2018 Annual Air Monitoring Network Plan

Appendix B:

Minimum Monitoring Requirements and 2017 Monitor Classifications in AQS

Summary

The U.S. Environmental Protection Agency (EPA) establishes the minimum number of monitoring sites required to meet national ambient monitoring objectives. The minimum monitoring requirements are codified in Appendix D of 40 CFR Part 58. Minimum monitoring requirements are specific to each individual pollutant (e.g. ozone, $PM_{2.5}$) or objective based (e.g. NCore, PAMs) monitoring network. Minimum monitoring requirements typically rely on population and/or air pollution emissions data. Minnesota currently meets all minimum air monitoring requirements. This Appendix provides a detailed description of these requirements. It also provides tables that describe each monitor's scale, objective, method, and collocation, where required.

Federal Regulation

40 CFR § 58.10 Annual monitoring network plan and periodic network assessment.
(a)(1) Beginning July 1, 2007, the state, or where applicable local, agency shall submit to the Regional Administrator an annual monitoring network plan which shall provide for the documentation of the establishment and maintenance of an air quality surveillance system that consists of a network of SLAMS monitoring stations that can include FRM, FEM, and ARM monitors that are part of SLAMS, NCore, CSN, PAMS, and SPM stations. The plan shall include a statement of whether the operation of each monitor meets the requirements of appendices A, B, C, D, and E of this part, where applicable. The Regional Administrator may require additional information in support of this statement. The annual monitoring network plan must be made available for public inspection and comment for at least 30 days prior to submission to the EPA and the submitted plan shall include and address, as appropriate, any received comments.

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$PM_{2.5}$

Fine particulate ($PM_{2.5}$) monitoring requirements

The minimum monitoring requirements for $PM_{2.5}$ are established in Appendix D of 40 CFR Part 58 (Table 1). In addition to these population-based requirements, $PM_{2.5}$ monitoring is required at NCore and near-road air monitoring sites. Minnesota currently meets all $PM_{2.5}$ monitoring requirements (Table 2), based on current monitoring objectives and methods (Tables 3-6).

Table 1. National minimum monitoring requirements for $PM_{2.5}$

MSA Population [1,2]	Most recent 3-year design value ≥85% of any $PM_{2.5}$ NAAQS[3]	Most recent 3-year design value ≤85% of any $PM_{2.5}$ NAAQS[3,4]
>1,000,000	3	2
500,000 – 1,000,000	2	1
50,000 - <500,0005	1	0

[1] Minimum monitoring requirement applies to the Metropolitan statistical area (MSA).
[2] Population based on latest available census figures.
[3] The $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) levels and forms are defined in 40 CFR part 50.
[4] Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population

Table 2. Minnesota monitoring requirements for $PM_{2.5}$ as compared to national standards

Metropolitan Area	2016 Population Estimate	Maximum 2016 Annual DV as % of Standard (12 µg/m³)	Maximum 2016 Daily DV as % of Standard (35 µg/m³)	Minimum Requirement	2018 Sites with FRM or FEM monitor
Minneapolis-St. Paul-Bloomington, MN-WI[1]	3,551,036	73%	63%	2	8
Duluth, MN-WI[2]	279,227	47%	49%	0	2
Fargo, ND-MN[3]	238,124	61%*	57%*	0	1 (ND)
Rochester, MN[4]	215,884	56%	51%	0	1
St. Cloud, MN[5]	195,644	49%	49%	0	1
La Crosse-Onalaska, WI-MN[6]	136,936	61%	57%	0	1 (WI)
Grand Forks, ND-MN[7]	102,743	unmonitored		0	0
Mankato-North Mankato, MN[8]	100,016	unmonitored		0	0
NCore (Blaine)	Not a population based requirement			1	1
Near-road phase 1 (Minneapolis)	Not a population based requirement			1	1
Near-road phase 2 (Lakeville)	Not a population based requirement			1	1

[1] Counties include: Anoka (MN), Carver (MN), Chisago (MN), Dakota (MN), Hennepin (MN), Isanti (MN), Ramsey (MN), Scott (MN), Sherburne (MN), Washington (MN), Wright (MN), Pierce (WI), St. Croix (WI)
[2] Counties include: Carlton (MN), St. Louis (MN), Douglas (WI)
[3] Counties include: Clay (MN), Cass (ND)
[4] Counties include: Dodge (MN), Olmsted (MN), Wabasha (MN)
[5] Counties include: Benton (MN), Stearns (MN)
[6] Counties include: Houston (MN), La Crosse (WI)
[7] Counties include: Polk (MN), Grand Forks (ND)
[8] Counties include: Blue Earth (MN), Nicollet (MN)
*These AQS DVs have not met the data completeness criteria and are, therefore, subject to change, or may continue to be invalid values.

Table 3. Scales and objectives of MPCA and Tribal $PM_{2.5}$ monitors

MPCA Site ID	AQS Monitor ID	Monitor Type	Parameter Description	Measurement Scale	Monitor Objective Type
250	27-053-2006-88101-1	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
470	27-037-0470-88101-1	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
	27-037-0470-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
480	27-037-0480-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Middle Scale	Source Oriented
505	27-139-0505-88101-1	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
868	27-123-0868-88101-1	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
871	27-123-0871-88101-1	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
	27-123-0871-88101-2	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
	27-123-0871-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
	27-123-0871-88101-4	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
962	27-053-0962-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Middle Scale	Source Oriented
963	27-053-0963-88101-1	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
	27-053-0963-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
1300	27-137-7001-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
1909	27-053-1909-88101-3	SPM	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
2013	27-005-2013-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Urban Scale	Population Exposure
2304	27-007-2304-88101-3	TRIBAL	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
3052	27-145-3052-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
3201	27-171-3201-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
3204	27-035-3204-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Urban Scale	Population Exposure
4210	27-083-4210-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Urban Scale	Population Exposure/ Regional Transport
5008	27-109-5008-88101-1	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
	27-109-5008-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
6010	27-003-1002-88101-1	SLAMS	$PM_{2.5}$ - Local Conditions	Urban Scale	Population Exposure
	27-003-1002-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Urban Scale	Population Exposure
7001	27-075-0005-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Regional	General / Background
7417	27-017-7417-88101-3	TRIBAL	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
7550	27-137-7550-88101-1	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
	27-137-7550-88101-2	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
7554	27-137-7554-88101-1	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
	27-137-7554-88101-3	SLAMS	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure
7810	27-031-7810-88101-3	TRIBAL	$PM_{2.5}$ - Local Conditions	Neighborhood	Population Exposure

