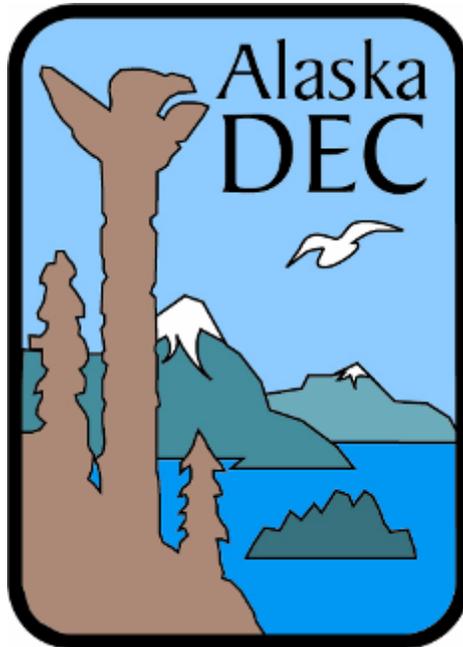


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Alaska's 2008 Air Monitoring Network Plan

Appendix and Glossary



Please provide comments by August 17, 2007 to:

State of Alaska Department of Environmental Conservation
Division of Air Quality
Air Monitoring and Quality Assurance Section
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APPENDIX A:

Designations

Non-attainment- any area that does not meet, or that contributes to poor ambient air quality in a nearby area that does not meet, the national primary or secondary ambient air quality standard for any pollutant on the national ambient air quality standards list.

Attainment- any area that meets the national primary or secondary ambient air quality standard for the pollutant.

Unclassifiable- any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

Maintenance- any area that is going through the transition from being designated a non-attainment area to attainment.

Note: Further information regarding designation can be found at:

<http://epa.gov/air/oaqps/greenbk/define.html>

<http://www.epa.gov/air/caa/>

APPENDIX B:

Siting Criteria

The Federal Environmental Protection Agency (EPA) Region 10 requested that the Alaska Department of Environmental Conservation (DEC) staff provide a table which demonstrates that each monitoring site complies with siting criteria identified in 40 CFR Part 58 Appendix E. Included are two tables: one for CO sites and one for PM sites. Certain sites have been found to have had their monitoring scale mis-designated. A discussion of the monitoring scale changes follows each table.

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 microscale 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 is a list with definitions on monitoring site scaling;

Microscale—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.

The following table (Table A-1) lists all CO monitoring sites in Anchorage and Fairbanks (including SPM) and how they fit the siting criteria from Appendix E of 40 CFR Part 58.

Table A-1 CO monitoring sites in Anchorage and Fairbanks.

Site Name	Monitoring Scale	Probe Distance from Wall (in meters)	Height (in meters)	Spacing from Obstructions	Spacing from Roadway (in meters)	Trees
Garden	Neighborhood	1	3	180 degrees unobstructed	7	Yes
Turnagain	Neighborhood	1	3	180 degrees unobstructed	12 meters from 500 VPD roadway	Yes
Bowman	Neighborhood	1	2.5	180 degrees unobstructed	500	Yes
Parkgate	Neighborhood	1	2.5	180 degrees unobstructed	22	None
Old Post Office	Microscale	1 meter	3 meters	180 degrees unobstructed	3 meters	None
Hunter Elementary School	Neighborhood	1 meter	3 meters	180 degrees unobstructed	>30 meters (<10,000 VPD)	None
Armory	Neighborhood	1 meter	3 meters	180 degrees unobstructed	500m	None

In the 2000 network assessment the Garden Site was stated to be “micro” scale based on the probes vicinity to the roadway. After further review of Appendix E and Appendix D of EPA 40 CFR 58, EPA-450/3-75-077, and further discussion within DEC, we are now classifying this site as “neighborhood” scale.

Particulate Matter (PM₁₀ and PM_{2.5}) Sites

For microscale 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.

Microscale 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.

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TableA-2 lists all PM monitoring sites in Alaska (including SPM) and how they fit the siting criteria from Appendix E of 40 CFR Part 58.

