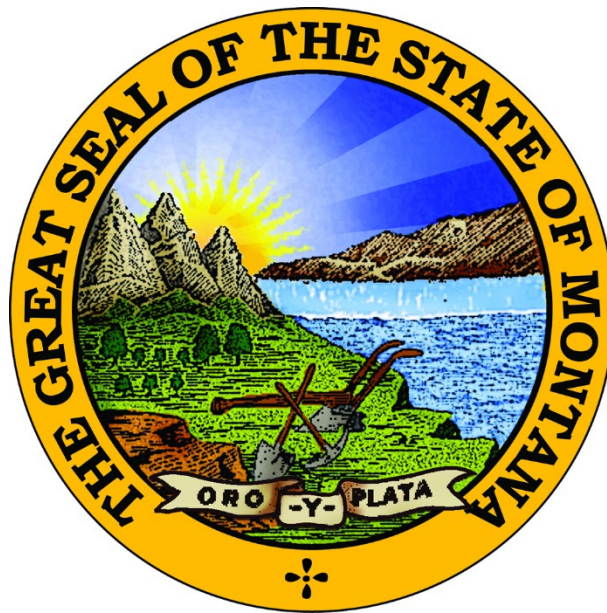


STATE OF MONTANA  
AIR QUALITY ANNUAL  
MONITORING NETWORK PLAN



July 2022

Montana Department of Environmental Quality  
Air Quality Bureau

1520 East 6<sup>th</sup> Ave  
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# Introduction

The Montana Department of Environmental Quality (DEQ), Air Quality Bureau produces an Air Quality Monitoring Network Plan (Plan) on an annual basis in accordance with the requirements of Title 40 of the Code of Federal Regulations Part 58.10 (40 CFR 58.10). The intent of this plan is to accurately describe the ambient air monitoring sites in DEQ's statewide network, identify each site's monitoring purpose, describe how the sites fulfill national Network Design Criteria requirements (40 CFR 58, Appendix D), and describe any deviations in physical characteristics or operation from regulatory requirements. The Plan also describes changes DEQ anticipates making to the network in the next year.

During Plan development, DEQ evaluates its existing ambient air monitoring network and assesses how to tailor the network based on modified data needs, changing regulatory requirements, and available resources. In addition, the development process provides an opportunity for DEQ to solicit, evaluate, and respond to comments and input from the public, county agencies, and other interested parties regarding the monitoring network.

This Plan consists of three broad sections. Section I describes the various pollutant-specific ambient air monitoring design requirements and explains how and why DEQ has implemented each as applicable. Section II describes changes to the monitoring network that DEQ is proposing to make in the following year. Section III is comprised of appendices which provide supplemental information and data in support of specific elements outlined within this Plan.

## Background

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." The Federal Clean Air Act requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants in the ambient air known as "criteria air pollutants." Criteria air pollutants are the most common air pollutants with known harmful human health effects. The six criteria pollutants are:

- Ozone (O<sub>3</sub>);
- Carbon Monoxide (CO);
- Nitrogen Dioxide (NO<sub>2</sub>);
- Sulfur Dioxide (SO<sub>2</sub>);
- Lead (Pb); and
- Particulate Matter (PM). PM concentrations of airborne materials are currently measured in two size fractions, those with an aerodynamic diameter of 10 microns and less (PM<sub>10</sub>), and those with an aerodynamic diameter of 2.5 microns and less (PM<sub>2.5</sub>). At one Montana monitoring station DEQ collects an additional PM fraction referred to as PM<sub>coarse</sub> or PM<sub>10-2.5</sub> which is the portion of PM<sub>10</sub> larger than PM<sub>2.5</sub>.

For each criteria air pollutant, NAAQS limits for ambient air have been 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 and damage to animals, crops, vegetation, and buildings. Montana has, in the past, adopted similar air quality standards known as the Montana Ambient Air Quality Standards

(MAAQS). These standards have generally, but not completely, been superseded by more stringent NAAQS. Unique, Montana-specific MAAQS for fluoride in forage, hydrogen sulfide, and settleable PM remain in place.

To determine if the NAAQS are being met, federal rules implemented by the EPA require each state to establish a network of monitors to measure concentrations of the criteria pollutants in ambient air. The design and extent of the monitoring network is based primarily on population size and density and, to a lesser degree, on measured air quality concentrations in comparison to the NAAQS. When assessing population impacts, the rules apply statistically-based definitions provided by the Office of Management and Budget and the Census Bureau summarized as “Core Based Statistical Areas” (CSBAs). The fundamental notion of a CBSA is space defined by at least one urbanized area with a surrounding population. A CBSA with at least one urbanized area of 50,000 or more people is termed a *Metropolitan* or *Metro* Statistical Area (MSA), and a CBSA with at least one urbanized cluster of 10,000 or more people is termed a *Metropolitan* or *Micro* Statistical Area. As described in Appendix B to this Plan, there are currently three designated MSAs in Montana: Billings, Missoula, and Great Falls. In addition, there are four designated Micro Statistical Areas in the state: Kalispell, Helena, Bozeman, and Butte-Silver Bow. These population-summarizing distinctions are used throughout this Plan document.

The means of assessing monitored ambient air pollution impacts is embodied in a concept referred to as a “design value.” A design value is a statistic that describes the air quality status of a given location relative to the level and form of the NAAQS. For example, if a NAAQS limit is in the form of a *three-year* average, then monitored *hourly* values cannot be statistically compared directly to that standard to determine if the ambient air quality complies with the NAAQS. To make such a comparison, hourly measurements must be statistically transformed into the same units as the NAAQS. In the example above the hourly measured values must be transformed into a three-year average (design value) so that a direct comparison may be made. Design values for each criteria pollutant are communicated in detail in 40 CFR Part 50, and are referred to throughout this Plan document.

DEQ’s overall ambient air monitoring program endeavors to continually achieve three basic monitoring objectives in conformity with 40 CFR 58 Appendix D Section 1.1:

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.

# I. Ambient Air Monitoring Requirements

The following sections summarize the ambient air monitoring requirements for each of the criteria air pollutants and explain DEQ’s implementation of those requirements.

## A. O<sub>3</sub> Monitoring Criteria

The minimum number of ozone monitors required in a network is defined by the federal Design Criteria found in 40 CFR Part 58, Appendix D. Table 1 summarizes those requirements.

**Table 1 - Minimum O<sub>3</sub> Monitoring Requirements <sup>(1)</sup>**

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

<sup>(1)</sup> From Table D-2 of Appendix D to 40 CFR Part 58.

<sup>(2)</sup> Minimum monitoring requirements apply to the metropolitan statistical area (MSA).

<sup>(3)</sup> Population based on latest available census figures.

<sup>(4)</sup> O<sub>3</sub> NAAQS levels and forms are defined in 40 CFR Part 50.

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

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

All three of Montana’s MSAs fall within the 50,000 to 350,000 population category. DEQ conducted O<sub>3</sub> monitoring in the Billings area from 2005 to 2007 (station number 30-111-0086) with a resulting 8-hour O<sub>3</sub> design value of 0.059 parts per million by volume (ppm). As listed in Appendix F, the primary and secondary NAAQS for ozone is 0.070 ppm based on a rolling 8-hour average, and 85% of that value is 0.060 ppm. The Billings design value is less than that measure, so no additional monitoring is required based on population in that MSA. In Great Falls, historical monitoring data, meteorological patterns including consistently windy conditions, and professional judgment indicate that monitoring in this MSA is not warranted given the low O<sub>3</sub> levels monitored in the two larger MSAs. At present, O<sub>3</sub> monitoring is being conducted in Missoula as representative of Montana’s three MSAs.

Beyond the monitoring efforts related to the three MSAs, DEQ has endeavored to define and track background levels of O<sub>3</sub> across Montana and to assess air quality impacts from petroleum exploration within the eastern portion of the state. In several cases, the Bureau of Land Management (BLM) has provided collaborative funding in this effort. DEQ conducts O<sub>3</sub> monitoring in Broadus (30-075-0001), Sidney (30-083-0002), Malta (30-071-0010), Lewistown (30-027-0006), and at the National Core Monitoring Site (NCore) north of Helena (30-049-0004). In addition, O<sub>3</sub> monitoring was completed at the Birney site (30-087-0001) and begun in Miles City (30-017-0005) in late 2021, as proposed and approved in DEQ’s 2021 Network Plan. Appendix A of this Plan provides a map displaying the locations of these sites.

Table 2 summarizes the 8-hour rolling average O<sub>3</sub> values measured at monitoring sites operated by DEQ during the designated 2021 ozone season (April through September). Table 3 summarizes the 8-hour O<sub>3</sub> values measured at monitoring sites operated by DEQ during the entire 2021 calendar year.

**Table 2 – 8-Hour Rolling Monitored O<sub>3</sub> Values for the 2021 Ozone Season<sup>(1)</sup>**

Station	Concentrations (ppm)			NAAQS Design Values (ppm) <sup>(2)</sup>	
	Minimum	Maximum	Average	2021	2019 – 2021
Birney <sup>(3)</sup>	0.004	0.068	0.035	0.059	0.059
Broadus	0.007	0.075	0.038	0.069	0.064
Lewistown	0.012	0.076	0.041	0.073	0.062
Malta	0.008	0.071	0.036	0.064	0.057
Missoula	0.002	0.066	0.032	0.065	0.051
NCore	0.011	0.071	0.041	0.067	0.062
Sidney	0.007	0.073	0.039	0.070	0.061

<sup>(1)</sup> Ozone Monitoring Season for Montana is April through September as established under 40 CFR Part 58, Table D-3.

<sup>(2)</sup> Design Values calculated by the US EPA Air Quality System (AQS) database.

<sup>(3)</sup> Birney operated only part of the year in 2021. Therefore, NAAQS Design Values for this station represent 2020 annual and 2018–2020 3-year values.

