STATE OF MONTANA

AIR QUALITY MONITORING NETWORK PLAN

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Montana Department of Environmental Quality
Air Quality Bureau

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Introduction

The Air Quality Monitoring Network Plan (Plan) is produced by the Montana Department of Environmental Quality (DEQ) on an annual basis in order to meet three objectives. First, the Plan development process establishes the structure for the 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. Second, the Plan provides 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. Third, the Plan is developed and submitted to the Region 8 Office of the United States Environmental Protection Agency (EPA Region 8) in fulfillment of the requirements contained in Title 40 of the Code of Federal Regulations (CFR) Part 58.10.

The Plan is intended to accurately describe the monitoring sites in the DEQ's network, identify their monitoring purpose, describe how the sites fulfill Network Design criteria, 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.

The 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 (SO_2);
- lead (Pb);
- nitrogen dioxide (NO_2);
- ozone (O_3); and
- particulate matter (PM). PM includes airborne materials in two size fractions, those with an aerodynamic diameter of 10 microns and less (PM_{10}), 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 eight appendices. Descriptions of the location information for each of the individual monitoring sites can be found in Appendix A. Appendix B describes the Core Based Statistical Areas (CBSAs) or larger communities within Montana that may require ambient air monitoring. Appendix C provides a detailed description of the existing monitors within the DEQ's network and an indication of the monitors that the DEQ desires to change. Appendix D provides a summary of network-wide monitoring results for calendar year 2015. Appendix E lists the fine particulate matter chemical components for which analysis is performed. Appendix F summarizes the DEQ's efforts to keep its fine particulate monitors comparable to national reference method standards. Appendix G summarizes the current NAAQS and MAAQS. Finally, Appendix H includes the comments on the Plan received during the 30-day public inspection and comment period prescribed by 40 CFR 58.10(a)(1), as well as a copy of the DEQ's response to each.

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 O_3 Monitoring Requirements[1]

Metropolitan Statistical Area (MSA) population[2,3]	Number of Monitors per MSA	
	Most recent 3-year design value concentrations ≥ 85% of any O3 NAAQS[4]	Most recent 3-year design value concentrations < 85% of any O3 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) O_3 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, there are three Metropolitan Statistical Areas (MSAs) in Montana, and all three fall within the 50,000 to 350,000 person population category. The three MSAs are Billings (Yellowstone, Carbon, and Golden Valley Counties), Missoula (Missoula County), and Great Falls (Cascade County). At present, O_3 monitoring is being conducted in Missoula as representative of these three areas. The DEQ previously conducted O_3 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 suggest that monitoring in this MSA is not warranted given the low O_3 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 O_3 across Montana, particularly in light of increased petroleum exploration within the

eastern portion of the state. The DEQ is conducting O_3 monitoring in Broadus (30-075-0001), Birney (30-087-0001), Sidney (30-083-0001), and at the National Core Monitoring Site (NCore, 30-049-0004). In 2012, two additional monitoring stations were added to this network in Malta (30-071-0010) and Lewistown (30-027-0006). See Appendix A for a map displaying the location of all these sites. Table 2 summarizes the 8-hour rolling average O_3 values measured at monitoring sites operated by the DEQ during the designated 2015 ozone season (June through September), while Table 3 summarizes the 8-hour O_3 values measured at monitoring sites operated by the DEQ during the entire 2015 calendar year.

Table 2 – 8-Hour Rolling Monitored O_3 Values for Ozone Season 2015

Station	Concentrations (ppm)			NAAQS Design Values (ppm)[1]	
	Minimum	Maximum	Average	2015	2013 - 2015
Birney	0.002	0.060	0.031	0.056	0.055
Broadus	0.008	0.061	0.032	0.056	0.055
Lewistown	0.010	0.060	0.033	0.056	0.055
Malta	0.008	0.062	0.033	0.061	0.055
Missoula	0.0	0.055	0.018	0.055	0.055
Ncore	0.005	0.060	0.034	0.058	0.056
Sidney	0.011	0.062	0.036	0.058	0.055

[1] Design Values calculated by the EPA Air Quality System (AQS) database.

Table 3 – 8-Hour Rolling Monitored O_3 2105 Annual Values

Station	Concentrations (ppm)		
	Minimum	Maximum	Average
Birney	0.001	0.060	0.029
Broadus	0.001	0.061	0.03
Lewistown	0.006	0.060	0.033
Malta	0.004	0.062	0.030
Missoula	0.0	0.058	0.018
NCore	0.0	0.062	0.033
Sidney	0.009	0.062	0.034

As demonstrated in Tables 2 and 3, very little variability has been seen in the monitored ambient O_3 concentrations across the state of Montana. The 8-hour O_3 design value of 0.059 ppm collected in the Billings area during 2005-2007 further illustrates this phenomenon. 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, then, that the O_3 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 very 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 O_3. Montana does not contain any O_3 nonattainment areas, therefore no PAMS monitoring is 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 NO_2 monitoring sites (see Section I.C.). Table 4 summarizes the number of required CO monitoring sites.

Table 4 – Minimum CO Monitoring Requirements[1]

Criteria	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

As documented in Appendix B, no Montana CBSA's 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 became extremely low. As a result, the 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 CO monitor at the NCore station north of Helena to track trace-level background concentrations of this pollutant over time. Section I.H describes NCore monitoring efforts. In a separate effort, the DEQ had also maintained a CO monitor at a location just inside the west entrance to Yellowstone National Park on behalf of the National Park Service. The West Yellowstone (30-031-0017) monitoring station remains in operation, however, as of July 31st, 2015, the DEQ no longer is affiliated with operation of the site. This site was, and remains, principally to monitor traffic impacts to this significant Class 1 area, particularly in the wintertime.

Table 5 summarizes the 1-hour CO values measured at these two monitoring sites during 2015.

Table 5 – 1-Hour Monitored CO Values for 2015

Station	Concentrations (ppm)		
	Min	Max	Average
West Yellowstone[1]	0	2.8	0.1
NCore[2]	0.024	1.107	0.164

[1] Reflects data from Jan. 1, 2015 through July 31, 2015
[2] Trace level instrument

C. Nitrogen Dioxide (NO2) Monitoring Criteria

The minimum number of NO_2 monitoring sites required by 40 CFR 58 Appendix D Section 4.3 is summarized in Table 6.

Table 6 – Minimum NO_2 Monitoring Requirements[1]

Requirement Type	Criteria[2]	Minimum Number of 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
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 described in Appendix B, no Montana communities meet any of the criteria listed in Table 6, and no additional NO_2 monitoring has been required of the DEQ by the Regional EPA Administrator; therefore no ambient NO_2 monitors are currently required in Montana. However, the DEQ currently operates five NO_2 monitoring sites in an effort to determine NO_2 background concentrations and potential impacts associated with the oil and gas industry in the eastern part of the state. NO_2 is monitored at Sidney (30-083-0001), Broadus (30-075-0001), and Birney (30-087-0001). In 2012, two additional monitoring stations were added to this network in Malta (30-071-0010) and Lewistown (30-027-0006) in partnership with the BLM in an attempt to further define background concentrations and spatial distribution of this pollutant within the state of Montana.

In a separate effort, the DEQ had also maintained a NO_2 monitor at a location just inside the west entrance to Yellowstone National Park on behalf of the National Park Service. The West Yellowstone (30-031-0017) monitoring site remains in operation, however, as of July 31st, 2015, the DEQ no longer is affiliated with operation of the site. This site was, and remains, principally to monitor traffic impacts to this significant Class 1 area, particularly in the wintertime.

Table 7 summarizes the 1-hour NO_2 values measured at monitoring sites operated by the DEQ during 2015.

Table 7 – 1-Hour Monitored NO_2 Values for 2015

Site	Concentrations (ppb)			NAAQS Design Values (ppb)[1]	
	Min	Max	Average	2015	2013 – 2015
Birney	0	7	0	5	6

Broadus	0	12	0	9	10
Lewistown	0	27	0	12	13
Malta	0	11	0	6	7
Sidney	0	13	1	--	--
West Yellowstone[(2)]	0	31	1	--	--

[(1)] Design Values calculated by the AQS database.
[(2)] Valid Design Value not available, monitor closed July 31, 2015.

D. Sulfur Dioxide (SO2) Monitoring Criteria

The minimum number of SO_2 monitoring sites required by 40 CFR 58 Appendix D Section 4.4 is summarized within Table 8.