Table 4. Scales and objectives of Industrial $PM_{2.5}$ monitors in AQS

MPCA Site ID	AQS Monitor ID	Monitor Type	Parameter Description	Measurement Scale	Monitor Objective Type
447	27-163-0447-88101-3	Industrial	$PM_{2.5}$ - Local Conditions	Middle Scale	Source Oriented
448	27-163-0448-88101-1	Industrial	$PM_{2.5}$ - Local Conditions	Middle Scale	Source Oriented
	27-163-0448-88101-3	Industrial	$PM_{2.5}$ - Local Conditions	Middle Scale	Source Oriented
TBD	TBD – 3M Maplewood	Industrial	$PM_{2.5}$ - Local Conditions	Middle Scale	Source Oriented
	TBD – 3M Maplewood	Industrial	$PM_{2.5}$ - Local Conditions	Middle Scale	Source Oriented
TBD	TBD – 3M Maplewood	Industrial	$PM_{2.5}$ - Local Conditions	Middle Scale	Source Oriented

Table 5. Sampling frequency, duration, and collocation of MPCA and Tribal $PM_{2.5}$ monitors

MPCA Site ID	AQS Monitor ID	Monitor Type	Method Code	Sample Analysis Description	Sample Duration	Collection Frequency	Collocation Primary Monitor Indicator	Distance from Primary Monitor (m)
250	27-053-2006-88101-1	SLAMS	145	Gravimetric	24 hours	Every 3rd Day	n/a	n/a
470	27-037-0470-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	Y	0
	27-037-0470-88101-1	SLAMS	145	Gravimetric	24 hours	Every 3rd Day	N	1
480	27-037-0480-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
505	27-139-0505-88101-1	SLAMS	145	Gravimetric	24 hours	Every 3rd Day	n/a	n/a
868	27-123-0868-88101-1	SLAMS	145	Gravimetric	24 hours	Every 3rd Day	n/a	n/a
871	27-123-0871-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	Y	0
	27-123-0871-88101-4	SLAMS	170	Beta Attenuation	1 hour	Every Day	N	1.5
	27-123-0871-88101-1	SLAMS	145	Gravimetric	24 hours	Every 3rd Day	N	1.5
	27-123-0871-88101-2	SLAMS	145	Gravimetric	24 hours	Every 6th Day	N	1.5
962	27-053-0962-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
963	27-053-0963-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	Y	0
	27-053-0963-88101-1	SLAMS	145	Gravimetric	24 hours	Every 3rd Day	N	1
1300	27-137-7001-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
1909	27-053-1909-88101-3	SPM	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
2013	27-005-2013-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
2304	27-007-2304-88101-3	TRIBAL	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
3052	27-145-3052-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
3201	27-171-3201-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
3204	27-035-3204-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
4210	27-083-4210-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
5008	27-109-5008-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	Y	0
	27-109-5008-88101-1	SLAMS	145	Gravimetric	24 hours	Every 3rd Day	N	1
6010	27-003-1002-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	Y	0
	27-003-1002-88101-1	SLAMS	145	Gravimetric	24 hours	Every 3rd Day	N	1
7001	27-075-0005-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
7417	27-017-7417-88101-3	TRIBAL	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
7550	27-137-7550-88101-1	SLAMS	145	Gravimetric	24 hours	Every 3rd Day	Y	0
	27-137-7550-88101-2	SLAMS	145	Gravimetric	24 hours	Every 6th Day	N	1.5
7554	27-137-7554-88101-3	SLAMS	170	Beta Attenuation	1 hour	Every Day	Y	0
	27-137-7554-88101-1	SLAMS	145	Gravimetric	24 hours	Every 3rd Day	N	1
7810	27-031-7810-88101-3	TRIBAL	170	Beta Attenuation	1 hour	Every Day	n/a	n/a

Table 6. Methods and collocation of Industrial $PM_{2.5}$ monitors in AQS

MPCA Site ID	AQS Monitor ID	Monitor Type	Method Code	Sample Analysis Description	Sample Duration	Collection Frequency	Collocation Primary Monitor Indicator	Distance from Primary Monitor (m)
447	27-163-0447-88101-3	Industrial	170	Beta Attenuation	1 hour	Every Day	n/a	n/a
448	27-163-0448-88101-1	Industrial	142	Gravimetric	24 hours	Every 12th Day	Y	0
	27-163-0448-88101-3	Industrial	170	Beta Attenuation	1 hour	Every Day	N	2
TBD	TBD – 3M Maplewood	Industrial	142	Gravimetric	24 hours	Every 12th Day	Y	0
	TBD – 3M Maplewood	Industrial	170	Beta Attenuation	1 hour	Every Day	N	2
TBD	TBD – 3M Maplewood	Industrial	170	Beta Attenuation	1 hour	Every Day	N	n/a

PM_{10}

PM_{10} monitoring requirements

The minimum monitoring requirements for PM_{10} are established in Appendix D of 40 CFR Part 58 (Table 7). In addition to these population-based requirements, PM_{10} monitoring is required at NCore sites. Minnesota currently meets all PM_{10} monitoring requirements (Table 8), based on current monitoring objectives and methods (Tables 9-12).

Table 7. National minimum monitoring requirements for PM_{10}

	MSA[1]		
Population category	**High concentration[2]**	**Medium concentration[3]**	**Low concentration[4,5]**
>1 million	6-10	4-8	2-4
500,000 – 1 million	4-8	2-4	1-2
250,000 – 500,000	3-4	1-2	0-1
100,000 – 250,000	1-2	0-1	0

[1]Selection of urban areas and actual numbers of stations per area within the ranges shown in this table will be jointly determined by EPA and the State Agency.
[2]High concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding the PM_{10} NAAQS by 20 percent or more.
[3]Medium concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding 80 percent of the PM_{10} NAAQS.
[4]Low concentration areas are those for which ambient PM_{10} data show ambient concentrations less than 80 percent of the PM_{10} NAAQS.
[5]These minimum monitoring requirements apply in the absence of a design value.