**Table 3 – 8-Hour Rolling Monitored O<sub>3</sub> 2021 Annual Values**

Station	Concentrations (ppm)		
	Minimum	Maximum	Average
Birney	0.002	0.068	0.032
Broadus	0.004	0.075	0.033
Lewistown	0.012	0.076	0.038
Malta	0.008	0.071	0.032
Missoula	0.00	0.066	0.026
NCore	0.011	0.071	0.038
Sidney	0.007	0.073	0.035

As demonstrated in Tables 2 and 3, minor variability has been observed in the monitored ambient O<sub>3</sub> concentrations across the state. This is particularly interesting given the spatial breadth, the significant topographic variability, and the population diversity of these sites. Collectively, the seven monitoring sites (including the 2005–2007 Billings site) are established in large populated communities, small towns, a rural oilfield, rural settings with minimal population and no industry, and a pristine background location adjacent to a federal wilderness area. This background diversity indicates that monitored O<sub>3</sub> concentrations in the ambient air across Montana represent general background levels produced principally by natural sources, stratospheric intrusion, or transported in from sources outside the state, with little anthropogenic source input from within Montana.

In recent years, the overall population of Montana has increased, with notable growth in communities outside of the three named MSAs, but currently within several of Montana’s Micropolitan Statistical Areas. DEQ will continue to observe growth patterns in these areas and assess whether additional O<sub>3</sub> monitoring sites are warranted.

Also in the interest of tracking background O<sub>3</sub> trends, DEQ anticipates installing an O<sub>3</sub> and an NO<sub>2</sub> monitor in Billings through funds made available as part of the “American Rescue Plan Direct Award for Enhancing Continuous Monitoring of PM<sub>2.5</sub> and Other NAAQS Air Pollutants” grant. The new equipment is slated for installation at the existing Lockwood monitoring site (30-111-0087) before the end of calendar year 2023.

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 O<sub>3</sub>. Montana does not contain any O<sub>3</sub> nonattainment areas, therefore PAMS monitoring is not required, nor currently conducted, in the DEQ network.

## B. 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 NO<sub>2</sub> 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<sup>(1)</sup>**

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

<sup>(1)</sup> From Appendix D to 40 CFR Part 58, Sec 4.2.1.

<sup>(2)</sup> CBSA populations are based on latest available census figures.

As documented in Appendix B to this Plan, no Montana CBSAs meet the criteria listed in Table 4, and no CO monitors are required in Montana on this basis.

Historically, 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 improved urban traffic patterns and the gradual upgrade of Montana’s vehicle fleet to newer, cleaner-burning engines, monitored CO concentrations in Montana’s ambient air were reduced and 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.

As described in Appendix F, the 1-hour NAAQS for CO is 35 ppm (35,000 parts per billion (ppb)). Table 5 summarizes the 1-hour CO values measured at the NCore monitoring site during 2021.

**Table 5 – 1-Hour Monitored CO Values for 2021 at NCore**

Station	Concentrations (ppb)		
	Min	Max	Average
NCore	0	663	151

## C. NO<sub>2</sub> Monitoring Criteria

The minimum number of NO<sub>2</sub> monitoring sites required by 40 CFR 58 Appendix D Section 4.3 is summarized in Table 6.

**Table 6 – Minimum NO<sub>2</sub> Monitoring Requirements<sup>(1)</sup>**

Requirement Type	Criteria <sup>(2)</sup>	Minimum NO <sub>2</sub> Monitors Required
Near Road Monitors	CBSA Population ≥ 1 million	1, for hourly maximum concentrations
	CBSA Population ≥ 2.5 million	1, plus the station above for a total of 2
	CBSA Population ≥ 500,000 and Road Segments with 1 or more roadway segments with annual average daily traffic counts (AADT) ≥250,000	2, as in the description above
Area-Wide Monitoring	CBSA Population ≥ 1 million	1, for expected highest area concentration
Protection of Susceptible and Vulnerable Populations	Any area inside or outside CBSAs, nation wide	As Required by EPA Regional Administrator per Appendix D Section 4.3.4.

<sup>(1)</sup> From Appendix D to 40 CFR Part 58, Sec 4.3.1.

<sup>(2)</sup> CBSA populations are based on latest available census figures.

As discussed in Appendix B, no Montana communities meet any of the population criteria listed in Table 6, and no additional NO<sub>2</sub> monitoring has been required of DEQ by the Regional EPA Administrator; therefore, no ambient NO<sub>2</sub> monitors are currently required in Montana. However, DEQ currently operates five NO<sub>2</sub> monitoring sites in an effort to determine NO<sub>2</sub> background concentrations along with potential impacts associated with the oil and gas industry in the eastern part of the state. DEQ monitors NO<sub>2</sub> at Sidney (30-083-0002) and Broadus (30-075-0001), and also monitored NO<sub>2</sub> at Birney (30-087-0001) until the late fall of 2021 when the station was moved to Miles City (30-17-0005) with EPA concurrence. In addition, DEQ monitors NO<sub>2</sub> at Malta (30-071-0010) and Lewistown (30-027-0006) in partnership with the BLM.

As described in Appendix F, the 1-hour NAAQS for NO<sub>2</sub> is 100 ppb. Table 7 summarizes the 1-hour NO<sub>2</sub> values measured at monitoring sites operated by the DEQ during 2021.

**Table 7 – 1-Hour Monitored NO<sub>2</sub> Values for 2021**

Site	Concentrations (ppb)			NAAQS Design Values (ppb) <sup>(1)</sup>	
	Min	Max	Average	2021	2019 – 2021
Birney <sup>(2)</sup>	0	17.0	0.9	6.0	6
Broadus	0	14.0	0.9	10.0	10
Lewistown	0	18.0	0.8	9.0	11
Malta	0	17.0	0.7	8.0	7
Sidney	0	14.0	1.1	11.0	10

<sup>(1)</sup> Design Values calculated by the USEPA Air Quality System database.

<sup>(2)</sup> The Birney station operated only part of the year in 2021. Therefore, NAAQS Design Values for this station represent 2020, and the 2018 – 2020 design value period.

As detailed in Section II of this Plan, upon receipt of anticipated “American Rescue Plan Direct Award for Enhancing Continuous Monitoring of PM<sub>2.5</sub> and Other NAAQS Air Pollutants” funds, DEQ is planning to install a new NO<sub>2</sub> and a new O<sub>3</sub> monitor in Billings. The new NO<sub>2</sub> analyzer is slated for installation at the existing Lockwood monitoring site (30-111-0087) before the end of calendar year 2023.



## D. SO<sub>2</sub> Monitoring Criteria

The minimum number of SO<sub>2</sub> monitoring sites required by 40 CFR 58 Appendix D Section 4.4 is summarized within Table 8.

**Table 8 – Minimum SO<sub>2</sub> Monitoring Requirements<sup>(1)</sup>**

Requirement Type	Criteria	Minimum SO <sub>2</sub> Monitors Required
Population Weighted Emissions Index (PWEI <sup>(2)(3)</sup> )	≥1,000,000	3
	<1,000,000 - ≥100,000	2
	<100,000 - ≥5,000	1

<sup>(1)</sup> From Appendix D to 40 CFR Part 58, Sec. 4.4.2.

<sup>(2)</sup> CBSA populations based on latest available census figures.

<sup>(3)</sup> CBSA PWEI means Core Based Statistical Area Population Weighted Emissions Index.

The EPA criteria used to determine the number of required SO<sub>2</sub> monitors is similar to other pollutants but requires additional statistical formulations for analyzing population/pollution impacts. Two metrics are used in this analysis: 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 SO<sub>2</sub> emitted in the county using the most recent aggregated emissions data available in the National Emissions Inventory (NEI); divided by 1,000,000). Billings is the only CBSA in Montana where SO<sub>2</sub> monitoring could potentially be required based on these prescribed metrics. Table 9 summarizes the current PWEI for the Billings CBSA using the latest published NEI values.

**Table 9 – Billings CBSA PWEI Calculation**

Population <sup>(1)</sup> (a)	Reported Emission <sup>(2)</sup> (b)	PWEI <sup>(3)</sup> (c)
187,037	4797.52	897.31

<sup>(1)</sup> US Census Bureau Population Estimate as of July 1, 2021.

<sup>(2)</sup> Aggregate tons of SO<sub>2</sub> per 2017 National Emissions Inventory for Yellowstone, Golden Valley and Carbon Counties (the Billings MSA).

<sup>(3)</sup> PWEI (c) = a x b/1,000,000.

SO<sub>2</sub> monitoring is triggered within a CBSA when the calculated PWEI value is equal to or greater than 5,000 as reflected in Table 8. Based on the prescribed criteria, neither Billings nor any of the other Montana CBSAs present an SO<sub>2</sub> PWEI that approaches or exceeds 5,000. Based on this criterion, no DEQ SO<sub>2</sub> monitoring is required.

DEQ continues to operate one long-term SO<sub>2</sub> monitor at the Coburn Road site in Billings (30-111-0066) as part of the approved Maintenance Plan (81 FR 28718, Re-designation Request and Associated Maintenance Plan for Billings, MT 2010 SO<sub>2</sub> Nonattainment Area) to provide an on-going assessment of SO<sub>2</sub> compliance in the Billings area. The Coburn Road site, located within the former Yellowstone County (partial) SO<sub>2</sub> 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 SO<sub>2</sub> monitor at the Sidney site (30-083-0002) to assess impacts from oil and gas production in eastern Montana, and one trace-level background SO<sub>2</sub> monitor at the NCore station (30-049-0004). Section I.H describes NCore monitoring.

As described in Appendix F, the 1-hour NAAQS for SO<sub>2</sub> is 75 ppb. Table 10 summarizes the 1-hour values measured at the SO<sub>2</sub> monitoring sites operated by DEQ during 2021.

**Table 10 – 1-Hour Monitored SO<sub>2</sub> Values for 2021**

Site	Concentrations (ppb)			NAAQS Design Values (ppb) <sup>(1)</sup>	
	Min	Max	Average	2021	2019 - 2021
Billings - Coburn Road	0	28.7	1.1	20	19
NCore - Sieben's Flat	0	2.5	0.5	1	2
Sidney	0	6.2	0.1	5	7

<sup>(1)</sup> Design Values are calculated by the USEPA Air Quality System (AQS) database.

## E. Pb Monitoring Criteria

The minimum number of Pb monitoring sites required by 40 CFR 58 Appendix D Section 4.5 is summarized within Table 11.