Table 8 – Minimum SO_2 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 numbers of required SO_2 monitors is based on two metrics: the Core Based Statistical Area (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 quantity of population in the CBSA multiplied by the annual tons of SO_2 emitted using the most recent aggregated emissions data available in the National Emissions Inventory, divided by 1,000,000). The Billings CBSA as described in Appendix B is the only CBSA in Montana that has the potential to require SO_2 monitoring based on these prescribed metrics. Table 9 summarizes the current PWEI for the Billings CBSA using both the latest NEI values and 2015 reported emissions.

Table 9 – Billings CBS PWEI Calculation[(1)]

Population[(1)] (a)	Reported Emissions (b)	PWEI[(2)] (c)
168,283	7,663.976[(3)]	1,289.73
	4,693.52[(4)]	789.84

[(1)] US Census Bureau Population Estimate as of July 1, 2015.
[(2)] PWEI (c) = a x b/1,000,000
[(3)] 2011 National Emissions Inventory (latest available).
[(4)] 2015 calendar year emission reported to the DEQ.

Based on the listed criteria, neither Billings nor any of the other Montana CBSAs present an SO_2 PWEI that approaches or exceeds 5,000. Consequently, no DEQ SO_2 monitoring is required based on the PWEI criteria. However, 40 CFR 58 Appendix D Section 4.4.3 also specifies that the EPA Regional Administrator may require additional SO_2 monitoring where the PWEI criteria are not thought to adequately meet monitoring objectives. In particular, the Administrator may require additional monitoring in areas that have "the potential to have concentrations that

may violate or may contribute to the violation of the NAAQS…." While not required by the Administrator, the DEQ continues to operate one long-term SO_2 monitor at the Coburn Road site in Billings (30-111-0066) to provide an ongoing assessment of SO_2 compliance in the Billings area. The Coburn Road site has been in continuous operation since 1981 as a State or Local Air Monitoring Station (SLAMS) site for NAAQS comparison purposes.

The DEQ also operates one background SO_2 monitor at the Sidney site (30-083-0001), 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 SO_2 monitoring sites operated by the DEQ during 2015.

Table 10 – 1-Hour Monitored SO_2 Values for 2015

Site	Concentrations (ppb)			NAAQS Design Values (ppb)	
	Min	Max	Average	2015	2013 - 2015
Billings - Coburn Road	0	61.0	1.0	48	63
NCore - Sieben's Flat	0	8.5	0.1	2	2
Sidney - Oil Field	0	8.0	0	3	4

Beyond the DEQ-operated monitors, ambient SO_2 is monitored by industrial sources in the communities of Great Falls and Billings. In the Great Falls area, one SO_2 monitoring site (Black Eagle, 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 the DEQ's air quality compliance program. In the Billings/Laurel area there is currently a single industry-operated SO_2 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 SO_2-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 Plans (QAPP) as individual Primary Quality Assurance Organizations (PQAOs) independent of the DEQ. The 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. The 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.

E. Lead (Pb) Monitoring Criteria

The lead monitoring design rule in 40 CFR 58 Appendix D Section 4.5 requires monitoring agencies to establish air quality monitoring near industrial facilities that emit more than 0.5 tons per year (tpy) of lead into the atmosphere, and at specified airports. None of the listed airports are located in Montana, but one facility in the state has reported annual lead emissions in excess of the 0.5 tpy emission threshold.

Each calendar year the DEQ requires facilities with active Montana Air Quality Permits to report quantities of air pollutant emissions by February 15th of the following year. For calendar year 2015, one facility within the state of Montana reported total lead emissions in excess of the 0.5 tpy threshold. Talen Montana, LLC's Colstrip Steam Electric Generating Station located in Rosebud County reported total lead emissions of 1.96 tons for calendar 2015. This value is elevated from the total of 1.84 tons reported in 2014, and both values exceed the 0.5 tpy monitoring threshold.

As stated in the previous plans the DEQ has assessed the need to monitor lead near the Talen facility based on the CFR criteria. While 40 CFR 58 Appendix D Section 4.5 requires monitoring, it establishes no funding mechanism to accomplish the requirement. In addition, other pollutants (e.g. $PM_{2.5}$, Ozone, and SO_2) currently pose a more significant risk to the citizens of Montana and thereby require the application of available ambient air monitoring resources. Consequently, the DEQ is deferring lead monitoring in Colstrip until sufficient funding and heightened pollutant priority provide for the accomplishment of this endeavor.

F. Particulate Matter (PM10) Monitoring Criteria

The minimum number of PM_{10} monitoring sites required by 40 CFR 58 Appendix D Section 4.6 is shown in Table 11.

Table 11 - Minimum PM_{10} Monitoring Requirements[1]

	Number of Monitors per MSA[1]		
Population category	**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 PM_{10} NAAQS by 20 percent or more.
[3] Medium concentration areas are those for which data exceeds 80 percent of the PM_{10} NAAQS.
[4] Low concentration areas are those for which data is less than 80 percent of the PM_{10} NAAQS.
[5] The low concentration requirements are the minimum which apply in the absence of a design value.

As described in Appendix B and in Table 12 below none of the Montana MSAs currently meet the combination of population and PM_{10} concentration listed in Table 11. However, the DEQ continues to operate PM_{10} monitors in seven areas previously designated as nonattainment for the 24-hour PM_{10} NAAQS as required by EPA and to demonstrate the adequacy of PM_{10} control

plans. Those areas include Butte, Columbia Falls, Kalispell, Libby, Missoula, Thompson Falls, and Whitefish.

The DEQ also operates PM_{10} monitors in several areas in order to define background levels of this pollutant. These areas include Broadus, Birney and Sidney. In 2012 two additional monitoring stations were added to this network in Malta (30-071-0010) and Lewistown (30-027-0006) 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 12 summarizes the 24-hour values measured at the PM_{10} monitoring sites operated by the DEQ during 2015.

Table 12 – 24-Hour Monitored PM_{10} Values for 2015

	Concentration (µg/m^3) [1]			NAAQS Design Values[2]	
Site	**Min**	**Max**	**Average**	**2015**	**2012 - 2014**
Birney[3]	1	71	15	--	--
Broadus[3]	2	105	23	--	--
Butte	1	65	16	0	0
Flathead Valley	1	97	16	0	0
Kalispell	9	139	30	0	0
Lewistown	0	27	6	0	0
Libby	3	80	19	0	0
Malta	0	56	8	0	0
Missoula	3	78	18	0	0
Ncore	0	59	6	0	0
Sidney[3]	1	76	16	--	--
Thompson Falls	5	143	22	0	0
Whitefish	3	135	29	0	0

(1) Data set excludes DEQ defined exceptional events.
(2) PM_{10} Design Values are in the form of numbers of estimated exceedances as calculated by the procedure in 40 CFR 50 Appendix K. The Design Values provided do not include data flagged for exceptional events.
(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).

PM_{10} monitoring is discussed further in Section II.

G. Fine Particulate Matter (PM2.5) 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]

	Number of Monitors per MSA	
MSA population[2]	**Most recent 3-year design value ≥85% of any $PM_{2.5}$NAAQS[3]**	**Most recent 3-year design value <85% of any $PM_{2.5}$NAAQS[3][4]**
>1,000,000	3	2
500,000 - 1,000,000	2	1

50,000 - <500,000	1	0

(1) From Table D-5 of Appendix D to 40 CFR Part 58. Minimum monitoring requirements applicable to MSAs.
(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, Montana possesses only 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. The DEQ and several county air quality programs operate $PM_{2.5}$ monitors in various communities to demonstrate continuing NAAQS compliance, to provide information to Health Departments implementing $PM_{2.5}$ control strategies, and to inform the public of potential health impacts during both winter inversions and summer wildfire events. In addition, the DEQ is currently operating $PM_{2.5}$ monitors in Broadus, Birney and Sidney to define background levels of this pollutant. In 2012 two additional monitoring stations were added to this network in Malta (30-071-0010) and Lewistown (30-027-0006) in partnership with the BLM in an attempt to further define background concentrations and spatial distribution of this pollutant within the state of Montana. These sites, along with the NCore site 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 state.

In a separate effort, the DEQ has also monitored $PM_{2.5}$ at a location just inside the west entrance to Yellowstone National Park. The West Yellowstone (30-031-0017) monitoring site remains in operation, however, as of July 31st, 2015, the DEQ no longer is affiliated with the operation of this station. This site was, and remains, principally to monitor traffic impacts to this significant Class 1 area, particularly in the wintertime. Through an established memorandum of understanding with the National Park Service, the DEQ still acquires the near-real time continuous data from the PM2.5 monitor and provides this concentration data to the public.

Table 14 summarizes the 24-hour values measured at the $PM_{2.5}$ monitoring sites operated by the DEQ during 2015.

