the general monitoring site locations in the Municipality of Anchorage, Fairbanks North Star Borough, Matanuska-Susitna Valley, and the City and Borough of Juneau. In addition to the network maps, area maps which provide greater detail of the individual site locations are presented. All maps are presented in Figures 3-1 through 3-13. All map base images were prepared using Google Earth® with Landsat and US Geological Survey digital images using the World Geodetic System (WGS 84) datum.

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 site evaluation forms were reviewed and updated, when necessary, in 2016 by DEC and are presented in **Appendix A** of this report.

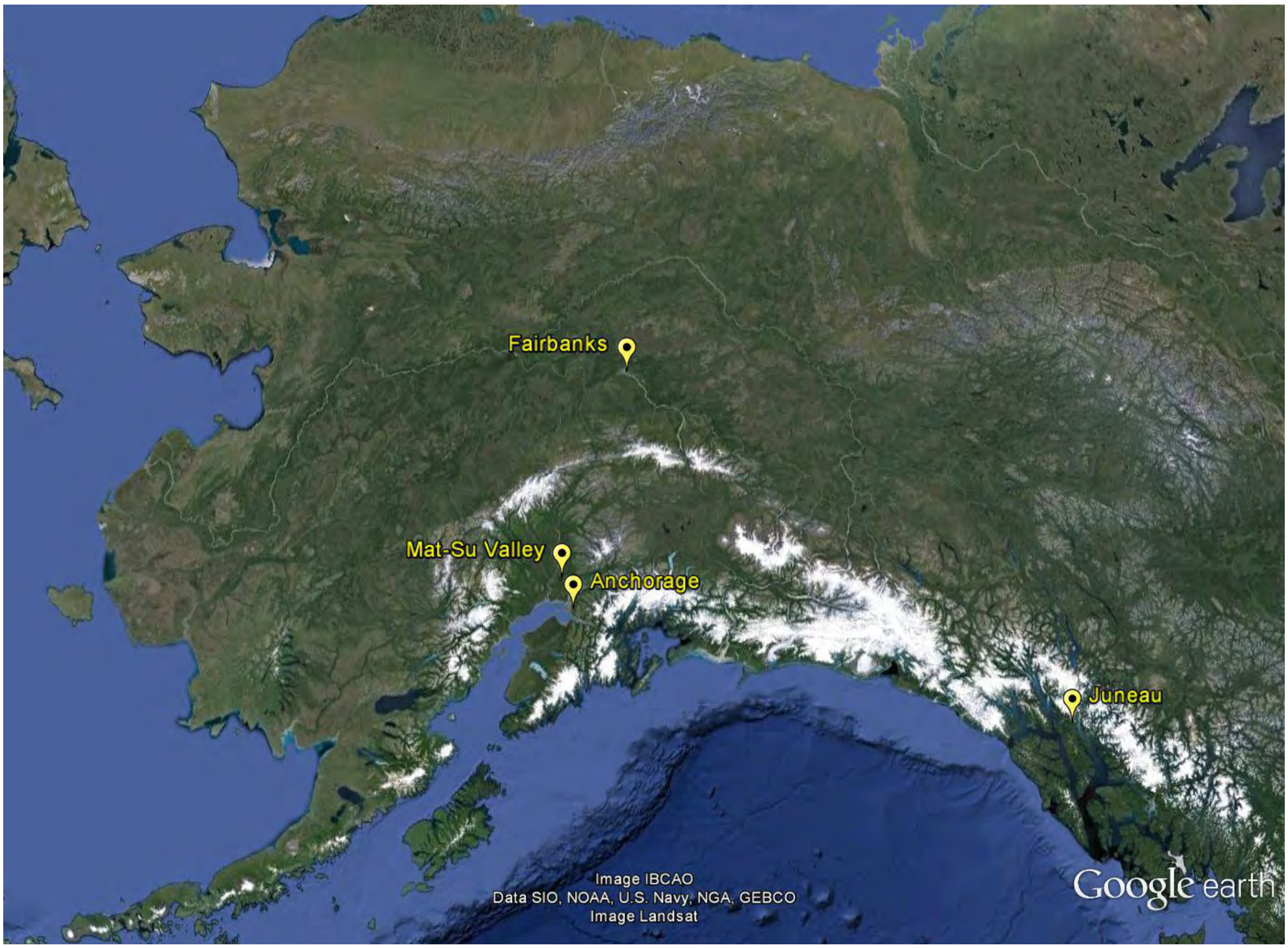


Figure 3-1. State of Alaska AQS Air Monitoring Networks

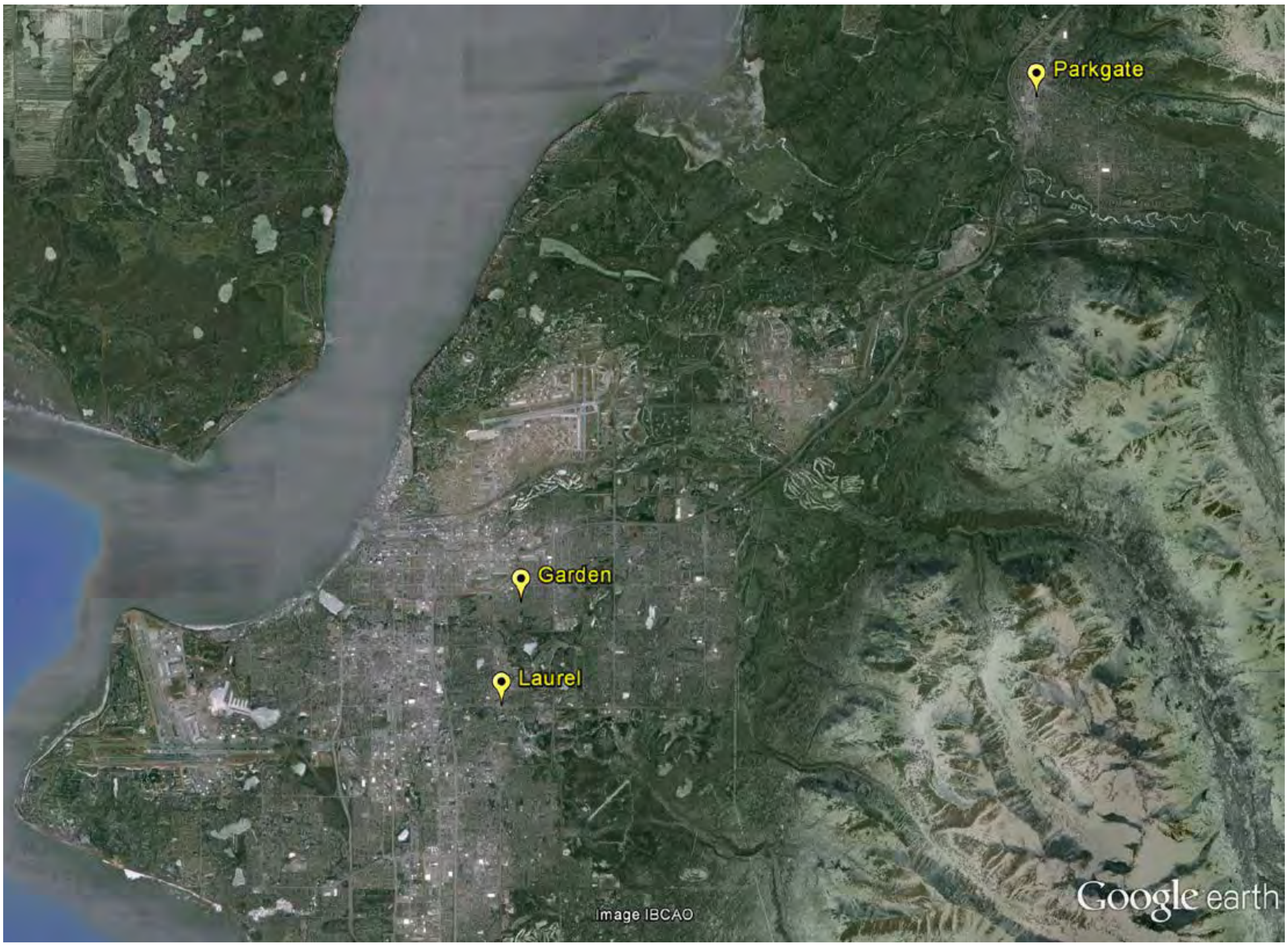
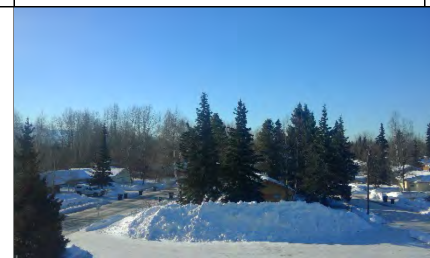


Figure 3-2. Anchorage Air Monitoring Network

Figure 3-3. Anchorage Garden Site Area Map

Figure 3-4. Pictures of the Garden Site (AQS ID 02-020-0018)

North	East	South	West
			
Views in four directions from the Garden Site			
			
Views in four directions towards the Garden Site			

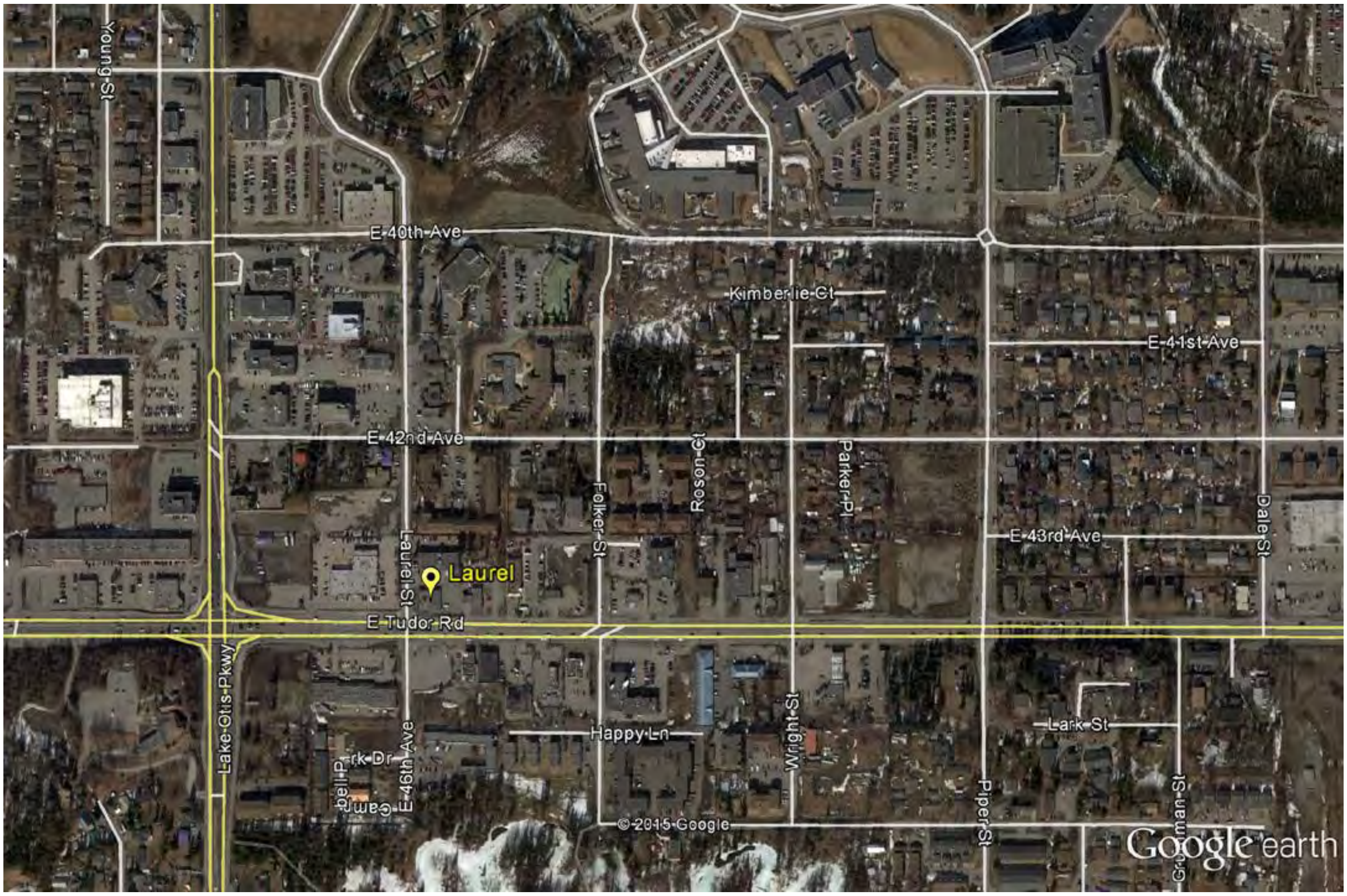


Figure 3-5. Anchorage Laurel Site Area Map

Figure 3-6. Pictures of the Laurel Site (AQS ID 02-020-0051)

North	East	South	West
			
Views in four directions from the Laurel Site			
			
Views in four directions towards the Laurel Site			

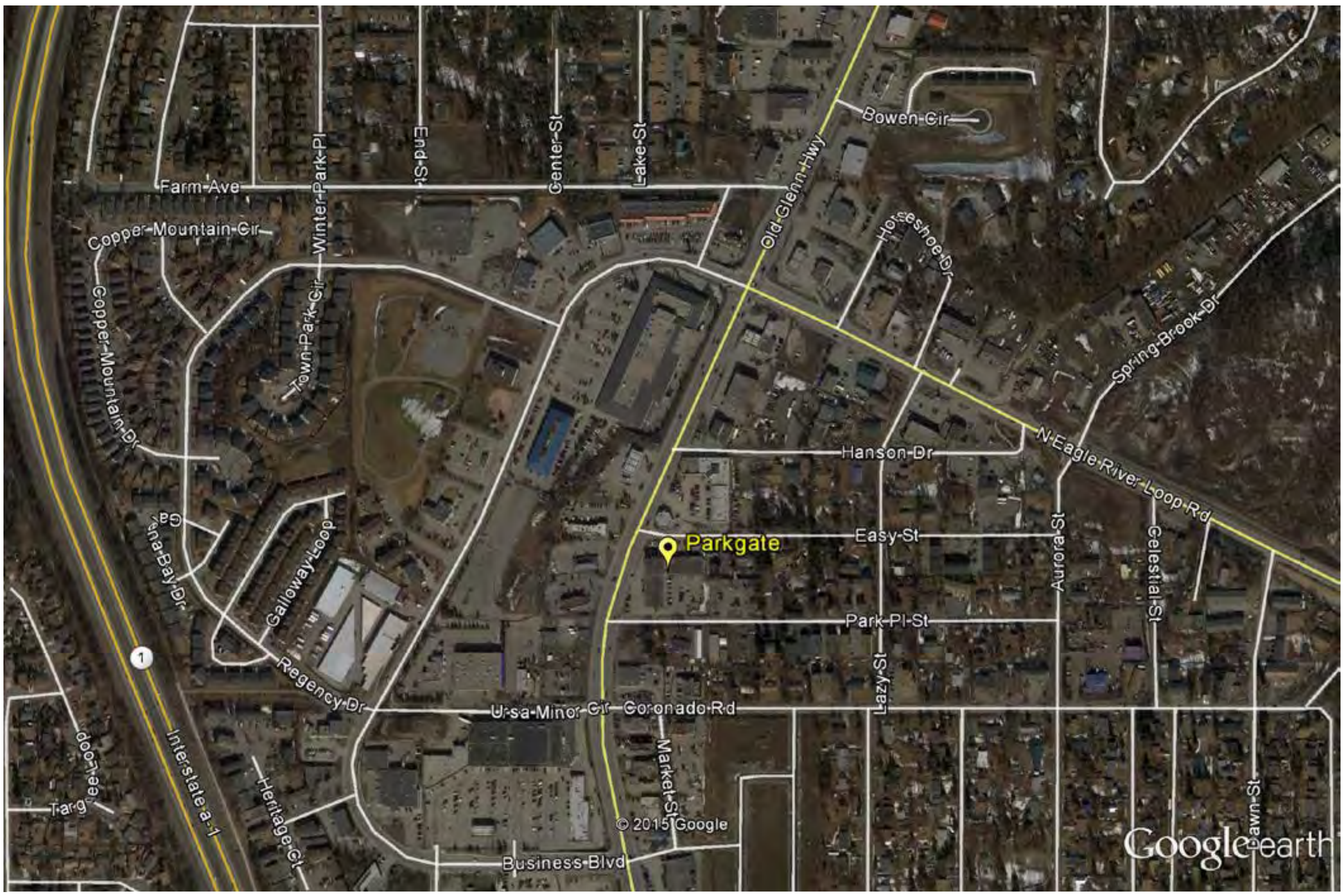


Figure 3-7. Anchorage Parkgate/Eagle River Area Map

Figure 3-8. Pictures of the Parkgate Site (AQS ID 02-020-1004)

North	East	South	West
			
Views in four directions Towards the Parkgate Site			
			
Views in four directions from the Parkgate Site			

Figure 3-9 Fairbanks North Star Borough Area Map

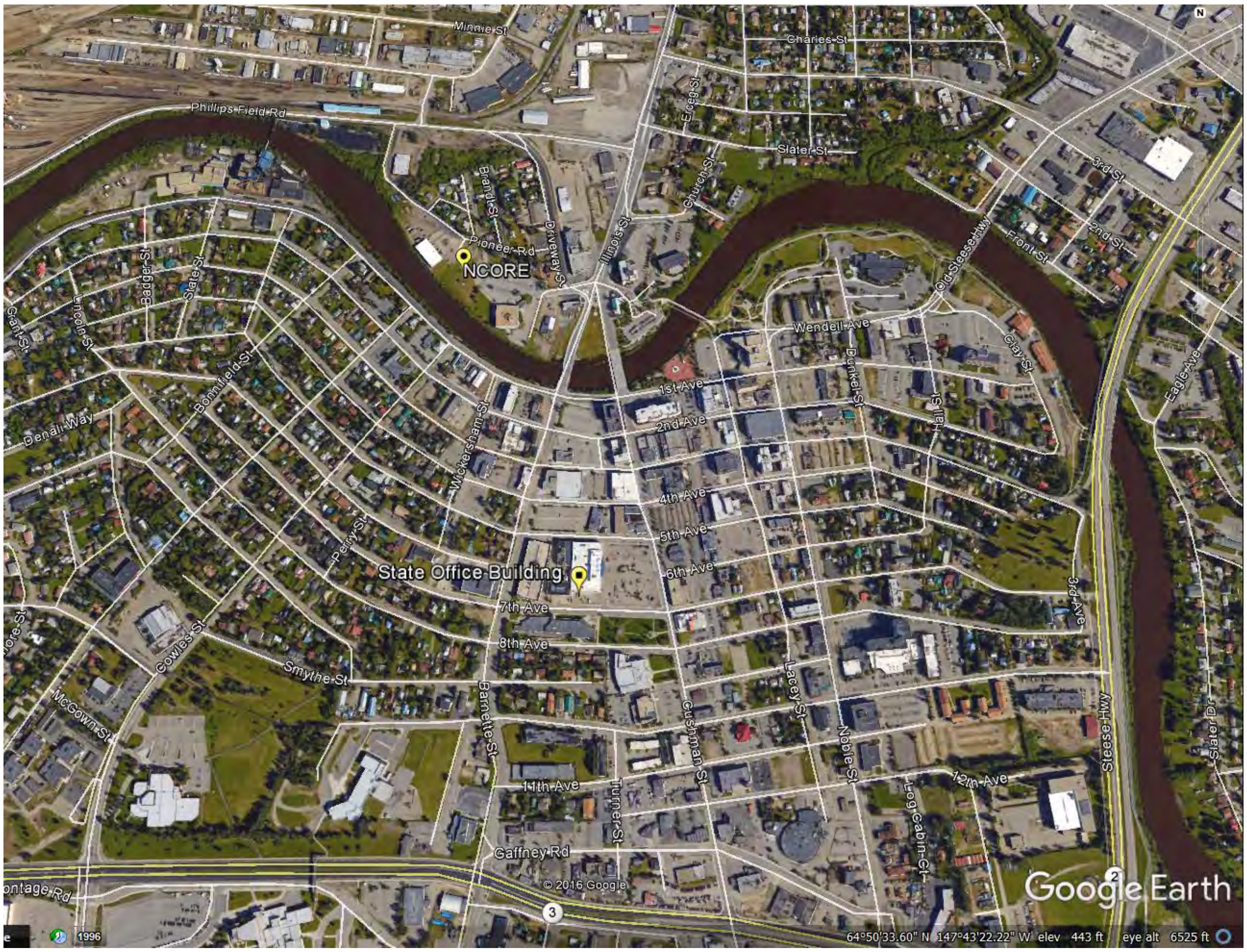


Figure 3-10 Fairbanks Area Map (NCore and SOB pollutant monitoring sites)