**Table 11 – Minimum Pb Monitoring Requirements<sup>(1)</sup>**

Criteria	Minimum Number of Pb Monitors Required
Non-Airport Source emitting ≥ 0.5 tons of Pb per year	1 each
Airport Source emitting ≥ 1.0 tons of Pb per year	1 each

<sup>(1)</sup> From Appendix D to 40 CFR Part 58, Sec 4.5(a)

The requirements in Appendix D to 40 CFR Part 58, Section 4.5(a) specify that lead emissions assessments for monitoring determination be based on either “the most recent National Emission Inventory (NEI) or other scientifically justifiable methods and data (such as improved emissions factors or site-specific data) taking into account logistics and the potential for population exposure.” The most recent NEI (from 2017) indicates that no airports in Montana emitted more than the 1.0 tons per year of Pb, and that only one non-airport source in the state emitted more than the 0.5 tons per year of Pb. Montana Resources operates an open pit copper and molybdenum mine and associated processing facilities in Butte, Montana. The source-oriented Pb monitoring requirement was triggered by Montana Resources through reported estimated Pb emissions of 1.86 tons, as presented in the 2017 National Emission Inventory.

PM has been monitored in Butte over the years since 1962, and has consistently demonstrated that results obtained from the Butte-Greeley (30-093-0005) station are representative of the highest local PM concentrations for all size fractions. DEQ, as well as other entities, have monitored for Pb in Total Suspended Particulate (TSP) concentrations at various locations within the Butte community since the 1970s. Montana Resources has recently contracted Bison Engineering, Inc. (Bison) to conduct independent ambient air monitoring for Pb and other particulate matter constituents. Bison has conducted TSP Pb monitoring at the Greeley site since March 2019; and sampling is still underway in 2022. Samples are collected on a schedule which calls for continuous collection of airborne PM for approximately six days per sample in an attempt to sample more days than that prescribed by the Federal Reference Method. Table 12 provides a summary of the Pb results obtained for March 2019 through the end of 2021.

**Table 12 – Summary of Montana Resources Greeley Site Pb Results**

Mean of Sample Results ( $\mu\text{g}/\text{m}^3$ ) <sup>(1)</sup>	Number of Samples	Non-Detect Threshold ( $\mu\text{g}/\text{m}^3$ )	Samples Below Analysis Detectable Threshold (percent)	Mean of Samples as 3-month Averages ( $\mu\text{g}/\text{m}^3$ ) <sup>(2)</sup>
0.010	149	.0055	74	0.0061

<sup>(1)</sup> Samples analyzed and found to be below the detectable level of the laboratory method were reported as a value one-half of the detection limit, thus no results of zero were reported.

<sup>(2)</sup> Per the Pb NAAQS (40 CFR 50.16)

The NAAQS for Pb established in 40 CFR 50.16 is 0.15 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), arithmetic mean concentration over a 3-month period.

Preliminary examination of the data collected by Bison on behalf of Montana Resources provides reliable credible evidence of low Pb concentration levels in the ambient air in Butte. These concentrations do not approach or exceed the monitoring threshold of 50 % of the NAAQS value. The sampling strategy, although robust in principle, does not follow the Federal Reference Method for Pb monitoring. Further evaluation of the existing Butte Pb data will be conducted in the coming months. DEQ will then work with EPA and Montana Resources to define an appropriate path forward with regard to future Pb monitoring in Butte.

## F. PM<sub>10</sub> Monitoring Criteria

The approximate minimum number of permanent PM<sub>10</sub> monitoring sites required by 40 CFR 58 Appendix D Section 4.6 is shown in Table 13.

**Table 13 - Minimum PM<sub>10</sub> Monitoring Requirements<sup>(1)</sup>**

Population category	Number of Monitors per MSA <sup>(1)</sup>		
	High concentration <sup>(2)</sup>	Medium concentration <sup>(3)</sup>	Low concentration <sup>(4)(5)</sup>
>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

<sup>(1)</sup> 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.

<sup>(2)</sup> High concentration areas are those for which data exceeds the PM<sub>10</sub> NAAQS by 20 percent or more.

<sup>(3)</sup> Medium concentration areas are those for which data exceeds 80 percent of the PM<sub>10</sub> NAAQS.

<sup>(4)</sup> Low concentration areas are those for which data is less than 80 percent of the PM<sub>10</sub> NAAQS.

<sup>(5)</sup> The low concentration requirements are the minimum which apply in the absence of a design value.

Currently all MSAs in Montana are within the lowest population category and have historically consistently demonstrated measured PM<sub>10</sub> concentrations in either the low or medium categories in Table 13. Therefore, the present PM<sub>10</sub> network, as described below, satisfies the PM<sub>10</sub> network design criteria.

DEQ operates PM<sub>10</sub> monitors in seven areas previously designated as nonattainment for the 24-hour PM<sub>10</sub> NAAQS. This monitoring is required by EPA to demonstrate the adequacy of Montana’s PM<sub>10</sub> control or maintenance plans for those areas which have been re-designated to a NAAQS attainment status. 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 PM<sub>10</sub> monitors in several areas to define and track background concentrations and spatial distribution of this pollutant within the state of Montana. These areas

include Sidney (30-083-0002), Broadus (30-075-0001), Malta (30-071-0010) and Lewistown (30-027-0006). DEQ also monitored PM<sub>10</sub> at Birney (30-087-0001) until the late fall of 2021 when the station was moved with EPA concurrence to Miles City (30-17-0005).

As described in Appendix F, the 24-hour NAAQS for PM<sub>10</sub> is 150 µg/m<sup>3</sup>. Table 14 summarizes the 24-hour average values measured at PM<sub>10</sub> monitoring sites operated by DEQ in 2021.

**Table 14 – 24-Hour Average Monitored PM<sub>10</sub> Values for 2021<sup>(1)</sup>**

Site	Concentration (µg/m <sup>3</sup> )			NAAQS Comparison		
	Min	Max	Average	AQS Estimated Exceedances <sup>(2)</sup>		3-Year DV Est. Concentration <sup>(3)</sup>
				2021	3-Year	
Birney <sup>(4)</sup>	0	120	22	--	--	--
Broadus <sup>(4)</sup>	0	137	30	--	--	--
Butte	0	116	22	0	0	116
Flathead Valley	7	100	28	0	0.4	91
Kalispell	7	100	28	0	1	131
Lewistown	1	80	12	0	0	78
Libby	4	100	20	0	1	131
Malta	0	198	13	1	0.7	145
Missoula	1	91	17	0	0	123
Sidney - 201	1	75	11	0	0	58
Thompson Falls	10	178	26	2.1	0.7	168
Whitefish	1	96	25	0	0	136

<sup>(1)</sup> Dataset includes all values (flagged exceptional events included).

<sup>(2)</sup> PM<sub>10</sub> Design Values are in the form of numbers of estimated exceedances as calculated by the US EPA Air Quality System (AQS) database in accordance with the procedure in 40 CFR 50 Appendix K.

<sup>(3)</sup> Based on PM<sub>10</sub> SIP Development Guideline-Table Look-up Method (EPA Table 6-1).

<sup>(4)</sup> These monitors are non-Federal Equivalent Method (non-FEM) monitors operated for informational purpose only and are not certified to produce NAAQS-comparison data.

## G. PM<sub>2.5</sub> Monitoring Criteria

The minimum number of PM<sub>2.5</sub> monitoring sites required by 40 CFR 58 Appendix D Section 4.7 is shown in Table 15.

**Table 15 – Minimum PM<sub>2.5</sub> Monitoring Requirements<sup>(1)</sup>**

MSA population <sup>(2)</sup>	Number of Monitors per MSA	
	Most recent 3-year design value ≥85% of any PM <sub>2.5</sub> NAAQS <sup>(3)</sup>	Most recent 3-year design value <85% of any PM <sub>2.5</sub> NAAQS <sup>(3)(4)</sup>
>1,000,000	3	2
500,000 - 1,000,000	2	1
50,000 - <500,000	1	0

<sup>(1)</sup> From Table D-5 of Appendix D to 40 CFR Part 58. Minimum monitoring requirements per MSA.

<sup>(2)</sup> Population based on latest available census figures.

<sup>(3)</sup> PM<sub>2.5</sub> NAAQS levels and forms are defined in 40 CFR part 50.

<sup>(4)</sup> These minimum monitoring requirements apply in the absence of a design value.

As described in Appendix B of this Plan, Montana’s three current MSAs (Billings, Missoula, and Great Falls) all fall into the smallest population category listed in Table 15. As described in Appendix F, the annual mean and 3-year 24-hour 98<sup>th</sup> percentile NAAQS for PM<sub>2.5</sub> are 12.0 and 35 µg/m<sup>3</sup>, respectively. The 85% value for those limits are 10.2 and 29.75 µg/m<sup>3</sup>. For the most recent 3-year design period, only the Missoula MSA exceeded an 85% threshold as reflected in Table 16,

thus one PM<sub>2.5</sub> monitor is required in Missoula. No other PM<sub>2.5</sub> monitors or near-road PM<sub>2.5</sub> monitors are required within any community in Montana based on the current criteria.

Because PM<sub>2.5</sub> is a pollutant of significant concern within Montana, DEQ's PM<sub>2.5</sub> monitoring network goes well beyond the minimum requirements as specified in Table 15. DEQ, in partnership with several county air quality programs, operate PM<sub>2.5</sub> monitors in various locations statewide to inform the public of potential PM<sub>2.5</sub>-related health impacts during both winter inversions and summer wildfire events, to demonstrate continuing NAAQS compliance, and to inform various health departments' PM<sub>2.5</sub> control strategies.

DEQ continues to operate a PM<sub>2.5</sub> monitor in the community of Libby as required by EPA to demonstrate the adequacy of Montana's PM<sub>2.5</sub> maintenance plan resulting from the re-designation of this area from nonattainment to attainment for the 24-hour PM<sub>2.5</sub> NAAQS. In addition, DEQ operates PM<sub>2.5</sub> monitors in Sidney (30-083-0002), Broadus (30-075-0001), Malta (30-071-0010), Lewistown (30-027-0006), and at its NCore site (30-049-0004, see Section I.H.) to further define background concentrations and spatial distribution of this pollutant within the state of Montana. DEQ monitored PM<sub>2.5</sub> at Birney (30-087-0001) for this purpose until the late fall of 2021 when the station was moved with EPA concurrence to Miles City (30-17-0005). DEQ also operates multipurpose community-based PM<sub>2.5</sub> 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 Lake (30-063-0038).