Table 14 – Monitored $PM_{2.5}$ Values for 2015

Site	Concentration ($\mu g/m^3$)(1)			NAAQS Design Values ($\mu g/m^3$)		
				2015	2013 - 2015	
	Min	Max	Average	98th Pctl.	24 hour	Annual
Billings(2)	0.8	44.1	7.4	20.1	20	7.8
Birney	0	17.4	5.2	12	12	4.8
Bozeman(3)	0.8	101	7.9	--	--	--
Broadus	0.4	30	5.7	13.1	14	5.4

Butte	0	36.7	8.1	24.8	29	8.6
Flathead Valley	0.5	39.5	8.4	23.9	28	8.1
Frenchtown	2.5	30	9.5	22.7	25	8.9
Great Falls[3]	0.8	82.8	8.4	--	--	--
Hamilton	0	41.6	6.4	31.5	29	7.2
Helena-Rossiter	0.5	40.9	7.7	31	26	7.3
Lewistown	0	13.8	3.9	10.8	10	3.8
Libby	0.9	31.7	11.2	27.4	27	10.2
Malta	0	12.8	4.7	11.3	14	6.2
Missoula	0	30.9	8	22.2	22	7.2
Ncore	0	13.9	2.8	11.2	10	3.3
Seeley[3]	0.3	54.2	13.3	--	--	--
Sidney	0	12.8	5.2	13.4	15	7.0
West Yellowstone[3][4]	0	49.5	2.4	--	--	--

[1] 24-hour monitored concentrations. Data set excludes DEQ defined exceptional events.
[2] Design Value does not meet completeness requirements – converted to Federal Equivalent Method (FEM) in May 2015.
[3] Monitors are non-Federal Equivalent Method (non-FEM) monitors operated for public information only. They are not certified to produce NAAQS-comparison data.
[4] Data accounts for the period Jan. 1, 2015 through Aug. 31, 2015

The $PM_{2.5}$ monitoring criteria in 40 CFR 58 Appendix D Section 4.7 contains two additional significant requirements. First, 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). Two sites in Montana are currently part of this network: Butte (30-093-0005) and NCore (30-049-0004). Appendix F contains a list of the chemical components for which analysis is performed on filters collected at these stations.

Second, 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 rule to be operated in any Montana community, so the CFR Section 4.7.2. criteria does not currently have direct application in the state. 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 the DEQ's $PM_{2.5}$ network is now 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 the DEQ and to the citizens of Montana.

The DEQ has been very deliberate in its operation and QA of continuous particulate monitors. As a result, Montana's comparisons between FRM and FEM instruments and between collocated FEM instruments have been quite good. Data analysis tools made available in USEPA's April 20, 2013 memorandum, "Update on Use of PM2.5 Continuous FEMS," demonstrate this reality as shown by the statistical summaries contained in Appendix F. The

DEQ intends to continue to make strong use of continuous FEM instruments in its $PM_{2.5}$ monitoring network.

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. 40 CFR 58.13(a) details that each NCore site must be established and operating no later than January 1, 2011. By definition, each NCore site must include monitoring equipment to measure $PM_{2.5}$, $PM_{10-2.5}$, speciated $PM_{2.5}$, O_3, SO_2, CO, NO, NO_Y, lead, and basic 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 human activities.

The Montana NCore site (Sieben's Flat, 30-049-0004) was installed in late 2010. All parameters were functional and acquiring data within the first week of January 2011 and, except for time periods where operational problems have occurred, have been operated continuously through the date of this report.

The monitoring directives in 40 CFR Appendix D Section 4.8 contains specific requirements for the operation of monitors for $PM_{10-2.5}$. 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. Other Monitoring Requirement Issues

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 four sites that do not meet all of the Appendix E siting requirements. 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 extremely 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.

Three PM_{10} monitors located in eastern Montana, Sidney (30-083-0001), 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 the three sites is located in a remote region, and of logistic necessity, near unpaved gravel roads traveled by ranching and oilfield equipment. As a result, the monitors are unduly

influenced by that traffic and are not appropriately representing background PM_{10} concentrations in their intended scaled scope. However, the 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 redesignate the PM_{10} monitors at Broadus and Birney as special purpose monitors producing non-regulatory (SPM-NR), or NAAQS excluded, data. The Sidney PM_{10} monitor is already designated as producing non-regulatory data. EPA approved the redesignation on April 8, 2013.

2. Processes for Moving PM2.5 Monitors

If circumstances were to make it necessary or desirable to relocate a $PM_{2.5}$ monitor with data exceeding a NAAQS, the change would be discussed between the local county program (if one exists), and the Permitting, Planning, Compliance, Registration and Monitoring sections of the DEQ's Air Quality Bureau. The Research and Monitoring Services Section would solicit public feedback through the public comment period of the annual Monitoring Network Plan. Simultaneously, the DEQ would solicit comments from the EPA Region 8 office for the proposed change. No change would be made without demonstrating that a replacement site produced comparably high values unless circumstances precluded such a comparison.

3. PM2.5 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 St. Luke's station in Billings (30-111-0085). 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. The 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.

4. 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 has undergone a significant edit and update which was approved on May 3, 2013 and adopted March 20, 2015.

II. Proposed Changes to the Monitoring Network

A. Introduction

DEQ's Air Research and Monitoring Services Section regards the requirement to develop and submit an Annual Network Plan to EPA as an opportunity to review the existing air monitoring network and to plan for future needs. In the process of producing this document, the 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. Furthermore, 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 aforementioned efforts.

Immediate changes are proposed in this annual network plan, while long-term evaluation and direction of the DEQ air quality surveillance system continue to be addressed within the periodic network assessment, and the resulting system modifications. DEQ anticipates occasional potential changes to the focus and direction of Montana's air monitoring network in response to future federal rulemaking. The following sections outline proposed changes to the Montana DEQ's existing air monitoring network

B. Network Modification Plan

In accordance to 40 CFR 58.14 the DEQ is required to develop a network system modification plan and schedule which addresses the findings and direction offered by the 5 year network assessment. The system modification plan is to be submitted as part of the annual monitoring plan due no later than the year after submittal of the network assessment.

DEQ submitted the periodic network assessment on July 1, 2015, in conjunction with the 2015 calendar year annual network monitoring plan. Within the 2015 network assessment DEQ identified the following potential objectives and future air monitoring strategies;

- Upgrade the technology and automation of $PM_{2.5}$ monitors in order to more effectively utilize limited resources and provide the public with more information in real-time; including an evaluation of the need for additional $PM_{2.5}$ monitoring sites in western Montana
- Evaluate the O_3 monitoring needs in response to the new 1-hour NAAQS
- Review the SO_2, NO_2 and O_3 data from the new sites in eastern Montana and evaluate the results in relation to the production data collected as the oil and gas fields develop

Based on the results of the network assessment no formal network modification plans or schedule is proposed by the DEQ at this time. The DEQ is well positioned to address the objectives and near-term monitoring strategies with the current network.

As summarized within the network assessment, $PM_{2.5}$ is the pollutant of greatest concern throughout Montana. DEQ will maintain a continued focus to upgrade the technology and automation of its $PM_{2.5}$ monitoring network into the future; however at this time DEQ believes the $PM_{2.5}$ network is operating at a high level with the current availability of human and monetary resources. Further, with much of the air quality impacts originating from wildfires, the DEQ will likely increase reliance on the temporary location of portable continuous particulate monitors. The portability of these monitors provide for rapid deployment, effective placement in areas of highest impact, and can be readily linked to DEQ's web-based viewer, whereby providing the general public with timely information.

While the existing SLAMS network provides valuable data to Montana's densely populated areas, placement of such fixed sites in the numerous small mountain valley communities in western Montana is not feasible with the DEQ's current resources. The versatility and relevance of the portable monitor offers a more practical solution.

With respect to the promulgation of the new 1-hour O_3 NAAQS effective on December 28, 2015, no change to DEQ's ozone monitoring network is necessary. The minimum O_3 monitoring criteria established within 40 CFR 58 is satisfied by current and previously conducted monitoring results, as detailed within Appendix A of this document. Further, DEQ's O_3 monitors are operated year round, including the NCore site; therefore, the extension of the required O_3 monitoring season does not necessitate a change in operation. DEQ will continue to operate O_3 monitors year round at all monitoring stations.

Finally, the 2015 Network Assessment document identified the evaluation of monitoring efforts related to oil and gas development in eastern Montana as a potential area of emphasis. The DEQ operates several multi-pollutant monitoring stations throughout eastern Montana, including the Sidney station which was specifically established to characterize impacts associated with oil and gas development in Montana's Bakken formation. Data from these sites have continually presented design values well below the respective NAAQS levels. The volume of collected ambient criteria pollutant data which demonstrates continued compliance with ambient standards, coupled with a significant reduction in new development and existing production within the oil and gas sector within recent years, yields a conclusion that the existing network is sufficient to address current and future trends within oil and gas development industry in eastern Montana.

