STATE OF MONTANA

AIR QUALITY MONITORING NETWORK PLAN

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Montana Department of Environmental Quality
Air Resources Management Bureau

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Contents

Introduction

The Air Quality Monitoring Network Plan (the Plan) is produced by the Montana Department of Environmental Quality (Department) on an annual basis in order to meet three objectives. First, the Plan provides opportunity for the Department to solicit, evaluate, and respond to comments and input from County Agencies, the general public, and other Department interests regarding the Department's ambient air monitoring network. Second, the Plan development process establishes the structure for the Department to evaluate its existing monitoring network and to tailor it based on modified data needs, changing regulatory requirements, and available resources. Third, the Plan is developed and submitted to the Regional Office of the Federal Environmental Protection Agency (EPA) in fulfillment of the requirements contained in Title 40 of the Code of Federal Regulations Part 58.10 (40 CFR 58.10).

The Plan is intended to accurately describe the monitoring sites in the agency network, identify their monitoring objectives, and describe any deviations in physical characteristics or operation from regulatory requirements. The Plan also describes changes the Department anticipates making to the network in the next year.

The Department monitors air quality principally by measuring concentrations of criteria air pollutants pursuant to the federal Clean Air Act. Criteria air pollutants are the most common air pollutants with known harmful human health effects, and are the pollutants for which ambient air quality standards have been set. 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 particles with an aerodynamic diameter of 10 microns and less (PM_{10}) and particles 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 welfare. Montana has adopted similar air quality standards known as the Montana Ambient Air Quality Standards (MAAQS).

The Plan document is provided in three broad sections. The first section describes the various pollutant-specific ambient monitoring requirements and explains how the Department has implemented each as applicable. The next section describes changes to the monitoring network that the Department is proposing. The final section includes four appendices containing specific monitor information. Descriptions of the location information for each of the individual monitoring sites can be found in Appendix A. Appendix B provides both a detailed description of the existing monitors within the Department's network and a description of the monitors after proposed changes are implemented. Appendix C provides a one-page summary of the proposed network changes. Appendix D outlines the current NAAQS and MAAQS.

Ambient Air Monitoring Requirements

The term 'ambient air' is defined in 40 CFR 50.1as "that portion of the atmosphere, external to buildings, to which the general public has access. " The EPA requires each state to establish a network of monitors to measure concentrations of the criteria pollutants in the ambient air based upon population, regional air quality, and regulatory concerns.

The Department meets and exceeds its regulatory obligation for measuring air pollution throughout Montana. Currently in Montana there are no communities with populations large enough or air quality poor enough to require more than one monitoring site for any of the criteria air pollutants, although historically, multiple monitoring sites in several large communities were sometimes operated in order to make that determination.

The following sections summarize the ambient air monitoring requirements for each of the criteria air pollutants.

Ozone (O_3) Requirements

The EPA required minimum number of ozone monitors is defined in Table 1.

Table 1 - EPA Minimum O_3 Monitoring Requirements.[1]

Metropolitan Statistical Area (MSA) population[2,3]	Most recent 3-year design value concentrations ≥ 85% of any O_3 NAAQS[4]	Most recent 3-year design value concentrations < 85% of any O_3 NAAQS[4,5]
>10 million	4	2
4 – 10 million	3	1
350,000 – <4 million	2	1
50,000 – <350,000[6]	1	0

[1] From Table D-2 of Appendix D to 40 CFR Part 58
[2] Minimum monitoring requirements apply to the metropolitan statistical area (MSA)
[3] Population based on latest available census figures.
[4] 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] A MSA must contain an urbanized area of 50,000 or more population.

There are three Metropolitan Statistical Areas (MSAs) in Montana in the 50,000 to 350,000 population category, as follows:

- Billings (Yellowstone County)
- Missoula (Missoula County)
- Great Falls (Cascade County)

Based on historical and current monitoring data and professional knowledge of emission levels and meteorological patterns, the Department does not expect the O_3 levels in Montana to exceed the level of the current O_3 NAAQS. In the Billings area, the monitored O_3 design value during 2005-2007 was only 0.059 parts per million (ppm) or 78.7 percent of the current NAAQS. In Great Falls, historical monitoring data and professional judgment suggest even lower values. Monitoring is currently being conducted in Missoula (30-063-0024) to define ambient levels of O_3 in that MSA. In addition, O_3 monitoring is currently being conducted in Broadus (30-075-0001), Birney (30-087-0001), Sidney (30-083-0001), and at the new National Core Monitoring Site (NCore, 30-049-0004) to define background concentrations of this pollutant. To-date, the collected information from these sites indicates that O_3 is not currently a pollutant of concern in Montana.

It is significant to note that the O_3 NAAQS are under review by EPA. The level of the new primary NAAQS may be reduced from the current 0.075 ppm to between 0.060 and 0.070 ppm. The revised primary standard may also include a rural monitoring requirement which could be satisfied by the background NCore site or one of the sites in eastern Montana (e.g. Broadus). Additionally, the potential revisions to the O_3 NAAQS might include changing the secondary NAAQS to reflect the cumulative exposure of vegetation to O_3 over the growing season. The affect of a new secondary NAAQS cannot be projected at this time. It would likely take years of rural monitoring to determine compliance with a secondary NAAQS.

Lead (Pb) Requirements

On December 27, 2010, the EPA published a new lead monitoring rule to implement the assessment of compliance with a new lead NAAQS promulgated in 2008. The new monitoring rule requires states to establish air quality monitoring near industrial facilities that emit more than 0.5 tons per year (tpy) of lead into the atmosphere or in large urban areas with a population greater than 500,000 people. While Montana does not have any communities that meet the latter criteria, questions have been raised regarding whether or not any facilities in the state meet or exceed the 0.5 tpy emissions threshold. Three facilities have been examined for their total lead emissions.

Initially, EPA's estimates indicated that the emissions from the Montana Tunnels Mining Corporation facility near Jefferson City, Montana, exceeded the lead monitoring threshold. The EPA-estimated emissions from this facility were based upon Toxic Release Inventory (TRI) reports provided by Montana Tunnels and not upon standard air program reporting practices. The facility has provided documentation to the Department that indicates that the TRI reporting rules and procedures resulted in greatly overestimated quantities of lead emitted into the atmosphere from this operation. In addition, the mining operations at the facility ceased in 2008 and milling operations were shut down in April of 2009. The facility has no immediate plans for reopening. Consequently, the Department does not believe that lead emissions from this facility exceed the 0.5 tpy threshold, and no monitoring is currently necessary.

Next, EPA projected that the Park County Landfill incinerator also exceeds the lead monitoring threshold. The Park County Incinerator previously operated in the state of Montana and held both a Montana Air Quality Permit and a Title V Operating Permit. On January 31, 2003, the EPA promulgated the "Federal Plan Requirements for Small Municipal Waste Combustion Units Constructed on or before August 30, 1999." The Park County Incinerator would have needed to comply with these requirements. On August 24, 2004, Park County submitted a closure agreement to EPA. In a letter dated October 4, 2004, EPA responded to Park County accepting the Municipal Waste Combustion Unit Closure Agreement submitted pursuant to 40 CFR 62.15095, and accepted the promise to close the facility prior to May 6, 2005. The facility was shut down prior to May 6, 2005. The Department received a request from Park County to revoke both of their air quality permits in a letter dated May 23, 2005. Montana Air Quality Permit #1629 was revoked on June 15, 2005, and Montana Title V Operating Permit #OP1629-01 was revoked on July 17, 2005. This facility has not operated for a considerable period of time, and currently is not permitted to operate; therefore no lead monitoring is necessary.

Most recently, EPA revised estimates of lead emissions from coal fired electric generating plants, and in so doing projected that lead emissions from the Colstrip generating facility in Rosebud County Montana exceed the lead monitoring threshold. The Department does not have reliable estimates of lead emissions from Colstrip, and so contacted representatives from the facility in an effort to obtain this information. Colstrip has conducted EPA-required air toxics stack testing on two of the units at the facility in representation of the four units present there. Currently, results are available from one of the two tests and results from the second test are expected shortly. Based on the results of the first test Colstrip is extrapolating that total lead emissions from the entire facility are less than 0.5 tpy. The Department is waiting on results from the second test and subsequent communication from Colstrip, and will make a determination on the need for lead monitoring at the facility when those documents are received.

Historically, the Department has monitored lead in the community of East Helena, Montana. This community is the site of ASARCO's now-defunct primary lead smelter, and was designated as a nonattainment area (NAA) for lead (and sulfur dioxide) during the smelter's operation. The ASARCO smelter ceased operations in 2003, and shortly thereafter the Department stopped lead monitoring when the measured ambient levels dropped well below the lead NAAQS.

Particulate Matter ≤ 10 Microns in Diameter (PM_{10}) Requirements

The minimum number of PM_{10} monitoring sites required by EPA is shown in Table 2.

Table 2 - EPA Minimum PM_{10} Monitoring Requirements.[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 Department.
[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.

Based on these criteria, no PM_{10} monitoring is required because the populations in Montana's three MSAs are not high enough to meet the medium concentration requirement. In 2006, EPA revoked the annual PM_{10} NAAQS but retained the 24-hour NAAQS. The Department continues to operate PM_{10} monitors in seven areas 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 are Butte, Columbia Falls, Kalispell, Libby, Missoula, Thompson Falls, and Whitefish.