Table 8. Minnesota monitoring requirements for PM_{10} as compared to national standards

Metropolitan Area	**2016 Population Estimate**	**Expected days greater than 80% of the NAAQS (120 µg/m^3)**	**Minimum Requirement**	**2018 Sites**
Minneapolis-St. Paul-Bloomington, MN-WI	3,551,036	0[1]	2-4	4
Duluth, MN-WI	279,227	0	0-1	1
Fargo, ND-MN	238,124	0	0	1 (ND)
Rochester, MN	215,884	unmonitored	0	0
St. Cloud, MN	195,644	unmonitored	0	0
La Crosse-Onalaska, WI-MN	136,936	unmonitored	0	0
Grand Forks, ND-MN	102,743	unmonitored	0	0
Mankato-North Mankato, MN	100,016	unmonitored	0	0
NCore (Blaine)	Not a population based requirement		1	1

[1] This calculation excludes PM_{10} monitoring results from an industrial area of North Minneapolis (27-053-0909 and 27-053-0910)

Table 9. Scales and objectives of MPCA PM_{10} monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Parameter Description	Measurement Scale	Monitor Objective Type
866	SLAMS	27-123-0866-81102-1	PM_{10} Total 0-10um Stp	Middle Scale	Highest Concentration
	SLAMS	27-123-0866-81102-2	PM_{10} Total 0-10um Stp	Middle Scale	Highest Concentration
868	SLAMS	27-123-0868-81102-3	PM_{10} Total 0-10um Stp	Neighborhood	Population Exposure
909	SLAMS	27-053-0909-81102-3	PM_{10} Total 0-10um Stp	Middle Scale	Source Oriented
910	SLAMS	27-053-0910-81102-3	PM_{10} Total 0-10um Stp	Middle Scale	Source Oriented
966	SLAMS	27-053-0966-81102-1	PM_{10} Total 0-10um Stp	Neighborhood	Population Exposure
1300	SLAMS	27-137-7001-81102-1	PM_{10} Total 0-10um Stp	Neighborhood	Population Exposure
6010	SLAMS	27-003-1002-81102-3	PM_{10} Total 0-10um Stp	Urban Scale	Population Exposure
7545	SLAMS	27-137-0032-81102-1	PM_{10} Total 0-10um Stp	Middle Scale	Source Oriented
	SLAMS	27-137-0032-81102-2	PM_{10} Total 0-10um Stp	Middle Scale	Source Oriented

Table 10. Scales and objectives of Industrial PM_{10} monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Parameter Description	Measurement Scale	Monitor Objective Type
1009	Industrial	27-075-1009-81102-1	PM_{10} Total 0-10um Stp	Neighborhood	Source Oriented
7632	Industrial	27-075-7632-81102-1	PM_{10} Total 0-10um Stp	Neighborhood	Source Oriented
		27-075-7632-81102-2	PM_{10} Total 0-10um Stp	Neighborhood	Source Oriented
7640	Industrial	27-075-7640-81102-1	PM_{10} Total 0-10um Stp	Neighborhood	Source Oriented
		27-075-7640-81102-2	PM_{10} Total 0-10um Stp	Neighborhood	Source Oriented
		27-075-7640-81102-3	PM_{10} Total 0-10um Stp	Neighborhood	Source Oriented
447	Industrial	27-163-0447-81102-3	PM_{10} Total 0-10um Stp	Middle Scale	Source Oriented
448	Industrial	27-163-0448-81102-3	PM_{10} Total 0-10um Stp	Middle Scale	Source Oriented

Table 11. Methods and collocation of MPCA PM_{10} monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Method Code	Sample Analysis Description	Sample Duration	Collection Frequency	Collocation Primary Monitor Indicator	Distance from Primary Monitor (m)
866	SLAMS	27-123-0866-81102-1	063	Gravimetric	24 hours	Every 6th Day	Y	0
		27-123-0866-81102-2	063	Gravimetric	24 hours	Every 12th Day	N	1.5
868	SLAMS	27-123-0868-81102-3	122	Beta Attenuation	1 hour	Every Day	n/a	n/a
909	SLAMS	27-053-0909-81102-3	122	Beta Attenuation	1 hour	Every Day	n/a	n/a
910	SLAMS	27-053-0910-81102-3	122	Beta Attenuation	1 hour	Every Day	n/a	n/a
966	SLAMS	27-053-0966-81102-1	063	Gravimetric	24 hours	Every 6th Day	n/a	n/a
1300	SLAMS	27-137-7001-81102-1	063	Gravimetric	24 hours	Every 6th Day	n/a	n/a
6010	SLAMS	27-003-1002-81102-3	122	Beta Attenuation	1 hour	Every Day	n/a	n/a
7545	SLAMS	27-137-0032-81102-1	063	Gravimetric	24 hours	Every 6th Day	Y	0
		27-137-0032-81102-2	063	Gravimetric	24 hours	Every 6th Day	N	1.5

Table 12. Methods and collocation of Industrial PM_{10} monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Method Code	Sample Analysis Description	Sample Duration	Collection Frequency	Collocation Primary Monitor Indicator	Distance from Primary Monitor (m)
1009	Industrial	27-075-1009-81102-1	063	Gravimetric	24 hours	Every 6th Day	n/a	n/a
7632	Industrial	27-075-7632-81102-1	063	Gravimetric	24 hours	Every 6th Day	Y	1
		27-075-7632-81102-2	063	Gravimetric	24 hours	Every 12th Day	n/a	n/a
7640	Industrial	27-075-7640-81102-1	063	Gravimetric	24 hours	Every 6th Day	Y	0
		27-075-7640-81102-2	063	Gravimetric	24 hours	Every 12th Day	N	1
		27-075-7640-81102-3	122	Beta Attenuation	1 hour	Every Day	N	1
447	Industrial	27-163-0447-81102-3	122	Beta Attenuation	1 hour	Every Day	n/a	n/a
448	Industrial	27-163-0448-81102-3	122	Beta Attenuation	1 hour	Every Day	n/a	n/a

Total Suspended Particulate Matter (TSP)

TSP monitoring requirements

The TSP NAAQS was replaced in 1987 by the PM_{10} standard. There are currently no federal requirements to monitor TSP, but Minnesota continues to monitor at several locations (Tables 13 and 14).