As always, implementation of any ambient air monitoring strategy will be balanced between the competing interests of statuary requirements, federal and state air quality policies, and the availability of human and monetary resources. In any case, the Department will continue its long standing practice of considering all options during its annual and 5-year reviews of Montana's ambient air monitoring network

C. West Yellowstone Station

At the request of the National Park Service, DEQ discontinued monitoring efforts associated with the West Yellowstone (30-031-0017) station on July 31st, 2015. The annual data up to mid-

night on July 31st, 2015 have been entered into AQS and certified by the DEQ. Only the monitors assigned to DEQ were subsequently closed. The West Yellowstone station remained open with the designated AQS Number and Site Name.

The National Park Service continues to manage operation of the West Yellowstone station, and through an established memorandum of understanding the DEQ acquires the near-real time continuous data from the $PM_{2.5}$ monitor in order to provide this concentration data to the public.

D. Administrative Corrections

Several discrepancies were noted between the actual monitor designations with the EPA's AQS database and the information portrayed within the Existing Ambient Air Quality Monitoring Network table of Appendix C of this plan. Discrepancies pertained to the monitor site type and/or the monitor spatial scale of representation for multiple monitoring stations. The current network plan was reconciled to reflect the monitoring network profiles established within AQS, as follows;

1. **Birney (30-087-0001) & Broadus (30-075-0001):**

   Formerly the network plan identified the spatial representation for gaseous pollutant and $PM_{2.5}$ monitors at the Birney and Broadus stations at the neighborhood scale. These two monitoring stations were established with the intention of defining background levels of pollutants on a broader scale, as represented by the regional measurement scale prescribed within AQS.

   The current plan is revised to define the spatial scale of representation for the monitoring of NO_2, O_3 and $PM_{2.5}$ as regional. Due the circumstances outlined in Section I.1 of this plan the PM_{10} monitor designations will remain unchanged.

2. **Lewistown (30-027-0006) & Malta (30-071-0010):**

   As discussed, the Lewistown and Malta monitoring stations were added to this network in partnership with the BLM in an attempt to further define background concentrations and spatial distribution of pollutants within the state of Montana. Previous iterations of this plan identified the spatial scale of representation for the monitors operating at these sites as neighborhood, while in AQS designations were prescribed as regional scale monitors. Additional discrepancies were noted with the assignment of monitor type as SPM producing non-regulatory quality data in the plan, with designations of SPM without the non-regulatory, or NAAQS excluded, citation in AQS.

   The current plan is revised to define the NO_2, O_3 and $PM_{2.5}$ monitors' spatial scale of representation as regional and the monitor type as SPM. Due the circumstances outlined in Section I.1 of this plan the PM_{10} monitor designations will remain unchanged.

E. Ongoing Network Changes

The Montana DEQ continues to recognize the need for additional changes to our network, such as lead monitoring near Colstrip. Additionally, as indicated in our previous network plans, diminishing monitoring resources are necessitating 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 PM_{10} 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, the DEQ is working to develop the documentation required by the EPA to re-designate five areas that are currently classified as nonattainment for $PM_{10,}$ however, we do not anticipate completion of that documentation in the coming year.

III. Appendices

Appendix A, Monitoring Site Location Information

Montana Department of Environmental Quality

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
30-111-0085	Billings St Luke's	2nd Ave. N. and N. 32nd St.	-108.511542	45.780400	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
30-029-0049	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
30-083-0001	Sidney Oil Field	Corner Cnty Roads 335 and 131	-104.485552	47.803392	--	--
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

Miles
0 25 50 100

Montana AQ Monitoring Sites

May, 2013

Montana Department of Environmental Quality

Appendix B, Montana Core Based Statistical Areas (CBSAs)

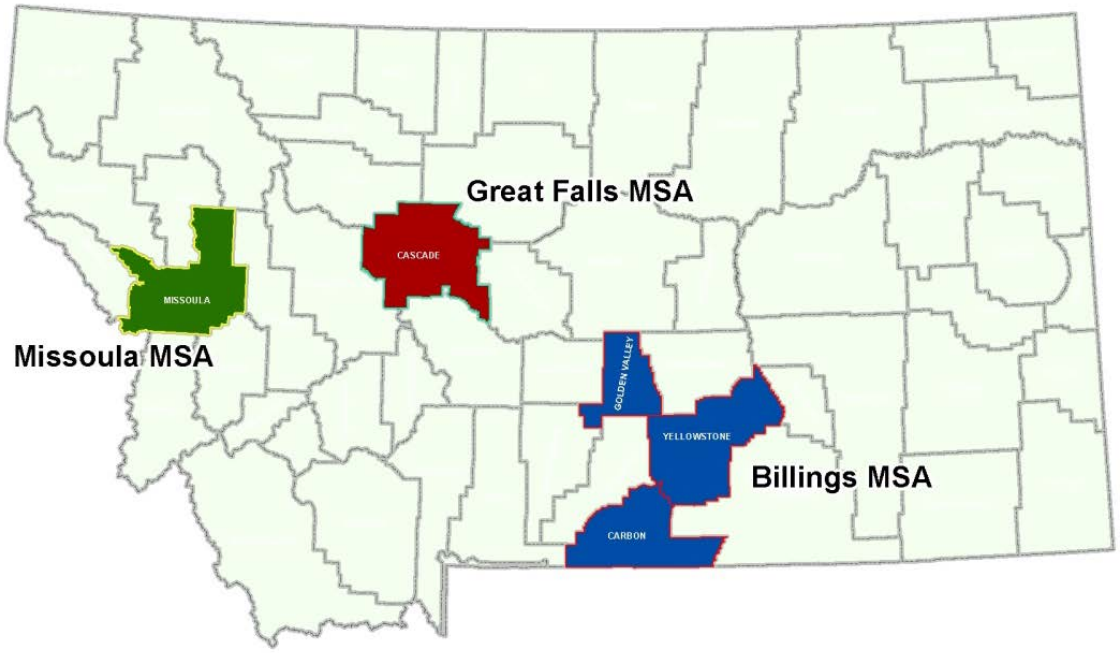
CBSA definition per 40 CFR 58.1: "*Core-based statistical area (CBSA)* is defined by the U.S. Office of Management and Budget, as a statistical geographic entity consisting of the county or counties associated with at least one urbanized area/urban cluster of at least 10,000 population, plus adjacent counties having a high degree of social and economic integration. Metropolitan Statistical Areas (MSAs) and micropolitan statistical areas 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) (*http://www.census.gov/population/estimates/metro-city/List1.txt*)."

Montana Core Based Statistical Areas[1]

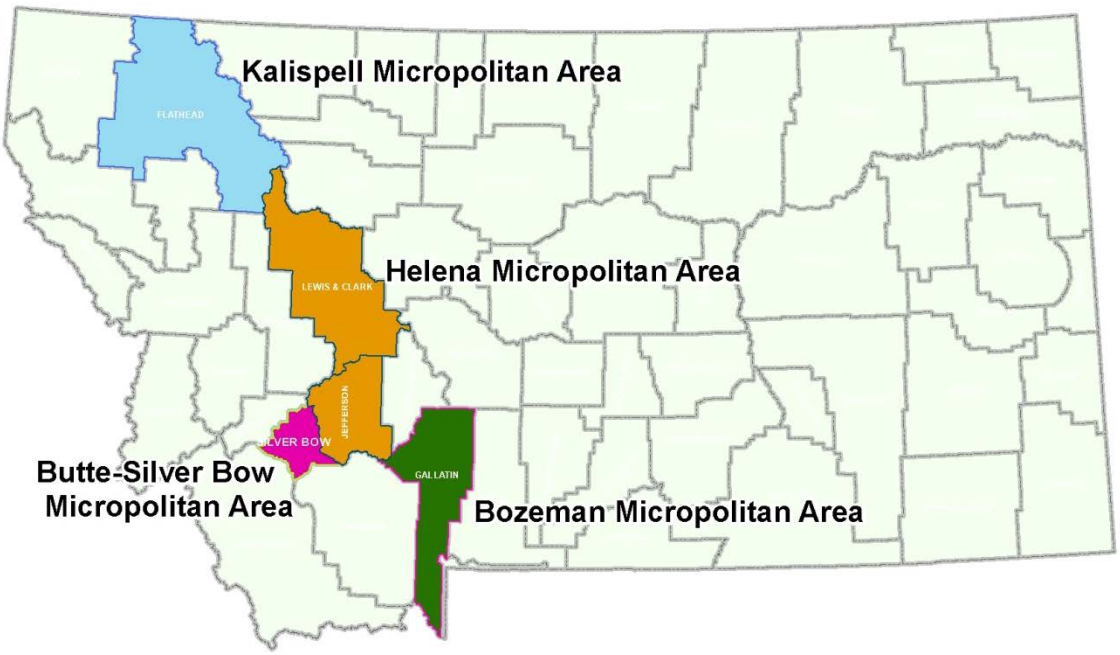
CBSA Code	CBSA Title	Metropolitan or Micropolitan Statistical Area	2015 Estimated Total Population	County/County Equivalent	2015[2] Estimated County Population	FIPS State Code	FIPS County Code	Central or Outlying County
13740	Billings, MT	Metro	168,283	Golden Valley County	827	30	37	Outlying
				Carbon County	10,408	30	9	Outlying
				Yellowstone County	157,048	30	111	Central
33540	Missoula, MT	Metro	114,181	Missoula County	114,181	30	63	Central
24500	Great Falls, MT	Metro	82,278	Cascade County	82,278	30	13	Central
14580	Bozeman, MT	Micro	100,739	Gallatin County	100,739	30	31	Central
28060	Kalispell, MT	Micro	96,165	Flathead County	96,165	30	29	Central
25740	Helena, MT	Micro	78,063	Jefferson County	11,645	30	43	Outlying
				Lewis and Clark County	66,418	30	49	Central
15580	Butte-Silver Bow, MT	Micro	34,622	Silver Bow County	34,622	30	93	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, 2015.