The Department is currently also operating PM_{10} monitors in several areas in order to define background levels of this pollutant. These areas include Broadus, Birney, Sidney and the NCore site.

Particulate Matter ≤ 2.5 Microns in Diameter ($PM_{2.5}$) Requirements

Based on the requirements summarized below in Table 3, the number of $PM_{2.5}$ monitoring sites required by EPA is based on the $PM_{2.5}$ design criteria and the population of the MSAs. In Montana, there are only three MSAs and all fall into the smallest population category. The Missoula MSA is the only one with a $PM_{2.5}$ design value greater than 85 percent of the NAAQS, thus it is the only Montana community required to have a $PM_{2.5}$ monitoring site. This requirement is currently met in Missoula with the operation of three $PM_{2.5}$ monitoring sites: one at the Missoula City-County Health Department (#30-063-0031), one at Boyd Park (#30-063-0026) and one at Frenchtown (#30-063-0037).

Table 3 – EPA Minimum $PM_{2.5}$ Monitoring Requirements.[1]

MSA population[1,2]	Most recent 3-year design value ≥85% of any $PM_{2.5}$NAAQS[3]	Most recent 3-year design value <85% of any $PM_{2.5}$NAAQS[3,4]
>1,000,000	3	2
500,000–1,000,000	2	1
50,000–<500,000[5]	1	0

[1] From Table D-5 of Appendix D to 40 CFR Part 58. Minimum monitoring requirements apply 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.
[5] A MSA is an urbanized area with a population of 50,000 or more.

The Department's $PM_{2.5}$ monitoring network goes well beyond the minimum requirements. The Department and the local county air quality programs operate $PM_{2.5}$ monitors in several communities with potential wintertime air quality issues as well as a network of continuous monitors to provide near real-time public exposure information of particular interest during the summer wildfire season. In addition, as with PM_{10}, the Department operates several $PM_{2.5}$ monitors to define background concentrations of this pollutant.

Sulfur Dioxide (SO_2) Requirements

EPA published revisions to the SO_2 NAAQS and monitoring requirements on June 22, 2010. The new Primary NAAQS focuses on shorter-term exposure to SO_2 by establishing a 1-hour standard and by requiring monitoring agencies to collect and report the highest 5-minute block average concentration within each hour. In addition, EPA modified the criteria used to determine the numbers of SO_2 monitors required based on two new 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, divided by 1,000,000). Table 4 summarizes the requirements for numbers of SO_2 monitors.

Table 4 – EPA Minimum $PM_{2.5}$ Monitoring Requirements.[1]

CBSA PWEI	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

Billings is the only community in Montana that has the potential to require SO_2 monitoring based on total SO_2 emissions and population. The Billings/Yellowstone County PWEI was calculated as follows:

Yellowstone County 2010 Census Population : 147,972
MTDEQ 2010 SO_2 Emissions (tons per year) : 8,166

(147,972 x 8,166) / 1,000,000 = 1,208

Based on the listed criteria, neither Billings nor any of the Montana CBSAs present an SO_2 PWEI that approaches or exceeds 5,000. Consequently, no Department SO_2 monitoring is required by the revised NAAQS. However, the Department continues to operate one long-term SO_2 monitor at the Coburn Road site (30-111-0066) in Billings (designated as a State or Local Air Monitoring Station or SLAMS), and began operating a background SO_2 monitor at the Sidney site (30-083-0001) on June 1, 2010. In addition, the Department began collecting and reporting the NAAQS-required maximum 5-minute block data at both sites on September 1, 2010. In January of 2011 the Department also began monitoring background levels of SO_2 at its NCore station (30-049-0004) as discussed later in this document.

Beyond the Department-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 in the community of Black Eagle is operated by the Montana Refining Company as required by their air quality permit. In the Billings/Laurel area there are currently four industry-operated sites. One is operated by the Yellowstone Electric Limited Partnership (YELP) as a condition of their air quality permit, and three are operated by a consortium of local SO_2-emitting industries (the Billings Laurel Air Quality Technical Committee or BLAQTC). The Department performs periodic quality assurance audits of these sites. YELP operates under its own approved Quality Assurance Project Plan (QAPP). The Department enters the YELP data into AQS but is not the Primary Quality Assurance Organization (PQAO) for that site. The Department's Relationship with BLAQTC is more complex. BLAQTC operates these monitors under its own approved QAPP, but by legislative agreement the Department must maintain an oversight role in the BLAQTC monitoring efforts. Currently the Department reviews and enters the SO_2 monitoring data from just one of the BLAQTC sites (Lockwood Park, 30-111-1065) into AQS, in addition to the auditing function discussed previously. The Department believes that the data obtained from the YELP and BLAQTC monitors meet the commitments of the individual QAPPs and is therefore of regulatory quality.

Currently, the Department looks principally to the Coburn Road SLAMS monitor for NAAQS compliance determination in the Billings area, but continues to examine the YELP and BLAQTC data for contrast and comparison purposes, and may use the YELP and BLAQTC data for NAAQS compliance evaluation in the future as necessary.

Nitrogen Dioxide (NO_2) Requirements

EPA revised the NO_2 NAAQS and related monitoring requirements in January, 2010. Per EPA communication, the new monitoring requirement's focus is that "monitoring is needed to measure:

- Peak, short-term concentrations – primarily near major roads in urban areas;
- Highest concentrations of NO_2 that occur over wider community areas; and
- Concentrations impacting susceptible and vulnerable groups."

The resulting monitoring requirements are summarized in Table 5.

Table 5 – EPA Minimum NO_2 Monitoring Requirements[1].

Criteria	Minimum # of NO_2 Monitors Required
CBSA[2] Population ≥ 500,000	At least 1near a major road
CBSA Population ≥ 2.5 million	At least 2 near major roads
CBSA Population ≥ 500,000 and Road Segments with annual average daily traffic counts ≥250,000	A second monitor is required near a major road
Population ≥ 1million	At least 1 community-wide monitor
Communities determined to be susceptible and vulnerable to NO_2 -related health effects	As determined by Regional EPA Administrators in conjunction with states. At least 40 additional monitors nationwide.

[1] From Appendix D to 40 CFR Part 58, Sec 4.3.2
[2] Core Based Statistical Area (CBSA-- a county or counties with at least one urbanized area of at least 10,000 people population)

No Montana communities meet any of the listed criteria; therefore no NO_2 monitors are currently required.

As with O_3, the Department currently operates three non-required monitoring sites in an effort to determine NO_2 background concentrations and concentration impacts associated with the oil and gas industry in the eastern part of the state. NO_2 is monitored at the following locations:

- Sidney (30-083-0001);
- Broadus (30-075-0001); and
- Birney (30-087-0001).

In a related effort, the Department has recently begun monitoring general background concentrations of NO_Y at the Sieben's Flat NCore site (30-049-0004) near Helena. NO_Y includes NO_2, though the NO_2 fraction is not quantified.

Carbon Monoxide (CO) Requirements

On January 31, 2011, after a lengthy scientific review, EPA announced that there was no reason to revise the current CO NAAQS. Therefore, Montana has no requirement for a minimum number of CO monitoring sites. In Montana, like most other states, ambient CO concentrations are normally closely associated with motor vehicle emissions. Ambient CO concentrations increase near locations with high traffic volumes and under conditions of poor atmospheric ventilation. Currently, the Department and local county air programs conduct CO monitoring in the communities of Missoula, Great Falls, and Billings.

In 2003, EPA approved Limited Maintenance Plans (LMPs) for Great Falls and Billings as allowed for by the federal Clean Air Act. However, EPA requires states to develop a second LMP eight years following the approval of the first and submit it to EPA for approval into the State Implementation Plan (SIP). The Department revised the CO LMPs and anticipates submission of the second LMPs in June, 2011.

Due to consistently low CO concentrations and the need to re-direct limited resources to core air monitoring priorities, the Department reduced CO monitoring in Great Falls, Missoula, and Billings to only the first and fourth quarters of each calendar year. In 2011, the Department will request the termination of all CO monitoring in Montana following submission of SIP modifications which address the use of alternative monitoring techniques.

National Core Monitoring Site (NCore) Requirements

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 $PM_{2.5}$, PM10, $PM_{10\text{-}2.5}$, speciated $PM_{2.5}$, O_3, SO_2, CO, NO_Y, lead, and basic meteorology. The majority of NCore sites across the nation are established in urban areas. In Montana, 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 (30-049-0004) was installed in late 2010, and the parameters were functional and acquiring data within the first week of January 2011. Table 6 summarizes the monitored parameters at the Department's NCore station and their respective start-up dates.