Table 13. Scales and objectives of MPCA TSP monitors

MPCA Site ID	Monitor Type	AQS Monitor ID	Parameter Description	Measurement Scale	Monitor Objective Type
420	SLAMS	27-037-0020-11101-1	Suspended particulate (TSP)	Middle Scale	Source Oriented
		27-037-0020-11101-2	Suspended particulate (TSP)	Middle Scale	Source Oriented
423	SLAMS	27-037-0423-11101-2	Suspended particulate (TSP)	Middle Scale	Source Oriented
438	SLAMS	27-163-0438-11101-1	Suspended particulate (TSP)	Middle Scale	Source Oriented
446	SLAMS	27-163-0446-11101-1	Suspended particulate (TSP)	Middle Scale	Source Oriented
465	SLAMS	27-037-0465-11101-1	Suspended particulate (TSP)	Middle Scale	Source Oriented
		27-037-0465-11101-2	Suspended particulate (TSP)	Middle Scale	Source Oriented
470	SLAMS	27-037-0470-11101-1	Suspended particulate (TSP)	Neighborhood	Population Exposure
871	SLAMS	27-123-0871-11101-1	Suspended particulate (TSP)	Neighborhood	Population Exposure
907	SLAMS	27-053-1007-11101-1	Suspended particulate (TSP)	Neighborhood	Population Exposure
909	SLAMS	27-053-0909-11101-1	Suspended particulate (TSP)	Middle Scale	Source Oriented
910	SLAMS	27-053-0910-11101-1	Suspended particulate (TSP)	Middle Scale	Source Oriented
962	SLAMS	27-053-0962-11101-1	Suspended particulate (TSP)	Middle Scale	Source Oriented
963	SLAMS	27-053-0963-11101-1	Suspended particulate (TSP)	Neighborhood	Population Exposure
966	SLAMS	27-053-0966-11101-1	Suspended particulate (TSP)	Neighborhood	Population Exposure
1300	SLAMS	27-137-7001-11101-1	Suspended particulate (TSP)	Neighborhood	Population Exposure
1909	SPM	27-053-1909-11101-1	Suspended particulate (TSP)	Neighborhood	Population Exposure
6010	SLAMS	27-003-1002-11101-1	Suspended particulate (TSP)	Neighborhood	Population Exposure
7549	SLAMS	27-137-7549-11101-1	Suspended particulate (TSP)	Middle Scale	Source Oriented
7555	SLAMS	27-137-7555-11101-1	Suspended particulate (TSP)	Neighborhood	Population Exposure
		27-137-7555-11101-2	Suspended particulate (TSP)	Neighborhood	Population Exposure

Table 14. Methods and collocation of MPCA TSP monitors

MPCA Site ID	AQS Monitor ID	Method Code	Sample Analysis Description	Sample Duration	Collection Frequency	Collocation Primary Monitor Indicator	Distance from Primary Monitor (m)
420	27-037-0020-11101-1	091	Gravimetric	24 hours	Every 6th Day	Y	0
	27-037-0020-11101-2	091	Gravimetric	24 hours	Every 6th Day	N	2.5
423	27-037-0423-11101-2	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
438	27-163-0438-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
446	27-163-0446-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
465	27-037-0465-11101-1	091	Gravimetric	24 hours	Every 6th Day	Y	0
	27-037-0465-11101-2	091	Gravimetric	24 hours	Every 12th Day	N	2.5
470	27-037-0470-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
871	27-123-0871-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
907	27-053-1007-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
909	27-053-0909-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
910	27-053-0910-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
962	27-053-0962-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
963	27-053-0963-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
966	27-053-0966-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
1300	27-137-7001-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
1909	27-053-1909-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
6010	27-003-1002-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
7549	27-137-7549-11101-1	091	Gravimetric	24 hours	Every 6th Day	n/a	n/a
7555	27-137-7555-11101-1	091	Gravimetric	24 hours	Every 6th Day	Y	0
	27-137-7555-11101-2	091	Gravimetric	24 hours	Every 12th Day	N	3

Lead

Lead monitoring requirements

The minimum monitoring requirements for lead are established in Appendix D of 40 CFR Part 58. Lead monitoring requirements are based on annual emissions. This source-oriented network requires lead monitoring for non-airport sources which emit 0.5 tons or more lead per year (TPY) (Table 15) and from each airport which emits 1.0 or more tons per year, based on either the most recent National Emission Inventory (NEI) or other scientifically justifiable methods and data. The EPA Regional Administrator may waive the lead monitoring requirement near lead sources if the State or, where appropriate, local agency can demonstrate the lead source will not contribute to a maximum lead concentration in ambient air in excess of 50% of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be re-evaluated once every five years as part of the network assessment.

Table 15. 2014 to 2015 comparison of sources with annual lead emissions greater than 0.5 TPY, based on National Emissions Inventory data

Facility Name	City	County	2014 Lead Emissions (TPY)	2015 Lead Emissions (TPY)
Grede LLC – St. Cloud	St. Cloud, MN	Stearns	0.80	0.69
Gopher Resource LLC	Eagan, MN	Dakota	0.16	0.50
US Steel Corp – Minntac	Mountain Iron, MN	St. Louis	0.86	0.45

In addition to the emissions-based lead monitoring requirements, the EPA Regional Administrator can require additional monitoring beyond the minimum monitoring requirements where the "likelihood of lead air quality violations is significant", or where the emissions density, topography, or population locations are complex and varied. The MPCA interprets the "likelihood of lead air quality violations is significant" to include locations where ambient monitoring or modeling indicate that ambient lead concentrations may be greater than 50% of the lead NAAQS. Based on monitoring conducted from 2014-2016, three ambient lead monitoring sites measured maximum 3-month rolling average lead concentrations greater than 50% of the lead NAAQS (Table 16). At a minimum, the MPCA intends to continue monitoring for lead at these sites for as long as the maximum 3-month rolling average lead concentration is greater than 50% of the lead NAAQS.