Table 16 summarizes the 24-hour average values along with the annual and 24-hour NAAQS design values measured at the PM<sub>2.5</sub> monitoring sites operated by DEQ during 2021.

**Table 16 – 24-Hour Average Monitored PM<sub>2.5</sub> Values for 2021<sup>(1)</sup>**

Site	Concentration (µg/m <sup>3</sup> )			NAAQS Design Values (µg/m <sup>3</sup> )		
				2021	2019 - 2021	
	Min	Max	Average	98 <sup>th</sup> Percentile	24-hour	Annual
Billings – Lockwood	1.9	78.2	10.2	37.8	26	7.7
Birney	0	60.5	9.6	45.4	30	6.7
Bozeman <sup>(2)</sup>	0.8	65.7	10.5	--	--	--
Broadus	0.6	57.8	9	37.8	27	7.5
Butte	0	72.5	9.7	48.9	37	7.0
Dillon <sup>(2)(3)</sup>	0	65	5	--	--	--
Flathead Valley	0	61.5	7.8	37.4	33	7.1
Frenchtown	2.3	65.9	10.8	49.1	34	9.3
Great Falls <sup>(2)</sup>	0.5	68	7.8	--	--	--
Hamilton	0	67.6	9.1	51.4	35	6.5
Helena-Rossiter	0.8	56.8	9.3	44.3	33	8.5
Lewistown	0	63.2	6.6	40.5	25	5.0
Libby	0.4	92.7	14.6	52.9	43	13.3
Malta	0	53.8	6.7	32.5	23	5.5
Missoula	0	61.2	7.8	43.2	32	7.5
NCore	0	63	5.9	42.1	25	3.7
Seeley <sup>(2)</sup>	0.7	70.5	15.4	--	--	--
Sidney - 201	0	54	6.2	30.3	18	5.0
Thompson Falls <sup>(2)</sup>	1.7	131.9	12.4	--	--	--

<sup>(1)</sup> Dataset includes all values (exceptional events included).

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

<sup>(3)</sup> Data is not currently reported to AQS.

The PM<sub>2.5</sub> monitoring criteria in 40 CFR 58 Appendix D contains three additional 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<sub>2.5</sub> monitoring sites (per Table 15, 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, only one PM<sub>2.5</sub> monitor is required by federal Monitoring Network Design Criteria to be operated in any Montana community. That monitor, in Missoula, is a continuous, FEM instrument. In addition, PM<sub>2.5</sub> is a significant pollutant in Montana, and impacts from summer wildfires, prescribed burning and wintertime inversions have established a strong demand for continuous, near-real time PM<sub>2.5</sub> data for assessing and communicating public health impacts as well as determining NAAQS compliance. To meet this need, DEQ’s PM<sub>2.5</sub> network is comprised solely of continuous monitors. However, DEQ also operates an appropriate number of FRM monitors to meet quality assurance (QA) requirements for collocation and validation purposes network-wide.

Second, 40 CFR 58 Appendix D, Section 4.7.3 requires each state to install and operate at least one PM<sub>2.5</sub> site to monitor for regional background and at least one PM<sub>2.5</sub> site to monitor regional transport. DEQ previously designated the Sidney-201 station (030-083-002) as a background and regional transport site for the State of Montana. In response to DEQ’s 2021 Network Plan, EPA questioned whether the Sidney site conforms to national siting guidance for sites designated to comply with the Section 4.7.3 requirement. DEQ proposes the establishment of its NCore site (30-049-004) as a background and regional transport site for Montana, and anticipates further discussion with EPA on this matter.

Finally, 40 CFR, Appendix D, Section 4.7.4 requires that each state continue to conduct PM<sub>2.5</sub> chemical speciation monitoring at locations designated to be part of the national Speciation Trends Network (STN) and 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.

As discussed in Section II of this Plan, DEQ continually assesses its PM<sub>2.5</sub> monitoring network to determine suitability and needs. For 2022 and beyond DEQ intends to place particular emphasis on community-scale monitoring in Montana's historically underserved and at-risk populations. DEQ anticipates an expansion of its PM<sub>2.5</sub> monitoring/sensing capabilities over the next several years, particularly if federal grant funds become available to support this effort.

## **H. 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<sub>2.5</sub>, speciated PM<sub>2.5</sub>, PM<sub>10-2.5</sub>, O<sub>3</sub>, SO<sub>2</sub>, CO, NO (nitric oxide), NO<sub>y</sub> (a range of nitrogen oxide compounds), 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. Montana's NCore site (Sieben's Flat, 30-049-0004) was established in late 2010. Data is continuously being acquired from all required monitors.

As noted above, the monitoring directives in 40 CFR Appendix D Section 4.8.1 contain specific requirements for the operation of monitors for PM<sub>10-2.5</sub> (PM<sub>Coarse</sub>) 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**

DEQ designs its network and operates its air monitoring sites in compliance with EPA's national requirements for ambient air monitoring sites (40 CFR Part 58, Appendices A, C, D and E). Within DEQ's network there are two sites that do not meet all the siting requirements of 40 CFR Part 58, Appendix E. First, the Hamilton PM<sub>2.5</sub> site (30-081-0007) 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 DEQ.

Second, two PM<sub>10</sub> monitors located in eastern Montana as elements of the Broadus (30-075-0001) and Birney (3-087-0001) sites were established to define background concentrations of this pollutant on a neighborhood or broader scale. Each of these sites is in a remote region, and because of logistic necessity, was located near unpaved gravel roads traveled by ranching and agricultural equipment. As a result, the monitors are unduly influenced by dust generated by that road traffic and are not appropriately representing background PM<sub>10</sub> concentrations in their intended scaled scope. However, because the two sites provided desirable spatial and regional representation, DEQ found value in continuing to operate them. Consequently, in its 2012

Network Plan DEQ proposed to designate the PM<sub>10</sub> 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. As indicated throughout this Plan document, the Birney site was closed down by DEQ and moved to Miles City in the late fall of 2021 as proposed and approved in DEQ's 2021 Plan. The Broadus PM<sub>10</sub> monitor continues to operate under the conditions and designation described above. All the monitors in Miles City, including PM<sub>10</sub>, are operated under a SLAMS designation.

## **2. PM<sub>2.5</sub> Spatial Scales and Monitoring Methods**

Data from PM<sub>2.5</sub> monitoring sites with spatial scales designated as smaller than “neighborhood” is generally not used for PM<sub>2.5</sub> NAAQS compliance review purposes in DEQ's network. Currently, the only PM<sub>2.5</sub> site in the Montana network of this nature is the Overlook Park station in Great Falls (30-013-0001) which is designated a “middle” range spatial scale remaining from historical monitoring purposes.

The network description table in Appendix C indicates a notation of the monitor classification for all PM<sub>2.5</sub> monitors operated by DEQ in the column labeled “PM”. Monitors designated as Federal Reference Method or equivalent (FRM or FEM) generate data suitable for determining compliance with the PM<sub>2.5</sub> NAAQS. In addition, DEQ has historically operated non-FEM PM<sub>2.5</sub> monitoring equipment for general information purposes and will continue to do so. These monitors are classified as “Non” in the “PM” column of Appendix C.

## **3. Quality Assurance Project Plan (QAPP)**

Federal rules and associated guidance establish a significant and appropriate system of quality requirements and direction with respect to ambient monitoring; 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. DEQ is scheduled to update its QAPP in 2022.



## II. Proposed Changes to the Monitoring Network

### A. Introduction

DEQ regards the requirement to develop and submit an Annual Network Plan as an opportunity to review its 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, revisions to the NAAQS and monitoring rules, and the needs of Montana's population to receive appropriate and timely information related to ambient air quality impacts. Based on that breadth of understanding, DEQ attempts to balance monitoring requirements and needs against available resources. In addition, DEQ completes periodic Network Assessments in accordance with 40 CFR 58.10(d). The last Network Assessment was completed in 2020.

Depending on the immediacy of the need for program changes, near-term network modifications are typically proposed in the Annual Network Plan, while longer-term or broader impact evaluation and direction of DEQ's air quality surveillance system is addressed within the periodic Network Assessment. DEQ also anticipates occasional changes to the focus and direction of Montana's Air Monitoring Network in response to federal rulemaking and nation-wide policy direction; and resulting modification proposals follow in an appropriate time window.

Montana DEQ anticipates the following potential changes to its air monitoring network for the 2022 planning period.

### B. Lockwood O<sub>3</sub> and NO<sub>2</sub>

As referenced in Sections I.A. and I.C. above, DEQ applied for and has received initial approval for an EPA direct grant in support of enhanced monitoring. One component of the application for this grant included DEQ's plan for installing new NO<sub>2</sub> and O<sub>3</sub> monitors in Billings. That network change has received EPA approval in the grant review process, and the equipment is slated for installation at the existing Billings-Lockwood monitoring site (30-111-0087) as soon as funding and equipment are available; hopefully before the end of calendar year 2023.

### C. Ongoing and Future Network Changes

#### 1. **PM<sub>10</sub> Monitoring**

As part of an overall assessment of particulate matter impacts and monitoring needs, DEQ will be evaluating its PM<sub>10</sub> network. The outcome of that assessment could result in proposed network changes in the 2023 Network Plan.

#### 2. **PM<sub>2.5</sub> Monitoring**

Because PM<sub>2.5</sub> continues to be the pollutant of greatest concern in Montana, DEQ is continuously looking for opportunities to enhance Montana's PM<sub>2.5</sub> monitoring network to better capture PM<sub>2.5</sub> impacts and trends in the state. DEQ is particularly focused on better communication of potential PM<sub>2.5</sub>-related health impacts to all of Montana's citizens, especially those living in underserved communities and in at-risk populations. The "American Rescue Plan Direct Award for Enhancing Continuous Monitoring of PM<sub>2.5</sub> and Other NAAQS Air Pollutants" grant referenced in sections I.A., C., and G. includes funding for equipment that would modify and enhance DEQ's PM<sub>2.5</sub> monitoring network. New equipment approved by EPA in the grant process includes the

replacement of non-FEM E-BAM (portable Environmental Beta-Attenuation Mass Monitor) PM<sub>2.5</sub> instruments in Dillon, Cut Bank, and Havre with FEM E-BAM instrumentation. Also as part of DEQ's anticipated award, new FEM E-BAM sites will be established in Chouteau, Glendive and Glasgow; and a new non-FEM E-BAM site will be established in Eureka, Montana. DEQ plans to begin uploading data from the new FEM instruments to AQS, AirNow, and Montana's Today's Air website by January 1, 2024. The E-BAM at Eureka will provide data to Today's Air and AirNow by that same planned deadline.