Table 6 – Sieben's Flat NCore Parameters and Start-up Dates

Parameter	Collection Frequency	Start Collection Date
O_3	Continuous	01/01/11
CO	Continuous	01/05/11
SO_2 1-hour	Continuous	01/01/11*
SO_2 5-min max/hour	Continuous	01/01/11*
NO	Continuous	01/01/11*
NO_Y	Continuous	01/01/11*
$PM_{2.5}$ filter-based	24 hrs every 3rd day	01/03/11
$PM_{2.5}$ continuous	Continuous	01/01/11
$PM_{2.5}$ speciated	24 hrs every 3rd day	01/06/11
PM_{10} continuous	Continuous	01/01/11
$PM_{10-2.5}$ continuous (coarse)	Continuous	01/01/11
Wind Speed (WS)	Continuous	01/01/11
Wind Direction (WD)	Continuous	01/01/11
WD Standard Deviation	Continuous	01/01/11
Ambient Temperature	Continuous	01/01/11

* These monitors began actual operation on 01/01/11 but because of operational difficulties the start date of actual data reporting has not yet been determined. See the discussion in the text.

As noted in Table 6, all the monitors except CO were installed and operating on January 1, 2011, as required by 40 CFR 58.13(a). The start-up for CO was delayed until January 5 due to the need to provide the instrument with a purging air system. The filter-based samplers were both available for their first scheduled run day. The SO_2 and NO_Y monitors were both on-line and collecting data on January 1, but quality assurance concerns have resulted in the Department initiating a review to determine when the produced values were of sufficient quality to include in the federal AQS database. Essentially the concern involves the consistency in the way both of these analyzers respond to zero concentrations of test gases and the appropriateness of EPA-published guidelines for the limits of acceptability on these very low-level instruments. The Department believes that good quality data was being collected within the month of January, but an official start date has not yet been agreed upon.

Other Monitoring Requirement Issues

The Department 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). There are only two sites currently not meeting all of the Appendix E siting requirements. The Hamilton - PS#46 (30-081-0007) and Columbia Falls - Ball Park (30-029-0007) sites are located within 15 meters of roads; however, the sites are next to roads with extremely low traffic counts. There is also a tree at the Columbia Falls site partially obstructing the air flow. The Department understands that EPA Region 8 has approved site location wavers for these sites. In addition, the Department is proposing to move the Columbia Falls site as discussed later in this document.

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 present), and the Permitting, Planning, and Monitoring sections of the Department's Air Resources Management Bureau. The Air Monitoring Section would solicit public feedback through the public comment period of the annual Monitoring Network Plan. Simultaneously, the Department would solicit comment 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. Montana does not have any community monitoring zones nor anticipates creating one, so the impact of relocating a site on such zones is not relevant.

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. The only $PM_{2.5}$ site in the Montana network of this nature is the one at the west entrance to Yellowstone National Park (30-031-0017). All other $PM_{2.5}$ monitors designated as Federal Reference Method or equivalent (FRM/FEM) generate data suitable for determining compliance with the $PM_{2.5}$ NAAQS. The Department has historically operated non-FEM $PM_{2.5}$ monitoring equipment for general information purposes, and will continue to do so. The tables in Appendix B discriminate between FRM, FEM and non-FEM PM instrumentation operated within the Department's network.

Proposed Changes to the Monitoring Network

Introduction

The Department's Air Monitoring 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. This Plan document is the result of considerable discussion between the Air Monitoring Section and its data users, both within the Department and at the county level; and also includes consideration of the Department's desire to provide air quality data to the public. Within this broad process the Department reviewed air pollutant trends, known and projected emission changes, and revisions to the NAAQS and monitoring rules; then attempted to balance those realities against available resources. The changes proposed in this document reflect the results of that process.

Overall, the proposed changes to Montana's ambient air monitoring network pertain to three general areas:

A. Consolidation of $PM_{2.5}$ monitoring efforts in western Montana;
B. Termination of CO monitoring; and
C. Other minor and general changes.

A discussion of each of these areas follows. All the network changes proposed by the Department are summarized in Appendix C.

A. Consolidation of $PM_{2.5}$ Monitoring Efforts in Western Montana

Background

Fine particulate is a pollutant of considerable concern in western Montana. The majority of Montana's population resides in the western third of the state in mountain valley communities which are sometimes poorly ventilated. Unlike the eastern part of the state which experiences consistent surface winds, the rugged terrain of western Montana tends to deflect winds upward and allow air in the valleys to stagnate. This tendency is worsened in the winter when cold, dense air collects in the valleys with warmer air above. The cloud layer that forms at the temperature transition zone during these inversions blocks solar input into the valleys creating a stable, stagnant condition that can persist until blown out by a substantial wind. In most western Montana communities firewood is relatively available and is commonly combusted for space heating purposes. The resulting wood smoke, combined with the stagnant wintertime air conditions, can result in high $PM_{2.5}$ concentrations. Chemical mass balance studies have shown that about 70 percent of the winter-time $PM_{2.5}$ in the most populated valleys comes from wood burning.

These circumstances have resulted in the Department establishing a substantial fine particulate monitoring network to track population exposure to this pollutant. The Department's Air Monitoring Section has created a website (http://todaysair.mt.gov) where near real-time $PM_{2.5}$ data from 14 sites is available for public information and regulatory response. Three of the sites exist primarily to provide broader state-wide representation, particularly for summer wildfire events, but most sites exist to monitor winter population exposure and to provide data for local burning control programs. Table 7 provides 24-hour average design values for western Montana valley communities for the 2008 to 2010 period. The average design values do not always represent data approved for regulatory purposes. In some cases, the averages were calculated excluding all wildfire effects and combing data from multiple monitors. Complete data sets were not available in all cases, but the numbers are indicative of air quality in the listed communities relative to the NAAQS during the last 3 years.

Table 7 – $PM_{2.5}$ Levels (24-hour averages)

Community	Design Value 2008 – 2010
Butte	37.7
Helena	34.4
Libby	30.7
Hamilton	29.8
Belgrade	27.9
Columbia Falls	27.4
Missoula	23.7
West Yellowstone	21.0
Whitefish	20.3
Kalispell	19.1
Thompson Falls	17.4

Proposed Modifications

In reviewing the Department's $PM_{2.5}$ network, four issues become prominent:

1. $PM_{2.5}$ Design Values that are consistently below the NAAQS;
2. Multiple, duplicative monitors representing the same airshed;
3. Limited operating resources; and
4. The Department's ongoing goal to replace filter-based monitors with monitors that collect PM data continuously.

As a result of the analysis of the network in light of these four issues, the Department is proposing the following changes:

1. Discontinue $PM_{2.5}$ monitoring at Thompson Falls (30-089-0007). Adequate data has been collected to determine that this area is not at risk of exceeded the $PM_{2.5}$ NAAQS (note also the value for Thompson Falls in Table 7). The continued operation of this site no longer warrants the expenditure of limited available resources.

2. Discontinue $PM_{2.5}$ monitoring at Belgrade-Wastewater Lagoon (30-031-0018). This site was originally added as a backup/alternative to the Belgrade ConAgra site (30-031-0008) which is approximately 1.5 miles away. It was established because of concern that the property lease at ConAgra might be discontinued, a dynamic that has not taken place. Monitored values at the Wastewater site are consistently lower than at ConAgra. Consequently, the site is redundant and will be discontinued.

3. Replace the filter-based monitors at Libby (30-053-0018) with continuous, Federal Equivalent Method monitors.

4. Discontinue $PM_{2.5}$ monitoring at the Missoula Health Department Site (30-063-0031). The Health Department site in Missoula is a filter-based, collocated site. The Department has compared the 1-day-in-three monitoring results from this site with the continuous, collocated $PM_{2.5}$ monitoring site at Boyd Park (30-063-0024) located approximately 2.2 miles away. These data sets are in statistical agreement in representation of this airshed, so only one site is necessary to demonstrate NAAQS compliance and to provide health-based information to the public during periods of wildfire smoke impacts or winter inversions. The continued expenditure of limited resources to operate and maintain the Health Department site can no longer be justified. The collection of continuous $PM_{2.5}$ data is greatly preferable to the 1-day-in-three filter-based data. Therefore, the Department intends to continue monitoring at Boyd Park and discontinue monitoring at the Missoula Health Department site. The collocated $PM_{2.5}$ filter-based monitor currently located at this site would be moved to Belgrade ConAgra (30-031-0008).

5. Consolidate the PM monitoring effort within the Flathead Valley through the following steps:

    a. Discontinue $PM_{2.5}$ monitoring at Kalispell and Whitefish, and consolidate the $PM_{2.5}$ monitoring in the Flathead Valley region at a single new site in Columbia Falls.

    b. Discontinue both PM_{10} and $PM_{2.5}$ filter-based monitoring at the current Columbia Falls Ball Park site (30-029-0007). Move the PM_{10} filter-based collocated monitor to Thompson Falls High School (30-089-0007).

c. Establish continuous PM_{10} and $PM_{2.5}$ monitors at a new site near the Columbia Falls High School that meets all EPA siting criteria.

d. Replace the remaining filter-based PM_{10} monitors at Kalispell and Whitefish with continuous PM_{10} monitors.

Since April of 2008, the Department has collected $PM_{2.5}$ data at sites in Columbia Falls, Kalispell and Whitefish, all located within approximately 15 miles or less of each other in the Flathead Valley. Given the fact that all three sites are located in the same valley, the question arose as to whether or not the sites were monitoring the same or separate air sheds. The Department has analyzed the $PM_{2.5}$ data collected on the same dates from all three sites since April 2008, and the results strongly suggest that Columbia Falls has $PM_{2.5}$ concentrations consistently higher than in Kalispell or Whitefish (see Table 7).