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Figure 3-11. Pictures of the State Office Building (AQS ID 02-090-0010)

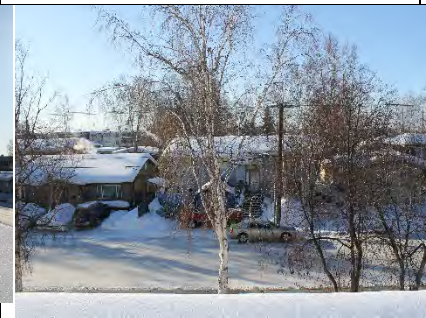
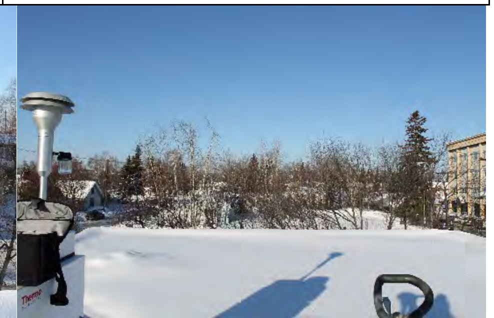
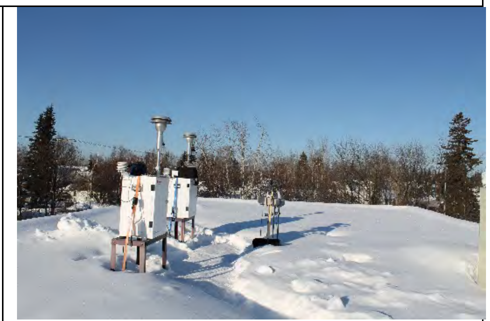
North	East	South	West
			
Views in four directions from the State Office Building			
Not available, equipment in close proximity to edge of the roof			
Views in four directions towards the State Office Building Site			

Figure 3-12. Pictures of NCore (AQS ID 02-090-0034)

North	East	South	West
			
Views in four directions from the NCore site			
			
Views in four directions towards the NCore site			

Figure 3-13 Fairbanks, Peger Area Map (meteorological site)

Figure 3-14. Pictures of TAC (Peger Rd.) (AQS ID 02-090-4010)

<table>
<tr><th>North</th><th>East</th><th>South</th><th>West</th></tr>
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<tr><td colspan="4">Views in four directions from the TAC site</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Views in four directions toward the TAC Site</td></tr>
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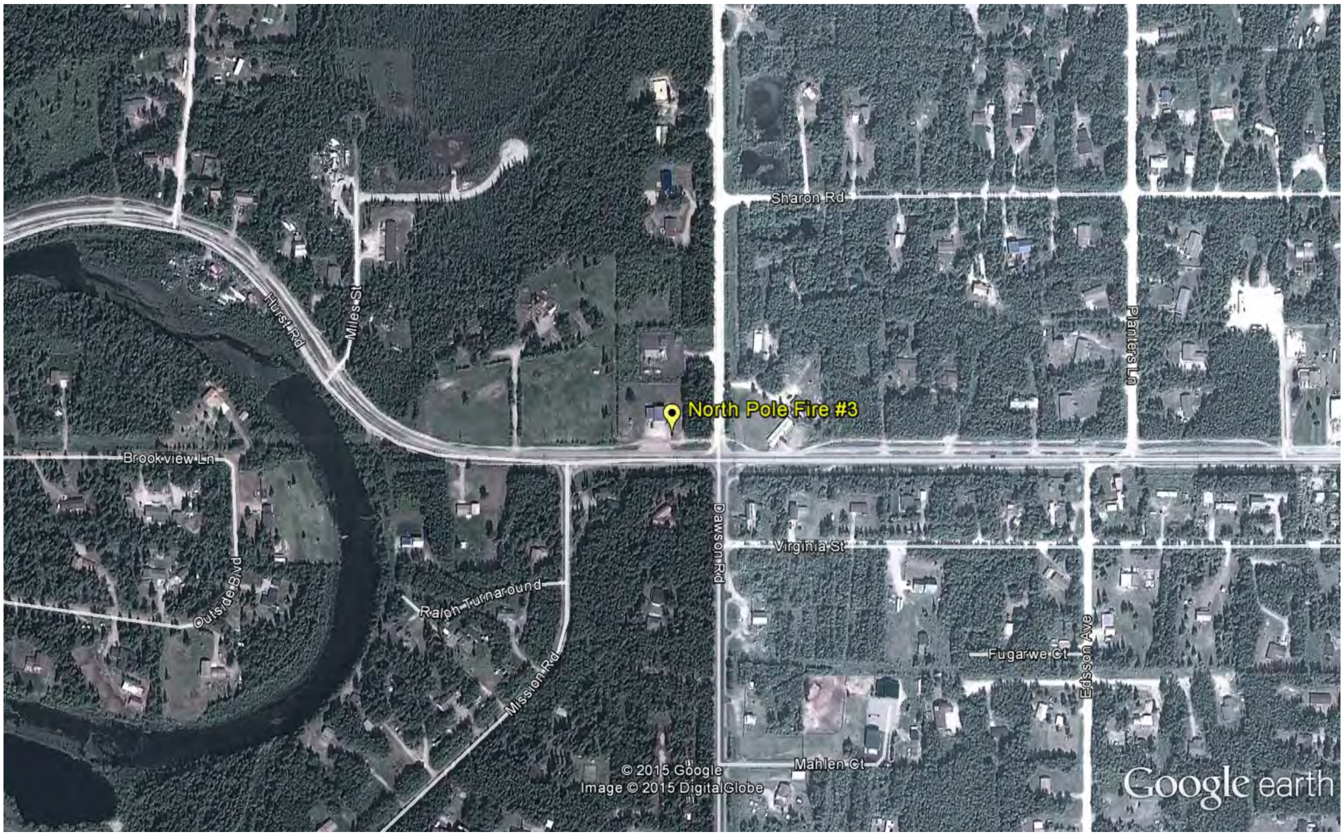


Figure 3-15. North Pole, North Pole Fire #3 Area Map

Figure 3-16. Pictures of North Pole Fire Station #3 (AQS ID 020-090-0035)

North	East	South	West
			
Views in four directions from the North Pole site			
			
Views in four directions towards the North Pole Site			

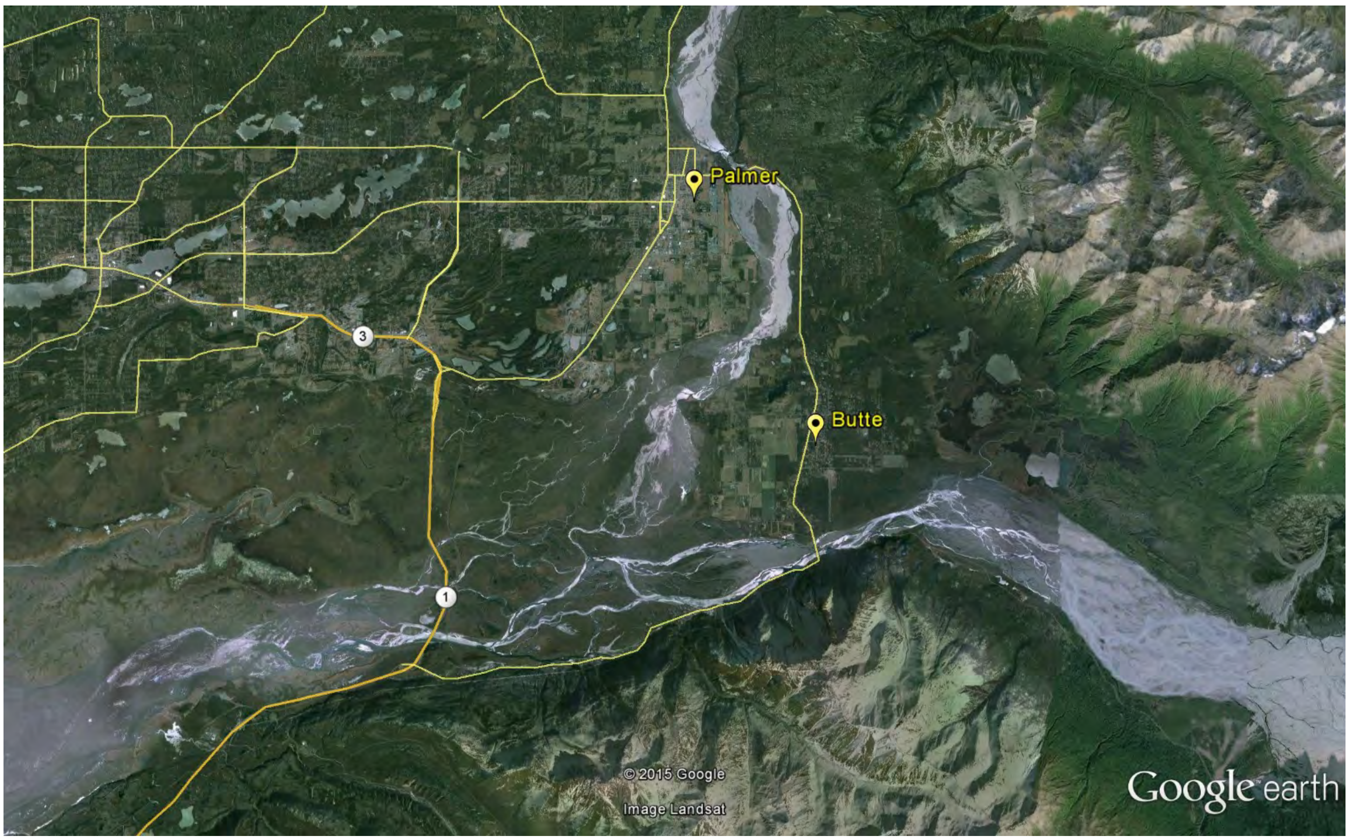


Figure 3-17. Matanuska-Susitna Valley Air Monitoring Network

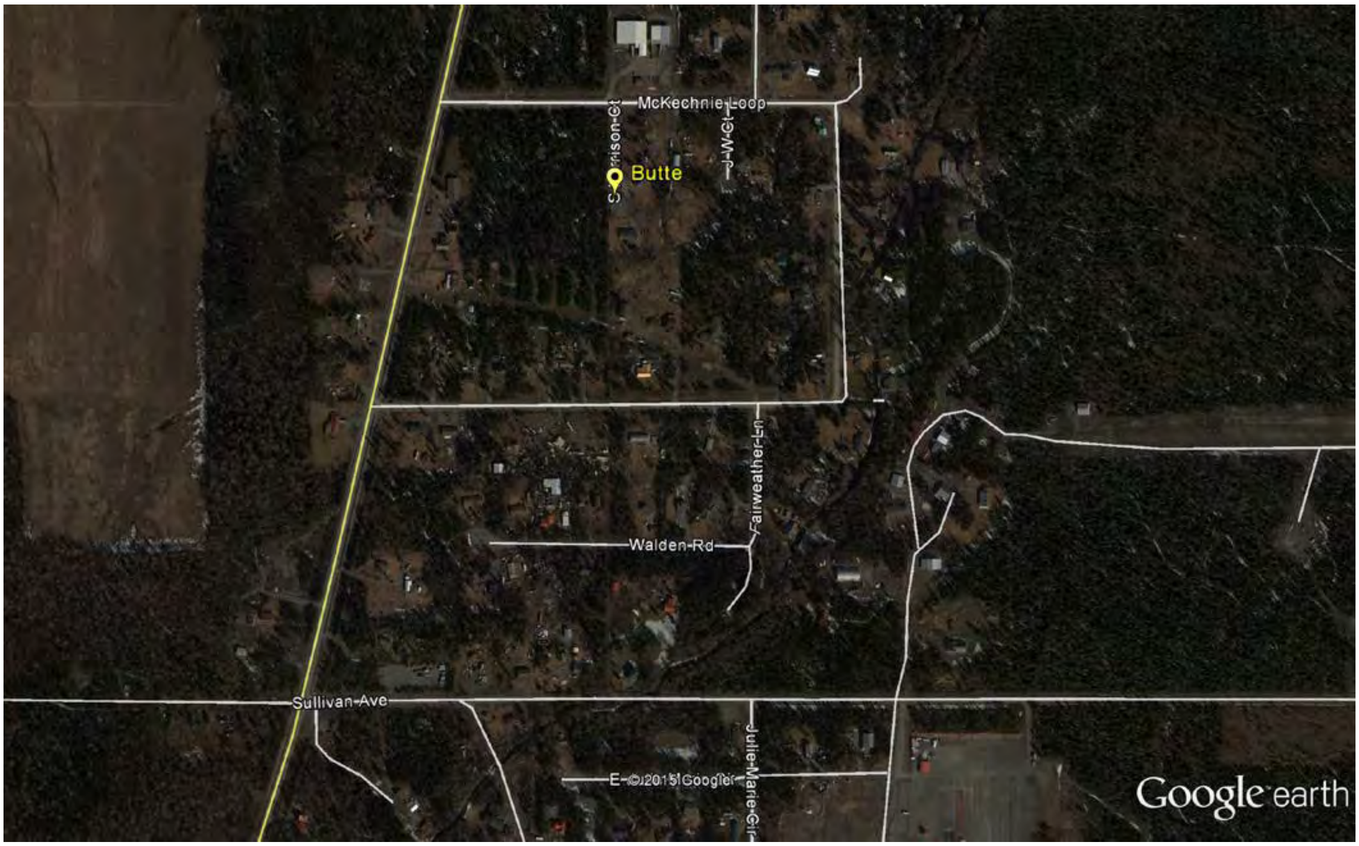


Figure 3-18. Matanuska-Susitna Valley, Butte Area Map

Figure 3-19. Pictures of Butte (Harrison Court) (AQS ID 020-170-0008)

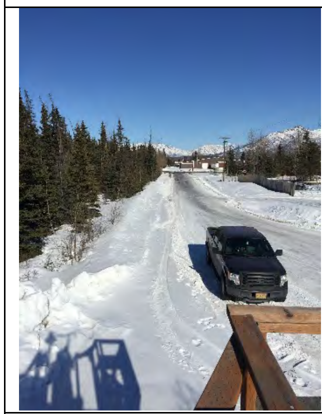
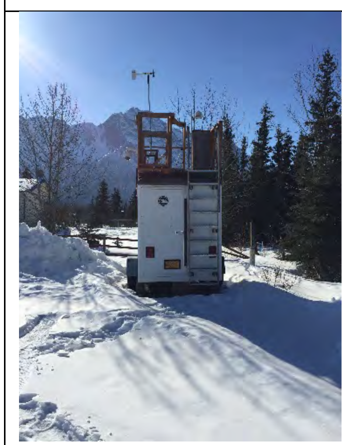
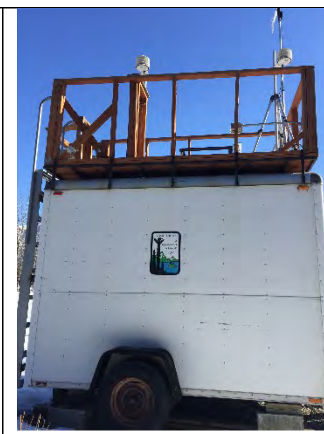
North	East	South	West
			
Views in four directions from the Harrison Court Site			
			
Views from four directions toward the Harrison Court Site			

Figure 3-20. Matanuska-Susitna Valley, Palmer Area Map

Figure 3-21. Pictures of Palmer (AQS ID 020-170-0012)

North	East	South	West
			
Views in four directions from the Palmer Site			
			
Views from four directions toward the Palmer Site			

Figure 3-22. City and Borough of Juneau Air Monitoring Network, Floyd Dryden Middle School, Mendenhall Valley Area Map

Figure 3-23. Pictures of Floyd Dryden (AQS ID 02-110-0004)

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<tr><th>North</th><th>East</th><th>South</th><th>West</th></tr>
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<tr><td colspan="4">Views in four cardinal directions from the Floyd Dryden Site</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Views in four cardinal directions toward the Floyd Dryden Site</td></tr>
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3.2 *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. Those site evaluation forms are presented in **Appendix B** of this report. Included are two tables: one for CO sites (Table 3-2) and one for PM sites (Table 3-3).

The following is a list of definitions relating to monitoring site scaling:

Micro-scale—defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters.

Middle Scale—defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometer.

Neighborhood Scale—defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range.

Urban Scale—defines the overall, citywide conditions with dimensions on the order of 4 to 50 kilometers. This scale would usually require more than one site for definition.

Carbon Monoxide Sites

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

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

The following table (Table 3-2) lists all CO monitoring sites in Anchorage and Fairbanks and how they fit the siting criteria from Appendix E of 40 CFR Part 58.