Table 16. Minnesota lead monitoring sites with maximum 3-month rolling average lead concentrations greater than 50% of the NAAQS

Site Name	AQS Monitor ID	Maximum 3-month Rolling Average (2014-2016)	Percent of NAAQS
Eagan – Gopher Resources	27-037-0465-14129-1	0.13 µg/m^3	87%
Minneapolis – Lowry Avenue	27-053-0909-14129-1	0.12 µg/m^3	80%
Minneapolis – Pacific Street	27-053-0910-14129-1	0.08 µg/m^3	53%

In 2016, the EPA rescinded the lead monitoring requirement for NCore sites. Lead monitoring will continue at the NCore (6010) site as part of the MPCA Air Toxics Monitoring program (Tables 17 and 18).

The MPCA conducted ambient lead monitoring at Grede LLC – St. Cloud (27-145-3053) from January 2010 – June 2013. The maximum 3-month rolling average lead concentration measured near the facility was 0.01 µg/m^3, which is less than 50% of the lead standard. The MPCA submitted a monitor closure request to the U.S. EPA Region 5 Administrator in April of 2013. The Regional Administrator approved the closure request

in June 2013. As required by regulation the MPCA will re-evaluate the need for ambient lead monitoring at Grede LLC in 2017, using current emissions, updated facility characteristics, and regulatory air dispersion models approved by the EPA. A monitoring waiver request will be developed and sent to the EPA for approval.

In 2009, the MPCA conducted modeling to assess ambient lead concentrations near US Steel Corp – Minntac. The results of this modeling predicted that maximum ambient lead concentrations near the facility were less than 50% of the lead NAAQS. See the 2011 Source-oriented Lead Monitoring Plan for Minnesota for a summary of these results, https://www.pca.state.mn.us/sites/default/files/aq10-04.pdf. The MPCA received a lead monitoring waiver for US Steel Corp-Minntac in December 2011.

The 2011 monitoring waiver was re-evaluated and results were published in the January 2017 Lead Monitoring Waiver Renewal for U.S. Steel Corp – Minntac. Results of the 2017 modeling reassessment are similar to those conducted in 2009 and 2011. Modeled ambient lead concentrations are well below the monitoring threshold of 50% of the lead NAAQS. Using a background ambient lead concentration of 0.01 $\mu g/m^3$, the total facility impact is estimated at 0.010244 $\mu g/m^3$, which is approximately 14% of the threshold to require ambient fence-line monitoring.

Based on these results, the EPA has approved MPCA's lead monitoring waiver for the Minntac facility.

Table 17. Scales and objectives of MPCA lead monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Parameter Description	Measurement Scale	Monitor Objective Type
420	SLAMS	27-037-0020-14129-1	Lead (Tsp) LC	Middle Scale	Source Oriented
	SLAMS	27-037-0020-14129-2	Lead (Tsp) LC	Middle Scale	Source Oriented
423	SLAMS	27-037-0423-14129-2	Lead (Tsp) LC	Middle Scale	Source Oriented
438	SLAMS	27-163-0438-14129-1	Lead (Tsp) LC	Middle Scale	Source Oriented
446	SLAMS	27-163-0446-14129-1	Lead (Tsp) LC	Middle Scale	Source Oriented
465	SLAMS	27-037-0465-14129-1	Lead (Tsp) LC	Middle Scale	Source Oriented
	SLAMS	27-037-0465-14129-2	Lead (Tsp) LC	Middle Scale	Source Oriented
470	SLAMS	27-037-0470-14129-1	Lead (Tsp) LC	Neighborhood	Population Exposure
871	SLAMS	27-123-0871-14129-1	Lead (Tsp) LC	Neighborhood	Population Exposure
907	SLAMS	27-053-1007-14129-1	Lead (Tsp) LC	Neighborhood	Population Exposure
909	SLAMS	27-053-0909-14129-1	Lead (Tsp) LC	Middle Scale	Source Oriented
910	SLAMS	27-053-0910-14129-1	Lead (Tsp) LC	Middle Scale	Source Oriented
962	SLAMS	27-053-0962-14129-1	Lead (Tsp) LC	Middle Scale	Source Oriented
963	SLAMS	27-053-0963-14129-1	Lead (Tsp) LC	Neighborhood	Population Exposure
966	SLAMS	27-053-0966-14129-1	Lead (Tsp) LC	Neighborhood	Population Exposure
1300	SLAMS	27-137-7001-14129-1	Lead (Tsp) LC	Neighborhood	Population Exposure
1909	SPM	27-053-1909-14129-1	Lead (Tsp) LC	Neighborhood	Population Exposure
6010	SLAMS	27-003-1002-14129-1	Lead (Tsp) LC	Neighborhood	Population Exposure
7549	SLAMS	27-137-7549-14129-1	Lead (Tsp) LC	Neighborhood	Population Exposure
7555	SLAMS	27-137-7555-14129-1	Lead (Tsp) LC	Neighborhood	Population Exposure
	SLAMS	27-137-7555-14129-2	Lead (Tsp) LC	Neighborhood	Population Exposure