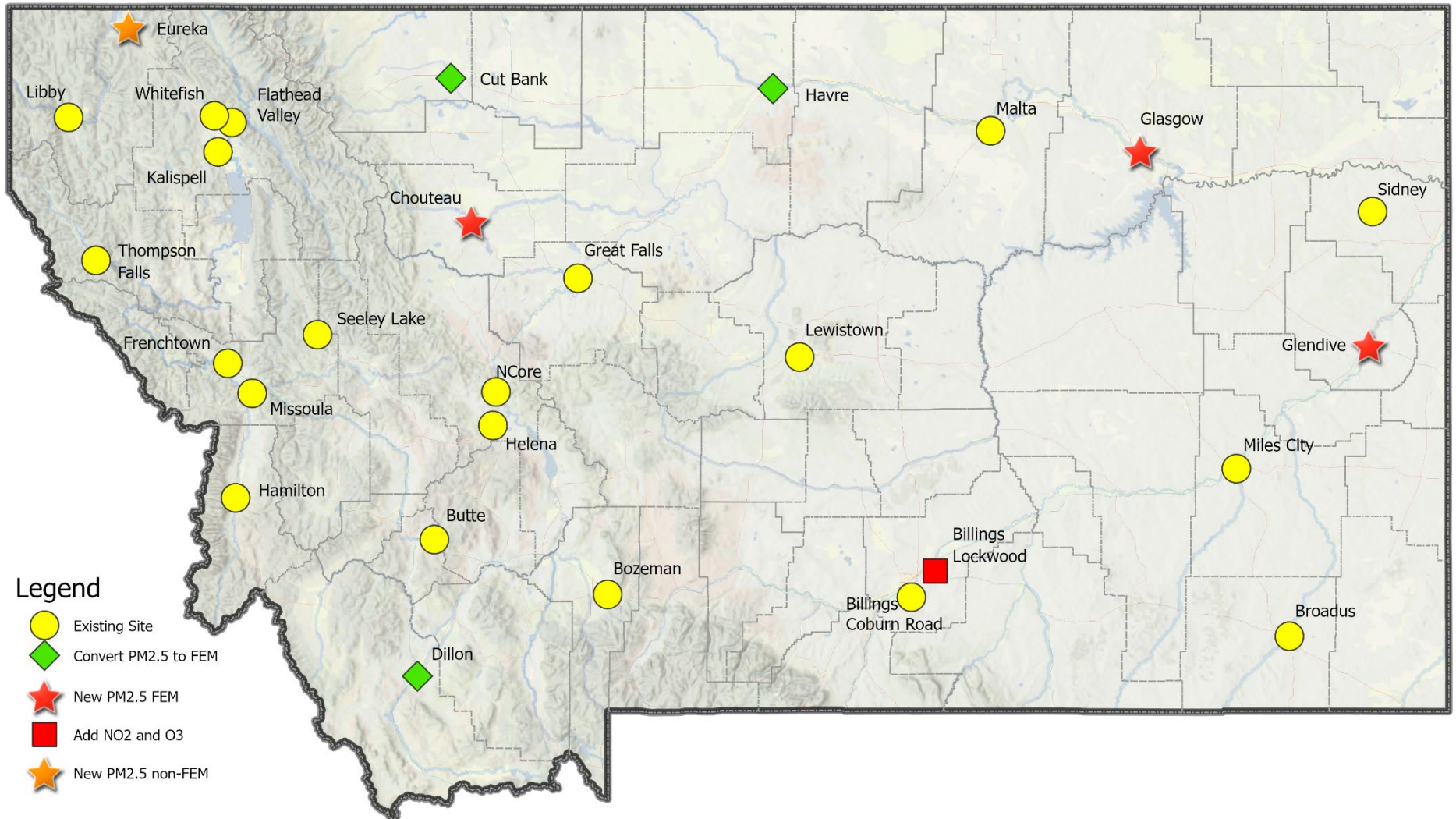
In addition, DEQ has submitted an "Enhanced Air Quality Monitoring for Communities Grant" application to the EPA. DEQ's proposal aims to address spatial limitations in its existing PM<sub>2.5</sub> network by installing additional monitoring stations and sensors in key locations, particularly in communities where air quality information is not currently available. DEQ's grant application includes proposals for six additional FEM E-BAMs, 13 non-FEM E-BAMs, and 164 personal PM<sub>2.5</sub> sensors. This proposal describes a path for transforming Montana's air quality network in a way that is practical, maintainable, and scalable for the future. The result would be a monitoring network that serves more numerous and more diverse communities in our expansive state. The application process has helped formalize DEQ's PM<sub>2.5</sub> network goals and the proposal will serve as a roadmap for future years, whether the project is funded through this opportunity or not.

### III. Appendices

## Appendix A

### Monitoring Site Locations

# Montana Ambient Air Quality Monitoring Sites



## Current Ambient Air Monitoring Site Location Summary

AQS No.	City - Site Name	Montana Address	Longitude	Latitude	CBSA	
					Designation	Name and ID Number
30-111-0066	Billings Coburn Road	Coburn Hill Rd.	-108.45878	45.786579	Metro	Billings, MT, 13740
30-111-0087	Billings-Lockwood	2320 Old Hardin Road	-108.426551	45.806357	Metro	Billings, MT, 13740
30-031-0019	Bozeman High School	N 15th Avenue, H.S. Parking Lot	-111.056282	45.683765	Micro	Bozeman, MT, 14580
30-075-0001	Broadus Powder River	Big Powder River Road East	-105.370283	45.440295	--	--
30-093-0005	Butte Greeley School	Alley Between N. Park Pl. and S. Park Pl.	-112.501247	46.002602	Micro	Butte-Silver Bow, MT, 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	Kalispell, MT, 28060
30-063-0037	Frenchtown Beckwith	16134 Beckwith Street	-114.224273	47.012907	Metro	Missoula, MT, 33540
30-013-0001	Great Falls Overlook Park	10th Ave. S. and 2nd St. E.	-111.303317	47.494318	Metro	Great Falls, MT, 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, MT, 25740
30-029-0047	Kalispell Flathead Electric	E Center St. and Woodland Ave.	-114.305334	48.20054	Micro	Kalispell, MT, 28060
30-027-0006	Lewistown	303 East Aztec Drive	-109.455315	47.048537	--	--
30-053-0018	Libby Courthouse Annex	418 Mineral Ave.	-115.55228	48.391672	--	--
30-071-0010	Malta	2309 Short Oil Road	-107.862471	48.317507	--	--
30-017-0005	Miles City-Pine Hills	3710 Leighton Blvd	-105.81264	46.41141		
30-063-0024	Missoula Boyd Park	3100 Washburn Rd.	-114.020549	46.842297	Metro	Missoula, MT, 33540
30-063-0038	Seeley Lake Elem. School	School Lane	-113.476182	47.17563	Metro	Missoula, MT, 33540
30-083-0002	Sidney 201	Intersection of Hwy 201 and County R 326	-104.676864	47.8679	--	--
30-049-0004	Sieben's Flat NCore	I-15 Exit 209, then Sperry Dr.	-111.987164	46.8505	Micro	Helena, MT, 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	Kalispell, MT, 28060
Temporary	Havre	3 <sup>rd</sup> Street and 4 <sup>th</sup> Avenue	-109.677483	48.551019	--	--
Temporary	Cut Bank	Cut Bank Airport	-112.363842	48.607406	--	--

**Appendix B**  
**Montana Core Based Statistical Areas**  
**(CBSAs)**

## Definition of CBSA

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 CBSAs (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 does not have any CSAs.

Montana’s CBSAs are summarized in the table below, and presented in map graphics in the following page.