Table 3-2. CO Monitoring Sites in Anchorage and Fairbanks May 2016

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	Yes
NCore 02-090-0034	Neighborhood	Not applicable	4	360 degrees unobstructed	85	None

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

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

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

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

Table 3-3. PM Monitoring Sites in Alaska as of January 2017

Site Name	Monitoring Scale	Height (meters)	Spacing from Obstructions (meters)	Spacing from Roadway (meters)	Traffic (VPD)	Trees
Garden 02-020-0018	Neighborhood	10	12m to 5m tall penthouse	10	< 5,000	None
Laurel 02-020-0045	Microscale	7	None	15	35, 000	None
Parkgate 02-020-1004	Neighborhood	6	13m to 4m tall penthouse	44	11,000	None
Butte 02-170-0008	Neighborhood	4	> 8	150	Unknown, probably < 5,000	None
Palmer 02-170-0012	Neighborhood	4	None	>20	Unknown, probably < 5,000	None
State Office Building 02-090-0010	Neighborhood	6	30m to 3.75m tall penthouse	20	7,400	None
NCore 02-090-0034	Neighborhood	4	75 m to 12 m building	85	3,559	None
North Pole Fire #3 02-090-0035	Neighborhood	4	None	23 to Hurst Rd	3,730	> 30
Floyd Dryden 02-110-0004	Neighborhood	6	Furnace flue @ 20m, 4m penthouse @ 15m	65	12,770	12 m tall 25m away

3.3 *Monitoring Methods, Designation and Sampling Frequency*

Table 3-4 presents information for current sites (and monitors) used in coding the data submitted by DEC to the AQS database. The information provided in Table 3-4 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. The 5-digit AQS parameter codes are specific to the pollutant, instrumentation, and sampling equipment used, and how the concentration units are expressed in either local conditions or corrected to standard conditions for temperature and pressure. The 5-digit parameter code identifies the parameter being measured e.g. PM_{10}, SO_2, or wind speed. The 1-digit POC code is the parameter occurrence code. As suggested by Region 10 EPA, DEC uses the POC to indicate whether the sampler or instrument is (1) a primary data source, or (2) a secondary data source such as a collocated sampler, or (3) that an instrument is measuring on a continuous basis. The AQS method code provides information specific to the analytical technique used for the pollutant determination such as instrumental analysis using chemiluminescence for nitric oxide or gravimetric analysis for particulate. The notation presented in the sample frequency indicates how often the pollutant concentration is determined. For example, 1/6 indicates that one sample is collected every sixth day according to the national EPA air monitoring schedule. Continuous indicates that an instrument is continuously analyzing a sample stream providing a pollutant concentration on a real-time basis (e.g. 1-min SO_2 reading) or a near-real time basis (e.g. 1-hour $PM_{2.5}$ reading from a beta attenuation monitor, a BAM). The equipment information column identifies on-site equipment (either a sampler or instrument) specific to the AQS parameter code.

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

A summary of pollutant concentration data calculated as NAAQS design values, maxima, or as averages are presented in **Appendix E**. Those values caused by exceptional events and with which EPA has already concurred and for which DEC has made application for concurrence have been included in these summaries in table E-0-1. Table E-0-2 shows the values 2015 summer wildfire exceedances. In the highly unlikely event that EPA does not concur with DEC's 2015 Exceptional Event Waiver Request (currently in preparation) the NCore and SOB sites this table (E-0-1) will be correct.

Table 3-4. AQS Codes as of January 2016; 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
Garden Site/ Anchorage 02-020-0018	PM_{10STD}/ PM_{10LC}	SLAMS	01/01/2009	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020X Coarse
	$PM_{2.5LC}$	SLAMS	01/01/2009	88101-3	170	Continuous	Met-One BAM 1020X Coarse
	CO	SLAMS	01/01/1979	42101-1	554	Continuous (Oct-Mar)	Thermo Env. Inst. Model 48i
Laurel/ Anchorage 02-020-0045	PM_{10STD}/ PM_{10LC}	SPM	05/28/2015	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020X
Parkgate/ Eagle River 02-020-1004	PM_{10STD}/ PM_{10LC}	SLAMS	01/01/2009	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020X Coarse
Parkgate/ Eagle River 02-020-1004	$PM_{2.5LC}$	SLAMS	01/01/2009	81102-3/ 85101-3	170	Continuous	Met-One BAM 1020X Coarse
State Office Building/ Fairbanks 02-090-0010	$PM_{2.5LC}$	SLAMS	10/23/1998	88101-1	143	1/3	R & P Partisol 2000
NCore/ Fairbanks 02-090-0034	PM_{10STD}/ PM_{10LC}	NCORE	02/15/2011	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020X Coarse
	$PM_{2.5LC}$	NCORE	02/15/2011	88101-3	170	Continuous	Met-One BAM 1020X Coarse
	PM_{10STD}/ PM_{10LC}	NCORE	11/10/2012	81102-1/ 85101-1	126	1/3	Thermo Scientific Partisol 2000i

Site Name/ Location	Pollutant Parameter	Monitor Designation	Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
NCore/ Fairbanks 02-090-0034	$PM_{2.5LC}$	NCORE	11/04/2009	88101-1	143	1/1ǂ	Thermo Scientific Partisol 2000i
	PM_{10LC} - $PM_{2.5LC}$	NCORE	02/15/2011	86101-1	175	1/3	paired Thermo Scientific Partisol 2000i
	CO	NCORE	08/01/2011	42101-1	554	Continuous	Thermo Scientific 48i
	SO_2 (1-hr)	NCORE	08/01/2011	42401-1	560	Continuous	Thermo Scientific 43i-TL
	SO_2 (5-min)	NCORE	08/18/2011	42401-2	560	Continuous	Thermo Scientific 43i-TL
	NO_Y	NCORE	01/01/2013	42600-1	674	Continuous	Thermo Scientific 42iY-TL
	NO	NCORE	10/05/2012	42601-1	674	Continuous	Thermo Scientific 42iY-TL
	NO_Y-NO	NCORE	10/05/2012	42612-1	674	Continuous	Thermo Scientific 42iY-TL
	NO_X	NCORE	03/01/2014	42603-1	574	Continuous	Thermo Fisher 42i-TL
	NO	NCORE	03/01/2014	42601-2	674	Continuous	Thermo Scientific 42i-TL
	NO_2	NCORE	03/01/2014	42602-1	574	Continuous	Thermo Scientific 42i-TL
	O_3	NCORE	08/01/2011	44201-1	087	Continuous	Teledyne API 400E
	WD	NCORE	04/05/2011	61104-1	061	Continuous	Met-One Sonic Anemometer
	WS	NCORE	04/05/2011	61103-1	061	Continuous	Met-One Sonic Anemometer

Site Name/ Location	Pollutant Parameter	Monitor Designation	Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
NCore/ Fairbanks 02-090-0034	BP	NCORE	04/05/2011	64101-1	014	Continuous	Met-One BAM 1020X Barometer
	Ambient Temp @ 2 m	NCORE	04/01/2011	62101-2	061	Continuous	Met-One Temp Sensor
	Ambient Temp @ 10 m	NCORE	04/01/2011	62101-1	061	Continuous	Met-One Temp Sensor
	$PM_{2.5LC}$ Speciation	CSN	1/1/2015	Multiple*	Multiple*	1/3	URG 3000N
	$PM_{2.5LC}$ Speciation	CSN	1/1/2015	Multiple*	Multiple*	1/3	Met-One Super SASS $PM_{2.5}$ LC
North Pole Fire #3/ North Pole 02-090-0035	$PM_{2.5LC}$	SLAMS	03/01/2012	88101-1	143	1/3	Thermo Scientific Partisol 2000i
	$PM_{2.5LC}$	SLAMS	03/01/2012	88501-3/ 88502-3	170	Continuous	Met-One BAM 1020X
	$PM_{2.5LC}$ collocated	NCORE	05/08/2013	88101-2	143	1/6	Thermo Scientific Partisol 2000i
	Ambient Temp @ 3 m	SPM	TBD (2017)	62101-2	061	Continuous	Met-One Temp Sensor
	WD @3 m	SPM	TBD (2017)	61104-1	061	Continuous	Met-One Sonic Anemometer
	WS @ 3 m	SPM	TBD (2017)	61103-1	061	Continuous	Met-One Sonic Anemometer
	Ambient Temp @ 10 m	SPM	TBD (2017)	62101-1	061	Continuous	Met-One Temp Sensor

Site Name/ Location	Pollutant Parameter	Monitor Designation	Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
	WD @10 m	SPM	TBD (2017)	61104-1	061	Continuous	Met-One Sonic Anemometer
	WS @ 10 m	SPM	TBD (2017)	61103-1	061	Continuous	Met-One Sonic Anemometer
Peger Rd Met 02-090-4010	AmbientTemp @ 10 m	SPM	TBD (2017)	62101-2	061	Continuous	Met-One Temp Sensor
	WD@ 10 m	SPM	TBD (2017)	61104-1	061	Continuous	Met-One Sonic Anemometer
	WS @ 10m	SPM	TBD (2017)	61103-1	061	Continuous	Met-One Sonic Anemometer
	Ambient Temp @ 30 m	SPM	TBD (2017)	62101-1	061	Continuous	Met-One Temp Sensor
	WD@ 30 m	SPM	TBD (2017)	61104-1	061	Continuous	Met-One Sonic Anemometer
	WS @ 30m	SPM	TBD (2017)	61103-1	061	Continuous	Met-One Sonic Anemometer
Palmer/ Matanuska-Susitna Valley 02-170-0012	PM_{10STD}/ PM_{10LC}	SPM	01/01/2010	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020X Coarse
	$PM_{2.5LC}$	SPM	01/01/2010	88101-3	170	Continuous	Met-One BAM 1020X Coarse
	O_3	SPM	4/1/2015	44201-1	087	Continuous Seasonal Apr - Oct	Teledyne API 400E

Site Name/ Location	Pollutant Parameter	Monitor Designation	Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
Butte/ Matanuska-Susitna Valley 02-170-0008	PM_{10STD}/ PM_{10LC}	SPM	04/11/1998	81102-3/ 85101-3	122	Continuous	Met-One BAM 1020X Coarse
	$PM_{2.5LC}$	SLAMS	08/10/2011	88101-3	170	Continuous	Met-One BAM 1020X Coarse
Floyd Dryden Middle School/ Juneau 02-110-0004	PM_{10STD}/ PM_{10LC}	SLAMS	01/01/1986	81102-1/ 85101-1	126	1/6	R&P Partisol 2000
	PM_{10STD}/ PM_{10LC}	SLAMS collocated	01/01/1986	81102-2/ 85101-2	126	1/6	R&P Partisol 2000
	$PM_{2.5LC}$	SLAMS	08/21/2009	88101-3	170	Continuous	Met-One BAM 1020X
	$PM_{2.5LC}$	SLAMS collocated	4/1/2015	88101-2	143	1/6	Thermo Scientific Partisol 2000i

ł Multiple Partisol 2000i samplers will be installed on NCore to achieve daily FRM sampling
*Multiple AQS codes are used to identify individual chemical species

Table 3-5. Instrument-Level Monitoring Objectives

Site Name/ Location	Pollutant Parameter	AQS Parameter and Occurrence Code	AQS Method Codes	Equipment	Monitoring Objective (40 CFR 58 Appendix D)	Required due to NAA or Maintenance Plan?
Garden Site/ Anchorage 02-020-0018	PM_{10STD}/ PM_{10LC}	81102-3/ 85101-3	122	Met-One BAM 1020X Coarse	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
	$PM_{2.5LC}$	88101-3	170	Met-One BAM 1020X Coarse	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
	CO	42101-1	554	Thermo Env. Inst. Model 48i	-Provide timely air pollution information -Determine ambient air quality standard compliance	Yes
Laurel/ Anchorage 02-020-0045	PM_{10STD}/ PM_{10LC}	81102-3/ 85101-3	122	Met-One BAM 1020X	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
Parkgate/ Eagle River 02-020-1004	PM_{10STD}/ PM_{10LC}	81102-3/ 85101-3	122	Met-One BAM 1020X Coarse	-Provide timely air pollution information -Determine ambient air quality standard compliance	Yes
Parkgate/ Eagle River 02-020-1004	$PM_{2.5LC}$	81102-3/ 85101-3	170	Met-One BAM 1020X Coarse	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
State Office Building/ Fairbanks 02-090-0010	$PM_{2.5LC}$	88101-1	143	R & P Partisol 2000	-Determine ambient air quality standard compliance	Yes
NCore/ Fairbanks 02-090-0034	PM_{10STD}/ PM_{10LC}	81102-3/ 85101-3	122	Met-One BAM 1020X Coarse	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	No
	$PM_{2.5LC}$	88101-3	170	Met-One BAM 1020X Coarse	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	Yes
	PM_{10STD}/ PM_{10LC}	81102-1/ 85101-1	126	Thermo Scientific Partisol 2000i	-Determine ambient air quality standard compliance -Support air pollution research studies	No
	$PM_{2.5LC}$	88101-1	143	Thermo Scientific Partisol 2000i	-Determine ambient air quality standard compliance -Support air pollution research studies	Yes

Site Name/ Location	Pollutant Parameter	AQS Parameter and Occurrence Code	AQS Method Codes	Equipment	Monitoring Objective (40 CFR 58 Appendix D)	Required due to NAA or Maintenance Plan?
NCore/ Fairbanks 02-090-0034	PM_{10LC} - $PM_{2.5LC}$	86101-1	175	paired Thermo Scientific Partisol 2000i	-Determine ambient air quality standard compliance -Support air pollution research studies	Yes
	CO	42101-1	554	Thermo Scientific 48i	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	Yes
	SO_2 (1-hr)	42401-1	560	Thermo Scientific 43i-TL	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	No
	SO_2 (5-min)	42401-2	560	Thermo Scientific 43i-TL	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	No
	NO_Y	42600-1	674	Thermo Scientific 42iY-TL	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	No
	NO	42601-1	674	Thermo Scientific 42iY-TL	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	No
	NO_Y-NO	42612-1	674	Thermo Scientific 42iY-TL	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	No
	NO_X	42603-1	574	Thermo Fisher 42i-TL	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	No
	NO	42601-2	674	Thermo Scientific 42i-TL	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	No
	NO_2	42602-1	574	Thermo Scientific 42i-TL	-Provide timely air pollution information -Determine ambient air quality standard compliance	No

Site Name/ Location	Pollutant Parameter	AQS Parameter and Occurrence Code	AQS Method Codes	Equipment	Monitoring Objective (40 CFR 58 Appendix D)	Required due to NAA or Maintenance Plan?
NCore/ Fairbanks 02-090-0034					-Support air pollution research studies	
	O_3	44201-1	087	Teledyne API 400E	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies	No
	WD	61104-1	061	Met-One Sonic Anemometer	-Provide timely air pollution information -Support air pollution research studies	No
	WS	61103-1	061	Met-One Sonic Anemometer	-Provide timely air pollution information -Support air pollution research studies	No
	BP	64101-1	014	Met-One BAM 1020X Barometer	-Provide timely air pollution information. -Support air pollution research studies	No
	Ambient Temp @ 2 m	62101-2	061	Met-One Temp Sensor	-Provide timely air pollution information. -Support air pollution research studies	No
	Ambient Temp @ 10 m	62101-1	061	Met-One Temp Sensor	-Provide timely air pollution information. -Support air pollution research studies	No
	$PM_{2.5LC}$ Speciation	Multiple*	Multiple *	URG 3000N	-Support air pollution research studies	No
	$PM_{2.5LC}$ Speciation	Multiple*	Multiple *	Met-One Super SASS $PM_{2.5}$ LC	-Support air pollution research studies	No
North Pole Fire #3/ North Pole 02-090-0035	$PM_{2.5LC}$	88101-1	143	Thermo Scientific Partisol 2000i	-Determine ambient air quality standard compliance	Yes
	$PM_{2.5LC}$	88501-3/ 88502-3	170	Met-One BAM 1020X	-Provide timely air pollution information -Determine ambient air quality standard compliance	Yes

Site Name/ Location	Pollutant Parameter	AQS Parameter and Occurrence Code	AQS Method Codes	Equipment	Monitoring Objective (40 CFR 58 Appendix D)	Required due to NAA or Maintenance Plan?
	$PM_{2.5LC}$ collocated	88101-2	143	Thermo Scientific Partisol 2000i	-Determine ambient air quality standard compliance	Yes
Peger Rd Met 02-090-4010	Ambient Temp @ 3 m	62101-2	061	Met-One Temp Sensor	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
	Ambient Temp @ 10 m	62101-1	061	Met-One Temp Sensor	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
	WD	61104-1	061	Met-One Sonic Anemometer	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
	WS	61103-1	061	Met-One Sonic Anemometer	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
Palmer/ Matanuska-Susitna Valley 02-170-0012	PM_{10STD}/ PM_{10LC}	81102-3/ 85101-3	122	Met-One BAM 1020X Coarse	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
	$PM_{2.5LC}$	88101-3	170	Met-One BAM 1020X Coarse	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
	O_3	44201-1	087	Teledyne API 400E	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
Butte/ Matanuska-Susitna Valley 02-170-0008	PM_{10STD}/ PM_{10LC}	81102-3/ 85101-3	122	Met-One BAM 1020X Coarse	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
	$PM_{2.5LC}$	88101-3	170	Met-One BAM 1020X Coarse	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
Floyd Dryden Middle School/ Juneau 02-110-0004	PM_{10STD}/ PM_{10LC}	81102-1/ 85101-1	126	R&P Partisol 2000	-Determine ambient air quality standard compliance	No
	PM_{10STD}/ PM_{10LC}	81102-2/ 85101-2	126	R&P Partisol 2000	-Determine ambient air quality standard compliance	Yes

Site Name/ Location	Pollutant Parameter	AQS Parameter and Occurrence Code	AQS Method Codes	Equipment	Monitoring Objective (40 CFR 58 Appendix D)	Required due to NAA or Maintenance Plan?
	$PM_{2.5LC}$	88101-3	170	Met-One BAM 1020X	-Provide timely air pollution information -Determine ambient air quality standard compliance	No
	$PM_{2.5LC}$	88101-2	143	Thermo Scientific Partisol 2000i	-Determine ambient air quality standard compliance	No

3.4 *FNSB Short Term Monitoring*

The Fairbanks North Star Borough conducted short term special purpose monitoring at 17 sites between October 1, 2014 and March 31, 2016. The purpose was to measure hourly $PM_{2.5}$ concentrations at non-regulatory sites throughout the nonattainment area in order to better understand the air quality impacts experienced in various neighborhoods. Monitors were placed in suspected hotspot areas (i.e. relatively small areas with significantly higher $PM_{2.5}$ concentrations than the surrounding areas) identified by complaints and other data available such as sniffer vehicle data. The short term monitors remained in one location for between one month and one season. Monitoring occurred primarily in winter months except for the deployment of one monitor to Eielson Air Force Base Clinic to assess air quality impacts of summertime wildfires. This section contains information about each site and a summary of collected data. DEC will prepare a separate document with an analysis of all short term monitoring dating back through 2008 in the FNSB non-attainment area. Data have been separated between Fairbanks and North Pole area to allow for comparison of SPM data with data collected at the regulatory sites, NCore and the North Pole Fire Station #3.

FNSB BAMs have not met FEM criteria consistently from year to year. In order to make data consistent and comparable between years, acceptable $PM_{2.5}$ data (88502) were used for all comparisons between SPM and SLAMS monitors. Raw BAM $PM_{2.5}$ (88501) and acceptable $PM_{2.5}$ (88502) have been loaded to AQS.