Table 18. Methods and collocation of MPCA lead monitors

MPCA Site ID	AQS Monitor ID	Monitor Type	Method Code*	Sample Duration	Collection Frequency	Collocation Primary Monitor Indicator	Distance from Primary Monitor (m)
420	27-037-0020-14129-1	SLAMS	196	24 hours	Every 6th Day	Y	0
	27-037-0020-14129-1	SLAMS	196	24 hours	Every 6th Day	N	2.5
423	27-037-0423-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
438	27-163-0438-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
446	27-163-0446-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
465	27-037-0465-14129-1	SLAMS	196	24 hours	Every 6th Day	Y	0
	27-037-0465-14129-2	SLAMS	196	24 hours	Every 12th Day	N	2.5
470	27-037-0470-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
871	27-123-0871-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
907	27-053-1007-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
909	27-053-0909-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
910	27-053-0910-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
962	27-053-0962-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
963	27-053-0963-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
966	27-053-0966-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
1300	27-137-7001-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
1909	27-053-1909-14129-1	SPM	196	24 hours	Every 6th Day	n/a	n/a
6010	27-003-1002-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
7549	27-137-7549-14129-1	SLAMS	196	24 hours	Every 6th Day	n/a	n/a
7555	27-137-7555-14129-1	SLAMS	196	24 hours	Every 6th Day	Y	0
	27-137-7555-14129-2	SLAMS	196	24 hours	Every 12th Day	N	3

*Method 196 is heated ultrasonic HNO_3/HCl extraction with ICAP-AES

Ozone

Ozone (O_3) monitoring requirements

The minimum monitoring requirements for ozone are established in Section 4.1 of Appendix D of 40 CFR part 58 (Table 19). In addition to these population-based requirements, ozone monitoring is required at NCore sites. Minnesota currently meets all ozone monitoring requirements (Table 20), based on current monitoring objectives and methods (Tables 21 and 22).

Table 19. National minimum monitoring requirements for ozone

MSA Population[1,2]	Most recent 3-year design value concentrations ≥85% of any O_3 NAAQS[3]	Most recent 3-year design value concentration <85% of any O_3 NAAQS[3,4]
>10 million	4	2
4-10 million	3	1
350,000 - <4 million	2	1
50,000 - <350,000[5]	1	0

[1]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
[2]Population based on latest available census figures.
[3]The ozone (O_3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

Table 20. Minnesota monitoring requirements for ozone as compared to national standards

Metropolitan Area	2016 Population Estimate	Maximum 2016 8-Hour DV as % of Standard (70 ppb)	Minimum Requirement	2018 Sites
Minneapolis-St. Paul-Bloomington, MN-WI	3,551,036	90%	2	6
Duluth, MN-WI	279,227	76%	0	1
Fargo, ND-MN	238,124	80%*	0	1 (ND)
Rochester, MN	215,884	87%	1	1
St. Cloud, MN	195,644	86%	1	1
La Crosse-Onalaska, WI-MN	136,936	89%	1	1 (WI)
Grand Forks, ND-MN	102,743	unmonitored	0	0
Mankato-North Mankato, MN	100,016	unmonitored	0	0
NCore (Blaine)	Not a population based requirement		1	1

*The AQS DV for the 8-hour ozone has not been validated as of March 27, 2017; this is, therefore, an estimate.

Table 21. Scales and objectives of MPCA and Tribal ozone monitors

MPCA Site ID	Monitor Type	AQS Monitor ID	Parameter Description	Measurement Scale	Monitor Objective Type
505	SLAMS	27-139-0505-44201-1	Ozone	Neighborhood	Population Exposure
962	SLAMS	27-053-0962-44201-1	Ozone	Middle Scale	Source Oriented
2013	SLAMS	27-005-2013-44201-1	Ozone	Urban Scale	Regional Transport
3051	TRIBAL	27-095-3051-44201-1	Ozone	Urban Scale	Population Exposure
3052	SLAMS	27-145-3052-44201-1	Ozone	Neighborhood	Population Exposure
3201	SLAMS	27-171-3201-44201-1	Ozone	Neighborhood	Highest Concentration
3204	SLAMS	27-035-3204-44201-1	Ozone	Urban Scale	Population Exposure
4210	SLAMS	27-083-4210-44201-1	Ozone	Urban Scale	Regional Transport
5008	SLAMS	27-109-5008-44201-1	Ozone	Neighborhood	Population Exposure
5302	SLAMS	27-049-5302-44201-1	Ozone	Neighborhood	Population Exposure
6010	SLAMS	27-003-1002-44201-1	Ozone	Neighborhood	Highest Concentration
6012	SLAMS	27-003-1001-44201-1	Ozone	Neighborhood	Highest Concentration
6016	SLAMS	27-163-6016-44201-1	Ozone	Neighborhood	Highest Concentration
7001	SLAMS	27-075-0005-44201-1	Ozone	Regional	General / Background
7417	TRIBAL	27-017-7417-44201-1	Ozone	Neighborhood	Population Exposure
7550	SLAMS	27-137-7550-44201-1	Ozone	Neighborhood	Population Exposure

Table 22. Methods of MPCA and Tribal ozone monitors

MPCA Site ID	Monitor Type	AQS Monitor ID	Parameter Description	Method Code	Sample Analysis Description
505	SLAMS	27-139-0505-44201-1	Ozone	087	Ultraviolet Absorption
962	SLAMS	27-053-0962-44201-1	Ozone	087	Ultraviolet Absorption
2013	SLAMS	27-005-2013-44201-1	Ozone	087	Ultraviolet Absorption
3051	TRIBAL	27-095-3051-44201-1	Ozone	087	Ultraviolet Absorption
3052	SLAMS	27-145-3052-44201-1	Ozone	087	Ultraviolet Absorption
3201	SLAMS	27-171-3201-44201-1	Ozone	087	Ultraviolet Absorption
3204	SLAMS	27-035-3204-44201-1	Ozone	087	Ultraviolet Absorption
4210	SLAMS	27-083-4210-44201-1	Ozone	087	Ultraviolet Absorption
5008	SLAMS	27-109-5008-44201-1	Ozone	087	Ultraviolet Absorption
5302	SLAMS	27-049-5302-44201-1	Ozone	087	Ultraviolet Absorption
6010	SLAMS	27-003-1002-44201-1	Ozone	087	Ultraviolet Absorption
6012	SLAMS	27-003-1001-44201-1	Ozone	087	Ultraviolet Absorption
6016	SLAMS	27-163-6016-44201-1	Ozone	087	Ultraviolet Absorption
7001	SLAMS	27-075-0005-44201-1	Ozone	087	Ultraviolet Absorption
7417	TRIBAL	27-017-7417-44201-1	Ozone	087	Ultraviolet Absorption
7550	SLAMS	27-137-7550-44201-1	Ozone	087	Ultraviolet Absorption

