Quality Assurance Plan

for the 2010 Carbon Monoxide Emission Inventory in support of Missoula County's 2nd 10-Year Limited Maintenance Plan for the Missoula Carbon Monoxide Maintenance Area

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February 2015

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Contents

ABBREVIATIONS

ARMB	Air Resources Management Bureau, Montana Department of Environmental Quality
CO	Carbon Monoxide
E.I.	Emission Inventory
EIIP	Emission Inventory Improvement Program
EPA	United States Environmental Protection Agency
IDT	Inventory Development Team
MCCHD	Missoula City-County Health Department
MA	Maintenance Area
MDEQ	Montana Department of Environmental Quality
MMPO	Missoula Metropolitan Planning Organization
MT	Montana
NAA	Non-attainment Area
NAAQS	National Ambient Air Quality Standard
NEI	National Emission Inventory
PM10	Particulates with an Aerodynamic Diameter of 10 Microns (u) or Less
QA	Quality Assurance
QAP	Quality Assurance Plan
QC	Quality Control
USEPA	United States Environmental Protection Agency

1. Introduction

1.1 Purpose of Inventory

This document outlines the quality assurance plan (QAP) for Missoula City-County Health Department's (MCCHD) 2010 update to the carbon monoxide (CO) emission inventory (E.I.) for the Missoula CO Maintenance Area (MA). The emission inventory is being conducted in support of a limited maintenance plan for the Missoula CO MA. Carbon monoxide is a colorless, odorless gas that reduces blood's oxygen-carrying capacity. For the 2010 CO E.I., MCCHD will determine CO emissions from MA sources identified in the Missoula 2000 CO emission inventory. In 2004, the Montana Department of Environmental Quality (MDEQ) developed a 2000 Missoula CO emission inventory (E.I.) that included the MA in its geographic scope [1]. The 2000 CO E.I. estimated area and industrial point emissions within the Missoula urban and outlying areas, including the Missoula CO MA.

This emission inventory will be confined to the MA (Appendix A). The MA roughly follows the Missoula City limits (Appendix B), with a few variations. The current boundaries of the Missoula "Moderate" CO nonattainment area were published in the Federal Register (FR) on November 6, 1991 (56 FR 56694) and includes the areas within the following Township (T), Range (R) and Sections (S):

- T13N R19W Sections 2, 5, 7, 8, 11, 14-24, and 26-34
- T12N R19W Sections 4, 5, 6, 7
- T13N R20W Sections 23, 24, 25, 26, 35, and 36; and
- T14N R19W Sections 29 and 32

In addition, because Missoula historically exceeded the CO NAAQS in winter months, the emission inventory will be based on a winter day in 2010. Winter is defined for this E.I. as December, January and February.

1.2 Quality Assurance Policy and Objectives

The 2010 CO Missoula Nonattainment Area emission inventory is considered a Level III inventory, based on guidance provided by the Emission Inventory Improvement Program (EIIP) [2]. It is a Level III inventory because it includes site-specific data, and will not be used for rule making or strategic decision making. The end use of this inventory drives the minimum QA and work plan requirements.

In order to provide data of sufficient quality for maintenance planning needs, quality assurance and quality control procedures are implemented as part of the inventory process. The procedures address data quality objectives of accuracy, completeness, comparability and representativeness. A brief discussion of the data quality objectives and target goals is given below.

Accuracy: All estimates must be calculated and documented using acceptable methods. Individual source requirements and availability of data and resources will affect the estimation method selection.

Completeness: Completeness is addressed by ensuring that all applicable source categories are included in the inventory, and that all information required to estimate emissions is present. Applicable source categories are described in the 2010 CO Emission Inventory Plan in Support of Missoula County's Limited Maintenance Plan for the Missoula CO Maintenance Area [3].

Comparability: Data will be compared to the most recent base year inventory (the 2000 Missoula CO emission inventory [1]). Any discrepancies (data outliers) greater than 20% involving sources that made up greater than 5 % of the 2000 CO inventory will be corrected or justified.

Representativeness: Actual 2010 winter daily emissions for the Missoula CO nonattainment area will be calculated for this inventory. Local data will be used in inventory calculations wherever possible.

2.0 Program Summary

This QAP provides written instructions for the quality assurance and control aspects associated with development of the 2010 Missoula CO emissions inventory. It is designed so that QA/QC procedures are implemented throughout the whole inventory development process. This will ensure that the inventory is as complete as possible, accurate, comparable, and representative of the MA. Personnel involved with the inventory and their responsibilities are discussed in Section 3.0.