Monitoring at Fairbanks sites shows that concentrations measured at SPM sites are generally higher than those measured at NCore. Sites were located in suspected hotspot areas and this data confirms that those areas do experience higher concentrations than the NCore site. In most cases, on days when a SPM site 24-hour average concentration exceeded the NAAQS, the NCore site did not report an exceedance. Of 73 exceedances recorded during SPM monitoring in Fairbanks, only 16 exceedances were recorded concurrently at the NCore site. On days with an exceedance occurring at either the SPM or regulatory site, the 24-hour average value recorded at the SPM site was, on average, higher than the regulatory site with the exception of the Artisans Courtyard site. The maximum 24-hour average $PM_{2.5}$ concentration among Fairbanks-area SPM sites was 90.2 $\mu g/m^3$ at Hamilton Acres Baptist School.

Monitoring at North Pole sites shows that concentrations measured at SPM sites generally replicate the trend of high PM2.5 concentrations measured at the North Pole Fire Station #3 site, but that, with some exceptions, concentrations are lower than those measured at the North Pole Fire Station #3. This might indicate that North Pole Fire Station #3 may itself be located in a hotspot area. There were 121 exceedances of the NAAQS recorded at North Pole SPM sites and the North Pole Fire Station #3 monitor recorded 110 concurrent exceedances. On days with an exceedance occurring at either the SPM or regulatory site, the 24-hour average value recorded at the SPM site was, on average, lower than the regulatory site with the exception of the Dixon Road site and summertime monitoring at the Eielson AFB Clinic site. The maximum wintertime

24-hour average $PM_{2.5}$ concentration among North Pole-area SPM sites was 116.4 µg/m^3 at North Pole Water and the maximum summertime 24-hour average concentration was 142.3 µg/m^3 at the Eielson AFB Clinic.

Information regarding the SPM sites, their locations, a summary of the data collected, and a comparison between SPM site data to regulatory site data are included below.

After FNSB transferred monitoring responsibilities to DEC, DEC discontinued short term special purpose monitoring due to staffing and resource constraints.

Table 3-5. Fairbanks Special Purpose Monitoring Sites, October 2014 – March 2016

AQS Site	Site Name	Address	Latitude Longitude (WGS 84)	AQS Parameter and Occurrence Code	AQS Method Code	Collection Frequency	Equipment
4001	Watershed Charter School	4975 Decalathon Ave Fairbanks, AK 99709	64.82648 N -147.86893 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
4005	Watershed Charter School	4975 Decalathon Ave Fairbanks, AK 99709	64.82648 N -147.86893 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
4006	Hamilton Acres Baptist School	138 Farewell Ave Fairbanks, AK 99701	64.84528 N -147.68495 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
4007	Faith Baptist Church	910 Chena Pump Rd Fairbanks, AK 99701	64.827361 N -147.890146 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
4008	Artisan Courtyard	1755 Westwood Way Fairbanks, AK 99709	64.861023 N -147.78569 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
4009	Chena Pump Road	1005 Chena Pump Rd Fairbanks, AK 99709	64.823025 N -147.897463 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X

Table 3-6. North Pole Special Purpose Monitoring Sites, October 2014 – March 2016

AQS Site	Site Name	Address	Latitude Longitude (WGS 84)	AQS Parameter and Occurrence Code	AQS Method Code	Collection Frequency	Equipment
0039	North Pole Water	2696 Mockler Ave North Pole, AK 99705	64.759289 N -147.372278 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
				88101-1	146	1/3	Thermo Scientific Partisol 2000
5001	Newby Park	2770 Newby Rd North Pole, AK 99705	64.741994 N -147.287222 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
5004	Ticasuk Brown Elementary	785 Lakloey Dr North Pole, AK 99705	64.825065 N -147.531212 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
5005	Bright Electric	1410 Old Richardson Hwy North Pole AK 99705	64.804272 N -147.562052 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
5006	North Star Fire Station #2	Dennis & Bradway North Pole, AK 99705	64.805582 N -147.544197 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
5007	Eielson AFB Clinic	2630 Central Ave #3349 Eielson AFB, AK 99702	64.672603 N -147.082926 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
5008	North Pole Pump Station	Patriot Dr & Refinery Loop North Pole, AK 99705	64.746764 N -147.35454 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
5009	North Pole Water 5	171 5th Ave North Pole, AK 99705	64.750885 N -147.351130 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
5010	Dixon Road	1944 Dixon Road North Pole, AK 99705	64.779333 N -147.330157 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
5011	Badger Road Elementary	2301 Bradway Rd North Pole, AK 99705	64.80473 N -147.41489 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X
5012	North Pole Water Stillmeyer	Patriot Dr & Refinery Loop North Pole, AK 99705	64.746627 N -147.353268 W	88501-3 88502-3	733	continuous	Met-One BAM 1020X

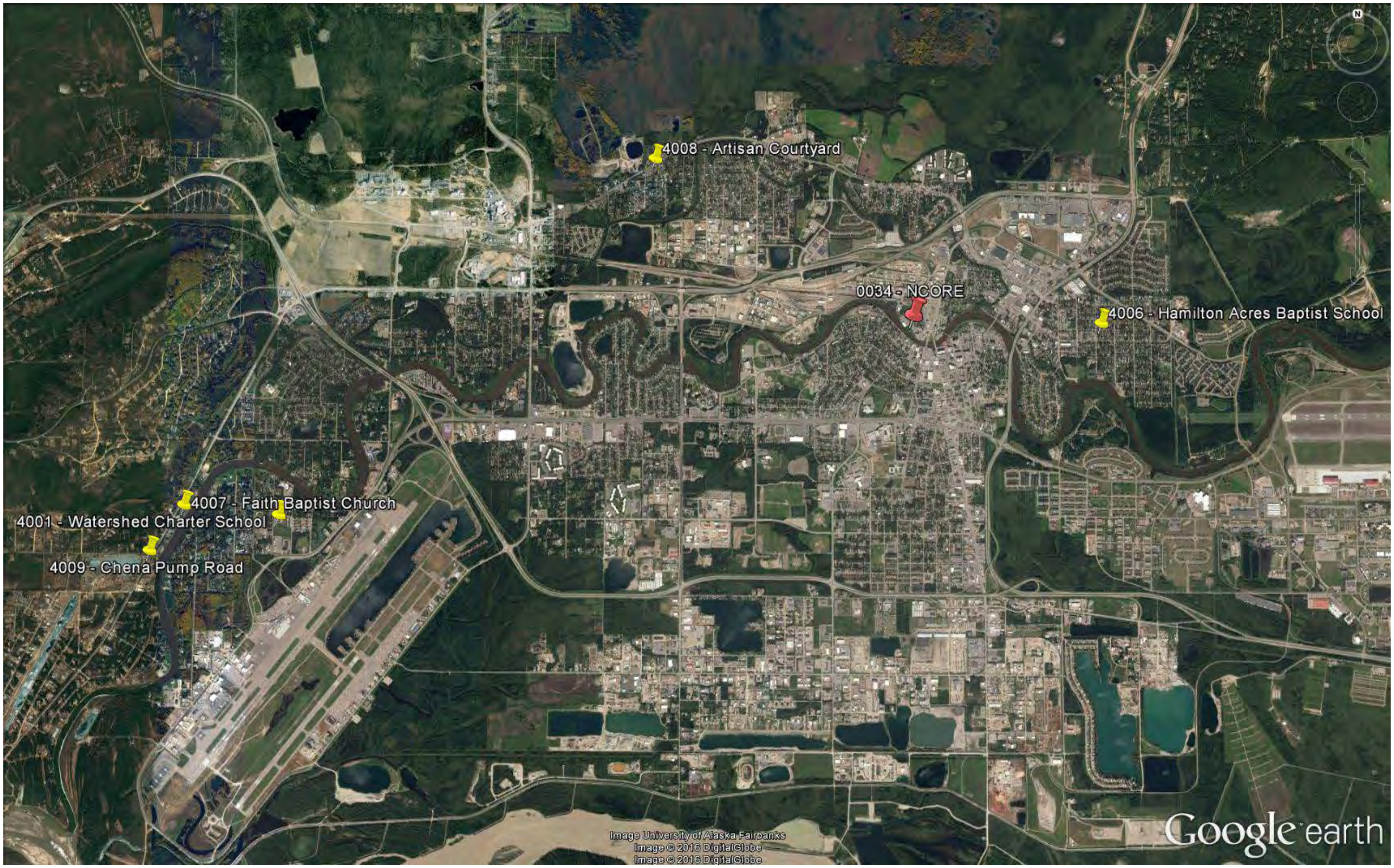


Figure 3-24. Map of Fairbanks Short Term Sites

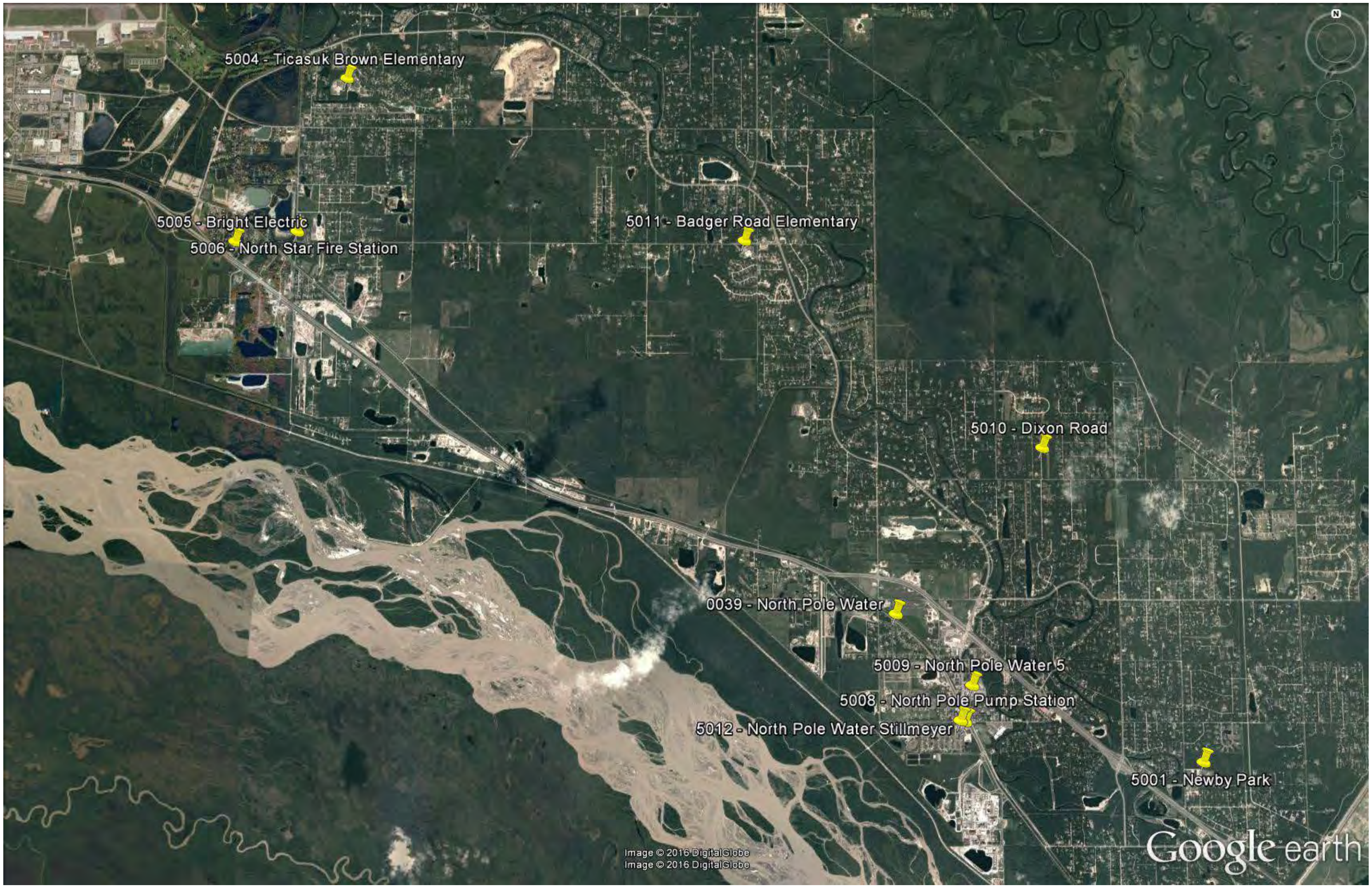


Figure 3-25. Map of North Pole Short Term Sites

Table 3-7. Short Term Site Monitoring Data Summary for Parameter 88502

	AQS Site Number	Site Name	Run Days	Average $PM_{2.5}$ ($\mu g/m^3$)	Median $PM_{2.5}$ ($\mu g/m^3$)	Maximum $PM_{2.5}$ ($\mu g/m^3$)	Number of Exceedances	Concurrent Regulatory Site Exceedances	Percent SPM Exceedances During Site Operation	Average Difference During Exceedances ($\mu g/m^3$)	Start Date	End Date
Fairbanks Sites	4001	Watershed Charter School	88	14.8	9.2	58.6	8	0	9%	25.4	10/1/2015	12/31/2015
	4005	Watershed Charter School	31	13.5	13.2	24.0	0	0	0%	N/A	10/1/2014	10/31/2014
	4006	Hamilton Acres Baptist School	173	28.9	25.3	90.2	56	15	32%	20.5	10/1/2014	3/31/2015
	4007	First Baptist Church	51	18.0	15.9	44.6	2	0	4%	27.7	10/1/2014	11/20/2014
	4008	Artisan Courtyard	85	11.4	9.3	36.7	1	0	1%	-13.1	1/7/2016	3/31/2016
	4009	Chena Pump Road	37	26.7	26.6	59.7	6	1	16%	13.8	1/13/2016	2/18/2016
North Pole Sites	0039	North Pole Water	182	23.8	15.7	116.4	46	44	25%	-19.1	10/1/2014	3/31/2015
	5001	Newby Park	59	17.7	12.6	59.3	9	9	15%	-22.5	1/29/2015	3/31/2015
	5004	Ticasuk Brown Elementary	42	24.7	21.1	74.5	10	10	24%	-19.7	11/18/2015	12/30/2015
	5005	Bright Electric	43	15.5	13.8	39.9	1	1	2%	-11.7	2/18/2015	4/1/2015
	5006	North Star Fire Station #2	45	15.3	12.6	43.0	3	2	7%	-18.7	9/29/2015	11/18/2015
	5007*	Eielson AFB Clinic	50	23.4	13.8	142.3	7	6	14%	14.2	6/24/2015	8/14/2015
	5008	North Pole Pump Station	43	34.5	33.2	66.7	19	18	44%	-19.7	1/6/2015	2/18/2015
	5009	North Pole Water 5	83	9.6	4.8	38.3	2	2	2%	-33.6	10/1/2015	12/30/2015
	5010	Dixon Road	42	38.5	28.6	104.4	19	14	45%	10.3	11/20/2014	12/31/2014
	5011	Badger Road Elementary	43	14.6	11.1	40.9	1	0	2%	-11.5	2/18/2016	4/1/2016
	5012	North Pole Water Stillmeyer	87	12.0	7.7	53.9	4	4	5%	-24.8	1/5/2016	3/31/2016

*Monitoring occurred during summertime wildfires.

Figures 3-16 and 3-17 show comparisons between 24-hour average $PM_{2.5}$ data collected at SPM sites and the regulatory sites in Fairbanks and North Pole. The grey area represents the concentrations recorded at the NCore or NPFS #3 sites, the colored dots represent concentrations recorded at various SPM sites. When a colored data point is inside the grey area, the concentration recorded at the SPM site is lower than the concentration recorded at the regulatory site. When a colored data point falls outside of the grey area, the value recorded at the SPM site is greater than the concentration recorded at the regulatory site. A large number of data points falling outside of the grey area, Hamilton Acres Site 4006 for example, indicates a likely hotspot area where the regulatory monitor underrepresents conditions experienced at that SPM site. A large number of data points falling within the grey area, North Pole Water Site 0039 for example, indicates the regulatory site over-represents the concentrations experienced at the SPM site.