As the results presented in Figures 1, 2 and 3 suggest, the $PM_{2.5}$ data from all three sites track very well with each other overall, and more specifically, during the 2nd and 3rd quarters (summer) or the 4th and 1st quarters (winter), respectively.

The relationship between the three sites' $PM_{2.5}$ data can also be expressed by the Pearson correlation coefficient statistical function which varies from -1 for a perfect decreasing (negative) linear relationship to +1 representing a perfect increasing (positive) linear relationship. The correlation between the three sites was analyzed for the entire dataset, as well as the "summer" and "winter" subset, and the results are presented in Table 8. Figures 1 through 3 represent the data graphically.

Table 8. Statistical relationship between Flathead $PM_{2.5}$ sites by season as represented by Pearson correlation coefficient.

Paired $PM_{2.5}$ Sites	All matched data	2nd & 3rd Qtrs	4th & 1st Qtrs
Col. Falls-Kalispell	0.8259	0.8138	0.8036
Col. Falls-Whitefish	0.7583	0.8728	0.5935
Kalispell-Whitefish	0.7855	0.8375	0.6929

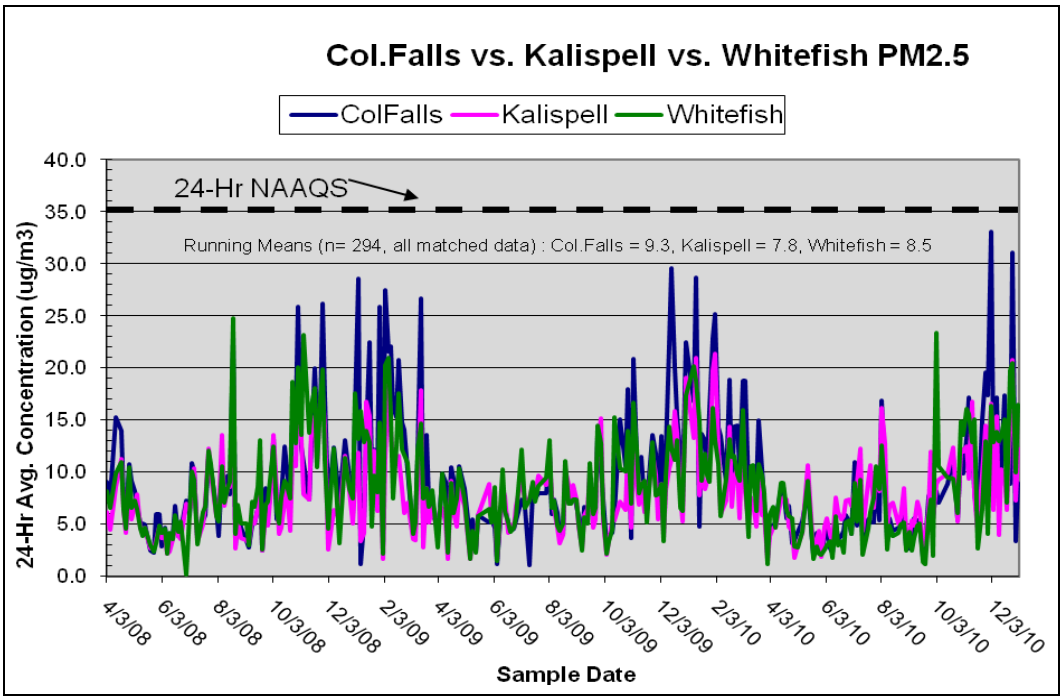


Figure 1. Comparison of all $PM_{2.5}$ data collected on the same dates at sites in Columbia Falls, Kalispell and Whitefish from April 2008 through December 2010.

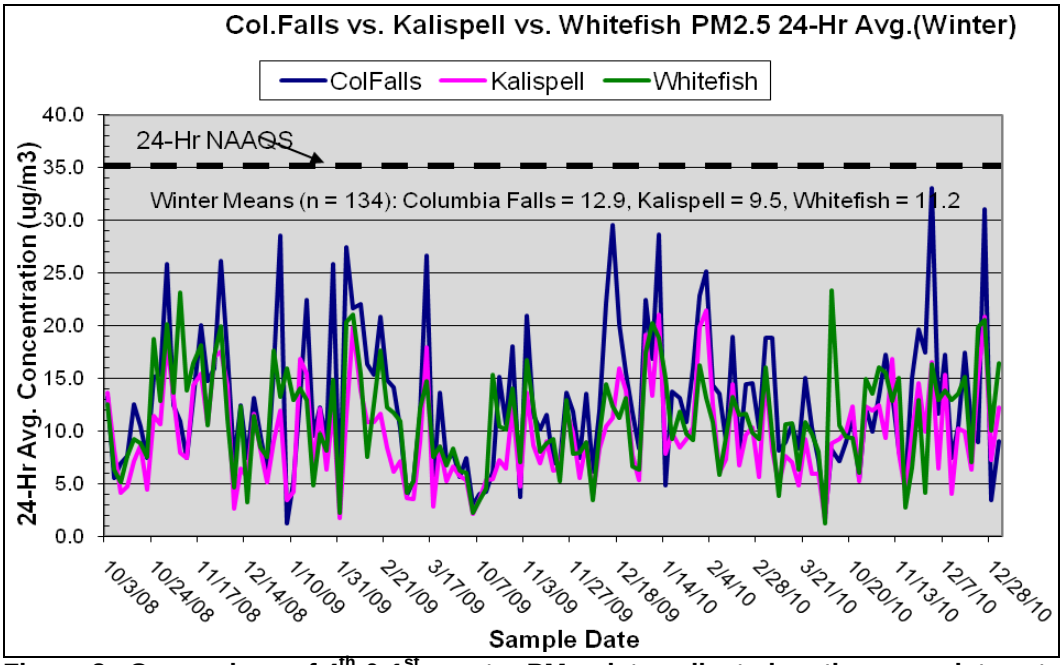


Figure 2. Comparison of 4th & 1st quarter $PM_{2.5}$ data collected on the same dates at Columbia Falls, Kalispell and Whitefish sites from April 2008 - December 2010.

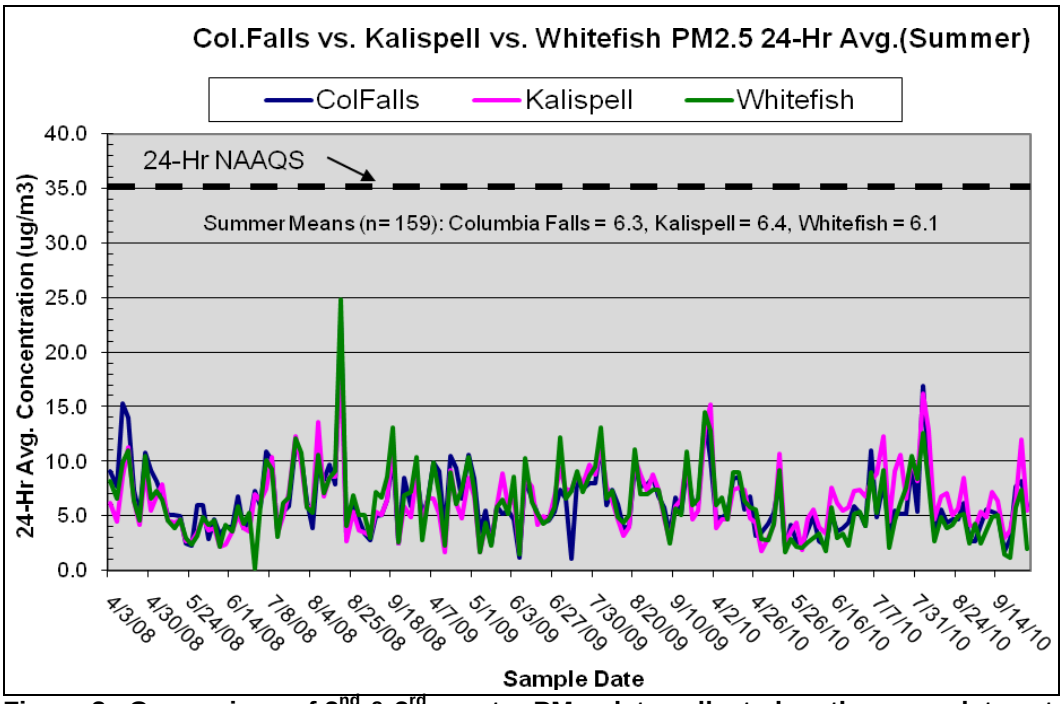


Figure 3. Comparison of 2nd & 3rd quarter $PM_{2.5}$ data collected on the same dates at Columbia Falls, Kalispell and Whitefish sites from April 2008 - December 2010.

During the winter of 2010-2011 the Department installed a portable E-BAM $PM_{2.5}$ sampler at the Belgrade High School in order to compare concentrations between this site and the established Columbia Falls Ball Park site. The data compared quite favorably. As a result, the High School site is believed to be a preferable monitoring site because it appears to be more representative of the Columbia Falls/Flathead Valley area, and because it will meet all appropriate siting criteria.