Carbon Monoxide

Carbon monoxide (CO) monitoring requirements

The minimum monitoring requirements for CO are established in Appendix D of 40 CFR Part 58. These requirements include monitoring CO at NCore sites and at two near-road air monitoring site in CBSAs having a population of 1,000,000 or more persons (Table 23). In addition to these minimum requirements, the Regional Administrator may require additional monitors in situations where data or other information suggests that CO concentrations may be approaching or exceeding the NAAQS. Currently, CO monitoring is required in St. Paul (27-123-0050) through 2019 as part of the area's CO maintenance SIP. Minnesota currently meets the minimum CO monitoring requirements, according to monitoring objectives and methods (Tables 24 and 25).

Table 23. Minnesota carbon monoxide monitoring requirements

Location Requirement	Required Sites	2018 Sites
Near-road CO for CBSAs > 1 million (Minneapolis – St. Paul- Bloomington, MN-WI)	1	2
NCore (Blaine)	1	1
St. Paul Maintenance Area	1	1

Table 24. Scales and objectives of MPCA carbon monoxide monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Parameter Description	Measurement Scale	Monitor Objective Type
420	SLAMS	27-037-0020-42101-1	Carbon Monoxide	Middle Scale	Source Oriented
423	SLAMS	27-037-0423-42101-1	Carbon Monoxide	Middle Scale	Source Oriented
480	SLAMS	27-037-0480-42101-1	Carbon Monoxide	Middle Scale	Source Oriented
861	SLAMS	27-123-0050-42101-1	Carbon Monoxide	Microscale	Highest Concentration
954	SLAMS	27-053-0954-42101-1	Carbon Monoxide	Microscale	Highest Concentration
962	SLAMS	27-053-0962-42101-1	Carbon Monoxide	Middle Scale	Source Oriented
6010	SLAMS	27-003-1002-42101-1	Carbon Monoxide	Urban Scale	Population Exposure

Table 25. Methods of MPCA carbon monoxide monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Method Code	Sample Analysis Description
420	SLAMS	27-037-0020-42101-1	093	Gas Filter Correlation CO Analyzer
423	SLAMS	27-037-0423-42101-1	093	Gas Filter Correlation CO Analyzer
480	SLAMS	27-037-0480-42101-1	093	Gas Filter Correlation CO Analyzer
861	SLAMS	27-123-0050-42101-1	093	Gas Filter Correlation CO Analyzer
954	SLAMS	27-053-0954-42101-1	093	Gas Filter Correlation CO Analyzer
962	SLAMS	27-053-0962-42101-1	093	Gas Filter Correlation CO Analyzer
6010	SLAMS	27-003-1002-42101-1	593	Gas Filter Correlation Teledyne API 300 EU

Nitrogen Dioxide

Nitrogen dioxide (NO_2) monitoring requirements

The minimum monitoring requirements for NO_2 are established in Appendix D of 40 CFR Part 58. There are two primary monitoring objectives for NO_2, including monitoring near roads and in neighborhoods (area-wide) (Table 26). In addition to these minimum requirements, the Regional Administrator may require additional monitoring in areas where NO_2 is expected to be near the level of the NAAQS. To date, the Regional Administrator has not required any additional NO_2 monitors in Minnesota. Minnesota currently meets all NO_2 monitoring requirements (Table 27), based on current monitoring objectives and methods (Table 29).

Table 26. National minimum monitoring requirements for nitrogen dioxide

MSA Population	Near-Road Monitors	Area-wide Monitors
500,000	1-2[1]	0
1,000,000	1	1
2,500,000	2	1

Table 27. Minnesota monitoring requirements for nitrogen dioxide

Metropolitan Area	2016 Population Estimate	Required Near-Road	2018 Near-Road	Required Area-Wide	2018 Area-Wide
Minneapolis-St. Paul-Bloomington, MN-WI	3,551,036	2	2	1	1
Duluth, MN-WI	279,227	0	0	0	0
Fargo, ND-MN	238,124	0	0	0	1 (ND)
Rochester, MN	215,884	0	0	0	0
St. Cloud, MN	195,644	0	0	0	0
La Crosse-Onalaska, WI-MN	136,936	0	0	0	0
Grand Forks, ND-MN	102,743	0	0	0	0
Mankato-North Mankato, MN	100,016	0	0	0	0

Table 28. Scales and objectives of MPCA nitrogen dioxide monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Parameter Description	Measurement Scale	Monitor Objective Type
420	SLAMS	27-037-0020-42602-1	Nitrogen Dioxide	Middle Scale	Source Oriented
423	SLAMS	27-037-0423-42602-1	Nitrogen Dioxide	Middle Scale	Source Oriented
480	SLAMS	27-037-0480-42602-1	Nitrogen Dioxide	Middle Scale	Source Oriented
962	SLAMS	27-053-0962-42602-1	Nitrogen Dioxide	Middle Scale	Source Oriented / Highest Concentration
6010*	SLAMS	27-003-1002-42602-1	Nitrogen Dioxide	Urban Scale	General / Background

*The NO_2 monitor at NCore (6010) satisfies the area-wide requirement for the Minneapolis-St. Paul-Bloomington, MN-WI CBSA.

