

STATE OF MONTANA
AIR QUALITY MONITORING
NETWORK PLAN



June 2020

Montana Department of Environmental Quality
Air Quality Bureau

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Contents

Introduction.....	1
I. Ambient Air Monitoring Requirements.....	2
A. Ozone (O ₃) Monitoring Criteria.....	2
B. Carbon Monoxide (CO) Monitoring Criteria	4
C. Nitrogen Dioxide (NO ₂) Monitoring Criteria.....	4
D. Sulfur Dioxide (SO ₂) Monitoring Criteria.....	5
E. Lead (Pb) Monitoring Criteria.....	7
F. Particulate Matter (PM ₁₀) Monitoring Criteria.....	8
G. Fine Particulate Matter (PM _{2.5}) Monitoring Criteria.....	9
H. National Core Monitoring Site (NCore) Monitoring Criteria.....	11
I. General Monitoring Network Design Considerations	11
II. Changes to the Monitoring Network	13
III. Appendices	14
Appendix A, Monitoring Site Locations.....	15
Appendix B, Montana Core Based Statistical Areas	18
Appendix C, Monitoring Network Summary	21
Appendix D, 2019 Ambient Air Quality Raw Data Summary	24
Appendix E, PM _{2.5} Speciation Analytes.....	26
Appendix F, National and Montana Ambient Air Quality Standards.....	29
Appendix G, Annual SO ₂ DRR Report.....	31
Appendix H, Public Inspection & Comment	33
Appendix I, Public Comment Recieved	35

Introduction

This Air Quality Monitoring Network Plan (Plan) is developed and submitted on an annual basis in accordance with the requirements contained in Title 40 of the Code of Federal Regulations (CFR) Part 58.10. The intent of this plan is to accurately describe the monitoring sites in the Montana Department of Environmental Quality's (DEQ) network, identify each site's monitoring purpose, describe how the sites fulfill Network Design Criteria (40 CFR 58, Appendix D), and describe any deviations in physical characteristics or operation from regulatory requirements. The Plan also describes changes the DEQ anticipates making to the network in the next year. In turn, providing opportunity for the DEQ to solicit, evaluate, and respond to comments and input from County Agencies, the general public, and other DEQ interests regarding the network.

The Plan development process establishes the structure for DEQ to evaluate its existing ambient air monitoring network and to tailor the network based on modified data needs, changing regulatory requirements, and available resources.

DEQ monitors air quality principally by measuring concentrations of criteria air pollutants pursuant to the federal Clean Air Act (CAA) in an endeavor to meet three basic monitoring objectives:

1. Provide air pollution data to the general public in a timely manner.
2. Support compliance with ambient air quality standards and emissions strategy development.
3. Support air pollution research studies.

Criteria air pollutants are the most common air pollutants with known harmful human health effects. The six criteria pollutants are:

- carbon monoxide (CO)
- sulfur dioxide (SO₂)
- lead (Pb)
- nitrogen dioxide (NO₂)
- ozone (O₃)
- particulate matter (PM). PM includes airborne materials in two size fractions, those with an aerodynamic diameter of 10 microns and less (PM₁₀), and those with an aerodynamic diameter of 2.5 microns and less (PM_{2.5}).

For each criteria air pollutant, National Ambient Air Quality Standards (NAAQS) are established to protect public health and the environment. Two types of federally-mandated air quality standards may exist. Primary standards set limits to protect public health, including the health of at-risk populations such as people with pre-existing heart or lung disease (e.g. asthmatics), children, and older adults. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings. Montana has adopted similar air quality standards known as the Montana Ambient Air Quality Standards (MAAQS).

This Plan is presented in three broad sections. The first section describes the various pollutant-specific ambient air monitoring design requirements and explains how the DEQ has implemented each as applicable. The second section describes changes to the monitoring network that the DEQ is proposing. The final section includes appendices which provide supplemental information and data in support of specific elements outlined within this Plan.

I. Ambient Air Monitoring Requirements

The term ‘ambient air’ is defined in 40 CFR 50.1 as “that portion of the atmosphere, external to buildings, to which the general public has access.” Federal rules implemented by the United States Environmental Protection Agency (EPA) require each state to establish a network of monitors to measure concentrations of criteria pollutants in ambient air based upon population, regional air quality, and regulatory concerns. The following sections summarize the ambient air monitoring requirements for each of the criteria air pollutants, and explain the DEQ’s implementation.

A. Ozone (O3) Monitoring Criteria

The minimum number of ozone monitors required by 40 CFR Part 58, Appendix D is summarized in Table 1.

Table 1 - Minimum O₃ Monitoring Requirements⁽¹⁾

Metropolitan Statistical Area (MSA) population ^(2,3)	Number of Monitors per MSA	
	Most recent 3-year design value concentrations ≥ 85 percent (%) of any O ₃ NAAQS ⁽⁴⁾	Most recent 3-year design value concentrations < 85% of any O ₃ NAAQS ^(4,5)
>10 million	4	2
4 – 10 million	3	1
350,000 – <4 million	2	1
50,000 – <350,000 ⁽⁶⁾	1	0

⁽¹⁾ From Table D-2 of Appendix D to 40 CFR Part 58

⁽²⁾ Minimum monitoring requirements apply to the metropolitan statistical area (MSA)

⁽³⁾ Population based on latest available census figures.

⁽⁴⁾ O₃ NAAQS levels and forms are defined in 40 CFR Part 50.

⁽⁵⁾ These minimum monitoring requirements apply in the absence of a design value.

⁽⁶⁾ An MSA must contain an urbanized area of 50,000 or more population.

As described in Appendix B to this Plan, there are three Metropolitan Statistical Areas (MSAs) in Montana, and all three fall within the 50,000 to 350,000 population category. The three MSAs are Billings, Missoula, and Great Falls. At present, O₃ monitoring is being conducted in Missoula as representative of these three areas. DEQ previously conducted O₃ monitoring in the Billings area from 2005 to 2007 (station number 30-111-0086). In Great Falls, historical monitoring data, meteorological patterns, and professional judgment indicate that monitoring in this MSA is not warranted given the low O₃ levels monitored in the two larger MSAs and the consistently windy conditions that exist in Great Falls.

Beyond monitoring efforts related to the three MSAs, the DEQ has endeavored, in several cases with collaborative funding from the Bureau of Land Management (BLM), to define background levels of O₃ across Montana and to assess impacts from petroleum exploration within the eastern portion of the state. DEQ conducts O₃ monitoring in Broadus (30-075-0001), Birney (30-087-0001), Sidney (30-083-0002), Malta (30-071-0010), Lewistown (30-027-0006), and at the National Core Monitoring Site (NCore) (30-049-0004). See Appendix A of this Plan for a map displaying the location of these sites. Table 2 summarizes the 8-hour rolling average O₃ values measured at monitoring sites operated by the DEQ during the designated 2019 ozone season (April – September), while Table 3 summarizes the 8-hour O₃ values measured at monitoring sites operated by the DEQ during the entire calendar year.

Table 2 – 8-Hour Rolling Monitored O₃ Values for Ozone Season 2019⁽¹⁾

Station	Concentrations (ppm)			NAAQS Design Values (ppm) ⁽²⁾	
	Minimum	Maximum	Average	2019	2017 – 2019
Birney	0.003	0.061	0.030	0.057	0.058
Broadus	0.007	0.064	0.033	0.064	0.063
Lewistown	0.007	0.059	0.034	0.058	0.060
Malta	0.006	0.061	0.032	0.056	0.056
Missoula	--	--	--	--	0.049
NCore	0.005	0.059	0.035	0.062	0.061
Sidney-201	0.01	0.068	0.033	0.057	0.058

⁽¹⁾ Ozone Monitoring Season established under 40 CFR Part 58, Table D-3

⁽²⁾ Design Values calculated by the USEPA Air Quality System (AQS) database

-- Insufficient data collected

Table 3 – 8-Hour Rolling Monitored O₃ 2019 Annual Values

Station	Concentrations (ppm)		
	Minimum	Maximum	Average
Birney	0.003	0.061	0.029
Broadus	0.007	0.064	0.033
Lewistown	0.007	0.064	0.035
Malta	0.006	0.061	0.030
Missoula	--	--	--
NCore	0.005	0.066	0.034
Sidney-201	0.01	0.068	0.033

-- Insufficient data collected

As demonstrated in Tables 2 and 3, minor variability has been observed in the monitored ambient O₃ concentrations across the state. The 8-hour O₃ design value of 0.059 ppm collected in the Billings area during 2005-2007 further illustrates this occurrence. The dynamic becomes particularly interesting given the spatial breadth and population diversity of these sites. Two of the seven monitoring sites (including the 2005–2007 Billings site) are located in the two largest-population communities in Montana, two are in small towns, one is in a rural oilfield, two are in very rural settings with minimal population and no industry, and one is in a pristine background location adjacent to a federal wilderness area. It appears, that the O₃ monitored in the ambient air across Montana is indicative of general background concentrations produced principally by natural sources or transported in from sources outside the state, with little anthropogenic source input from within Montana.

The monitoring directives in 40 CFR Appendix D, Section 5 contain specific requirements for the operation of Photochemical Assessment Monitoring Stations (PAMS) in areas classified as serious, severe, or extreme nonattainment for O₃. Montana does not contain any O₃ nonattainment areas, therefore PAMS monitoring is not required of the DEQ.

B. Carbon Monoxide (CO) Monitoring Criteria

Per 40 CFR 58 Appendix D Section 4.2, the requirements for CO monitoring sites are closely related to the requirements for near-road NO₂ monitoring sites (see Section I.C. of this Plan). Table 4 summarizes the number of required CO monitoring sites.

Table 4 – Minimum CO Monitoring Requirements⁽¹⁾

Criteria⁽²⁾	Number of Near-Road CO Monitors Required
CBSA Population ≥ 1,000,000	One, collocated with an NO ₂ monitor or in an alternative location approved by the EPA Regional Administrator

⁽¹⁾ From Appendix D to 40 CFR Part 58, Sec 4.2.1

⁽²⁾ CBSA populations based on latest available census figures

As documented in Appendix B to this Plan, no Montana Core Based Statistical Areas (CBSAs) meet the listed criteria, and no CO monitors are required in Montana on this basis.