Montana Metropolitan Statistical Areas (MSAs)



Montana Micropolitan Statistical Areas



Appendix C, Existing and Proposed Air Monitoring Network

Existing Ambient Air Quality Monitoring Network By Location With Proposed Change

AQS Number	Site Name	Pollutant	Parameter - POC	Method Code	Method Note[1]	Method PM[2]	Frequency	Type[3]	Spatial Scale	Monitoring Objective[4]	2016 Change
30-111-0066	Billings-Coburn	SO_2	42401-1	600	7		Continuous	SLAMS	Neigh.	H,S	
		SO_2 - 5 min	42406-1	600	7		Continuous	SLAMS	Neigh.	H,S	
30-111-0085	Billings-St. Luke's	$PM_{2.5}$	88101-3	731	8	FEM	Continuous	SPM	Micro.	P	✓
30-087-0001	Birney	NO	42601-1	574	11		Continuous	SLAMS	Regional	B	✓
		NO_2	42602-1	574	11		Continuous	SLAMS	Regional	B	✓
		NO_X	42603-1	574	11		Continuous	SLAMS	Regional	B	✓
		O_3	44201-1	047	9		Continuous	SLAMS	Regional	B	✓
		PM_{10}	81102-1	150	15	FEM	Continuous	SPM NR	Neigh.	B	
		$PM_{2.5}$	88101-3	183	16	FEM	Continuous	SLAMS	Regional	B	✓
30-031-0019	Bozeman	$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM	Neigh.	P	
30-075-0001	Broadus	NO	42601-1	574	11		Continuous	SLAMS	Regional	B	✓
		NO_2	42602-1	574	11		Continuous	SLAMS	Regional	B	✓
		NO_X	42603-1	574	11		Continuous	SLAMS	Regional	B	✓
		O_3	44201-1	047	9		Continuous	SLAMS	Regional	B	✓
		PM_{10}	81102-1	150	15	FEM	Continuous	SPM NR	Neigh.	B	
		$PM_{2.5}$	88101-3	183	16	FEM	Continuous	SLAMS	Regional	B	✓
30-093-0005	Butte-Greeley	PM_{10}	81102-4	122	4	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88101-2	116	2	FRM	1 in 6 coll[5]	QA Col			
		$PM_{2.5}$ Spc'n	Various		6	FRM	1 in 6	CSN	Neigh.	H,P	
30-029-0049	Flathead Valley	PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh	P	
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh	P	
30-063-0037	Frenchtown	$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	P	
30-013-0001	Great Falls-OP	$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM NR	Middle	H,P	
30-081-0007	Hamilton	$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
30-049-0026	Helena-Rossiter	$PM_{2.5}$	88101-3	183	16	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88101-2	116	2	FRM	1 in 6 coll[5]	QA Col			
		$PM_{2.5}$	88101-4	170	8	FEM	Continuous – coll[6]	QA Col			
30-029-0047	Kalispell-FEC	PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	H,P	
30-053-0018	Libby	PM_{10}	81102-1	150	15	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88101-3	183	16	FEM	Continuous	SLAMS	Neigh.	H,P	
30-027-0006	Lewistown	NO	42601-1	599	10		Continuous	SPM	Regional	B	✓
		NO_2	42602-1	599	10		Continuous	SPM	Regional	B	✓
		NO_X	42603-1	599	10		Continuous	SPM	Regional	B	✓
		O_3	44201-1	047	9		Continuous	SPM	Regional	B	✓
		PM_{10}	81102-1	150	15	FEM	Continuous	SPM NR	Neigh.	B	
		$PM_{2.5}$	88101-3	183	15	FEM	Continuous	SPM	Regional	B	✓
30-071-0010	Malta	NO	42601-1	599	10		Continuous	SPM	Regional	B	✓
		NO_2	42602-1	599	10		Continuous	SPM	Regional	B	✓
		NO_X	42603-1	599	10		Continuous	SPM	Regional	B	✓
		O_3	44201-1	047	9		Continuous	SPM	Regional	B	✓
		PM_{10}	81102-1	150	15	FEM	Continuous	SPM NR	Neigh.	B	
		$PM_{2.5}$	88101-3	183	16	FEM	Continuous	SPM	Regional	B	✓
30-063-0024	Missoula-Boyd	O_3	44201-1	047	9		Continuous	SLAMS	Neigh.	P	
		PM_{10}	81102-6	122	4	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
30-063-0038	Seeley Lake	$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM NR	Neigh.	H,P	
30-083-0001	Sidney	NO	42601-1	599	10		Continuous	SLAMS	Neigh.	S	
		NO_2	42602-1	599	10		Continuous	SLAMS	Neigh.	S	
		NO_X	42603-1	599	10		Continuous	SLAMS	Neigh.	S	
		O_3	44201-1	047	9		Continuous	SLAMS	Neigh.	S	
		SO_2	42401-1	600	7		Continuous	SLAMS	Neigh.	S	
		SO_2 - 5 min	42406-1	600	7		Continuous	SLAMS	Neigh.	S	
		PM_{10}	81102-1	150	15	FEM	Continuous	SPM NR	Neigh.	S	
		$PM_{2.5}$	88101-3	183	16	FEM	Continuous	SLAMS	Neigh.	S	

Continued...

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

AQS Number	Site Name	Pollutant	Parameter - POC	Method			Frequency	Type[3]	Spatial Scale	Monitoring Objective[4]	2016 Change
				Code	Note[1]	PM[2]					
30-049-0004	NCore	CO	42101-1	554	13		Continuous	NCore	Region	B	
		NO	42601-1	674	14		Continuous	NCore	Region	B	
		NOy	42600-1	674	14		Continuous	NCore	Region	B	
		O_3	44201-1	047	9		Continuous	NCore	Region	B	
		SO_2	42401-1	600	14		Continuous	NCore	Region	B	
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	NCore	Region	B	
		$PM_{2.5}$	88101-1	116	2	FRM	1 in 3	NCore	Region	B	
		$PM_{2.5}$ Spc'n	Various		6	FRM	1 in 3	NCore	Region	B	
		PM_{coarse}	86101-1	185	12	FEM	Continuous	NCore	Region	B	
30-089-0007	Thompson Falls	PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	H, P	
30-031-0017	West Yellowstone	CO	42101-1	093	1		Continuous	SPM NR	Micro	S	✓
		NO	42601-1	599	10		Continuous	SPM NR	Micro	S	✓
		NO_2	42602-1	599	10		Continuous	SPM NR	Micro	S	✓
		NO_X	42603-1	599	10		Continuous	SPM NR	Micro	S	✓
		$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM NR	Micro	S	✓
30-029-0009	Whitefish	PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	P	

[1] **Method Notes**

1 Teledyne-API Model 300 Nondispersive infrared CO analyzer (FEM)
2 BGI-PQ200 with very sharp cut cyclone (FEM)
3 BGI-PQ200 with WINS eliminator (FRM)
4 MetOne BAM 1020 Beta attenuation monitor (PM_{10} FEM)
5 MetOne BAM 1020 with $PM_{2.5}$ sharp cut cyclone Beta attenuation monitor
6 MetOne / URG Speciation Air Sampling System (FRM)
7 Teledyne-API Model T100U Ultraviolet SO_2 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 O_3 analyzer (FEM)
10 Teledyne-API Model T200U Chemiluminescence analyzer $NO/NO_x/NO_2$ (FRM)
11 Thermo Model 42i TL Chemiluminescence $NO/NO_x/NO_2$ 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-NOy chemiluminescent specialty trace level gas analyzer
15 Thermo Scientific 5014i Beta continuous particulate monitor for PM_{10} (FEM)
16 Thermo Scientific, 5014i Beta continuous particulate monitor for $PM_{2.5}$ (FEM)