2.1 Major Program Components

Inventory tasks and QC procedures will include data checking by the inventory development team (IDT) throughout the development of the inventory and final emission report. These procedures include, but are not limited to, the following:

- The development and implementation of written procedures for data gathering, data assessment, data handling, calculation of emissions, and reporting;
- Review of all calculations for technical soundness and accuracy, including verification that the appropriate emission factors were used;
- Use of technically sound approaches when developing results;
- Documentation of the data in a manner that will allow reconstruction of all inventory development activities; and

- Maintenance of an orderly master file of all the data gathered and a copy-ready version of the final inventory submitted to the U.S. EPA.

QA activities are distinguished from QC activities in that they provide a more objective assessment of data quality because QA personnel (e.g. independent reviewers) are not directly involved in the development of the inventory. QA activities are usually more comprehensive because they include assessments of the effectiveness and appropriateness of the systems established to control data quality.

The QA program is equal in importance to inventory development and QC procedures, and includes peer review, reality checks and calculation checks conducted by an external, independent reviewer at the Montana Department of Environmental Quality.

3. Agencies Responsible for the Emission Inventory

The Missoula City-County Health Department Air Quality Division has primary responsibility for preparing and submitting the 2010 CO Emissions Inventory for Missoula County. Point sources and the majority of area source emission estimates were prepared by MCCHD. The Montana Department of Environmental Quality (MDEQ) Air Resources Management Bureau (ARMB) prepared nonroad emission estimates for the county, and MCCHD apportioned those estimates to the CO MA. The MDEQ also provided exhaust data for onroad mobile sources using data gathered by the Missoula Metropolitan Planning Organization (MMPO). Table 3.1 lists those responsible for inventory preparation and quality assurance/ quality control activities.

Table 3.1 Authors and QA/QC contacts for the 2010 Missoula PM10 emission inventory

Source	Author(s)	QA/QC contacts
Point	Sarah Coefield MCCHD (406) 258-4755	Cyra Cain MDEQ (406) 444-3490
Area	Sarah Coefield MCCHD (406) 258-4755	Cyra Cain MDEQ (406) 444-3490
Nonroad Mobile Sources	Sarah Coefield MCCHD (406) 258-4755 Cyra Cain MDEQ (406) 444-3490	Kristen Martin MDEQ (406) 444-3490
Onroad Mobile Sources	Sarah Coefield MCCHD (406) 258-4755 Cyra Cain MDEQ (406) 444-3490	Kristen Martin MDEQ (406) 444-3490

4. General QA/QC Procedures

QA/QC procedures described in this QAP were developed to help ensure data accuracy, completeness, representativeness, and comparability. These procedures will be implemented throughout the planning, data collection, emission estimation, and reporting phases of the inventory development program.

4.1 QC Activities

QC procedures will be implemented by the IDT during inventory development to meet the technical and data quality objectives. These activities will be conducted at critical steps in the inventory development process where the successful outcome of inventory development could be compromised. These critical steps are presented below and discussed in the following subsections of this QAP:

- Data gathering;
- Data documentation;
- Calculating emissions;
- Data checking;
- Reporting; and
- Maintenance of the master file.

4.1.1 Data Gathering

Data gathering will be conducted according to U.S. EPA-approved procedures. The approach and supporting documents or references will be thoroughly documented and included in the emissions report.

Data for area source emission calculations will be gathered from a wide universe of resources. Whenever applicable, local surveyed data (such as annual emissions reports) will be used, as this data best reflects activity in the county and the maintenance area. When local data is not available, state data from state agencies (such as the Montana Department of Transportation) will be used. National-level data (such as those from the US Census Bureau) will be used when no local, state or regional data is available. In addition, the most recent EIIP guidance for area sources will be consulted for direction in determining the most relevant data source for use in emissions calculations.

Data for point source emissions will be gathered from the sources' air quality permits.

4.1.2 Data Documentation

All data used in this inventory will be tracked on a spreadsheet that identifies the data source, and where and how it was used in the emission inventory. In addition, all spreadsheets used for emission calculations will list the data sources used for the calculations, so the data can be checked for entry and use errors. Emission calculation spreadsheets will include units of measurement with each data value. Each revision of an inventory spreadsheet that occurs after QA/QC activities will be labeled with that day's date, and old versions of the spreadsheet will be kept in an archived folder. All spreadsheets, calculations and references will be maintained by the Inventory Director/QA Coordinator (Sarah Coefield 406-258-4755) in a master folder that is backed up on Missoula County servers.

When reporting emissions, the following will be upheld: complete descriptions of all data sources will be included; units of measurement will be provided for each data value; an explanation will be provided for emission sources that are omitted from the final inventory; the procedures used to calculate emissions will be described and example calculations will be provided; and documents from which emission factors are taken will be identified and referenced.

4.1.3 Calculating Emissions

Information on how point, area and mobile sources will be calculated is provided in the 2010 CO Emission Inventory Plan in Support of Missoula County's Limited Maintenance Plan for the Missoula CO Maintenance Area [3].