Historically, the DEQ and local county air programs have conducted CO monitoring in various larger communities in the state where motor vehicle emissions had caused ambient air concerns. However, because of the improvement of traffic patterns and the gradual renewal of the general vehicle fleet to newer, cleaner-burning engines, monitored CO concentrations in ambient air remain extremely low. As a result, DEQ discontinued its traffic-related CO monitoring with EPA approval, and no community CO monitoring is currently being conducted.

The DEQ continues to operate one trace-level CO monitor at the NCore station north of Helena to track background concentrations of this pollutant over time. Section I.H describes NCore monitoring efforts.

Table 5 summarizes the 1-hour CO values measured at the NCore monitoring site during 2019.

Table 5 – 1-Hour Monitored CO Values for 2019

Station	Concentrations (ppm)		
	Min	Max	Average
NCore	7	728	128

C. Nitrogen Dioxide (NO₂) Monitoring Criteria

The minimum number of NO₂ monitoring sites required by 40 CFR 58 Appendix D Section 4.3 is summarized in Table 6.

Table 6 – Minimum NO₂ Monitoring Requirements⁽¹⁾

Requirement Type	Criteria ⁽²⁾	Minimum NO ₂ Monitors Required
Near Road	CBSA Population ≥ 500,000	1
	CBSA Population ≥ 2.5 million	2
	CBSA Population ≥ 500,000 and Road Segments with annual average daily traffic counts ≥250,000	2
Area-Wide	CBSA Population ≥ 1 million	1
Requirement Type	Criteria ⁽²⁾	Minimum NO ₂ Monitors Required
Protection of Susceptible and Vulnerable Populations	Any area inside or outside CBSAs	As Required by EPA Regional Administrator and Appendix D Section 4.3.4(b).

⁽¹⁾ From Appendix D to 40 CFR Part 58, Sec 4.3.1

⁽²⁾ CBSA populations based on latest available census figures

As demonstrated in Appendix B, no Montana communities meet any of the criteria listed in Table 6, and no additional NO₂ monitoring has been required of DEQ by the Regional EPA Administrator; therefore no ambient NO₂ monitors are currently required in Montana. However, the DEQ currently operates five NO₂ monitoring sites in an effort to determine NO₂ background concentrations along with potential impacts associated with the oil and gas industry in the eastern part of the state. NO₂ is monitored at Sidney (30-083-0002), Broadus (30-075-0001), and Birney (30-087-0001), as well as Malta (30-071-0010) and Lewistown (30-027-0006) which are operated in partnership with the BLM in an attempt to further define background concentrations and spatial distribution of this pollutant within the state of Montana.

Table 7 summarizes the 1-hour NO₂ values measured at monitoring sites operated by the DEQ during 2019.

Table 7 – 1-Hour Monitored NO₂ Values for 2019

Site	Concentrations (ppb)			NAAQS Design Values (ppb) ⁽¹⁾	
	Min	Max	Average	2019	2017 – 2019
Birney	0	11.0	0.66	6.0	9
Broadus	0	14.0	0.82	10.0	10
Lewistown	0	14.0	0.68	11.0	10
Malta	0	15.0	0.69	7.0	8
Sidney – 201	0	15.0	1.18	11.0	10

⁽¹⁾ Design Values calculated by the USEPA Air Quality System database

D. Sulfur Dioxide (SO₂) Monitoring Criteria

The minimum number of SO₂ monitoring sites required by 40 CFR 58 Appendix D Section 4.4 is summarized within Table 8.

Table 8 – Minimum SO₂ Monitoring Requirements⁽¹⁾

CBSA PWEI ⁽²⁾⁽³⁾	Minimum Number of SO ₂ Monitors Required
≥1,000,000	3
<1,000,000 - ≥100,000	2
<100,000 - ≥5,000	1

⁽¹⁾ From Appendix D to 40 CFR Part 58, Sec 4.4.2

⁽²⁾ CBSA populations based on latest available census figures

⁽³⁾ Core Based Statistical Area Population Weighted Emissions Index

This EPA criteria used to determine the number of required SO₂ monitors is based on two metrics: the CBSA—(a county or counties with at least one urbanized area of at least 10,000 people population), and the Population Weighted Emissions Index (PWEI -- the population in the CBSA multiplied by the annual tons of SO₂ emitted using the most recent aggregated emissions data available in the National Emissions Inventory, divided by 1,000,000). The Billings CBSA is the only CBSA in Montana that has the potential to require SO₂ monitoring based on these prescribed metrics. Table 9 summarizes the current PWEI for the Billings CBSA using the latest published National Emission Inventory (NEI) values.

Table 9 – Billings CBSA PWEI Calculation

Population ⁽¹⁾ (a)	Reported Emission ⁽²⁾ (b)	PWEI ⁽³⁾ (c)
172,846	4710.1	814

⁽¹⁾ US Census Bureau Population Estimate as of July 1, 2019

⁽²⁾ 2017 National Emissions Inventory (Yellowstone, Golden Valley and Carbon County)

⁽³⁾ PWEI (c) = a x b/1,000,000

SO₂ monitoring is triggered within a CBSA when the calculated WPEI value is equal to or greater than 5,000. Based on the prescribed criteria, neither Billings nor any of the other Montana CBSAs present an SO₂ PWEI that approaches or exceeds 5,000. Consequently, no DEQ SO₂ monitoring is required based on the PWEI criteria.

DEQ continues to operate one long-term SO₂ monitor at the Coburn Road site in Billings (30-111-0066) as part of the approved Maintenance Plan (81 FR 28718, Resdesignation Request and Associated Maintenance Plan for Billings, MT 2010 SO₂ Nonattainment Area) to provide an ongoing assessment of SO₂ compliance in the Billings area. The Coburn Road site, located within the former Yellowstone County (partial) SO₂ Nonattainment Area, has been in continuous operation since 1981 as a State or Local Air Monitoring Station (SLAMS) site for NAAQS comparison purposes.

Additionally, DEQ operates one SO₂ monitor at the Sidney site (30-083-0002) to assess impacts from oil and gas production in eastern Montana, and one trace-level background monitor at the NCore station (30-049-0004). Section I.H describes NCore monitoring. Table 10 summarizes the 1-hour values measured at the SO₂ monitoring sites operated by the DEQ during 2019.

Table 10 – 1-Hour Monitored SO₂ Values for 2019

Site	Concentrations (ppb)			NAAQS Design Values (ppb) ⁽¹⁾	
	Min	Max	Average	2019	2017 - 2019
Billings - Coburn Road	0	26.5	4.27	18	24
NCore - Sieben's Flat	0	18.4	0.50	3	5
Sidney - 201	0	14.4	1.14	9	17

⁽¹⁾ Design Values calculated by the USEPA Air Quality System database

Beyond DEQ-operated monitors, ambient SO₂ is monitored by industrial sources in the communities of Great Falls and Billings. In the Great Falls area, one SO₂ monitoring location (Race Track Site, 30-013-2001) in the community of Black Eagle is operated by the Calumet Montana Refining Company, LLC (Calumet) as required by their air quality permit. Data from this site is not entered into the AQS database but is used by DEQ's air quality compliance program. In the Billings/Laurel area there is currently a single industry-operated SO₂ monitoring site (Johnson Lane, 30-111-2006), maintained by Yellowstone Electric Limited Partnership (YELP) as a condition of their air quality permit. Three additional monitors were historically operated by a consortium of local SO₂-emitting industries, known as the Billings Laurel Air Quality Technical Committee (BLAQTC). The Brickyard (30-111-2005) and Laurel (30-111-0016) sites were discontinued in June of 2015; while the third site, Lockwood (30-111-1065), failed in 2011 and was not replaced. The DEQ performed periodic quality assurance audits of these sites and has entered their data into AQS, but suspended these efforts in 2011 due to resource constraints.

Both YELP and BLAQTC performed monitoring under an approved Quality Assurance Project Plan (QAPP) as individual Primary Quality Assurance Organizations (PQAOs) independent of the DEQ. DEQ believes that the data obtained from the YELP and BLAQTC monitors met the commitments of the individual QAPPs and are therefore of regulatory quality. DEQ looks principally to the Coburn Road SLAMS monitor for NAAQS compliance determination in the Billings area, but has historically examined, and continues to examine, available data for contrast and comparison purposes.

On August 10, 2015, EPA finalized the Data Requirements Rule (DRR) for the 2010 1-hour SO₂ primary NAAQS (40 CFR 51, Subpart BB). The SO₂ DRR required that air agencies identify and characterize air quality around large sources. Talen Montana, LLC's (Talen) Colstrip Steam Electric Station located in Rosebud County was the sole source in Montana identified as applicable to the rule. As required in the rule for characterizing air quality for the primary 2010 SO₂ NAAQS, Montana submitted the appropriate designation of attainment for Rosebud County as demonstrated through modeling on December 20, 2016. On January 9, 2018 within 83 Federal Register (FR) 1098, EPA published a notice that they agreed with Montana's determination and designated Rosebud county as Attaining/Unclassifiable for the 2010 SO₂ standard. In the same notice EPA designated all the remaining counties in Montana as Attaining/Unclassifiable for the 2010 SO₂ standard, with the exception of the a portion of Yellowstone county which was previously designated as Attainment.

As required in the SO₂ DRR (40 CFR 51.1205), Montana DEQ is required to submit: an annual report of SO₂ emissions at Talen Montana, LLC's Colstrip Steam Electric Generating Station. This requirement is addressed within Appendix G to this Plan.