Table A-2: PM monitoring sites in Alaska

Site Name	Monitoring Scale	Height (in meters)	Spacing from Obstructions	Spacing from Roadway (in meters)	Traffic (VPD)	Trees
Garden	Neighborhood	10	12m to 5m tall penthouse	10	< 5,000	None
Muldoon	Middle	3.5	None	24	32,500	None
Tudor	Microscale	3.3	None	7	46,900	
Parkgate	Neighborhood	6	13m to 4m tall penthouse	44	11,000	None
Harrison Court	Neighborhood	4 meters	None	150 meters	< 5,000	None
State Office Building	Neighborhood	6 meters	30 meters to 3.75 meter tall penthouse	20 meters	2,400	1 tree at 10 meters away
Floyd Dryden	Neighborhood	6 meters	Furnace flue @ 20 meters, 4 meter penthouse @ 15 meters	65 meters	12,770	12 meter tall @ 25 meters away

Glossary:

SLAMS: State and local monitoring station

The SLAMS consist of a network of roughly 4000 monitoring stations nationwide. Distribution depends largely on the needs of the State and local air pollution control agencies to meet their respective State Implementation Plan (SIP) requirements. The SIPs provide for the implementation, maintenance and enforcement of the NAAQS in each air quality control region within a state. The State of Alaska monitoring network currently has 13 SLAMS sites for carbon monoxide and PM.

NAMS: national air monitoring station

The NAMS are a subset of the SLAMS network with emphasis on urban and multi-source areas. There are no current NAMS*-designated monitors in the monitoring network.

SPMS: special purpose monitoring station

Special Purpose monitoring stations are not permanently established and can be adjusted to accommodate changing needs and priorities for special studies needed by the State and local agencies. The SPMS are used to supplement the fixed monitoring network as circumstances require.

Air Quality Index (AQI)

The AQI is an index for reporting daily air quality and what associated health concerns the public should be aware of. The AQI focuses on health effects that might happen within a few hours or days of breathing polluted air. The AQI rates the air quality in 6 steps from good to hazardous.

µg/sm³: micro-gram per standard cubic meter.

TEOM – FDMS: Thermo Electron Inc. Tapered Element Oscillating Microbalance Filter Dynamic Measurement System continuous monitoring sampler. This sampler can sample for coarse or fine particulate matter.

BAM 1020: Met-One Inc. Beta Attenuation Monitor model 1020 continuous monitoring sampler. This sampler can sample for coarse and fine particulate matter.

Course particulate matter: PM₁₀ – particulate matter less than or equal to 10 microns in size.

Fine particulate matter: PM_{2.5} – particulate matter less than or equal to 2.5 microns.

National Ambient Air Quality Standards (NAAQS):

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The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards for six principal pollutants, which are called "criteria pollutants."

The Criteria Pollutants¹

Pollutant	Primary Stds.	Averaging Times	Secondary Stds.
Carbon Monoxide	9 ppm (10 mg/m ³)	8-hour ⁽¹⁾	None
	35 ppm (40 mg/m ³)	1-hour ⁽¹⁾	None
Lead	1.5 µg/m ³	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 ppm (100 µg/m ³)	Annual (Arithmetic Mean)	Same as Primary
Particulate Matter (PM ₁₀)	Revoked ⁽²⁾	Annual ⁽²⁾ (Arith. Mean)	
	150 µg/m ³	24-hour ⁽³⁾	
Particulate Matter (PM _{2.5})	15.0 µg/m ³	Annual ⁽⁴⁾ (Arith. Mean)	Same as Primary
	35 µg/m ³	24-hour ⁽⁵⁾	
Ozone	0.08 ppm	8-hour ⁽⁶⁾	Same as Primary
	0.12 ppm	1-hour ⁽⁷⁾ (Applies only in limited areas)	Same as Primary
Sulfur Oxides	0.03 ppm	Annual (Arith. Mean)	-----
	0.14 ppm	24-hour ⁽¹⁾	-----
	-----	3-hour ⁽¹⁾	0.5 ppm (1300 µg/m ³)

⁽¹⁾ Not to be exceeded more than once per year.

⁽²⁾ Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the agency revoked the annual PM₁₀ standard in 2006 (effective December 17, 2006).

⁽³⁾ Not to be exceeded more than once per year on average over 3 years.

¹ NAAQS criteria table can be found at <http://epa.gov/air/criteria.html>

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- (4) To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.
- (5) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/sm³ (effective December 17, 2006).
- (6) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
- (7) (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1 , as determined by appendix H.
- (b) As of June 15, 2005 EPA revoked the [1-hour ozone standard](#) in all areas except the fourteen 8-hour ozone nonattainment [Early Action Compact \(EAC\) Areas](#).