Figure 3-26. Fairbanks PM2.5 Special Purpose Monitoring Data, 24-hour PM2.5 Concentrations, October 2014 - March 2016

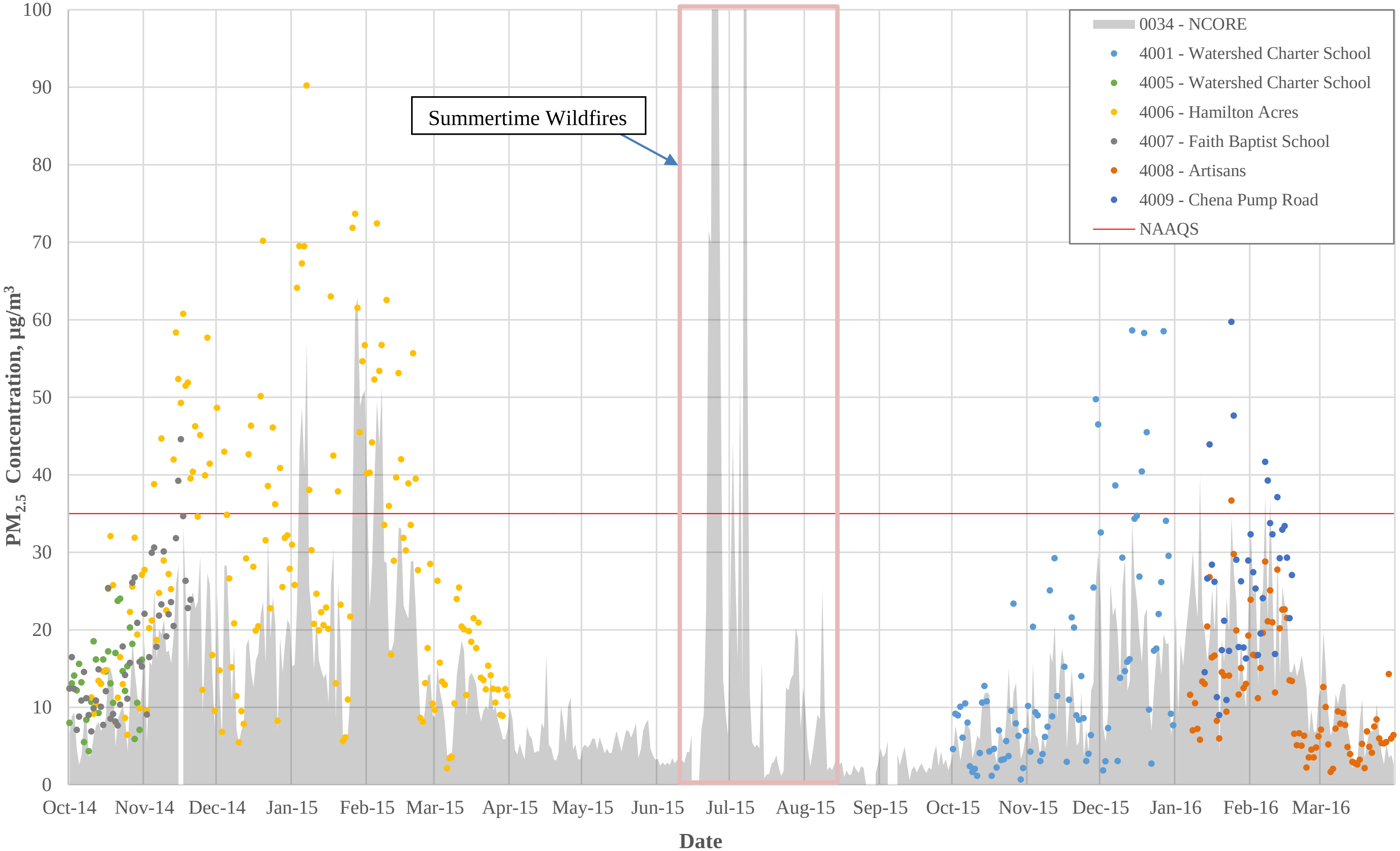
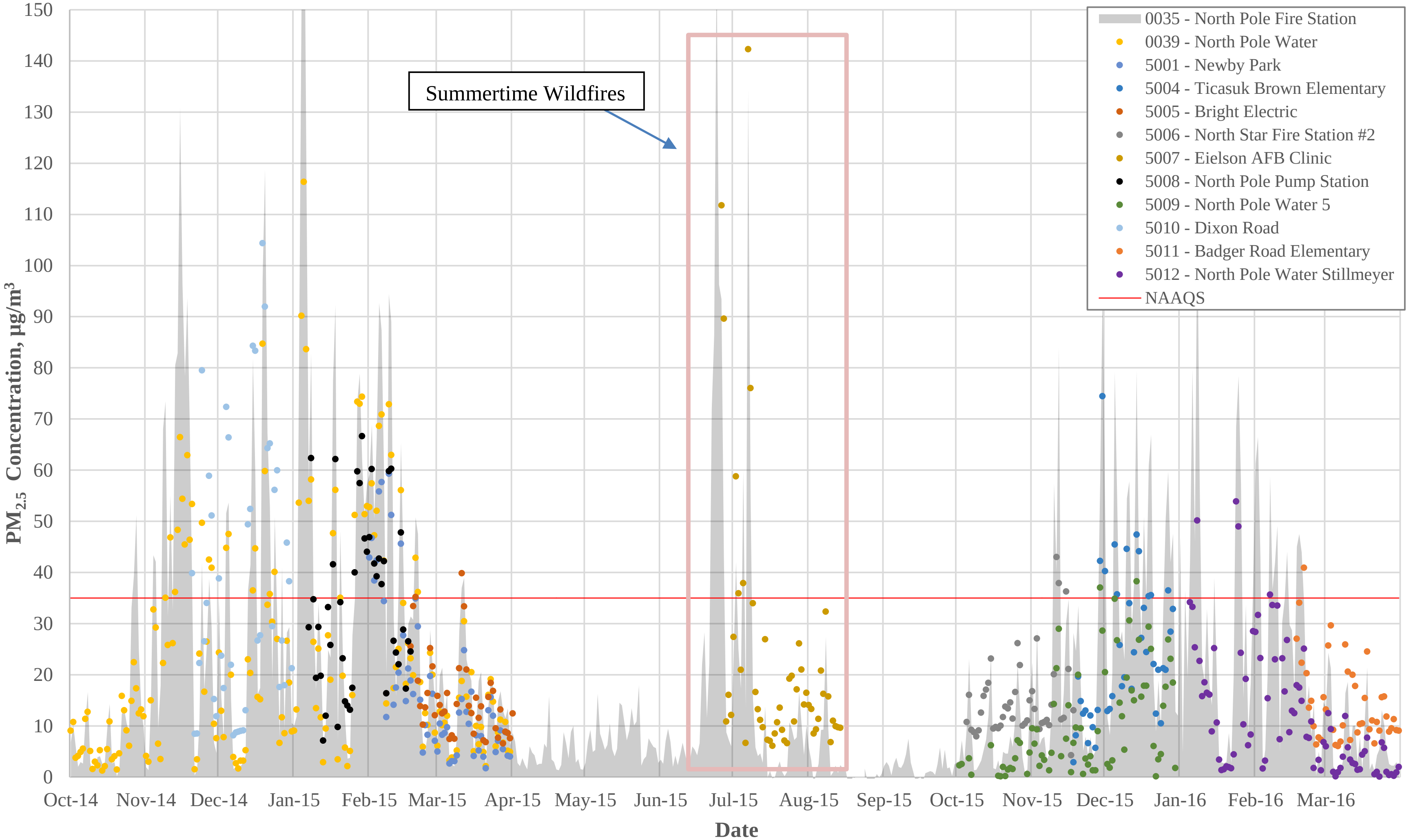


Figure 3-27. North Pole PM2.5 Special Purpose Monitoring Data, 24-hour PM2.5 Concentrations, October 2014 - March 2016



3.5 *Comparison of $PM_{2.5}$ FRM and Continuous Methods*

EPA designated the Met One BAM as a Class III Federal Equivalence Method (FEM) in 2008. To qualify as an FEM the instrument needs to meet performance criteria when compared to the FRM. The performance criteria for Class III FEM approval for monitors must meet the key statistical metrics for multiplicative bias (slope) between 0.9 and 1.1 and an additive bias (intercept) between -2.00 and 2.00 (40 CFR Part 58.11 e, 40 CFR Part 53 Subpart C Figure C-2).

DEC has deployed $PM_{2.5}$ Met One BAM statewide. DEC found that all Alaskan $PM_{2.5}$ BAM sites meet FEM performance requirements, except for the North Pole sites prior to calendar year 2016 and the NCore and SOB sites prior to 2014. All Alaskan sites other than FNSB were deemed to be FEM after measuring an adequate span of concentrations. The time it took to obtain them ranged from a year to almost 3 years (Juneau 10/2009-5/2011; Garden 1/2009-6/2011; Palmer 10/2012-3/2015; Butte 9/2011-12/2013). Figure 3-18 depicts a graphical summary of the results. Data collected in 2016 has not been included in this analysis.

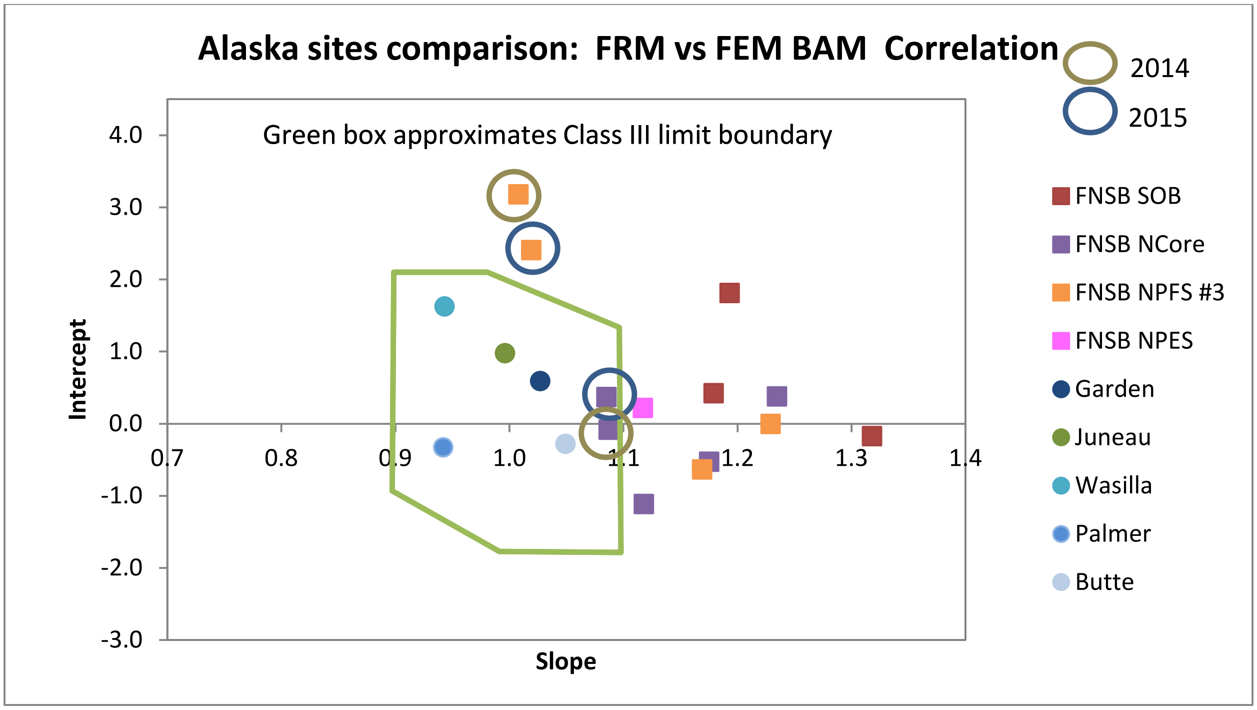


Figure 3-28: Alaska FRM FEM Correlations; the green box shows Class III performance criteria

The green box in Figure 3.18 represents acceptable limits for slope and intercept for $PM_{2.5}$ methods. The Floyd Dryden BAM in Juneau, Garden BAM in Anchorage and the Matanuska-Susitna Valley BAMs at Butte, Palmer and Wasilla all met the slope and intercept performance criteria for $PM_{2.5}$ FEM in 2014.

A more detailed discussion of the comparison between the two sampling methods can be found in DEC's assessment of BAM-FRM correlations report[4].

4 Network Modifications completed in 2015/2016

DEC notified EPA of the shutdown of several SPM sites (Prior approval from EPA is not required for discontinuance of SPM, 40 CFR 58.20 (f)). These SPM sites included Soldotna (02-122-0008) in the Kenai Peninsula Borough and Wasilla (02-170-0013) in the Matanuska Susitna Borough.

DEC re-designated the North Pole Fire Station from a SPM site to a SLAMS site as proposed in the 2015 annual network plan. DEC had originally classified this site as a micro-scale site in the 2014 annual network plan; however, in a letter dated February 2, 2015, EPA disagreed with this classification stating that there were insufficient data available to document the State's determination. DEC's position was based on data collected within a 1-2 mile radius of the North Pole Fire Station. The data indicated the neighborhood-scale area does not experience homogenous $PM_{2.5}$ concentrations and that the siting scale might be more appropriately categorized as a micro-scale site. As per 40 CFR 58 Appendix D a SLAMS site is required in an area of maximum neighborhood scale impact. In their letter EPA recommended the State conduct a saturation study to determine the scale of the North Pole Fire Station site.

Due to the technical difficulties of measuring $PM_{2.5}$ concentrations comparable to the NAAQS in the harsh climate experienced in a typical North Pole winter, a saturation study as proposed by EPA was considered to too costly and beyond the available funding at the time. DEC therefore decided to forego the cost intensive demonstration in 2015/2016 and re-designated the North Pole Fire Station as a SLAMS site although doubts remained about the representativeness of the North Pole Fire Station site. Per the EPA request, DEC and FNSB had already agreed to operate the site year-round starting in 2015. The primary sampler is an FRM with a continuous analyzer operating for use in air quality advisories. To fund the year-round operations, DEC decided to shut down the second site in North Pole, the North Pole Water site.

DEC continues to operate two seasonal $PM_{2.5}$ SPM sites in Yakutat in the winter seasons of 2015-2017 to assess the impacts of two planned biomass boilers to provide heat for city buildings.

[4] Assessment of the continuous PM2.5 Met One BAM 1020 sampler performance in the State of Alaska air monitoring network 2009 - 2015; http://dec.alaska.gov/air/anpms/Projects&Reports/DOCS/Alaska-PM2.5-FRM-FEM-Correlations-Report.pdf

5 PROPOSED NETWORK MODIFICATIONS FOR 2017

5.1 *$PM_{2.5}$ Network -Fairbanks North Star Borough*

In March 2016 the Mayor of the Fairbanks North Star Borough notified DEC that all ambient air monitoring responsibilities would fall back to the State. Due to resource and staffing issues, DEC is committed to operate and maintain the regulatory sites, i.e. State Office Building (SOB), the multi pollutant NCore site and the North Pole Fire Station #3 (NPF3) as well as the meteorological site at Peger Road. For the near future DEC will not conduct any short term special purpose monitoring. One time funding became available to DEC in early calendar year 2016. DEC decided to conduct a saturation study in North Pole planned for early 2017, in order to better characterize air quality in the area surrounding the North Pole Fire Station #3 regulatory monitor. Additional information about the study can be found on the DEC website: http://dec.alaska.gov/air/north-pole-study.htm.

Because both the NCore and State Office Building sites had design values of 35 $\mu g/m^3$ for 2015, daily sampling was started. The NCore site began daily sampling with FRMs on October 1, 2016. The State Office Building has obtained a sequential sampler, Partisol 2025i from Thermo Scientific to test it in FNSB's extreme weather conditions for the month of January. If it performs well despite severe Fairbanks weather, the State will purchase a sequential sampler for the State Office Building site.

5.2 *PM_{10} monitoring in the City and Borough of Juneau*

Historically, PM_{10} has been a problem for Juneau Alaska's Mendenhall Valley. The Mendenhall Valley was designated as non-attainment for PM_{10} in 1990, however, the last PM_{10} exceedance recorded at Mendenhall Valley's monitoring station, Floyd Dryden, was in 1993. Since then, PM_{10} concentrations have steadily decreased. This can be attributed to the elimination of most PM_{10} sources by paving dirt and gravel roads. In 2009, the Mendenhall Valley was re-designated as a limited maintenance area.

It is highly improbable that the Floyd Dryden monitoring site will record a PM_{10} exceedance for the Mendenhall Valley in the future. It is important from both a regulatory and health standpoint to continue collecting PM_{10} data, however, in an effort to save staff time and equipment, DEC proposes using $PM_{2.5}$ to predict PM_{10} concentrations. The following is a detailed look at that effort.

For this analysis, DEC used previously submitted and validated AQS data collected over 2006 to 2015 at Floyd Dryden. The data were pared down so that only 24-hr samples where PM_{10} was collocated with $PM_{2.5}$ at concentrations greater than 3 $\mu g/m^3$ were used.

A statistical analysis of this data was performed to see how strong the correlation was between PM_{10} and $PM_{2.5}$. This was compared to the EPA's Data Quality Objective[5] (DQO Guidance) for correlating FRM and FEMs.

The null hypothesis (H_0) for this study is that there is no correlation between PM_{10} and $PM_{2.5}$. The sample concentrations resulted purely by chance and PM_{10} cannot be predicted from $PM_{2.5}$. The alternative hypothesis (H_a) for this study is that there is a correlation between PM_{10} and $PM_{2.5}$ and PM_{10} can be predicted from $PM_{2.5}$.

The equation of the best-fit line for the PM_{10} and $PM_{2.5}$ correlation was used as a starting point to determine a conservative, yet accurate, model for predicting PM_{10} from actual $PM_{2.5}$ concentrations.

Correlation between PM_{10} and $PM_{2.5}$

Sampling Data

Figure 4-1 shows a time series of actual PM_{10} and $PM_{2.5}$ concentrations in comparison to the National Ambient Air Quality Standards (NAAQS) from 2006 to 2010. The distribution of these particulate matter concentrations is given in Figure 5-2. Most days recorded concentrations below 15 $\mu g/m^3$ for both PM_{10} and $PM_{2.5}$. There were no PM_{10} exceedances over this 10 year span and only 3 $PM_{2.5}$ exceedances. The maximum concentrations measured for PM_{10} were 48 $\mu g/m^3$ for the 1st Max and 43.5 $\mu g/m^3$ for the 2nd Max. The maximum concentrations measured for $PM_{2.5}$ were 46.2 $\mu g/m^3$ for the 1st Max and 37.5 $\mu g/m^3$ for the 2nd Max.

[5] EPA-454/B-02-002 November 2002, Data Quality Objectives (DQOs) for Relating Federal Reference Method (FRM) and Continuous PM2.5 Measurements to Report, an Air Quality Index (AQI).

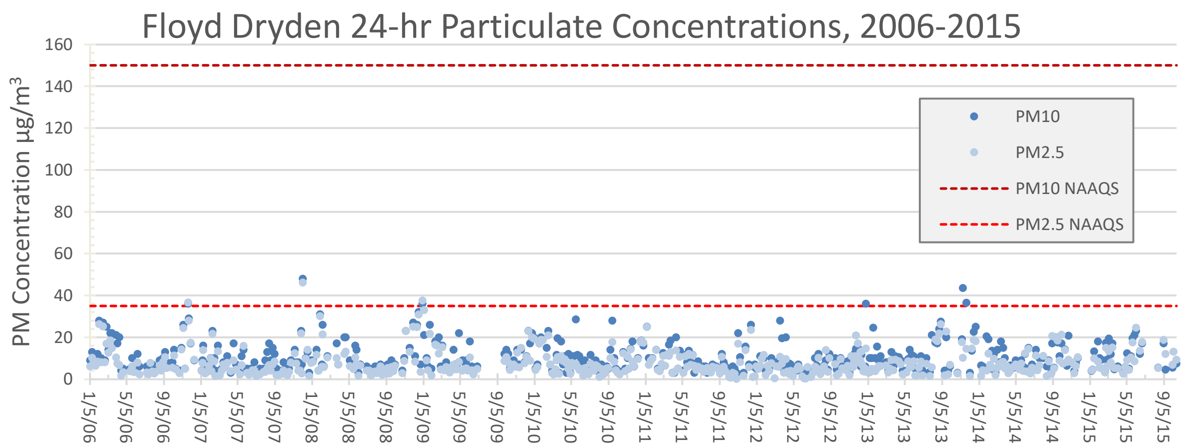


Figure 5-5-1: Floyd Dryden 24-hr Particulate Matter Concentrations from 2006 to 2015. Concentration pairs <3µg/m³ were excluded.

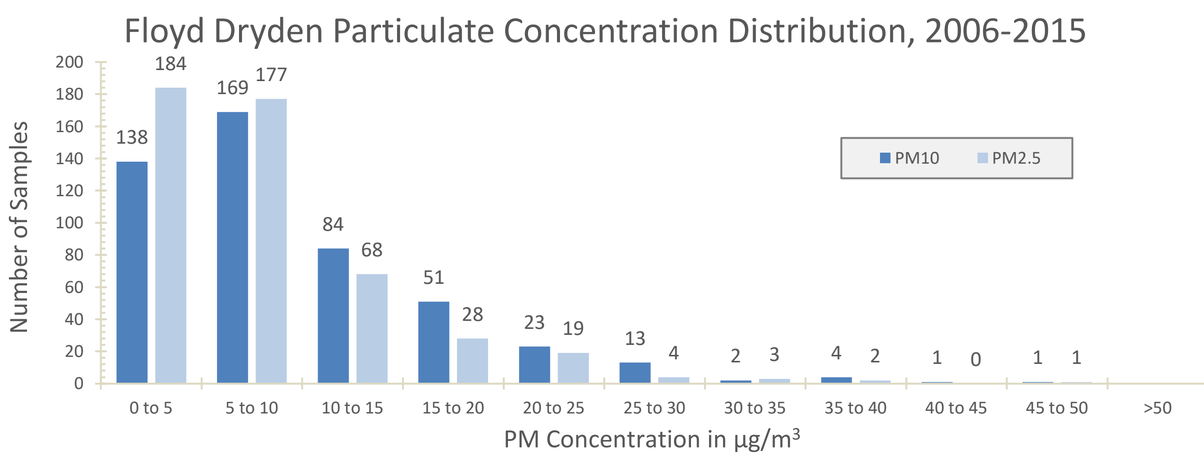


Figure 5-5-2: Distribution of Particulate Matter Concentrations over 2006 to 2015. Concentration pairs <3µg/m³ were excluded.