E. Lead (Pb) Monitoring Criteria

On November 12, 2008, EPA lowered the NAAQS for Pb to 0.15 µg/m³ (micrograms per cubic meter) (73 FR, 66964). In addition, the rule established a design criteria for Pb in 40 CFR 58, Appendix D, Section 4.5 (a) requiring ambient air monitoring of certain sources which are expected to or have been shown to contribute to a maximum concentration in ambient air in excess of the Pb NAAQS. These regulations require, at a minimum, the installation of one source-oriented SLAMS site to measure the maximum Pb concentration in the ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year (tpy), and from each airport which emits 1.0 or more tpy. Currently, Talen Montana, LLC's Colstrip Steam Electric Station located in Rosebud County and Montana Resources located in Silver bow County are the only sources which have reported Pb emissions in excess of 0.5 tpy. No airport in Montana has reported emissions in excess of the monitoring threshold.

Talen Montana, LLC’s Colstrip Steam Electric Generating Station has historically reported total lead emissions in excess of 0.5 tpy. As stated in 40 CFR 58, Appendix D, Section 4.5 (a) (ii) the Regional EPA Administrator may waive the requirement stated above if the local air agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50% of the NAAQS (based on historical monitoring data, modeling, or other means). On May 18, 2018, the State of Montana submitted a monitoring waiver request and along with supporting documentation to EPA Region 8 to forego monitoring in Colstrip due to modeled Pb concentrations in the ambient air less than 50% of the NAAQS. EPA Region 8 granted a waiver from the Pb monitoring requirement in Colstrip on November 5, 2018.

Montana Resources operates an open pit copper and molybdenum mine, and associated processing facilities, located in Butte, Montana. The source-oriented Pb monitoring requirement was triggered by Montana Resources through reported 2017 estimated Pb emissions of 1.86 tons; as presented in the 2017 National Emission Inventory (initially released in August of 2019).

The DEQ, as well as other entities, have monitored for Pb as well as other parameters from various locations with the Butte community since the early 1960’s. Based on consistent confirmation of the Butte-Greeley (30-093-0005) station as the highest point of concentration, from historic and near-term monitoring data results, the DEQ has consolidated monitoring resources overtime to the single Butte-Greeley site. No exceedance of the Pb NAAQS has been observed in the Butte area; including from the Butte-Greeley site.

DEQ acknowledges the obligation to address the recently triggered requirement of 40 CFR 58, Appendix D, Section 4.5 (a); and as such, is presently evaluating options to address this obligation.

F. Particulate Matter (PM₁₀) Monitoring Criteria

The minimum number of PM₁₀ monitoring sites required by 40 CFR 58 Appendix D Section 4.6 is shown in Table 11.

Table 11 - Minimum PM₁₀ Monitoring Requirements⁽¹⁾

Population category	Number of Monitors per MSA ⁽¹⁾		
	High concentration ⁽²⁾	Medium concentration ⁽³⁾	Low concentration ⁽⁴⁾⁽⁵⁾
>1,000,000	6–10	4–8	2–4
500,000–1,000,000	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⁾ From Table D-4 of Appendix D to 40 CFR Part 58 -- Selection of urban areas and actual numbers of stations per MSA within the ranges shown in this table will be jointly determined by EPA and the DEQ

⁽²⁾ High concentration areas are those for which data exceeds the PM₁₀ NAAQS by 20 percent or more

⁽³⁾ Medium concentration areas are those for which data exceeds 80 percent of the PM₁₀ NAAQS

⁽⁴⁾ Low concentration areas are those for which data is less than 80 percent of the PM₁₀ NAAQS

⁽⁵⁾ The low concentration requirements are the minimum which apply in the absence of a design value

No MSAs in Montana currently meet the combination of population and PM₁₀ concentration listed in Table 11. However, the DEQ continues to operate a network of PM₁₀ monitors throughout the state serving various objectives. DEQ operates PM₁₀ monitors in seven areas previously designated as nonattainment for the 24-hour PM₁₀ NAAQS as required by EPA and to demonstrate the adequacy of PM₁₀ control plans or maintenance plans for those areas which have received redesignation to attainment. Those areas include Butte (30-093-0005), Columbia Falls (30-029-0049), Kalispell (30-029-0047), Libby (30-053-0018), Missoula (30-063-0024), Thompson Falls (30-089-0007), and Whitefish (30-029-0009).

The DEQ also operates PM₁₀ monitors in several areas in an attempt to further define background concentrations and spatial distribution of this pollutant within the state of Montana. These areas include Sidney (30-083-0002), Broadus (30-075-0001), Birney (30-087-0001), Malta (30-071-0010) and Lewistown (30-027-0006).

Table 12 summarizes the 24-hour average values measured at PM₁₀ monitoring sites operated by the DEQ during 2019. PM₁₀ monitoring is discussed further in Section II.

Table 12 – 24-Hour Average Monitored PM₁₀ Values for 2019⁽¹⁾

Site	Concentration (µg/m ³)			NAAQS Design Values ⁽²⁾	
	Min	Max	Average	2019	2017 - 2019
Birney ⁽³⁾	1	53	10.1	--	--
Broadus ⁽³⁾	0	116	15.9	--	--
Butte	3	69	20.0	0	0
Flathead Valley	0	49	11.2	0	0
Kalispell	8	96	23.3	0	0
Lewistown	0	34	7.5	0	0
Libby	4	65	16.3	0	0
Malta	0	27	7.2	0	0
Missoula	2	85	16.6	0	0
Sidney - 201	0	59	9.7	0	0
Thompson Falls	1	43	12.1	0	0
Whitefish	3	86	18.1	0	0

⁽¹⁾ Dataset excludes DEQ defined exceptional events

⁽²⁾ PM₁₀ Design Values are in the form of numbers of estimated exceedances as calculated by the USEPA Air Quality System database in accordance with the procedure in 40 CFR 50 Appendix K

⁽³⁾ Designated as Special Purpose Monitor (SPM) which are non-regulatory (NAAQS excluded) as they do not meet appropriate sighting criteria for the spatial scale of representation (See Section I of this Plan)

G. Fine Particulate Matter (PM_{2.5}) Monitoring Criteria

The minimum number of PM_{2.5} monitoring sites required by 40 CFR 58 Appendix D Section 4.7 is shown in Table 13.

Table 13 – Minimum PM_{2.5} Monitoring Requirements⁽¹⁾

MSA population ⁽²⁾	Number of Monitors per MSA	
	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 - <500,000	1	0

⁽¹⁾ From Table D-5 of Appendix D to 40 CFR Part 58. Minimum monitoring requirements applicable to MSA

⁽²⁾ Population based on latest available census figures

⁽³⁾ PM_{2.5} NAAQS levels and forms are defined in 40 CFR part 50

⁽⁴⁾ Minimum monitoring requirements apply in the absence of a design value

As described in Appendix B of this Plan, Montana possesses three MSAs (Billings, Missoula, and Great Falls), and all three fall into the smallest population category listed in Table 13. Missoula is the only Montana MSA that has at any time demonstrated a PM_{2.5} design value greater than 85 percent of the NAAQS, though it has not done so for nearly a decade. Consequently, no PM_{2.5} monitors or near-road PM_{2.5} monitors are required within Missoula or any community in Montana based on the current criteria.

Because PM_{2.5} is a pollutant of concern within Montana, the DEQ's PM_{2.5} monitoring network goes well beyond the minimum requirements as specified in Table 13. DEQ, along with several county air quality programs, operate PM_{2.5} monitors in various locations to demonstrate continuing NAAQS compliance, to provide information to various health departments PM_{2.5} control strategies, and to inform the public of potential health impacts during both winter inversions and summer wildfire events.

DEQ continues to operate a PM_{2.5} monitor in the community of Libby as required by EPA and to demonstrate the adequacy of the PM_{2.5} maintenance plan resulting from the redesignation from nonattainment to attainment for the 24-hour PM_{2.5} NAAQS. In addition, DEQ operates PM_{2.5} monitors in Sidney (30-083-0002), Broadus (30-075-0001), Birney (30-087-0001), Malta (30-071-0010) and Lewistown (30-027-0006) in an attempt to further define background concentrations and spatial distribution of this pollutant within the state of Montana. Additionally, DEQ operates multipurpose community-based monitors in Billings (30-111-0087), Bozeman (30-031-0019), Butte (30-093-0005), Columbia Falls (30-029-0049), Dillon (30-001-003), Frenchtown (30-063-0037), Great Falls (30-013-0001), Hamilton (30-081-0007), Helena (30-049-0026), Missoula (30-063-0024), and Seeley (30-063-0038). These sites, along with the NCore site (30-049-0004) located north of Helena, meet the requirements of 40 CFR Appendix D Section 4.7.3 to install and operate at least one regional background and at least one regional transport PM_{2.5} monitoring site within the network.

Table 14 summarizes the 24-hour average values measured at the PM_{2.5} monitoring sites operated by the DEQ during 2019.