Based on these analyses, the Department intends to undertake the Flathead Valley PM monitoring modifications detailed above.

B. Termination of CO Monitoring

The Department currently monitors CO during the cold weather months (October through the following March) in three Montana communities: Missoula (Malfunction Junction, 30-063-0005), Great Falls (Overlook Park, 30-013-0001), and Billings (St. Luke's, 30-111-0085). At sometime in the past each of these communities demonstrated a violation of the CO NAAQS. However, each of the communities has now demonstrated continual attainment of compliance with the NAAQS for over a decade. The monitored CO values presented in Figures 4 and 5 indicate compliance with the CO NAAQS at more than an adequate margin of safety, and the CO concentrations are either stable or declining. Continued monitoring under these

circumstances is a significant and unnecessary expenditure of resources with no discernable benefit. Therefore, the Department is proposing to shut down these monitors.

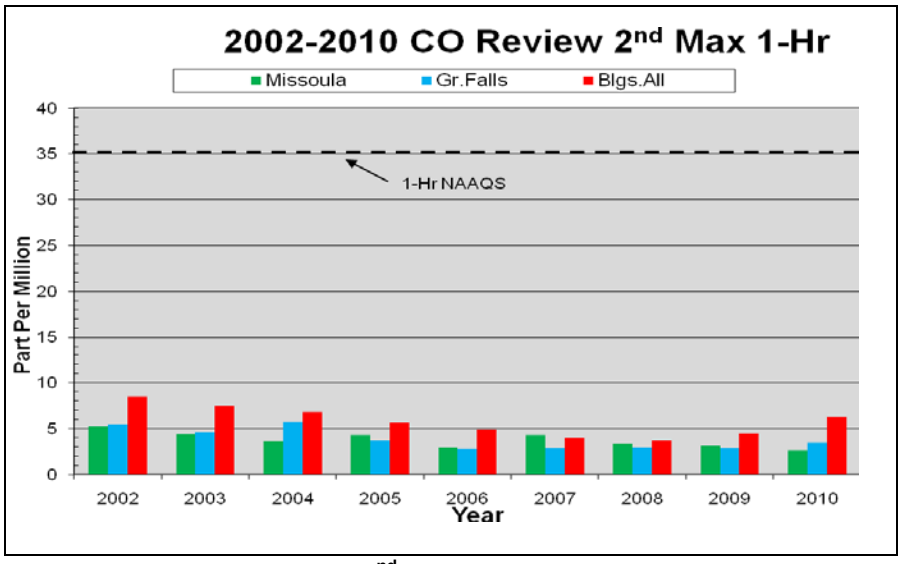


Figure 4 - Carbon Monoxide 2nd Maximum 1- Hour Averages 2002-2010.

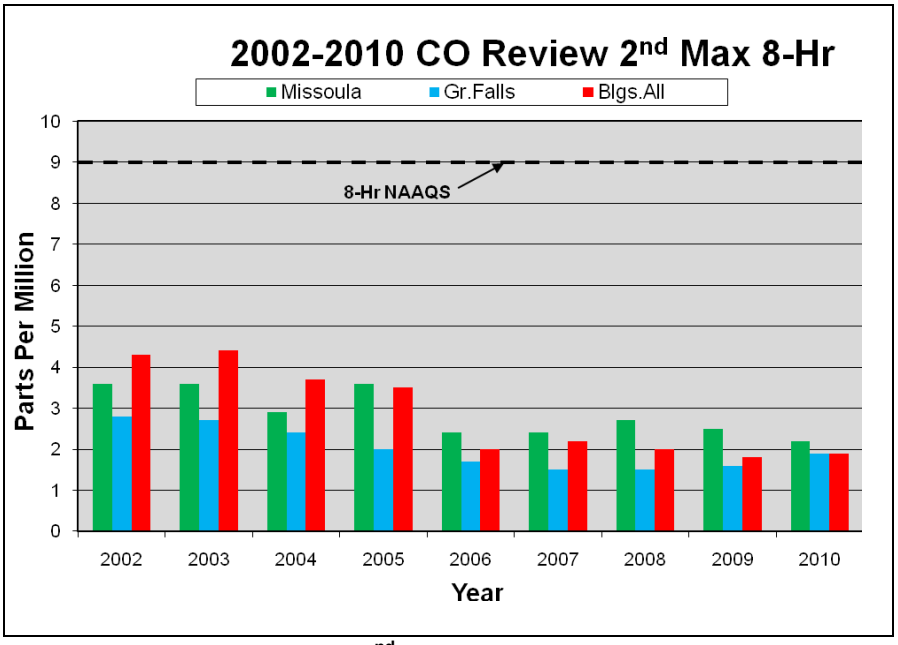


Figure 5 - Carbon Monoxide 2nd Maximum 8- Hour Averages 2002-2010.

Termination of CO monitoring at Great Falls and Billings will likely precipitate changes in the equipment and locations of the non-FEM continuous $PM_{2.5}$ monitors operated in those communities solely to provide data to the public via the "Today's Air" website. Currently, the CO and $PM_{2.5}$ monitors are paired together in climate-controlled shelters.

The elimination of the CO analyzers significantly diminishes the need for the shelters and presents the possibility of eliminating them and decreasing operating costs as a result.

For Great Falls the Department is investigating the feasibility of replacing the Great Falls non-FEM $PM_{2.5}$ monitor with a continuous non-FEM $PM_{2.5}$ monitor that can operate without a shelter (E-BAM). If this technology is found to be appropriate in this application, the Department will likely set the monitor up in a more representative and secure location at the old (previously closed) Great Falls High School site (30-013-1026). The Overlook Park site would then be closed.

For Billings, the Department will likely move the non-FEM $PM_{2.5}$ monitor to the Coburn Road site, and the St. Luke's site would be closed.

C. Other Minor and General Changes

Broadus and Birney M**eteorology**. The Department currently monitors wind speed and wind direction by traditional vane and cup methods at Broadus and Birney in the southeastern portion of Montana. The great distance of these sites from Helena has made trips for quality assurance checks and instrument repairs for meteorological parameters an ongoing challenge. The result has been significant data loss for these parameters. As a result, the Department has decided to replace the traditional wind measurement equipment with sonic anemometers at each site. This change will provide ample and accurate wind information with minimal maintenance expense and a great reduction in data loss.

Similarly, the Department currently monitors vertical differential temperature between the 2-meter and 9-meter above-ground elevations at the Broadus and Birney stations. Once again, the remoteness of these facilities makes consistent quality assurance efforts problematic. At the same time, there appears to be no real need for these data. Consequently, the Department is proposing to eliminate the collection of differential vertical temperature at these sites, and continue to monitor normal 2-meter ambient temperature only.

West Yellowstone Monitoring. The Department currently operates ambient air monitoring stations at two locations for the National Park Service (NPS) at the west entrance to Yellowstone National Park. CO and continuous $PM_{2.5}$ are monitored at a location in the center of the community of West Yellowstone (City Center, 30-031-0016). CO, NO_X, and continuous $PM_{2.5}$ are monitored at a location right at the park entrance gate (Park Entrance, 30-031-0017). The purpose of the two sites is principally to support NPS efforts to establish and implement an appropriate winter use plan for the park. Following negotiations and establishment of a new contract, the Department and the NPS have agreed to shut down the City Center site as of May 31, 2011. The Department will continue to operate the Park Entrance site without modification.

Sidney Site and Monitor Designations. As noted in Appendix B, most of the monitors at the Sidney monitoring site are currently designated as an “Industrial” or “Industrial-Non-regulatory” type class. The Department had previously determined that these monitors should all be designated as SLAMS types, but the change was never accomplished within the AQS database. Consequently, the Department will make that change as a result of this Network Review process.