Statistical Analysis

To determine if PM_{10} could be predicted from $PM_{2.5}$, DEC first needed to know if PM_{10} is correlated to $PM_{2.5}$ and the strength of the correlation. To do this, DEC used the last 10 years of collocated samples for PM_{10} and $PM_{2.5}$ (2006 to 2015). These two datasets are not independent as $PM_{2.5}$ is a subset of PM_{10} however, but for the purposes of this analysis, DEC assumes the relationship to be negligible. Summarized in Table 5-1, regression statistics show how well the calculated linear regression equation fits the data[6].

- Multiple R refers to the correlation coefficient. This shows how strong the linear relationship is. A Multiple R equal to 1 would indicate a perfect positive relationship and a Multiple R equal to 0 would indicate no relationship. The Multiple R of 0.85 in our analysis, indicates that there is a strong linear relationship between the data and the model equation.

[6] cameron.econ.ucdavis.edu/excel/ex61multipleregression.html

- R squared (r^2) is the Coefficient of Determination, and shows how many points fall on the regression line. In this study the calculated r^2 equal to 0.72, means that 72% of the data can be explained by the model.
- Standard Error of the regression is a measure of how spread out the y variables are around the mean. The calculated standard error of 3.74 indicates that the average distance of the data points from the model line is approximately plus or minus 3.74 $\mu g/m^3$.
- Observations is the number of data points used in the regression. In this study, DEC analyzed 486 paired sample runs.

Table 5-1: Summary Output Regression Statistics

Regression Statistics	
Multiple R	0.8467
R Square	0.7169
Standard Error	3.7383
Observations	486

Table 5-2 gives specific information about the components of the data analysis.

- The Coefficient gives the least squares estimate. This is the best line of fit between data points that minimizes variance. Looking at the data provided in Table 5-3, The Coefficient for Intercept, would be the best fit intercept in the model equation (2.757). The Coefficient for the X Variable, would be the best fit slope in the equation (0.944).
- Standard error is a measure of how spread out the data is. The standard error for the Intercept (y-data) was 0.275, while the standard error for the x variable was 0.027.
- P Value gives evidence for or against the null hypothesis. With an alpha level of 5% (0.05), the null hypothesis would be rejected if p is less than or equal to 0.05. A p greater than 0.05 indicates that the alternative hypothesis is weak and the null cannot be rejected. Both the P value for the Intercept and X Variable ($PM_{2.5}$) were less than 0.05, indicating that the null hypothesis should be rejected, and that PM_{10} can be predicted from $PM_{2.5}$.
- Lower and Upper 95.0% shows the upper and lower boundaries of the confidence interval.

Table 5-2: Data Analysis Statistics

	Coefficients	Standard Error	P-value	Lower 95.0%	Upper 95.0%
Intercept	2.757	0.275	$1.108e^{-21}$	2.217	3.296
X ($PM_{2.5}$)	0.944	0.027	$9.566e^{-135}$	0.891	0.997

Equation 1 is the calculated linear regression between $PM_{2.5}$ and PM_{10}. Figure 5-3 visualizes the correlation between PM_{10} and $PM_{2.5}$.

$$\text{Eq. 1:}\quad Actual\ PM_{10} = [(0.94)(PM_{2.5})] + 2.76$$

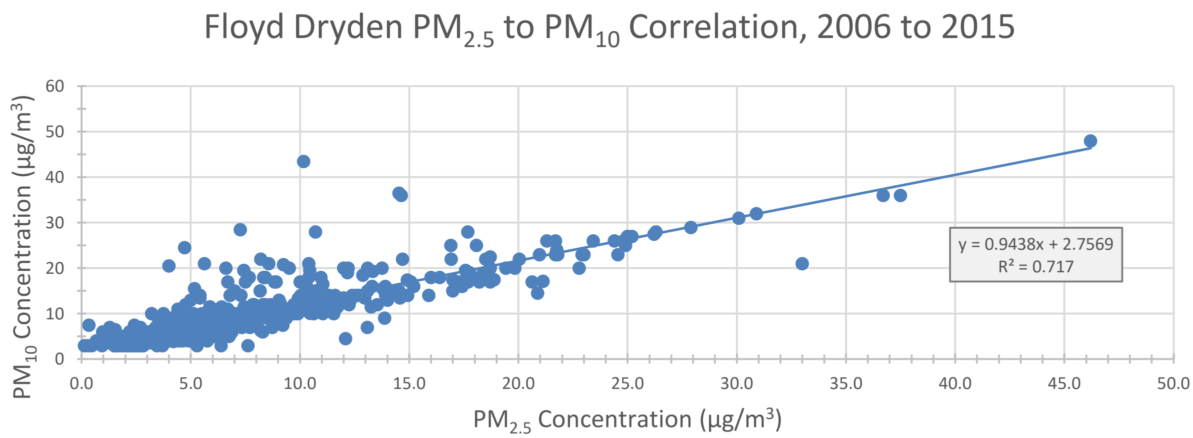


Figure 5-5-3: Correlation between $PM_{2.5}$ and PM_{10} at Floyd Dryden from 2006-2015. Concentrations <3µg/m^3 were excluded.

Model Development

DEC's proposed model is based on the EPA's Data Quality Objective Guidance (DQO Guidance) for Relating Federal Reference Method (FRM) and Continuous $PM_{2.5}$ Measurements. Although this guidance addresses the comparison of $PM_{2.5}$ data from FRM and FEM candidate method measurements, DEC proposes that the methods laid out in the DOQ can be translated to a correlation between measurements of the two particulate matter size fractions. This method was used successfully in a similar study by Washington State's Department of Ecology[7]. DEC's calculated Pearson Correlation Coefficient (r^2) was 0.72. This exceeds the minimum criteria listed in the DQO Guidance (r^2 greater than 0.70).

The regression statistics performed on Floyd Dryden's PM_{10} and $PM_{2.5}$ data show that $PM_{2.5}$ could stand in as a statistically valid surrogate for PM_{10}. However, just taking Equation 1 as our model would not provide a buffer for potential outliers. DEC recommends a more conservative approach, of multiplying $PM_{2.5}$ by 2.5 when estimating PM_{10}, see Equation 4. Equations 2 and 3 show other possible models. Figure 5-4 is a visual representation of the 3 potential models (equations 2-4) against actual PM data (equation 1) with respect to both the PM_{10} and $PM_{2.5}$ NAAQS. This figure shows what PM_{10} concentrations would have been under predicted 2006 to 2015 if PM_{10} had been calculated using actual $PM_{2.5}$ concentrations and the model equations.

Eq. 2: $Calculated\ PM_{10} = [1.5\ (PM_{2.5})] + 2.76$

Eq. 3: $Calculated\ PM_{10} = [2\ (PM_{2.5})] + 2.76$

Eq. 4: $\boldsymbol{Calculated\ PM_{10} = [2.5\ (PM_{2.5})] + 2.76}$

[7] Department of Ecology State of Washington, June 2013, SIP Revision for the Thurston County, Washington Second 10-Year Limited Maintenance Plan for PM_{10}.

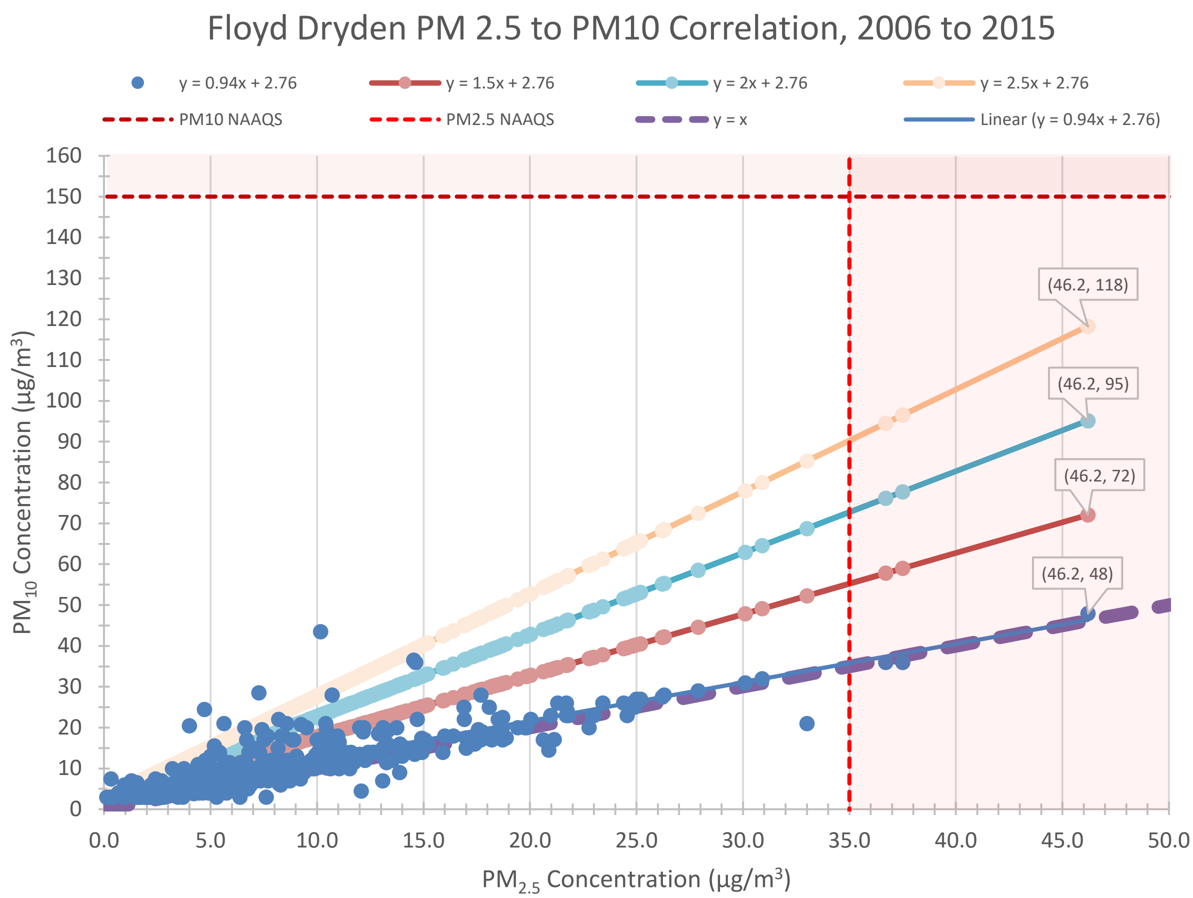


Figure 5-5-4: Comparing actual PM10 and PM2.5 concentrations (equation 1) to the predicted PM10 concentrations using proposed models (equations 2-4).

Even at the highest $PM_{2.5}$ concentration over a 10 year span ($PM_{2.5}$ = 46.2), the maximum predicted PM_{10} concentration is still well below the PM_{10} NAAQS. Table 5-3 summarizes the number and percentage of samples where actual PM_{10} was greater than the PM_{10} concentrations predicted from equations 2, 3, and 4.

Table 5-3: Summary of the number, percentage, and max difference in actual PM_{10} sampled to predicted PM_{10} (2006 to 2016) using equations 2-4. DEC's proposed model (eq. 3) is in bold.

	Number of samples	Percentage of total samples
Actual $PM_{10} \geq$ Predicted PM_{10} (Eq. 2)	47	9.7%
Actual $PM_{10} \geq$ Predicted PM_{10} (Eq. 3)	23	4.7%
Actual $PM_{10} \geq$ Predicted PM_{10} (Eq. 4)	**9**	**1.9%**

The conclusion of DEC's correlation analysis is that PM_{10} can be predicted from $PM_{2.5}$ concentrations at the Floyd Dryden monitoring site. Over the 10 year span analyzed (2006 to

2015), the correlation (r^2) between PM_{10} and $PM_{2.5}$ samples greater than 3 µg/m^3 was 0.72. This exceeds the EPA's DQO Guidance for FRM for FRM, FEM correlations set at 0.70.

At Juneau's Floyd Dryden Monitoring site, most of the PM_{10} is $PM_{2.5}$, however, in an effort to be very conservative in predicted PM_{10}, DEC developed 3 models (equation 2-4). Of the 3 models, equation 4 strikes the best balance between predicting accurate concentrations while still being conservative. Only 1.9% of the predicted PM_{10} samples using equation 4 were higher than actual PM_{10} concentrations. Furthermore, as can be visualized in Figure 5-4, most of these 1.9% of samples occurred at low $PM_{2.5}$ concentrations, where from a health standpoint, it is less important to accurately predict PM_{10}. As $PM_{2.5}$ increases, the model equation holds more accurately. At no point, when looking at predicted PM_{10} over 2006 to 2015, did equation 4 (or any of the model equations) yield a NAAQS exceedance.

DEC requests EPA approval to shut down PM_{10} monitoring at the Floyd Dryden site in the Juneau Mendenhall Valley effective January 1, 2017. In lieu of PM_{10} monitoring data DEC will use equation 4 and real time $PM_{2.5}$ data collected at the site to predict PM_{10} values.

5.3 *Municipality of Anchorage*

The Municipality of Anchorage has returned all ambient air monitoring responsibilities to DEC effective January 1, 2017. At this point, DEC does not plan to make any changes to the Anchorage Monitoring network.

5.4 *Rural Alaska*

DEC plans to install a year-round $PM_{2.5}$ SPM site in Bethel to characterize air quality experienced in rural Alaska. Although the Orutsararmiut Native Council (ONC) conducted PM monitoring in Bethel for several years, questions about air quality remain. Bethel is located in south western Alaska and is the largest community in the state that is not on the road system i.e. accessible only by air or water. It is the main port on the Kuskokwim River and is the hub community for those living in the Yukon-Kuskokwim Delta. Due to budgetary issues, this project is progressing slower than initially estimated. Site selection is planned for spring 2017 with a proposed start up in summer of 2017.

APPENDIX A: NETWORK EVALUATION FORMS

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR NITROGEN DIOXIDE (NO2)				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE:** April 26, 2016 **EVALUATOR:** MATTHEW STICHICK, CHEMIST II				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.3.2(a)	Near-road NO2 Monitors: One microscale near-road NO_2 monitoring station in each CBSA with a population of 500,000 or more persons.			✓
4.3.2(a)	Near-road NO2 Monitors: An additional near-road NO_2monitoring station is required for any CBSA with a population of 2,500,000 persons, or in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT count.			✓
4.3.2(b)	Near-road NO2 Monitors: Measurements at required near-road NO_2 monitor sites utilizing chemiluminescence FRMs must include at a minimum: NO, NO_2, and NO_X			✓
4.3.3(a)	Area-wide NO2 Monitoring: One monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO_2 concentrations representing the neighborhood or larger spatial scales.			✓
Comments: The State of Alaska has no CBSA with a population of 500,000 or more persons.				

Table 1					
CBSA Description[1]	CBSA population[2, 3] (2010)	Required number of Near-road NO2 sites	Present number of Near-road NO2 sites	Required number of Area-wide NO2 sites	Present number of Area-wide NO2 sites
Municipality of Anchorage	291,826	0	0	0	0
Matanuska-Susitna Valley Borough	88,995	0	0	0	0
Fairbanks North Star Borough	97,581	0	0	0	0
City and Borough of Juneau	31,275	0	0	0	0

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

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

[3]Population based on latest available census figures.

<table>
<tr><td colspan="6">PART 58 APPENDIX D SITE EVALUATION FORM FOR CARBON MONOXIDE (CO)</td></tr>
<tr><td colspan="6">STATE: ALASKA AGENCY: DEPARTMENT OF ENVIRONMENTAL CONSERVATION AQS AGENCY CODE: 02
EVALUATION DATE: April 26, 2016 EVALUATOR: MATTHEW STICHICK, CHEMIST II</td></tr>
<tr><td rowspan="2">APPLICABLE SECTION</td><td rowspan="2">REQUIREMENT</td><td rowspan="2">OBSERVED</td><td colspan="3">CRITERIA MET?</td></tr>
<tr><td>YES</td><td>NO</td><td>N/A</td></tr>
<tr><td>4.2.1(a)</td><td>One CO monitor is required to operate collocated with one required near-road NO₂ monitor in CBSAs having a population of 1,000,000 or more persons. If a CBSA has more than one required near-road NO₂ monitor, only one CO monitor is required to be collocated with a near-road NO₂ monitor within that CBSA.</td><td></td><td></td><td></td><td>✓</td></tr>
<tr><td>4.2.2(a)</td><td>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.</td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td colspan="6">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 NO₂. The Garden Site (AQS ID 02-020-0018) is the single CO site currently operating in the Municipality of Anchorage for NAAQS compliance. A single CO SLAMS monitor is also operating for NAAQS compliance in the Fairbanks North Star Borough at the Old Post Office Building Site (AQS 02-090-0002). The Fairbanks North Star Borough also operates a CO monitor at the multi-pollutant NCore site.</td></tr>
</table>

MSA Description[1]	CBSA population[2, 3]	Minimum required number of SLAMS CO sites	Present number of SLAMS CO sites in MSA
Municipality of Anchorage	291,826	1	1
Fairbanks North Star Borough	97,581	1	1

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

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

[3]Population based on latest available census figures.

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR OZONE (O_3)

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

EVALUATION DATE: April 26, 2016 **EVALUATOR:** MATTHEW STICHICK, CHEMIST II

APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.1(b)	At least one O_3 site for each MSA, or CSA if multiple MSAs are involved, must be designed to record the maximum concentration (note location in comment field).	✔		
4.1(c)	The appropriate spatial scales for O_3 sites are neighborhood, urban, and regional (note deviations in comment field).	✔		
4.1(f)	Confirm that the monitoring agency consulted with EPA R10 when siting the maximum O3 concentration site.	✔		
4.1(i)	O3 is being monitored at SLAMS monitoring sites during the "ozone season" as specified in Table D-3 of Appendix D to Part 58.	✔		

Comments: Ozone monitoring was established at the Municipality of Anchorage, Garden site (AQS ID 02-020-0018) as a SLAMS site in April 2010. This site was established to be representative of the combined MSAs for the Municipality of Anchorage and the Matanuska Valley Borough. Ozone monitoring was conducted at this site for three seasons 2010, 2011, and 2012. The ozone three-year design value was 0.045 ppm, which represents 60 percent of the NAAQS. Ozone monitoring was established at the Wasilla site (AQS ID 02-170-0012) in the Matanuska-Susitna Valley Borough as a SPM site in 2011. Monitoring was conducted during the ozone seasons in 2011 and 2012. Equipment problems prevented monitoring during the 2013 season. Ozone monitoring at the Wasilla site resumed on April 1, 2014 and was suspended on November 30, 2014. Ozone monitoring was established at the Palmer site (AQS ID 02-170-0012) in the Matanuska-Susitna Valley Borough beginning on April 1, 2015, and has been monitored there year-round since that date.