4.1.4 Data Checking

Data checking is used to ensure data accuracy. Data will be checked at logical steps in the development of the inventory where transcription or calculation errors are likely to be found. Data checking will also be used to assess the technical soundness of the data

Although different types of data will be reviewed at each checkpoint, the type of review may also vary. For example, when a document containing information is first received and logged in, it will first be checked to see if it was generated in the correct year and is for the correct location. Later, as data are used in calculating emissions, checking will include evaluations of data accuracy, reasonableness, and completeness.

The most logical checkpoints for each review are after data entry and calculations are performed. Data can be checked by the Inventory Director/QA Coordinator, another IDT member or a technical reviewer. If errors are found during these reviews, the person generating the data and reviewer must agree on the corrective action to be taken and see to it that the error is eliminated. They must also determine the impact, if any, that the error will have on other relevant data, and revise the affected data accordingly.

4.1.5 Reporting

The emissions inventory report will be formatted according to the instructions provided by the U.S. EPA. Prior to finalizing the report, all of the actions taken in response to the recommendations for corrective actions will be evaluated to determine whether the report accurately reflects the corrections made. The report will be reviewed for technical soundness, completeness, accuracy, comparability, and representativeness by senior technical reviewers and QA Personnel.

It is the responsibility of the Inventory Director to ensure that the report accurately reflects the data and that the master file provides sufficient data to verify the results reported. A copy of the report will be retained in the master file and made available to all project personnel.

4.1.6 Maintenance of the Master File

The master file will be maintained on Missoula County servers. It will contain all data gathered and produced during development of the inventory. It will also contain sufficient supporting data to verify the accuracy of the emissions results reported in the inventory. Proper naming and organization of individual files, documents and spreadsheets will facilitate data retrieval. References will be maintained, along with applicable data contained within each reference. In addition, all email correspondences relating to the inventory development will be saved in a folder within the master file.

4.2 QA Activities and Procedures

QA activities are distinguished from QC activities in that they provide a more objective assessment of data quality because QA personnel are not directly involved in the development of the inventory. QA activities are usually more comprehensive because they include assessments of the effectiveness and appropriateness of the systems established to control data quality.

Several quality assurance checks will be employed by the Montana Department of Environmental Quality and the MCCHD to address the data quality objectives discussed in Chapter 1.2 related to accuracy, completeness, comparability, and/or representativeness: reality/peer review checks, sample calculations and range checks.

4.2.1 Reality Check/Peer Review

Independent review will be conducted by knowledgeable staff at the MDEQ to ensure that data, assumptions, and procedures are reasonable. The objective of these checks is to ensure accuracy, completeness, comparability, and representativeness.

Reasonableness of methods, assumptions, and emissions estimates will be assessed by 1) comparing data sources used in the final inventory to those used for the 2011 NEI; 2) relying on reviewer expertise; and 3) comparing emissions estimates to other inventory efforts, particularly the 2000 Missoula CO year inventory and the 2011 NEI.

4.2.2 Sample Calculations

Sample calculations provide verification of values by replicating calculations. The benefit is to ensure that calculations are done correctly. The objective is accuracy.

Emissions calculations will be duplicated by MDEQ to spot check the accuracy of the arithmetic and, therefore, the resulting emissions estimates. Priority will be given to those categories identified as the largest emissions contributors.

For nonroad and onroad emissions estimates, sample calculations will only be used to verify allocation factors and use of emission factor calculations. The modeling runs themselves will not be checked with sample calculations because the emissions estimates are generated using

EPA-approved models. Rather, these data, which were generated by MDEQ modeling staff, will checked by comparing the results of similar modeling runs conducted for previous inventories (such as the 2000 Missoula CO inventory) to ensure the results are reasonable.

4.2.3 Standard Range Checks

Standard range checks address the data quality objective of comparability. The benefit is to identify the source categories that have the greatest change in emission levels from previous emission estimates. All data quality objectives are addressed using these checks.

The 2010 base year inventory will be compared to the most recent Missoula CO inventory (base year 2000). Any discrepancies (data outliers) will be verified or corrected.

4.2.4 Corrective Action Plan

Corrective and follow-up actions identified during the quality checking process will be noted and referred to the appropriate staff.

References

[1] C. Cain, "2000 Missoula, Montana, Carbon Monixide Emission Inventory," Montana Department of Environmental Quality, Helena, 2004.

[2] "Emission Inventory Improvement Program (EIIP)," Prepared by the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO), 1996.

[3] S. Coefield, "2010 Carbon Monoxide Emission Inventory Plan in Support of Missoula County's Limited Maintenance Plan for the Missoula Carbon Monoxide Maintenance Area," Missoula City-County Health Department, Missoula, 2015.

Appendix A: Map of CO Maintenance Area

Appendix B: Map of Missoula City Limits