[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

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

AQS Number	Site Name	Pollutant	2016 Change Summary	Network Plan Reference
30-087-0001	**Birney**	NO	Spatial scale: From Neighborhood to Regional in plan	Section II.C.1
		NO_2		
		NO_X		
		O_3		
		$PM_{2.5}$		
30-075-0001	**Broadus**	NO	Spatial scale: From Neighborhood to Regional in plan	Section II.C.1
		NO_2		
		NO_X		
		O_3		
		$PM_{2.5}$		
30-027-0006	**Lewistown**	NO	1) Spatial scale: From Neighborhood to Regional in plan 2) Monitor Type: From SPM-NR to SPM in plan	Section II.C.2
		NO_2		
		NO_X		
		O_3		
		$PM_{2.5}$		
30-071-0010	**Malta**	NO	1) Spatial scale: From Neighborhood to Regional in plan 2) Monitor Type: From SPM-NR to SPM	Section II.C.2
		NO_2		
		NO_X		
		O_3		
		$PM_{2.5}$		
30-031-0017	**West Yellowstone**	CO	Monitors Discontinued	Section II.B
		NO		
		NO_2		
		NO_X		
		$PM_{2.5}$		

Appendix D, Ambient Air Quality Summary, Calendar Year 2015

Site	Parameter	Units	Annual Values[1]			Data Capt. %	NAAQS Comparison[2]		NAAQS[3]		NAAQS Design Value[4]	
			Min	Max	Ave		# >	# > 80%	Short-term	Extended	Short-term	Extended
Billings - Coburn Road	SO_2	ppb	0	61	1	90	0	0	75	0.5	78	0[5]
Billings - St. Lukes	$PM_{2.5}$	ug/m^3	0.8	44.1	7.4	89	1	2	35	12	20	7.8
Birney - Tongue River	NO_2	ppb	0	7	0	80	0	0	100	53	6	0.4
Birney - Tongue River	OZONE	ppm	0.001	0.065	0.029	94	0	2	0.070	--	0.055	--
Birney - Tongue River	PM_{10} STD	ug/m^3	1	71	15	87	0	0	150	--	0[5]	--
Birney - Tongue River	$PM_{2.5}$	ug/m^3	0	17.4	5.2	87	0	0	35	12	12	4.8
Bozeman High School	$PM_{2.5}$	ug/m^3	0.8	101	7.9	90	4	9	35	12	NA[6]	NA[6]
Broadus - Powder River	NO_2	ppb	0	12	0	91	0	0	100	53	10	0.7
Broadus - Powder River	OZONE	ppm	0.001	0.092	0.031	96	1	5	0.070	--	0.055	--
Broadus - Powder River	PM_{10} STD	ug/m^3	2	105	23	90	0	0	150	--	0[5]	--
Broadus - Powder River	$PM_{2.5}$	ug/m^3	0.4	30	5.7	87	0	1	35	12	14	5.4
Butte - Greeley School	PM_{10} STD	ug/m^3	1	65	16	85	0	0	150	--	0[5]	--
Butte - Greeley School	$PM_{2.5}$	ug/m^3	0	36.7	8.1	85	1	2	35	12	29	8.6
Flathead Valley	PM_{10} STD	ug/m^3	1	97	16	89	0	0	150	--	0[5]	--
Flathead Valley	$PM_{2.5}$	ug/m^3	0.5	39.5	8.4	87	3	5	35	12	28	8.1
Frenchtown - Beckwith	$PM_{2.5}$	ug/m^3	2.5	30	9.5	89	0	1	35	12	25	8.9
Great Falls - Overlook Park	$PM_{2.5}$	ug/m^3	0.8	82.8	8.4	95	9	10	35	12	NA[6]	NA[6]
Hamilton - PS #46	$PM_{2.5}$	ug/m^3	0	41.6	6.4	89	5	8	35	12	29	7.2
Helena - Rossiter Pump	$PM_{2.5}$	ug/m^3	0.5	40.9	7.7	91	2	8	35	12	26	7.3
Helena - Rossiter Pump	$PM_{2.5}$ COL	ug/m^3	0	38	7.8	38	1	3	35	12	NA[7]	NA[7]
Kalispell - Flathead Electric	PM_{10} STD	ug/m^3	9	139	30	99	0	2	150	--	0[5]	--
Lewistown - Lewistown	NO_2	ppb	0	27	0	92	0	0	100	53	13	0.6
Lewistown - Lewistown	OZONE	ppm	0.005	0.066	0.033	97	0	4	0.070	--	0.055	--
Lewistown - Lewistown	PM_{10} STD	ug/m^3	0	27	6	94	0	0	150	--	0[5]	--
Lewistown - Lewistown	$PM_{2.5}$	ug/m^3	0	13.8	3.9	95	0	0	35	12	10	3.8
Libby - Courthouse Annex	PM_{10} STD	ug/m^3	3	80	19	73	0	0	150	--	0[5]	--
Libby - Courthouse Annex	$PM_{2.5}$	ug/m^3	0.9	31.7	11.2	88	0	5	35	12	27	10.2
Malta - Malta	NO_2	ppb	0	11	0	98	0	0	100	53	7	0.6
Malta - Malta	OZONE	ppm	0.004	0.067	0.03	92	0	11	0.070	--	0.055	--
Malta - Malta	PM_{10} STD	ug/m^3	0	56	8	91	0	2	150	--	0[5]	--
Malta - Malta	$PM_{2.5}$	ug/m^3	0	12.8	4.7	92	0	0	35	12	14	6.2
Missoula - Boyd Park	OZONE	ppm	0	0.179	0.018	94	2	2	0.070	--	0.055	--
Missoula - Boyd Park	PM_{10} STD	ug/m^3	3	78	18	93	0	0	150	--	0[5]	--
Missoula - Boyd Park	$PM_{2.5}$	ug/m^3	1	30.9	8	90	0	3	35	12	22	7.2
Missoula - Boyd Park	$PM_{2.5}$ COL	ug/m^3	0	23.7	6	62	0	0	35	12	NA[7]	NA[7]
NCore - Sieben's Flat	CO TRACE	ppb	24	1107	164	77	0	0	35000	9000	0	0
NCore - Sieben's Flat	NO_Y	ppb	0	13.6	1	70			--	--	--	--
NCore - Sieben's Flat	OZONE	ppm	0	0.064	0.034	96	0	4	0.070	--	0.056	--
NCore - Sieben's Flat	PM_{10} STD	ug/m^3	0	59	6	94	0	0	150	--	0[5]	--
NCore - Sieben's Flat	$PM_{2.5}$	ug/m^3	0	13.9	2.8	95	0	0	35	12	10	3.3
NCore - Sieben's Flat	PM_{COARSE}	ug/m^3	0	35	3	94			--	--	--	--
NCore - Sieben's Flat	SO_2	ppb	0	8.5	0.1	87	0	0	75	500	2	0
Seeley - Elementary School	$PM_{2.5}$	ug/m^3	0.3	54.2	13.3	88	11	31	35	12	NA[6]	NA[6]
Sidney - Oil Field	NO_2	ppb	0	13	0	98	0	0	100	53	--	--
Sidney - Oil Field	OZONE	ppm	0.004	0.07	0.035	98	0	7	0.070	--	0.056	--
Sidney - Oil Field	PM_{10} STD	ug/m^3	1	76	16	89	0	0	150	--	0	--
Sidney - Oil Field	$PM_{2.5}$	ug/m^3	0	12.8	5.2	88	0	0	35	12	15	7.0
Sidney - Oil Field	SO_2	ppb	0	8	0	93	0	0	75	53	5	0
Thompson Falls High School	PM_{10} STD	ug/m^3	5	143	22	99	0	3	150	--	0	--
West Yellowstone	CO	ppm	0	33.5	0.1	77	0	2	35	9	0	0
West Yellowstone	NO_2	ppb	0	48	1	76	0	0	100	53	--	--
West Yellowstone	$PM_{2.5}$	ug/m^3	0	49.5	2.4	94	1	1	35	12	NA[6]	NA[6]
Whitefish - Dead End	PM_{10} STD	ug/m^3	3	135	29	94	0	2	150	--	0	--

(1) Based on 1-hour average values for gaseous parameters and 24-hour average for particulates. Data set excludes 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 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 does not necessarily indicate an exceedance occurred.