Table 14 – 24-Hour Average Monitored PM_{2.5} Values for 2019⁽¹⁾

Site	Concentration (µg/m ³)			NAAQS Design Values (µg/m ³)		
				2019	2017 - 2019	
	Min	Max	Average	98 th Pctl.	24 hour	Annual
Billings – Lockwood	0.9	19.0	5.70	10.4	14	6.6
Birney	0	19.0	4.07	11.0	11	4.7
Bozeman ⁽²⁾	0	31.1	6.77	--	--	--
Broadus	0	27.0	5.13	12.3	16	5.9
Butte	0	30.0	5.18	19.7	23	6.4
Dillon ⁽²⁾⁽³⁾	0	15.0	2.38	--	--	--
Flathead Valley	0	36.4	6.44	24.0	22	6.9
Frenchtown	1.4	57.9	8.33	24.4	22	8.2
Great Falls ⁽²⁾	0	16.3	5.4	--	--	--
Hamilton	0	23.2	4.61	18.4	24	6.2
Helena-Rossiter	0	47.0	8.38	29.4	34	8.2
Lewistown	0	11.9	3.59	8.5	10	3.9
Libby	1.4	33.4	11.42	29.1	28	11.1
Malta	0	11.2	3.92	9.6	10	4.3
Missoula	0	26.2	6.99	18.6	21	7.1
Ncore	0	16.0	2.25	9.1	10	2.7
Seeley ⁽²⁾	0	48.0	10.67	--	--	--
Sidney - 201	0	16.3	4.44	10.8	11	4.7
Thompson Falls ⁽²⁾	0	32.5	6.78	--	--	--

⁽¹⁾ Dataset excludes DEQ defined exceptional events

⁽²⁾ Monitors are non-Federal Equivalent Method (non-FEM) monitors operated for informational purpose only and are not certified to produce NAAQS-comparison data

⁽³⁾ Data is not currently reported to AQS

The PM_{2.5} monitoring criteria in 40 CFR 58, Appendix D, contains two additional significant requirements. First, Section 40 CFR 58, Appendix D, Section 4.7.2 requires that states operate continuous analyzers in at least one-half of the *required* PM_{2.5} monitoring sites (per Table 13, above). The continuous monitors must be designated as Federal Equivalent Method (FEM) analyzers, and at least one analyzer per MSA must be collocated with an episodic Federal Reference Method (FRM) analyzer. As previously discussed, no PM_{2.5} monitors are required by federal Monitoring Network Design Criteria rule to be operated in any Montana community, so the CFR Section 4.7.2 criteria does not currently have direct application in Montana. However, PM_{2.5} is a significant pollutant in Montana, and impacts from summer wildfires and wintertime inversions have established a strong demand for continuous, near-real time PM_{2.5} data for assessing public health impacts as well as determining NAAQS compliance. To meet this need DEQ's PM_{2.5} network is comprised solely of continuous monitors; with FRM monitors used only for collocation, validation, and quality assurance (QA) purposes. As a result, the national discussion regarding the accuracy and representativeness of continuous monitors is of great significance to DEQ and to the citizens of Montana.

Second, 40 CFR, Appendix D, Section 4.7.4 requires that each state continue to conduct PM_{2.5} Chemical Speciation monitoring at locations designated to be part of the national Speciation Trends Network (STN) that are operated as part of the Chemical Speciation Network (CSN). Two sites in Montana are currently included in the CSN; Butte (30-093-0005) and NCore (30-049-0004). Appendix E contains a list of the chemical components for which analysis is performed on filters collected at these stations.

H. National Core Monitoring Site (NCore) Monitoring Criteria

Section 3 of Appendix D to 40 CFR 58 requires that each state operate at least one NCore multipollutant monitoring site. By definition, each NCore site must include monitoring equipment to measure PM_{2.5}, PM_{10-2.5}, speciated PM_{2.5}, O₃, SO₂, CO, NO, NO_y, and meteorology. The majority of NCore sites across the nation are established in urban areas. In Montana however, the NCore site was established as a long-term trend background site in an area believed to be relatively pristine and un-impacted by anthropogenic sources.

The Montana NCore site (Sieben's Flat, 30-049-0004) was installed in late 2010. All parameters are functional and acquiring ongoing data.

The monitoring directives in 40 CFR Appendix D Section 4.8.1 contains specific requirements for the operation of monitors for PM_{10-2.5} at NCore sites. These requirements are currently limited in application to NCore monitoring sites and are fully met in Montana's NCore site at Sieben's Flat.

I. General Monitoring Network Design Considerations

1. Monitors Not Meeting Siting Criteria

The DEQ designs its network and operates the air monitoring sites in compliance with EPA's requirements for ambient air monitoring sites (40 CFR Part 58, Appendices A, C, D and E). Within the DEQ's network there are three sites that do not meet all of the siting requirements of 40 CFR Part 58, Appendix E. The Hamilton (30-081-0007) PM_{2.5} site is located within 15 meters of paved city streets, but is operated as a neighborhood-scale site and not intended as a "traffic corridor" monitor as discussed 40 CFR 58 Appendix E

Section 6.3. The roads receive low traffic counts, and EPA has approved (granted a waiver) of the continued operation of this site as a neighborhood scale site in response to previous Annual Network Report documents submitted by the DEQ.

Two PM₁₀ monitors located in eastern Montana, Broadus (30-075-0001) and Birney (3-087-0001), were established to define background concentrations of this pollutant on a neighborhood or broader scale. Each of these sites is located in a remote region, and of logistic necessity, near unpaved gravel roads traveled by ranching and agricultural equipment. As a result, the monitors are unduly influenced by that traffic and are not appropriately representing background PM₁₀ concentrations in their intended scaled scope. However, DEQ desires to continue to operate these monitors as part of a suite of instruments located at these sites. Consequently, in its 2012 Network Plan the DEQ proposed to designate the PM₁₀ monitors at Broadus and Birney as special purpose monitors producing non-regulatory (SPM-NR), or NAAQS excluded, data. EPA approved this designation on April 8, 2013.

2. PM_{2.5} Spatial Scales and Monitoring Methods

The data from PM_{2.5} monitoring sites with spatial scales designated as smaller than “neighborhood” is generally not used for PM_{2.5} NAAQS compliance review purposes in the DEQ’s network. Currently, the only PM_{2.5} site in the Montana network of this nature is the Overlook Park station in Great Falls (30-013-0001).

All PM_{2.5} monitors designated as Federal Reference Method or equivalent (FRM/FEM) generate data suitable for determining compliance with the PM_{2.5} NAAQS. However, DEQ has historically operated non-FEM PM_{2.5} monitoring equipment for general information purposes, and will continue to do so. The tables in Appendix C discriminate between FRM, FEM and non-FEM PM_{2.5} instrumentation operated within the DEQ’s network.

3. Quality Assurance Project Plan (QAPP)

Federal rules and associated guidance establish a significant grid of quality assurance requirements, and the DEQ operates its monitoring network within these requirements. Of note is the requirement in 40 CFR 58 Appendix A, Section 2 for each monitoring organization to develop and describe its quality system within a written QAPP. The DEQ’s QAPP underwent an update which was adopted by the Montana Board of Environmental Review on February 9, 2018.

II. Changes to the Monitoring Network

A. Introduction

DEQ regards the requirement to develop and submit an Annual Network Plan as an opportunity to review the existing air monitoring network and to plan for future needs. In the process of producing this document, DEQ reviews air pollutant trends, known and projected emission changes, and revisions to the NAAQS and monitoring rules; then attempts to balance those realities against available resources. Likewise, in 2015 the DEQ completed a periodic network assessment in accordance to 40 CFR 58.10(d). The changes proposed in this document reflect the results of both efforts.

Immediate changes are proposed in this annual network plan, while long-term evaluation and direction of DEQ's air quality surveillance system continue to be addressed within the periodic network assessment, and the resulting system modifications. DEQ anticipates occasional changes to the focus and direction of Montana's air monitoring network in response to future federal rulemaking. No network changes completed since submission of the 2019 Annual Monitoring Network Plan and no changes to Montana DEQ's air monitoring network are proposed for the 2020 planning period.

B. Ongoing Network Changes

1. **PM₁₀ Monitoring in Nonattainment Areas**

As indicated in previous network plans, diminishing monitoring resources necessitate a redirection of monitoring efforts toward those pollutants and geographic areas that have the greatest potential human health impacts or are of the greatest national concern. As a result, we would like to reiterate our belief that historical PM₁₀ monitoring from multiple sites has served its purpose and needs to be discontinued so that the resources associated with those efforts can be redirected to areas and pollutants of a higher priority. In light of this, DEQ continues to work on redesignation of nonattainment areas for PM₁₀. The Missoula nonattainment area was redesignated to attainment effective on June 24, 2019. The Kalispell, Columbia Falls, and Libby nonattainment area redesignations were approved by USEPA on March 20, 2020, the comment period has closed and are awaiting final action. The Butte nonattainment area redesignation request and demonstration package was submitted to USEPA for review on March 30, 2020. DEQ will seek to address the remaining PM₁₀ nonattainment redesignations in the next planning period.

2. **Fine Particulate Monitoring (PM_{2.5})**

As previously discussed, PM_{2.5} is a pollutant of concern within Montana. DEQ is continuously look for opportunities to expand Montana's PM_{2.5} monitoring network using a assortment of air quality instruments which balances the need for regulatory quality NAAQS comparable data, as well as the necessity to provide quality data to the public and local health departments for general use. To this end DEQ is exploring the possible integration of lower-cost air quality sensors into the fine particulate network. A variety of sensor instrumentation are in the field under test conditions in order to gauge operation and data acquisition functionality, and to provide a comparison to current regulatory methods. DEQ will look to employ this sensor technology during the next several years.

DEQ will continue to rely on high-accuracy regulatory methods to monitor fine particulate air quality impacts, as well as its existing cache of portable monitors for use during high-impact events (i.e. wildfires) or special studies.