### Montana Core Based Statistical Areas<sup>(1)(2)</sup>

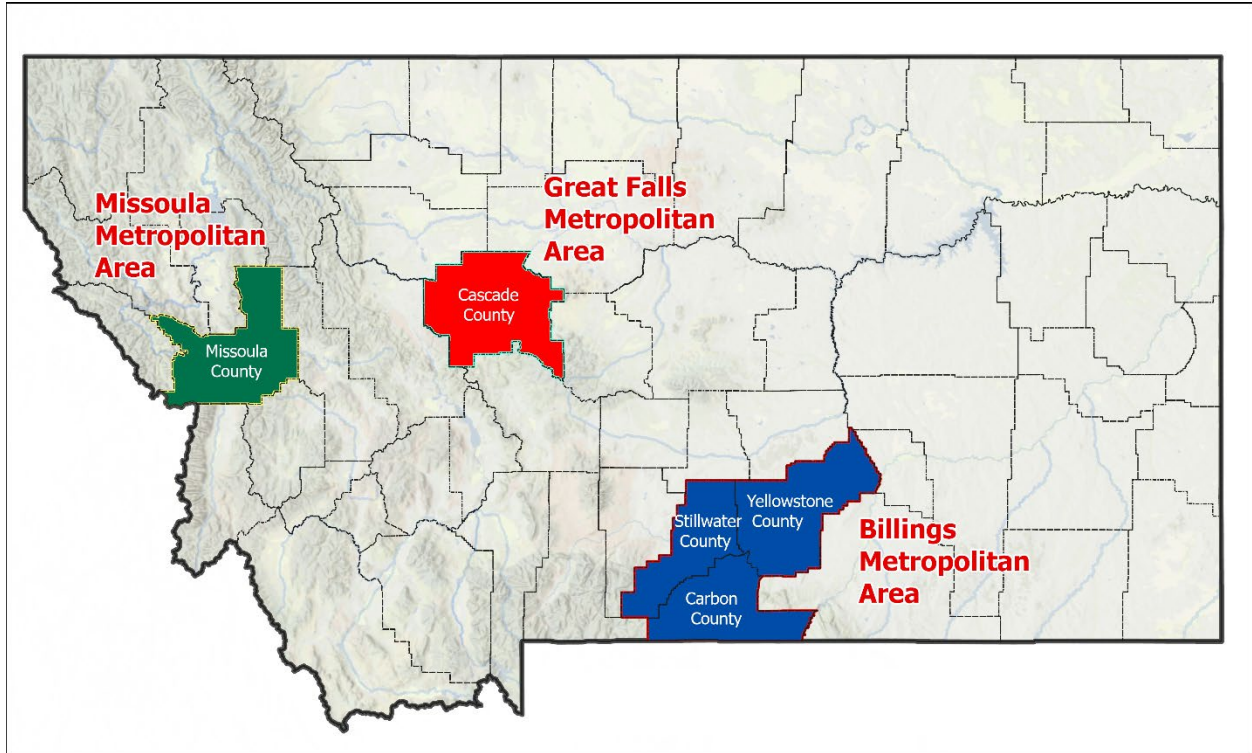
CBSA Code	CBSA Title	Metropolitan or Micropolitan Statistical Area	Estimated Total Population	County/County Equivalent	Estimated County Population	FIPS State Code	FIPS County Code	Central or Outlying County
13740	Billings, MT	Metro	187,037	Stillwater County	9,044	30	095	Outlying
				Carbon County	10,847	30	009	Outlying
				Yellowstone County	167,146	30	111	Central
33540	Missoula, MT	Metro	119,600	Missoula County	119,600	30	063	Central
24500	Great Falls, MT	Metro	84,511	Cascade County	84,511	30	013	Central
14580	Bozeman, MT	Micro	122,713	Gallatin County	122,713	30	031	Central
28060	Kalispell, MT	Micro	108,454	Flathead County	108,454	30	029	Central
25740	Helena, MT	Micro	12,470 72,223	Jefferson County	12,470	30	043	Outlying
				Lewis and Clark County	72,223	30	049	Central
15580	Butte-Silver Bow, MT	Micro	35,411	Silver Bow County	35,411	30	093	Central

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

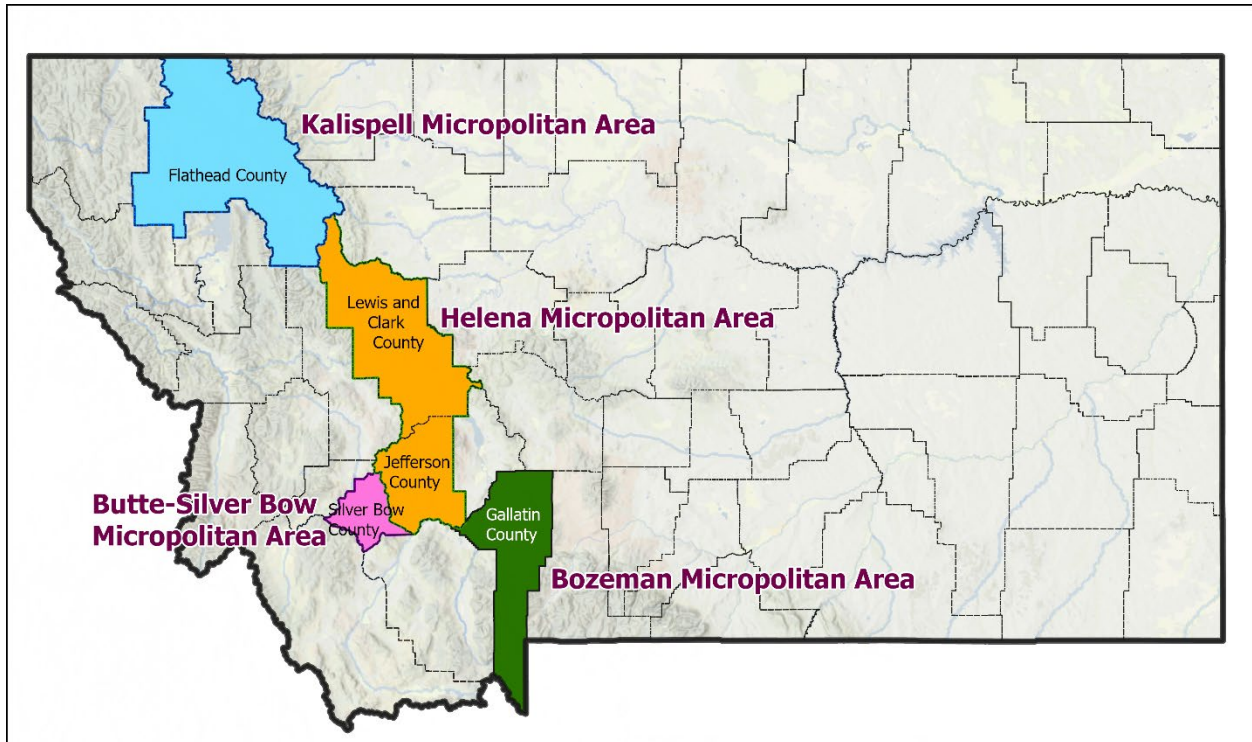
<sup>(2)</sup> US Census Bureau Population Estimate as of July 1, 2021.