(3) NAAQS averaging times:

Averaging Time	CO	NO_2	$PM_{2.5}$	SO_2
Short-term	1-hour	1-hour	24-hour	1-hour
Extended	8-hour	Annual	Annual	3-hour

(4) Design Values calculated by the AQS database. '--' Indicates no Design Value designated or available

(5) Value provided is the number of exceedance as determined by form of the standard.

(6) Monitors are non-Federal Equivalent Method (non-FEM) monitors operated for public information only. They are not certified to produce NAAQS-comparison data.

(7) Continuous co-located monitor operated for quality assurance means.

Appendix E, $PM_{2.5}$ Speciation Analytes

PM2.5 Speciation Analytes

	Parameter	Method
Mass - PM2.5		
PM 2.5u Gravimetric	88502	810
Trace elements (33)		
Aluminum	88104	811
Antimony	88102	811
Arsenic	88103	811
Barium	88107	811
Bromine	88109	811
Cadmium	88110	811
Calcium	88111	811
Cerium	88117	811
Cesium	88118	811
Chlorine	88115	811
Chromium	88112	811
Cobalt	88113	811
Copper	88114	811
Indium	88131	811
Iron	88126	811
Lead	88128	811
Magnesium	88140	811
Manganese	88132	811
Nickel	88136	811
Phosphorus	88152	811
Potassium	88180	811
Rubidium	88176	811
Selenium	88154	811
Silicon	88165	811
Silver	88166	811
Sodium	88154	811
Strontium	88168	811
Sulfur	88169	811
Tin	88160	811
Titanium	88161	811
Vanadium	88164	811
Zinc	88167	811
Zirconium	88185	811
Cations - PM2.5 (NH4, Na, K)		
Ammonium	88301	812
Potassium	88303	812
Sodium	88302	812
Nitrate - PM2.5		
Nitrate (Total)	88306	812
Sulfate - PM2.5		
Sulfate	88403	812
Organic and elemental carbon IMPROVE_A		
E1 IMPROVE	88383	841
E2 IMPROVE	88384	841
E3 IMPROVE	88385	841
EC IMPROVE TOR	88380	831
EC IMPROVE TOT	88357	840
O1 IMPROVE	88374	841
O2 IMPROVE	88375	841
O3 IMPROVE	88376	841
O4 IMPROVE	88377	841
OC IMPROVE TOR	88370	838
OC IMPROVE TOT	88355	839
OP IMPROVE TOR	88378	842
OP IMPROVE TOT	88388	826

Appendix F, PM2.5 FRM / FEM Comparisons

$PM_{2.5}$ FRM / FEM Comparison, Helena Rossiter School Site – 2015

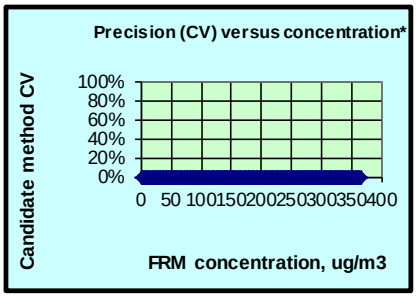
Summary - Candidate ARM Comparability

Applicant:	MT DEQ
Candidate method:	BGI PQ200 FRM (MC 116) - Class
Test site:	Helena-Rossiter Thermo 5014i FEM / BGI PQ200 FRM PM2.5 Collocation - (Site location 30-049-0026)

Data sets	Number
Valid data sets available:	54
Number of valid data sets required for ARM Comparison:	90
Number of valid data sets for this test is:	**Insufficient**
Additional data sets needed:	36

(Including **10** data sets excluded because FRM conc. < 3.)

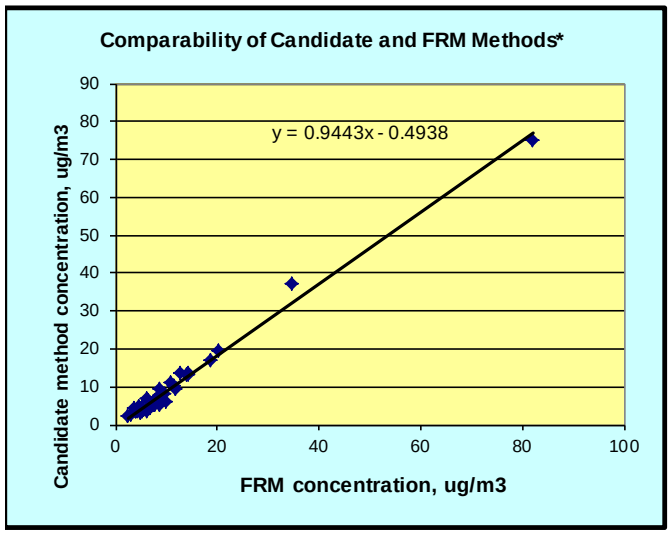
Precision (if data are available)	Data set mean, µg/m³		Data set precision, µg/m³		Relative precision (CV)	
	FRM	Candidate	FRM	Candidate	FRM	Candidate
Mean:	**9.8**	**8.6**				
Maximum:	94.2	75.1				
Minimum:	0.6	1.2				
Candidate / FRM Ratio:		88.1%				
	RMS Relative Precision for this site:					
	Test requirements - Class III:				**10.0%**	**15.0%**
	Precision Test Results for site:					

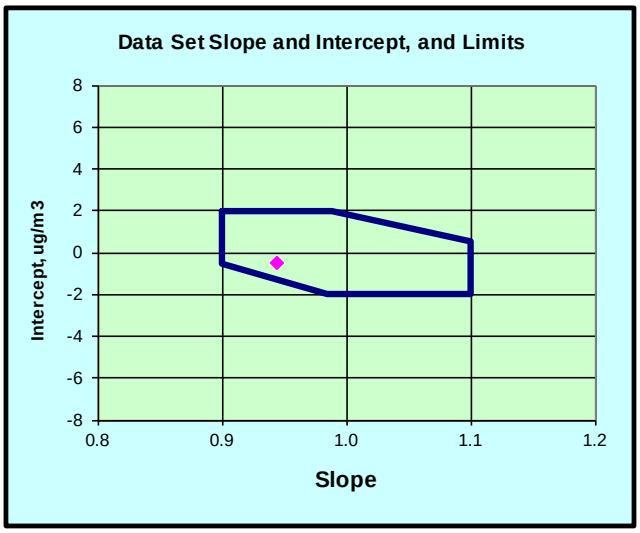


Regression statistics		Slope[1]	Intercept[2]	Correlation (r)
Statistics for this test site:		**0.945**	**-0.530**	**0.99308**
Limits for Class III	**Upper:**	**1.100**	**2.000**	
	Lower:	**0.900**	**-1.309**	**0.95000**
Test Results (Pass/Fail):		**PASS**	**PASS**	**PASS**

[1]Multiplicative bias [2]Additive bias

Note: Precision statistics can be calculated only for data sets containing multiple FRM or multiple candidate ARM





***If chart does not plot correctly, go to the Regression sheet and click on the ▼ in the Validity column and then on "ok." If new data are added, click "all" then "ok" to include the new data.**

$PM_{2.5}$ FRM / FEM Comparison, NCore Site - 2015

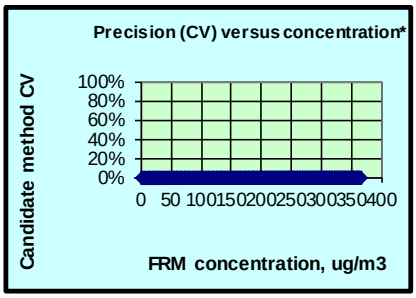
Summary - Candidate ARM Comparability

Applicant:	MT DEQ
Candidate method:	BGI PQ200 FRM (MC 116) - Class
Test site:	NCore: MetOne 1020 FEM / BGI PQ200 FRM PM2.5 Sampler Comparison - (Site location 30-049-0004)

Data sets	Number
Valid data sets available:	115
Number of valid data sets required for ARM Comparison:	90
Number of valid data sets for this test is:	**OK**
Additional data sets needed:	--

(Including **83** data sets excluded because FRM conc. < 3.)