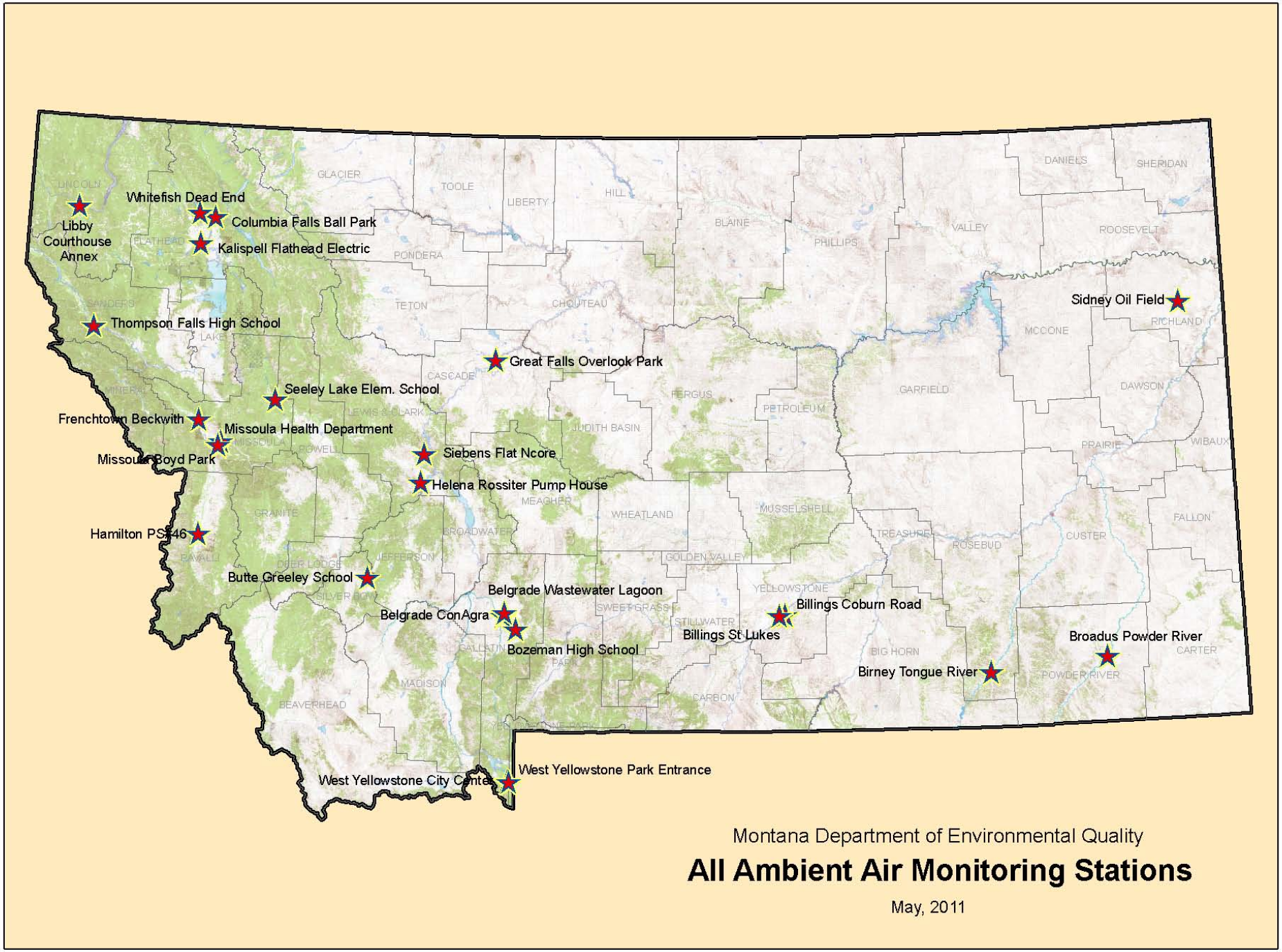
Beyond the specific details listed above, the Department is not currently anticipating any additional site movement or change within its monitoring network through the end of calendar 2011. The Department will once again initiate a review of its network beginning in January of 2012 to determine if other changes may be required at that time. No revisions to the monitoring network will occur without prior discussion and approval from EPA Region 8 through, in part, a formal Network Modification Request.

APPENDIX A

MONITORING SITE LOCATION INFORMATION

Montana Department of Environmental Quality
Ambient Air Monitoring Site Location Summary

AQS No.	City - Site Name	Montana Address	Plan 2011 Change?	Longitude	Latitude	CBSA	
30-031-0008	Belgrade ConAgra	100 S. Broadway	✓	-111.177490	45.773769	--	--
30-031-0018	Belgrade Wastewater Lagoon	Lagoon Road	✓	-111.164839	45.793821	Micro	Bozeman-Belgrade, Gallatin County
30-111-0066	Billings Coburn Road	Coburn Hill Rd.		-108.458785	45.786585	Metro	Billings, Yellowstone County
30-111-0085	Billings St Luke's	2nd Ave. N. and N. 32nd St.	✓	-108.511493	45.780412	Metro	Billings, Yellowstone County
30-087-0001	Birney Tongue River	3 Miles N of Birney	✓	-106.490123	45.366116	--	--
30-031-0019	Bozeman High School	N 15th Avenue		-111.056312	45.683764	Micro	Bozeman-Belgrade, Gallatin County
30-075-0001	Broadus Powder River	Big Powder River Road East	✓	-105.386098	45.432706	--	--
30-093-0005	Butte Greeley School	Adams and Park		-112.501235	46.002594	Micro	Butte, Silver Bow County
30-029-0007	Columbia Falls Ball Park	C St. and 4th Ave. E N	✓	-114.175840	48.380344	Micro	Kalispell Area, Flathead County
30-063-0037	Frenchtown Beckwith	~15316 Mullan Road		-114.224259	47.012007	Metro	Missoula, Missoula County
30-013-0001	Great Falls Overlook Park	10th Ave. S. and 2nd St. E.	✓	-111.303370	47.494419	Metro	Great Falls, Cascade County
30-081-0007	Hamilton PS#46	Madison and 3rd St. S.		-114.158851	46.243596	--	--
30-049-0026	Helena Rossiter Pump House	1497 Sierra Rd. East		-112.013247	46.659319	Micro	Helena, Lewis and Clark County
30-029-0047	Kalispell Flathead Electric	Center St. and Woodland Ave.	✓	-114.304250	48.200527	Micro	Kalispell Area, Flathead County
30-053-0018	Libby Courthouse Annex	418 Mineral Ave.	✓	-115.551923	48.392120	--	--
30-063-0024	Missoula Boyd Park	3100 Washburn Rd.		-114.020562	46.842064	Metro	Missoula, Missoula County
30-063-0031	Missoula Health Department	301 West Alder	✓	-113.995529	46.875623	Metro	Missoula, Missoula County
30-063-0005	Missoula Malfunction Junction	Fairgrounds	✓	-114.018014	46.848389	Metro	Missoula, Missoula County
30-063-0038	Seeley Lake Elem. School	School Lane		-113.476134	47.175573	--	--
30-049-0004	Sieben's Flat NCore	Unnamed County Road		-111.987167	46.850506	--	--
30-083-0001	Sidney Oil Field	Corner Cnty Roads 335 and 131	✓	-104.486346	47.803844	--	--
30-089-0007	Thompson Falls High School	Golf and Haley	✓	-115.324091	47.594459	--	--
30-031-0016	West Yellowstone City Center	Parkway B (Alley)	✓	-111.105569	44.661538	--	--
30-031-0017	West Yellowstone Park Entrance	NE of West Park Entrance Gate		-111.091700	44.657385	--	--
30-029-0009	Whitefish Dead End	End of 10th St.	✓	-114.335901	48.400481	Micro	Kalispell Area, Flathead County


Whitefish Dead End
Columbia Falls Ball Park
Libby Courthouse Annex
Kalispell Flathead Electric
Thompson Falls High School
Sidney Oil Field
Great Falls Overlook Park
Seeley Lake Elem. School
Frenchtown Beckwith
Missoula Health Department
Missoula Boyd Park
Siebens Flat Ncore
Helena Rossiter Pump House
Hamilton PS #46
Butte Greeley School
Belgrade Wastewater Lagoon
Belgrade ConAgra
Billings Coburn Road
Billings St Lukes
Bozeman High School
Broadus Powder River
Birney Tongue River
West Yellowstone City Center
West Yellowstone Park Entrance
Montana Department of Environmental Quality
All Ambient Air Monitoring Stations
May, 2011