## Montana Metropolitan Statistical Areas (MSAs)



## Montana Micropolitan Statistical Areas



**Appendix C**  
**Monitoring Network Parameter  
and Equipment Summary**

AQS Number	Site Name	Pollutant	Parameter-POC	Method			Operating Schedule	Type <sup>(4)</sup>	Monitoring Objective <sup>(5)</sup>	Spatial Scale	2022 Change ?
				Code	Note <sup>(2)</sup>	PM <sup>(2)</sup>					
30-111-0066	Billings-Coburn	SO <sub>2</sub>	42401-1	600	7		Continuous	SLAMS	H,S	Neigh.	
		SO <sub>2</sub> - 5 min	42406-1	600	7		Continuous	SLAMS	H,S	Neigh.	
30-111-0087	Billings-Lockwood	PM <sub>2.5</sub>	88101-3	170	8	FEM	Continuous	SPM	P	Neigh.	
		NO	42601-1	599	10		Continuous	SLAMS	B	Regional	✓
		NO <sub>2</sub>	42602-1	599	10		Continuous	SLAMS	B	Regional	✓
		NO <sub>x</sub>	42603-1	599	10		Continuous	SLAMS	B	Regional	✓
		O <sub>3</sub>	44201-1	87	19		Continuous	SLAMS	B	Regional	✓
30-031-0019	Bozeman	PM <sub>2.5</sub>	88502-3	731	5	Non	Continuous	SPM (NR)	P	Neigh.	
30-075-0001	Broadus	NO	42601-1	574	11		Continuous	SLAMS	B	Regional	
		NO <sub>2</sub>	42602-1	574	11		Continuous	SLAMS	B	Regional	
		NO <sub>x</sub>	42603-1	574	11		Continuous	SLAMS	B	Regional	
		O <sub>3</sub>	44201-1	47	9		Continuous	SLAMS	B	Regional	
		PM <sub>10</sub> <sup>(1)</sup>	81102-1	150	15	FEM	Continuous	SPM (NR)	B	Neigh.	
		PM <sub>2.5</sub>	88101-3	183	16	FEM	Continuous	SLAMS	B	Regional	
30-093-0005	Butte-Greeley	PM <sub>10</sub> <sup>(1)</sup>	81102-4	122	4	FEM	Continuous	SLAMS	H,P	Neigh.	
		PM <sub>2.5</sub>	88101-3	170	8	FEM	Continuous	SLAMS	H,P	Neigh.	
		PM <sub>2.5</sub>	88101-2	116	2	FRM	1 in 6 Coll	SLAMS	QA Coll	Neigh.	
		PM <sub>2.5</sub> Spc'n	Various		6		1 in 6	SLAMS CSN	H,P	Neigh.	
30-029-0049	Flathead Valley	PM <sub>10</sub> <sup>(1)</sup>	81102-1	122	4	FEM	Continuous	SLAMS	P	Neigh.	
		PM <sub>2.5</sub>	88101-3	170	8	FEM	Continuous	SLAMS	P	Neigh.	
30-063-0037	Frenchtown	PM <sub>2.5</sub>	88101-3	170	8	FEM	Continuous	SLAMS	P	Neigh.	
30-013-0001	Great Falls-OP	PM <sub>2.5</sub>	88502-3	731	5	Non	Continuous	SPM (NR)	H,P	Middle	
30-081-0007	Hamilton	PM <sub>2.5</sub>	88101-3	170	8	FEM	Continuous	SLAMS	H,P	Neigh.	
30-049-0026	Helena-Rossiter	PM <sub>2.5</sub>	88101-3	183	16	FEM	Continuous	SLAMS	H,P	Neigh.	
		PM <sub>2.5</sub>	88101-4	170	8	FEM	Cont-Coll	SPM	QA Coll	Neigh.	
		PM <sub>2.5</sub>	88101-1	116	2	FRM	1 in 6	SLAMS	H,P	Neigh.	
		PM <sub>2.5</sub>	88101-2	116	2	FRM	1 in 6 Coll	SLAMS	QA Coll	Neigh.	
30-029-0047	Kalispell-FEC	PM <sub>10</sub> <sup>(1)</sup>	81102-1	122	4	FEM	Continuous	SLAMS	H,P	Neigh.	
30-053-0018	Libby	PM <sub>10</sub> <sup>(1)</sup>	81102-1	150	15	FEM	Continuous	SLAMS	H,P	Neigh.	
		PM <sub>2.5</sub>	88101-3	183	16	FEM	Continuous	SLAMS	H,P	Neigh.	
30-027-0006	Lewistown	NO	42601-1	599	10		Continuous	SPM	B	Regional	
		NO <sub>2</sub>	42602-1	599	10		Continuous	SPM	B	Regional	
		NO <sub>x</sub>	42603-1	599	10		Continuous	SPM	B	Regional	
		O <sub>3</sub>	44201-1	47	9		Continuous	SPM	B	Regional	
		PM <sub>10</sub> <sup>(1)</sup>	81102-1	150	15	FEM	Continuous	SPM	B	Neigh.	
		PM <sub>2.5</sub>	88101-3	183	15	FEM	Continuous	SPM	B	Regional	
30-071-0010	Malta	NO	42601-1	599	10		Continuous	SPM	B	Regional	
		NO <sub>2</sub>	42602-1	599	10		Continuous	SPM	B	Regional	
		NO <sub>x</sub>	42603-1	599	10		Continuous	SPM	B	Regional	
		O <sub>3</sub>	44201-1	47	9		Continuous	SPM	B	Regional	
		PM <sub>10</sub> <sup>(1)</sup>	81102-1	150	15	FEM	Continuous	SPM	B	Neigh.	
		PM <sub>2.5</sub>	88101-3	183	16	FEM	Continuous	SPM	B	Regional	
30-017-0005	Miles City-Pine Hills	NO	42601-1	599	10		Continuous	SLAMS	B	Regional	
		NO <sub>2</sub>	42602-1	599	10		Continuous	SLAMS	B	Regional	
		NO <sub>x</sub>	42603-1	599	10		Continuous	SLAMS	B	Regional	
		O <sub>3</sub>	44201-1	87	19		Continuous	SLAMS	B	Regional	
		PM <sub>10</sub> <sup>(1)</sup>	81102-1	150	15	FEM	Continuous	SLAMS	B	Neigh.	
		PM <sub>2.5</sub>	88101-3	183	16	FEM	Continuous	SLAMS	B	Regional	
30-063-0024	Missoula-Boyd	O <sub>3</sub>	44201-1	47	9		Continuous	SLAMS	P	Neigh.	
		PM <sub>10</sub> <sup>(1)</sup>	81102-6	122	4	FEM	Continuous	SLAMS	H,P	Neigh.	
		PM <sub>2.5</sub>	88101-3	170	8	FEM	Continuous	SLAMS	H,P	Neigh.	
30-049-0004	NCore-Sieben Flats	CO	42101-1	554	13		Continuous	SLAMS	B	Region	
		NO	42601-1	674	14		Continuous	SLAMS	B	Region	
		NO <sub>y</sub>	42600-1	674	14		Continuous	SLAMS	B	Region	
		O <sub>3</sub>	44201-1	47	9		Continuous	SLAMS	B	Region	
		SO <sub>2</sub>	42401-1	600	14		Continuous	SLAMS	B	Region	
		PM <sub>2.5</sub>	88101-3	170	8	FEM	Continuous	SLAMS	B	Region	
		PM <sub>2.5</sub>	88101-1	116	2	FRM	1 in 3	SLAMS	B	Region	
		PM <sub>2.5</sub>	88101-2	116	2	FRM	1 in 3 Coll	SLAMS	QA Coll	Region	
		PM <sub>2.5</sub> Spc'n	Various		6		1 in 3	SLAMS CSN	B	Region	
		PM <sub>10</sub> ase	86101-1	185	12	FEM	Continuous	SLAMS	B	Region	
30-063-0038	Seeley Lake	PM <sub>2.5</sub>	88502-3	731	5	Non	Continuous	SPM (NR)	H,P	Neigh.	
30-083-0002	Sidney 201	NO	42601-1	599	10		Continuous	SLAMS	S	Neigh.	
		NO <sub>2</sub>	42602-1	599	10		Continuous	SLAMS	S	Neigh.	
		NO <sub>x</sub>	42603-1	599	10		Continuous	SLAMS	S	Neigh.	
		O <sub>3</sub>	44201-1	47	9		Continuous	SLAMS	S	Neigh.	
		SO <sub>2</sub>	42401-1	600	7		Continuous	SLAMS	S	Neigh.	
		SO <sub>2</sub> - 5 min	42406-1	600	7		Continuous	SLAMS	S	Neigh.	
		PM <sub>10</sub> <sup>(1)</sup>	81102-1	150	15	FEM	Continuous	SLAMS	S	Neigh.	
		PM <sub>2.5</sub>	88101-3	183	16	FEM	Continuous	SLAMS	S	Neigh.	
30-089-0007	Thompson Falls	PM <sub>10</sub> <sup>(1)</sup>	81102-3	122	4	FEM	Continuous	SLAMS	H,P	Neigh.	
		PM <sub>2.5</sub>	88502-3	731	5	Non	Continuous	SPM (NR)	P	Neigh.	
30-029-0009	Whitefish	PM <sub>10</sub> <sup>(1)</sup>	81102-1	122	4	FEM	Continuous	SLAMS	P	Neigh.	
30-001-0003	Dillon	PM <sub>2.5</sub>	88101-1	209	18	FEM	Continuous	SLAMS	P	Neigh.	Planned
	Havre	PM <sub>2.5</sub>	88101-1	209	18	FEM	Continuous	SLAMS	P	Neigh.	Planned
	Cut Bank	PM <sub>2.5</sub>	88101-1	209	18	FEM	Continuous	SLAMS	P	Neigh.	Planned
	Chouteau	PM <sub>2.5</sub>	88101-1	209	18	FEM	Continuous	SLAMS	P	Neigh.	Planned
	Glendive	PM <sub>2.5</sub>	88101-1	209	18	FEM	Continuous	SLAMS	P	Neigh.	Planned
	Glasgow	PM <sub>2.5</sub>	88101-1	209	18	FEM	Continuous	SLAMS	P	Neigh.	Planned
	Eureka	PM <sub>2.5</sub>	88101-1	209	18	FEM	Continuous	SLAMS	P	Neigh.	Planned

See notes next page...

## **Pollutant**

<sup>(1)</sup> **PM<sub>10</sub> measurements** are reported in both Standard (STD) and local Actual (ACT) conditions.

## **Method**

### **(2) Note**

- 1 Teledyne-API Model 300 Nondispersive infrared CO analyzer (FEM)
- 2 BGI-PQ200 with very sharp cut cyclone (FRM)
- 4 MetOne BAM 1020 Beta Attenuation Monitor (PM<sub>10</sub> FEM)
- 5 MetOne BAM 1020 Beta Attenuation Monitor with PM<sub>2.5</sub> sharp cut cyclone (SCC)
- 6 MetOne / URG Speciation Air Sampling System
- 7 Teledyne API Model T100U Ultraviolet SO<sub>2</sub> fluorescence (FEM)
- 8 MetOne FEM BAM 1020 with PM<sub>2.5</sub> very sharp cut cyclone Beta attenuation monitor (PM<sub>2.5</sub> FEM)
- 9 Thermo Model 49i UV Photometric O<sub>3</sub> analyzer (FEM)
- 10 Teledyne API Model T200U Chemiluminescence analyzer NO/NO<sub>x</sub>/NO<sub>2</sub> (FRM)
- 11 Thermo Model 42i TL Chemiluminescence NO/NO<sub>x</sub>/NO<sub>2</sub> analyzer (FRM)
- 12 MetOne BAM1020 PM<sub>10-2.5</sub> measurement system -- Paired beta attenuation monitors (FEM)
- 13 Thermo Model 48i-TLE enhanced trace level CO analyzer
- 14 Thermo Model 42i-TLE. NO-DIF-NOy chemiluminescent specialty trace level gas analyzer
- 15 Thermo Scientific 5014i Beta Attenuation Monitor for PM<sub>10</sub> (FEM)
- 16 Thermo Scientific, 5014i Beta Attenuation Monitor for PM<sub>2.5</sub> (FEM)
- 17 MetOne E-BAM Beta Attenuation Monitor with PM<sub>2.5</sub> sharp cut cyclone (SCC)
- 18 MetOne 1022 FEM E-BAM Beta Attenuation Monitor with PM<sub>2.5</sub> very sharp cut cyclone (SCC)
- 19 Teledyne API Model T400 UV Photometric O<sub>3</sub> analyzer (FEM)

<sup>(3)</sup> **PM** --Monitor Type: FEM = Federal Equivalent Method, FRM = Federal Reference Method,  
Non = Not FEM or FRM method

## **Type**

### **(4) Monitor Site Type:**

- SLAMS : State or Local Air Monitoring Station
- SPM : Special Purpose Monitor
- CSN : Chemical Speciation Network
- (NR) : Non-Regulatory Data

## **Operating Schedule**

- Continuous : Samples continuously, reports a result at the end of each hour
- 1 in 6 : Collects a 24-hour sample every 6 days
- 1 in 3 : Collects a 24-hour sample every 3 days
- Coll : An FRM sampler operated along with a continuous sampler for Quality Assurance purposes
- Cont-Coll : A continuous (FEM) sampler operated along with another continuous (FEM) sampler for Quality Assurance purposes.