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.

MSA Description[a]	MSA population[1, 2]	Minimum required number of SLAMS O3 sites (from Table D-2)	Present number of SLAMS O3 sites in CBSA	
Municipality of Anchorage	291,826 (2010)	0	0	
Matanuska-Susitna Valley Borough	88,995 (2010)	0	0	1 SPM site in Palmer
Combined (MSAs)	380,821	1	0	3-years completed in Anchorage & Wasilla; one year completed in Palmer.
Fairbanks North Star Borough	21,820	0	0	1 Ncore Site

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

Table D-2 of Appendix D to Part 58 - SLAMS O3 Monitoring Minimum Requirements

MSA population[1, 2]	Most recent 3-year design value concentrations ≥85% of any O3 NAAQS[3]	Most recent 3-year design value concentrations <85% of any O3 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 figures.
[3]The ozone (O3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

Table D-3 of Appendix D to Part 58—Ozone Monitoring Season by State

State	Begin month	End Month
Alaska	April	October
Idaho	May	September
Oregon	May	September
Washington	May	September

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR PM10				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE:** April 26, 2016 **EVALUATOR:** MATTHEW STICHICK, CHEMIST II				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.6(a)	Table D-4 indicates the approximate number of permanent stations required in MSAs to characterize national and regional PM10 air quality trends and geographical patterns. Use the form below and Table D-4 to verify if your PM10 network has to appropriate number of samplers.	✔		
Comments: All of the site locations are based on historical agreements among the EPA, ADEC and (where applicable) local agencies.				

MSA Description[1]	MSA population[2,3]	Minimum required number of PM10 stations (from Table D-4)	Present number of PM10 stations in MSA
Municipality of Anchorage	291,826	1	3 (2 SLAMS, 1 SPM)
Matanuska-Susitna Valley Borough	88,995	1	2 (1 SLAMS, 1 SPM)
Fairbanks North Star Borough	97,581	1	1 (1 Ncore)
City and Borough of Juneau	31,275	1	2 (collocated)

[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 latest available census figures.

Table D-4 of Appendix D to Part 58 – PM10 Minimum Monitoring Requirements			
MSA population[1,2]	High concentration2	Medium concentration3	Low concentration4 5
>1 million	6-10	4-8	2-4
500K to 1 million	4-8	2-4	1-2
250K to 500K	3-4	1-2	0-1
100K to 250K	1-2	0-1	0

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

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR PM2.5

STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02
EVALUATION DATE: April 26, 2016 **EVALUATOR:** MATTHEW STICHICK, CHEMIST II

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

Comments:

MSA Description[1]	MSA population[2,3]	Design Value for years 2013-2015 24-hr/Annual Avg. µg/m³	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
Municipality of Anchorage	291,826		0	2	2	0
Garden Site		18/5.7	SLAMS/FEM	1	1	
Parkgate		16/5.5	SLAMS/FEM	1	1	
Matanuska-Susitna Valley Borough	88,995		1	2	2	0
Butte Site		35/7.1	SLAMS/FEM	1	1	
Palmer Site		10/2.7	SPM/FRM & FEM	1	1	
Fairbanks North Star Borough	97,581		1	3	0	1 speciation
State Office Building		35/10.2	SLAMS/FRM	1		
Ncore Site		35/10.3	NCore/2 FRM	1 (collocated)		1 speciation
North Pole		124/NA*	SLAMS/FRM	1		
City and Borough of Juneau	27,940		1	1	1	0
Floyd Dryden Site		24/6.8	SLAMS/FEM	1	1	

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

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

[3]Population based on latest available census figures.

*Design values are not calculated based on seasonal sampling.

Table D-5 of Appendix D to Part 58 – PM2.5 Minimum Monitoring Requirements		
MSA population[1, 2]	Most recent 3-year design value ≥85% of any PM2.5 NAAQS[3]	Most recent 3-year design value <85% of any PM2.5 NAAQS[3, 4]
>1 million	3	2
500K to 1 million	2	1
50K to <500K[5]	1	0

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

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR SULFUR DIOXIDE (SO_2)				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE:** April 26, 2016 **EVALUATOR:** MATTHEW STICHICK, CHEMIST II				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.4.1	State and, where appropriate, local agencies must operate a minimum number of required SO_2 monitoring sites (based on PWEI calculation specified in 4.4.2 – use Table 1 and 2 below to determine minimum requirement for each CBSA)	✓		
4.4.2(a)(1)	Is the monitor sited within the boundaries of the parent CBSA and is it one of the following site types: population exposure, highest concentration, source impacts, general background, or regional transport?			✓
4.4.3(a)	Has the EPA Regional Administrator required additional SO_2 monitoring stations above the minimum number of monitors required in 4.4.2? If so, note location in comment field.		✓	
4.4.5(a)	Is your agency counting an existing SO2 monitor at an NCore site in a CBSA with a minimum monitoring requirement?			✓
Comments: As evident from the calculations shown below, the State of Alaska has no CBSAs which require SO_2 monitoring. The operating SO_2 monitor is located at the multi-pollutant Ncore site in the Fairbanks North Star Borough.				

Table 1.

CBSA Description[1]	CBSA population[1, 2]	total amount of SO2 in tons per year emitted within the CBSA (from 2011 NEI[4])	PWEI (population x total emissions ÷ 1,000,000)	Minimum required number of SO2 monitors in CBSA (see Table 2 below)	Present number of SO2 monitors in CBSA
Municipality of Anchorage	291,826	416.9	121.7	0	0
Fairbanks North Star Borough	97,581	3,180.4	310.3	0	1
Matanuska-Susitna Valley Borough	88,995	113.0	10.1	0	0
Juneau	31,275	1,260.3	39.4	0	0
North Slope Borough	9,430	1,330.7	12.5	0	0

[1]see http://www.census.gov/population/metro/data/def.html
[2]Minimum monitoring requirements apply to the Core Based statistical area (CBSA). CBSA includes both metropolitan and micropolitan statistical areas.
[3]Population based on latest available census figures.
[4]see https://www.epa.gov/air-emissions-inventories/2011-national-emissions-inventory-nei-data

Table 2. Minimum SO2 Monitoring Requirements (Section 4.4.2 of App D to Part 58)

PWEI (Population weighted Emission Index) Value	Require number of SO2 monitors
>= 1,000,000	3
>= 100,000 but < 1,000,000	2
>= 5,000 but < 100,000	1

APPENDIX B: MONITORING PATH & SITING CRITERIA EVALUATION FORMS

PART 58 APPENDIX E SITE EVALUATION FORM FOR CO					
SITE NAME: Garden AQS ID: 02-020-0018	SITE ADDRESS: 3000 E 16th Ave. Anchorage, AK 99508 EVALUATION DATE: 4-25-2016	EVALUATOR: C Salerno			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	For neighborhood or larger spatial scale sites the probe must be located 2-15 meters above ground level and must be at least 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	Probe height 3 meters	X		
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.		X		
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).		X		
	(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.		X		
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.		X		
	(c) No trees should be between source and probe inlet for microscale sites.	1*		X	
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.				X
	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.				X
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex) for reactive gases.		X		
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.				X
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.				X	
Other Comments: Trees have grown slightly.					

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

[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. (Last actual count was 2009 ADT ~ 113).

1* One white spruce is between probe and 16th street.

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5,and Pb					
SITE NAME: Garden AQS ID: 02-020-0018	SITE ADDRESS: 3000 E 16th Ave. Anchorage, AK 99508 EVALUATION DATE: 4-25-2016	EVALUATOR: C Salerno			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale $PM_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	Roof height 6 meters. All PM inlets at 8 meters.	X		
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.		X		
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.		X		
	(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.		X		
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.		X		
	(c) No trees should be between source and probe inlet for microscale sites.		X		
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.		X		
Are there any changes that might compromise original siting criteria?				X	
Other Comments: ADT < 10,000, traffic lane 14 meters north of probe. (Last actual count 2009, ~ADT 113).					

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5,and Pb					
SITE NAME: Laurel AQS ID: 02-020-0045	SITE ADDRESS: 4335 Laurel St. Anchorage, AK 99508 EVALUATION DATE: 4-25-2016	EVALUATOR: C Salerno			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale PM$_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	Roof height ~ 5 meters. PM inlet at 7 meters.	X		
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.		X		
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.		X		
	(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.		X		
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.		X		
	(c) No trees should be between source and probe inlet for microscale sites.		X		
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.		X		
Are there any changes that might compromise original siting criteria?				X	
Other Comments: DOT 2013 ~ ADT on Tudor Road at Laurel 33,500. Traffic lane approximately 12 meters south of probe. This site is considered the "Maximum Exposure" site for PM10 in Anchorage bowl.					

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5,and Pb					
SITE NAME: Parkgate AQS ID: 02-020-1004	SITE ADDRESS: 11723 Old Glenn Hwy E 16th Ave. Eagle River, AK 99577 EVALUATION DATE: 4-25-2016	EVALUATOR: C Salerno			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale $PM_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	Roof height 5 meters. All PM inlets at 7 meters.	X		
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.		X		
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.		X		
	(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.		X		
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.		X		
	(c) No trees should be between source and probe inlet for microscale sites.		X		
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.		X		
Are there any changes that might compromise original siting criteria?				X	
Other Comments: DOT info 2013 ~ ADT 14,000 on Old Glenn Hwy Eagle River. Traffic lane 44 meters west. Easy Street traffic lane 23 meters north.					

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5,and Pb

SITE NAME: Floyd Dryden SITE ADDRESS: Mendenhall Valley, Juneau

AQS ID: 02-110-0004 EVALUATION DATE: 4/29/16 EVALUATOR: Carrie Cummings

APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale PM$_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.		X		
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.		X		
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.		X		
	(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.		X		
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.		X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
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.				X

Other Comments:

PART 58 APPENDIX E SITE EVALUATION FORM FOR O3					
SITE NAME Palmer AQS ID 02/170- 0012	SITE ADDRESS South Gulkana St., Palmer, Alaska EVALUATION DATE 05/04/16	EVALUATOR Matthew Stichick			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	The sampling inlet is about 4m above the ground	X		
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.	No sources	X		
	(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.	No sources	X		
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.	No obstacles	X		
	(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.	No obstacles	X		
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.	Closest trees >100 m away from sampling site	X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
6. SPACING FROM ROADWAYS	See spacing requirements table below	Road >20m away from sampling site	X		
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex).	FEP Teflon	X		
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.				X
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.				X	
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.

Ad way average daily traffic, vehicles per day	Minimum distance[1] (meters)	Minimum distance[1, 2] (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

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

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5,and Pb					
SITE NAME Palmer SITE ADDRESS South Gulkana St., Palmer, Alaska AQS ID 02/170- 0012 EVALUATION DATE 05/04/16 EVALUATOR Matthew Stichick					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale $PM_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	Sampling inlet>3m above ground 360° Unrestricted air flow	X		
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.	Paved roads only No sources near by	X		
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.	No obstacles	X		
	(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.	No obstacles	X		
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.	Nearest tree>100m	X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
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.	Road>20m away	X		
Are there any changes that might compromise original siting criteria?				X	
Other Comments:					

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5,and Pb					
SITE NAME Butte SITE ADDRESS Harrison Court, Butte, Alaska AQS ID 02-170-0008 EVALUATION DATE 05/04/16 EVALUATOR Matthew Stichick					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale $PM_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	Trees>10m	X		
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.	Paved road, gravel cul-de-sac	X		
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.	No obstacles	X		
	(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.	No obstacles	X		
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.	Trees >10m	X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
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.	Road>100m away	X		
Are there any changes that might compromise original siting criteria?				X	
Other Comments:					

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5,and Pb					
SITE NAME__FSOB__|__________________ SITE ADDRESS__675 7th Avenue, Fairbanks__________________________ AQS ID__02-090-0010_________ EVALUATION DATE___5/6/2016_______ EVALUATOR__TJ Brado_________________					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale $PM_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	~ 7 meters	X		
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.	> 40 meters to nearest solid fuel burning appliance.	X		
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.	No obstacles	X		
	(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.	Unrestricted	X		
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.	> 10 meters	X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
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.	> 20 meters	X		
Are there any changes that might compromise original siting criteria?				X	
Other Comments:					

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5,and Pb					
SITE NAME_NPF3__________________ SITE ADDRESS___809 Pioneer Road, Fairbanks________________________ AQS ID_02-090-0035__________ EVALUATION DATE__5/6/2016_______ EVALUATOR__TJ Brado_______________					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale $PM_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	~ 5 meters	X		
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.	~ 70 meters to the nearest solid fuel burning appliance.	X		
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.	No obstacles	X		
	(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.	Unrestricted	X		
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.	> 10 meters	X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
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.	~ 30 meters	X		
Are there any changes that might compromise original siting criteria?				X	
Other Comments:					

PART 58 APPENDIX E SITE EVALUATION FORM FOR O3					
SITE NAME__FNSB NCORE____________ SITE ADDRESS__809 Pioneer Road, Fairbanks__________________________ AQS ID___02-090-0034________ EVALUATION DATE__5/6/2016______ EVALUATOR__TJ Brado__________________					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	~ 4 meters	X		
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.	~160m to Diving Duck ~450m to Power Plant	X		
	(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.	No Furnace/flues	X		
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.	No obstacles	X		
	(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.	Unrestricted	X		
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.	> 10 meters	X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
6. SPACING FROM ROADWAYS	See spacing requirements table below	> 10 meters (~70m)	X		
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex).	Glass and FEP	X		
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.	< 5 seconds	X		
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.				X	
Other Comments:					

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

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

Roadway average daily traffic, vehicles per day	Minimum distance[1] (meters)	Minimum distance[1, 2] (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

PART 58 APPENDIX E SITE EVALUATION FORM FOR CO					
SITE NAME_FNSB NCORE_______________ SITE ADDRESS__809 Pioneer Road, Fairbanks__________________________					
AQS ID__02-030-0034__________ EVALUATION DATE__5/6/2016________ EVALUATOR__TJ Brado________________					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	For neighborhood or larger spatial scale sites the probe must be located 2-15 meters above ground level and must be at least 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	~4 meters	X		
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.	~160m to Diving Duck Roasters, ~450m to Power Plant	X		
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).	No Obstructions	X		
	(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.	Unrestricted	X		
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.	>10 meters	X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
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.				X
	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.				X
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex) for reactive gases.	Glass with FEP Sample Lines.	X		
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.	< 5 seconds	X		
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.				X	
Other Comments:					

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

[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.

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5,and Pb

SITE NAME__FNSB NCORE______________ SITE ADDRESS___809 Pioneer Road, Fairbanks________________________

AQS ID_02-090-0034___________ EVALUATION DATE__5/6/2016________ EVALUATOR__TJ Brado________________

APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale $PM_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	~ 5 meters	X		
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.	~ 160m to Diving Duck ~450m to Power Plant	X		
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.	No obstacles	X		
	(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.	Unrestricted	X		
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.	> 10 meters	X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
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.	~ 70 meters	X		
Are there any changes that might compromise original siting criteria?				X	
Other Comments:					

PART 58 APPENDIX E SITE EVALUATION FORM FOR NO, NOx, NO2, and NOy					
SITE NAME__FNSB NCORE____________ SITE ADDRESS_809 Pioneer Road, Fairbanks__________________________					
AQS ID___02-090-0034________ EVALUATION DATE__5/6/2016_________ EVALUATOR___TJ Brado______________					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	For neighborhood or larger spatial scale sites the probe must be located 2-15 meters above ground level and must be at least 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. Microscale near-road NO_2 monitoring sites are required to have sampler inlets between 2 and 7 meters above ground level. If located near the side of a building or wall, then locate the sampler probe on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	~ 4 meters	X		
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.	~160m to Diving Duck ~450m to Power Plant	X		
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.	No Obstructions	X		
	(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.	Unrestricted	X		
	(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.				X
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.	> 10 meters	X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
6. SPACING FROM ROADWAYS	See spacing requirements table below	> 10 meters (~70m)	X		
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex).	Glass & FEP	X		
	(c) Sampling probes for reactive gas monitors at NCore and at NO_2 sites must have a sample residence time less than 20 seconds.	< 5 seconds	X		
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.				X	
Other Comments:					

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

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

Roadway average daily traffic, vehicles per day	Minimum distance[1] (meters)	Minimum distance[1, 2] (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

PART 58 APPENDIX E SITE EVALUATION FORM FOR SO2					
SITE NAME__FNSB NCORE______________ SITE ADDRESS____809 Pioneer Road, Fairbanks_____________________ AQS ID__02-090-0034_________ EVALUATION DATE__5/6/2016_________ EVALUATOR___TJ Brado_______________					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICLE PLACEMENT	2-15 meters above ground level. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	~ 4 meters	X		
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.	~160m to Diving Duck ~450m to Power Plant	X		
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.	No obstacles	X		
	(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.	Unrestricted	X		
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.	> 10 meters	X		
	(c) No trees should be between source and probe inlet for microscale sites.				X
6. SPACING FROM ROADWAYS	There are no roadway spacing requirements for SO2.				✓
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex).	Glass and FEP	X		
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.	< 5 seconds	X		
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.				X	
Other Comments:					

APPENDIX C: ADDITIONAL MONITORING PROJECTS

Smoke Monitoring for Air Quality Advisories

Smoke from wildland fires can affect large areas and impacts 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 wild fires, with air quality degrading into the very unhealthy to hazardous range. DEC assists the Alaska Fire Service in assessing air quality impacts in areas affected by fires and provides information needed to protect public health. The DEC Air Quality Division uses two separate methods to assess air quality impacts and issue air quality advisories statewide: monitoring data and visibility information. Often a combination of both data sets is used to issue air quality advisories. The DEC meteorologist or AQ staff with assistance from the NWS use meteorological and air monitoring data to forecast smoke movement and predict where air quality impacts might be experienced.

DEC, with the help of local site operators, currently operates two continuous analyzers in rural Alaska during the wild fire season: Galena and Ft Yukon. DEC also has two portable, battery-operated, continuous particulate matter monitors (E-BAM) equipped with satellite communication devices, which can transmit the data to a website. The E-BAM instrument requires little maintenance and staff is typically only needed at set-up and to ensure proper operation for the first day. Remote data access allows staff in the DEC office or in the field to use the data for advisories and briefings. Currently no additional samplers are requested, as staff time and travel funds are the limiting factor in expanding the smoke monitoring network.