APPENDIX B

EXISTING and PROPOSED AIR MONITORING NETWORK

Montana Department of Environmental Quality

EXISTING Ambient Air Quality Monitoring Network By Location

May, 2011

AQS Number	Site	Pollutant	Param-POC	Method Code	Method Note[5]	Method PM	Frequency	Type	Spatial Scale	Monitoring Objective[1]	Plan 2011 Change?
30-031-0008	Belgrade-ConAgra	$PM_{2.5}$	88101-1	116	2	FRM	1 in 3	SLAMS	Neigh.	H,P	✓
30-031-0018	Belgrade-Wastewater Lagoon	$PM_{2.5}$	88101-1	116	2	FRM	1 in 3	SPM	Neigh.	H,P	✓
30-111-0066	Billings-Coburn Road	SO_2	42401-1	100	7		Continuous	SLAMS	Neigh.	H,S	
		SO_2 - 5 min	42406-1	100	7		Continuous	SLAMS	Neigh.	H,S	
30-111-0085	Billings-St. Luke's	CO	42101-1	093	1		Contin 1st/4th Qtr[4]	SLAMS	Micro.	H,P,S	✓
		$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM	Micro.	P	✓
30-087-0001	Birney-Tongue River	NO	42601-1	074	11		Continuous	SLAMS	Neigh.	B	
		NO_2	42602-1	074	11		Continuous	SLAMS	Neigh.	B	
		NO_X	42603-1	074	11		Continuous	SLAMS	Neigh.	B	
		O_3	44201-1	047	9		Continuous	SLAMS	Neigh.	B	
		PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	B	
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	B	
30-031-0019	Bozeman-High School	$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM	Neigh.	P	
30-075-0001	Broadus-Powder River	NO	42601-1	074	11		Continuous	SLAMS	Neigh.	B	
		NO_2	42602-1	074	11		Continuous	SLAMS	Neigh.	B	
		NO_X	42603-1	074	11		Continuous	SLAMS	Neigh.	B	
		O_3	44201-1	047	9		Continuous	SLAMS	Neigh.	B	
		PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	B	
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	B	
30-093-0005	Butte-Greeley School	PM_{10}	81102-4	122	4	FEM	Continuous	SLAMS	Neigh.	H,P,S	
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$ Spc'n	88101-5	810	6	FRM	1 in 6	Suppl	Neigh.	H,P	
30-029-0007	Columbia Falls-Ball Park	PM_{10}	81102-1	125	3	FRM	1 in 6	SLAMS	Neigh	H,P,S	✓
		PM_{10}	81102-2	125	3	FRM	1 in 12 coll[2]	QA			✓
		$PM_{2.5}$	88101-1	116	2	FRM	1 in 3	SLAMS	Neigh	H,P	✓
30-063-0037	Frenchtown-Beckwith	$PM_{2.5}$	88101-1	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
30-013-0001	Great Falls-Overlook Park	CO	42101-1	093	1		Contin 1st/4th Qtr[4]	SLAMS	Micro.	H,P,S	✓
		$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM	Middle	H,P	✓
30-081-0007	Hamilton-Parking Spot #46	$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
30-049-0026	Helena-Rossiter Pump House	$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88101-2	116	2	FRM	1 in 12 coll[2]	QA			
30-029-0047	Kalispell-Flathead Electric	PM_{10}	81102-2	125	3	FRM	1 in 6	SLAMS	Neigh.	H,P	✓
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	✓
30-053-0018	Libby-Courthouse Annex	PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM	Neigh.	H,P	✓
		$PM_{2.5}$	88101-1	116	2	FRM	1 in 3	SLAMS	Neigh.	H,P	✓
		$PM_{2.5}$	88101-2	116	2	FRM	1 in 12 coll[2]	QA	Neigh.	H,P	✓
30-063-0024	Missoula-Boyd Park	O_3	44201-1	047	9		Continuous	SLAMS	Neigh.	B	
		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	
		$PM_{2.5}$	88101-4	170	8	FEM	Continuous - coll[3]	QA			
30-063-0031	Missoula-Health Dept.	$PM_{2.5}$	88101-1	116	2	FRM	1 in 3	SLAMS	Neigh.	H,P	✓
		$PM_{2.5}$	88101-2	116	2	FRM	1 in 12 coll[2]	QA	Neigh.	H,P	✓
30-063-0005	Missoula-Malfunction Junction	CO	42101-1	093	1		Contin 1st/4th Qtr[4]	SLAMS	Micro	H,P,S	✓
30-063-0038	Seeley Lake-Elem. School	$PM_{2.5}$	88502-1	731	5	Non	Continuous	SPM	Neigh.	H,P	
30-083-0001	Sidney-Oil Field	NO	42601-1	099	10		Continuous	ID-NR	Neigh.	S	✓
		NO_2	42602-1	099	10		Continuous	ID-NR	Neigh.	S	✓
		NO_X	42603-1	099	10		Continuous	ID-NR	Neigh.	S	✓
		O_3	44201-1	047	9		Continuous	ID-NR	Neigh.	S	✓
		SO_2	42401-1	100	7		Continuous	SLAMS	Neigh.	S	
		SO_2 - 5 min	42406-1	100	7		Continuous	SLAMS	Neigh.	S	
		PM_{10}	81102-1	122	4	FEM	Continuous	ID	Neigh.	S	✓
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	ID	Neigh.	S	✓

AQS Number	Site	Pollutant	Param-POC	Method Code	Method Note[5]	Method PM	Frequency	Type	Spatial Scale	Monitoring Objective[1]	Plan 2011 Change?
30-049-0004	Sieben's Flat (NCore)	CO	42101-1	554	13		Continuous	NCore	Region	B	
		NO	42601-1	574	15		Continuous	NCore	Region	B	
		NOy	42600-1	574	15		Continuous	NCore	Region	B	
		O_3	44201-1	047	9		Continuous	NCore	Region	B	
		SO2	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	88502-5	810	6	FRM	1 in 3	NCore	Region	B	
		PM_{coarse}	86101-1	185	12	FEM	Continuous	NCore	Region	B	
30-089-0007	Thompson Falls-High School	PM_{10}	81102-1	125	3	FRM	1 in 6	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88101-1	116	2	FRM	1 in 3	SLAMS	Neigh.	H,P	✓
30-031-0016	West Yellowstone-City Center	CO	42101-1	093	1		Continuous	SLAMS	Neigh.	H,P	✓
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	✓
30-031-0017	West Yellowstone-Park Entrance	CO	42101-1	093	1		Continuous	SPM-NR	Micro	S	
		NO	42601-1	099	10		Continuous	SPM-NR	Micro	S	
		NO_2	42602-1	099	10		Continuous	SPM-NR	Micro	S	
		NO_X	42603-1	099	10		Continuous	SPM-NR	Micro	S	
		$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM-NR	Micro	S	
30-029-0009	Whitefish-Dead End	PM_{10}	81102-2	125	3	FRM	1 in 6	SLAMS	Neigh.	H,P	✓
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	✓

Footnotes

[1] **Monitoring Objective Descriptions:** B = Background, H = High Concentration, P = Population Exposure, S = Source Impact

[2] **"Coll"** = collocated sampler

[3] **"Continuous Coll"** = collocated continuous (BAM) sampler

[4] **"Contin 1st/4th Qtr"** = Analyzer operates continuously, but only during the first and fourth calendar quarters of each year.

[5] **Method Notes :**

1 Teledyne-API Model 300. Nondispersive infrared-equivalent method.
2 BGI-PQ200 with very sharp cut cyclone. Federal Reference Method.
3 BGI-PQ200 with WINS eliminator. Federal Reference Method.
4 MetOne BAM 1020. Beta attenuation monitor-equivalent method PM10.
5 MetOne BAM 1020 with PM2.5 sharp cut cyclone. Beta attenuation monitor.
6 MetOne Speciation Air Sampling System.
7 Teledyne-API Model 100. Ultraviolet fluorescence-equivalent method.
8 MetOne FEM-BAM 1020 with PM2.5 very sharp cut cyclone. Beta attenuation monitor-equivalent method PM2.5.
9 Thermo Model 49i. UV absorption-equivalent method.
10 Teledyne-API Model 200EV. Chemiluminescence-Federal Reference Method.
11 Thermo Model 42i TL. Chemiluminescence-Federal Reference Method.
12 MetOne BAM1020 PM10-2.5 Measurement System. Paired beta attenuation monitors.
13 Thermo Model 48i-TLE. Enhanced Trace Level CO Analyzer
14 Teledyne-API Model 100E. Trace Level UV Fluorescence SO2 Analyzer
15 Thermo Model 42i-TLE. NO-DIF-NOy chemiluminescent specialty trace level gas analyzer
16 Climatronics Wind Mark III
17 R.M. Young Aspirated Temperature Probe and Shield
18 Climatronics Sonic Anemometer
19 MetOne Shielded Temperature Probe
20 MetOne Relative Humidity Sensor

[6] **Type :**

SLAMS : State or Local Air Monitoring Station
SPM : Special Purpose Monitor
QA : Quality Assurance Monitor
ID : Industrial Monitor
ID-NR : Industrial Monitor, Non-Regulatory Data

Montana Department of Environmental Quality

PROPOSED Ambient Air Quality Monitoring Network By Location

May, 2011

AQS Number	Site	Pollutant	Param-POC	Method Code	Method Note[5]	Method PM	Frequency	Type	Spatial Scale	Monitoring Objective[1]	Plan 2011 Change?
30-031-0008	Belgrade-ConAgra	$PM_{2.5}$	88101-1	116	2	FRM	1 in 3	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88101-2	116	2	FRM	1 in 12 coll[2]	QA	Neigh.	H,P	✓
30-111-0066	Billings-Coburn Road	SO_2	42401-1	100	7		Continuous	SLAMS	Neigh.	H,S	
		SO_2 - 5 min	42406-1	100	7		Continuous	SLAMS	Neigh.	H,S	
30-111-0085	Billings-St. Luke's	$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM	Micro.	P	✓
30-087-0001	Birney-Tongue River	NO	42601-1	074	11		Continuous	SLAMS	Neigh.	B	
		NO_2	42602-1	074	11		Continuous	SLAMS	Neigh.	B	
		NO_X	42603-1	074	11		Continuous	SLAMS	Neigh.	B	
		O_3	44201-1	047	9		Continuous	SLAMS	Neigh.	B	
		PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	B	
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	B	
30-031-0019	Bozeman-High School	$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM	Neigh.	P	
30-075-0001	Broadus-Powder River	NO	42601-1	074	11		Continuous	SLAMS	Neigh.	B	
		NO_2	42602-1	074	11		Continuous	SLAMS	Neigh.	B	
		NO_X	42603-1	074	11		Continuous	SLAMS	Neigh.	B	
		O_3	44201-1	047	9		Continuous	SLAMS	Neigh.	B	
		PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	B	
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	B	
30-093-0005	Butte-Greeley School	PM_{10}	81102-4	122	4	FEM	Continuous	SLAMS	Neigh.	H,P,S	
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$ Spc'n	88101-5	810	6	FRM	1 in 6	Suppl	Neigh.	H,P	
30-029-0007	Columbia Falls-Ball Park	PM_{10}	81102-3	122	4	FEM	Continuous	SLAMS	Region	H,P,S	✓
		$PM_{2.5}$	88101-2	170	8	FEM	Continuous	SLAMS	Region	H,P	✓
30-063-0037	Frenchtown-Beckwith	$PM_{2.5}$	88101-1	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
30-013-0001	Great Falls-Overlook Park	$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM	Middle	H,P	✓
30-081-0007	Hamilton-Parking Spot #46	$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
30-049-0026	Helena-Rossiter Pump House	$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88101-2	116	2	FRM	1 in 12 coll[2]	QA			
30-029-0047	Kalispell-Flathead Electric	PM_{10}	81102-3	122	4	FEM	Continuous	SLAMS	Neigh.	H,P	✓
30-053-0018	Libby-Courthouse Annex	PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	H,P	
		$PM_{2.5}$	88101-1	170	8	FEM	Continuous	SLAMS	Neigh.	H,P	✓
30-063-0024	Missoula-Boyd Park	O_3	44201-1	047	9		Continuous	SLAMS	Neigh.	B	
		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	
		$PM_{2.5}$	88101-4	170	8	FEM	Continuous - coll[3]	QA			
30-063-0038	Seeley Lake-Elem. School	$PM_{2.5}$	88502-1	731	5	Non	Continuous	SPM	Neigh.	H,P	
30-083-0001	Sidney-Oil Field	NO	42601-1	099	10		Continuous	SLAMS	Neigh.	S	✓
		NO_2	42602-1	099	10		Continuous	SLAMS	Neigh.	S	✓
		NO_X	42603-1	099	10		Continuous	SLAMS	Neigh.	S	✓
		O_3	44201-1	047	9		Continuous	SLAMS	Neigh.	S	✓
		SO_2	42401-1	100	7		Continuous	SLAMS	Neigh.	S	
		SO_2 - 5 min	42406-1	100	7		Continuous	SLAMS	Neigh.	S	
		PM_{10}	81102-1	122	4	FEM	Continuous	SLAMS	Neigh.	S	✓
		$PM_{2.5}$	88101-3	170	8	FEM	Continuous	SLAMS	Neigh.	S	✓