Table 29. Methods of MPCA NO_2 monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Parameter Description	Method Code	Sample Analysis Description
420	SLAMS	27-037-0020-42602-1	Nitrogen Dioxide	099	Gas Phase Chemiluminescence
423	SLAMS	27-037-0423-42602-1	Nitrogen Dioxide	099	Gas Phase Chemiluminescence
480	SLAMS	27-037-0480-42602-1	Nitrogen Dioxide	099	Gas Phase Chemiluminescence
962	SLAMS	27-053-0962-42602-1	Nitrogen Dioxide	099	Gas Phase Chemiluminescence
6010	SLAMS	27-003-1002-42602-1	Nitrogen Dioxide	099	Gas Phase Chemiluminescence

Sulfur Dioxide

Sulfur dioxide (SO_2) monitoring requirements

The minimum monitoring requirements for SO_2 are established in Appendix D of 40 CFR Part 58. The SO_2 monitoring requirement is based on the Population Weighted Emissions Index (PWEI) for all CBSAs (Table 30). The PWEI is calculated by multiplying the population of each CBSA, using the most recent census data or estimates, and the total amount of SO_2 in tons per year emitted within the CBSA area, using an aggregate of the most recent county level emissions data available in the National Emissions Inventory for each county in each CBSA. The resulting value is divided by one million, providing a PWEI value, the units of which are million person-tons per year (Table 31). Updated NEI data and PWEI values will be included in the 2019 Air Monitoring Network Plan; the MPCA currently monitors SO_2 at six locations in the state (Tables 32 and 33).

Table 30. National minimum monitoring requirements for sulfur dioxide

PWEI for CBSA	Required Sites
≥1 million	3
100,000 to < 1 million	2
5,000 to < 100,000	1

Table 31. Minnesota monitoring requirements for sulfur dioxide as compared to national standards

Metropolitan Area	2016 Population Estimate	2014 NEI SO_2 (tons/year)	PWEI	Minimum requirement	2018 Sites
Minneapolis-St. Paul-Bloomington, MN-WI	3,551,036	22,440	79,685	1	2
Duluth, MN-WI	279,227	6,867	1,918	0	0
Fargo, ND-MN	238,124	38,997	4482	1	1 (ND)
Rochester, MN	215,884	300	65	0	0
St. Cloud, MN	195,644	301	60	0	0
La Crosse-Onalaska, WI-MN	136,936	153	21	0	0
Grand Forks, ND-MN	102,743	11,391	1170	0	0
Mankato-North Mankato, MN	100,016	305	31	0	0
NCore (Blaine)	Not a population based requirement			1	1

Table 32. Scales and objectives of MPCA sulfur dioxide monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Parameter Description	Measurement Scale	Monitor Objective Type
420	SLAMS	27-037-0020-42401-1	Sulfur Dioxide	Middle Scale	Source Oriented
423	SLAMS	27-037-0423-42401-1	Sulfur Dioxide	Middle Scale	Source Oriented
436	SLAMS	27-163-0436-42401-1	Sulfur Dioxide	Middle Scale	Source Oriented
443	SLAMS	27-037-0443-42401-1	Sulfur Dioxide	Middle Scale	Source Oriented
954	SLAMS	27-053-0954-42401-1	Sulfur Dioxide	Middle Scale	Population Exposure
6010	SLAMS	27-003-1002-42401-1	Sulfur Dioxide	Urban Scale	Population Exposure

Table 33. Methods of MPCA sulfur dioxide monitors in AQS

MPCA Site ID	Monitor Type	AQS Monitor ID	Method Code	Sample Analysis Description
420	SLAMS	27-037-0020-42401-1	100	Ultraviolet Fluorescence
423	SLAMS	27-037-0423-42401-1	100	Ultraviolet Fluorescence
436	SLAMS	27-163-0436-42401-1	100	Ultraviolet Fluorescence
443	SLAMS	27-037-0443-42401-1	100	Ultraviolet Fluorescence
954	SLAMS	27-053-0954-42401-1	100	Ultraviolet Fluorescence
6010	SLAMS	27-003-1002-42401-1	600	Ultraviolet Fluorescence API 100 EU

On June 2, 2010, the EPA finalized revisions to the primary SO_2 NAAQS, which established a new one-hour standard (and subsequently revoked previous standards). As part of the designation process, under the 2015 "Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS)" (Data Requirements Rule or DRR) final rule [40 CFR Part 51.1203(b) and (d)], EPA required responsible air agencies to identify "applicable source" areas of SO_2 emissions. These "applicable sources" included stationary sources that 1) were not located in a designated nonattainment area, and 2) had actual SO_2 emissions greater than 2,000 tons per year. The MPCA identified four sources that met the applicable source criteria, and in June of 2016 submitted to EPA its recommended air quality characterization pathways (Table 34). On January 13, 2017, the MPCA submitted its recommended designations for the 2010 primary SO_2 NAAQS and the DRR final modeling analyses for the four facilities. Information regarding the SO_2 designation process and SO_2 emissions regulations can be found on the EPA website, at https://www.epa.gov/so2-pollution/so2-data-requirements-rule-january-13-2017-state-submittals-minnesota.

Table 34. Facilities in Minnesota identified as applicable sources under the Data Requirements Rule

Facility Name	City	County	Pathway
Xcel Energy – Sherburne Generating Plant	Becker	Sherburne	Model Actual
Minnesota Power – Boswell Energy Center	Cohasset	Itasca	Model Allowable
Minnesota Power – Taconite Harbor Energy Center	Schroeder	Cook	Model Allowable
Otter Tail Power Co – Hoot Lake Plant	Fergus Falls	Otter Tail	Model Actual

The DRR modeling predicted compliance with the one-hour SO_2 NAAQS for all four facilities. Two locations, the Xcel Energy Sherburne Generating Plant (Sherco) and the Otter Tail Power Company's Hoot Lake Plant (Hoot Lake), were modeled based on actual emissions measurements. Sherco's modeled emissions level was below 50% of the NAAQS; the DRR does not require further reporting on the site in future years.

Hoot Lake DRR modeling predicts emission up to 75% of the one-hour SO_2 NAAQS and, therefore, further reporting on the site is required annually under the DRR. Each future annual report will address emissions levels at Hoot Lake. The first report is due the calendar year after the effective date of initial designation, which is expected for Minnesota sources by December 31, 2017; thus, the first report, which will take the form of an Appendix in this plan, will be due with the 2019 Air Monitoring Network Plan. Hoot Lake is in the process of being decommissioned, with an end-date of 2020. Emissions are expected to continue to fall pre-decommissioning, and annual reports will only be necessary until plant closure is complete, with subsequent documentation of said closure provided to the EPA.