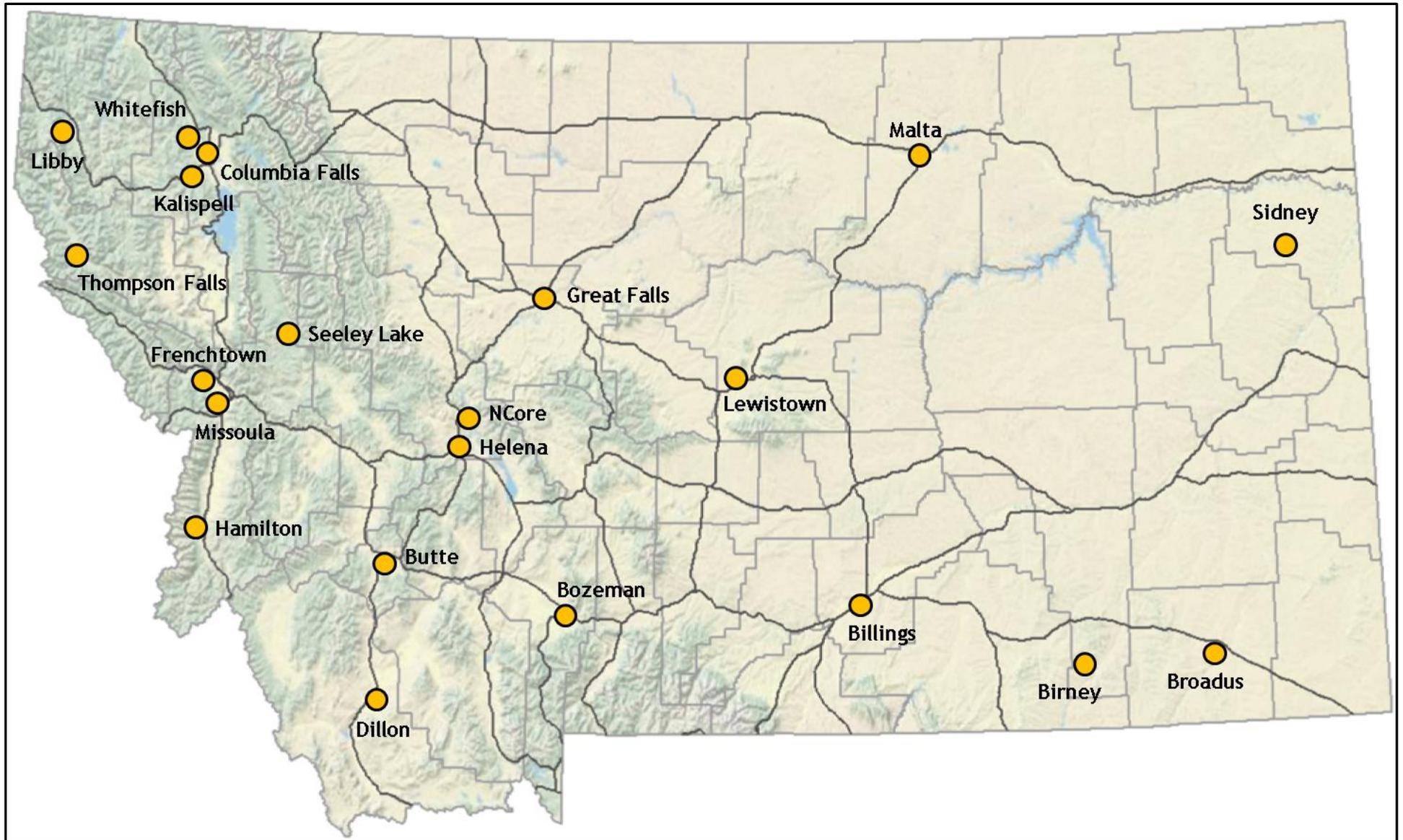
III. Appendices

Appendix A
Monitoring Site Locations

Ambient Air Monitoring Site Location Summary

AQS No.	City - Site Name	Montana Address	Longitude	Latitude	CBSA	
30-111-0066	Billings Coburn Road	Coburn Hill Rd.	-108.458780	45.786579	Metro	Billings, 13740
30-111-0087	Billings-Lockwood	2320 Old Hardin Road	-108.426551	45.806357	Metro	Billings, 13740
30-087-0001	Birney Tongue River	SR 566, 3 Miles N of Birney	-106.489820	45.366151	--	--
30-031-0019	Bozeman High School	N 15th Avenue, H.S. Parking Lot	-111.056282	45.683765	Micro	Bozeman, Gallatin County, 14580
30-075-0001	Broadus Powder River	Big Powder River Road East	-105.370283	45.440295	--	--
30-093-0005	Butte Greeley School	Alley Btwn N. Park Pl. and S. Park Pl.	-112.501247	46.002602	Micro	Butte, Silver Bow County, 15580
30-001-0003	Dillon	State Hwy 91 S. and Barrett St.	-112.642516	45.206442	--	--
30-029-0049	Flathead Valley	610 13th St West	-114.189272	48.363694	Micro	Flathead County, 28060
30-063-0037	Frenchtown Beckwith	16134 Beckwith Street	-114.224273	47.012907	Metro	Missoula, Missoula County, 33540
30-013-0001	Great Falls Overlook Park	10th Ave. S. and 2nd St. E.	-111.303317	47.494318	Metro	Great Falls, Cascade County, 24500
30-081-0007	Hamilton PS#46	Madison and 3rd St. S.	-114.158889	46.243621	--	--
30-049-0026	Helena Rossiter Pump House	1497 Sierra Rd. East	-112.013089	46.658762	Micro	Helena, 25740
30-029-0047	Kalispell Flathead Electric	E Center St. and Woodland Ave.	-114.305334	48.200540	Micro	Kalispell Area, Flathead County, 28060
30-027-0006	Lewistown	303 East Aztec Drive	-109.455315	47.048537	--	--
30-053-0018	Libby Courthouse Annex	418 Mineral Ave.	-115.552280	48.391672	--	--
30-071-0010	Malta	2309 Short Oil Road	-107.862471	48.317507	--	--
30-063-0024	Missoula Boyd Park	3100 Washburn Rd.	-114.020549	46.842297	Metro	Missoula, Missoula County, 33540
30-063-0038	Seeley Lake Elem. School	School Lane	-113.476182	47.175630	Metro	Missoula, Missoula County, 33540
30-083-0002	Sidney 201	Intersection of Hwy 201 and Cnty R 326	-104.676864	47.867900	--	--
30-049-0004	Sieben's Flat NCore	I-15 Exit 209, then Sperry Dr.	-111.987164	46.850500	Micro	Helena, 25740
30-089-0007	Thompson Falls High School	Golf and Haley	-115.323746	47.594395	--	--
30-029-0009	Whitefish Dead End	End of 10th St.	-114.335973	48.400523	Micro	Flathead County, 28060

Montana Ambient Air Quality Monitoring Sites



Appendix B
Montana Core Based Statistical Areas
(CBSAs)

CBSA definition per 40 CFR 58.1: “*Core-based statistical area (CBSA)* is defined by the U.S. Office of Management and Budget, as a statistical geographic entity consisting of the county or counties associated with at least one urbanized area/urban cluster of at least 10,000 population, plus adjacent counties having a high degree of social and economic integration. Metropolitan Statistical Areas and Micropolitan Statistical Areas (MSAs) are the two categories of CBSA (metropolitan areas have populations greater than 50,000; and Micropolitan areas have populations between 10,000 and 50,000). In the case of very large cities where two or more CBSAs are combined, these larger areas are referred to as combined statistical areas (CSAs).

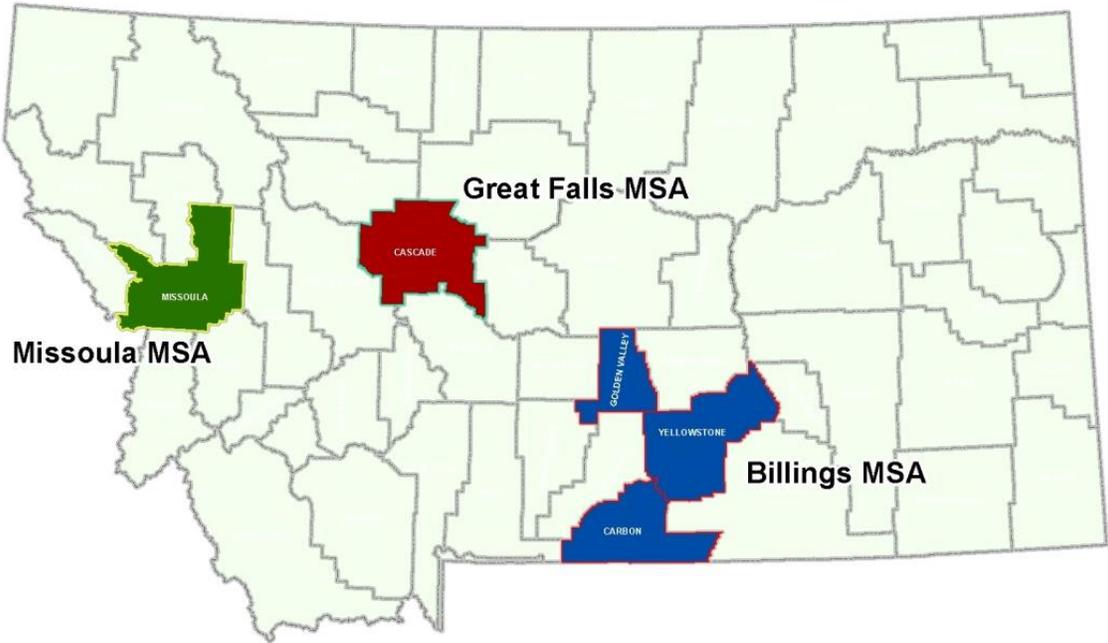
Montana Core Based Statistical Areas⁽¹⁾⁽²⁾

CBSA Code	CBSA Title	Metropolitan or Micropolitan Statistical Area	Estimated Total Population	County/County Equivalent	Estimated County Population	FIPS State Code	FIPS County Code	Central or Outlying County
13740	Billings, MT	Metro	172,846	Golden Valley County	821	30	037	Outlying
				Carbon County	10,725	30	009	Outlying
				Yellowstone County	161,300	30	111	Central
33540	Missoula, MT	Metro	119,600	Missoula County	119,600	30	063	Central
24500	Great Falls, MT	Metro	81,366	Cascade County	81,366	30	013	Central
14580	Bozeman, MT	Micro	114,434	Gallatin County	114,434	30	031	Central
28060	Kalispell, MT	Micro	103,806	Flathead County	103,806	30	029	Central
25740	Helena, MT	Micro	81,653	Jefferson County	12,221	30	043	Outlying
				Lewis and Clark County	69,432	30	049	Central
15580	Butte-Silver Bow, MT	Micro	34,915	Silver Bow County	34,915	30	093	Central