(Continued…)

AQS Number	Site	Pollutant	Param-POC	Method Code	Method Note[5]	Method PM	Frequency	Type	Spatial Scale	Monitoring Objective[1]	Plan 2011 Change?
30-049-0004	Sieben's Flat (NCore)	CO	42101-1	554	13		Continuous	NCore	Region	B	
		NO	42601-1	574	15		Continuous	NCore	Region	B	
		NOy	42600-1	574	15		Continuous	NCore	Region	B	
		O_3	44201-1	047	9		Continuous	NCore	Region	B	
		SO2	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	88502-5	810	6	FRM	1 in 3	NCore	Region	B	
		PM_{coarse}	86101-1	185	12	FEM	Continuous	NCore	Region	B	
30-089-0007	Thompson Falls-High School	PM_{10}	81102-1	125	3	FRM	1 in 6	SLAMS	Neigh.	H,P	
		PM_{10}	81102-2	125	3	FRM	1 in 12 coll[2]	QA			✓
30-031-0017	West Yellowstone-Park Entrance	CO	42101-1	093	1		Continuous	SPM-NR	Micro	S	
		NO	42601-1	099	10		Continuous	SPM-NR	Micro	S	
		NO_2	42602-1	099	10		Continuous	SPM-NR	Micro	S	
		NO_X	42603-1	099	10		Continuous	SPM-NR	Micro	S	
		$PM_{2.5}$	88502-3	731	5	Non	Continuous	SPM-NR	Micro	S	
30-029-0009	Whitefish-Dead End	PM_{10}	81102-2	122	4	FEM	Continuous	SLAMS	Neigh.	H, P, S	✓

Footnotes

[1] **Monitoring Objective Descriptions:** B = Background, H = High Concentration, P = Population Exposure, S = Source Impact

[2] **"Coll"** = collocated sampler

[3] **"Continuous Coll"** = collocated continuous (BAM) sampler

[4] **"Contin 1st/4th Qtr"** = Analyzer operates continuously, but only during the first and fourth calendar quarters of each year.

[5] **Method Notes :**

1 Teledyne-API Model 300. Nondispersive infrared-equivalent method.
2 BGI-PQ200 with very sharp cut cyclone. Federal Reference Method.
3 BGI-PQ200 with WINS eliminator. Federal Reference Method.
4 MetOne BAM 1020. Beta attenuation monitor-equivalent method PM10.
5 MetOne BAM 1020 with PM2.5 sharp cut cyclone. Beta attenuation monitor.
6 MetOne Speciation Air Sampling System.
7 Teledyne-API Model 100. Ultraviolet fluorescence-equivalent method.
8 MetOne FEM-BAM 1020 with PM2.5 very sharp cut cyclone. Beta attenuation monitor-equivalent method PM2.5.
9 Thermo Model 49i. UV absorption-equivalent method.
10 Teledyne-API Model 200EV. Chemiluminescence-Federal Reference Method.
11 Thermo Model 42i TL. Chemiluminescence-Federal Reference Method.
12 MetOne BAM1020 PM10-2.5 Measurement System. Paired beta attenuation monitors.
13 Thermo Model 48i-TLE. Enhanced Trace Level CO Analyzer
14 Teledyne-API Model 100E. Trace Level UV Fluorescence SO2 Analyzer
15 Thermo Model 42i-TLE. NO-DIF-NOy chemiluminescent specialty trace level gas analyzer
16 Climatronics Wind Mark III
17 R.M. Young Aspirated Temperature Probe and Shield
18 Climatronics Sonic Anemometer
19 MetOne Shielded Temperature Probe
20 MetOne Relative Humidity Sensor

[6] **Type :**

SLAMS : State or Local Air Monitoring Station
SPM : Special Purpose Monitor
QA : Quality Assurance Monitor
ID : Industrial Monitor
ID-NR : Industrial Monitor, Non-Regulatory Data

APPENDIX C

Summary of Proposed Network Changes

Montana Department of Environmental Quality
Ambient Air Quality Monitoring Network By Location

Summary of Proposed Changes

May, 2011

AQS Number	Site	Pollutant	Proposed 2011 Change
30-031-0008	Belgrade-ConAgra	$PM_{2.5}$	Add one collocated filter-based $PM_{2.5}$ monitor
30-031-0018	Belgrade-Wastewater Lagoon	$PM_{2.5}$	Discontinue and close
30-111-0066	Billings-Coburn Road	SO_2	Possibly bring non-FEM BAM from St Luke's
30-111-0085	Billings-St. Luke's	CO	Discontinue and close
		$PM_{2.5}$	Possibly move to Coburn Road
30-087-0001	Birney-Tongue River	Wind S&D	Replace with sonic anemometer
		Diff. Temp.	Discontinue
30-075-0001	Broadus-Powder River	Wind S&D	Replace with sonic anemometer
		Diff. Temp.	Discontinue
30-029-0007	Columbia Falls-Ball Park	PM_{10}	Discontinue and close.
		$PM_{10\ coll}$	Discontinue and close.
		$PM_{2.5}$	Discontinue and close.
30-029-XXXX	Columbia Falls-High School	PM_{10}	New site, install continuous BAM
		$PM_{2.5}$	New Site, install Continuous BAM
30-013-0001	Great Falls-Overlook Park	CO	Discontinue and close
		$PM_{2.5}$	Possibly move to Great Falls High School Site
30-013-XXXX	Great Falls High School	$PM_{2.5}$	Possible new site, install non-FEM E-BAM
30-029-0047	Kalispell-Flathead Electric	PM_{10}	Replace filter-based monitor with continuous
		$PM_{2.5}$	Discontinue and close
30-053-0018	Libby-Courthouse Annex	$PM_{2.5}$	Replace continuous non-FEM with continuous FEM
		$PM_{2.5}$	Discontinue and remove filter-based monitor
		$PM_{2.5\ coll}$	Remove collocated sampler
30-063-0031	Missoula-Health Dept.	$PM_{2.5}$	Discontinue and close
		$PM_{2.5\ coll}$	Remove collocated sampler
30-063-0005	Missoula-Malfunction Junction	CO	Discontinue and close
30-049-0004	Sidney-Oil Field	NO	Redesignate monitor type as SLAMS
		NO_2	Redesignate monitor type as SLAMS
		NO_X	Redesignate monitor type as SLAMS
		O_3	Redesignate monitor type as SLAMS
		PM_{10}	Redesignate monitor type as SLAMS
		$PM_{2.5}$	Redesignate monitor type as SLAMS
30-089-0007	Thompson Falls-High School	PM_{10}	Add collocated sampler
		$PM_{2.5}$	Discontinue and close
30-031-0016	West Yellowstone-City Center	CO	Discontinue and close
		$PM_{2.5}$	Discontinue and close
30-029-0009	Whitefish-Dead End	PM_{10}	Replace filter-based monitor with continuous
		$PM_{2.5}$	Discontinue and close

APPENDIX D

National & 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	0.12 ppm [g]	0.10 ppm [b]	Primary & Secondary
	8-Hour	0.075 ppm [h] (2008 std)	NA	Primary & Secondary
	8-Hour	0.08 ppm [i] (1997 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	15.0 µg/m^3 [m]	NA	Primary & 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 $\mu g/m^3$), 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.

END OF DOCUMENT