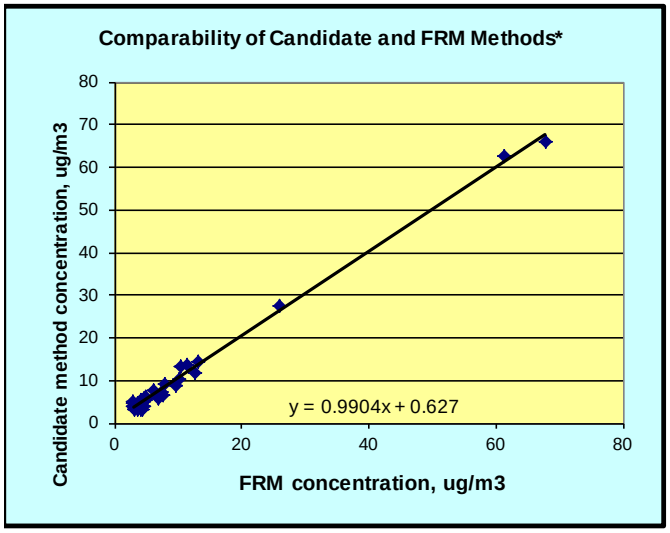
Precision (if data are available)	Data set mean, µg/m³		Data set precision, µg/m³		Relative precision (CV)	
	FRM	Candidate	FRM	Candidate	FRM	Candidate
Mean:	**4.6**	**4.6**				
Maximum:	85.4	66.0				
Minimum:	-1.1	0.3				
Candidate / FRM Ratio:		100.8%				
	RMS Relative Precision for this site:					
	Test requirements - Class III:				**10.0%**	**15.0%**
	Precision Test Results for site:					

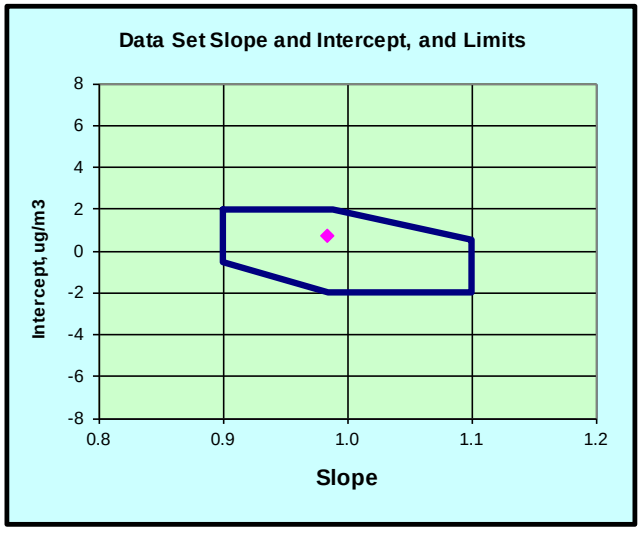


Regression statistics		Slope[1]	Intercept[2]	Correlation (r)
Statistics for this test site:		**0.984**	**0.746**	**0.99118**
Limits for Class III	**Upper:**	**1.100**	**2.000**	
	Lower:	**0.900**	**-1.997**	**0.95000**
Test Results (Pass/Fail):		**PASS**	**PASS**	**PASS**

[1]Multiplicative bias [2]Additive bias

Note: Precision statistics can be calculated only for data sets containing multiple FRM or multiple candidate ARM





***If chart does not plot correctly, go to the Regression sheet and click on the ▼ in the Validity column and then on "ok." If new data are added, click "all" then "ok" to include the new data.**

$PM_{2.5}$ FRM / FEM Comparison, Butte Site- 2015

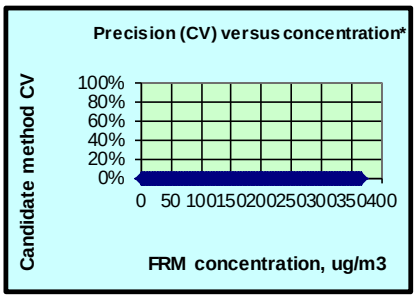
Summary - Candidate ARM Comparability

Applicant:	MT DEQ
Candidate method:	BGI PQ200 FRM (MC 116) - Class
Test site:	Butte-Greeley MetOne 1020 FEM / BGI PQ200 FRM PM2.5 Collocation - (Site location 30-093-0005)

Data sets	Number
Valid data sets available:	53
Number of valid data sets required for ARM Comparison:	90
Number of valid data sets for this test is:	**Insufficient**
Additional data sets needed:	37

(Including **9** data sets excluded because FRM conc. < 3.)

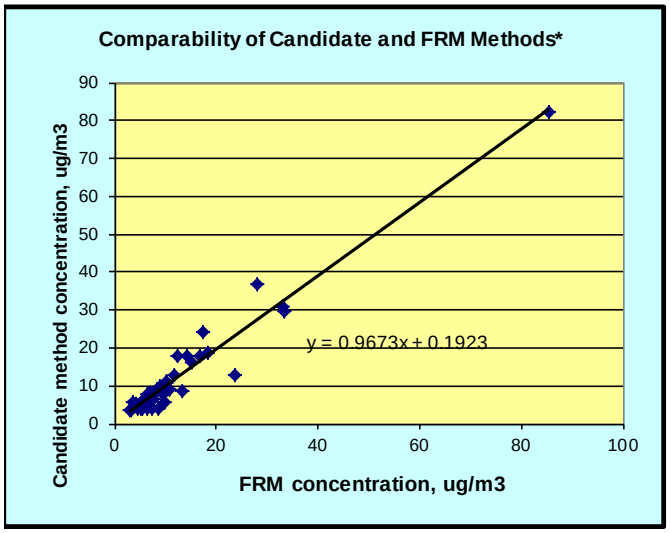
Precision (if data are available)	Data set mean, µg/m³		Data set precision, µg/m³		Relative precision (CV)	
	FRM	Candidate	FRM	Candidate	FRM	Candidate
Mean:	**10.3**	**10.1**				
Maximum:	89.3	82.4				
Minimum:	-1.0	1.5				
Candidate / FRM Ratio:		98.3%				
	RMS Relative Precision for this site:					
	Test requirements - Class III:				**10.0%**	**15.0%**
	Precision Test Results for site:					

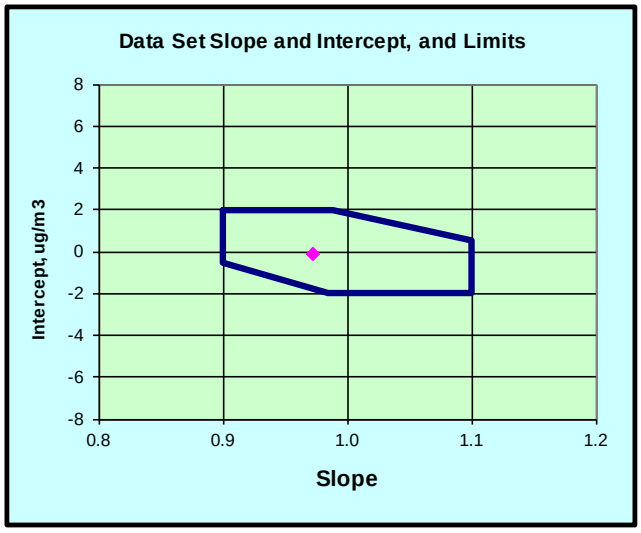


Regression statistics		Slope[1]	Intercept[2]	Correlation (r)
Statistics for this test site:		**0.973**	**-0.140**	**0.97117**
Limits for Class III	**Upper:**	**1.100**	**2.000**	
	Lower:	**0.900**	**-1.803**	**0.95000**
Test Results (Pass/Fail):		**PASS**	**PASS**	**PASS**

[1]Multiplicative bias [2]Additive bias

Note: Precision statistics can be calculated only for data sets containing multiple FRM or multiple candidate ARM





***If chart does not plot correctly, go to the Regression sheet and click on the ▼ in the Validity column and then on "ok." If new data are added, click "all" then "ok" to include the new data.**

Appendix G, 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_2S)	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] (2015 std)	NA	Primary & Secondary
Particulate Matter ≤ 10 µm (PM_{10})	24-Hour	150 µg/m^3 [j]	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. (effective May 27, 2008)
[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. The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard. EPA is in the process of reconsidering these standards (set in March 2008).
[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. Promulgated June 2, 2010. Expected effective date mid-August, 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/m^3), 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 SO_2 NAAQS will remain effective until one year after designations are effective for the June 2, 2010, revised SO_2 NAAQS (75 ppb), except in existing SO_2 nonattainment areas (Laurel and East Helena, MT). In Laurel and East Helena, EPA will retain the 1971 SO_2 NAAQS until EPA approves attainment and/or maintenance demonstrations for the revised SO_2 NAAQS.

Appendix H, Comments Received

The DEQ Air Quality Monitoring Network Plan was made available for public inspection as required by 40 CFR 58.10(a)(1) on May 31, 2016. The following provides a summary of comments received;

Person/Group Commenting	Comment	Response