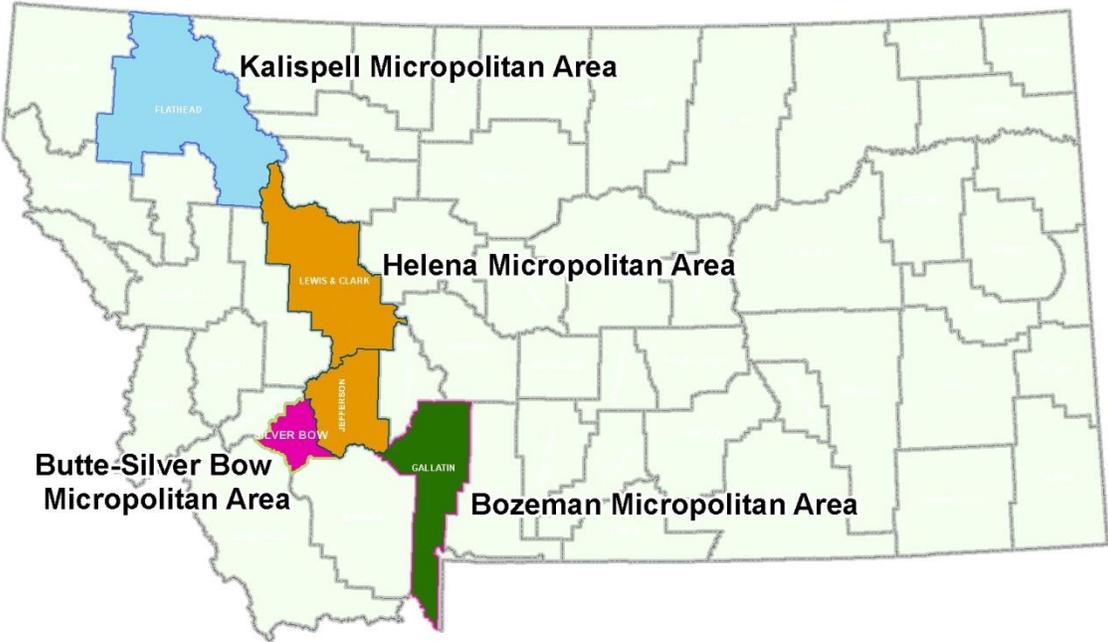
⁽¹⁾ U.S. Census Bureau, Population Division; Office of Management and Budget, Metropolitan and Micropolitan Statistical Areas.

⁽²⁾ US Census Bureau Population Estimate as of July 1, 2019.

Montana Metropolitan Statistical Areas (MSAs)



Montana Micropolitan Statistical Areas



Appendix C
Monitoring Network Summary

Ambient Air Quality Monitoring Network By Location With Proposed or Actual Changes

AQS Number	Site Name	Pollutant	Parameter - POC	Method			Frequency	Type ⁽³⁾	Spatial Scale	Monitoring Objective ⁽⁴⁾	2020 Change
				Code	Note ⁽¹⁾	PM ⁽²⁾					
30-111-0066	Billings-Coburn	SO ₂	42401-1	600	7		Continuous	SLAMS	Neigh.	H,S	none
		SO ₂ - 5 min	42406-1	600	7		Continuous	SLAMS	Neigh.	H,S	none
30-111-0087	Billings-Lockwood	PM _{2.5}	88101-3	170	8	FEM	Continuous	SPM	Neigh.	P	none
30-087-0001	Birney	NO	42601-1	574	11		Continuous	SLAMS	Regional	B	none
		NO ₂	42602-1	574	11		Continuous	SLAMS	Regional	B	none
		NO _X	42603-1	574	11		Continuous	SLAMS	Regional	B	none
		O ₃	44201-1	047	9		Continuous	SLAMS	Regional	B	none
		PM ₁₀	81102-1	150	15	FEM	Continuous	SPM NR	Neigh.	B	none
30-031-0019	Bozeman	PM _{2.5}	88502-3	731	5	Non	Continuous	SPM NR	Neigh.	P	none
30-075-0001	Broadus	NO	42601-1	574	11		Continuous	SLAMS	Regional	B	none
		NO ₂	42602-1	574	11		Continuous	SLAMS	Regional	B	none
		NO _X	42603-1	574	11		Continuous	SLAMS	Regional	B	none
		O ₃	44201-1	047	9		Continuous	SLAMS	Regional	B	none
		PM ₁₀	81102-1	150	15	FEM	Continuous	SPM NR	Neigh.	B	none
30-093-0005	Butte-Greeley	PM _{2.5}	88101-3	183	16	FEM	Continuous	SLAMS	Regional	B	none
		PM ₁₀	81102-4	122	4	FEM	Continuous	SLAMS	Neigh.	H,P	none
		PM _{2.5}	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	none
		PM _{2.5}	88101-2	116	2	FRM	1 in 6	SLAMS		QA Coll ⁽⁵⁾	none
30-001-0003	Dillon	PM _{2.5} Spc'n	Various		6		1 in 6	SLAMS ⁽⁷⁾	Neigh.	H,P	none
30-001-0003	Dillon	PM _{2.5}	88502-1	734	17	Non	Continuous	SPM NR	Neigh.	P	none
30-029-0049	Flathead Valley	PM ₁₀	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	P	none
		PM _{2.5}	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	P	none
30-063-0037	Frenchtown	PM _{2.5}	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	P	none
30-013-0001	Great Falls-OP	PM _{2.5}	88502-3	731	5	Non	Continuous	SPM NR	Middle	H,P	none
30-081-0007	Hamilton	PM _{2.5}	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	none
30-049-0026	Helena-Rossiter	PM _{2.5}	88101-3	183	16	FEM	Continuous	SLAMS	Neigh.	H,P	none
		PM _{2.5}	88101-2	116	2	FRM	1 in 6 coll ⁽⁵⁾	SLAMS		QA Coll ⁽⁵⁾	none
		PM _{2.5}	88101-4	170	8	FEM	Continuous	SPM		QA Coll ⁽⁶⁾	none
30-029-0047	Kalispell-FEC	PM ₁₀	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	H,P	none
30-053-0018	Libby	PM ₁₀	81102-1	150	15	FEM	Continuous	SLAMS	Neigh.	H,P	none
		PM _{2.5}	88101-3	183	16	FEM	Continuous	SLAMS	Neigh.	H,P	none
30-027-0006	Lewistown	NO	42601-1	599	10		Continuous	SPM	Regional	B	none
		NO ₂	42602-1	599	10		Continuous	SPM	Regional	B	none
		NO _X	42603-1	599	10		Continuous	SPM	Regional	B	none
		O ₃	44201-1	047	9		Continuous	SPM	Regional	B	none
		PM ₁₀	81102-1	150	15	FEM	Continuous	SPM NR	Neigh.	B	none
		PM _{2.5}	88101-3	183	15	FEM	Continuous	SPM	Regional	B	none
30-071-0010	Malta	NO	42601-1	599	10		Continuous	SPM	Regional	B	none
		NO ₂	42602-1	599	10		Continuous	SPM	Regional	B	none
		NO _X	42603-1	599	10		Continuous	SPM	Regional	B	none
		O ₃	44201-1	047	9		Continuous	SPM	Regional	B	none
		PM ₁₀	81102-1	150	15	FEM	Continuous	SPM NR	Neigh.	B	none
		PM _{2.5}	88101-3	183	16	FEM	Continuous	SPM	Regional	B	none
30-063-0024	Missoula-Boyd	O ₃	44201-1	047	9		Continuous	SLAMS	Neigh.	P	none
		PM ₁₀	81102-6	122	4	FEM	Continuous	SLAMS	Neigh.	H,P	none
		PM _{2.5}	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	none
30-049-0004	NCore-Sieben Flats	CO	42101-1	554	13		Continuous	NCore	Region	B	none
		NO	42601-1	674	14		Continuous	NCore	Region	B	none
		NO _y	42600-1	674	14		Continuous	NCore	Region	B	none
		O ₃	44201-1	047	9		Continuous	NCore	Region	B	none
		SO ₂	42401-1	600	14		Continuous	NCore	Region	B	none
		PM _{2.5}	88101-3	170	8	FEM	Continuous	NCore	Region	B	none
		PM _{2.5}	88101-1	116	2	FRM	1 in 3	NCore	Region	B	none
PM _{2.5} Spc'n	Various		6		1 in 3	SLAMS ⁽⁷⁾	Region	B	none		
PM _{coarse}	86101-1	185	12	FEM	Continuous	SLAMS	Region	B	none		

Continued...

Ambient Air Quality Monitoring Network By Location With Proposed or Actual Changes (continued)

AQS Number	Site Name	Pollutant	Parameter - POC	Method			Frequency	Type ⁽³⁾	Spatial Scale	Monitoring Objective ⁽⁴⁾	2020 Change
				Code	Note ⁽¹⁾	PM ⁽²⁾					
30-063-0038	Seeley Lake	PM _{2.5}	88502-3	731	5	Non	Continuous	SPM NR	Neigh.	H,P	none
30-083-0002	Sidney 201	NO	42601-1	599	10		Continuous	SLAMS	Neigh.	S	none
		NO ₂	42602-1	599	10		Continuous	SLAMS	Neigh.	S	none
		NO _X	42603-1	599	10		Continuous	SLAMS	Neigh.	S	none
		O ₃	44201-1	047	9		Continuous	SLAMS	Neigh.	S	none
		SO ₂	42401-1	600	7		Continuous	SLAMS	Neigh.	S	none
		SO ₂ - 5 min	42406-1	600	7		Continuous	SLAMS	Neigh.	S	none
		PM ₁₀	81102-1	150	15	FEM	Continuous	SLAMS	Neigh.	S	none
30-089-0007	Thompson Falls	PM ₁₀	81102-3	122	4	FEM	Continuous	SLAMS	Neigh.	H, P	none
		PM _{2.5}	88502-3	731	5	FEM	Continuous	SPM NR	Neigh.	P	none
30-029-0009	Whitefish	PM ₁₀	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	P	none