Radiation Monitoring

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

APPENDIX D: IMPROVE NETWORK

In 1977, Congress amended the Clean Air Act to include provisions to protect the scenic vistas of the nation's national parks and wilderness areas. In these amendments, Congress declared as a national visibility goal:

> *The prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution. (Section 169A)*

At that time, Congress designated all wilderness areas over 5,000 acres and all national parks over 6,000 acres as mandatory federal Class I areas. These Class I areas receive special visibility protection under the Clean Air Act.

The 1990 amendments to the Clean Air Act established a new Section 169(B) to address regional haze. To address the 1990 Clean Air Act amendments, the problem of long-range transport of pollutants causing regional haze, and to meet the national goal of reducing man-made visibility impairment in Class I areas, EPA adopted the Regional Haze Rule in 1999.

Alaska has four Class I areas subject to the Regional Haze Rule: Denali National Park, Tuxedni National Wildlife Refuge, Simeonof Wilderness Area, and Bering Sea Wilderness Area. They were designated Class I areas in August 1977. Figure 1 shows their locations, with Denali National Park in the Interior, Tuxedni

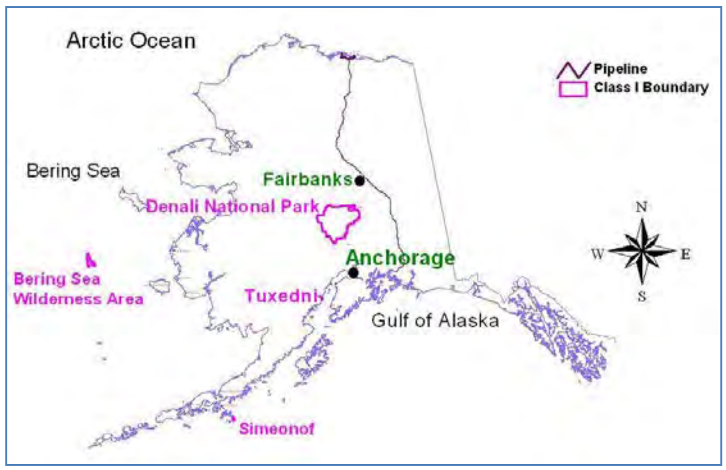


Figure 1. Alaskan Class I Areas

In Alaska, Class I Areas are managed by the National Park Service (NPS) and the U.S. Fish and Wildlife Service (USFWS.)

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 stations (Denali National Park and Preserve, Simeonof, and Tuxedni) were 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.

Denali National Park and Preserve

Denali National Park and Preserve (DNPP) is a large park in the interior of Alaska. It has kept its integrity as an ecosystem because it was set aside for protection fairly early in Alaska's history. Denali National Park headquarters lies 240 miles north of Anchorage and 125 miles southwest of Fairbanks, in the center of the Alaska Range. The park area totals more than 6 million acres. Denali is the only Class I site in Alaska that is easily accessible and connected to the road system. Denali has the most extensive air monitoring of Alaska's Class I areas, so more detailed examinations of long-term and seasonal air quality trends are possible for this site.

IMPROVE monitoring sites were established at two locations within or near the boundaries of the National Park and Preserve. The first air monitoring site is located near the eastern end of the park road at the Park Headquarters. A second, newer site, known as Trapper Creek, is located to the south of the Park at another site with reliable year-round access and electrical power.

The Denali Headquarters monitoring site (DENA1) is across the Park Road from park headquarters, approximately 250 yards from headquarters area buildings. The site (elevation of 2,125 feet) sits above the main road (elevation 2,088 feet). The side road to the monitoring site winds uphill for 130 yards, providing access to the monitoring site and a single-family residential staff cabin. The hill is moderately wooded, but the monitoring site sits in a half an acre clearing. During the park season, mid-May to mid-September, 70 buses and approximately 560 private vehicles per day loaded with park visitors traverse the road. During the off season, approximately100 passenger and maintenance vehicles pass within 0.3 miles of the monitoring site. Private vehicles are only allowed on the first 14.8 miles of the Park Road.

The Trapper Creek IMPROVE monitoring site (TRCR1) is located 100 yards east of the Trapper Creek Elementary School. The site is located west of Trapper Creek, Alaska and a quarter mile south of Petersville Road. The site is the official IMPROVE site for Denali National Park and Preserve and was established in September 2001 to evaluate the long-range transport of pollution into the Park from the south. The elementary school experiences relatively little traffic during the day, about 4 buses and 50 automobiles. The school is closed June through August. This site was selected because it has year-round access to power, is relatively open, and is not directly impacted by local sources.

IMPROVE monitoring data have been recorded at the Denali Headquarters IMPROVE site from March of 1988 to present. The IMPROVE monitor near the Park's headquarters was the original IMPROVE site. Due to topographical barriers, such as the Alaska Range, it was determined that the headquarters site was not adequately representative of the entire Class I area. Therefore, Trapper Creek, just outside of the park's southern boundary, was chosen as a second site for an IMPROVE monitor and is the official Denali IMPROVE site as of September 10, 2001. The headquarters site is now the protocol site. A Clean Air Status and Trends Network (CASTNet) monitor is located near the Denali Headquarters IMPROVE site.

Simeonof Wilderness Area

Simeonof Wilderness Area comprises 25,141 acres located in the Aleutian Chain, 58 miles from the mainland. It is one of 30 islands that make up the Shumagin Group on the western edge of the Gulf of Alaska. Access to Simeonof is difficult due to its remoteness and the unpredictable weather. Winds are mostly from the north and northwest as part of the mid-latitude westerlies. Occasionally winds from Asia blow in from the west. The island is isolated and the closest air pollution sources are marine traffic in the Gulf of Alaska and the community of Sand Point.

The Fish and Wildlife Service placed an IMPROVE air monitor in the community of Sand Point to represent the wilderness area. The community is on a nearby, more accessible island approximately 60 miles north west of the Simeonof Wilderness Area. The monitor has been on-line since September 2001. The location was selected to provide representative data for regional haze conditions at the wilderness area.

Tuxedni National Wildlife Refuge

Tuxedni National Wildlife Refuge is located on a fairly isolated pair of islands in Tuxedni Bay, Cook Inlet in Southcentral Alaska. There is little human use of Tuxedni except for a few kayakers and some backpackers. An old cannery, built near Snug Harbor on Chisik Island, is not part of the wilderness area; however it is a jumping off point for ecotourists staying at Snug Harbor arriving by boat or plane. The owners of the land have a commercial fishing permit as do many Cook Inlet fishermen. Set nets are installed around the perimeter of the island and in Tuxedni Bay during fishing season.

Along with commercial fishing, Cook Inlet has reserves of gas and oil that are currently under development. Gas fields are located at the Kenai area and farther north. The inlet produces 30,000 barrels of oil a day and 485 million cubic feet of gas per day. Pipelines run from Kenai to the northeast and northeast along the western shore of Cook Inlet starting in Redoubt Bay. The offshore drilling is located north of Nikiski and the West McArthur River. All of the oil is refined at the Nikiski refinery and the Kenai Tesoro refinery for use in Alaska and overseas.

The Fish and Wildlife Service installed an IMPROVE monitor near Lake Clark National Park to represent conditions at Tuxedni Wilderness Area. This site is on the west side of Cook Inlet, approximately 5 miles from the Tuxedni Wilderness Area. The site was operational as of December 18, 2001, and represents regional haze conditions for the wilderness area. In 2014 the property owner and site operator notified the US Fish and Wildlife Service that he would no longer be able to service the site. USFWS, US NPS and DEC cooperated on finding a new site location on the Kenai Peninsula, which allows easier access. A new site was establish roughly 3 miles south of the community of Ninilchik.

Bering Sea Wilderness Area

The Bering Sea Wilderness Area is located off the coast of Alaska about 350 miles southwest of Nome. Hall Island is at the northern tip of the larger St Matthew Island.

The Bering Sea Wilderness Area had a DELTA-DRUM sampler placed on it during a field visit in 2002. However, difficulties were encountered with the power supply for the sampler and no valid data are available from that effort. No IMPROVE monitoring is currently planned for the Bering Sea Wilderness Area because of its inaccessibility.

Monitoring data and additional information for the Alaskan IMPROVE sites are available from the EPA website, http://vista.cira.colostate.edu/improve .

Additional Monitoring Considerations

DEC published a final study report for the Regional Haze Trans-boundary Monitoring project in July 2012.
(http://www.dec.state.ak.us/air/am/Haze%20report/Final%20Regional%20Haze%20Trans-Boundary%20Monitoring%20Project.pdf)
One of the driving factors for the study was the quantitative evaluation of foreign contribution to local air quality impacts. While long-range transport of pollutants was observed and documented through various measurement techniques, DEC was unable to quantify international source contribution even as a whole. Current sampling methods do not provide enough time resolution to adequately document short events lasting only a few days i.e., the IMPROVE sampling schedule misses 2/3 of the year because samplers operate every third day. DRUM samplers which operate on a semi-continuous basis i.e., collecting 3-hour samples, initially seemed a viable method to collect year-round data and provide a comparison to the IMPROVE chemical analysis. Even if all the other problems encountered with operating the DRUM samplers in a remote field setting could be overcome, a reliable quantitative comparison to the IMPROVE data set is not possible given the low mass loading on the DRUM sampling strips combined with uncertainty for start and end hours.

DELTA-DRUM Samplers have been used at several sites in Alaska for relatively short periods. Researchers have unsuccessfully modified these samplers for remote winter use in Denali Park. Drum samplers were set up at the Denali and Trapper Creek sites as well as in McGrath and Lake Minchumina in February and March 2008. They experienced numerous mechanical and pump problems due to severe winter conditions and proved to be too problematic. These samplers operated intermittently between February/March 2006 and April 2009, resulting in very little usable data.

DEC still has concerns about the location of the Denali headquarters IMPROVE site as being representative of the entire Class I area. The Denali Headquarters IMPROVE site is located within the area of most heavy use and development and, thus, may not be representative of the pristine wilderness that makes up the remainder of the park lands. Lake Minchumina was clearly the cleanest site. An argument could be made that most of the 6 million acres of DNPP best resemble Lake Minchumina with its current 13 residents compared to Denali headquarters or Trapper Creek which see nearly a half a million visitors per year. Most of the park visitors (432,301 in 2008), and DNPP staff (145 permanent, 290 summer seasonal) and Talkeetna staff (10 permanent, approximately 20 summer seasonal) are concentrated around DNPP headquarters (personal communication Blakesley 2012, June 6; DNPP, 2012). Traffic is mostly concentrated on the main highway and the single dirt road through the wilderness area (DNPP, 2012).

The question that still needs to be answered is whether or not the Lake Minchumina site is more representative of the entire park than the two existing IMPROVE sites at Denali Headquarters and Trapper Creek. Before a final decision for relocation would be made, additional studies should be conducted that integrate meteorological observations with aerosol concentrations more quantitatively than was possible for this study analysis. As DEC continues to implement its Regional Haze plan and performs required updates in future years, the experience and data gained through this study can be used to inform the development and planning for new monitoring efforts that may provide additional insight into aerosol impacts in Alaska's Class I areas. Given the vast, remote areas of Alaska, the challenge remains to develop air monitoring approaches that can be successfully operated in the State's wilderness areas.

Future studies will use more robust sampling equipment for long term monitoring. Because of the remoteness of Alaska's Class I sites, DEC will most likely explore other sampling equipment for regulatory monitoring to demonstrate compliance with the Regional Haze Rule glide-path. As the concentrations of anthropogenic aerosols decreases toward background it will become more difficult to monitor successfully in the future without advances in monitoring instrumentation and pump and power technologies.

APPENDIX E: NAAQS SUMMARY TABLES

Table E-0-1. $PM_{2.5}$ under local /actual conditions (µg/m³); exceedance exceptional event values not included

$PM_{2.5}$ Monitoring Sites	AQS Site ID	98th Percentile			Weighted Annual Mean			2015 Design Value	
		2015	2014	2013	2015	2014	2013	24-hr	Annual
Garden/ Anchorage	02-020-0018	18.4	18.5	15.7	6.3	6.1	4.9	18	5.7
Parkgate / Eagle River	02-020-1004	17.2	14.7	15.0	6.1	5.4	5.0	16	5.5
Butte/ Matanuska-Susitna Valley	02-170-0008	37.9	39.5	29.7	6.8	8.0	6.4	35	7.1
Palmer/ Matanuska-Susitna Valley	02-170-0012	9.9	10.3	11.1	2.7	2.3	3.2	10	2.7
Wasilla/ Matanuska-Susitna Valley	02-170-0013	20.7*	18.5	16.0	6.1*	3.8	4.0	NA	NA
State Office Building/ Fairbanks	02-090-0010	35.3	34.5	36.3	10.3	10.3	9.6	35	10.2
NCore Site/ Fairbanks	02-090-0034	36.7	31.6	36.2	10.0	10.4	10.5	35	10.3
North Pole Fire #3/ North Pole	02-090-0035	111.6	138.3	121.6	NA	NA	NA	124	NA
Floyd Dryden/ Juneau	02-110-0004	21.0	27.5	22.7	7.7	7.7	5.9	24	6.8

* Annual values did not meet data completeness criteria.

Table E-0-2. $PM_{2.5}$ under local /actual conditions (µg/m³); only EPA concurred exceptional exceedance event values excluded (2013); wildfires included for 2015 because EPA has not yet applied their concurrence.

$PM_{2.5}$ Monitoring Sites	AQS Site ID	98th Percentile	Weighted Annual Mean	2015 Design Value

		2015	2014	2013	2015	2014	2013	24-hr	Annual
State Office Building/ Fairbanks	02-090-0010	57.1	34.5	36.3	10.3	10.3	9.6	42	10.2
NCore Site/ Fairbanks	02-090-0034	60.0	31.6	36.2	10.0	10.4	10.5	42	10.3
North Pole Fire #3/ North Pole	02-090-0035	111.6	138.3	121.6	NA	NA	NA	124	NA

Table E-0-3. PM_{10} under standard conditions ($\mu g/m^3$); exceptional event values not included; asterisks indicate inadequate completeness

PM_{10} Monitoring Sites	Site ID	2015 Exceed-ances	2015 1st Max 24-hr	2015 2nd Max 24-hr	2014 Exceed-ances	2014 1st Max 24-hr	2014 2nd Max 24-hr	2013 Exceed-ances	2013 1st Max 24-hr	2013 2nd Max 24-hr
Garden/ Anchorage	02-020-0018	0	78	75	0	91	87	0	65	58
Laurel/Anchorage	02-020-0045	0*	90	76	NA	NA	NA	NA	NA	NA
Tudor/ Anchorage	02-020-0044	NA	NA	NA	2	198	155	1	256	120
Parkgate/ Eagle River	02-020-1004	0	90	70	0	111	109	1	174	78
NCore/ Fairbanks	02-090-0034	3	233	229	0	94	74	0	111	95
Butte/ Matanuska-Susitna Valley	02-170-0008	0	147	126	0	117	107	0	81	72
Palmer/ Matanuska-Susitna Valley	02-170-0012	2	192	158	0	110	106	0	113	84
Floyd Dryden/ Juneau	02-110-0004	0*	21	18	0	38	31	0	33	24

Table E-0-4. Sites within Limited Maintenance Plan areas - PM_{10} under standard conditions ($\mu g/m^3$)

PM_{10} Monitoring Sites	Site ID	5-year mean (2011 through 2015)
Parkgate/ Eagle River	02-020-1004	18
Floyd Dryden/ Juneau	02-110-0004	8

Table E-0-52. CO (ppm)

CO Monitoring Sites	Site ID	2015 Exceed-ances	2015 1st Max 8-hr	2015 2nd Max 8-hr	2014 Exceed-ances	2014 1st Max 8-hr	2014 2nd Max 8-hr	2013 Exceed-ances	2013 1st Max 8-hr	2013 2nd Max 8-hr
Garden Site / Anchorage	02-020-0018	0	2.8	2.8	0	2.7	2.5	0	3.4	3.1
NCore/ Fairbanks	02-090-0034	0	3.8	2.4	0	2.0	1.9	0	2.8	2.2

Table E-0-6. SO_2 (ppb)

SO_2 Monitoring Sites	Site ID	2015 99th Percentile	2015 Completed Quarters	2014 99th Percentile	2014 Completed Quarters	2013 99th Percentile	2013 Completed Quarters	3-yrs Design Value
NCore/ Fairbanks	02-090-0034	30	4	40	4	37	4	36

Table E-0-7. O_3 (ppm)

		2015			2014			2013			3-Years	
O_3 Monitoring Sites	Site ID	Valid Days	Percent Compl	4th Max	Valid Days	Percent Compl	4th Max	Valid Days	Percent Compl	4th Max	Percent Compl	Design Value
Palmer/ Matanuska-Susitna Valley	02-170-0012	197	92	0.047	NA	NA	NA	NA	NA	NA	31	0.047*
NCore/ Fairbanks	02-090-0034	197	98	0.045	211	99	0.044	211	99	0.048	99	0.045

* Annual values did not meet data completeness criteria
NA – not available

Table E-0-8. NO_2 (ppb)

NO_2 Monitoring Sites	Site ID	2015 98th Percentile	2015 Completed Quarters	2014 98th Percentile	2014 Completed Quarters	2013 98th Percentile	2013 Completed Quarters	3-yrs Design Value
NCore/ Fairbanks	02-090-0034	68.1	4	41.2	2	NA	0	NA

NA – not available; monitor not installed until 7/1/2014

APPENDIX F: EPA APPROVAL LETTER FOR LEAD MONITORING WAIVER

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

AUG 11 2016

OFFICE OF
AIR AND WASTE

Ms. Denise Koch
Director, Division of Air Quality
Alaska Department of Environmental Conservation
410 Willoughby Avenue, Suite 303
Juneau, Alaska 99811-1800

Dear Ms. Koch:

In your letter dated April 14, 2016, Alaska Department of Environmental Conservation requested a waiver of the lead monitoring requirements at the Red Dog Mine based on the results of dispersion modeling conducted by your staff. The Red Dog Mine is a source of lead emissions exceeding 0.5 tons/year which requires lead monitoring as specified in 40 C.F.R. Part 58, Appendix D, section 4.5(a).

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). The modeling approach and protocol for the Red Dog Mine conducted by ADEC were consistent with the EPA's guidance, and were approved by the EPA. The results of this modeling demonstrates that the maximum ambient air 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.

The approval and existence of this lead source-monitoring waiver for the Red Dog Mine should be identified in the next Alaska 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.

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 for renewal must be submitted to EPA 120 days prior to the expiration of this waiver. The formal request to renew the lead source-monitoring waiver must demonstrate that the site conditions for which the previous modeling was conducted are still appropriate. 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.

If you have any questions on this subject, please have your staff contact Mr. Keith Rose at (206) 553-1949 or rose.keith@epa.gov.

Sincerely,

Timothy B. Hamlin
Director

cc: Ms. Barbara Trost
ADEC

Ms. Deanna Huff
ADEC