## **Monitoring Objective**

### **(5) Monitoring Objective Descriptions:**

B = Background, H = Highest Concentration, P = Population Exposure,  
S = Source Impact, QA Coll = Quality Assurance Collocated Monitor

**Appendix D**  
**Ambient Air Quality Network 2021**  
**Raw Data Summary**

## Ambient Air Monitoring Network Summary

Summary for Period: 1/1/2021 through 12/31/2021    Exceptional Events Included

*The data below may not be final, and can be revised upon full quality assurance review.*

Site	Parameter	Units	Min	Max	Average	Data Capt %	# >NAAQ	#>85% NAAQ	NAAQS
Billings - Coburn Road	SO2	ppb	0	28.7	1.1	87	0	0	75
Billings Lockwood	PM25	µg/m3	1.9	78.2	10.2	93	10	19	35
Birney - Tongue River	NO2	ppb	0	17	0	93	0	0	100
Birney - Tongue River	OZONE	ppm	0.001	0.073	0.032	89	10	121	0.07
Birney - Tongue River	PM10 STD	µg/m3	0	120	22	78	0	0	150
Birney - Tongue River	PM25	µg/m3	-0.7	60.5	9.6	77	13	18	35
Bozeman High School	PM25	µg/m3	0.8	65.7	10.5	95	12	14	35
Broadus - Powder River	NO2	ppb	0	14	0	95	0	0	100
Broadus - Powder River	OZONE	ppm	0.002	0.179	0.033	95	33	246	0.07
Broadus - Powder River	PM10 STD	µg/m3	1	137	30	87	0	1	150
Broadus - Powder River	PM25	µg/m3	0.6	57.8	9	94	11	14	35
Butte - Greeley School	PM10 STD	µg/m3	0	116	22	99	0	0	150
Butte - Greeley School	PM25	µg/m3	-1.4	72.5	9.7	99	20	28	35
Cut Bank	PM25	µg/m3	0	110	6	96	9	14	35
Dillon	PM25	µg/m3	0	65	5	98	11	14	35
Flathead Valley (Columbia Falls HS	PM10 STD	µg/m3	0	87	14	99	0	0	150
Flathead Valley (Columbia Falls HS	PM25	µg/m3	-0.8	61.5	7.8	99	11	16	35
Frenchtown - Beckwith	PM25	µg/m3	2.3	65.9	10.8	100	20	22	35
Great Falls - Overlook Park	PM25	µg/m3	0.5	68	7.8	100	11	18	35
Hamilton - PS #46	PM25	µg/m3	-4.8	67.6	9.1	97	23	28	35
Helena - Rossiter Pump House	PM25	µg/m3	0.8	56.8	9.3	99	15	19	35
Helena - Rossiter Pump House	PM25 COL	µg/m3	0.6	52.8	7.8	98	13	17	35
Kalispell - Flathead Electric	PM10 STD	µg/m3	7	100	28	99	0	0	150
Lewistown - Lewistown	NO2	ppb	0	18	0	97	0	0	100
Lewistown - Lewistown	OZONE	ppm	0.008	0.09	0.038	98	68	292	0.07
Lewistown - Lewistown	PM10 STD	µg/m3	1	80	12	100	0	0	150
Lewistown - Lewistown	PM25	µg/m3	-0.7	63.2	6.6	100	11	16	35
Libby - Courthouse Annex	PM10 STD	µg/m3	4	100	20	99	0	0	150
Libby - Courthouse Annex	PM25	µg/m3	0.4	92.7	14.6	99	17	23	35
Malta - Malta	NO2	ppb	0	17	0	96	0	0	100
Malta - Malta	OZONE	ppm	0.004	0.076	0.032	98	11	118	0.07
Malta - Malta	PM10 STD	µg/m3	0	198	13	99	1	1	150
Malta - Malta	PM25	µg/m3	-0.4	53.8	6.7	90	3	9	35
Miles City	NO2	ppb	0	33	4	99	0	0	100
Miles City	OZONE	ppm	0	0.056	0.021	99	0	0	0.07
Miles City	PM10 STD	µg/m3	3	50	11	16	0	0	150
Miles City	PM25	µg/m3	1.6	17.1	4.6	16	0	0	35
Missoula - Boyd Park	OZONE	ppm	0	0.088	0.026	98	8	148	0.07
Missoula - Boyd Park	PM10 STD	µg/m3	1	91	17	93	0	0	150
Missoula - Boyd Park	PM25	µg/m3	-1.6	61.2	7.8	99	18	21	35
NCore - Sieben's Flat	CO TRACE	ppb	0	663	150	90	0	0	35000
NCore - Sieben's Flat	NOY	ppb	0	50.1	1.2	91	7951	7951	0
NCore - Sieben's Flat	OZONE	ppm	0	0.078	0.038	98	32	255	0.07
NCore - Sieben's Flat	PM10 STD	µg/m3	0	86	10	96	0	0	150
NCore - Sieben's Flat	PM25	µg/m3	-3	63	5.9	96	12	16	35
NCore - Sieben's Flat	PMCOARSE	µg/m3	-1	26	3	95	308	308	0
NCore - Sieben's Flat	SO2	ppb	0	2.5	0.5	95	0	0	75
Seeley - Elementary School	PM25	µg/m3	0.7	70.5	15.4	100	24	39	35
Sidney - 201	NO2	ppb	0	14	1	94	0	0	100
Sidney - 201	OZONE	ppm	0.004	0.078	0.035	94	45	266	0.07
Sidney - 201	PM10 STD	µg/m3	1	75	12	96	0	0	150
Sidney - 201	PM25	µg/m3	0	54	6.2	93	4	7	35
Sidney - 201	SO2	ppb	0	6.2	0.1	85	0	0	75
Thompson Falls High School	PM10 STD	µg/m3	10	178	26	96	2	3	150
Thompson Falls High School	PM25	µg/m3	1.7	131.9	12.4	96	21	32	35
Whitefish - Dead End	PM10 STD	µg/m3	1	96	25	98	0	0	150

Min/max/average based on valid hourly values for gas.

Min/max/average based on daily averages for particulate. A valid daily average is calculated if at least 75% of hours in the day are valid.

Data Capture % for gas is based on 8760 possible collection hours in the summary period.

Data Capture % for particulate is based on valid collection days out of 365 days in the summary period.

# of exceedances based on 1-hour NAAQS for gas, and 24-hour NAAQS for particulate.

A gas exceedance occurs if any hour in the summary period exceeds the 1-hour standard. A particulate exceedance occurs if any valid daily average exceeds the 24-hour

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

<b>Averaging Time</b>	<b>CO</b>	<b>NO<sub>2</sub></b>	<b>Ozone</b>	<b>PM<sub>2.5</sub></b>	<b>PM<sub>10</sub></b>	<b>SO<sub>2</sub></b>
Short-term	1-hour	1-hour	--	24-hour	24-hour	1-hour
Extended	8-hour	Annual	8-hour	Annual	--	3-hour

**Appendix E**  
**PM<sub>2.5</sub> Speciation Analytes**



## PM<sub>2.5</sub> 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**

National Ambient Air Quality Standards					Montana Ambient Air Quality Standards *
Pollutant	Primary/Secondary	Averaging Time	Level	Form	
<b>CO</b> Carbon Monoxide	primary	8-hour (Average Backward)	9 ppm	Not to be exceeded more than once per year	9 ppm
		1-hour	35 ppm		23 ppm
<b>NO<sub>2</sub></b> Nitrogen Dioxide	primary	1-hour	100 ppb	98th percentile of 1-hr daily max conc., avg'd over 3 years	0.30 ppm
	primary and secondary	Annual	53 ppb <sup>(2)</sup>	Annual Mean	0.05 ppm
<b>O<sub>3</sub></b> Ozone	primary and secondary	8-hour (Average Forward)	0.070 ppm <sup>(3)</sup>	Annual fourth-highest daily maximum 8-hr concentration,	–
					1-hour 0.10 ppm
<b>SO<sub>2</sub></b> Sulfur Dioxide	primary	1-hour	75 ppb <sup>(4)</sup>	99th percentile of 1-hour daily max concentrations, avg'd over 3 years	0.50 ppm
	secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year	–
					24-hour 0.10 ppm
					Annual 0.02 ppm
<b>Pb</b> Lead	primary and secondary	Rolling 3 month average	0.15 µg/m <sup>3</sup> <sup>(1)</sup>	Not to be exceeded	–
	primary	Quarterly Average	1.5 µg/m <sup>3</sup> <sup>(1)</sup>	Remains in effect only in E. Helena N.A. Area	1.5 µg/m <sup>3</sup>
<b>PM<sub>2.5</sub></b>  Particulate Matter	primary	Annual	12.0 µg/m <sup>3</sup>	annual mean, averaged over 3 years	–
	secondary	Annual	15.0 µg/m <sup>3</sup>	annual mean, averaged over 3 years	–
	primary and secondary	24-hour	35 µg/m <sup>3</sup>	98th percentile, averaged over 3 years	–
	<b>PM<sub>10</sub></b>	primary and secondary	24-hour	150 µg/m <sup>3</sup>	Not to be exceeded more than once per year on average over 3 years
					Annual 50 µg/m <sup>3</sup>

\* MAAQS also include: Fluoride in forage, monthly: 50 µg/g & grazing season: 35 µg/g; H<sub>2</sub>S hourly: 0.05 ppm; Settleable PM 30-day avg: 10 g/m<sup>2</sup>

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m<sup>3</sup> as a calendar quarter average) also remain in effect.

(2) The level of the annual NO<sub>2</sub> standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

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

(4) The previous SO<sub>2</sub> standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO<sub>2</sub> standards or is not meeting the requirements of a SIP call under the previous SO<sub>2</sub> standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

**Appendix G**  
**Annual SO<sub>2</sub> Data Requirements Rule Report**

# Annual SO<sub>2</sub> Data Requirements Rule Report

On August 10, 2015, EPA finalized the Data Requirements Rule (DRR) for the 2010 1-hour SO<sub>2</sub> primary NAAQS (40 CFR 51, Subpart BB). The SO<sub>2</sub> 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 to which this rule applied. As required in the rule for characterizing air quality for the primary 2010 SO<sub>2</sub> 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).

The SO<sub>2</sub> DRR (40 CFR 51.1205), requires DEQ to submit an annual report of SO<sub>2</sub> 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 report may be submitted directly or included as an Appendix to the agency’s Annual Network Plan document. The following information is provided 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 2021 actual emissions as provided by Talen Montana, LLC for each of its coal-fired emitting units.

**Table 1. Emission Summary at Colstrip Steam Electric Generating Station**

Modeled Emission Sources	Modeled Actual SO <sub>2</sub> Emissions (tons/year)				2021 Actual SO <sub>2</sub> 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	0.0	-100%
Unit 2	2,589.72	4,889.66	3,393.30	3,624.23	0.0	-100%
Unit 3	2,144.72	2,533.16	2,057.54	2,245.14	1,883.63	-18%
Unit 4	2,257.88	942.34	2,303.83	1,834.68	2,227.78	-26%
<b>Colstrip Total</b>	<b>9,204.35</b>	<b>12,474.86</b>	<b>10,222.18</b>	<b>10,633.79</b>	<b>4,111.41</b>	<b>-70%</b>

## 2. Recommendation Regarding Additional Modeling

Total actual emissions are significantly less than the modeled emissions; therefore, no further modeling is recommended to show compliance with the 1-hour SO<sub>2</sub> NAAQS.

**Appendix H**  
**Public Inspection and Comments**

## **Public Inspection and Comments**

This Plan was made available for public inspection and comment on May 30, 2022. As of July 1, 2022, no comments or other related correspondence were received.