(1) Method Notes

- 1 Teledyne-API Model 300 Nondispersive infrared CO analyzer (FEM)
- 2 BGI-PQ200 with very sharp cut cyclone (FEM)
- 4 MetOne BAM 1020 Beta Attenuation Monitor (PM₁₀ FEM)
- 5 MetOne BAM 1020 Beta Attenuation Monitor with PM_{2.5} sharp cut cyclone (SCC)
- 6 MetOne / URG Speciation Air Sampling System
- 7 Teledyne-API Model T100U Ultraviolet SO₂ fluorescence (FEM)
- 8 MetOne FEM-BAM 1020 with PM_{2.5} very sharp cut cyclone Beta attenuation monitor (PM_{2.5} FEM)
- 9 Thermo Model 49i UV Photometric O₃ analyzer (FEM)
- 10 Teledyne-API Model T200U Chemiluminescence analyzer NO/NO_x/NO₂ (FRM)
- 11 Thermo Model 42i TL Chemiluminescence NO/NO_x/NO₂ analyzer (FRM)
- 12 MetOne BAM1020 PM_{10-2.5} measurement system -- Paired beta attenuation monitors (FEM)
- 13 Thermo Model 48i-TLE enhanced trace level CO analyzer
- 14 Thermo Model 42i-TLE. NO-DIF-NO_y chemiluminescent specialty trace level gas analyzer
- 15 Thermo Scientific 5014i Beta Attenuation Monitor for PM₁₀ (FEM)
- 16 Thermo Scientific, 5014i Beta Attenuation Monitor for PM_{2.5} (FEM)
- 17 MetOne E-BAM Beta Attenuation Monitor with PM_{2.5} sharp cut cyclone (SCC)

(2) Method PM Monitor Type: FEM = Federal Equivalent Method, FRM = Federal Reference Method, Non = Not FEM or FRM method

(3) Monitor Site Type:

- SLAMS : State or Local Air Monitoring Station
- SPM : Special Purpose Monitor
- QA Col: Quality Assurance, Co-located Monitor
- ID : Industrial Monitor
- NR : Non-Regulatory Data
- CSN : Chemical Speciation Network

(4) Monitoring Objective Descriptions: B = Background, H = Highest Concentration, P = Population Exposure, S = Source Impact

(5) "Coll" = collocated sampler

(6) "Continuous - Coll" = collocated continuous (BAM) sampler

(7) Network Affiliation: CSN-STN

Summary of Proposed or Actual Changes to the Existing Ambient Air Quality Monitoring Network

AQS Number	Site Name	Pollutant	Description of Change(s)	Network Plan Reference
			No changes proposed	

Appendix D
Ambient Air Quality Raw Data
Summary, Calendar Year 2019

Site	Parameter	Units	Annual Values ⁽¹⁾			Data Capture	NAAQS Comparison ⁽²⁾		NAAQS ⁽³⁾	
			Min.	Max.	Ave.		# >	# > 85%	Short-Term	Extended
Billings - Coburn Road	SO2	ppb	0	26.5	0.7	97	0	0	75	500
Billings Lockwood	PM2.5	ug/m ³	0.9	66.7	6.0	80	1	1	35	12
Birney - Tongue River	NO2	ppb	0	11	0	98	0	0	100	53
	OZONE	ppm	0.001	0.065	0.029	96	0	25	0.070	--
	PM10 STD	ug/m ³	0	91	11.2	98	0	0	150	--
	PM2.5	ug/m ³	0.2	19.0	4.30	95	0	0	35	12
Bozeman High School	PM2.5	ug/m ³	0.9	31.1	6.8	93	0	1	35	12
Broadus - Powder River	NO2	ppb	0	14	0	67	0	0	100	53
	OZONE	ppm	0.005	0.16	0.033	97	3	30	0.070	--
	PM10 STD	ug/m ³	1	116	16.7	96	0	0	150	--
	PM2.5	ug/m ³	0	27.0	5.33	97	0	0	35	12
Butte - Greeley School	PM10 STD	ug/m ³	3	69	20.1	99	0	0	35	12
	PM2.5	ug/m ³	0	30.0	5.28	98	0	1	35	12
Dillon	PM2.5	ug/m ³	0	15.0	2.38	98	0	0	35	12
Flathead Valley (Columbia Falls HS)	PM10 STD	ug/m ³	0	49	11.6	98	0	0	150	--
	PM2.5	ug/m ³	0	36.4	6.66	98	1	2	35	12
Frenchtown - Beckwith	PM2.5	ug/m ³	1.4	57.9	8.48	99	1	1	35	12
Great Falls - Overlook Park	PM2.5	ug/m ³	1.1	37.5	5.61	99	1	1	35	12
Hamilton - PS #46	PM2.5	ug/m ³	0	23.2	4.61	99	0	0	35	12
Helena - Rossiter Pump House	PM2.5	ug/m ³	0.2	53.0	8.62	99	2	8	35	12
	PM2.5 COL	ug/m ³	0.2	44.3	6.29	98	2	2	35	12
Kalispell - Flathead Electric	PM10 STD	ug/m ³	8	96	23.6	99	0	0	150	--
Lewistown - Lewistown	NO2	ppb	0	14	0	98	0	0	100	53
	OZONE	ppm	0.005	0.065	0.035	95	0	30	0.070	--
	PM10 STD	ug/m ³	0	41	7.8	98	0	0	150	--
	PM2.5	ug/m ³	0	27.8	3.8	98	0	0	35	12
Libby - Courthouse Annex	PM10 STD	ug/m ³	4	65	16.6	100	0	0	150	--
	PM2.5	ug/m ³	1.4	36.1	11.61	97	1	7	35	12
Malta - Malta	NO2	ppb	0	15	0	97	0	0	100	53
	OZONE	ppm	0.003	0.071	0.031	99	1	13	0.070	--
	PM10 STD	ug/m ³	0	33	7.5	99	0	0	150	--
	PM2.5	ug/m ³	0	19.0	4.05	100	0	0	35	12
Missoula - Boyd Park	OZONE	ppm	--	--	--	--	--	--	0.070	--
	PM10 STD	ug/m ³	2	85	17.0	98	0	0	150	--
	PM2.5	ug/m ³	0.7	26.2	7.19	98	0	0	35	12
NCore - Sieben's Flat	CO TRACE	ppb	7	728	128	84	0	0	35000	9000
	NOY	ppb	0	9.7	1.2	85	--	--	--	--
	OZONE	ppm	0	0.07	0.035	98	4	67	0.070	--
	PM10 STD	ug/m ³	0	61	7.1	96	0	0	150	--
	PM2.5	ug/m ³	0	20.9	2.30	90	0	0	35	12
	PMCOARSE	ug/m ³	0	17	3.9	87	--	--	--	--
Seeley - Elementary School	SO2	ppb	0	18.4	0.3	93	0	0	75	0.5
Sidney - 201	PM2.5	ug/m ³	0.1	48.0	10.8	99	3	8	35	12
	NO2	ppb	0	15	1	96	0	0	100	53
	OZONE	ppm	0.073	0.033	95	4	44	0.07	0.070	--
	PM10 STD	ug/m ³	0	69	9.8	95	0	0	150	--
	PM2.5	ug/m ³	0	16.8	4.50	98	0	0	35	12
Thompson Falls High School	SO2	ppb	0	14.4	0.4	95	0	0	75	500
	PM10 STD	ug/m ³	1	43	12.2	95	0	0	150	--
	PM2.5	ug/m ³	0.8	32.5	6.82	98	0	1	35	12
Whitefish - Dead End	PM10 STD	ug/m ³	3	86	18.4	99	0	0	150	--

⁽¹⁾ Based on 1-hour average values for gaseous parameters and 24-hour average for particulate. Dataset does not exclude DEQ defined flagged exceptional events.

⁽²⁾ Short-Term NAAQS standard comparison only. Comparison based on 8-hour rolling average for ozone, 1-hour average values for all other gaseous pollutants, and 24-hour average values for particulates. Comparisons are based on highest values observed and does not account for the calculated form of the standard (See Appendix G for actual NAAQS standard). Count of values above the given NAAQS are for reference only and does not necessarily indicate an exceedance of a standard occurred.

⁽³⁾ NAAQS averaging times (for reference only):

Averaging Time	CO	NO ₂	Ozone	PM _{2.5}	PM ₁₀	SO ₂
Short-term	1-hour	1-hour	--	24-hour	24-hour	1-hour
Extended	8-hour	Annual	8-hour	Annual	--	3-hour

Appendix E
PM2.5 Speciation Analytes

Teflon filters are analyzed by X-Ray Fluorescence (XRF) for 33 elements:

AQS Parameter Code	Parameter Description	AQS Parameter Code	Parameter Description
88102	Antimony (Sb)	88136	Nickel (Ni)
88103	Arsenic (As)	88140	Magnesium (Mg)
88104	Aluminum (Al)	88152	Phosphorous (P)
88107	Barium (Ba)	88154	Selenium (Se)
88109	Bromine (Br)	88160	Tin (Sn)
88110	Cadmium (Cd)	88161	Titanium (Ti)
88111	Calcium (Ca)	88164	Vanadium (V)
88112	Chromium (Cr)	88165	Silicon (Si)
88113	Cobalt (Co)	88166	Silver (Ag)
88114	Copper (Cu)	88167	Zinc (Zn)
88115	Chlorine (Cl)	88168	Strontium (Sr)
88117	Cerium (Ce)	88169	Sulfur (S)
88118	Cesium (Cs)	88176	Rubidium (Rb)
88126	Iron (Fe)	88180	Potassium (K)
88128	Lead (Pb)	88184	Sodium (Na)
88131	Indium (In)	88185	Zirconium (Zr)
88132	Manganese (Mn)		

Nylon filters are analyzed by ion chromatography (IC) for major ions:

AQS Parameter Code	Parameter Description
88203	Chloride Ion
88301	Ammonium Ion
88302	Sodium Ion
88303	Potassium Ion
88306	Total Nitrate
88403	Sulfate

Quartz filters are analyzed by the IMPROVE A thermal/optical carbon analysis for organic and elemental carbon and their fractions:

AQS Parameter Code	Parameter Description
88320	OC PM2.5 LC TOR
88321	EC PM2.5 LC TOR
88324	OC1 PM2.5 LC
88325	OC2 PM2.5 LC
88326	OC3 PM2.5 LC
88327	OC4 PM2.5 LC
88328	OP PM2.5 LC TOR
88329	EC1 PM2.5 LC

88330	EC2 PM2.5 LC
88331	EC3 PM2.5 LC
88355	OC CSN Unadj. PM2.5 LC TOT
88357	EC CSN Unadj. PM2.5 LC TOT
88370	OC CSN Unadj. PM2.5 LC TOR
88374	OC1 CSN Unadj. PM2.5 LC
88375	OC2 CSN Unadj. PM2.5 LC
88376	OC3 CSN Unadj. PM2.5 LC
88377	OC4 CSN Unadj. PM2.5 LC
88378	OP CSN Unadj. PM2.5 LC TOR
88379	OP PM2.5 LC TOT
88380	EC CSN Unadj. PM2.5 LC TOR
88381	EC PM2.5 LC TOT
88382	OC PM2.5 LC TOT
88383	EC1 CSN Unadj. PM2.5 LC
88384	EC2 CSN Unadj. PM2.5 LC
88385	EC3 CSN Unadj. PM2.5 LC
88388	OP CSN Unadj. PM2.5 LC TOT

Appendix F
**National and Montana Ambient
Air Quality Standards**

FEDERAL & STATE AIR QUALITY STANDARDS

Pollutant	Averaging Period	Federal (NAAQS)	State (MAAQs)	NAAQS Standard Type
Carbon Monoxide (CO)	1-Hour	35 ppm ^a	23 ppm ^b	Primary
	8-Hour	9 ppm ^a	9 ppm ^b	Primary
Fluoride in Forage	Monthly	NA	50 µg/g ^c	NA
	Grazing Season	NA	35 µg/g ^c	NA
Hydrogen Sulfide (H ₂ S)	1-Hour	NA	0.05 ppm ^b	NA
Lead (Pb)	Quarterly	1.5 µg/m ³ ^{c, o}	1.5 µg/m ³ ^c	NA
	Rolling 3-Month	0.15 µg/m ³ ^c	NA	Primary & Secondary
Nitrogen Dioxide (NO ₂)	1-Hour	100 ppb ^d	0.30 ppm ^b	Primary
	Annual	53 ppb ^e	0.05 ppm ^f	Primary & Secondary
Ozone (O ₃)	1-Hour	NA ^g	0.10 ppm ^b	Primary & Secondary
	8-Hour	0.070 ppm ^h	NA	Primary & Secondary
Particulate Matter ≤ 10 µm (PM ₁₀)	24-Hour	150 µg/m ³ ⁱ	150 µg/m ³ ^j	Primary & Secondary
	Annual	NA	50 µg/m ³ ^k	Primary & Secondary
Particulate Matter ≤ 2.5 µm (PM _{2.5})	24-Hour	35 µg/m ³ ^l	NA	Primary & Secondary
	Annual	12.0 µg/m ³ ^m	NA	Primary
	Annual	15.0 µg/m ³ ^m	NA	Secondary
Settleable PM	30-Day	NA	10 g/m ² ^c	NA
Sulfur Dioxide (SO ₂)	1-Hour	75 ppb ⁿ	0.50 ppm ^p	Primary
	3-Hour	0.5 ppm ^a	NA	Secondary
	24-Hour	0.14 ppm ^{a, q}	0.10 ppm ^b	Primary
	Annual	0.030 ppm ^{e, q}	0.02 ppm ^f	Primary
Visibility	Annual	NA	3 x 10 ⁻⁵ /m ^f	NA

^a Federal violation when exceeded more than once per calendar year.

^b State violation when exceeded more than once over any 12-consecutive months.

^c Not to be exceeded (ever) for the averaging time period as described in either state or federal regulation. Pb is a 3-year assessment period for attainment.

^d Federal violation when 3-year average of the 98th percentile of the daily maximum 1-hr average at each monitoring site exceeds the standard.

^e Federal violation when the annual arithmetic mean concentration for a calendar year exceeds the standard.

^f State violation when the arithmetic average over any four consecutive quarters exceeds the standard.

^g Applies only to NA areas designated before the 8-hour standard was approved in July, 1997. MT has none.

^h Federal violation when 3-year average of the annual 4th-highest daily max. 8-hour concentration exceeds standard.

ⁱ 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. (3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

^j State and federal violation when more than one expected exceedance per calendar year, averaged over 3-years.

^k State violation when the 3-year average of the arithmetic means over a calendar year at each monitoring site exceed the standard.

^l Federal violation when 3-year average of the 98th percentile 24-hour concentrations at each monitoring site exceed the standard.

^m Federal violation when 3-year average of the annual mean at each monitoring site exceeds the standard.

ⁿ Federal violation when 3-year average of the 99th percentile of the daily maximum 1-hr average at each monitoring site exceeds the standard. Final rule June 22, 2010.

^o The 1978 Pb NAAQS will remain effective until one year after designations are effective for the October 15, 2008, revised Pb NAAQS (0.15 µg/m³), except in existing Pb nonattainment areas (East Helena, MT). In East Helena, EPA will retain the 1978 Pb NAAQS until EPA approves attainment and/or maintenance demonstrations for the revised Pb NAAQS.

^p State violation when exceeded more than eighteen times in any 12 consecutive months.

^q The 1971 SO₂ NAAQS will remain effective until one year after designations are effective for the June 2, 2010, revised SO₂ NAAQS (75 ppb), except in existing SO₂ nonattainment areas (Laurel and East Helena, MT). In Laurel and East Helena, EPA will retain the 1971 SO₂ NAAQS until EPA approves attainment and/or maintenance demonstrations for the revised SO₂ NAAQS.

Appendix G
Annual SO₂ Data Requirements Rule Report

On August 10, 2015, EPA finalized the Data Requirements Rule (DRR) for the 2010 1-hour SO₂ primary NAAQS (40 CFR 51, Subpart BB). The SO₂ DRR required that air agencies identify and characterize air quality around large sources. Talen Montana, LLC's Colstrip Steam Electric Generating Station, a coal-fired power plant located in Rosebud County, was the sole source in Montana identified as applicable to the rule. As required in the rule for characterizing air quality for the primary 2010 SO₂ NAAQS, Montana DEQ submitted the appropriate designation of attainment for Rosebud County to the EPA as demonstrated through modeling on December 20, 2016. On January 9, 2018, EPA classified Rosebud County as Attainment/Unclassifiable ([40 CFR Part 81](#)).

As required in the SO₂ DRR (40 CFR 51.1205), Montana DEQ is required to submit: an annual report of SO₂ emissions at Talen Montana, LLC's Colstrip Steam Electric Generating Station; an assessment of the cause of any emission increases compared with modeled emissions; and a recommendation regarding if additional modeling is needed to ensure compliance with the rule. The following information is intended to meet those requirements.

1. Summary of Emissions

Table 1 shows a summary of the three years of actual emissions modeled for the DRR compared to 2019 actual emissions as provided by Talen Montana, LLC for each of its coal-fired.

Table 1. Emission Summary at Colstrip Steam Electric Generating Station

Modeled Emission Sources	Modeled Actual SO ₂ Emissions (tons/year)				2019 Actual SO ₂ Emissions (tons/year)	Emission Change Compared to Modeled Average
	2012	2013	2014	Average (2012-2014)		
Unit 1	2,212.03	4,109.70	2,467.51	2,929.74	1668.42	-43%
Unit 2	2,589.72	4,889.66	3,393.30	3,624.23	2117.08	-42%
Unit 3	2,144.72	2,533.16	2,057.54	2,245.14	2324.18	4%
Unit 4	2,257.88	942.34	2,303.83	1,834.68	2215.19	21%
Colstrip Total	9,204.35	12,474.86	10,222.18	10,633.79	8,324.87	-22%

2. Assessment of the Cause of Emission Increases

Annual SO₂ emissions in 2019 were lower for Unit's 1 and 2 compared to the average annual emissions used for modeling. Unit 3's 2019 emissions slightly higher than the actual 2012 and 2014 emissions. In 2019, Unit 4 emissions were higher than the actual 2013 emissions because the unit was shut down for an extended period in 2013, as noted in the modeling demonstration. Overall, emissions from Colstrip are 22 percent lower in 2019 compared to the 3-year average annual modeled emissions.

3. Recommendation Regarding Additional Modeling

Total emissions are 22 percent less than the modeled emissions; therefore, no further modeling is recommended to show compliance with the 1-hour SO₂ NAAQS.

Appendix H
Public Inspection & Comment

The 2020 Ambient Monitoring Network Plan was made available for public inspection and comment as required by 40 CFR 58.10(a)(1) on June 1, 2020.

A single response to public inspection and comment was received on June 30, 2020, by Bison Engineering (Bison), on behalf of Montana Resources. The response specifically addressed Plan elements under Section E - Lead Monitoring Criteria, pertaining to the recently triggered requirement under 40 CFR 58, Appendix D, Section 4.5 (a) which mandates ambient air monitoring for sources emitting 0.50 tpy or greater of lead. Montana Resources operates an open pit copper and molybdenum mine, and associated processing facilities, located in Butte, Montana. The source-oriented Pb monitoring requirement was triggered by Montana Resources through reported 2017 estimated Pb emissions of 1.86 tons.

Bison's comment package presented a discussion of the current and ongoing ambient Pb monitoring activities Montana Resources engaged Bison to conduct at the Greeley School in Butte, as well as an analysis and assessment of data collected to date through this monitoring project, along with perspectives offered by historic data collected by various entities. Ultimately comments points to a conclusion that sufficient scientific evidence exists to support a demonstration that Montana Resources will not contribute to a maximum Pb concentration in ambient air in excess of 50 percent of the NAAQS.

As established with Section E to this plan, DEQ is presently evaluating options to address this Pb monitoring obligation. DEQ will review the information and ascertions submitted by Bison and will incorporate into the formal plan as appropriate. The comments were received via electronic mail and are included within Appendix I to this Plan.

Appendix I
Public Comment Recieved